Abstract
tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package tcolorbox can be used for the setting of \LaTeX{} examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.
<table>
<thead>
<tr>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.9 Transparency</td>
</tr>
<tr>
<td>4.10 Height Control</td>
</tr>
<tr>
<td>4.11 Box Content Additions</td>
</tr>
<tr>
<td>4.12 Overlays</td>
</tr>
<tr>
<td>4.13 Floating Objects</td>
</tr>
<tr>
<td>4.14 Embedding into the Surroundings</td>
</tr>
<tr>
<td>4.15 Bounding Box</td>
</tr>
<tr>
<td>4.15.1 Shifting Bounding Box Borders</td>
</tr>
<tr>
<td>4.15.2 Box Alignment</td>
</tr>
<tr>
<td>4.15.3 Toggle Enlargements</td>
</tr>
<tr>
<td>4.15.4 Spread Box to Page Borders</td>
</tr>
<tr>
<td>4.15.5 Box Extrusion</td>
</tr>
<tr>
<td>4.16 Layered Boxes and Every Box Settings</td>
</tr>
<tr>
<td>4.17 Capture Mode</td>
</tr>
<tr>
<td>4.18 Text Characteristics</td>
</tr>
<tr>
<td>4.19 Files</td>
</tr>
<tr>
<td>4.20 \tcolorbox Specials</td>
</tr>
<tr>
<td>4.21 Counters, Labels, and References</td>
</tr>
<tr>
<td>4.22 Even and Odd Pages</td>
</tr>
<tr>
<td>4.23 Externalization</td>
</tr>
<tr>
<td>4.24 Miscellaneous</td>
</tr>
<tr>
<td>5 Initialization Option Keys</td>
</tr>
<tr>
<td>5.1 Numbered Boxes</td>
</tr>
<tr>
<td>5.2 Lists of \tcolorbox es</td>
</tr>
<tr>
<td>6 Side by Side</td>
</tr>
<tr>
<td>6.1 Basic Settings</td>
</tr>
<tr>
<td>6.2 Advanced Settings</td>
</tr>
<tr>
<td>7 Saving and Loading of Verbatim Texts</td>
</tr>
<tr>
<td>8 Recording</td>
</tr>
<tr>
<td>8.1 Macros</td>
</tr>
<tr>
<td>8.2 Options</td>
</tr>
<tr>
<td>8.3 Example: Exercises</td>
</tr>
<tr>
<td>8.4 Example: Solutions</td>
</tr>
<tr>
<td>9 Technical Overview and Customization</td>
</tr>
<tr>
<td>9.1 Skins and Drawing Engines</td>
</tr>
<tr>
<td>9.2 Code Option Keys</td>
</tr>
<tr>
<td>9.3 Subskins</td>
</tr>
<tr>
<td>9.4 Drawing Scheme</td>
</tr>
<tr>
<td>9.5 Color Names</td>
</tr>
<tr>
<td>9.6 Useful Properties</td>
</tr>
<tr>
<td>10 Library</td>
</tr>
<tr>
<td>10.1 Style Option Keys</td>
</tr>
<tr>
<td>10.2 Boxed Title Option Keys</td>
</tr>
<tr>
<td>10.2.1 Boxed Title Placement</td>
</tr>
<tr>
<td>10.2.2 Options for the Boxed Title Placement</td>
</tr>
<tr>
<td>10.2.3 Options for the Boxed Title Box</td>
</tr>
</tbody>
</table>
## 16 Library \texttt{raster} \hspace{1cm} 308

16.1 Concept of Rasters ........................................... 308
16.2 Macros of the Library ........................................ 310
16.3 Option Keys of the Library ................................... 314
16.4 Adding Styles for Specific Boxes .............................. 320
16.5 Combining Columns or Rows .................................. 322
16.6 Rasters inside Rasters ......................................... 325
16.6.1 Raster Setup ............................................... 325
16.6.2 Placing Spaces ............................................. 326

## 17 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted} \hspace{1cm} 330

17.1 Loading the Libraries .......................................... 330
17.1.1 Loading \texttt{listings} ....................................... 330
17.1.2 Loading \texttt{listingsutf8} .................................. 330
17.1.3 Loading \texttt{minted} ........................................ 331
17.2 Common Macros of the Libraries ............................... 331
17.3 Producing \texttt{tcblisting} Environments ...................... 334
17.4 Producing \texttt{\textbackslash tcbinputlisting} Commands ....... 338
17.5 Option Keys of the \texttt{listings} Library ...................... 340
17.6 Option Keys of the \texttt{listingsutf8} Library ................. 342
17.7 Option Keys of the \texttt{minted} Library ...................... 343
17.8 Common Option Keys of all Libraries ......................... 345
17.9 Option Keys for Processing and Full Document Examples .... 355
17.10 Creation of \LaTeX Tutorials .................................. 362
17.11 Creation of \LaTeX Exercises ................................ 369
17.12 List of Exercises ............................................. 372
17.13 Solutions for the given \LaTeX Exercises .................... 373

## 18 Library \texttt{theorems} \hspace{1cm} 375

18.1 Macros of the Library .......................................... 375
18.2 Option Keys of the Library ................................... 379
18.3 Examples for Definitions and Theorems ....................... 395
18.4 Using other theorem environments with \texttt{tcolorbox} ....... 400

## 19 Library \texttt{breakable} \hspace{1cm} 401

19.1 Technical Overview ........................................... 401
19.2 Limitations and Known Bugs .................................. 402
19.3 Main Option Keys ............................................. 403
19.4 Option Keys for the Break Appearance ....................... 408
19.5 Extra Options for Partial Boxes ............................... 410
19.6 Breakable boxes and the \texttt{multicol} package ............... 413
19.7 Break Point Insertion ......................................... 416
19.8 Break Sequence for the Skins ................................ 417
19.9 Break by Hand (Faked Break) ................................ 427

## 20 Library \texttt{magazine} \hspace{1cm} 428

20.1 Creation and Resetting of Box Arrays ......................... 428
20.2 Storing Content ............................................... 429
20.3 Retrieving Content ............................................ 431
20.4 Box Dimensions ................................................ 434
20.5 Leaflet Example ............................................... 436
# Contents

21 Library poster 438
  21.1 Overview 438
  21.2 Main Poster Environment 439
  21.3 Poster Settings 441
  21.4 Coverage 442
  21.5 Common Box Settings 443
  21.6 Font Scaling 443
  21.7 Box Placement 444

22 Library fitting 452
  22.1 Macros of the Library 452
  22.2 Producing \tcbboxfit Commands 454
  22.3 Option Keys of the Library 457

23 Library hooks 466
  23.1 Concept of Hooks 466
  23.2 Box Content Additions 467
  23.3 Embedding into the Surroundings 469
  23.4 Overlays 470
  23.5 Watermarks 472
  23.6 Underlays 474
  23.7 Finishes 475
  23.8 Skin Code 475
  23.9 Extras 477
  23.10 Listings 477

24 Library xparse 478

25 Library external 479
  25.1 Preparation of a Document for Externalization 480
  25.2 Marking Externalization Snippets 481
  25.3 Customization 486
  25.4 Troubleshooting and FAQ 490

26 Library documentation 491
  26.1 Macros of the Library 491
  26.2 Entry Content Option Keys 505
  26.3 Entry Customization Option Keys 508
  26.4 General Customization Option Keys 513
  26.5 Language Option Keys 516
  26.6 Predefined Colors of the Library 517

A Picture Credits 518

References 519

Index 521
1 Introduction

The package originates from the first edition of my book «\LaTeX– Einführung in das Textsatzsystem» \cite{18} in about 2006. For the \LaTeX examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics \cite{19-21} as well. With this package, you are invited to apply these boxes for similar projects.

The breaking news for version 2.00 was the support for breakable boxes. This feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested “side by side” mode for listings has been added. With version 3.00, boxed titles are introduced together with improved customization options for overlays, underlays, finishes, and own code extensions.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.

1.1 Installation

Typically, \texttt{tcolorbox} will be installed as part of a major \LaTeX distribution and there is nothing special to do for a user.

If you intend to make a local installation \emph{by hand}, see the \texttt{README} file of the \texttt{tcolorbox} package for some hints. The short story is: you have to install not only \texttt{tcolorbox.sty}, but also all \texttt{*.code.tex} files in the local \texttt{texmf} tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} \cite{22}, \texttt{verbatim} \cite{17}, \texttt{etoolbox} \cite{7}, and \texttt{environ} \cite{16}. \texttt{tcolorbox} itself is loaded in the usual manner in the preamble:

\begin{verbatim}
\usepackage{tcolorbox}
\end{verbatim}

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with \texttt{\tcbuselibrary P.9} (see there). For example, the key to typeset listings is:

\begin{verbatim}
\usepackage[listings]{tcolorbox}
\end{verbatim}
1.3 Libraries

The base package \texttt{tcolorbox} is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

\begin{verbatim}
\tcbuselibrary{⟨key list⟩}
\end{verbatim}

Loads the libraries given by the \texttt{⟨key list⟩}.

\begin{verbatim}
\tcbuselibrary{listings, theorems}
\end{verbatim}

The following keys are used inside \texttt{\tcbuselibrary} respectively \texttt{\usepackage} without the key tree path /tcb/library/.

\begin{itemize}
\item \texttt{/tcb/library/skins} \hspace{1cm} \texttt{sims}
  
  Loads the package \texttt{tikz} \cite{tikz} and provides additional styles (skins) for the appearance of the colored boxes; see Section 10 from page 165.

\item \texttt{/tcb/library/vignette} \hspace{1cm} \texttt{vignette}
  
  Provides code for more ornamental; see Section 15 from page 295.

\item \texttt{/tcb/library/raster} \hspace{1cm} \texttt{raster}
  
  Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 16 from page 308.

\item \texttt{/tcb/library/listings} \hspace{1cm} \texttt{listings}
  
  Loads the package \texttt{listings} \cite{listings} and provides additional macros for typesetting listings which are described in Section 17 from page 330.

\item \texttt{/tcb/library/listingsutf8} \hspace{1cm} \texttt{listingsutf8}
  
  Loads the packages \texttt{listings} \cite{listings} and \texttt{listingsutf8} \cite{listingsutf8} for UTF-8 support. This is a variant of the library \texttt{listings} and is described in Section 17 from page 330.

\item \texttt{/tcb/library/minted} \hspace{1cm} \texttt{minted}
  
  Loads the package \texttt{minted} \cite{minted} to typeset listings with the Pygments \cite{pygments} tool, also see Section 17 on page 330.

\item \texttt{/tcb/library/theorems} \hspace{1cm} \texttt{theorems}
  
  Provides additional macros for typesetting theorems which are described in Section 18 from page 375.

\item \texttt{/tcb/library/breakable} \hspace{1cm} \texttt{breakable}
  
  Provides support for automatic box breaking from one page to another; see Section 19 on page 401.

\item \texttt{/tcb/library/magazine} \hspace{1cm} \texttt{magazine}
  
  Provides support for storing broken box parts to be used later or in interchanged order, Section 20 on page 428.

\item \texttt{/tcb/library/poster} \hspace{1cm} \texttt{poster}
  
  Provides support for creating posters, Section 21 on page 438.

\item \texttt{/tcb/library/fitting} \hspace{1cm} \texttt{fitting}
  
  Provides support for font size adaption of the box content to the box dimensions; see Section 22 from page 452.

\item \texttt{/tcb/library/hooks} \hspace{1cm} \texttt{hooks}
  
  Extends several option keys to “hookable” keys; see Section 23 from page 466.
\end{itemize}
/tcb/library/xparse

Loads \texttt{xparse} and is considered a legacy library kept for compatibility; see Section 24 from page 478.

/tcb/library/external

Provides externalization support for stand-alone document snippets, see Section 25 on page 479.

/tcb/library/documentation

Provides additional macros for typesetting \LaTeX{} documentations which are described in Section 26 from page 491.

/tcb/library/many

Loads the libraries \texttt{skins}, \texttt{breakable}, \texttt{raster}, \texttt{hooks}, \texttt{theorems}, and \texttt{fitting}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of typesetting listings and using the specialized \texttt{documentation} library.

/tcb/library/most

Loads all libraries except \texttt{minted}, \texttt{documentation}, and \texttt{xparse}. Use this shortcut, if you want to use all features of \texttt{tcolorbox} with exception of using the \texttt{minted} package and using the specialized \texttt{documentation} library.

/tcb/library/all

Loads all libraries. Use this shortcut only, if you intend to use the \texttt{documentation} library.
3 Macros for Box Creation

3.1 Using \texttt{tcolorbox} and \texttt{tcbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

creates the following compiled text box:

This is a \textbf{tcolorbox}.

The text content of the box can be divided in an upper and a lower part by the command \texttt{tcblower}. Visually, both parts are separated by a line. For example:

\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

This code gives the following box:

This is another \textbf{tcolorbox}.

Here, you see the lower part of the box.

The \texttt{(options)} control the appearance and several functions of the boxes, see Section 4 on page 23 for the complete list. A quick example is given here:

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,title=My nice heading]
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

My nice heading

This is another \textbf{tcolorbox}.

Here, you see the lower part of the box.

\texttt{tcblower}

Used inside \texttt{tcolorbox} to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see \texttt{tcbline} \textsuperscript{P. 230}.
\texttt{\tcbset}\{\textit{options}\}\}

Sets options for every following \texttt{tcolorbox} \footnote{P.12} inside the current \TeX\ group. By default, this does not apply to nested boxes, see Section 4.16 on page 102. For example, the colors of the boxes may be defined for the whole document by this:

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
\end{tcolorbox}

\texttt{\tcbsetforeverylayer}\{\textit{options}\}\}

Sets options for every following \texttt{tcolorbox} \footnote{P.12} inside the current \TeX\ group. In contrast to \texttt{\tcbset}, this does also apply to nested boxes, see Section 4.16 on page 102. Technically, the \textit{options} are appended to the default values for every \texttt{tcolorbox} which are applied by \texttt{/tcb/reset} \footnote{P.118}.

You should not use this macro, if you are not completely sure that you want to have the \textit{options} also for boxes in boxes (in boxes in boxes ...).

\begin{tcolorbox}[colback=green!10!white]
\begin{tcolorbox}[colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[colframe=red!75!black]
Note that this nested box has a red frame but no green background.
\end{tcolorbox}

Options given with \texttt{\tcbsetforeverylayer} survive a \texttt{\reset}.

All options for this box

This is a tcolorbox.

\begin{tcolorbox}
\begin{tcolorbox}
Note that this nested box has a red frame but no green background.
\end{tcolorbox}
\end{tcolorbox}
\tcbbox\{\textit{options}\}\{\textit{box content}\}

Creates a colored box which is fitted to the width of the given \textit{box content}. In principle, most \textit{options} for a \texttt{tcolorbox} \textsuperscript{P.12} can be used for \texttt{tcbbox} with some restrictions. A \texttt{tcbbox} cannot have a lower part and cannot be broken.

\begin{quote}
\texttt{\tcbset\{colframe=blue!50!black, colback=white, colupper=red!50!black, fonttitle=\bfseries, nobeforeafter, center title\}}
\end{quote}

Text \texttt{\tcbbox[tcbox raise base]\{Hello World\}\hfill}
\%
\texttt{\tcbbox[\texttt{left}=0\texttt{mm}, \texttt{right}=0\texttt{mm}, \texttt{top}=0\texttt{mm}, \texttt{bottom}=0\texttt{mm}, \texttt{boxsep}=0\texttt{mm}, toptitle=0.5\texttt{mm}, bottomtitle=0.5\texttt{mm}, title=My table\}\{\%}
\texttt{\arrayrulecolor{blue!50!black}\renewcommand{\arraystretch}{1.2}\%}
\texttt{\begin{tabular}{r|c|l}
One & Two & Three \ \hline\hline
Men & Mice & Lions \ \hline
Upper & Middle & Lower
\end{tabular}}\hfill
\%
\texttt{\tcbbox[\texttt{colback}=blue!85!black, \texttt{left}=0\texttt{mm}, \texttt{right}=0\texttt{mm}, \texttt{top}=0\texttt{mm}, \texttt{bottom}=0\texttt{mm}, \texttt{boxsep}=1\texttt{mm}, \texttt{arc}=0\texttt{mm}, \texttt{boxrule}=0.5\texttt{pt}, title=My picture\}\{\%
\texttt{\includegraphics[width=5\texttt{cm}]{Basilica_5.png}}\%

\begin{tabular}{|c|}
\hline
\texttt{\usepackage{tikz}}
\texttt{\tcbset\{colframe=blue!50!black, colback=white, colupper=red!50!black, fonttitle=\bfseries, center title\}}
\texttt{\% Fized width box}
\texttt{\begin{tcolorbox}\texttt{Hello\\textbackslash World!}\end{tcolorbox}}
\texttt{\% Fitted width box (like hbox or makebox)}
\texttt{\tcbbox\{Hello\\textbackslash World!\}}
\texttt{\% Fitted width box (using a \texttt{tikzname} node)}
\texttt{\tcbbox[tikznode]\{Hello\\textbackslash World!\}}
\end{tabular}
3.2 Producing \texttt{tcolorbox} Environments and Commands

\begin{verbatim}
\newtcolorbox[\init options]{\name}{\number}{\default}{\options}
\end{verbatim}

Creates a new environment \langle \name \rangle based on \texttt{tcolorbox} P.12. Basically, \texttt{\newtcolorbox} operates like \texttt{\newenvironment}. This means, the new environment \langle \name \rangle optionally takes \langle \number \rangle arguments, where \langle \default \rangle is the default value for the optional first argument. The \langle \options \rangle are given to the underlying \texttt{tcolorbox}. Note that /tcb/savedelimiter P.31 is set to the given \langle \name \rangle automatically. The \langle \init options \rangle allow setting up automatic numbering, see Section 5 from page 123.

\begin{verbatim}
\newtcolorbox{mybox}{colback=red!5!white, 
colframe=red!75!black}
\begin{mybox}
This is my own box.
\end{mybox}
\end{verbatim}

This is my own box.

\begin{verbatim}
\newtcolorbox{mybox}[1]{colback=red!5!white, 
colframe=red!75!black,fonttitle=\bfseries, 
title=\#1}
\begin{mybox}{Hello there}
This is my own box with a mandatory title.
\end{mybox}
\end{verbatim}

Hello there

\begin{verbatim}
\newtcolorbox{mybox}[2][]{colback=red!5!white, 
colframe=red!75!black,fonttitle=\bfseries, 
colbacktitle=red!85!black,enhanced, 
attach boxed title to top center={yshift=-2mm}, 
title=\#2,\#1}
\begin{mybox}[colback=yellow]{Hello there}
This is my own box with a mandatory title 
and options.
\end{mybox}
\end{verbatim}

Hello there

\begin{verbatim}
\newtcolorbox[pabox][auto counter,number within=section][]{\name}[2][]{\% 
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, 
title=Examp. \- \thetcbcounter: \#2,\#1}
\begin{pabox}[colback=yellow]{Hello there}
This is my own box with a mandatory 
numbered title and options.
\end{pabox}
\end{verbatim}

Examp. 3.1: Hello there

\begin{verbatim}
\renewtcolorbox[\init options]{\name}{\number}{\default}{\options}
\end{verbatim}

Operates like \texttt{\newtcolorbox}, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\DeclareTColorBox{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}

Creates a new environment ⟨name⟩ based on \texttt{tcolorbox} \textsuperscript{P.12}.

Basically, \texttt{\DeclareTColorBox} operates like \texttt{\DeclareDocumentEnvironment}. This means, the new environment ⟨name⟩ is constructed with the given argument ⟨specification⟩. The ⟨options⟩ are given to the underlying \texttt{tcolorbox} \textsuperscript{P.12}.

Note that /tcb/savedelimiter \textsuperscript{P.31} is set to the given ⟨name⟩ automatically.

The ⟨init options⟩ allow setting up automatic numbering, see Section 5 from page 123.

The new environment is always created, irrespective of an already existing environment with the same name.

\begin{verbatim}
% counter from previous example
\DeclareTColorBox[use counter from=pabox]{mybox}{O{red} m d"" !O{} }
{enhanced,colframe=#1!75!black,colback=#1!5!white,
 fonttitle=\bfseries,title={\thetcbcounter~#2},
 IfValueT={#3}{watermark text={#3}},#4}
\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{blue}{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{green}{My title}"My Watermark"
This is a tcolorbox.
\end{mybox}

\begin{mybox}{yellow}{My title}[colbacktitle=yellow!50!white,coltitle=black]
This is a tcolorbox.
\end{mybox}

\begin{mybox}{purple}{My title}"All together"[coltitle=yellow]
This is a tcolorbox.
\end{mybox}
\end{verbatim}

| 3.2 My title | This is a tcolorbox. |
| 3.3 My title | This is a tcolorbox. |
| 3.4 My title | This is a tcolorbox. | My Watermark |
| 3.5 My title | This is a tcolorbox. |
| 3.6 My title | This is a tcolorbox. | All together |
\NewTColorBox\{\(init\ options\)\}\{\(name\)\}\{\(specification\)\}\{\(options\)\}

Operates like \DeclareTColorBox\textsuperscript{P.16}, but based on \NewDocumentEnvironment instead of \DeclareDocumentEnvironment. An error is issued if \(name\) has already been defined.

\RenewTColorBox\{\(init\ options\)\}\{\(name\)\}\{\(specification\)\}\{\(options\)\}

Operates like \DeclareTColorBox\textsuperscript{P.16}, but based on \RenewDocumentEnvironment instead of \DeclareDocumentEnvironment. An existing environment is redefined.

\ProvideTColorBox\{\(init\ options\)\}\{\(name\)\}\{\(specification\)\}\{\(options\)\}

Operates like \DeclareTColorBox\textsuperscript{P.16}, but based on \ProvideDocumentEnvironment instead of \DeclareDocumentEnvironment. The environment \(name\) is only created if it is not already defined.
\DeclareTotalTColorBox[(init options)]{\langle name\rangle}{(specification)}{(options)}{(content)}

Creates a new command \langle name\rangle based on \texttt{tcolorbox} \textsuperscript{-P.12}. In contrast to \DeclareTColorBox \textsuperscript{-P.16}, also the \langle content\rangle of the \texttt{tcolorbox} is specified. Basically, \DeclareTotalTColorBox operates like \DeclareDocumentCommand. This means, the new command \langle name\rangle is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying \texttt{tcolorbox} \textsuperscript{-P.12} which is filled with the specified \langle content\rangle.

Note that /tcb/savedelimiter \textsuperscript{-P.31} is set to the given \langle name\rangle automatically. The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 123. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTColorBox{\diabox}{0}{v}{m}
{ bicolor,nobeforeafter,equal height group=diabox,width=5.7cm,
  fonttitle=\textbf{\ttfamily},adjusted title=\#2,center title,
  colframe=\textcolor{blue}{20!black},leftupper=0mm,rightupper=0mm,colback=\textcolor{black}{75!white},#1
  \tikz\path[fill zoom image=\#2](0,0)rectangle(\textwidth,4cm);%
\tcblower#3}
\end{verbatim}

\begin{verbatim}
\diabox{blueshade.png}{Created with GIMP.\
\url{http://www.gimp.org}}
\end{verbatim}

\begin{verbatim}
\diabox{goldshade.png}{Created with GIMP.\
\url{http://www.gimp.org}}
\end{verbatim}

\NewTotalTColorBox[(init options)]{\langle name\rangle}{(specification)}{(options)}{(content)}

Operates like \DeclareTotalTColorBox, but based on \texttt{NewDocumentCommand} instead of \DeclareDocumentCommand. An error is issued if \langle name\rangle has already been defined.

\RenewTotalTColorBox[(init options)]{\langle name\rangle}{(specification)}{(options)}{(content)}

Operates like \DeclareTotalTColorBox, but based on \texttt{RenewDocumentCommand} instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTColorBox[(init options)]{\langle name\rangle}{(specification)}{(options)}{(content)}

Operates like \DeclareTotalTColorBox, but based on \texttt{ProvideDocumentCommand} instead of \DeclareDocumentCommand. The command \langle name\rangle is only created if it is not already defined.
### 3.3 Producing \texttt{tcbox} Commands

\begin{verbatim}
\texttt{\newtcbox}[\langle init options \rangle]\{\langle name \rangle}\{\langle number \rangle\}\{\langle default \rangle\}\{\langle options \rangle\}
\end{verbatim}

Creates a new macro \texttt{\langle name \rangle} based on \texttt{tcbox} \textsuperscript{P.14}. Basically, \texttt{\newtcbox} operates like \texttt{\newcommand}. The new macro \texttt{\langle name \rangle} optionally takes \langle number \rangle+1 arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying \texttt{tcbox}. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 123.

\begin{verbatim}
\newtcbox{\mybox}{colback=red!5!white, colframe=red!75!black}
\mybox{This is my own box.}
\end{verbatim}

\begin{verbatim}
\newtcbox{\mybox}[1]{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\#1}
\mybox{Hello there}{This is my own box.}
\end{verbatim}

\begin{verbatim}
\newtcbox{\mybox}[2]\{colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries, title=\#2,\#1}
\mybox[\textcolor{yellow}]{Hello there}{This is my own box.}
\end{verbatim}

Definition in the preamble:

\begin{verbatim}
\newtcbox[\textit{use counter from previous example}]{\pbbox}[2]\{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=(\thetcbcounter) \#2,\#1}
\end{verbatim}

\begin{verbatim}
\pbbox[\textcolor{yellow}]{Hello there}{This is my own box.}
\end{verbatim}

\begin{verbatim}
\newtcbox{\mybox}[1][\textcolor{red}]{on line, arc=0pt,outer arc=0pt,colback=\textcolor{red}{}110!white,colframe=\textcolor{red}{}!50!black, boxsep=0pt,left=1pt,right=1pt,top=2pt,bottom=2pt, boxrule=0pt,bottomrule=1pt,toprule=1pt}
\newtcbox{\xmybox}[1][\textcolor{red}]{on line, arc=7pt,colback=\textcolor{red}{}110!white,colframe=\textcolor{red}{}!50!black, before upper={\rule[-3pt]{0pt}{10pt}},boxrule=1pt, boxsep=0pt,left=6pt,right=6pt,top=2pt,bottom=2pt}
\end{verbatim}

The \texttt{\mybox[\textcolor{green}]{quick} brown \mybox[\textcolor{blue}]{fox} \mybox[\textcolor{blue}]{jumps} over the \mybox[\textcolor{green}]{lazy} \mybox[\textcolor{dog}]{dog}}. \texttt{\par}

The \texttt{\mybox[\textcolor{green}]{quick} brown \xmybox[\textcolor{fox}]{fox} \xmybox[\textcolor{blue}]{jumps} over the \xmybox[\textcolor{green}]{lazy} \xmybox[\textcolor{dog}]{dog}}.

The \texttt{quick brown fox jumps over the lazy dog}. The \texttt{quick brown fox jumps over the lazy dog}.
\renewtcbox\{\langle\textit{init options}\rangle\}{\langle\textit{name}\rangle\langle\textit{number}\rangle\langle\textit{default}\rangle\langle\textit{options}\rangle\}

Operates like \newtcbox\footnote{P.19}, but based on \renewcommand instead of \newcommand. An existing macro is redefined.

\DeclareTCBox\{\langle\textit{init options}\rangle\}{\langle\textit{name}\rangle\langle\textit{specification}\rangle\langle\textit{options}\rangle\}

Creates a new command \langle\textit{name}\rangle based on \tcbox\footnote{P.14}. Basically, \DeclareTCBox operates like \DeclareDocumentCommand. This means, the new command \langle\textit{name}\rangle is constructed with the given argument \langle\textit{specification}\rangle. The \langle\textit{options}\rangle are given to the underlying \tcbox\footnote{P.14}.

Note that /tcb/savedelimiter\footnote{P.31} is set to the given \langle\textit{name}\rangle automatically.

The \langle\textit{init options}\rangle allow setting up automatic numbering, see Section 5 from page 123. The new command is always created, irrespective of an already existing command with the same name.

\% counter from previous example
\setcounter{pabox}{3}
\renewcommand\thesection{Box \thepbox}
\setcounter{pbox}{3}
\renewcommand\thesubsection{Box \pbox}

\renewcommand\pbox{\arabic{pbox}}
\renewcommand\section{Box \arabic{section}}
\renewcommand\subsection{Box \arabic{subsection}}
\renewcommand\paragraph{Box \arabic{paragraph}}
\renewcommand\subparagraph{Box \arabic{subparagraph}}
\renewcommand\subsubparagraph{Box \arabic{subsubparagraph}}
\renewcommand\subsubsubparagraph{Box \arabic{subsubsubparagraph}}
\renewcommand\subsubsubsubparagraph{Box \arabic{subsubsubsubparagraph}}
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\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
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\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}
\renewcommand\subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph{Box \arabic{subsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubsubparagraph}}

\% counter from previous example
\DeclareTCBox[use counter from=pabox]{{mybox}\{s m s\}}
\{nobeforeafter,colback=red!5!white,colframe=red!75!black,
title={#2 (Box \getpbox)},fonttitle=\bfseries,
IfBooleanT={#1}{enhanced,drop shadow},
IfBooleanT={#3}{colbacktitle=red!50!white} \}

\mybox{Bird}{This is my first box.}
\hspace{1cm}
\mybox*[Tree]{This is my second box.}
\par\bigskip
\mybox{Bike}{This is my third box.}
\hspace{1cm}
\mybox*[City]{This is my fourth box.}

\NewTCBox\{\langle\textit{init options}\rangle\}{\langle\textit{name}\rangle\langle\textit{specification}\rangle\langle\textit{options}\rangle\}

Operates like \DeclareTCBox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle\textit{name}\rangle has already been defined.

\RenewTCBox\{\langle\textit{init options}\rangle\}{\langle\textit{name}\rangle\langle\textit{specification}\rangle\langle\textit{options}\rangle\}

Operates like \DeclareTCBox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTCBox\{\langle\textit{init options}\rangle\}{\langle\textit{name}\rangle\langle\textit{specification}\rangle\langle\textit{options}\rangle\}

Operates like \DeclareTCBox, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle\textit{name}\rangle is only created if it is not already defined.
\DeclareTotalTCBox\{
\langle init options \rangle \}{
\langle name \rangle \} \{\langle specification \rangle \} \{\langle options \rangle \} \{\langle content \rangle \}

Creates a new command \langle name \rangle based on \tcbox \textsuperscript{P.14}. In contrast to \DeclareTCBox \textsuperscript{P.20}, also the \langle content \rangle of the \tcbox is specified.

Basically, \DeclareTotalTCBox operates like \DeclareDocumentCommand. This means, the new command \langle name \rangle is constructed with the given argument \langle specification \rangle. The \langle options \rangle are given to the underlying \tcbox \textsuperscript{P.14} which is filled with the specified \langle content \rangle.

Note that /tcb/savedelimiter \textsuperscript{P.31} is set to the given \langle name \rangle automatically.

The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 123. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\fontupper=\ttfamily,nobeforeafter,tcbox raise base,arc=0pt,outer arc=0pt, top=0pt,bottom=0pt,left=0mm,right=0mm, leftrule=0pt,rightrule=0pt,toprule=0.3mm,bottomrule=0.3mm,boxsep=0.5mm, colback=#1!10!white,colframe=#1!50!black,#3}{#2}
\end{verbatim}

To set a word \textbf{bold} in \LaTeX, use \texttt{\textbf{bold}}. Alternatively, write \texttt{\bfseries bold}.

In \LaTeX, other font settings are done in the same way, e.g. \texttt{\textit}, \texttt{\itshape} or \texttt{\texttt}, \texttt{\ttfamily}.

To set a word \textbf{bold} in \LaTeX, use \texttt{\textbf{bold}}. Alternatively, write \texttt{\bfseries bold}. In \LaTeX, other font settings are done in the same way, e.g. \texttt{\textit}, \texttt{\itshape}

or \texttt{\ttfamily}.

The next example uses \texttt{\listinline} from the \texttt{listings} package to typeset the verbatim content.

\begin{verbatim}
% \usepackage{listings} or \tcbuselibrary{listings}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanT{#1}{\textcolor{red}{\ttfamily\bfseries > }}\%\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}}
\end{verbatim}

\texttt{\commandbox*{cd "My Documents"}} changes to directory \texttt{\commandbox{My Documents}}.

\texttt{\commandbox*{dir /A}} lists the directory content.

\texttt{\commandbox*{copy example.txt d:\target}} copies \texttt{\commandbox{example.txt}} to \texttt{\commandbox{d:\target}}.

\begin{verbatim}
> cd "My Documents" changes to directory My Documents.
> dir /A lists the directory content.
> copy example.txt d:\target copies example.txt to d:\target.
\end{verbatim}
\NewTotalTCBox\{\langle init options\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Operates like \DeclareTotalTCBox\{P.21}, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name\rangle has already been defined.

\RenewTotalTCBox\{\langle init options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Operates like \DeclareTotalTCBox\{P.21}, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTCBox\{\langle init options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Operates like \DeclareTotalTCBox\{P.21}, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle name\rangle is only created if it is not already defined.

\tcboxverb\{\langle options\rangle\}\{\langle verbatim box content\rangle\}

Creates a colored box based on \tcbox\{P.14\} which is fitted to the width of the given \langle verbatim box content\rangle. The underlying \tcbox\{P.14\} is styled with /tcb/verbatim\{P.108\} plus the given \langle options\rangle. The difference to \tcbox\{P.14\} is that the \langle verbatim box content\rangle is interpreted verbatim. Therefore, \tcboxverb acts similar to \verb.

\tcboxverb\{\LaTeX\}, \tcboxverb\{colback=blue!10!white, colupper=blue\}\{\LaTeX\}, \tcboxverb\{blank, fuzzy halo\}\{\LaTeX\}, \tcboxverb\{beamer\}\{\LaTeX\}, \tcboxverb\{enhanced, skin=enhancedmiddle jigsaw, colframe=red\}\{\LaTeX\}.

3.4 Redefining other Environments (Wrapping with tcolorbox)

\tcolorboxenvironment\{\langle name\rangle\}\{\langle options\rangle\}

An existing environment \langle name\rangle is redefined to be boxed inside a tcolorbox with the given \langle options\rangle.

\% tcbuselibrary{skins}
\newenvironment{myitemize}{% \egin{itemize}}{\end{itemize}}
\tcolorboxenvironment{myitemize}{blanker, before skip=6pt, after skip=6pt, borderline west={3mm}{0pt}{red}}

Some text.
\begin{myitemize}
\item Alpha
\item Beta
\item Gamma
\end{myitemize}

More text.

See further examples in Section 18.4 on page 400.
4 Option Keys

For the \textit{options} in \texttt{tcolorbox} \textsuperscript{P.12} respectively \texttt{\tcbset} \textsuperscript{P.13} the following \texttt{pgf} keys can be applied. The key tree path /\texttt{tcb}/ is not to be used inside these macros. It is easy to add your own style keys using the syntax for \texttt{pgf} keys, see \texttt{[18, 22]} or the examples starting from page 362.

4.1 Title

/\texttt{tcb/title}=⟨\texttt{text}⟩ (no default, initially empty)

Creates a heading line with ⟨\texttt{text}⟩ as content.

\begin{tcolorbox}[title=My heading line]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My heading line
This is a \textcolor{black}{tcolorbox}.

/\texttt{tcb/notitle} (no value, initially set)

Removes the title line if set before.

/\texttt{tcb/adjusted title}=⟨\texttt{text}⟩ (style, no default, initially unset)

Creates a heading line with ⟨\texttt{text}⟩ as content. The minimal height of this line is adjusted to fit the text given by /\texttt{tcb/adjust text}. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

/\texttt{tcb/adjust text}=⟨\texttt{text}⟩ (no default, initially Äpgjy)

This sets the reference text for /\texttt{tcb/adjusted title}. If your texts never exceed “Äpgjy” in depth and height you don’t need to care about this option.
/tcb/squeezed title=(text) (style, no default, initially unset)

Creates a single heading line with \textit{(text)} as content. If the \textit{(text)} is longer than the available space, the text is squeezed to fit into the available space.

\begin{tcbitemize}[raster columns=3,raster equal height,\textcolor{red!75}{\textcolor{black}}\textcolor{red!5}{white},\textbf{fonttitle=bfseries}]
\tcbitem[squeezed title={Short title}] First box
\tcbitem[squeezed title={This is a very very long title}] Second box
\tcbitem[squeezed title={This title is clearly too long for this application}] Third box
\end{tcbitemize}

/tcb/squeezed title*=\textit{(text)} (style, no default, initially unset)

This is a combination of \textit{/tcb/adjusted title} \cite{P.23} and \textit{/tcb/squeezed title}.

\begin{tcbitemize}[raster columns=3,raster equal height,\textcolor{red!75}{\textcolor{black}}\textcolor{red!5}{white},\textbf{fonttitle=bfseries}]
\tcbitem[squeezed title*={Short title}] First box
\tcbitem[squeezed title*={This is a very very long title}] Second box
\tcbitem[squeezed title*={This title is clearly too long for this application}] Third box
\end{tcbitemize}

/tcb/titlebox=\textit{(mode)} (no default, initially visible)

Controls the treatment of the title part of the box. Feasible values for \textit{(mode)} are:
- \texttt{visible}: usual type setting of the title box,
- \texttt{invisible}: empty space instead of the title contents.

\begin{tcolorbox}[title=My invisible title,\texttt{titlebox=invisible}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}. 24
/tcb/detach title (no value)
Detaches the title from its normal position. The text of the title is stored into \tcbtitletext and the formatted title is available by \tcbttitle. The main application is to move the title from its usual place to another one.

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title,before upper=\tcbtitle\quad]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[detach title,after upper=\par\hfill\tcbtitle]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title
This is a \textbf{tcolorbox}.

My title
This is a \textbf{tcolorbox}.

My title
This is a \textbf{tcolorbox}.

/tcb/attach title (no value)
Attaches the title to its normal position. This option is used to reverse /tcb/detach title.

\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper={---}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

\begin{mybox}[attach title to upper,after title={:}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title — This is a \textbf{tcolorbox}.

My title: This is a \textbf{tcolorbox}.

More title options are documented in Section 4.11 on page 69 and Section 10.2 on page 172.
4.2 Subtitle

Inside the box content, one or more subtitles can be added. In general, a subtitle is a further `tcolorbox` which inherits some color and geometry options from the enclosing box. It may be customized just like any other `tcolorbox`.

\[\text{\texttt{\textbackslash tcsbSubtitle}}[(\textit{options})](\textit{text})\]

Used inside a `tcolorbox` to add a subtitle box with the given \(\langle\textit{text}\rangle\). This is an independent `tcolorbox` which is formatted by several inherited properties of the enclosing box, by further settings from `/tcb/subtitle style`, and by the given \(\langle\textit{options}\rangle\).

```latex
\begin{tcolorbox}[title=My title,  
colback=red!5!white,  
colframe=red!75!black,  
fonttitle=\textbf\]
This is a \texttt{tcolorbox}.
\ \texttt{tcsbSubtitle}[\texttt{before skip=\texttt{\baselineskip}}]\% 
\texttt{\texttt{My subtitle}}
\texttt{Further text.}
\end{tcolorbox}
```

\[\begin{tcolorbox}[title=My title,  
colback=red!5!white,  
colframe=red!75!black,  
colbacktitle=yellow!50!red,  
coltitle=red!25!black,  
fonttitle=\textbf\]
This is a \texttt{tcolorbox}.
\ \texttt{tcsbSubtitle}[\texttt{before skip=\texttt{\baselineskip}}]\% 
\texttt{\texttt{My subtitle}}
\texttt{Further text.}
\end{tcolorbox}

\[/tcb/subtitle style=(\textit{options})\]

(no default, initially empty)

Adds `tcolorbox \langle\textit{options}\rangle` to the settings for `\texttt{tcsbSubtitle}`.

```latex
\begin{tcolorbox}[title=My title,  
colback=red!5!white,  
colframe=red!75!black,  
colbacktitle=yellow!50!red,  
coltitle=red!25!black,  
fonttitle=\textbf,  
subtitle style={boxrule=0.4pt,  
colback=yellow!50!red!25!white}]
This is a \texttt{tcolorbox}.
\ \texttt{tcsbSubtitle}\{\texttt{My subtitle}\}
\texttt{Further text.}
\texttt{tcsbSubtitle}\{\texttt{Second subtitle}\}
\texttt{Further text.}
\end{tcolorbox}
```
4.3 Upper Part

The text content of a \texttt{tcolorbox} may be parted into a mandatory \textit{upper part} and an optional \textit{lower part}. These parts are separated by \texttt{tcblower}. If there is no \texttt{tcblower}, there is no \textit{lower part} and the \textit{upper part} forms the complete text content.

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}
\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\tcblower
This is the lower part.
\end{tcolorbox}

\texttt{/tcb/upperbox=(mode)} \hfill \texttt{(no default, initially visible)}

Controls the treatment of the upper part of the box. If there is no lower part, this is the complete text content. Feasible values for \texttt{(mode)} are:

- \texttt{visible}: usual type setting of the upper part,
- \texttt{invisible}: empty space instead of the upper part contents.

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\texttt{/tcb/visible} \hfill \texttt{(style, no value)}

Shortcut for setting \texttt{/tcb/upperbox}, \texttt{/tcb/lowerbox}, and \texttt{/tcb/titlebox} to be \texttt{visible}.

\texttt{/tcb/invisible} \hfill \texttt{(style, no value)}

Shortcut for setting \texttt{/tcb/upperbox}, \texttt{/tcb/lowerbox}, and \texttt{/tcb/titlebox} to be \texttt{invisible}.
/tcb/saveto=file name

Saves the content of the box into a file for an optional later usage. This is the counterpart of /tcb/savelowerto \textsuperscript{P.29}, but is saves not only the upper part but the whole content. If a lower part is present, it is also saved including \textsuperscript{P.12}.

\textbf{Note:} This option cannot be combined with /tcb/savelowerto \textsuperscript{P.29}.

\begin{tcolorbox}[invisible,saveto=\jobname_mysave1.tex,colback=white]
This is a \textbf{tcolorbox} which seems to be empty. The content is saved for later usage.
\end{tcolorbox}

Now, we load the saved text:\
\input{\jobname_mysave1.tex}

\begin{tcolorbox}[saveto=\jobname_mysave2.tex]
This is a \textbf{tcolorbox}.
\textbf{tcblower}
This is the lower part.
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10,coltitle=black,colbacktitle=red!20,sidebyside,title=Here we see the saved content including the lower part]
\input{\jobname_mysave2.tex}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part.
4.4 Lower Part

/tcb/lowerbox=⟨mode⟩ \hfill (no default, initially visible)

Controls the treatment of the lower part of the box. Feasible values for ⟨mode⟩ are:

- **visible**: usual type setting of the lower part,
- **invisible**: empty space instead of the lower part contents,
- **ignored**: the lower part is not used (here).

The last two values are usually applied in connection with `savelowerto`.

\begin{tcolorbox}
[lowerbox=invisible,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}
[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but ignored).
\end{tcolorbox}

/tcb/savelowerto=⟨file name⟩ \hfill (no default, initially empty)

Saves the content of the lower part into a file for an optional later usage.

\begin{tcolorbox}
[lowerbox=invisible,savelowerto=\jobname_bspsave.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex:
\[ f(x) = \frac{1+x^2}{1-x^2} \].
\end{tcolorbox}

Now, we load the saved text:\
\input{\jobname_bspsave.tex}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Now, we load the saved text:
This is the lower part which may be quite complex: \( f(x) = \frac{1 + x^2}{1 - x^2} \).
\texttt{/tcb/lower\ separated=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{true})

If set to \texttt{true}, the lower part is visually separated from the upper part. It depends on the chosen skin how the visualization of the separation is done.
/tcb/savedelimiter={name} \hspace{1cm} (no default, initially \texttt{tcolorbox})

Used in connection with new environment definitions which extend \texttt{tcolorbox} and use or allow the option \texttt{savelowerto}. To catch the end of the new box environment \texttt{(name)} has to be the name of this environment. Additionally, the environment definition has to use \texttt{\textbackslash tcolorbox} instead of \texttt{\begin{tcolorbox}} and \texttt{\end{tcolorbox}} instead of \texttt{\end{tcolorbox}}.

\begin{tcolorbox}
\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}
\end{tcolorbox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}

My Example

Upper part.

Now, the saved part is used:

Saved lower part!

The \texttt{savedelimiter} is used implicitly with \texttt{\newtcolorbox} \cite{P.15} which allows a more convenient usage:

\begin{tcolorbox}
\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}
\end{tcolorbox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}

My Example

Upper part.

Now, the saved part is used:

Saved lower part!
4.5 Colors and Fonts

/tcb/colframe=⟨color⟩  (no default, initially black!75!white)
Sets the frame ⟨color⟩ of the box.

\begin{tcolorbox}[colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/tcb/colback=⟨color⟩  (no default, initially black!5!white)
Sets the background ⟨color⟩ of the box.

\begin{tcolorbox}[colback=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

Also see /tcb/colbacklower→P.241 of the \texttt{\textsc{lib}} skins library.

/tcb/title filled=true|false  (default true, initially false)
Switches the drawing of the title background according to the given value. This option is set to true automatically by /tcb/colbacktitle, /tcb/opacitybacktitle→P.56, and /tcb/title style→P.168, and /tcb/title code→P.156.

\begin{tcolorbox}[title=My title,title filled]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a tcolorbox.

\begin{tcolorbox}[title=My title,title filled=false]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a tcolorbox.

/tcb/colbacktitle=⟨color⟩  (no default, initially black!50!white)
Sets the background ⟨color⟩ of the title area of the box.

\begin{tcolorbox}[colbacktitle=red!50!white,title=My title,coltitle=black,fonttitle=bfsseries]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a tcolorbox.
/tcb/colupper=(color) (no default, initially black)

Sets the text (color) of the upper part.

\begin{tcolorbox}[colupper=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/collower=(color) (no default, initially black)

Sets the text (color) of the lower part.

\begin{tcolorbox}[collower=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/coltext=(color) (style, no default, initially black)

Sets the text (color) of the box. This is an abbreviation for setting colupper and collower to the same value.

\begin{tcolorbox}[coltext=red!75!black]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/coltitle=(color) (no default, initially white)

Sets the title text (color) of the box.

\begin{tcolorbox}[coltitle=red!75!black, colbacktitle=black!10!white,title=Test]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Test
This is a \textbf{tcolorbox}. 

33
Sets \texttt{(text)} before the content of the upper part (e.g. font settings).

\begin{tcolorbox}\[fontupper=Hello!\sffamily\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Hello! This is a \texttt{tcolorbox}.

Sets \texttt{(text)} before the content of the lower part (e.g. font settings).

\begin{tcolorbox}\[fontlower=sffamily\bfseries\]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
This is a \texttt{tcolorbox}.
This is the lower part.

Sets \texttt{(text)} before the content of the title text (e.g. font settings).

\begin{tcolorbox}\[fonttitle=sffamily\bfseries\large,title=Hello\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Hello
This is a \texttt{tcolorbox}.

More color options are provided by using skins documented in Section 10 from page 165.
4.6 Text Alignment

\texttt{/tcb/halign=(alignment)}

(no default, initially justify)

If there is no lower part, \texttt{halign} determines the horizontal \langle alignment \rangle of the text content. Otherwise, \texttt{halign} determines the horizontal \langle alignment \rangle of the upper part of the box only. The feasible values for \langle alignment \rangle are more or less identical to the corresponding \texttt{/tikz/align} settings, even if the implementation differs.

- \texttt{justify}: usual left and right justified type setting.
- \texttt{left}: left border justification in analogy to \texttt{plain} \texttt{tex}.
- \texttt{flush left}: left border justification with \texttt{raggedright} of \texttt{IATEX}.
- \texttt{right}: right border justification in analogy to \texttt{plain} \texttt{tex}.
- \texttt{flush right}: right border justification with \texttt{raggedleft} of \texttt{IATEX}.
- \texttt{center}: centering in analogy to \texttt{plain} \texttt{tex}.
- \texttt{flush center}: centering with \texttt{centering} of \texttt{IATEX}.

The differences between the flush and non-flush version are explained in detail in the \texttt{TiKZ} manual [22]. The short story is that the non-flush versions will often look more balanced but with more hyphenations.

\begin{tcolorbox}
[adjusted title=flush center,halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}
[adjusted title=flush left,halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}
[adjusted title=flush right,halign=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}
[adjusted title=center,halign=center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}
[adjusted title=left,halign=left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\begin{tcolorbox}
[adjusted title=right,halign upper=right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}

\texttt{/tcb/halign upper=(alignment)}

(no default, initially justify)

Alias for \texttt{/tcb/halign}.
\texttt{/tcb/halign lower=(alignment)} (no default, initially \texttt{justify})

\texttt{halign lower} determines the horizontal \texttt{(alignment)} of the lower part of the box. The feasible values for \texttt{(alignment)} are the same as for /tcb/halign \textsuperscript{\textit{P.35}}.

\begin{tcbraster}[raster columns=3,fonttitle=\bfseries, colback=red!5!white,colframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign lower=flush center]
  Upper part. \texttt{tcblower} Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign lower=flush left]
  Upper part. \texttt{tcblower} Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign lower=flush right]
  Upper part. \texttt{tcblower} Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign lower=center]
  Upper part. \texttt{tcblower} Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign lower=left]
  Upper part. \texttt{tcblower} Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign lower=right]
  Upper part. \texttt{tcblower} Lower part.
\end{tcolorbox}
\end{tcbraster}
/tcb/halign title=⟨alignment⟩  (no default, initially justify)

halign lower determines the horizontal ⟨alignment⟩ of the title of the box. The feasible values for ⟨alignment⟩ are the same as for /tcb/halign ¹.³⁵.

\begin{tcbraster}[raster columns=3,fonttitle=\bfseries, colback=red!5!white,colframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign title=flush center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign title=flush left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign title=flush right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign title=center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign title=left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign title=right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}

\begin{flushcenter}
This is a \textbf{tcolorbox}.
\end{flushcenter}

\begin{flushleft}
This is a \textbf{tcolorbox}.
\end{flushleft}

\begin{flushright}
This is a \textbf{tcolorbox}.
\end{flushright}

\begin{center}
This is a \textbf{tcolorbox}.
\end{center}

\begin{left}
This is a \textbf{tcolorbox}.
\end{left}

\begin{right}
This is a \textbf{tcolorbox}.
\end{right}

/tcb/flushleft upper  (style, no value)
Shortcut for setting /tcb/halign ¹.³⁵ to flush left.

/tcb/center upper  (style, no value)
Shortcut for setting /tcb/halign ¹.³⁵ to flush center.

/tcb/flushright upper  (style, no value)
Shortcut for setting /tcb/halign ¹.³⁵ to flush right.

/tcb/flushleft lower  (style, no value)
Shortcut for setting /tcb/halign lower ¹.³⁶ to flush left.

/tcb/center lower  (style, no value)
Shortcut for setting /tcb/halign lower ¹.³⁶ to flush center.

/tcb/flushright lower  (style, no value)
Shortcut for setting /tcb/halign lower ¹.³⁶ to flush right.
Shortcut for setting \texttt{/tcb/halign title} to \texttt{flush left}.

Shortcut for setting \texttt{/tcb/halign title} to \texttt{flush center}.

Shortcut for setting \texttt{/tcb/halign title} to \texttt{flush right}.

The vertical alignment settings are only relevant for boxes which are larger than their natural height, see Section 4.10 on page 58.

\texttt{/tcb/valign\langle\textit{alignment}\rangle} \hspace{2cm} (no default, initially \texttt{top})

If the height of a \texttt{tcolorbox} is not the natural height, \texttt{valign} determines the vertical \texttt{\langle\textit{alignment}\rangle} of the upper part. Feasible values are:

- \texttt{top}: Anchor text at top.
- \texttt{center}: Anchor text at center.
- \texttt{bottom}: Anchor text at bottom.
- \texttt{scale}: Scale text vertically to fit into the available space. This is brutal and may not look very good. Consider Section 22 on page 452 alternatively.
- \texttt{scale*}: Like \texttt{scale}, but scaling is bounded by \texttt{/tcb/valign scale limit}.

For a box with natural height, these settings are meaningless.

\begin{verbatim}
\tcbset{width=(\linewidth-2mm)/4,before=,after=\hfill, colframe=blue!75!black,colback=white,height=2cm}
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign] This is a \textbf{tcolorbox}. \end{tcolorbox}}
\end{verbatim}

\texttt{/tcb/valign upper\langle\textit{alignment}\rangle} \hspace{2cm} (no default, initially \texttt{top})

Alias for \texttt{/tcb/valign}.

\texttt{/tcb/valign lower\langle\textit{alignment}\rangle} \hspace{2cm} (no default, initially \texttt{top})

This key has the same meaning for the lower part as \texttt{valign} for the upper part, i.e., it determines the vertical \texttt{\langle\textit{alignment}\rangle} of the lower part with feasible values \texttt{top, center, bottom, scale, and scale*}.

\texttt{/tcb/valign scale limit\langle\textit{real number}\rangle} \hspace{2cm} (no default, initially 1.1)

Sets an upper scale limit for the \texttt{scale*} setting in \texttt{/tcb/valign} and \texttt{/tcb/valign lower}. Note that this value is not reset by \texttt{/tcb/reset}. So, changes also apply to embedded boxes.

Also see \texttt{/tcb/sidebyside align} for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

\texttt{/tcb/width=(length)} \hspace{1em} \text{(no default, initially } \texttt{\linewidth})

Sets the total width of the colored box to \texttt{⟨length⟩}. See also \texttt{/tcb/height} \textsuperscript{−P.58}.

\begin{tcolorbox}
\texttt{\tcbset{colback=red!5!white, colframe=red!75!black}}
\begin{tcolorbox}[width=\linewidth/2] This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\texttt{/tcb/text width=(length)} \hspace{1em} \text{(style, no default)}

Sets the text width of the upper part to \texttt{⟨length⟩}. See also \texttt{/tcb/text height} \textsuperscript{−P.59}.

\begin{tcolorbox}
\texttt{\tcbset{colback=red!5!white, colframe=red!75!black}}
\begin{tcolorbox}[text width=4cm] This is a \texttt{\textbf{tcolorbox}} where the text has a width of 4cm.
\end{tcolorbox}
\end{tcolorbox}

This is a \texttt{tcolorbox} where the text has a width of 4cm.

\texttt{/tcb/add to width=(length)} \hspace{1em} \text{(style, no default)}

Adds \texttt{⟨length⟩} to the current total width of the colored box.

\begin{tcolorbox}
\texttt{\tcbset{width=4cm, colback=red!5!white, colframe=red!75!black}}
\begin{tcolorbox}
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\begin{tcolorbox}[add to width=1cm]
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}
\end{tcolorbox}

This is a \texttt{tcolorbox}.

This is a \texttt{tcolorbox}.

See Section 4.10 on page 58 for setting fixed height values.
4.7.2 Rules

\texttt{/tcb/toprule=(\textit{length})} (no default, initially 0.5mm)
Sets the line width of the top rule to \textit{(length)}.

\begin{tcolorbox} \[ \text{\texttt{tcbset}}\{\text{colback=red!5!white, colframe=red!75!black}\} \]
\begin{tcolorbox} [toprule=3mm] \text{This is a \texttt{tcolorbox}.} \end{tcolorbox} \end{tcolorbox}

\begin{tcolorbox}[toprule=3mm]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/bottomrule=(\textit{length})} (no default, initially 0.5mm)
Sets the line width of the bottom rule to \textit{(length)}.

\begin{tcolorbox} \[ \text{\texttt{tcbset}}\{\text{colback=red!5!white, colframe=red!75!black}\} \]
\begin{tcolorbox} [bottomrule=3mm] \text{This is a \texttt{tcolorbox}.} \end{tcolorbox} \end{tcolorbox}

\begin{tcolorbox}[bottomrule=3mm]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/leftrule=(\textit{length})} (no default, initially 0.5mm)
Sets the line width of the left rule to \textit{(length)}.

\begin{tcolorbox} \[ \text{\texttt{tcbset}}\{\text{colback=red!5!white, colframe=red!75!black}\} \]
\begin{tcolorbox} [leftrule=3mm] \text{This is a \texttt{tcolorbox}.} \end{tcolorbox} \end{tcolorbox}

\begin{tcolorbox}[leftrule=3mm]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/rightrule=(\textit{length})} (no default, initially 0.5mm)
Sets the line width of the right rule to \textit{(length)}.

\begin{tcolorbox} \[ \text{\texttt{tcbset}}\{\text{colback=red!5!white, colframe=red!75!black}\} \]
\begin{tcolorbox} [rightrule=3mm] \text{This is a \texttt{tcolorbox}.} \end{tcolorbox} \end{tcolorbox}

\begin{tcolorbox}[rightrule=3mm]
This is a tcolorbox.
\end{tcolorbox}
\texttt{/tcb/titlerule=\langle length \rangle} \hspace{1cm} \text{(no default, initially 0.5mm)}

Sets the line width of the rule below the title to \langle length \rangle.

\begin{tcolorbox}[titlerule=3mm,title=This is the title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/boxrule=\langle length \rangle} \hspace{1cm} \text{(style, no default, initially 0.5mm)}

Sets all rules of the frame to \langle length \rangle, i.e. \texttt{/tcb/toprule\rightarrow P.40}, \texttt{/tcb/bottomrule\rightarrow P.40}, \texttt{/tcb/leftrule\rightarrow P.40}, \texttt{/tcb/rightrule\rightarrow P.40}, and \texttt{/tcb/titlerule}.

\begin{tcolorbox}[boxrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

More options for drawing a \texttt{/tcb/borderline\rightarrow P.195} are provided by using skins documented in Section 10 from page 165.

\subsection*{4.7.3 Arcs}

\texttt{/tcb/arc=\langle length \rangle} \hspace{1cm} \text{(no default, initially 1mm)}

Sets the inner radius of the four frame arcs to \langle length \rangle.

\begin{tcolorbox}[arc=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
Sets `/tcb/arc` to match the half of the inner width of the colored box. If width and height of the box are identical, this gives a circle.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center,valign=center, square,circular arc]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

If the height of the box is smaller than the width, the result will look quite ugly.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center,valign=center, square,circular arc]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Sets `/tcb/arc` to match the smaller value of the half of the inner width and of the inner height of the colored box.

\begin{tcolorbox}[width=3cm,height=2cm, bean arc]
Box A
\end{tcolorbox}

\begin{tcolorbox}[width=2cm,height=3cm, bean arc]
Box B
\end{tcolorbox}

This only works for a fixed `/tcb/height` after width and height are set by option keys.

\tcbset{size=fbox,boxrule=0.5mm, colback=red!5!white, colframe=red!75!black, halign=center,valign=center}
\begin{tcolorbox}[enhanced, size=minimal,auto outer arc, width=2.1cm,octogon arc, colback=red,colframe=white,colupper=white, fontupper=\fontsize{7mm}{7mm}\selectfont\bfseries\sffamily, halign=center,valign=center, square,arc is angular, borderline={0.2mm}{-1mm}{red} ]
STOP
\end{tcolorbox}

Sets `/tcb/arc` to match $\frac{1}{2+\sqrt{2}}$ of the inner width of the colored box. If width and height of the box are identical, the interior is a regular octogon.
/tcb/arc is angular (no value, initially unset)

Using this options applies a patch which straightens the corners arcs of the boxes. The little arcs are replaced by little straight lines.

This patch is considered as an experimental feature. It changes some of the original Ti\textit{kZ} code. This change may break with future updates of Ti\textit{kZ}.

\begin{tcolorbox}[arc is angular]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc is curved]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\tcbset{colback=red!5!white,colframe=red!75!black, arc=3mm}

\begin{tcolorbox}[arc is angular]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc is curved]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\tcbset{colback=red!5!white,colframe=red!75!black, arc=3mm}

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\tcbset{colback=red!5!white,colframe=red!75!black, arc=3mm}

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/outer arc=(length) (no default, initially unset)

Sets the outer radius of the four frame arcs to \textit{length}.

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/auto outer arc (no value, initially set)

Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by \textit{/tcb/arc}.\textsuperscript{P. 41}
4.7.4 Spacing

\texttt{/tcb/boxsep=⟨length⟩}  
(no default, initially 1mm)

Sets a common padding of ⟨length⟩ between the text content and the frame of the box. This value is added to the key values of left, right, top, bottom, and middle at the appropriate places.

\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\tcbsubset{colback=red!5!white,colframe=red!75!black,width=(\linewidth-4mm)/2, before=,after=\hfill}
\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[before=,after=\hfill]
\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\texttt{/tcb/left=⟨length⟩}  
(style, no default, initially 4mm)

Sets the left space between all text parts and frame (additional to boxsep). This is an abbreviation for setting lefttitle, leftupper, and leftlower to the same value.

\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/left*=⟨length⟩}  
(style, no default)

Sets /tcb/left such that ⟨length⟩ is the distance between the left bounding box and the text parts.

\begin{tcolorbox}
\tcbsubset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\tcbsubset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[grow to left by=5mm,left*=0mm, enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

This is some text.

This is some text.

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
/tcb/lefttitle=(length)  
(no default, initially 4mm)
Sets the left space between title text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[lefttitle=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title
This is a \textbf{tcolorbox}.

/tcb/leftupper=(length)  
(no default, initially 4mm)
Sets the left space between upper text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftupper=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title
This is a \textbf{tcolorbox}.

/tcb/leftlower=(length)  
(no default, initially 4mm)
Sets the left space between lower text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftlower=3cm]
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/right=(length)  
(style, no default, initially 4mm)
Sets the right space between all text parts and frame (additional to boxsep). This is an abbreviation for setting righttitle, rightupper, and rightlower to the same value.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,right=2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}. 

45
Sets $/tcb/right^*=\langle length \rangle$ such that $\langle length \rangle$ is the distance between the right bounding box and the text parts.

\begin{tcolorbox}[grow to right by=5mm,right*=0mm, halign=right,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\flushright This is some text.

\begin{tcolorbox}[width=5cm,righttitle=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\end{tcolorbox}

My very long title text

This is a \textbf{tcolorbox} with standard upper box dimensions.

\begin{tcolorbox}[width=5cm,rightupper=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with compressed upper box dimensions.
\end{tcolorbox}

My very long title text

This is a \textbf{tcolorbox} with compressed upper box dimensions.
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,rightlower=2cm]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\tcblower
This is the lower part with large space at right.
\end{tcolorbox}

This is a tcolorbox with standard upper box dimensions.

This is the lower part with large space at right.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[top=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.

This is the lower part.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[toptitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a tcolorbox.
/tcb/bottom=⟨length⟩ (no default, initially 2mm)

Sets the bottom space between text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[bottom=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/bottomtitle=⟨length⟩ (no default, initially 0mm)

Sets the bottom space between title and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[bottomtitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

/tcb/middle=⟨length⟩ (no default, initially 2mm)

Sets the space between upper and lower text to the separation line (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.
4.7.5 Size Shortcuts

/tcb/size=(name) (no default, initially normal)

Sets all geometry keys with exception of /tcb/width→P.39 to predefined length values. For (name), the following values are feasible:

- **normal**: normal sized boxes e.g. of width \linewidth.
- **title**: title line sized boxes.
- **small**: small boxes e.g. for keyword highlighting.
- **fbox**: identical to the standard \fbox.
- **tight**: no padding space at all.
- **minimal**: no padding space, no box rules.

\begin{tcolorbox}[on line, title=Test, width=2.2cm]
\s
\end{tcolorbox}

\begin{tabular}{|c|c|c|c|c|}
\hline
\textbf{normal} & \textbf{title} & \textbf{small} & \textbf{fbox} & \textbf{tight} & \textbf{minimal} \\
\hline
\textbf{Test} & \textbf{Test} & \textbf{Test} & \textbf{Test} & \textbf{Test} & \textbf{Test} \\
\hline
\textbf{Test} & \textbf{Test} & \textbf{Test} & \textbf{Test} & \textbf{Test} & \textbf{Test} \\
\hline
\textbf{lower} & \textbf{lower} & \textbf{lower} & \textbf{lower} & \textbf{lower} & \textbf{lower} \\
\hline
\end{tabular}

**Predefined values**

<table>
<thead>
<tr>
<th></th>
<th>normal</th>
<th>title</th>
<th>small</th>
<th>fbox</th>
<th>tight</th>
<th>minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>boxrule</td>
<td>0.5mm</td>
<td>0.4mm</td>
<td>0.3mm</td>
<td>0.4pt</td>
<td>0.4pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>boxsep</td>
<td>1.0mm</td>
<td>1.0mm</td>
<td>1.0mm</td>
<td>3.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>left</td>
<td>4.0mm</td>
<td>2.0mm</td>
<td>1.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>right</td>
<td>4.0mm</td>
<td>2.0mm</td>
<td>1.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>top</td>
<td>2.0mm</td>
<td>0.25mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>bottom</td>
<td>2.0mm</td>
<td>0.25mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>toptitle</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>bottomtitle</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0mm</td>
<td>0.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>middle</td>
<td>2.0mm</td>
<td>0.75mm</td>
<td>0.5mm</td>
<td>1.0pt</td>
<td>0.2pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>arc</td>
<td>1.0mm</td>
<td>0.75mm</td>
<td>0.5mm</td>
<td>1.0pt</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
<tr>
<td>outer arc</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>0.0pt</td>
<td>0.0pt</td>
</tr>
</tbody>
</table>

49
/tcb/oversize=(length) (style, default 0pt)

Sets the text width of the upper part to the current line width plus an optional \textit{length}. This is achieved by changing the keys \texttt{/tcb/width}\textsuperscript{P.39} /tcb/enlarge left by\textsuperscript{P.94}, and \texttt{/tcb/enlarge right by}\textsuperscript{P.94} appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given after all other geometry keys! Also see \texttt{/tcb/grow sidewards by}\textsuperscript{P.96} and /tcb/spread sidewards\textsuperscript{P.99}.

\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[oversize, title=Oversized box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}

\textit{Normal text for comparison:}

\textbf{Oversized box}


\textbf{Normal box}

4.7.6 Toggle Left and Right

/\texttt{tcb/toggle left and right}=\langle toggle preset\rangle  \quad \text{(default evenpage, initially none)}

According to the \langle toggle preset\rangle, the left and the right settings of the \texttt{tcolorbox} are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right rules, spaces, and corners are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right rules, spaces, and corners are switched. This value also sets /\texttt{tcb/check odd page} \rightarrow \texttt{P.113} to \texttt{true}.

Horizontal bounding box enlargements are not toggled by this option. They can be toggled independently by /\texttt{tcb/toggle enlargement} \rightarrow \texttt{P.97}. For example, /\texttt{tcb/oversize} \rightarrow \texttt{P.50} changes the bounding box.

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.


4.8 Corners

The four corners of any \texttt{tcolorbox} can be set individually as \texttt{/tcb/sharp corners} or as \texttt{/tcb/rounded corners} \textsuperscript{P.54}. These settings are also reflected in the behavior of \texttt{/tcb/borderline} \textsuperscript{P.195} and \texttt{/tcb/shadow} \textsuperscript{P.206} as one would expect.

By default, all four corners are \textit{rounded}. So, only the \texttt{/tcb/sharp corners} option will be necessary for most use cases. The \texttt{/tcb/rounded corners} \textsuperscript{P.54} option can be used to revert a \texttt{/tcb/sharp corners} setting.

\texttt{/tcb/sharp corners=⟨position⟩} \hspace{1cm} (default all, initially unset)

The \textit{⟨position⟩} denotes one or more of the four box corners to be set as \textit{sharp} corners. The not assigned corners will retain their mode. Feasible values for \textit{⟨position⟩} are:

- northwet
- northeast
- southwest
- southeast
- north
- south
- east
- west
- downhill
- uphill
- all

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.
The \texttt{/tcb/rounded corners} can be used to revert a \texttt{/tcb/sharp corners}\footnote{P.53} setting. The \texttt{(position)} denotes one or more of the four box corners to be set as \textit{rounded} corners. The not assigned corners will retain their mode. Feasible values for \texttt{(position)} are\footnote{The graphical examples assume that the boxes were set to have sharp corners before.}:

- \texttt{northwest}
- \texttt{northeast}
- \texttt{southwest}
- \texttt{southeast}
- \texttt{north}
- \texttt{south}
- \texttt{east}
- \texttt{west}
- \texttt{downhill}
- \texttt{uphill}
- \texttt{all}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners, rounded corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharpish corners]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/sharpish corners} \hspace{1cm} \texttt{(style, no value)}

Shortcut for setting \texttt{/tcb/arc} \footnote{P.41} and \texttt{/tcb/outer arc} \footnote{P.43} to 0pt. With this setting, rounded corners will appear as quasi-sharp, but e.g. the shadow will be somewhat rounder than the shadow of really sharp corners.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharpish corners]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners,]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The following examples will show the differences between \texttt{/tcb/rounded corners} \footnote{P.54}, \texttt{/tcb/sharpish corners} \footnote{P.54}, and \texttt{/tcb/sharp corners} \footnote{P.53}. The later two give the same core box, but \texttt{/tcb/borderline} \footnote{P.195} and \texttt{/tcb/shadow} \footnote{P.206} settings are slightly different. The following examples use \texttt{/tcb/drop fuzzy shadow} \footnote{P.200}.

My title

This is a \texttt{tcolorbox}.

\texttt{rounded corners}

My title

This is a \texttt{tcolorbox}.

\texttt{sharpish corners}

My title

This is a \texttt{tcolorbox}.

\texttt{sharp corners}
4.9 Transparency

Transparency effects are likely to be used in conjunction with \textit{jigsaw} skin variants, see Section 10.11 on page 219.

\verb|/tcb/opacityframe=(fraction)| \hspace{1cm} \textbf{(no default, initially 1.0)}

Sets the frame opacity of the box to the given \textit{(fraction)}.

\begin{tcolorbox}[opacityframe=0.25, colframe=red]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\verb|/tcb/opacityback=(fraction)| \hspace{1cm} \textbf{(no default, initially 1.0)}

Sets the background opacity of the box to the given \textit{(fraction)}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacityback=0.5]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Also see \verb|/tcb/opacitybacklower| \textsuperscript{P.241} of the \textit{skins} library.

\verb|/tcb/opacitybacktitle=(fraction)| \hspace{1cm} \textbf{(no default, initially 1.0)}

Sets the title background opacity of the box to the given \textit{(fraction)}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityframe=0.5, opacitybacktitle=0.5, title filled, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\verb|/tcb/opacityfill=(fraction)| \hspace{1cm} \textbf{(style, no default, initially 1.0)}

Sets the fill opacity for frame, interior and optionally the title background to the given \textit{(fraction)}.

\begin{tcolorbox}[standard jigsaw, colframe=red, opacityfill=0.7, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enhanced,opacityupper=0.5, interior ]
\begin{Verbatim}
\begin{verbatim}
\textbf{This is a tcolorbox.}
\end{verbatim}
\end{Verbatim}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,opacitylower=0.5, interior ]
\begin{Verbatim}
\begin{verbatim}
\textbf{This is the lower part.}
\end{verbatim}
\end{Verbatim}
\end{tcolorbox}

This is the lower part.

\begin{tcolorbox}[enhanced,opacitytext=0.5, interior ]
\begin{Verbatim}
\begin{verbatim}
\textbf{This is a tcolorbox.}
\end{verbatim}
\end{Verbatim}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,opacitytitle=0.7, coltitle=black, fonttitle=\bfseries, title=This is a title, title ]
\begin{Verbatim}
\begin{verbatim}
\textbf{This is a \textbf{tcolorbox}.}
\end{verbatim}
\end{Verbatim}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced jigsaw,fonttitle=\bfseries,title=This is a title, opacityframe=0.5,opacityback=0.25,opacitybacktitle=0.25,opacitytext=0.8, colback=red!5!white,colframe=red!75!black,colbacktitle=yellow!20!red]
\begin{Verbatim}
\begin{verbatim}
\textbf{This is a \textbf{tcolorbox}.}
\end{verbatim}
\end{Verbatim}
\end{tcolorbox}

This is a \textbf{tcolorbox}.
4.10 Height Control

In a typical usage scenario, the height of a \texttt{tcolorbox} is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

\begin{quote}

The height control keys are only applicable to unbreakable boxes. If a box is set to be \texttt{/tcb/breakable} \footnote{P.403}, the height is always computed according to the \textit{natural height}.
\end{quote}

\texttt{/tcb/natural height} \hspace{1cm} (no value, initially set)

Sets the total height of the colored box to its natural height depending on the box content.

\texttt{/tcb/height=⟨length⟩} \hspace{1cm} (no default)

Sets the total height of the colored box to \(⟨\text{length}⟩\) independent of the box content. \(⟨\text{length}⟩\) is the minimum height of the box, if \texttt{/tcb/height plus} is larger than zero.

\begin{verbatim}
\tcbset{width=(\linewidth-2mm)/3,before=,after=,hfill, colframe=blue!75!black,colback=white}
\begin{tcolorbox}[height=1cm,valign=center]
This box has a height of 1cm.
\end{tcolorbox}
\begin{tcolorbox}[height=2cm,valign=center]
This box has a height of 2cm.
\end{tcolorbox}
\begin{tcolorbox}[height=3cm,split=0.5,valign=center,valign lower=center]
This box has a height of 3cm.
\tcblower
Lower part.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm, right=1mm,boxsep=0mm,width=3cm,nobeforeafter}
\begin{tcolorbox}[height=1cm]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm,height plus=1cm]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm,height plus=1cm]
This is a \texttt{tcolorbox}. This is a \texttt{tcolorbox}. This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/height plus=⟨length⟩} \hspace{1cm} (no default, initially 0pt)

The box may extend a given fixed \texttt{/tcb/height} up to the given \(⟨\text{length}⟩\).
/tcb/height from=⟨min⟩ to ⟨max⟩ (style, no default)

Sets the box height to a dimension between ⟨min⟩ and ⟨max⟩.

\% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
    bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter,
    height from=2cm to 8cm}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\thispagestyle{empty}
\begin{tcolorbox}
\textbf{This is a tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}

/tcb/text height=⟨length⟩ (style, no default)

Sets the text height to ⟨length⟩. This is the length from the top of the upper part to the bottom of the optional lower part. See also /tcb/text width → P.39.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text height=2cm]
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}

This is a tcolorbox where the text area has a height of 2cm.
/tcb/add to height=⟨length⟩ (style, no default)

Adds ⟨length⟩ to the current height of the colored box. /tcb/height \textsuperscript{p.58} has to be set before this key is used! If this option is used several times, then the /tcb/height \textsuperscript{p.58} is also increased several times.

\begin{tcolorbox}
This box has a height of 2cm.
\end{tcolorbox}

\begin{tcolorbox}[add to height=1cm]
This box has a height of 3cm.
\end{tcolorbox}

\tcbset{height=2cm, valign=center, width=(\linewidth-2mm)/2, before=, after=\hfill, colframe=blue!75!black, colback=white}

/tcb/add to natural height=⟨length⟩ (style, no default)

The application of this option generates a box with natural height plus the given ⟨length⟩. If this option is used several times, then the last setting of ⟨length⟩ wins. The resulting box is not considered a fixed height box and the implementation is quite different to /tcb/add to height.

\begin{tcolorbox}
This box has natural height.
\end{tcolorbox}

\begin{tcolorbox}[add to natural height=1cm]
This box has natural height plus 1 cm.
\end{tcolorbox}

\tcbset{valign=center, width=(\linewidth-2mm)/2, before=, after=\hfill, colframe=blue!75!black, colback=white}
/tcb/height fill=true|false|maximunm (default true, initially false)

If set to true, the height of the tcolorbox is set to the rest of the available vertical space of the current page. If set to maximum, the page is compressed as much as possible. Note that the tcolorbox is always set as its own paragraph using this option. Also see /tcb/text fill→P.74.

Note that the library \breakable has to be loaded to use this key!

This height control key is only applicable to unbreakable boxes, but it uses code from the library \breakable. The counterpart for breakable boxes is /tcb/height fixed for→P.409.

This option can and should not be used for boxes in boxes, but it can be used for boxes inside a tcbraster→P.310.

\begin{tcolorbox}[height fill, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=Box which fills the rest of the page]
\lipsum[1]
\end{tcolorbox}

Box which fills the rest of the page

If this option is used for a `tcolorbox` which is embedded inside another (outer) `tcolorbox` and if this outer `tcolorbox` has a fixed height, then the given `(fraction)` of the available text height of the outer `tcolorbox` is used as `/tcb/height` for the current `tcolorbox`. Otherwise, `/tcb/natural height` is applied for the current `tcolorbox`.

```latex
\tcbset{colframe=blue!75!black,colback=white,fonttitle=\bfseries}

\begin{tcolorbox}[title=Outer box with fixed height 4cm,height=4cm]
  \begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
    This inner box matches the available space.
  \end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[title=Outer box with natural height]
  \begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
    This inner box has its natural height.
  \end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}[title=Outer box with fixed height 5cm,height=5cm]
  \begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.6]
    Deeply nested box using 60 percent of the available space.
  \end{tcolorbox}
  \begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.4]
    Deeply nested box using 40 percent of the available space.
  \end{tcolorbox}
\end{tcolorbox}
```

Outer box with fixed height 4cm

<table>
<thead>
<tr>
<th>Inner box</th>
</tr>
</thead>
<tbody>
<tr>
<td>This inner box matches the available space.</td>
</tr>
</tbody>
</table>

Outer box with natural height

<table>
<thead>
<tr>
<th>Inner box</th>
</tr>
</thead>
<tbody>
<tr>
<td>This inner box has its natural height.</td>
</tr>
</tbody>
</table>

Outer box with fixed height 5cm

<table>
<thead>
<tr>
<th>Inner box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deeply nested box using 60 percent of the available space.</td>
</tr>
<tr>
<td>Deeply nested box using 40 percent of the available space.</td>
</tr>
</tbody>
</table>
Sets \texttt{/tcb/height} to match the width of the colored box.

\begin{tcolorbox}[
width=3cm,
colback=red!5!white,
colframe=red!75!black,
left=0pt,right=0pt,
left upper = 0pt,right upper = 0pt,
right lower = 0pt,left lower = 0pt,
bottom=0pt,show frame,arc=0pt,boxrule=0.8pt]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/space}=(\texttt{fraction})

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is distributed between the upper and the lower part of the box. This space could also be negative. 

\texttt{\langle fraction \rangle} with a value between 0 and 1 is the amount of space which is added to the upper part, the rest is added to the lower part. If there is no lower part, then all of the space is added to the upper part always.

\texttt{\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,
colframe=blue!75!black,colback=white,height=3cm}}

\foreach \f in {0.2,0.4,0.7}
\{\begin{tcolorbox}[
space=\f]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}\}

\texttt{/tcb/space to upper}

This is an abbreviation for \texttt{space=1}, i.e. all extra space is added to the upper part.

\texttt{/tcb/space to lower}

This is an abbreviation for \texttt{space=0}, i.e. all extra space is added to the lower part (if there is any).
This is an abbreviation for \texttt{space=0.5}, i.e. the extra space equally distributed between the upper and the lower part.

\begin{tcolorbox}[width=(\linewidth-2mm)/3,before=,after=\hfill, colframe=blue!75!black,colback=white,height=3cm]
\foreach \myspace in {space to upper,space to both,space to lower}
{\begin{tcolorbox}[\myspace]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}}
\end{tcolorbox}

N 2015-02-15
U 2020-07-30

\texttt{/tcb/space to=⟨macro⟩} \hspace{1cm} (no default, initially unset)

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is saved into the given local \texttt{⟨macro⟩}. This \texttt{⟨macro⟩} can and should be used inside the box content to add content which is vertically sized to match \texttt{⟨macro⟩}.

\begin{itemize}
\item The actual length saved into \texttt{⟨macro⟩} is adapted dynamically during several compilations – at least two, but maybe more.
\item Due to the adaptation algorithm, objects can be sized with \texttt{⟨macro⟩} plus any offset length.
\item Never ever use \texttt{⟨macro⟩} multiplied with a factor. The only exception to this rule is that the space can be split into parts which sum to \texttt{⟨macro⟩}.
\item Never use this in combination with \texttt{/tcb/fit}.\footnote{P.457}
\end{itemize}

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm, space to=\myspace]
This is my box of height 3cm. The space is filled with a picture:\[2mm\]
\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}\[1mm\]
This is some other text.
\end{tcolorbox}
If the height of a `tcolorbox` is not the natural height, the \textit{fraction} with a value between 0 and 1 determines the positioning of the segmentation between the upper and the lower part. Here, 0 stands for top and 1 for bottom. Note that the box is split regardless of the actual dimensions of the text parts!
Boxes which are members of an equal height group will all get the same height, i.e. the maximum of all their natural heights. The \texttt{id} serves to distinguish between different height groups. Note that you have to compile twice to see changes and that height groups are global definitions.

```latex
\begin{tcolorbox}[equal height group=A,adjusted title={One}]
My smallest box.
\end{tcolorbox}
\begin{tcolorbox}[equal height group=A,adjusted title={Two}]
This box is also small.
\tcblower
But with a lower part.
\end{tcolorbox}
\begin{tcolorbox}[equal height group=A,adjusted title={Three}]
This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it.
\end{tcolorbox}
\tcbset{width=(\linewidth-1mm)/2,before=,after=\hfill,arc=0mm, colframe=red!75!black,colback=white,fonttitle=\bfseries}
\begin{tcolorbox}[equal height group=B]
Now, we use another equal height group.
\end{tcolorbox}
\begin{tcolorbox}[equal height group=B,after=]
\begin{equation*}
\int\limits_{0}^{1} x^2 = \frac13.
\end{equation*}
\end{tcolorbox}
```

See Section 16 on page 308 for more equal height options.
Plants a \langle id \rangle : \langle length \rangle into the equal height group with the given \langle id \rangle. This ensures that the height will not drop below \langle length \rangle. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying /tcb/height \rightarrow P.58 directly is that the boxes are never too small for their content.

\begin{tcolorbox}
My first box. All boxes will get 3.5cm times 3.5cm if the content height is not too large.
\end{tcolorbox}

\begin{tcolorbox}
My second box.
\tcblower
This is the lower part.
\end{tcolorbox}

\begin{tcblisting}{...}
\textbf{Mixed} with a listing.
\end{tcblisting}

\begin{tcolorbox}[title={Fourth box}]
My final box.
\end{tcolorbox}

\section*{/tcb/minimum for current equal height group=\langle length \rangle} (no default, initially unset)

Sets /tcb/minimum for equal height group for the current equal height group. Apparently, this only works for an already known equal height group, i.e. /tcb/equal height group \rightarrow P.66 has to be set before this option is used. This option is likely to be used in combination with /tcb/raster equal height \rightarrow P.319

\begin{tcbitemize}[raster equal height,...]
\item A
\item B
\end{tcbitemize}
/tcb/use height from group=(id)

Sets the current box to a fixed /tcb/height\textsuperscript{P.58} which is copied from an equal height group with the given \langle id\rangle. If this height is not available during the current compilation, no fixed height setting is used. If \langle id\rangle is omitted, the current equal height group is used which has to be set before by /tcb/equal height group\textsuperscript{P.66}.

Note that the natural height of the current box is not considered for computation of the group height. The main application for /tcb/use height from group is that the height can be adapted further by /tcb/add to height\textsuperscript{P.60}.

\begin{tcolorbox}[use height from group=C,add to height=-2cm,colframe=blue!75!black,colback=white]
Height from group \enquote{C} of the previous example, but reduced by 2cm.
\end{tcolorbox}

% \tcbuselibrary{raster}
Every line is inside an equal height group:
\begin{tcbraster}[raster equal height=rows,title=Box \thetcbrasternum,enhanced,size=small,colframe=red!50!black,colback=red!10!white]
\begin{tcolorbox}First line\second line\\The height of this box rules.\end{tcolorbox}
\begin{tcolorbox}[use height from group]Test\end{tcolorbox}
\begin{tcolorbox}[use height from group]First line\second line\end{tcolorbox}
\begin{tcolorbox}The height of this box rules.\end{tcolorbox}
\end{tcbraster}

\tcbheightfromgroup{\langle macro\rangle}{\langle id\rangle}

Saves the height from an equal height group with the given \langle id\rangle to a \langle macro\rangle. If this height is not available during the current compilation, \langle macro\rangle is set to 0pt.
4.11 Box Content Additions

The following options introduce some arbitrary \textit{(code)} to the content of a \texttt{tcolorbox}. These additions can be given at the beginning or at the ending of the title, the upper part, or the lower part.

\texttt{/tcb/before title=\textit{(code)}} \hspace{1cm} (no default, initially unset)

The given \textit{(code)} is placed \textit{after} the color and font settings and \textit{before} the content of the title.

\begin{tcolorbox}[title=My title]
\textbf{Important:} My title
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{\textbackslash tcbset\{before title={\textcolor{yellow}{\textbf{Important:}}}~\},}
\texttt{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\texttt{\textbackslash begin\{tcolorbox\}[title=My title]}
This is a \texttt{\textbf{tcolorbox}}.
\texttt{\textbackslash end\{tcolorbox\}}

\texttt{Important: My title}
This is a \texttt{tcolorbox}.

\texttt{/tcb/after title=\textit{(code)}} \hspace{1cm} (no default, initially unset)

The given \textit{(code)} is placed \textit{after} the content of the title.

\begin{tcolorbox}[title=My title]
This is a \texttt{\textbf{tcolorbox}}.
\end{tcolorbox}

\texttt{\textbackslash tcbset\{after title={\textbf{\textbackslash hfill}colorbox\{Navy\}\{approved\}},}
\texttt{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\texttt{\textbackslash begin\{tcolorbox\}[title=My title]}
This is a \texttt{\textbf{tcolorbox}}.
\texttt{\textbackslash end\{tcolorbox\}}

\texttt{My title approved}
This is a \texttt{tcolorbox}.
The given \textit{code} is placed after the color and font settings and before the content of the upper part. The \textit{code} is appended by a final \textit{\ignorespaces}.

\begin{tcolorbox}
\begin{tabular}{cc}
\textbf{Title} & \\
\textbf{one} & \textbf{two} \\
\textbf{three} & \textbf{four}
\end{tabular}
\end{tcolorbox}
The given \textit{\langle code \rangle} is placed after the content of the upper part. The \textit{\langle code \rangle} is prepended by a leading \texttt{\unskip}.

\texttt{\begin{tcolorbox}[title=My title]}
This is a \textbf{tcolorbox}.
\texttt{\end{tcolorbox}}

\texttt{\begin{tcolorbox}[before upper=\texttt{\unskip},after upper=\texttt{\unskip},}
\texttt{colback=red!5!white,colframe=red!75!black]}
This is a \textbf{tcolorbox}.
\texttt{\end{tcolorbox}}

The given \textit{\langle code \rangle} is placed after the content of the upper part. In contrast to \texttt{/tcb/after upper}, no \texttt{\unskip} is prepended. Use this for situations where \texttt{\unskip} is not needed or causes harm. See \texttt{/tcb/before upper*→P.70} for an example.

From version 3.80 to 3.94, this option prepended an \texttt{\unskip} to the given \textit{\langle code \rangle}.
From version 3.95 to 4.15, this option was deprecated.
From version 4.20, this option is re-established with changed semantic (no \texttt{\unskip}!)}
The given \texttt{code} is placed \textit{after} the color and font settings and \textit{before} the content of the lower part. The \texttt{code} is appended by a final \texttt{\ignorespaces}.

\begin{tcolorbox}
\texttt{\textit{Behold}: This is the lower part.}
\end{tcolorbox}

\begin{tcolorbox}
\texttt{This is a \textbf{tcolorbox}.}
\tcblower
\texttt{This is the lower part.}
\end{tcolorbox}

\begin{tcolorbox}
\tcset{before lower=\textit{Behold:-},colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\tcset{before lower*=\textit{Behold:-},colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\tcset{before lower**=\textit{Behold:-},colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\tcset{before lower***=\textit{Behold:-},colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}
/tcb/after lower=\langle code\rangle

The given \langle code\rangle is placed after the content of the lower part. The \langle code\rangle is prepended by a leading \unskip.

\begin{tcolorbox}[after lower=\ \textit{This is the end.},
  colback=red!5!white,colframe=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
  \end{tcolorbox}

/tcb/after lower*=\langle code\rangle

The given \langle code\rangle is placed after the content of the lower part. In contrast to /tcb/after upper P.71, no \unskip is prepended. Use this for situations where \unskip is not needed or causes harm.

\begin{tcolorbox}[before lower*=\$,after lower*=\$,
  colback=red!5!white,colframe=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  \sin^2(x)+\cos^2(x)=1.
  \end{tcolorbox}

\begin{tcolorbox}[before lower=\unskip,after lower=\unskip]
  \sin^2(x) + \cos^2(x) = 1.
  \end{tcolorbox}

From version 3.80 to 3.94, this option prepended an \unskip to the given \langle code\rangle. From version 3.95 to 4.15, this option was deprecated. From version 4.20, this option is re-established with changed semantic (no \unskip!)
If \texttt{tcb/text fill} is used, one cannot have a lower part and the box is unbreakable.

This style sets \texttt{tcb/before upper} → P.70 and \texttt{tcb/after upper} → P.71 to embed the upper part with a minipage. If a fixed height was applied e.g. by \texttt{tcb/height} → P.58 or \texttt{tcb/height fill} → P.61, this minipage gets a matching height. This allows to use vertical glue macros like \texttt{vfill} to act like expected. If the box has no fixed height, setting \texttt{tcb/text fill} has no other effect as making the box unbreakable.

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
height=8cm,text fill,
title=My filled box]
This is a \textbf{tcolorbox}.
\par\vfill
\begin{center}
My middle text.
\end{center}
\par\vfill
This is the end of my box.
\end{tcolorbox}
This style sets `/tcb/before upper` and `/tcb/after upper` and several geometry keys to support a `tabular*` with the given ⟨preamble⟩. The packages `array` and `colortbl` have to be loaded separately.

\begin{tcolorbox}\[tabulars*=\{\extracolsep{\fill}\hspace{5mm}\}\},
boxrule=0.5pt,title=My table\]
\begin{tabular}{lrrrrr@{\hspace{5mm}}}
Group & One & Two & Three & Four & Sum \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00
\end{tabular}
\end{tcolorbox}

This is a variant of `/tcb/tabulars` which adds some ⟨code⟩ before the table starts.

\begin{tcolorbox}\[tabulars*={\arrayrulewidth0.5mm\renewcommand\arraystretch{1.4}}\]
\begin{tabular}{lll}
One & Two & Three \\
\hline
1000.00 & 2000.00 & 3000.00 \\
\hline
2000.00 & 3000.00 & 4000.00
\end{tabular}
\end{tcolorbox}
If \texttt{/tcb/tabularx} or \texttt{/tcb/tabularx*} are used, one cannot have a lower part.

\texttt{/tcb/tabularx=}⟨\texttt{preamble}⟩\hspace{1cm}\texttt{(style)}

This style sets \texttt{/tcb/before upper →P.70} and \texttt{/tcb/after upper →P.71} and several geometry keys to support a \texttt{tabularx} with the given ⟨\texttt{preamble}⟩. The packages \texttt{tabularx} [4], \texttt{array}, and \texttt{colortbl} have to be loaded separately.

\begin{verbatim}
\% \usepackage{array,tabularx}
\% \usepackage{colortbl} - or - \usepackage{table}{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
coltitle=black,center title}
\begin{tcolorbox}\[tabularx={X||Y|Y|Y|Y||Y},title=My table\]
<table>
<thead>
<tr>
<th>Group</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1000</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
<td>10000</td>
</tr>
<tr>
<td>Green</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
<td>5000</td>
<td>14000</td>
</tr>
<tr>
<td>Blue</td>
<td>3000</td>
<td>4000</td>
<td>5000</td>
<td>6000</td>
<td>18000</td>
</tr>
<tr>
<td>Sum</td>
<td>6000</td>
<td>9000</td>
<td>12000</td>
<td>15000</td>
<td>42000</td>
</tr>
</tbody>
</table>
\end{tcolorbox}
\end{verbatim}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
\textbf{Group} & \textbf{One} & \textbf{Two} & \textbf{Three} & \textbf{Four} & \textbf{Sum} \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabular}
\caption{My table}
\end{table}

\texttt{/tcb/tabularx*=⟨\texttt{code}⟩}⟨\texttt{preamble}⟩\hspace{1cm}\texttt{(style)}

This is a variant of \texttt{/tcb/tabularx} which adds some ⟨\texttt{code}⟩ before the table starts.

\begin{verbatim}
\% \usepackage{array,tabularx}
\% \usepackage{colortbl} - or - \usepackage{table}{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
coltitle=black,center title}
\begin{tcolorbox}\[tabularx*={\arrayrulewidth0.5mm}{X|X|X},title=My table\]
\hline
\textbf{One} & \textbf{Two} & \textbf{Three} \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\hline
\end{tcolorbox}
\end{verbatim}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
\textbf{One} & \textbf{Two} & \textbf{Three} \\
\hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\hline
\end{tabular}
\caption{My table}
\end{table}
/tcb/tikz upper=\{options\}  \hspace{1cm} \text{(style)}

This style adds a centered \texttt{tikzpicture} environment to the start and end of the upper part. The \{options\} may be given as TikZ picture options.

\begin{tcolorbox} [tikz upper,fonttitle=\textbf{\footnotesize},colback=white,colframe=black, title=\texttt{tikzname}\ drawing]
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tcolorbox}

\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red]
(0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
(215:5mm) arc (215:325:5mm);
\end{tikzpicture}


/tcb/tikz lower=\{options\}  \hspace{1cm} \text{(style)}

This style adds a centered \texttt{tikzpicture} environment to the start and end of the lower part. The \{options\} may be given as TikZ picture options.

\begin{tcblisting} [tikz lower,listing side text,fonttitle=\textbf{\footnotesize},bicolor,colback=LightBlue!50!white,colbacklower=white,colframe=black, righthand width=3cm,title=\texttt{tikzname}\ drawing]
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
(215:5mm) arc (215:325:5mm);
\end{tcblisting}

\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red]
(0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
(215:5mm) arc (215:325:5mm);
\end{tikzpicture}
/tcb/tikznode upper\(=\)\(\langle \text{options} \rangle\) (style)

This style places the upper part content into a centered \textsc{tikz} node. The \(\langle \text{options} \rangle\) may be given as \textsc{tikz} node options. This style is especially useful for boxes with multiline texts which are fitted to the text width.

\begin{verbatim}
% \usepackage{tikz}
\newtcbbox{\headline}{[1][\{enhanced,center,
    ignore nobreak,fontupper=\Large\bfseries,
    colframe=red!50!black,colback=red!10!white,
    drop fuzzy shadow=yellow,tikznode upper,#1}\}
\headline{Important\\Headline}
\end{verbatim}

/tcb/tikznode lower\(=\)\(\langle \text{options} \rangle\) (style)

This style places the lower part content into a centered \textsc{tikz} node. The \(\langle \text{options} \rangle\) may be given as \textsc{tikz} node options.

\begin{verbatim}
% \usepackage{tikz}
\begin{tcolorbox}[bicolor,colback=LightBlue!50!white,colbacklower=white,
    colframe=black,tikznode lower={inner sep=2pt,draw=red,fill=yellow}]
Upper part.
\tcblower
Lower part.
\end{tcolorbox}
\end{verbatim}

/tcb/tikznode\(=\)\(\langle \text{options} \rangle\) (style)

Shortcut for setting \texttt{/tcb/tikznode upper} and \texttt{/tcb/tikznode lower} the same time.

/tcb/varwidth upper\(=\)\(\langle \text{length} \rangle\) (style, default \texttt{/tcb/width} \texttt{\textasciitilde P.39})

This style places the upper part content into a \texttt{varwidth} environment. This style needs the \texttt{varwidth} package \texttt{[1]} to be loaded manually. The resulting box has a maximal width of \(\langle \text{length} \rangle\). This option is only senseful for a \texttt{\tcbox \textasciitilde P.14}.

\begin{verbatim}
% \usepackage{varwidth}
\newtcbbox{\varbox}{colframe=red!50!black,
    colback=red!10!white,\varwidth upper}\varbox{Short text.}\varbox{This box contains is a longer text which is broken.}
\end{verbatim}
4.12 Overlays

With an overlay, arbitrary \(\langle\text{graphical code}\rangle\) can be added to a \texttt{tcolorbox}. This code is executed \textit{after} the frame and interior are drawn and \textit{before} the text content is drawn. Therefore, you can decorate the \texttt{tcolorbox} with your own extensions. Common special cases are \textit{watermarks} which are implemented using overlays. See Subsection 10.3 from page 183 if you want to add \textit{watermarks}.

If you use the core package only, the \(\langle\text{graphical code}\rangle\) has to be \texttt{pgf} code and there is not much assistance for positioning. Therefore, the usage of the \texttt{/tcb/enhanced} \texttt{P.227} mode from the library skins is recommended which allows \texttt{tikz} code and gives access to \texttt{/tcb/geometry nodes} \texttt{P.153} for positioning.

\texttt{/tcb/overlay=\langle\text{graphical code}\rangle}  
(no default, initially unset)

Adds \(\langle\text{graphical code}\rangle\) to the box drawing process. This \(\langle\text{graphical code}\rangle\) is drawn \textit{after} the frame and interior and \textit{before} the text content.

% \tcbuselibrary{skins} % preamble
% \usetikzlibrary{patterns} % preamble
% \tcbuselibrary{patterns} % preamble
\tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black,  
enlarge top by=5.5mm,  
overlay={\foreach \x in {2cm,3.5cm} {  
\begin{scope}[shift={([xshift=\x]frame.north west)}]  
\path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);  
\path[fill=black] (-0.2,0) arc (0:180:1mm);  
\end{scope}}}}}
\begin{tcolorbox}
\textbf{frogbox},title=My title
\end{tcolorbox}
\begin{tcolorbox}
\textbf{frogbox},title=My title
\tcblower
This is the lower part.
\end{tcolorbox}

% \usetikzlibrary{patterns} % preamble
% \tcbuselibrary{skins} % preamble
\tcbset{ribbonbox/.style={enhanced,colback=red!5!white,colframe=red!75!black,  
fonttitle=\bfseries,  
overlay={\path[draw=blue!75!white,fill=blue!10,line width=1mm] (0,0) arc (0:180:5mm);  
\path[fill=black] (-0.2,0) arc (0:180:1mm);  
\begin{scope}}}}}
\begin{tcolorbox}
\textbf{ribbonbox},title=My title
\tcblower
This is the lower part.
\end{tcolorbox}
/tcb/no overlay (style, no default, initially set)
Removes the overlay if set before.

/tcb/overlay broken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the (graphical code) is added to the box drawing process. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay unbroken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} but is not broken actually or if the box is set to be /tcb/unbreakable \textsuperscript{P.404}, then the (graphical code) is added to the box drawing process. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay first=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the (graphical code) is added to the box drawing process for the first part of the break sequence. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay middle=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the (graphical code) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay last=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the (graphical code) is added to the box drawing process for the last part of the break sequence. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay unbroken and first=(graphical code) (no default, initially unset)
This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay first together. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay middle and last=(graphical code) (no default, initially unset)
This is an optimized abbreviation for setting /tcb/overlay middle and /tcb/overlay last together. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay unbroken and last=(graphical code) (no default, initially unset)
This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay last together. /tcb/overlay \textsuperscript{P.79} overwrites this key.

/tcb/overlay first and middle=(graphical code) (no default, initially unset)
This is an optimized abbreviation for setting /tcb/overlay first and /tcb/overlay middle together. /tcb/overlay \textsuperscript{P.79} overwrites this key.

This example demonstrates the application of break sequence specific overlay options. Here, we define an environment myexample based on tcolorbox where the visible drawing is done totally by overlay keys.

Here, the first application of myexample produces an unbroken tcolorbox. The frame is drawn by the code given with /tcb/overlay unbroken.

The second application of myexample is broken into several parts which are drawn by the codes given with /tcb/overlay first, /tcb/overlay middle, and /tcb/overlay last.

% Preamble:
%\usepackage{tikz,lipsum}
%\tcbuselibrary{skins,breakable}
%\newcounter{example}

80
Example 1


Example 2


Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero.


I am floating

Floating box from floatplacement

This floating box is placed at the top of a page.

4.13 Floating Objects

/tcb/floatplacement={\textit{values}} \hspace{1cm} \text{(no default, initially htb)}

Sets \textit{values} as default values for the usage of /tcb/float and /tcb/float*. Feasible are the usual parameters for floating objects.

\begin{tcolorbox}
[tfloatplacement=t,float, title=Floating box from \{floatplacement\},
watermark text={I am floating}]
This floating box is placed at the top of a page.
\end{tcolorbox}

/tcb/float={\textit{values}} \hspace{1cm} \text{(default from floatplacement)}

Turns the box to a floating object where \textit{values} are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by floatplacement.

\begin{tcolorbox}
[float, title=Floating box from \{float\},
enhanced,watermark text={I'm also floating}]
This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.
\end{tcolorbox}

/tcb/float*=\textit{values} \hspace{1cm} \text{(default from floatplacement)}

Identical to /tcb/float, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages multicol or paracol. Note that you have to set width=\textwidth additionally, if the box should span the whole page width in these cases!

\begin{tcolorbox}
[float*, title=Floating box from \{float*\}, width=\textwidth,
enhanced,watermark text={I'm also floating}]
In this single column document, you will see no difference to \{float\}.
\end{tcolorbox}

/tcb/nofloat \hspace{1cm} \text{(style, initially set)}

Turns the floating behavior off.

\begin{tcolorbox}
[nofloat=\text{I'm also floating}]
In this single column document, you will see no difference to float.
\end{tcolorbox}
/tcb/every float={⟨code⟩}  (no default, initially empty)

For floating objects, the /tcb/before→P.86 and /tcb/after→P.86 settings are ignored. Instead, /tcb/before float and /tcb/after float can be used. Further, with /tcb/every float, the given ⟨code⟩ is inserted before a floating box. If the box is /tcb/breakable→P.403, the given ⟨code⟩ is inserted before every part of the break sequence. The most common use case is every float=\centering.

\tcbox[float=htb,title={Floating box},every float=\centering, colback=blue!50!black,colframe=blue!50!white,colbacktitle=blue!10!white,coltitle=black,center title]{\includegraphics[height=6cm]{lichtspiel.jpg}}

Floating box

/tcb/before float={⟨code⟩}  (no default, initially empty)
/tcb/after float={⟨code⟩}  (no default, initially empty)

For floating objects, the /tcb/before→P.86 and /tcb/after→P.86 settings are ignored. Code can be inserted after the begin of the float environment and before /tcb/every float with /tcb/before float and between the end of the box and the end of the float environment with /tcb/after float.

These options are not compatible with /tcb/breakable→P.403 floating objects and are ignored, if the box is set to be breakable.
4.14 Embedding into the Surroundings

Typically, but not necessarily, a \texttt{tcolorbox} is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys \texttt{/tcb(before} and \texttt{/tcb(after}.

Before version 4.40, the default setting for \texttt{/tcb(before} and \texttt{/tcb(after} was given by \texttt{/tcb/autoparskip}\textsuperscript{\cite{P.90}}. Starting with version 4.40, the default setting is given by \texttt{/tcb(before} skip balanced\textsuperscript{\cite{P.87}} and \texttt{/tcb(after} skip balanced\textsuperscript{\cite{P.87}}. Note that old documents may need adaptations of page breaks. Alternatively, the old default setting can be restored by using

\begin{verbatim}
\tcbsetforeverylayer{autoparskip}
\end{verbatim}

inside the document preamble.

\texttt{/tcb(before}=⟨\texttt{code}\rangle \quad \text{(no default, initially see /tcb(before}\textsuperscript{\cite{P.87}}\text{skip balanced})}

Sets the ⟨\texttt{code}\rangle which is executed before the colored box. It is not used for floating boxes. Also, it is not used, if the box follows a heading immediately and \texttt{/tcb/ignore nobreak}\textsuperscript{\cite{P.92}} is set to \texttt{false}.

\texttt{/tcb(after}=⟨\texttt{code}\rangle \quad \text{(no default, initially see /tcb(after}\textsuperscript{\cite{P.87}}\text{skip balanced})}

Sets the ⟨\texttt{code}\rangle which is executed after the colored box. It is not used for floating boxes.

\texttt{/tcb/nobeforeafter} \quad \text{(style, no value)}

Abbreviation for clearing the keys \texttt{before} and \texttt{after}. The colored box is not put into a paragraph and there is no space before or after the box.

\begin{verbatim}
\tcbset{myone/.style={colback=LightGreen,colframe=DarkGreen,
  equal height group=nobefaf,width=\linewidth/4,nobeforeafter}}
\begin{tcolorbox}[myone,title=Box 1]Box 1\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 2]Box 2\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 3]Box 3\end{tcolorbox}
\begin{tcolorbox}[myone,title=Box 4]Box 4\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/force nobeforeafter} \quad \text{(style, no value)}

Forces the setting of \texttt{/tcb/nobeforeafter even if \texttt{/tcb(before} and \texttt{/tcb(after} are set to other values later. Do not use this option globally unless you really know what you do. Note that embedded boxes do not inherit this forced clearance.
/tcb/before skip balanced=(glue)  (no default, initially 0.5\baselineskip plus 2pt)

Inserts some vertical space before the colored box. This style sets /tcb/before→P.86. If the depth of the preceding \TeX\ box is between 0pt and 0.3\baselineskip, the distance between the baseline of the preceding \TeX\ box and the tcolorbox is set to \langle glue\rangle+0.3\baselineskip.
If the depth is larger, the distance of the preceding \TeX\ box and the tcolorbox is set to \langle glue\rangle.
Alternatively, see /tcb/before skip→P.88 which ignores the baseline.

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[before skip balanced=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.

/tcb/after skip balanced=(glue)  (no default, initially 0.5\baselineskip plus 2pt)

Inserts some vertical space of the given \langle glue\rangle after the colored box. This style sets /tcb/after→P.86. Additionally, \prevdepth is set to 0.3\baselineskip. The following \TeX\ box may enlarge the space by further glue to adjust its baseline. Alternatively, see /tcb/after skip→P.88 which ignores the baseline.

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[after skip balanced=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.

/tcb/beforeafter skip balanced=(glue)  (no default, initially 0.5\baselineskip plus 2pt)

Inserts some vertical space of the given \langle glue\rangle before and after the colored box. This style sets /tcb/before skip balanced and /tcb/after skip balanced.

\begin{tcolorbox}[beforeafter skip balanced=0pt, height=1.8\baselineskip, enlarge top by=.1\baselineskip, enlarge bottom by=.1\baselineskip, colframe=blue!20, colback=blue!5, size=small, valign upper=center, \{ \}
\noindent\begin{tikzpicture}
\path[use as bounding box] (0,0)
rectangle (0.1,0.1);
\foreach \y in {0,1,...,9} { \draw[very thin,red]
(-0.2,-\y*\baselineskip) -- (
\linewidth+0.2cm,-\y*\baselineskip); }
\end{tikzpicture}
\begin{doubleline} Abc \end{doubleline}
\begin{doubleline} Def \end{doubleline}
\begin{doubleline} Ghi \end{doubleline}
\end{tcolorbox}

\begin{tikzpicture}
\path[use as bounding box] (0,0)
rectangle (0.1,0.1);
\foreach \y in {0,1,...,9} { \draw[very thin,red]
(-0.2,-\y*\baselineskip) -- (
\linewidth+0.2cm,-\y*\baselineskip); }
\end{tikzpicture}

line 1
\begin{doubleline} Abc \end{doubleline}
\begin{doubleline} Def \end{doubleline}
\begin{doubleline} Ghi \end{doubleline}
line 2
\begin{doubleline} Abc \end{doubleline}
\begin{doubleline} Def \end{doubleline}
\begin{doubleline} Ghi \end{doubleline}
line 3
\begin{doubleline} Abc \end{doubleline}
\begin{doubleline} Def \end{doubleline}
\begin{doubleline} Ghi \end{doubleline}
line 4

87
/tcb/before skip=⟨glue⟩ (style, no default)

Inserts some vertical space of the given ⟨glue⟩ before the colored box. This style sets /tcb/before → P.86. In contrast to /tcb/before skip balanced → P.87, this ⟨glue⟩ is relative to the lower edge of the preceding box and not to the baseline.

\begin{tcolorbox}[before skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/after skip=⟨glue⟩ (style, no default)

Inserts some vertical space of the given ⟨glue⟩ after the colored box. This style sets /tcb/after → P.86. In contrast to /tcb/after skip balanced → P.87, this ⟨glue⟩ is relative to the upper edge of the following box and not to the baseline.

\begin{tcolorbox}[after skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/beforeafter skip=⟨glue⟩ (style, no default)

Inserts some vertical space of the given ⟨glue⟩ before and after the colored box. This style sets /tcb/before skip and /tcb/after skip.

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Second box.
/tcb/left skip=(length) \hspace{1cm} (style, no default, initially 0\text{mm})

Inserts some horizontal space of the given \langle length \rangle before the colored box. This style sets \text{/tcb/grow} to \text{left} by \ref{P.95} with the negated \langle length \rangle, i.e. the bounding box and box width are changed.

\begin{tcolorbox}[left skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

/\text{tcb}/right skip=(length) \hspace{1cm} (style, no default, initially 0\text{mm})

Inserts some horizontal space of the given \langle length \rangle after the colored box. This style sets \text{/tcb/grow} to \text{right} by \ref{P.95} with the negated \langle length \rangle, i.e. the bounding box and box width are changed.

\begin{tcolorbox}[right skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

/\text{tcb}/\text{leftright} skip=(length) \hspace{1cm} (style, no default)

Inserts some horizontal space of the given \langle length \rangle before \text{and} after the colored box. This style changes the bounding box and the box width.

\begin{tcolorbox}[leftright skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This options is considered to be superseded by /tcb/before skip balanced \( ^{P.87} \) and /tcb/after skip balanced \( ^{P.87} \) (see note on page 86).
Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

\begin{verbatim}
\tcbset{parskip/.style={before={\par\pagebreak[0]\parindent=0pt},
                   after={\par}}}
\end{verbatim}

This options is considered to be superseded by /tcb/before skip balanced \( ^{P.87} \) and /tcb/after skip balanced \( ^{P.87} \) (see note on page 86).
Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is \textit{not} used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

\begin{verbatim}
\tcbset{noparskip/.style={before={\par\pagebreak[0]\smallskip\parindent=0pt},
                           after={\par\smallskip}}}
\end{verbatim}

This options is considered to be superseded by /tcb/before skip balanced \( ^{P.87} \) and /tcb/after skip balanced \( ^{P.87} \) (see note on page 86).
Tries to detect the usage of the package \texttt{parskip} and sets the keys \texttt{before} and \texttt{after} accordingly. Actually, the following is done:

- If the length of \texttt{parskip} is greater than \texttt{0pt} at the beginning of the document, /tcb/parskip is executed. Here, the usage of package \texttt{parskip} is \textit{assumed}.
- Otherwise, if the length of \texttt{parskip} is not greater than \texttt{0pt} at the beginning of the document, /tcb/noparskip is executed. Here, the absence of package \texttt{parskip} is \textit{assumed}.
/tcb/baseline=(length) 
(no default, initially 0pt)

Used to set the \pgfsetbaseline value of the resulting tcolorbox.

\begin{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
First line.\Second line.
\end{tcolorbox}

```
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
First line.\Second line.
\end{tcolorbox}
```

/tcb/box align=(alignment) 
(style, no default, initially bottom)

Used to set the /tcb/baseline value of the resulting tcolorbox. Feasible values for \texttt{alignment} are:

- \texttt{bottom}: alignment with the box bottom,
- \texttt{top}: alignment with the box top,
- \texttt{center}: alignment with the box center,
- \texttt{base}: alignment with the box content base. This option is not applicable for a \texttt{tcolorbox} but for a \texttt{tcbox} only. It is an alias for /tcb/tcbox raise base \texttt{P.108}.

```
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
```

```
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
```
Some text.........................................................
One line
Another line

\texttt{\textbackslash tcb\/ignore\ nobreak=\texttt{\stringtrue\string|\stringfalse}} \hfill (default \texttt{\stringtrue}, initially \texttt{\stringfalse})

After a heading, \LaTeX{} tries to avoid a break by setting a \texttt{\textit{nobreak}} boolean value. Starting from version 3.33, the \texttt{/tcb/before} \textsuperscript{P.86} respectively \texttt{/tcb/before\ skip} \textsuperscript{P.88} settings are not used after a heading if \texttt{/tcb/ignore\ nobreak} is set to \texttt{\textit{false}}. For an unbreakable box, \texttt{/tcb/before\ nobreak} is used instead. Further, a \texttt{/tcb/breakable} \textsuperscript{P.403} box will also try to avoid a break between a heading and a directly following first part of a break sequence. Set \texttt{/tcb/ignore\ nobreak} to \texttt{\textit{true}}, if \texttt{\textit{nobreak}} should be ignored as prior to version 3.33. Also, such a setting may be used locally to enforce the \texttt{/tcb/before} \textsuperscript{P.86} setting.

\texttt{\textbackslash tcb\/before\ nobreak=(\texttt{\stringcode})} \hfill (no default, initially \texttt{\stringnoindent})

Sets the \texttt{(\textit{code})} which is executed before the colored box if it is unbreakable, if \texttt{/tcb/ignore\ nobreak} is not set, and if the box follows a heading.

\texttt{\textbackslash tcb\/parfillskip\ restore=\texttt{\stringtrue\string|\stringfalse}} \hfill (default \texttt{\stringtrue}, initially \texttt{\stringtrue})

If this option is set to be \texttt{\textit{true}}, the minimum value of \texttt{\parfillskip} is tested at specific spots, if it is greater than \texttt{0pt}. If so, \texttt{\parfillskip} is restored to \texttt{\@flushglue} which happens to be the default value.

These tests are executed for \texttt{/tcb/parskip} \textsuperscript{P.90}, \texttt{/tcb/nopar} \textsuperscript{P.90}, \texttt{/tcb/after\skip} \textsuperscript{P.88}, \texttt{/tcb/breakable} \textsuperscript{P.403}, and \texttt{tcbraster} \textsuperscript{P.310}.

This option was created to automatically avoid overfull box warnings with \texttt{\parfillskip} changing packages.
4.15 Bounding Box

Normally, every tcolorbox has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, L\TeX{} reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the tcolorbox will get some clearance around it. If the bounding box is shrunk, i.e. enlarged with negative values, the tcolorbox will overlap to other parts of the page. For example, the tcolorbox could be stretched into the page margin.

The following examples use /tcb/show bounding box \textsuperscript{P.197} to display the actual bounding box. For this, the library \texttt{skins} has to be included and /tcb/enhanced \textsuperscript{P.227} has to be set.

4.15.1 Shifting Bounding Box Borders

/tcb/enlarge top initially by={\mathit{length}} \hspace{1em} (no default, initially 0\text{mm})

Enlarges the bounding box distance to the top of the box by \(\langle\text{length}\rangle\). If the box is breakable, only the first box of the break sequence gets enlarged. /tcb/enlarge top by \textsuperscript{P.94} overwrites this key.

\begin{tcbset}{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=-5\text{mm}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=5\text{mm},enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbset}

This is a tcolorbox.

This is a tcolorbox.

/tcb/enlarge bottom finally by={\mathit{length}} \hspace{1em} (no default, initially 0\text{mm})

Enlarges the bounding box distance to the bottom of the box by \(\langle\text{length}\rangle\). If the box is breakable, only the last box of the break sequence gets enlarged. /tcb/enlarge bottom by \textsuperscript{P.94} overwrites this key.

\begin{tcbset}{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=5\text{mm}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=-5\text{mm},enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbset}

This is a tcolorbox.

This is a tcolorbox.
/tcb/enlarge top at break by=\langle length \rangle

Enlarges the bounding box distance to the top of the box by \langle length \rangle, if the box is /tcb/breakable→P.403. In this case, it is applied to middle and last parts in a break sequence. /tcb/enlarge top by overwrites this key.

/tcb/enlarge bottom at break by=\langle length \rangle

Enlarges the bounding box distance to the bottom of the box by \langle length \rangle, if the box is /tcb/breakable→P.403. In this case, it is applied to first and middle parts in a break sequence. /tcb/enlarge bottom by overwrites this key.

/tcb/enlarge top by=\langle length \rangle

Enlarges the bounding box distance to the top of the box by \langle length \rangle. /tcb/enlarge top initially by→P.93 and /tcb/enlarge top at break by are set to \langle length \rangle.

/tcb/enlarge bottom by=\langle length \rangle

Enlarges the bounding box distance to the bottom of the box by \langle length \rangle. /tcb/enlarge bottom finally by→P.93 and /tcb/enlarge bottom at break by are set to \langle length \rangle.

/tcb/enlarge left by=\langle length \rangle

Enlarges the bounding box distance to the left side of the box by \langle length \rangle.

/tcb/enlarge right by=\langle length \rangle

Enlarges the bounding box distance to the right side of the box by \langle length \rangle.
/tcb/enlarge by=(length)  
(no default, initially 0mm)

Enlarges the bounding box distance to all sides of the box by ⟨length⟩.

\begin{tcolorbox}
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

\begin{tcolorbox}[enlarge by=5mm, enhanced, show bounding box]
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

/tcb/grow to left by=(length)  
(no default, initially 0mm)

Enlarges the current box width by ⟨length⟩ and enlarges (shrinks) the bounding box distance to the left side of the box by −⟨length⟩. Also see \texttt{/tcb/left skip \textasciitilde P.89}.

\begin{tcolorbox}[width=5cm, grow to left by=2cm, enhanced, show bounding box]
\textbf{This is a \textbf{tcolorbox} with a width of 7cm.}
\end{tcolorbox}

\begin{tcolorbox}[colframe=blue!75!black, colback=white]
\textbf{This is a \textbf{tcolorbox} with a width of 7cm.}
\end{tcolorbox}

/tcb/grow to right by=(length)  
(no default, initially 0mm)

Enlarges the current box width by ⟨length⟩ and enlarges (shrinks) the bounding box distance to the right side of the box by −⟨length⟩. Also see \texttt{/tcb/right skip \textasciitilde P.89}.

\begin{tcolorbox}[grow to right by=2cm, enhanced, show bounding box]
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

\begin{tcolorbox}[colframe=blue!75!black, colback=white]
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

\begin{tcolorbox}[grow to right by=2cm, grow to left by=1cm, enhanced, show bounding box]
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a \textbf{tcolorbox}.}
\end{tcolorbox}
Shortcut for setting /tcb/grow to left by \rightarrow P.95 and /tcb/grow to right by \rightarrow P.95 to (length). Also see /tcb/oversize \rightarrow P.50 and /tcb/spread sidewards \rightarrow P.99.

4.15.2 Box Alignment

/tcb/flush left
(style, no value)

Enlarges the bounding box to the right side to fill the line completely.

/tcb/flush right
(style, no value)

Enlarges the bounding box to the left side to fill the line completely.

/tcb/center
(style, no value)

Enlarges the bounding box equally to both sides to fill the line completely.
4.15.3 Toggle Enlargements

According to the \texttt{toggle preset}, the left and the right enlargements of the bounding box are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right enlargement are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right enlargement are switched. This value also sets /tcb/check odd page\textsuperscript{P.113} to true.

See /tcb/toggle left and right\textsuperscript{P.51} to toggle geometry settings.

\begin{tcolorbox}[toggle enlargement=none,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=forced]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=evenpage]
This page is an \texttt{tcbifoddpage}(odd)(even) page. Therefore, the left and right enlargements \texttt{tcbifoddpage}(are not)(are) toggled.
\end{tcolorbox}
4.15.4 Spread Box to Page Borders

The following border options are not applicable to nested boxes, boxes inside tables, etc. For boxes inside lists, the options may work, but not necessarily. Also, boxes should be set with `\noindent` and full width.

\begin{tcolorbox}[enhanced,spread inwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\begin{tcolorbox}[enhanced,spread outwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\begin{tcolorbox}[enhanced,fill downwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

\texttt{\begin{tcolorbox}[enhanced,spread inwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}

\texttt{\begin{tcolorbox}[enhanced,spread outwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}

\texttt{\begin{tcolorbox}[enhanced,fill downwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}

\texttt{\begin{tcolorbox}[enhanced,spread inwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}

\texttt{\begin{tcolorbox}[enhanced,spread outwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}

\texttt{\begin{tcolorbox}[enhanced,fill downwards, colframe=blue!75!black,colback=white,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}
This is an example for “spread upwards”.

\begin{tcolorbox}[enhanced,spread upwards,sharp corners=north,height=3cm, colframe=blue!75!black,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread upwards}.
\end{tcolorbox}

```
N 2017-02-13
```

\[ \text{/tcb/spread upwards}=(\text{length}) \] (default \text{0pt}, initially unset)

Combination of \text{/tcb/move upwards}\textsuperscript{\text{P.98}}, \text{/tcb/spread inwards}\textsuperscript{\text{P.98}}, and \text{/tcb/spread outwards}\textsuperscript{\text{P.98}}. The optional \textit{(length)} is used for all these keys.

\begin{tcolorbox}[enhanced,spread inwards=0pt,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread upwards}.
\end{tcolorbox}

```
N 2017-02-13
```

\[ \text{/tcb/spread inwards}=(\text{length}) \] (default \text{0pt}, initially unset)

Combination of \text{/tcb/move inwards}\textsuperscript{\text{P.98}} and \text{/tcb/spread outwards}\textsuperscript{\text{P.98}}. The optional \textit{(length)} is used for all these keys. Also see \text{/tcb/oversize}\textsuperscript{\text{P.50}} and \text{/tcb/grow inwards} by\textsuperscript{\text{P.96}}.

\begin{tcolorbox}[enhanced,spread inwards=0pt,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread inwards}.
\end{tcolorbox}

```
N 2017-02-13
```

\[ \text{/tcb/spread outwards}=(\text{length}) \] (default \text{0pt}, initially unset)

Identical to \text{/tcb/move outwards}\textsuperscript{\text{P.98}}, but without starting a new page.

\begin{tcolorbox}[enhanced,spread outwards=0pt,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread outwards}.
\end{tcolorbox}

```
N 2017-02-13
```

\[ \text{/tcb/spread outwards}=(\text{length}) \] (default \text{0pt}, initially unset)

Combination of \text{/tcb/move outwards}\textsuperscript{\text{P.98}}, \text{/tcb/fill downwards}\textsuperscript{\text{P.98}}, \text{/tcb/spread inwards}\textsuperscript{\text{P.98}}, and \text{/tcb/spread outwards}\textsuperscript{\text{P.98}}. Such, the box fills the whole page. The optional \textit{(length)} is used for all these keys.

\begin{tcolorbox}[enhanced,spread outwards=0pt,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread outwards}.
\end{tcolorbox}

```
N 2017-02-13
```

\[ \text{/tcb/spread downwards}=(\text{length}) \] (default \text{0pt}, initially unset)

Combination of \text{/tcb/fill downwards}\textsuperscript{\text{P.98}}, \text{/tcb/spread inwards}\textsuperscript{\text{P.98}}, and \text{/tcb/spread outwards}\textsuperscript{\text{P.98}}. The optional \textit{(length)} is used for all these keys.

\begin{tcolorbox}[enhanced,spread downwards=0pt,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread downwards}.
\end{tcolorbox}

```
N 2017-02-13
```

\[ \text{/tcb/spread downwards}=(\text{length}) \] (default \text{0pt}, initially unset)

Combination of \text{/tcb/fill downwards}\textsuperscript{\text{P.98}}, \text{/tcb/spread inwards}\textsuperscript{\text{P.98}}, and \text{/tcb/spread outwards}\textsuperscript{\text{P.98}}. The optional \textit{(length)} is used for all these keys.

\begin{tcolorbox}[enhanced,spread downwards=0pt,interior style={top color=blue!50,bottom color=white}]
This is an example for \enquote{spread downwards}.
\end{tcolorbox}

This is an example for “spread downwards”.

99
4.15.5 Box Extrusion

\textbf{The following keys should not be used with breakable boxes or boxes with a lower part.}

\texttt{/tcb/shrink tight} \hspace{1cm} (style, no value, initially unset)

The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the \texttt{/tcb/boxsep} to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

\begin{verbatim}
\tcbsct{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt,
nobeforeafter,tcbox raise base,shrink tight}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\texttt{Lorem \tcbox{ipsum} dolor sit amet, consectetur adipiscing elit.}

This is a \texttt{tcolorbox}.

\texttt{Lorem \texttt{ipsum} dolor sit amet, consectetur adipiscing elit.}

\begin{verbatim}
\tcbsct{enhanced,colframe=red,colback=yellow!25!white,
frame style={opacity=0.25},interior style={opacity=0.5},
nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,
vestibulum ut, placerat ac, adipiscing vitae, felis.
\tcbx{extrude left by=1cm}{Curabitur} dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,
vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
\end{verbatim}

\texttt{U 2014-09-19 /tcb/extrude right by=(length)} \hspace{1cm} (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given \texttt{(length)} to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

\begin{verbatim}
\tcbsct{enhanced,colframe=red,colback=yellow!25!white,
frame style={opacity=0.25},interior style={opacity=0.5},
nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,
vestibulum ut, placerat ac, adipiscing vitae, felis.
\tcbx{extrude right by=1cm}{Curabitur} dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit,
vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.
Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.
\end{verbatim}

\texttt{U 2014-09-19 /tcb/extrude left by=(length)}
The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to the top side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[\text{tcbox}\{\text{enhanced},\text{colframe=}\text{red},\text{colback=}\text{yellow!25!white},\]
\[\text{frame style=}\{\text{opacity=}0.25,\text{interior style=}\{\text{opacity=}0.5,\}
\text{nobeforeafter,tcbox raise base,shrink tight,extrude by=}2\text{mm}\}\]

\[\text{Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibu}
\text{ulum ut, placerat ac, adipiscing vitae, felis. }\text{\textit{Curabitur}}\]
\[\text{dictum gravida mauris. Nam arcu libero, nonummy eget, con}
\text{sectetuer id, vulputate a, magna.}\]

The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[\text{\textit{Curabitur}}\]
\[\text{dictum gravida mauris. Nam arcu libero, nonummy eget, con}
\text{sectetuer id, vulputate a, magna.}\]

The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to all sides. The inner width and the bounding box is kept unchanged and the operation is additive!

\[\text{\textit{Curabitur}}\]
\[\text{dictum gravida mauris. }\text{\textit{Nam}}\]
\[\text{arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. }\text{\textit{Mauris ut leo.}}\]
4.16 Layered Boxes and Every Box Settings

A `tcolorbox` may contain another `tcolorbox` and so on. The package takes track of the nesting level using a counter `tcblayer`. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing `/tcb/every box on layer n`\textsuperscript{103}. If needed, the number of managed layers can be increased by setting `	cbsetmanagedlayers`\textsuperscript{103} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a `/tcb/reset`\textsuperscript{118} by default. You can change this, but be prepared for surprises if you do.

If the defaults are not changed, a `tcolorbox` gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every `	cbset`\textsuperscript{13} command adds or changes options for the following boxes inside the current \TeX{} group.
3. While entering a `tcolorbox`, a `/tcb/every box on layer n`\textsuperscript{103} or `/tcb/every box on higher layers`\textsuperscript{103} option list is applied. With default settings this means:
   - For layer 1 (lowest layer), the `/tcb/every box` option list is applied. Not overwritten options given by a preceding `	cbset`\textsuperscript{13} survive.
   - For layer 2 and above (nested boxes), a `/tcb/reset`\textsuperscript{118} followed by `/tcb/every box` option list is applied. Every resettable options given by a preceding `	cbset`\textsuperscript{13} and by the surrounding box(es) are reset.
4. The ⟨options⟩ given to the `tcolorbox` are applied. Or, if the box was generated by `
ewtcolorbox`\textsuperscript{15} or friends, the ⟨options⟩ given there are applied.
5. If the box was generated by `
ewtcolorbox`\textsuperscript{15} or friends, some automated options are applied.

`/tcb/every box`\textsuperscript{} (style)

By default, this style is empty.

```
% default setting:
\tcbset{every box/.style={}}
```

It may be changed by redefining this style.

```
% setting all boxes to be enhanced:
\tcbset{every box/.style={enhanced}}
```

The alternative for setting something for every box (on every layer) is `	cbsetforverylayer`\textsuperscript{13}:

```
% setting all boxes to be enhanced:
\tcbsetforverylayer{enhanced}
```
Here, \( n \) has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

\[
\begin{verbatim}
% default settings:
\tcbset{
  every box on layer 1/.style={every box},
  every box on layer 2/.style={reset,every box},
  every box on layer 3/.style={reset,every box},
  every box on layer 4/.style={reset,every box},
}
\end{verbatim}
\]

Higher layers are layers above the highest managed layer number (4 by default).

\[
\begin{verbatim}
% default setting:
\tcbset{every box on higher layers/.style={reset,every box}}
\end{verbatim}
\]

{\tcbsetmanagedlayers}{(number)}

Replaces the highest managed layer number by \( \langle \text{number} \rangle \) where 4 is the default. This macro can only be used inside the preamble. Using a \( \langle \text{number} \rangle \) lower than 4 typically makes no sense, but is not forbidden.

\[
\begin{verbatim}
\% \usepackage{lipsum} \tcbuselibrary{skins,breakable}
\tcbset{colframe=red!75!black,fonttitle=\textbf,\
colback=red!5!white,\
every box/.style={enhanced,watermark text=\textetcblayer,\
before=\textpar\textsmallskip,after=\textpar\textsmallskip},\
every box on layer 2/.append style={colback=yellow!10!white,drop fuzzy shadow}}
\tcbsetmanagedlayers{4}
\begin{tcolorbox}[enhanced jigsaw,breakable,title=Layer 1 Box]
Here comes a footnote\footnote{Footnote from layer 1 box}.
\lipsum[2]
\end{tcolorbox}
\end{verbatim}
\]

\[
\begin{verbatim}
\begin{tcolorbox}[title=Layer 2 Box]
abc\textfootnote{The footnote of abc}
\end{tcolorbox}
\end{verbatim}
\]

\[
\begin{verbatim}
\begin{tcolorbox}[title=Another Box,ams equation]
\tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} = \infty.
\end{tcolorbox}
\end{verbatim}
\]

\[
\begin{verbatim}
Some text\footnote{Footnote from some text}.
\begin{tcolorbox}[title=Yet Another Box]
\tcboxfit[height=2cm]{\lipsum[1]}
My text.
\begin{tcolorbox}
Another lipsum text\footnote{A lipsum text}. \lipsum[3]
\end{tcolorbox}
\begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}
\end{verbatim}
\]

Layer 1 Box

Here comes a footnote\footnote{Footnote from layer 1 box}. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam laecus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae

Layer 2 Box

abc

*aThe footnote of abc

Another Box

\[
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (1)
\]

Some text

Yet Another Box


My text.


Layer 4

Layer 4

*aLayer 4 footnote

The End

*aA lipsum text

bLast footnote

*aFootnote from layer 1 box

bFootnote from some text
4.17 Capture Mode

\texttt{/tcb/capture\{mode\}} (no default, initially \texttt{minipage})

The capture \texttt{\{mode\}} defines how the box content is processed. Feasible values for \texttt{\{mode\}} are:

- \textbf{minipage}:
  This is the default \texttt{\{mode\}} for \texttt{tcolorbox}\footnote{P.12}. The content may have an upper and a lower part. Optionally, the box can be \texttt{/tcb/breakable}\footnote{P.403}. The box content is put into a minipage or into something similar to a minipage.

- \textbf{hbox}:
  This is the default \texttt{\{mode\}} for \texttt{\tcbox}\footnote{P.14}. The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is \texttt{/tcb/hbox}.

- \textbf{fitbox} (needs the \texttt{fitting} library)
  This is the default \texttt{\{mode\}} for \texttt{\tcboxfit}\footnote{P.452}. The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is \texttt{/tcb/fit}\footnote{P.457}.

\begin{tcbset}{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[capture=minipage]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[capture=hbox]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[capture=fitbox,height=9mm]% needs the \texttt{fitting} library
This is a tcolorbox.
\end{tcolorbox}
\end{tcbset}

\texttt{/tcb/hbox} (style, no default)

Shortcut for \texttt{capture=\texttt{hbox}}.

\begin{tcbset}{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[hbox]
This is a tcolorbox.
\end{tcolorbox}
\end{tcbset}

\texttt{/tcb/minipage} (style, no default)

Shortcut for \texttt{capture=\texttt{minipage}}.
The text inside a tcolorbox is formatted using a \LaTeX minipage if the box is unbreakable. If breakable, the box tries a mimicry of a minipage. In a minipage or parbox, paragraphs are formatted slightly different as the main text. If the key value is set to false, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended that you use this experimental setting only where you really want to have this feature.

\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}

parbox=true (normal)


parbox=false


Long words at the beginning of paragraphs in very narrow boxes will not be hyphenated using pdflatex. This problem is circumvented by applying the \texttt{hyphenationfix} option.

\begin{tcolorbox}
\texttt{\textbackslash tcbset\{colframe=blue!75!black,}
\texttt{\hspace{1em}fontupper=\texttt{\textbackslash normalsize},}
\texttt{\hspace{1em}colback=blue!5!white,width=4cm\}}
\begin{tcolorbox}
Rechnungsadjunktentochter.\par
Statthaltereikonzipist.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{hyphenationfix}]
Rechnungsadjunktentochter.\par
Statthaltereikonzipist.
\end{tcolorbox}

\texttt{parbox=false} and \texttt{hyphenationfix} should not be used together. They are targeting different box types and they do not blend very well.

4.19 Files

\texttt{\tcb/tempfile=⟨file name⟩} \hspace{1em} (no default, initially \texttt{⟨jobname⟩.tcbtemp})
Sets \texttt{⟨file name⟩} as name for the temporary file which is used inside \texttt{tcbwritetemp} \textsuperscript{P.142} and \texttt{tcbusetemp} \textsuperscript{P.142} implicitly.
4.20 \texttt{tcbox} Specials

The following options are applicable for \texttt{tcbox} \textsuperscript{P.14} and \texttt{tcboxmath} \textsuperscript{P.377} only.

/\texttt{tcb/tcbox raise}=\langle\texttt{length}\rangle \hfill (no default, initially 0pt)

Raises the \texttt{tcbox} \textsuperscript{P.14} by the given \langle\texttt{length}\rangle.

\begin{verbatim}
\begin{tcbitemize}
\end{tcbitemize}
\end{verbatim}

/test\fill
/\texttt{tcb/tcbox raise base}\{Hello World 1\}/\fill
/\texttt{tcb}{Hello World 2}/\fill
/\texttt{tcb/tcbox raise=5mm}\{Hello World 3\}

/\texttt{tcb/tcbox raise base} \hfill (style, no value, initially unset)

Raises the \texttt{tcbox} \textsuperscript{P.14} such that the base of its content matches the base of the environmental line; see example above.

/\texttt{tcb/on line} \hfill (style, no value, initially unset)

Combines /\texttt{tcb/tcbox raise base} with /\texttt{tcb/nobeforeafter} \textsuperscript{P.86}. The resulting box behaves analogue to \texttt{fbox}.

/\texttt{tcb/verbatim} \hfill (style, no value)

Sets options for a verbatim style \texttt{tcbox} \textsuperscript{P.14}. Since the indented boxes may contain only very few words, the dimensions are made smaller and /\texttt{tcb/nobeforeafter} \textsuperscript{P.86} and /\texttt{tcb/tcbox raise base} are set.

/\texttt{DeclareTotalTCBox}{\myverb}{ v }\{verbatim, colframe=red!75!black,colupper=blue\}#{1}

\myverb\{\textbf\} is a \myverb\{\LaTeX\} command.

\textbf\ is a \LaTeX\ command.
Controls how `\tcb` respects a `\tcbwidth` setting. Feasible values for `(mode)` are:

- **auto** (initial setting): ignore `\tcbwidth` and set box width according to its content.
- **auto limited**: Set box width according to its content, if it is smaller than `\tcbwidth`. Otherwise, the content is set like in a `tcolorbox` with line breaks.
- **forced center**: Set box width according to `\tcbwidth`. The content is centered and may overlap the box borders.
- **forced left**: Set box width according to `\tcbwidth`. The content is left aligned and may overlap the box borders.
- **forced right**: Set box width according to `\tcbwidth`. The content is right aligned and may overlap the box borders.
- **minimum center**: Set box width according to `\tcbwidth`, if the content fits into. The content is centered and the box width may grow beyond `\tcbwidth`.
- **minimum left**: Set box width according to `\tcbwidth`, if the content fits into. The content is left aligned and the box width may grow beyond `\tcbwidth`.
- **minimum right**: Set box width according to `\tcbwidth`, if the content fits into. The content is right aligned and the box width may grow beyond `\tcbwidth`.

```
\tcbset{size=small, on line, before upper=\strut,}
\tcbset{colframe=blue!75!black, colback=blue!5!white,}
\tcbset{fontupper=\normalsize, width=4cm}
```

```
\tcb[\tcbwidth=auto]{auto}\quad\tcb[\tcbwidth=auto limited]{auto limited}\quad\tcb[\tcbwidth=forced center]{forced center}\quad\tcb[\tcbwidth=forced left]{forced left}\quad\tcb[\tcbwidth=forced right]{forced right}\quad\tcb[\tcbwidth=minimum center]{minimum center}\quad\tcb[\tcbwidth=minimum left]{minimum left}\quad\tcb[\tcbwidth=minimum right]{minimum right}
```
4.21 Counters, Labels, and References

/tcb/phantom=(code) (no default, initially unset)

The ⟨code⟩ is put in a box at the upper left corner of the tcolorbox. If the tcolorbox is breakable, the ⟨code⟩ is executed for the first box of the break sequence only. If there already was some phantom code given, the new ⟨code⟩ is appended.

The ⟨code⟩ is intended to be used for counter stepping, labelling, and related operations which do not produce visible text.

- The ⟨code⟩ is executed before the title and box content, i.e. counter values are ensured to be increased before usage.
- Labels are ensured to reference the correct page number.
- The ⟨code⟩ is executed only once even during fitting operations for title and box content.
- In combination with the hyperref package, the hyper anchor is set to the upper left corner of the tcolorbox, i.e. links inside the pdf document will jump to the box pleasantly.
- Since the ⟨code⟩ is executed inside a \TeX{} group, only global operations can survive this group.

Examples for the phantom usage are given in Section 17.11 from page 369, e.g. Example 17.1 on page 370.

/tcb/nophantom (no value, initially set)

Removes the phantom code if set before.

/tcb/label=(marker) (no default, initially unset)

The ⟨marker⟩ is set as label text for a reference with the \ref macro. Typically, this option is used for numbered boxes, see Subsection 5.1 from page 123, e.g. /tcb/new/auto counter \rightarrow P.123.

/tcb/phantomlabel=(marker) (no default, initially unset)

Equivalent to /tcb/label for an unnumbered box. A \phantomsection from the package hyperref [15] is used to set a correct hyperlink target. This is not needed for a numbered box.

/tcb/label type=(type) (no default, initially unset)

This option key can be used only in conjunction with the cleveref package [5] which has to be loaded separately. ⟨type⟩ has to be a cross-reference type known to cleveref like theorem, algorithm, result, etc. References made with cleveref will use this type. Note that using label type will result in compilation errors, if cleveref is not loaded. For an example, see Theorem 18.3.5 on page 397.

/tcb/no label type (no value, initially set)

Removes a /tcb/label type, if set before.

/tcb/step=(counter) (no default, initially unset)

Shortcut for phantom={\refstepcounter{#1}}. The given ⟨counter⟩ is increased and ready for labelling. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 123.

/tcb/step and label={(counter)}{(marker)} (no default, initially unset)

Shortcut for using /tcb/step and /tcb/label. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 123.
If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 130 is used, this key describes the \textlangle\textrangle text for an entry into the generated list, e.g.

\textlangle\textrangle\text{list entry={\protect\numberline{\thetcbcounter}My beautiful Example}}

See Section 17.11 from page 369 for a complete example.

This is a shortcut for setting /tcb/list entry to \textlangle\textrangle\text{\protect\numberline{\thetcbcounter}⟨text⟩}. So, the following settings are identical:

\textlangle\textrangle\text{list text={My beautiful Example}, list entry={\protect\numberline{\thetcbcounter}My beautiful Example}}

See Section 17.11 from page 369 for a complete example.

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 130 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \textlangle\textrangle list with the given \textlangle\textrangle type. This issues:

\textlangle\textrangle\text{\addcontentsline{⟨list⟩}{⟨type⟩}{⟨entry text⟩}}

If the \textlangle\textrangle nameref package is loaded, the given \textlangle\textrangle text is used for corresponding \textlangle\textrangle nameref macros. Typically, the \textlangle\textrangle text will be chosen to be identical or nearly identical to the one for /tcb/title → P.23.

\textlangle\textrangle\text{\begin{pabox}\[label={mynamelabel},nameref={Title or anything else}\]{Title text}}
This is a tcolorbox.
\textlangle\textrangle\text{\end{pabox}}
This box is automatically numbered with \textlangle\textrangle\text{\ref{mynamelabel}} on page \textlangle\textrangle\text{\pageref{mynamelabel}}.

The box is titled \textlangle\textrangle\text{"Title or anything else"}.

\textlangle\textrangle\text{Examp. 4.1: Title text}
This is a tcolorbox.

\textlangle\textrangle\text{\begin{pabox}\[label={mynamelabel},nameref={Title or anything else}\]{Title text}}
This is a tcolorbox.
\textlangle\textrangle\text{\end{pabox}}
This box is automatically numbered with 4.1 on page 111.
The box is titled “Title or anything else”.

/tcb/nameref is used automatically inside \textlangle\textrangle\text{\newtcbtheorem}. → P.375.
A `\hypertarget` from the package `hyperref` [15] is used to create an internal link of an anchor `<marker>`. This `<marker>` can be referenced by `\hyperlink` or `/tcb/hyperlink`. 

```latex
\begin{tcolorbox}[enhanced,
colback=red!10,colframe=red!50!black,
hypertarget=hypertwinA,
hyperlink=hypertwinB,
title=Box A]
Click me to jump to Box B.
\end{tcolorbox}
```

Sets a PDF bookmark with the given `<text>`, if the package `bookmark` [10] is loaded. This bookmark is set with an automated destination (the current box) and is set one level below the current bookmark level.

```latex
\begin{tcolorbox}[colback=blue!10,colframe=blue!50!black,
bookmark=Example for using a bookmark,
title=Example for using a bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}
```

Identical to `/tcb/bookmark`, but additional `<options>` from the package `bookmark` [10] can be given.

```latex
\begin{tcolorbox}[colback=red!10,colframe=red!50!black,
bookmark*={color=red,italic,bold}
{Another bookmark example},
title=Red and bold bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}
```

Adds an index `<entry>` for the box. This is a shortcut for setting `\index{<entry>}` to `/tcb/phantom` P.110.

```latex
\index{<entry>}
```

Adds an `<entry>` to an index with a specific `<name>`. This is a shortcut for setting `\index[<name>]{<entry>}` to `/tcb/phantom` P.110. An index extension package like `imakeidx` has to be loaded to use this option key.

```latex
\index*[<name>]{<entry>}
```
4.22 Even and Odd Pages

Also see /tcb/toggle left and right → P.51 and /tcb/toggle enlargement → P.97 for further even/odd options.

/tcb/check odd page=true|false  (default true, initially false)
If set to true, a precise even/odd page testing for the current box is applied. This is done by using labels. If a box moves to another page, the document has to be compiled twice for the correct settings. If set to false, even/odd page tests may give wrong results for the first box of a page.

/tcb/toggle left and right → P.51, /tcb/toggle enlargement → P.97, and /tcb/if odd page automatically set check odd page, but for \tcbifoddpage → P.115 this option has to be set explicitly.

/tcb/if odd page={⟨odd options⟩}{⟨even options⟩}  (style, no default)
If the current box is on an odd page, the ⟨odd options⟩ are applied. On an even page, the ⟨even options⟩ are applied. /tcb/check odd page is automatically set for precise even/odd page testing.

\begin{tcolorbox}[if odd page={colback=yellow!50}{colback=red!50}]
This box is colored in yellow on an odd page
and is colored in red on an even page.
\end{tcolorbox}

This box is colored in yellow on an odd page and is colored in red on an even page.

If a box is /tcb/breakable → P.403, using /tcb/if odd page only acts upon the first box. If the setting should be repeated for every partial box of the break sequence, the option should be packed into /tcb/extras → P.410. In this case, /tcb/check odd page has to be set explicitly! Also see /tcb/if odd page* → P.114.

/tcb/if odd page or oneside={⟨odd options⟩}{⟨even options⟩}  (style, no default)
For onesided documents, the ⟨odd options⟩ are applied always. For twosided documents, this style is identical to /tcb/if odd page.
This option needs the \texttt{breakable} library, see Section 19 on page 401.

For breakable boxes, if the current partial box is on an odd page, the \texttt{(odd options)} are applied. On an even page, the \texttt{(even options)} are applied. \texttt{/tcb/check odd page}^\textsuperscript{P.113} is automatically set for precise even/odd page testing.

In contrast to \texttt{/tcb/if odd page}^\textsuperscript{P.113}, \texttt{/tcb/if odd page*} is used on \texttt{every} partial box of a break sequences and not only on the \texttt{first} box. Another difference is that \texttt{/tcb/if odd page*} is applied quite \texttt{late} during option processing, while \texttt{/tcb/if odd page}^\textsuperscript{P.113} is applied immediately.

\texttt{/tcb/if odd page*} is implemented as \texttt{/tcb/if odd page}^\textsuperscript{P.113} packed into \texttt{/tcb/extras}^\textsuperscript{P.410}.

\begin{tcolorbox}[breakable,if odd page*={colback=yellow!50}{colback=red!50}]
This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots\ sequence for a long content.
\end{tcolorbox}

\begin{tcolorbox}[breakable,if odd page*={colback=yellow!50}{colback=red!50}]
This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots\ sequence for a long content.
\end{tcolorbox}

For onesided documents, the \texttt{(odd options)} are applied always. For twosided documents, this style is identical to \texttt{/tcb/if odd page*}.
If the current box is on an odd page, the \textit{odd code} is executed. On an even page, the \textit{even code} is executed. For precise even/odd page testing, the \texttt{tcb/check odd page} \textsuperscript{P.113} has to be set manually inside the box options.

The macro \texttt{tcbifoddpage} can be used inside underlay, overlay, or watermark code to test if the box is on an odd page. This will work also for boxes in a break sequence.

The macro can also be used inside the box \texttt{content text}. For unbreakable boxes, the correct page test is applied. But for /tcb/breakable \textsuperscript{P.403} boxes, \texttt{tcbifoddpage} will always give the result for the page of the first box inside the box \texttt{content text}. If needed, the methods from the packages \texttt{changepage} or \texttt{ifoddpage} could be used here.

\begin{tcolorbox}
\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white,fonttitle=\bfseries}
begin{tcolorbox}[enhanced,check odd page,
title={Example for a box on an \texttt{tcbifoddpage}\{odd\}{even} page},
watermark text={\texttt{tcbifoddpage}\{Odd\}{Even} page!}]
lipsum[1]
end{tcolorbox}
\end{verbatim}
\end{tcolorbox}


\begin{tcolorbox}
\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white,fonttitle=\bfseries}
begin{tcolorbox}[enhanced,check odd page,
title={Example for a box on an odd page},
watermark text={\texttt{tcbifoddpage}\{Odd\}{Even} page!}]
lipsum[1]
end{tcolorbox}
\end{verbatim}
\end{tcolorbox}

For onesided documents, the \textit{odd code} is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.
This is a unique identifier (arabic number) for a tcolorbox. It is locally defined inside boxes and has no meaning outside. It is used for precise even/odd page testing, but may also be valuable for elaborate user code.

\begin{tcolorbox}[colback=yellow!5,title=Box \thetcolorboxnumber]
This box is \thetcolorboxnumber.
\tcbox[on line,size=fbox]{This box is \thetcolorboxnumber} and
\tcbox[on line,size=fbox]{this box is \thetcolorboxnumber}.
This box is \thetcolorboxnumber.
\end{tcolorbox}

Box 1223
This box is 1223. This box is 1224 and this box is 1225. This box is 1223.

This macro contains the expanded arabic page number of the current tcolorbox. It is locally defined inside boxes and has no meaning outside. It is precise only, if /tcb/check odd page was set.

\begin{tcolorbox}[colback=yellow!5,check odd page, title=Box on page \thetcolorboxpage]
This box is located on page \thetcolorboxpage.
\end{tcolorbox}

Box on page 116
This box is located on page 116.
4.23 Externalization

See Section 25 on page 479 for the \texttt{external} library of \texttt{tcolorbox}.

If the \texttt{externalization} library of the \texttt{tikz} package is used and \texttt{/tcb/graphical environment} \textsuperscript{\texttt{\_\_P.151}} is set to \texttt{tikzpicture}, a \texttt{tcolorbox} could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that \texttt{\_\_tikzexternaldisable} is set before a \texttt{tcolorbox} is used. If you typically use the pattern \texttt{\_\_tikzexternalenable some picture \_\_tikzexternaldisable}, there is nothing to care about.

- If \texttt{externalization} is enabled globally, use \texttt{/tcb/shield externalize} to shield any \texttt{tcolorbox}. The preamble code could look like this:

\begin{verbatim}
\usepackage{tikzlibrary{external}}
\tikzexternalize
\tcbset{shield externalize}
\end{verbatim}

\texttt{/tcb/shield externalize=true|false} \textsuperscript{\texttt{(default true, initially false)}}

If set to \texttt{true}, the drawing part of the \texttt{tcolorbox} is not being externalized which is a good thing at the current state of art. Nevertheless, if the \texttt{tcolorbox} contains a \texttt{tikzpicture}, this picture is still externalized. Pictures drawn with help of \texttt{/tcb/tikz upper} \textsuperscript{\texttt{\_\_P.77}} or alike are not externalized.

If a \texttt{tcolorbox} is used inside a node of an encircling \texttt{tikzpicture} which is externalized, do not use \texttt{\_\_tikzexternaldisable} in front of the \texttt{tcolorbox}. \texttt{/tcb/shield externalize} is deactivated automatically inside a \texttt{tikzpicture}.

\texttt{/tcb/shield externalize} is applied for every following \texttt{tcolorbox} inside the current \TeX group and is not affected by \texttt{/tcb/reset} \textsuperscript{\texttt{\_\_P.118}}.

\texttt{/tcb/external=(file name)} \textsuperscript{\texttt{(no default, initially unset)}}

Convenience option which calls \texttt{\_\_tikzsetnextfilename{(file name)}}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to set the externalization \texttt{(file name)} for the first \texttt{tikzpicture} which is discovered \texttt{inside} the box content. The package \texttt{tikz} \textsuperscript{\texttt{\_\_P.22}} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\_\_usetikzlibrary{external}} has to be used.

\texttt{/tcb/remake=true|false} \textsuperscript{\texttt{(default true, initially false)}}

Convenience option which calls \texttt{\_\_tikz/external/remake next}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to force the remake of the first \texttt{tikzpicture} which is discovered \texttt{inside} the box content. The package \texttt{tikz} \textsuperscript{\texttt{\_\_P.22}} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\_\_usetikzlibrary{external}} has to be used.
4.24 Miscellaneous

\texttt{/tcb/reset} (no value, initially set)

Sets (nearly) all \texttt{tcolorbox} settings (including loaded libraries) back to their default values plus any settings given by \texttt{\tcbsetforeverylayer}"P.13, \texttt{\tcb/savedelimiter}"P.31, \texttt{\tcb/capture}"P.105, and \texttt{\tcb/shield externalize}"P.117 keep their values. Also, all raster values (see Section 16 on page 308) are not resetted.

This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the \texttt{reset} is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 4.16 from page 102.

\texttt{/tcb/code=\{code\}} (no default, initially unset)

The given \{\texttt{code}\} is executed immediately. This option is useful to place some arbitrary code into an option list.

\begin{tcolorbox}
\texttt{\tcbset\{colback=red!5!white, colframe=red!75!black, code={Useless at this spot but functional.}, fonttitle=bfseries\}}
\begin{tcolorbox}
\texttt{\begin{tcolorbox}\{code={\newcommand{\mycommand}{\textit{working}}}, title=My \mycommand\ title\} This is a \textbf{tcolorbox}. \end{tcolorbox}}}
\end{tcolorbox}
\end{tcolorbox}

Useless at this spot but functional.

\begin{tcolorbox}
\textbf{My working title}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}
Wraps the `\tl_if_blank:n(TF)` command(s) of `expl3` for option setting. If the ⟨token list⟩ consists only of blank spaces or is entirely empty, the ⟨true options⟩ are set. Otherwise, the ⟨false options⟩ are set.

\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{ }
This is a tcolorbox.
\end{mybox}

\begin{mybox}{ }{colframe=red}{title=`#1'}
This is a tcolorbox.
\end{mybox}

Wraps the `\tl_if_empty:n(TF)` command(s) of `expl3` for option setting. If the ⟨token list⟩ is entirely empty, the ⟨true options⟩ are set. Otherwise, the ⟨false options⟩ are set.

\begin{mybox}{My title}
This is a tcolorbox.
\end{mybox}

\begin{mybox}{ }
This is a tcolorbox.
\end{mybox}

\begin{mybox}{ }{colframe=red}{title=`#1'}
This is a tcolorbox.
\end{mybox}
Wraps the \IfNoValueTF command(s) of \texttt{xparse} for option setting. If the \texttt{argument} has no value, the \texttt{true options} are set. Otherwise, the \texttt{false options} are set.

\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}[goldshade.png]
This is a tcolorbox.
\end{mybox}

Wraps the \IfValueTF command(s) of \texttt{xparse} for option setting. If the \texttt{argument} has a value, the \texttt{true options} are set. Otherwise, the \texttt{false options} are set.

\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}[My title]
This is a tcolorbox.
\end{mybox}
Wraps the \IfBoolean(TF) command(s) of \texttt{xparse} for option setting. If the \texttt{⟨argument⟩} is \texttt{\BooleanTrue}, the \texttt{⟨true options⟩} are set. If the \texttt{⟨argument⟩} is \texttt{\BooleanFalse}, the \texttt{⟨false options⟩} are set.

\begin{Verbatim}
\DeclareTColorBox{mybox}{ s }{colframe=red!75!black, 
   IfBooleanTF={#1}{colback=yellow!50!red}{colback=red!5!white}}
\end{Verbatim}

\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}*
This is a tcolorbox.
\end{mybox}

This is a tcolorbox.

This is a tcolorbox.
Annihilates the current \texttt{tcolorbox} as far as possible. Basically, this comments out the whole \texttt{tcolorbox} by using a key. If the option list of the current \texttt{tcolorbox} contains arbitrary code with global impact (like counter settings), these actions are not undone automatically. Nevertheless, the effects of \texttt{/tcb/phantom} → P.110, \texttt{/tcb/step} → P.110, \texttt{/tcb/new/auto counter} → P.123, etc., are removed by \texttt{/tcb/void}.

\begin{tcolorbox}[
   title=This box is completely removed by the following key,
   void
]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This option key cannot be applied for every situation. For example, if several box environments with the same environment name are nested, for the outer environment \texttt{/tcb/void} cannot be used, since the end of the inner environment will be misinterpreted as end of the outer environment. Also, \texttt{/tcb/void} cannot be used for environments wrapped with \texttt{\tcolorboxenvironment} → P.22.

\begin{tcolorbox}[
   title=This box is completely removed by the following key,
   nirvana
]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
Nested Box
\end{tcolorbox}

The contents of the current \texttt{tcolorbox} are processed including counter settings, but the box is just not drawn. Therefore, \texttt{/tcb/nirvana} is less radical than \texttt{/tcb/void} and several box environments can be nested without problems.

\begin{tcolorbox}[
   title=This box is completely removed by the following key,
   nirvana
]
This is a \textbf{tcolorbox}.
\begin{tcolorbox}
Nested Box
\end{tcolorbox}
\end{tcolorbox}
5 Initialization Option Keys

The initialization options are only applicable for the generation of new environments and commands based on \texttt{tcolorbox} and friends. Particularly, they can be used for

- \texttt{\newtcolorbox}\textsuperscript{P.15},
- \texttt{\newtcbox}\textsuperscript{P.19},
- \texttt{\newtclisting}\textsuperscript{P.334},
- \texttt{\newtcblisting}\textsuperscript{P.338},
- \texttt{\newtcbtheorem}\textsuperscript{P.375}, and
- \texttt{\newtcboxfit}\textsuperscript{P.454}.

Typically, these options may generate counters and alike. It is strongly recommended that you use initialization options inside the preamble only. Otherwise, you may get trouble when using \LaTeX{}'s \texttt{\include} features. Also, it is recommended to generate new environments and commands with these options after \texttt{hyperref} is loaded to avoid warnings about duplicate identifiers.

5.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by \texttt{\thetcbcounter}, e.g. inside the title of the box. The real counter name is stored inside \texttt{\tcbcounter}.

\texttt{/tcb/new/auto counter} \hfill (no value, initially unset)

Creates a new counter automatically. With \texttt{/tcb/new/number format}\textsuperscript{P.125} and \texttt{/tcb/new/number within}\textsuperscript{P.125}, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\texttt{\begin{pabox}[label={myautocounter}]{Title with number}}

This box is automatically numbered with \texttt{\ref{myautocounter}} on page \texttt{\pageref{myautocounter}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.

\texttt{\end{pabox}}

\begin{verbatim}
\begin{pabox}[label={myautocounter}]{Title with number}
This box is automatically numbered with \ref{myautocounter} on page \pageref{myautocounter}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.
\end{pabox}
\end{verbatim}

Examp. 5.1: Title with number

This box is automatically numbered with 5.1 on page 123. Inside the box, the 5.1 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.

123
/tcb/new/use counter from\{tcolorbox\} \hspace{1em} (no default, initially unset)

Here, a counter from another \{tcolorbox\} is reused. Note that the settings for /tcb/new/number format→^\text{P.125} and /tcb/new/number within→^\text{P.125} are inherited and cannot be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\newtcolorbox[use counter from=pabox]{mybox}[2]\{%
  colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries,
  title=Some Box \thetcbcounter: #2,#1
\%
\begin{mybox}[label={myusecounterfrom}]{Title with continued number}
This box is automatically numbered with \texttt{\ref{myusecounterfrom}} on page \texttt{\pageref{myusecounterfrom}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.
\end{mybox}

Some Box 5.2: Title with continued number

This box is automatically numbered with 5.2 on page 124. Inside the box, the 5.2 can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.

/tcb/new/use counter\{counter\} \hspace{1em} (no default, initially unset)

Here, an ordinary existing \LaTeX\ \{counter\} is used for numbering. With /tcb/new/number format→^\text{P.125} and /tcb/new/number within→^\text{P.125}, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

% \newcounter{myexample}% preamble
\newtcolorbox[use counter=myexample,number format=\Alph\}{mybox}[2]\{%
  colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
  title=Some Box \thetcbcounter: #2,#1
\%
\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with \texttt{\ref{myusecounter}} on page \texttt{\pageref{myusecounter}}. Inside the box, the \texttt{\thetcbcounter} can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.
\end{mybox}

Some Box A: Title with \LaTeX\ number

This box is automatically numbered with A on page 124. Inside the box, the A can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.

/tcb/new/use counter*=\{counter\} \hspace{1em} (no default, initially unset)

An existing \LaTeX\ \{counter\} is used for numbering. In contrast to /tcb/new/use counter, the options /tcb/new/number format→^\text{P.125} and /tcb/new/number within→^\text{P.125} are ignored. Use this for counters which are already configured outside the \texttt{tcolorbox} package, e.g. the standard \texttt{figure} counter.

/tcb/new/no counter \hspace{1em} (no value, initially set)

The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.

/tcb/new/reset counter on overlays=true|false \hspace{1em} (default true, initially false)

For \texttt{beamer} slides, this invokes the \texttt{\resetcounteronoverlays} command for the box counter. The counter is automatically reset on subsequent overlay slides of a frame. Thereby, the counter will be the same on all slides of every frame.
\texttt{/tcb/new/number within}=(\textit{counter}) \hspace{1cm} (no default, initially unset)

The automatic counter is set to zero, if \textit{\langle counter \rangle} is increased. Additionally, during output, the value of \textit{\langle counter \rangle} is prepended to the value of the automatic counter.

To prepend the automatic counter with the chapter number and to reset it with every new chapter, use:

\begin{verbatim}
number within=\textit{chapter}
\end{verbatim}

See \texttt{/tcb/new/use counter \textsuperscript{P.124}} for a complete example.

\texttt{/tcb/new/number format}=(\textit{format macro}) \hspace{1cm} (no default, initially \texttt{\arabic})

Declares the format of the automatic counter. The \textit{\langle format macro \rangle} can be any valid \LaTeX\ number formatting macro like \texttt{\arabic}, \texttt{\roman}, etc.

To display the counter value in large roman numbers, use:

\begin{verbatim}
number format=\Roman
\end{verbatim}

See \texttt{/tcb/new/auto counter \textsuperscript{P.123}} for a complete example.

\texttt{/tcb/new/number freestyle}=\langle \textit{code} \rangle \hspace{1cm} (no default, initially unset)

Allows advanced control over the complete number format. This option overrules the format given by \texttt{/tcb/new/number within} and \texttt{/tcb/new/number format}. Nevertheless, you can combine it with \texttt{/tcb/new/number within} to get the desired reset property.

The \textit{\langle code \rangle} is some formatting code which should contain \texttt{\tcbcounter} to reference the automated counter. Since this \textit{\langle code \rangle} is expanded, you have to secure each macro with \texttt{\noexpand} with exception of \texttt{\tcbcounter}.

\begin{verbatim}
Definition in the preamble:
\newtcolorbox[auto counter,number within=section, number freestyle={\langle Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter}\rangle}, 1\{\phbox\}[2]\{\%
colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries, title=Question-\texttt{\tcbcounter}\#2\#1}
\end{verbatim}

\begin{verbatim}
\begin{phbox}[label={myfreestyle}]\{Title with freestyle number\}
This box is automatically numbered with \texttt{\ref{myfreestyle}} on page \texttt{\pageref{myfreestyle}}. Inside the box, the \texttt{\tcbcounter} can also be referenced by \texttt{\themcbcounter}.
The real counter name is \texttt{\texttt{tcb@cnt@phbox}}.
\end{phbox}
\end{verbatim}

\textit{Question (Q/5/A): Title with freestyle number}

This box is automatically numbered with \texttt{(Q/5/A)} on page 125. Inside the box, the \texttt{(Q/5/A)} can also be referenced by \texttt{\tcbcounter}. The real counter name is \texttt{tcb@cnt@phbox}. 

125
The following options \texttt{/tcb/new/crefname} and \texttt{/tcb/new/Crefname} need to be set inside the preamble.

\texttt{/tcb/new/crefname}={\langle singular\rangle}{\langle plural\rangle} \hspace{1cm} (no default, initially unset)

This option key can be used only in conjunction with the \texttt{cleveref} package \cite{5} which has to be loaded separately. It creates a cross-reference type for the new \texttt{tcolorbox}'es, where the lowercase \langle singular\rangle \ and \langle plural\rangle \ forms of the cross-reference are given. This type is the environment or macro name and \texttt{/tcb/label type} \textsuperscript{P.110} \ is set automatically. See \texttt{/tcb/label type} \textsuperscript{P.110} \ and \cite{5} for more information.

\texttt{/tcb/new/Crefname}={\langle singular\rangle}{\langle plural\rangle} \hspace{1cm} (no default, initially unset)

This option key can be used only in conjunction with the \texttt{cleveref} package \cite{5} which has to be loaded separately. It creates a cross-reference type for the new \texttt{tcolorbox}'es, where the uppercase \langle singular\rangle \ and \langle plural\rangle \ forms of the cross-reference are given. This type is the environment or macro name and \texttt{/tcb/label type} \textsuperscript{P.110} \ is set automatically. See \texttt{/tcb/label type} \textsuperscript{P.110} \ and \cite{5} for more information.

\textbf{Definition in the preamble:}
\begin{verbatim}
% \usepackage{cleveref}
\newtcolorbox[auto counter,number within=section, 
crefname={bluebox}{blueboxes}]{mybluebox}[2]{
\begin{mybluebox}[label={myreference}]{My title}
This is an example.
\end{mybluebox}
\Cref{myreference}, \cref{myreference}.\Cpageref{myreference}, \cpageref{myreference}.\nameCref{myreference}, \namecref{myreference}.\labelcref{myreference}, \labelcpageref{myreference}.\Vref{myreference}, \vref{myreference}.\Vref*{myreference}, \vref*{myreference}.
\end{verbatim}

Bluebox 5.1: My title
\begin{mybluebox}[label={myreference}]{My title}
This is an example.
\end{mybluebox}

Bluebox 5.1, bluebox 5.1.
Page 126, page 126.
Bluebox, bluebox.
5.1, 126.
With \texttt{varioref}:
Bluebox 5.1, bluebox 5.1.
Bluebox 5.1, bluebox 5.1.
Used to comfortably blend into an existing schema of naming and numbering for some selected cases. For example, a \texttt{tcolorbox} can be used to display and entitle an image pretending to be a standard figure environment. Here, /tcb/title \texttt{\textasciitilde P.23} is used instead of the standard \texttt{\caption} and /tcb/list text \texttt{\textasciitilde P.111} can be used instead of the optional parameter of the standard \texttt{\caption}.

Feasible values for \texttt{\langle name \rangle} are:

- **figures**: blend into the standard figure environment.
- **tables**: blend into the standard table environment.
- **listings**: blend into the standard \texttt{lstlisting} environment of the package listings [6].

Note that \texttt{blend into=listings} can only be used in the document content or, preferably, inside a \texttt{\AtBeginDocument} clause! Using it without \texttt{\AtBeginDocument} inside the preamble does not work since the listings packages initializes its counter also inside \texttt{\AtBeginDocument}.

```latex
\begin{figure}[htb]
    \centering
    \includegraphics[height=4cm]{lichtspiel.jpg}
    \caption{A standard figure}
\end{figure}

\begin{tcolorbox}[blend into=figures,]{myfigure}[2]
    \centering
    \includegraphics[height=4cm]{lichtspiel.jpg}
\end{tcolorbox}
```

Figure 1: A standard figure

Figure 2: A tcolorbox figure
This option formats the title output of /tcb/new/blend into. Note that this is a common tcolorbox option which should be set globally or in the normal option part of \newtcolorbox.

Feasible values for ⟨value⟩ are:

- **colon**: use name/number plus colon.
- **dash**: use name/number plus dash.
- **colon hang**: use name/number plus colon with hanging indent.
- **dash hang**: use name/number plus dash with hanging indent.

```latex
\newtcolorbox[blend into=figures]{myfigure}[2][]{float=htb,capture=hbox,blend before title=dash hang,title={#2},every float=\centering,#1}

\begin{myfigure}{A tcolorbox figure with quite a long title}
    \includegraphics[height=5cm]{lichtspiel.jpg}
\end{myfigure}
```

Figure 3 – A tcolorbox figure with quite a long title
This option formats the title output of `/tcb/new/blend` into P.127. The `<code>` takes one parameter, the name/number. Use this, if `/tcb/blend before title` is not flexible enough.

\newtcolorbox[blend into=figures]{myfigure}[2]{float=htb,capture=hbox,blend before title code={\fbox{##1}\ },title={#2},every float={\centering,#1}

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}
5.2 Lists of tcolorboxes

For figures and tables, \LaTeX{} provides the \texttt{\listoffigures} and \texttt{\listoftables} commands to create lists of these numbered entities. Also, a \texttt{tcolorbox} can be part of such a kind of list.

1. Assign a list \langle name \rangle by the \textit{initialization} option /\texttt{tcb/new/list} inside.

2. Optionally, a new \langle type \rangle for list entries may be assigned by the \textit{initialization} option /\texttt{tcb/new/list type}.

3. List entries a generated automatically within each new \texttt{tcolorbox} using the above initialization.
   - If /\texttt{tcb/list entry} \textsuperscript{\texttt{P.111}} is set, the entry is generated with it.
   - Otherwise, if /\texttt{tcb/title} \textsuperscript{\texttt{P.23}} is set, the entry is generated with it.
   - Otherwise, the entry is generated with the current number and the environment name.

4. The generated list is displayed by \texttt{\tcblistof} \textsuperscript{\texttt{P.131}}.

\texttt{/tcb/new/list inside=\langle name \rangle} \hspace{1cm} \texttt{(no default, initially unset)}

Assigns a list or contents file to the generated \texttt{tcolorbox}es. Entries to this list are saved to a file which gets the \langle name \rangle as file name extension. The list is referenced by this name in \texttt{\tcblistof} \textsuperscript{\texttt{P.131}}. For example:

\begin{verbatim}
list inside=exam
\end{verbatim}

See Section 17.11 from page 369 for a complete example.

\texttt{/tcb/new/list type=\langle type \rangle} \hspace{1cm} \texttt{(no default, initially \texttt{tcolorbox})}

Optionally, some \langle type \rangle can be assigned to the list entries. For a new \langle type \rangle, a macro \texttt{\l@\langle type \rangle} has to exist which controls the format of the list entry. The default type is defined by

\begin{verbatim}
\newcommand*{\l@tcolorbox}{\@dottedtocline(1){1.5em}{2.3em}}
\end{verbatim}

This is identical to the \texttt{\l@section} setting of \LaTeX{}. \texttt{\l@tcolorbox} can be redefined or a new \langle type \rangle can be assigned.
\texttt{\textbackslash tcblistof} \{\texttt{\textbackslash macro}\}\{\texttt{name}\}\{\texttt{\textbackslash short}\}\{\texttt{title text}\}

Displays the generated list of \texttt{tcolorboxes} with the given \texttt{name}. The heading is generated by \texttt{\textbackslash macro}\{\texttt{\textbackslash short}\}\{\texttt{title text}\} where \texttt{\textbackslash section} is the default setting for \texttt{\textbackslash macro}. Here, as usual, \texttt{title text} is the title of the section or chapter while \texttt{\textbackslash short} is a shorter title for headings and table of contents.

- If \texttt{\textbackslash macro} ends with a *, \texttt{\textbackslash tcblistof} mimics the behavior of \texttt{\textbackslash listoffigures} from the standard \LaTeX classes and adds the title to the left and right mark for headings.
- If \texttt{\textbackslash macro} starts with \texttt{\textbackslash chapter}, a possible two column document setting is restored to one column (as standard \LaTeX classes do for \texttt{\textbackslash listoffigures}).

To display the list inside a subsection, use for example:

\texttt{\textbackslash tcblistof}\{\texttt{\textbackslash subsection}\}\{\texttt{exam}\}\{List of Exercises\}

The result of the example is found as Subsection 17.12 on page 372.

To apply the list similar to \texttt{\textbackslash listoffigures} for a report or book, use for example:

\texttt{\textbackslash tcblistof}\{\texttt{\textbackslash chapter*}\}\{\texttt{exam}\}\{List of Exercises\}

To set a short title for headings with the default \texttt{\textbackslash section} setting, use for example:

\texttt{\textbackslash tcblistof}\{\texttt{exam}\}\{List of Exercises\}\{Elaborate List of Fine Exercises for all Students of my Course\}

! The core of the list is generated by \texttt{\textbackslash starttoc}\{\texttt{name}\} which can be wrapped into an own macro.
6 Side by Side

A side by side box is a special \texttt{tcolorbox} \footnote{P.12} where the upper and lower part of the box are set side by side. All boxes of this kind are unbreakable.

Further side by side options for code examples are \texttt{/tcb/listing side text} \footnote{P.350}, \texttt{/tcb/text side listing} \footnote{P.350}, \texttt{/tcb/listing outside text} \footnote{P.350}, and \texttt{/tcb/text outside listing} \footnote{P.351}.

6.1 Basic Settings

\texttt{/tcb/sidebyside=true|false} \footnote{(default true, initially false)}

Normally, the upper part and the lower part of the box have their positions as their names suggest. If \texttt{sidebyside} is set to \texttt{true}, the upper part is drawn \textit{left-handed} and the lower part is drawn \textit{right-handed}. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

\begin{tcolorbox}
\texttt{\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}
\begin{tcolorbox}[title=My title,sidebyside]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
\texttt{\begin{tcolorbox}[bicolor,sidebyside,righthand width=3cm,sharp corners,boxrule=.4pt,colback=green!5,colbacklower=green!50!black!50]}
\lipsum[2]
\tcblower
\% \texttt{\includegraphics[width=\linewidth]{goldshade}}
\end{tcolorbox}
\end{tcolorbox}

Sets the vertical \textlt{alignment} for the left-handed and right-handed part.

Feasible values for \textlt{alignment} are:

- \textbf{center}: identical to \texttt{minipage} option \texttt{c}.
- \textbf{top}: identical to \texttt{minipage} option \texttt{t} (aligns the top lines of the left-handed and right-handed side according to their baselines).
- \textbf{bottom}: identical to \texttt{minipage} option \texttt{b} (aligns the bottom lines of the left-handed and right-handed side according to their baselines).
- \textbf{center seam}: aligns the center of the left-handed and right-handed side.
- \textbf{top seam}: aligns the very top seam of the left-handed and right-handed side.
- \textbf{bottom seam}: aligns the very bottom seam of the left-handed and right-handed side.

\begin{tcolorbox}[adjusted title=center,sidebyside align=center]
This is a text which is too long for one line.
tclower
This is a short text.
\end{tcolorbox}
\hfill
\begin{tcolorbox}[adjusted title=top,sidebyside align=top]
This is a text which is too long for one line.
tclower
This is a short text.
\end{tcolorbox}
\hfill
\begin{tcolorbox}[adjusted title=bottom,sidebyside align=bottom]
This is a text which is too long for one line.
tclower
This is a short text.
\end{tcolorbox}

\textbf{center}, \textbf{top}, and \textbf{bottom} are identical to the known corresponding \texttt{minipage} options. While this is the preferred approach for text content, the result for boxed content like tables or images may not be as expected.

For such content, one may use \textbf{center seam}, \textbf{top seam}, and \textbf{bottom seam}. For example, \textbf{top seam} aligns the very top seam of the left-handed and right-handed side.
center seam

This is my description text for the pictures displayed on the right-handed side.

---

top seam

This is my description text for the pictures displayed on the right-handed side.

---

bottom seam

This is my description text for the pictures displayed on the right-handed side.
/tcb/sidebyside gap = (length)  
(no default, initially 10mm)

Sets the horizontal distance between the left-handed and right-handed part to \langle length \rangle.

\begin{tcolorbox}[adjusted title=Wide gap, sidebyside gap=30mm]
This is a text which is too long for one line.
\end{tcolorbox}
\hfill
\begin{tcolorbox}[adjusted title=Narrow gap, sidebyside gap=1mm]
This is a text which is too long for one line.
\end{tcolorbox}

/tcb/lefthand width = (length)  
(no default, initially unset)

Sets the width of the left-handed part to the given \langle length \rangle.

\begin{tcolorbox}[title=My title, sidebyside, lefthand width=3cm]
This is the upper (left-handed) part.
\end{tcolorbox}

/tcb/righthand width = (length)  
(no default, initially unset)

Sets the width of the right-handed part to the given \langle length \rangle.

\begin{tcolorbox}[title=My title, sidebyside, righthand width=3cm]
This is the upper (left-handed) part.
\end{tcolorbox}
\texttt{/tcb/lefthand ratio=(fraction)} \hspace{1cm} \text{(no default, initially 0.5)}

Sets the width of the left-handed part to the given \textit{(fraction)} of the available space. \textit{(fraction)} is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,lefthand ratio=0.25]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}

\textbf{My title}

This is the upper (left-handed) part. \hspace{1cm} This is the lower (right-handed) part.

\texttt{/tcb/righthand ratio=(fraction)} \hspace{1cm} \text{(no default, initially 0.5)}

Sets the width of the right-handed part to the given \textit{(fraction)} of the available space. \textit{(fraction)} is a value between 0 and 1.

\begin{tcolorbox}[title=My title,sidebyside,righthand ratio=0.25]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}

\textbf{My title}

This is the upper (left-handed) part. \hspace{1cm} This is the lower (right-handed) part.
If one side of a side-by-side box should be adapted to the width of its content, this width has to be computed beforehand. The following example uses a savebox \mysavebox to store the picture to determine its width. A more convenient way to handle this task is to use the methods from Section 6.2 on page 138.

\begin{tikzpicture}
\path[fill=red!20,draw=red!50!black]
(0,0) node[below]{A} -- (3,1) node[right]{B}
-- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}

6.2 Advanced Settings

\texttt{\textbackslash tcbsidebyside[\langle options\rangle]\{\langle left-handed content\rangle\}\{\langle right-handed content\rangle\}}

Creates a colored box using more or less arbitrary \langle options\rangle for a \texttt{tcolorbox}\textsuperscript{P.12}. The \texttt{/tcb/sidebyside}\textsuperscript{P.132} option is set to \texttt{true} and the \langle left-handed content\rangle and \langle right-handed content\rangle is filled into the box appropriately. The resulting box is unbreakable. \texttt{\textbackslash tcbsidebyside} is not only a shortcut for using a normal \texttt{tcolorbox}\textsuperscript{P.12} with \texttt{/tcb/sidebyside}\textsuperscript{P.132}, but allows setting further options like \texttt{/tcb/sidebyside adapt}\textsuperscript{P.139} and \texttt{/tcb/sidebyside switch}\textsuperscript{P.141}.

\begin{verbatim}
\% \tcbsuselibrary{skins,xparse}
\% \usepackage{lipsum}
\tcbsidebyside[title=The Triangle,
   sidebyside adapt=left,
bicolor,colback=white,colbacklower=yellow!10,
   fonttitle=\bfseries,center title,drop lifted shadow,]
  \begin{tikzpicture}
    \path[fill=red!20,draw=red!50!black]
    (0,0) node[below]{A} -- (3,1) node[right]{B}
    -- (1,4) node[above]{C} -- cycle;
  \end{tikzpicture}
\end{verbatim}

The Triangle

The option allows the left-handed and/or right-handed side to determine the dimensions of the box. This option is only valid inside \texttt{tcbsidebyside}. Feasible values for \texttt{(side(s))} are:

- \texttt{none}: no measurement of left-handed and right-handed side.
- \texttt{left}: the actual width of the left-handed content is used to set \texttt{tcb/lefthand width}.
- \texttt{right}: the actual width of the right-handed content is used to set \texttt{tcb/righthand width}.
- \texttt{both}: the actual width of the left-handed and right-handed content is used to set \texttt{tcb/lefthand width}, \texttt{tcb/righthand width}, and the overall \texttt{tcb/width}.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
\tcbsidebyside[sidebyside adapt=left, title=Very important table, beamer, colframe=blue!50!black, colback=blue!10, lower separated=false, sidebyside gap=5mm]
{\
  \begin{tabular}{|l|c|r|}
  \hline
  left & center & right \\
  \hline
  A & B & C \\
  D & E & F \\
  \hline
  \end{tabular}
}
\end{verbatim}

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

Very important table

<table>
<thead>
<tr>
<th>left</th>
<th>center</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
</tbody>
</table>

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

\begin{verbatim}
\% \tcbuselibrary{skins,xparse}
\tcbsidebyside[sidebyside adapt=right, blanker, sidebyside gap=5mm]
\lipsum[2]
\end{verbatim}

\begin{tabular}{|l|c|r|}
\hline
left & center & right \\
A & B & C \\
D & E & F \\
\hline
\end{tabular}

\begin{tikzpicture}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}

Both sides adapted
If set to `true`, the \langle left-handed content\rangle and \langle right-handed content\rangle of \texttt{tcbsidebyside}\rightarrow P.138 are switched. Obviously, this option is only valid inside \texttt{tcbsidebyside}\rightarrow P.138. The side switching can be made even/odd page sensitive, if used inside \texttt{/tcb/if odd page}\rightarrow P.113.

\[
\begin{tabular}{|l|c|r|}
\hline
left & center & right \\
\hline
A & B & C \\
\hline
D & E & F \\
\hline
\end{tabular}
\]

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
7 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages `moreverb` and `verbatim`. They are used implicitly inside of a `tcolorbox` environment, but they can be used outside also.

\begin{tcbverbatimwrite}{⟨file name⟩}
⟨environment content⟩
\end{tcbverbatimwrite}

Saves the ⟨environment content⟩ to a file named by ⟨file name⟩. \TeX macros inside the environment are not expanded.

% This text is saved as is.
\begin{tcbverbatimwrite}{\jobname_myverb.tex}
This is the text which is saved by my own environment.
\end{tcbverbatimwrite}

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as `tcbverbatimwrite`, but uses the key value of `tempfile` for the file name.

% This text is saved as is.
\begin{tcbwritetemp}
This is the text which is saved by my own environment.
\end{tcbwritetemp}

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

\tcbusetemp

Loads the current temporary file which was saved by `tcbwritetemp`.

% This text is saved as is.
\begin{tcbwritetemp}
This is the text which is saved by my own environment.
\end{tcbwritetemp}

% This text is saved as is.
\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}
/tcb/verbatim ignore percent=true|false (default true, initially false)

If this option is set to be true, the percent sign % is silently ignored for \texttt{tcbverbatimwrite} \textsuperscript{P.142} and all macros and environments which are built using \texttt{tcbverbatimwrite} \textsuperscript{P.142}, e.g. \texttt{tcbwritetemp} \textsuperscript{P.142}, \texttt{tcblisting} \textsuperscript{P.331}, or \texttt{dispExample} \textsuperscript{P.499}. This option may be useful for creating some special effects, but mainly it is intended to be applied for documentation with DocStrip. The creation of this option was motivated by Yudai Nakata. Note that this option is not getting reset by \texttt{/tcb/reset} \textsuperscript{P.118}.

Normal usage:
\begin{tcbwritetemp}
\%\begin{center}\bfseries
This is my text.
\end{center}
\end{tcbwritetemp}
\tcbusetemp
\tcbset{verbatim ignore percent}
\bigskip Option applied:
\begin{tcbwritetemp}
\%\begin{center}\bfseries
This is my text.
\end{center}
\end{tcbwritetemp}
\tcbusetemp

\begin{tcblisting}{title=Normal}
\%\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
\end{center}
\end{tcblisting}
\begin{tcblisting}{title=Option applied, verbatim ignore percent}
\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
\end{center}
\end{tcblisting}

Note that every percent sign is removed, also escaped ones.

Normal
\begin{center}\bfseries
This is my 5\% text and this is my 10\% text.
\end{center}

Option applied
\begin{center}\bfseries
This is my 5\% text and this is my 10 text.
\end{center}
8 Recording

The package provides some macros and options to take records during compilation. This is done by \LaTeX file operations to save some data to a file for later usage. The main application scenario is depicted in Section 8.3 on the next page where information about example solutions is recorded and read again in Section 8.4 on page 148.

8.1 Macros

\texttt{\textbackslash tcbstartrecording[⟨file name⟩]}

Opens a file denoted by ⟨file name⟩ for writing the records. The default file name is \jobname.records. See Section 8.3 on the next page for an example application.

In some situations, a not existing optional parameter may cause parsing problems. If this happens (or just for precaution), use

\texttt{\textbackslash tcbstartrecording\textbackslash relax}

or

\texttt{\textbackslash tcbstartrecording[\jobname.records]}

\texttt{\textbackslash tcbrecord\{⟨content⟩\}}

Records any ⟨content⟩ to the record file. \texttt{\textbackslash tcbrecord} is implemented as \texttt{\immediate\textbackslash write}. \texttt{\textbackslash tcbstartrecording} has to be called before; otherwise, \texttt{\textbackslash tcbrecord} is silently ignored.

\texttt{\textbackslash tcbrecord\{\texttt{\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}\}}

\texttt{\textbackslash tcbstoprecording}

Closes the current record file which was opened by \texttt{\textbackslash tcbstartrecording} before.

\texttt{\textbackslash tcbinputrecords[⟨file name⟩]}

Opens a file denoted by ⟨file name⟩ for reading the records via \texttt{\input}. The default file name is the name of the last used record file for saving. \texttt{\textbackslash tcbstoprecording} has to be called before.

8.2 Options

\texttt{/tcb/record=⟨content⟩} \hspace{2cm} (style, no default)

Records any ⟨content⟩ to the record file, see \texttt{\textbackslash tcbrecord}. This key can be used several times to write several lines.

\texttt{record=\texttt{\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}}

\texttt{/tcb/no recording}

Disables \texttt{\textbackslash tcbrecord} and \texttt{/tcb/record} inside the current group.
8.3 Example: Exercises

The following application example creates exercises and their corresponding solutions. Each pair is generated inside a single \texttt{tcolorbox} where the solution is given below \texttt{tcblower}. For every example, the solution part is saved by \texttt{/tcb/savelowerto} to a file. The saving is recorded using \texttt{/tcb/record}. To enlighten the possibilities, the second exercise has no solution. Finally, the solutions are input in Section 8.4 on page 148.

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x)=\sin((\sin x)^2)
\end{equation*}
\tcblower
The derivative is:
\begin{align*}
f'(x) &= \left( \sin((\sin x)^2) \right)' \\
&= \cos((\sin x)^2) 2\sin x \cos x.
\end{align*}
\end{exercise}
\begin{exercise}[no solution]
It holds:
\begin{equation*}
\frac{d}{dx} \left( \ln|x| \right) = \frac{1}{x}.
\end{equation*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = (\sin(\sin x))^2
\end{equation*}
\textbf{The derivative is:}
\begin{align*}
f'(x) &= (\sin(\sin x))^2 \cos(\sin x) \cos x.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \sqrt{x^3 - 6x^2 + 2x}
\end{equation*}
\textbf{The derivative is:}
\begin{align*}
f'(x) &= \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}.
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \left(\frac{2+3x}{1-2x}\right)^3
\end{equation*}
\textbf{The derivative is:}
\begin{align*}
f'(x) &= 3 \left(\frac{2+3x}{1-2x}\right)^2 \frac{(1-2x)(3)-(2+3x)(-2)}{(1-2x)^2}
\end{align*}
\end{exercise}

\begin{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \frac{\cos x}{(\tan 2x)^2}
\end{equation*}
\textbf{The derivative is:}
\begin{align*}
f'(x) &= \frac{-\cos(2x) \left[ \sin x \sin 2x \cos 2x + 4 \cos x \cos(\sin 2x)^2 \right]}{(\sin 2x)^3}.
\end{align*}
\end{exercise}
Compute the derivative of the following function:
\begin{equation*}
f(x) = \cos((2x^2+3)^3)
\end{equation*}

The derivative is:
\begin{align*}
f'(x) &= \left( \cos((2x^2+3)^3) \right)' \\
&= -\sin((2x^2+3)^3) 3(2x^2+3)^2 2x \\
&= -12x(2x^2+3)^2 \sin((2x^2+3)^3).
\end{align*}

Compute the derivative of the following function:
\begin{equation*}
f(x) = (x^2+1) \sqrt{x^4+1}
\end{equation*}

The derivative is:
\begin{align*}
f'(x) &= \left( (x^2+1) \sqrt{x^4+1} \right)' \\
&= 2x \sqrt{x^4+1} + \frac{2x^3(x^2+1)}{\sqrt{x^4+1}}.
\end{align*}

Exercise 8.1: Compute the derivative of the following function:
\[ f(x) = \sin((\sin x)^2) \]

Solution on page 148

Exercise 8.2: It holds:
\[ \frac{d}{dx} (\ln x) = \frac{1}{x} \]

Exercise 8.3: Compute the derivative of the following function:
\[ f(x) = (\sin(\sin x))^2 \]

Solution on page 148

Exercise 8.4: Compute the derivative of the following function:
\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]

Solution on page 148
Exercise 8.5: Compute the derivative of the following function:

\[ f(x) = \left( \frac{2+3x}{1-2x} \right)^3 \]

Solution on page 149

Exercise 8.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 149

Exercise 8.7: Compute the derivative of the following function:

\[ f(x) = \cos(2x^2 + 3)^3 \]

Solution on page 149

Exercise 8.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)\sqrt{x^4 + 1} \]

Solution on page 149

8.4 Example: Solutions

This concludes the example given in Section 8.3 on page 145. Now, the saved and recorded solutions are included.

\textbf{Solution of Exercise 8.1 on page 147:}
The derivative is:

\[ f'(x) = \left( \sin((\sin x)^2) \right)' = \cos((\sin x)^2)2\sin x \cos x. \]

\textbf{Solution of Exercise 8.3 on page 147:}
The derivative is:

\[ f'(x) = \left( (\sin x)^2 \right)' = 2\sin x \cos(x) \cos x. \]

\textbf{Solution of Exercise 8.4 on page 147:}
The derivative is:

\[ f'(x) = \left( \sqrt{x^3 - 6x^2 + 2x} \right)' = \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}. \]
Solution of Exercise 8.5 on page 148:
The derivative is:
\[ f'(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(+2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^2}{(1 - 2x)^4}. \]

Solution of Exercise 8.6 on page 148:
The derivative is:
\[ f'(x) = \left( \frac{\cos x}{\tan 2x} \right)' = \frac{(\cos x(\cos 2x)^2)}{(\sin 2x)^2} = \frac{(\cos 2x)[(-\sin x)(\cos 2x)^2 + (\cos x)4 \cos x(-\sin 2x)] - \cos x(\cos 2x)^24 \sin 2x \cos 2x}{(\sin 2x)^3} = -\frac{\cos(2x)\sin x \sin 2x \cos 2x + 4 \cos x (\sin 2x)^2 + 4 \cos x (\cos 2x)^2}{(\sin 2x)^3}. \]

Solution of Exercise 8.7 on page 148:
The derivative is:
\[ f'(x) = \left( \cos((2x^2 + 3)^3) \right)' = -\sin((2x^2 + 3)^3)3(2x^2 + 3)^22 \cdot 2x = -12x(2x^2 + 3)^2 \sin((2x^2 + 3)^3). \]

Solution of Exercise 8.8 on page 148:
The derivative is:
\[ f'(x) = \left( (x^2 + 1) \sqrt{x^4 + 1} \right)' = 2x \sqrt{x^4 + 1} + \frac{2x^3(x^2 + 1)}{\sqrt{x^4 + 1}}. \]
9 Technical Overview and Customization

This section provides a technical overview of the skin concept of \texttt{tcolorbox}. For most applications of \texttt{tcolorbox}, one will not need to know the bells and whistles described herein. You may proceed to Section 10 on page 165 where the customization options for most users are documented.

The following explanations also cover options and settings from the \texttt{skins} library, see Section 10 on page 165.

9.1 Skins and Drawing Engines

From a technical point of view, a \textit{skin} is a style definition for the appearance of a \texttt{tcolorbox}. The core package provides some additional option keys for skins but only two skins called \texttt{standard} \footnote{P.225} and \texttt{standard jigsaw} \footnote{P.226}. The \texttt{skins} library adds several more skins. To change to a skin, only one option from the core package has to be set.

\begin{verbatim}
/\texttt{tcb/skin=\langle name\rangle} \hspace{1cm} \text{(style, no default, initially standard)}
\end{verbatim}

Sets the current skin to \langle name\rangle. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

\begin{verbatim}
/\texttt{tcb/skin=\langle name\rangle} \hspace{1cm} \text{(style, no default, initially standard)}
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable} \footnote{P.403} and \texttt{is} broken actually, then the skin for the first part of the break sequence is set to \langle name\rangle, see Subsection 19.8 on page 417. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
/\texttt{tcb/skin middle=\langle name\rangle} \hspace{1cm} \text{(style, no default, initially standard)}
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable} \footnote{P.403} and \texttt{is} broken actually, then the skin for the middle parts (if any) of the break sequence is set to \langle name\rangle, see Subsection 19.8 on page 417. Typically, this key is set by a \texttt{/tcb/skin}.

\begin{verbatim}
/\texttt{tcb/skin last=\langle name\rangle} \hspace{1cm} \text{(style, no default, initially standard)}
\end{verbatim}

If the box is set to be \texttt{/tcb/breakable} \footnote{P.403} and \texttt{is} broken actually, then the skin for the last part of the break sequence is set to \langle name\rangle, see Subsection 19.8 on page 417. Typically, this key is set by a \texttt{/tcb/skin}.
/tcb/graphical environment=(name) (no default, initially pgfpicture)

Sets the graphical environment for the tcolorbox to (name). Feasible values are pgfpicture and tikzpicture or environments which inherit from one of these two. This key is set by a /tcb/skin → P.150 and may seldom be used directly.

The skin of a tcolorbox is drawn by up to four engines. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The frame of the box, drawn by /tcb/frame engine.
2. The interior of the box. The interior of a box with title is drawn differently from a box without title. /tcb/interior titled engine or /tcb/interior engine → P.152 is used to draw the interior.
3. The segmentation (line) of the box, if there is a lower part; drawn by /tcb/segmentation engine → P.152.
4. The title area of the box, if there is a title and /tcb/title filled → P.32 is set to true; drawn by /tcb/title engine → P.152.

/tcb/frame engine=(name) (no default, initially standard)

Sets the frame drawing engine for a box to (name). Typically, this key is set by a /tcb/skin → P.150. Feasible values for (name) are:

- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/frame style → P.165,
- pathjigsaw: a tikz path which is controlled by /tcb/frame style → P.165,
- pathfirst: a tikz path which is controlled by /tcb/frame style → P.165,
- pathfirstjigsaw: a tikz path which is controlled by /tcb/frame style → P.165,
- pathmiddle: a tikz path which is controlled by /tcb/frame style → P.165,
- pathmiddlejigsaw: a tikz path which is controlled by /tcb/frame style → P.165,
- pathlast: a tikz path which is controlled by /tcb/frame style → P.165,
- pathlastjigsaw: a tikz path which is controlled by /tcb/frame style → P.165,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/interior titled engine=(name) (no default, initially standard)

Sets the interior drawing engine for a titled box to (name). Typically, this key is set by a /tcb/skin → P.150. Feasible values for (name) are:

- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/interior style → P.166,
- pathfirst: a tikz path which is controlled by /tcb/interior style → P.166,
- pathmiddle: a tikz path which is controlled by /tcb/interior style → P.166,
- pathlast: a tikz path which is controlled by /tcb/interior style → P.166,
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.
/tcb/interior engine=(name)  (no default, initially standard)

Sets the interior drawing engine for an untitled box to (name). Typically, this key is set by a /tcb/skin →P.150. Feasible values for (name) are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by /tcb/interior style →P.166,
- **pathfirst**: a tikz path which is controlled by /tcb/interior style →P.166,
- **pathmiddle**: a tikz path which is controlled by /tcb/interior style →P.166,
- **pathlast**: a tikz path which is controlled by /tcb/interior style →P.166,
- **freelance**: deprecated.
- **spartan**: a quite spartan code.
- **empty**: draw nothing.

/tcb/segmentation engine=(name)  (no default, initially standard)

Sets the segmentation (line) drawing engine for a box to (name). Typically, this key is set by a /tcb/skin →P.150. Feasible values for (name) are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by /tcb/segmentation style →P.168,
- **freelance**: deprecated.
- **spartan**: a quite spartan code.
- **empty**: draw nothing.

/tcb/title engine=(name)  (no default, initially standard)

Sets the title area drawing engine for a titled box to (name). Typically, this key is set by a /tcb/skin →P.150. Feasible values for (name) are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by /tcb/title style →P.168,
- **pathfirst**: a tikz path which is controlled by /tcb/title style →P.168,
- **pathmiddle**: a tikz path which is controlled by /tcb/title style →P.168,
- **pathlast**: a tikz path which is controlled by /tcb/title style →P.168,
- **freelance**: deprecated.
- **spartan**: a quite spartan code.
- **empty**: draw nothing.

After an engine is set to an initializing value, the resulting graphical code can be changed using code option keys, see Section 9.2 on page 154.
/tcb/geometry nodes=true|false

If set to true, up to four \texttt{tikz} nodes are defined for a \texttt{tcolorbox} which are named \texttt{frame}, \texttt{interior}, \texttt{segmentation}, and \texttt{title}. These nodes describe the boundaries of the equally named parts of a \texttt{tcolorbox}. They are used by most engines based on Ti\textit{k}Z. Typically, this key is set automatically by a \texttt{/tcb/skin} \texttt{\textbackslash P.150}.

\begin{tcolorbox}
\begin{minipage}{0.5\linewidth}
\begin{tcblower}
The upper part.
\end{tcblower}
\end{minipage}
\begin{minipage}{0.5\linewidth}
\begin{tcblower}
The lower part.
\end{tcblower}
\end{minipage}
\end{tcolorbox}
9.2 Code Option Keys

The following code options are applicable for all skins. The used ⟨graphical code⟩ can be any \pgf code. For all skins with exception of \texttt{standard} \cite{P.225} and \texttt{standard jigsaw} \cite{P.226}, the ⟨graphical code⟩ can also be any \texttt{TikZ} code.

/\tcb/frame code=⟨graphical code⟩ (code, default from \texttt{standard})

The given ⟨graphical code⟩ is used for drawing the \texttt{frame} of the box.

\begin{tcolorbox}
\begin{minipage}{\textwidth}
\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[enhanced,frame code={
  \foreach \n in {north east,north west,south east,south west}
  {\path [fill=red!75!black] (interior.\n) circle (3mm); }; }]
  This is a \texttt{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
\end{verbatim}
\end{minipage}
\end{tcolorbox}

/\tcb/frame empty (style, no value)

This is a shortcut for setting /\tcb/frame code to empty. This option removes the drawing of the frame. Alternatively, use /\tcb/frame hidden \cite{P.166}.

/\tcb/interior titled code=⟨graphical code⟩ (code, default from \texttt{standard})

The given ⟨graphical code⟩ is used for drawing the \texttt{interior} of the box, if the box comes with a title.

\begin{tcolorbox}
\begin{minipage}{\textwidth}
\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,interior titled code={
  ([xshift=-3mm,yshift=-3mm]interior.north west) -- ([xshift=-3mm,yshift=3mm]interior.south east)
  ([xshift=3mm,yshift=-3mm]interior.south west) -- ([xshift=3mm,yshift=3mm]interior.north east);}]
  This is a \texttt{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
\end{verbatim}
\end{minipage}
\end{tcolorbox}

/\tcb/interior titled empty (style, no value)

This is a shortcut for setting /\tcb/interior titled code to empty. This option removes the drawing of the untitled interior. Alternatively, use /\tcb/interior hidden \cite{P.167}.
/tcb/interior code=(graphical code) (code, default from standard)

The given (graphical code) is used for drawing the interior of the box, if the box is without a title.

\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[enhanced, interior code={
  \path[draw=red!5!white, line width=5mm, line cap=round]
  (%[xshift=3mm, yshift=-3mm]interior.north west)
  -- (%[xshift=-3mm, yshift=3mm]interior.south east)
  (%[xshift=3mm, yshift=3mm]interior.south west)
  -- (%[xshift=-3mm, yshift=-3mm]interior.north east);},]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior empty (style, no value)
This is a shortcut for setting /tcb/interior code to empty. This option removes the drawing of the interior. Alternatively, use /tcb/interior hidden → P.167.

/tcb/segmentation code=(graphical code) (code, default from standard)

The given (graphical code) is used for drawing the segmentation area of the box.

\tcbset{colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced, title=My title, segmentation code={
  \path[top color=red!5!white, bottom color=red!5!white, middle color=blue]
  (segmentation.south west) rectangle (segmentation.north east);},]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/segmentation empty (style, no value)
This is a shortcut for setting /tcb/segmentation code to empty. This option removes the drawing of the segmentation line. Alternatively, use /tcb/segmentation hidden → P.168.
The given *(graphical code)* is used for drawing the *title* area of the box.

My title

This is a `tcolorbox`.

This is the lower part.

/\textbf{tcolorbox}\n
This is a `tcolorbox`.

This is the lower part.

/\textbf{tcolorbox}\n
This is a shortcut for setting `/\textbf{tcolorbox}` to empty. This option removes the drawing of the title area. Alternatively, use `/\textbf{tcolorbox hidden}`.\textsuperscript{P. 169}
9.3 Subskins

A subskin is a new \texttt{/tcb/skin} based on an existing skin which is extended or changed.

\begin{quote}
Never use geometry settings or bounding box options inside a subskin definition! If one skin is replaced by another skin, the overall bounding box should stay constant. Especially, if a skin is used for a breakable box, unpredictable and unpleasant results could arise otherwise. If you want to change the geometry also, use an additional style. See the skin \texttt{beamer} and the style \texttt{/tcb/beamer} as pattern.
\end{quote}

\begin{tcolorbox}
\begin{verbatim}
\tcbsubskin\{}\langle\text{name}\rangle\}\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\}

\text{Creates a new skin} \langle\text{name}\rangle \text{ which inherits all properties of an existing} \langle\text{base skin}\rangle \text{ plus the given} \langle\text{options}\rangle. \text{The new skin} \langle\text{name}\rangle \text{ can be used as value for the keys} \texttt{/tcb/skin} \rightarrow\text{P.150}, \texttt{/tcb/skin first} \rightarrow\text{P.150}, \texttt{/tcb/skin middle} \rightarrow\text{P.150}, \text{and} \texttt{/tcb/skin last} \rightarrow\text{P.150}. \text{As} \langle\text{base skin}\rangle, \text{one can take} \texttt{standard} \rightarrow\text{P.225}, \texttt{empty} \rightarrow\text{P.261}, \texttt{enhanced} \rightarrow\text{P.227}, \text{or any skin from the}\texttt{skins} \text{library, see Section 10 on page 165.}
\end{verbatim}
\end{tcolorbox}

\begin{verbatim}
% \tcbuselibrary{skins}
\tcbsubskin{mycross}{empty}{frame code={%
  \draw[red,line width=5pt] (frame.south west)--(frame.north east);
  \draw[red,line width=5pt] (frame.north west)--(frame.south east);},
  skin first=mycross,skin middle=mycross,skin last=mycross }
\begin{tcolorbox}[skin=mycross]
  This is my content.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/skin first is subskin of=}\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\} \text{ (no default, initially unset)}

\text{Creates a new unnamed skin which inherits all properties of an existing} \langle\text{base skin}\rangle \text{ plus the given} \langle\text{options}\rangle. \text{This skin is set as} \texttt{/tcb/skin first} \rightarrow\text{P.150}.

See a detailed example on page 267.

\texttt{/tcb/skin middle is subskin of=}\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\} \text{ (no default, initially unset)}

\text{Creates a new unnamed skin which inherits all properties of an existing} \langle\text{base skin}\rangle \text{ plus the given} \langle\text{options}\rangle. \text{This skin is set as} \texttt{/tcb/skin middle} \rightarrow\text{P.150}.

See a detailed example on page 267.

\texttt{/tcb/skin last is subskin of=}\{\langle\text{base skin}\rangle\}\{\langle\text{options}\rangle\} \text{ (no default, initially unset)}

\text{Creates a new unnamed skin which inherits all properties of an existing} \langle\text{base skin}\rangle \text{ plus the given} \langle\text{options}\rangle. \text{This skin is set as} \texttt{/tcb/skin last} \rightarrow\text{P.150}.

See a detailed example on page 267.
9.4 Drawing Scheme

Depending on the complexity of a \texttt{tcolorbox} definition, the resulting box is drawn in a more or less complex series of steps.

To document and demonstrate these drawing steps, we consider the following box definition:

\begin{verbatim}
\newtcolorbox{testbox}[1]
[enhanced,title=Test Box,
 boxrule=1mm,titlerule=0.5mm,colframe=blue!50!black,
 interior style={top color=blue!20!green!50!white,bottom color=blue!20!yellow!50!white},
 colbacktitle=blue!50!green!90!white,segmentation style={solid},
 fonttitle=\bfseries,drop fuzzy shadow,borderline={0.3mm}{0.35mm}{yellow!50!white},
 underlay={\path[fill image opacity=0.15,fill image scale=0.9,
 fill stretch picture={\draw[blue,line width=2mm] circle (1);}
 (interior.south west) rectangle (interior.north east);},
 watermark text={Watermark},watermark color={green!20!white},
 finish={\begin{tcbclipframe}
 \path[bottom color=black,top color=black!50!white,opacity=0.1]
 (frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
 \path[top color=white,bottom color=black!50!white,opacity=0.1]
 (frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
 \end{tcbclipframe}},#1}
\end{verbatim}

For this definition, we get the maximal number of drawing steps:

1. shadow

2. frame

- Section 10.6 on page 200.

- \texttt{/tcb/colframe} \textsuperscript{P.32}, \texttt{/tcb/opacityframe} \textsuperscript{P.56}
- \texttt{/tcb/frame code} \textsuperscript{P.154}
- \texttt{/tcb/frame style} \textsuperscript{P.165}

- Section 10.5 on page 195

- Section 10.2 on page 172
- Section 10.8 on page 213

- Section 4.12 on page 79
- Section 10.3 on page 183

Lower part

• /tcb/colupper→P.33, /tcb/collower→P.33, /tcb/coltitle→P.33
• /tcb/fontupper→P.34, /tcb/fontlower→P.34, /tcb/fonttitle→P.34
• /tcb/opacityupper→P.57, /tcb/opacitylower→P.57, /tcb/opacitytitle→P.57

All together, the box is drawn:

% \usepackage{lipsum}
\begin{testbox}
\lipsum[2]
\tcblower
Lower part
\end{testbox}
9.5 Color Names

Color settings for a \texttt{tcolorbox} are saved into named colors which may be used inside a box, e.g. for an overlay. These color names are

- \texttt{tcbcolframe} set by \texttt{/tcb/colframe} \textsuperscript{P.32} (frame color)
- \texttt{tcbcolback} set by \texttt{/tcb/colback} \textsuperscript{P.32} (background color)
- \texttt{tcbcolbacktitle} set by \texttt{/tcb/colbacktitle} \textsuperscript{P.32} (background color of the title)
- \texttt{tcbcolbacklower} set by \texttt{/tcb/colbacklower} \textsuperscript{P.241} (skin dependend background color of the lower part; needs \texttt{skins} to be loaded)
- \texttt{tcbcolupper} set by \texttt{/tcb/colupper} \textsuperscript{P.33} (text color upper part)
- \texttt{tcbcollower} set by \texttt{/tcb/collower} \textsuperscript{P.33} (text color lower part)
- \texttt{tcbcoltitle} set by \texttt{/tcb/coltitle} \textsuperscript{P.33} (text color title)

\begin{tcolorbox}[title=Color names, colframe=blue!50!black, colback=blue!5, colbacktitle=blue!50, colupper=red!35!black]
\foreach \texttt{name} in {tcbcolframe, tcbcolback, tcbcolbacktitle, tcbcolbacklower, tcbcolupper, tcbcollower, tcbcoltitle}
{\tikz\path[draw,fill=\texttt{name}]
 (0,0) rectangle node[right=4mm,font=\texttt{ttfamily}]{\texttt{name}} (0.8,0.8);\par}
\end{tcolorbox}
9.6 Useful Properties

The following macros describe certain properties which may be used for the drawing scheme, see Section 9.4 on page 158. Sometimes, they are even available inside the box content. All of them are considered to be read-only and should never be redefined by the user.

\texttt{tcbheightspace}

If the height of a tcolorbox is not the natural height, the space difference between the forced and the natural size is hold by \texttt{tcbheightspace}. This macro is not usable inside the box content, but for skins or inside /tcb/underlay \textsuperscript{P.213}, /tcb/overlay \textsuperscript{P.79}, etc. If such a space information is needed inside the box content, see /tcb/space to \textsuperscript{P.64} instead.

\begin{verbatim}
% \tcbuselibrary{skins}
\newtcolorbox{testbox}[2][]{enhanced,size=fbox,
colframe=blue!75!black,colback=white,height=#2,
underlay={\node[above,inner sep=3pt] at (interior.south){
% \includegraphics[width=\tcbtextwidth,height=\tcbheightspace-3pt]{goldshade.png}};
},
#1}
\begin{testbox}{3cm}
  This is my box. The space is filled with a picture.
\end{testbox}
\begin{testbox}{2cm}
  This is my box. The space is filled with a picture.
\end{testbox}
\end{verbatim}

\texttt{tcbtextwidth}

This property describes the box content width.

- If there also is a lower part, it describes the width of the upper part.
- For /tcb/sidebyside \textsuperscript{P.132} boxes, it describes the combined text width plus segmentation.
- This property can be used inside the box content text with exception of /tcb/fit \textsuperscript{P.457} boxes.
- \texttt{tcbtextwidth} can be used for all box types for skins or inside /tcb/underlay \textsuperscript{P.213}, /tcb/overlay \textsuperscript{P.79}, etc.

\begin{verbatim}
\begin{tcolorbox}[colframe=blue!75!black]
  Inside a box: \texttt{tcbtextwidth} (\texttt{=\the\linewidth}).
\end{tcolorbox}
\end{verbatim}

Inside a box: 370.74823pt (\texttt{=370.74823pt}).
\texttt{\textbackslash tcbtextheight}\texttt{}

This property describes the designated box content height. If the box is larger than the natural height, the actual content will be smaller than \texttt{\textbackslash tcbtextheight}.

- For boxes with a fixed /tcb/height $^\text{P.58}$, this property can be used inside the box content text. For other boxes, it denotes 0pt inside the box content.
- \texttt{\textbackslash tcbtextheight} can be used for all box types for skins or inside /tcb/underlay $^\text{P.213}$, /tcb/overlay $^\text{P.79}$, etc.

\begin{tcolorbox}[enhanced,colframe=blue!75!black,underlay={\node[left,red] at (frame.east) {Here: \texttt{\textbackslash tcbtextheight}};}]
Inside a box with natural height: \texttt{\textbackslash tcbtextheight}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,colframe=blue!75!black,height=1cm,underlay={\node[left,red] at (frame.east) {Here: \texttt{\textbackslash tcbtextheight}};}]
Inside a box with fixed height: \texttt{\textbackslash tcbtextheight}.
\end{tcolorbox}

\texttt{\textbackslash tcbsegmentstate}\texttt{}

This macro contains 0, 1, or 2. It is set for every unbroken box and every broken partial box with the following meaning:

- 0: The current (partial) box contains only an upper part.
- 1: The current (partial) box contains an upper and a lower part. The segmentation node can be used for positioning.
- 2: The current (partial) box contains only a lower part. This can only be true for parts of breakable boxes.

Skins like \texttt{bicolor} $^\text{P.239}$ use this property to paint the (partial) boxes.

\begin{tcbbraster}[raster equal height,enhanced,watermark text=\texttt{\textbackslash tcbsegmentstate}]
\begin{tcolorbox}
Upper part
\end{tcolorbox}
\begin{tcolorbox}
Upper part\texttt{\textbackslash tcblower} Lower part\end{tcolorbox}
\end{tcbbraster}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{skins}

This also loads the package tikz \[22\]. Typically but not necessarily, the following skins use tikz instead of pgf.

In the following, general settings and options of the library are documented. The actual catalog of skins is found in Section 11 on page 223.

10.1 Style Option Keys

The following style options are applicable for all skins which use engines of type path, pathfirst, pathmiddle, or pathlast. Especially, the skin enhanced \[P.227\] supports all of them and standard \[P.225\] none.

/tcb/frame style = (tikz keys) \hspace*{1.5cm} (style, no default)

The \(\text{tikz keys}\) are used inside the \textit{tikz} path command for drawing the frame of the box. This option is available if the \textit{/tcb/frame engine} \hspace*{0.5cm} \[P.151\] is set to \textit{path}, \textit{pathfirst}, \textit{pathmiddle}, or \textit{pathlast}. It is \textit{not} available for \textit{standard}.

\begin{tcolorbox}
\begin{tcbset}{colback=red!5!white,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, frame style={left color=red!75!black, right color=blue!75!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcbset}
\end{tcolorbox}

\begin{tcolorbox}
\begin{tcbset}{colback=red!5!white,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, frame style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcbset}
\end{tcolorbox}

\textit{/tcb/frame style image = (file name)} \hspace*{1.5cm} (no default, initially unset)

Fills the frame with an external image referenced by \textit{(file name)}. For advanced features like blending of a picture with the background, use \textit{/tcb/frame style} together with \textit{/tikz/fill stretch image} \[P.281\].

\begin{tcolorbox}
\begin{tcbset}{colback=red!5!white,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, frame style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{tcbset}
\end{tcolorbox}
/tcb/frame style tile={(graphics options)}{(file name)}
(no default, initially unset)
Fills the frame with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/frame style → P.165 together with /tikz/fill tile image → P.285.

\begin{tcolorbox}[enhanced,title=My title,
  frame style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/frame hidden
(style, no value)
This is a shortcut for frame style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the frame. Alternatively, use /tcb/frame empty → P.154.

\begin{tcolorbox}[enhanced,title=My title,
  frame hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.

/tcb/interior style=⟨tikz keys⟩
(style, no default)
The ⟨tikz keys⟩ are used inside the \tikz path command for drawing the interior of the box. They are used for the titled and for the untitled version as well. This option is available if the /tcb/interior titled engine → P.151 or /tcb/interior engine → P.152 is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

\begin{tcolorbox}[enhanced,title=My title,
  interior style={left color=red!20!white,
    right color=yellow!50!white}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
This is the lower part.
/tcb/interior style image = (file name)  
(no default, initially unset)

Fills the interior with an external image referenced by \textit{(file name)}. For advanced features like blending of a picture with the background, use /tcb/interior style \rightarrow P.166 together with /tikz/fill stretch image \rightarrow P.281.

```
\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,  
interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a \textit{tcolorbox}.
This is the lower part.

/tcb/interior style tile = \{\textit{graphics options}\}\{\textit{file name}\}  
(no default, initially unset)

Fills the interior with a tile pattern based on an external image referenced by \textit{(file name)}. The \textit{\textit{graphics options}} are given to the underlying \texttt{includegraphics} command. For advanced features like blending of a picture with the background, use /tcb/interior style \rightarrow P.166 together with /tikz/fill tile image \rightarrow P.285.

```
\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,  
interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a \textit{tcolorbox}.
This is the lower part.

/tcb/interior hidden  
(style, no value)

This is a shortcut for interior style = \{\texttt{draw=none,fill=none}\}. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use /tcb/interior empty \rightarrow P.155 and/or /tcb/interior titled empty \rightarrow P.154.

```
\tcbset{frame style={top color=red!20!white,  
bottom color=red!20!white!75!black},  
fonttitle=\bfseries,coltitle=black}
\begin{tcolorbox}[enhanced,title=My title,  
interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title
This is a \textit{tcolorbox}.
This is the lower part.
/tcb/segmentation style=(tikz keys)  (style, no default)

The \textit{tikz keys} are used inside the \texttt{tikz} path command for drawing the \textit{segmentation} line of the box.
This option is available if the /tcb/segmentation engine \textsuperscript{\textsuperscript{P.152}} is set to \texttt{path}. It is \textit{not} available for \texttt{standard}.

\begin{tcolorbox}
\begin{Verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title,segmentation style={double=white,draw=blue,double distance=1pt,solid}]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

/tcb/segmentation hidden  (style, no value)

This is a shortcut for segmentation style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the segmentation line. See also /tcb/lower separated \textsuperscript{\textsuperscript{P.30}} which has the same effect for most skins. Alternatively, use /tcb/segmentation empty \textsuperscript{\textsuperscript{P.155}}.

\begin{tcolorbox}
\begin{Verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[title=My title,enhanced,segmentation hidden]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

/tcb/title style=(tikz keys)  (style, no default)

The \textit{tikz keys} are used inside the \texttt{tikz} path command for drawing the \textit{title area} of the box.
This option is available if the /tcb/title engine \textsuperscript{\textsuperscript{P.152}} is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is \textit{not} available for \texttt{standard}.

\begin{tcolorbox}
\begin{Verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,coltitle=blue!50!black,fonttitle=bfseries}
\begin{tcolorbox}[enhanced,title=My title,title style={left color=blue!15!yellow,right color=red!85!black}]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}
/tcb/title style image=(file name)  (no default, initially unset)
Fills the title area with an external image referenced by (file name). For advanced features like blending of a picture with the background, use /tcb/title style → P.168 together with /tikz/fill stretch image → P.281.

\tcbset{colback=blue!5!white,colframe=blue!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, title style image=blueshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/title style tile={(graphics options)}{(file name)}  (no default, initially unset)
Fills the title area with a tile pattern based on an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/title style → P.168 together with /tikz/fill tile image → P.285.

\tcbset{colback=red!5!white,colframe=red!75!black, coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, title style tile={width=1cm}{pink_marble.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/title hidden  (style, no value)
This is a shortcut for title style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the title background. See also /tcb/title filled → P.32 for a similar effect. Alternatively, use /tcb/title empty → P.156.

\tcbset{colback=red!5!white,colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My title, enhanced,title hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
The \textit{tikz\ keys} are used to draw a title rule, i.e. a rule below the optional title. The width of the rule is controlled by \texttt{/tcb/titlerule}. It may be set directly to a smaller width to create mixed effects with the standard rule. This option is implemented as an \texttt{/tcb/underlay}. Thus, it is not available for standard and standard jigsaw, but for all other skins, e.g. enhanced. As an underlay, this option can be used multiple times and is removed by \texttt{/tcb/no underlay}.

\begin{tcolorbox}[enhanced, colback=red!5!white,colframe=red!75!black, colbacktitle=red!50!yellow,fonttitle=\bfseries, title=My title, titlerule=1mm, titlerule style=yellow ] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced, colback=red!5!white,colframe=red!75!black, colbacktitle=red!50!yellow,fonttitle=\bfseries, title=My title, titlerule=1mm, titlerule style={yellow,line width=0.5mm} ] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[enhanced, colback=red!10!white,colframe=red!75!black, colbacktitle=red!50!yellow,fonttitle=\bfseries, frame hidden, boxrule=0pt,titlerule=1mm, titlerule style=red!50!black ] This is a \textbf{tcolorbox}. \end{tcolorbox}

\begin{tcolorbox}[empty, coltitle=red!75!black,fonttitle=\bfseries, borderline horizontal={0.5mm}{0pt}{red!50!white}, title=My title, titlerule style={red, arrows = {Hooks[arc=270]-Hooks[arc=270]}} ] This is a \textbf{tcolorbox}. \end{tcolorbox}
The combined TikZ style applied to frame, interior, and title background can be used by authors in customizing code.

/tikz/tcb fill frame (style, no value)
This is a TikZ style which is finally applied to the frame of the box.

```
\tcbset{enhanced, colback=red!5!white,
          colframe=red!75!black, fonttitle=\bfseries,
          frame code app={\path[\tcb fill frame]
                          ([yshift=-2mm]frame.north)
                          circle (8mm); } }
\begin{tcolorbox}[title=My title] This is a \textbf{tcolorbox}.
\tcblower This is the lower part.
\end{tcolorbox}
```

/tikz/tcb fill interior (style, no value)
This is a TikZ style which is finally applied to the interior of the box.

```
\tcbset{enhanced, colback=red!5!white,
          colframe=red!75!black, fonttitle=\bfseries,
          interior titled code app={\path[\tcb fill interior]
                                    ([yshift=-0.1pt]interior.north east)
                                    --([yshift=3pt]interior.north)
                                    --([yshift=-0.1pt]interior.north west)
                                    --cycle;} }
\begin{tcolorbox}[title=My title] This is a \textbf{tcolorbox}.
\tcblower This is the lower part.
\end{tcolorbox}
```

/tikz/tcb fill title (style, no value)
This is a TikZ style which is finally applied to the title area of the box.

```
\tcbset{enhanced, colback=red!5!white,
          colframe=red!75!black, fonttitle=\bfseries,
          colbacktitle=blue!75!black,
          title code app={\path[\tcb fill title]
                          (title) circle (5mm); } }
\begin{tcolorbox}[title=My title] This is a \textbf{tcolorbox}.
\tcblower This is the lower part.
\end{tcolorbox}
```
10.2 Boxed Title Option Keys

10.2.1 Boxed Title Placement

The following options place the title text into an own \texttt{\textbackslash box \ldots P.14}. This boxed title can be customized independently from the main box using \texttt{/tcb/boxed title style \ldots P.177}. The placement can be influenced by \texttt{\langle boxtitle options \rangle}.

\texttt{/tcb/attach boxed title to top left=\langle boxtitle options \rangle} \hspace{1cm} (style, default empty)

The title is boxed with a \texttt{\textbackslash box \ldots P.14} and attached to the top left corner of the main box.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top left]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to top text left=\langle boxtitle options \rangle} \hspace{1cm} (style, default empty)

The title is boxed with a \texttt{\textbackslash box \ldots P.14} and attached to the top left corner of the main box and shifted to match title text and box text.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top text left]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to top center=\langle boxtitle options \rangle} \hspace{1cm} (style, default empty)

The title is boxed with a \texttt{\textbackslash box \ldots P.14} and attached to the top of the main box.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top center]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to top text right=\langle boxtitle options \rangle} \hspace{1cm} (style, default empty)

The title is boxed with a \texttt{\textbackslash box \ldots P.14} and attached to the top right corner of the main box and shifted to match title text and box text.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top text right]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/attach boxed title to top right=\langle boxtitle options \rangle} \hspace{1cm} (style, default empty)

The title is boxed with a \texttt{\textbackslash box \ldots P.14} and attached to the top right corner of the main box.

\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top right]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
The title is boxed with a `\tcbox` \cite{P.14} and attached to the bottom left corner of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a \textbf{tcolorbox}.

Note that this matches the upper part, even, if there is a lower part.

\begin{tcolorbox}[enhanced,title=My title, halign=right, attach boxed title to bottom text right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

My title

Note that this matches the upper part, even, if there is a lower part.
This is a convenient style to mimic a standard title. It uses /tcb/attach boxed title to top center → P.172, /tcb/minipage boxed title → P.181, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches. Typically, one would not use different colors for the frame as in the example below.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top*, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

This is a convenient style to produce a standard-like title at the bottom of the box. It uses /tcb/attach boxed title to bottom center → P.173, /tcb/minipage boxed title → P.181, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom, boxed title style={colframe=red}] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom*] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.

This style combines /tcb/attach boxed title to bottom* with /tcb/boxed title style → P.177. The \langle options\rangle are given to /tcb/boxed title style → P.177.

\begin{tcolorbox}[tile,flip title={sharp corners}, title=My title, colback=red!10, colbacktitle=red!75!black] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.
10.2.2 Options for the Boxed Title Placement

The \textit{boxtitle options} of the keys described above are shift values. The dimensions of the boxed title are stored into two macros \texttt{\tcboxedtitleheight} and \texttt{\tcboxedtitlewidth}. These macros can be used inside the following \textit{boxtitle options}:

\begin{verbatim}
\texttt{/tcb/boxtitle/xshift=}⟨length⟩ (no default, initially 0pt)
\end{verbatim}

The boxed title is shifted by \texttt{⟨length⟩} in the horizontal direction.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top left=\{xshift=-2mm\},
boxed title style=\{size=small,colback=blue\}
] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\[My title\]
This is a \textbf{tcolorbox}.
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/boxtitle/yshift=}⟨length⟩ (no default, initially 0pt)
\end{verbatim}

The boxed title is shifted by \texttt{⟨length⟩} in the vertical direction.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top center\
\{yshift=-\tcboxedtitleheight/2\},
boxed title style=\{size=small,colback=blue\}
] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\[My title\]
This is a \textbf{tcolorbox}.
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/boxtitle/yshifttext=}⟨length⟩ (no default, initially 0pt)
\end{verbatim}

The text inside the main box is shifted by \texttt{⟨length⟩} to give room for e.g. a sunken title.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top center=
\{yshift=-3mm,yshifttext=-1mm\},
boxed title style=\{size=small,colback=blue\}
] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\[My title\]
This is a \textbf{tcolorbox}.
\end{verbatim}

\begin{verbatim}
\texttt{/tcb/boxtitle/yshift*=}⟨length⟩ (no default, initially 0pt)
\end{verbatim}

Sets \texttt{/tcb/boxtitle/yshift} and \texttt{/tcb/boxtitle/yshifttext} the same time. \texttt{/tcb/boxtitle/yshifttext} is only set if necessary.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top center=\{yshift*=\-3mm\},
boxed title style=\{size=small,colback=blue\}
] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\[My title\]
This is a \textbf{tcolorbox}.
\end{verbatim}

! The bounding box of the resulting total \textbf{tcolorbox} is adapted automatically to the \textit{vertical} dimensions of the boxed title. Possible horizontal enlargements are \textit{not} automatically computed.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title,
attach boxed title to top left=\{xshift=-2mm,yshift=-2mm\},
boxed title style=\{size=small,colback=blue\},
show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\[My title\]
This is a \textbf{tcolorbox}.
\end{verbatim}

175
10.2.3 Options for the Boxed Title Box

The boxed title options are implemented as an underlay, see Section 10.8 on page 213. Therefore, a boxed title is not drawn, if a skin does not support underlays like standard. Still, the room for the boxed titles gets reserved in these cases.

A TikZ node title is produced by a boxed title which can be used inside tcb/frame code, tcb/interior code, underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by tcb/underlay boxed title which are drawn before. Additionally, underlays defined by tcb/underlay boxed title are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\texttt{tcb/boxed title size=\langle size\rangle} (no default, initially \texttt{title})

This setting defines the basic size for the title box. Further settings can be applied using \texttt{tcb/boxed title style}. Feasible values for \texttt{\langle size\rangle} are:

- \texttt{title}: Sets the size according to \texttt{tcb/size=\textit{title}}.
- \texttt{standard}: No size setting. Typically, this is identical to \texttt{tcb/size=\textit{normal}}.
- \texttt{copy}: The size values for a title of the base box are copied for the title box.

\begin{tcbraster}[raster columns=3,enhanced,boxrule=0.4pt, title=My title,attach boxed title to top center]
\begin{tcolorbox}[boxed title size=title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxed title size=standard]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxed title size=copy]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}
By default, a boxed title is dimensioned with \texttt{/tcb/size=\texttt{P.49=title}} and inherits the \texttt{/tcb/skin=\texttt{P.150}} and \texttt{/tcb/colframe=\texttt{P.32}} of the main box. Also, the \texttt{/tcb/colback=\texttt{P.32}} is inherited from the main box. Font and color of the title text are set as usual. All other \texttt{⟨options⟩} are set by the \texttt{/tcbboxed title style} key. Since a boxed title is set by \texttt{\texttt{tbox}=\texttt{P.14}}, all \texttt{tcolorbox} options are applicable here. If \texttt{/tcbboxed title style} is used several times, the \texttt{⟨options⟩} are appended.

\begin{tcolorbox}[enhanced,title=My title,fonttitle=\bfseries,coltitle=green!25!black,attach boxed title to top center=\{yshift=-2mm,yshifttext=-1mm\},boxed title style=\{colframe=green!75!black,colback=yellow!50!green\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,title=My title,fonttitle=\bfseries,coltitle=green!25!black,attach boxed title to top text left=\{yshift=-0.50mm\},boxed title style=\{skin=enhancedfirst jigsaw,size=small,arc=1mm,bottom=-1mm,interior style=\{fill=none,top color=red!30!white,bottom color=red!20!white\}\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,title=My title,fonttitle=\bfseries,coltitle=green!25!black,attach boxed title to top center=\{yshift=-0.25mm-\texttt{tboxedtitleheight}/2,yshifttext=2mm-\texttt{tboxedtitleheight}/2\},boxed title style=\{boxrule=0.5mm,frame code=\{\path[tcb fill frame] ([xshift=-4mm]frame.west) -- (frame.north west) -- (frame.north east) -- ([xshift=4mm]frame.east) -- (frame.south east) -- (frame.south west) -- cycle; \},interior code=\{\path[tcb fill interior] ([xshift=-2mm]interior.west) -- (interior.north west) -- (interior.north east) -- ([xshift=2mm]interior.east) -- (interior.south east) -- (interior.south west) -- cycle; \}]}\lipsum[2]\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.


\begin{mybox}[colbacktitle=green]{My title}
\lipsum[2]
\end{mybox}
\begin{mybox}[colbacktitle=red]{My title}
\lipsum[3]
\end{mybox}
/tcb/hbox boxed title

The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

\newtcolorbox{mybox}[1]{hbox boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

/tcb/minipage boxed title=(length)

The title text content is captured with a minipage with a width of \(\langle\text{length}\rangle\). By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

/tcb/minipage boxed title*=\langle length \rangle

The title text content is captured with a minipage with a width of main box width plus \(\langle\text{length}\rangle\). By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title*=\langle length \rangle, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
The title text content is captured with a TikZ node with given TikZ \texttt{(options)}. The text is centered by default.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a \texttt{varwidth} environment with a width of \texttt{(length)}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a \texttt{varwidth} environment with a width of main box width plus \texttt{(length)}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
10.3 Watermark Option Keys

The following watermark options are applicable for all skins which use tikzpicture as /tcb/graphical environment \(^{P.151}\). Therefore, the skin standard \(^{P.225}\) does not support these watermarks, but all other skins, e.g. enhanced \(^{P.227}\).

The watermark options rely on the more general overlay options described in Section 4.12 from page 79. Therefore, watermarks and overlays cannot be used mixed. But a mixture is possible with the \([\hookrightarrow]\) hooks library, see Section 23.

\[\text{/tcb/watermark text} = \langle \text{text} \rangle\]  \(\text{no default, initially unset}\)

Writes some \(\langle \text{text} \rangle\) in the center of the interior region of a \texttt{tcolorbox}. This \(\langle \text{text} \rangle\) is written after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according to the values of \text{/tcb/watermark zoom} \(^{P.186}\) or \text{/tcb/watermark stretch} \(^{P.188}\).

\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcbshade
\lipsum[2]
\end{tcolorbox}

\textbf{My title}


\[\text{/tcb/watermark text on} = \langle \text{part} \rangle \text{ is} \ \langle \text{text} \rangle\]  \(\text{no default, initially unset}\)

This option writes some \(\langle \text{text} \rangle\) in the center of the interior region of a \texttt{tcolorbox} as described for \text{/tcb/watermark text}. But this is done only for boxes named \(\langle \text{part} \rangle\) of a break sequence, see \text{/tcb/breakable} \(^{P.403}\).

Feasible values for \(\langle \text{part} \rangle\) are:

- \textbf{broken}: all broken box parts,
- \textbf{unbroken}: unbroken boxes only,
- \textbf{first}: first parts of a break sequence,
- \textbf{middle}: middle parts of a break sequence,
- \textbf{last}: last parts of a break sequence,
- \textbf{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \textbf{middle and last}: middle and last parts of a break sequence,
- \textbf{first and middle}: first and middle parts of a break sequence.
/tcb/watermark graphics=(file name)  (no default, initially unset)

Draws an external picture referenced by ⟨file name⟩ in the center of the interior region of a \texttt{tcolorbox}. The picture is drawn after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of /tcb/watermark zoom \textsuperscript{P.186} or /tcb/watermark stretch \textsuperscript{P.188}.

\begin{tcolorbox}
\setlength{\parskip}{0pt}
\texttt{\textbackslash tcbset\{colback=red!5!white, colframe=red!75!black, fonttitle=\textbf\}}
\begin{tcolorbox}[enhanced, title=My title, watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\end{tcolorbox}

\texttt{\textbackslash tcblower}
This example uses a public domain picture from  \url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}

\texttt{\begin{tcolorbox}[enhanced, title=My title, watermark graphics=Basilica_5.png, watermark opacity=0.15]
\lipsum[1-2]
\end{tcolorbox}}

This example uses a public domain picture from \url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

/tcb/watermark graphics on=(part) is (file name)  (no default, initially unset)

This option draws a picture referenced by ⟨file name⟩ in the center of the interior region of a \texttt{tcolorbox} as described for /tcb/watermark graphics. But this is done only for boxes named ⟨part⟩ of a break sequence, see /tcb/breakable \textsuperscript{P.403}.

Feasible values for ⟨part⟩ are:

- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence.
Draws the given `tikz ⟨graphical code⟩` in the center of the interior region of a `tcolorbox`. The code is executed after the frame and interior are drawn and before the text content is drawn. The result is zoomed or stretched according the values of `/tcb/watermark zoom"P.186` or `/tcb/watermark stretch"P.188`.

\begin{tcolorbox}[enhanced,title=My title,watermark tikz={\draw[\line width=2mm] circle (1cm)\node[\fontfamily{ptm}\fontseries{b}\fontsize{20mm}{20mm}\selectfont \?};}]\lipsum[1]\lipsum[2]\end{tcolorbox}

My title


This option draws the given `tikz ⟨graphical code⟩` in the center of the interior region of a `tcolorbox` as described for `/tcb/watermark tikz` but this is done only for boxes named ⟨part⟩ of a break sequence, see `/tcb/breakable"P.403`.

Feasible values for ⟨part⟩ are:
- broken: all broken box parts,
- unbroken: unbroken box parts only,
- first: first parts of a break sequence,
- middle: middle parts of a break sequence,
- last: last parts of a break sequence,
- unbroken and first: unbroken box parts and first parts of a break sequence,
- middle and last: middle and last parts of a break sequence.

Removes the watermark if set before. This is an alias for `/tcb/no overlay"P.80`.
Sets the opacity value $\in [0,1]$ for a watermark.

\begin{tcolorbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcolorbox}

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcolorbox}
/tcb/watermark shrink=(fraction) (no default, initially unset)

Identically to /tcb/watermark zoom→P.186, but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

/tcb/watermark overzoom=(fraction) (no default, initially unset)

Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

If a /tcb/watermark overzoom value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than \text{opt}, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of /tcb/enhanced→P.227 boxes. To avoid this optical glitch, just set /tcb/pad at break→P.408 to any desired value.
Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

Sets the color for the watermark.


Donec vitae orci sit amet orci dignissim rutrum.
Sets the watermark to be clipped to the interior area.

\begin{tcolorbox}
\textbf{Clip (default), \texttt{clip watermark}}
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}
\textbf{No clip, \texttt{clip watermark=false}}
\lipsum[1]
\end{tcolorbox}
10.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type `path`, `pathfirst`, `pathmiddle`, or `pathlast`. Especially, the skin `enhanced` supports all of them and `standard` none. The typical area of application is inside overlay code, see Section 4.12 from page 79.

```latex
\begin{tcbclipframe}
⟨environment content⟩
\end{tcbclipframe}
```

Defines a Tikz scope which clips to the frame area path.

```latex
\makeatletter
\newtcolorbox{picturebox}[2]
{enhanced,frame hidden,interior hidden,fonttitle=\bfseries,
 overlay={\begin{tcbclipframe}\node at (frame)
{\includegraphics[width=\tcb@width,height=\tcb@height]{#2}};\end{tcbclipframe}%
\begin{tcbclipinterior}\fill[white,opacity=0.75]
(frame.south west) rectangle (frame.north east);\end{tcbclipinterior}},#1}
\makeatother
\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{picturebox}
```

My Picture Box

\begin{tcbinvclipframe}{environment content}\end{tcbinvclipframe}

Defines a \texttt{Tikz} scope which clips to the \textit{outside} of the frame area path.

\begin{tikzpicture}
% draw two balls
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}

\begin{tcolorbox}[title=A translucent box, overlay={\begin{tcbinvclipframe}
\draw [red,line width=1cm] ([xshift=-2mm,yshift=2mm]frame.north west) --([xshift=2mm,yshift=-2mm]frame.south east);
\draw [red,line width=1cm] ([xshift=-2mm,yshift=-2mm]frame.south west) --([xshift=2mm,yshift=2mm]frame.north east);
\end{tcbinvclipframe}}]
\lipsum[2]
\end{tcolorbox}

A translucent box

\begin{tcbclipinterior}
\begin{environment content}
\end{tcbclipinterior}
\end{environment content}
Defines a Tikz scope which clips to the interior area path.

\begin{tcolorbox}[enhanced,title=My Title, overlay={\begin{tcbclipinterior}
\draw[red,line width=1cm] (interior.north west)--(interior.south east);
\draw[red,line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}}]
\lipsum[1]
\end{tcolorbox}

\begin{tcbliptitle}
\begin{environment content}
\end{tcbliptitle}
\end{environment content}
Defines a Tikz scope which clips to the title area path.

\begin{tcolorbox}[enhanced,title=My Title,colframe=blue,colback=yellow!10!white, overlay={\begin{tcbliptitle}\node at (title) \{\includegraphics[width=\linewidth]{lichtspiel.jpg}\};\end{tcbliptitle}}]
\lipsum[1]
\end{tcolorbox}
/tcb/clip title=true|false (default true, initially false)
Sets the title to be clipped to the title area.

\tcbset{enhanced,width=6cm,colframe=red!50!white,coltitle=black, colbacktitle=yellow!50!white}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long},
clip title]
This is a tcolorbox.
\end{tcolorbox}

This is a title which is unbreakable and far too long
This is a tcolorbox.
This is a title which is unbreakable and far too long
This is a tcolorbox.

/tcb/clip upper=true|false (default true, initially false)
Sets the upper part to be clipped to the interior area.

\newcommand{\mygraphics}[2][]{\%\tcbox[enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,
right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper,
colback=black!75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter,
center title,fonttitle=\small\sffamily,title=\detokenize{#2}]\includegraphics[width=\the\dimexpr(\textwidth-4mm)/2\relax]{#2}}\mygraphics{lichtspiel.jpg}\hfill\mygraphics{Basilica_5.png}
The example for `/tcb/clip upper` sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

\newcommand{\mygraphics}[2]{
  \tcbbox[enhanced,capture=minipage,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,right=0pt,boxrule=0.4pt,drop fuzzy shadow,nobeforeafter,center title,fonttitle={\small\sffamily,title=\detokenize{#2}},
  width=(\linewidth-4mm)/2,\textwidth=6cm,colbacktitle={black},watermark zoom=1.0,watermark graphics={#2}]{}}

\mygraphics{lichtspiel.jpg}\hfill\mygraphics{Basilica_5.png}

\texttt{/tcb/clip lower=true|false} (default true, initially false)

Sets the lower part to be clipped to the interior area.
10.5 Border Line Option Keys

The following borderline options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment}. Therefore, the skin \texttt{standard} does not support these border lines, but most other skins, e.g. \texttt{enhanced}.

The borderlines are independent from the normal \texttt{tcolorbox} rules. They may be used with or without the \texttt{/tcb/segmentation engine}.

The borderlines are stackable, i.e. several different border lines can be used on the same \texttt{tcolorbox}. They are drawn after the box frame and box interior and before overlays or watermarks.

Technically, the normal \texttt{tcolorbox} rules result from a Ti\textsc{k}Z filling process. The borderline lines are created by a Ti\textsc{k}Z drawing process. This can be used to apply different effects.

\begin{verbatim}
\tcb/borderline = \{⟨width⟩\}⟨offset⟩\{⟨options⟩\} (no default, initially unset)
\end{verbatim}

Adds a new borderline to the stack of border lines. This border line is drawn with the given \texttt{⟨width⟩} and gets an \texttt{⟨offset⟩} computed from the frame outline. A positive \texttt{⟨offset⟩} value moves the borderline inside the \texttt{tcolorbox} and a negative \texttt{⟨offset⟩} value moves it outside without changing the bounding box.

The border line is drawn along a Ti\textsc{k}Z path with the given Ti\textsc{k}Z \texttt{⟨options⟩}. Note that the Ti\textsc{k}Z line width option should not be used here.

The border lines adapt to the rounded corners of the \texttt{tcolorbox}. An inside borderline will switch to sharp corners if necessary, an outside borderline will always be rounded except for \texttt{/tcb/sharp corners}.

\begin{tcolorbox}[enhanced, title=Rounded corners, fonttitle=\textbf, boxsep=5pt, arc=8pt, borderline={0.5pt}{0pt}{red}, borderline={0.5pt}{5pt}{blue,dotted}, borderline={0.5pt}{-5pt}{green} ]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[enhanced, title=Sharp corners, fonttitle=\textbf, boxsep=5pt, arc=8pt, sharp corners=downhill, borderline={0.5pt}{0pt}{red}, borderline={0.5pt}{5pt}{blue,dotted}, borderline={0.5pt}{-5pt}{green} ]
This is a tcolorbox.
\end{tcolorbox}


My title


/tcb/no borderline

(no default, initially set)
Removes all borderlines if set before.

/tcb/show bounding box=(color)

(default red, initially unset)
Displays the bounding box borderline of a tcolorbox. Its intended use is debugging and fine tuning. It should not be part of a final document. The optional (color) is the base color for the bounding box borderline.

\tcbset{enhanced,nobeforeafter,width=4cm,fonttitle=\bfseries}

\begin{tcolorbox}[show bounding box,title=Normal]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[show bounding box=blue,title=Shadow,drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[show bounding box=green,title=Enlarged,drop fuzzy shadow, enlarge by=2mm]
This is a tcolorbox.
\end{tcolorbox}
The following *partial* borderlines act slightly different from the complete borderlines described before. They ignore rounded corner settings, their length is not modified by their ⟨offset⟩, they ignore skin settings but adapt to breakable boxes.

**/tcb/borderline north={⟨width⟩}{⟨offset⟩}{⟨options⟩}** (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the north of the \texttt{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \texttt{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, borderline north={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

**/tcb/borderline south={⟨width⟩}{⟨offset⟩}{⟨options⟩}** (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the south of the \texttt{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \texttt{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, borderline south={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

**/tcb/borderline east={⟨width⟩}{⟨offset⟩}{⟨options⟩}** (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the east of the \texttt{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \texttt{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, borderline east={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

**/tcb/borderline west={⟨width⟩}{⟨offset⟩}{⟨options⟩}** (no default, initially unset)

Adds a new borderline with the given ⟨width⟩ to the west of the \texttt{tcolorbox}. A positive ⟨offset⟩ value moves the borderline inside the \texttt{tcolorbox} and a negative ⟨offset⟩ value moves it outside without changing the bounding box.

\begin{tcolorbox}[enhanced, borderline west={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
`/tcb/borderline horizontal=⟨width⟩⟨offset⟩⟨options⟩` (no default, initially unset)

Adds a new borderline with the given `⟨width⟩` to the north and south of the `tcolorbox`. A positive `⟨offset⟩` value moves the borderlines inside the `tcolorbox` and a negative `⟨offset⟩` value moves them outside without changing the bounding box.

\begin{tcolorbox}[blanker,top=3mm,bottom=3mm, borderline horizontal={2pt}{0pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced,colback=yellow!10!white,boxrule=0pt,frame hidden, borderline north={1mm}{-2mm}{red}, borderline south={1mm}{-2mm}{blue}, borderline west={1mm}{-2mm}{green}, borderline east={1mm}{-2mm}{yellow}]
\lipsum[1]
\end{tcolorbox}

10.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} P.151. Therefore, the skin \texttt{standard} P.225 does not support these shadows, but most other skins, e.g. \texttt{enhanced} P.227.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn \textit{before} the box frame is drawn.

\texttt{/tcb/no shadow} \hfill (no default)

Removes all shadows if set before.

10.6.1 Common Shadows and Halos

\texttt{/tcb/drop shadow=\texttt{\langle color\rangle}} \hfill (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{\langle color\rangle} for the shadow can be changed.

\begin{Verbatim}
\tcbb{\texttt{enhanced},\texttt{colback=red!5!white,}}\cr\texttt{\texttt{colframe=red!75!black,fonttitle=\texttt{\bfseries}}}
\begin{tcolorbox}[\texttt{drop shadow}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{title=Another shadow, drop shadow=blue}]
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}

Another shadow

\texttt{/tcb/drop fuzzy shadow=\texttt{\langle color\rangle}} \hfill (style, default \texttt{black!50!white})

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{\langle color\rangle} for the shadow can be changed.

\begin{Verbatim}
\tcbb{\texttt{enhanced},\texttt{colback=red!5!white,}}\cr\texttt{\texttt{colframe=red!75!black,fonttitle=\texttt{\bfseries}}}
\begin{tcolorbox}[\texttt{drop fuzzy shadow}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{title=Another shadow, drop fuzzy shadow=blue}]
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}

Another shadow

\texttt{/tcb/drop midday shadow=\texttt{\langle color\rangle}} \hfill (style, default \texttt{black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{\langle color\rangle} for the shadow can be changed.

\begin{Verbatim}
\tcbb{\texttt{enhanced},\texttt{colback=red!5!white,}}\cr\texttt{\texttt{colframe=red!75!black,fonttitle=\texttt{\bfseries}}}
\begin{tcolorbox}[\texttt{drop midday shadow}]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[\texttt{title=Another shadow, drop midday shadow=blue}]
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}

Another shadow
/tcb/drop fuzzy midday shadow=⟨color⟩ (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the ⟨color⟩ for the shadow can be changed.

```
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop fuzzy midday shadow] This is a tcolorbox.
\end{tcolorbox}
```

/tcb/halo=⟨size⟩ with ⟨color⟩ (style, default 0.9mm with yellow)
Adds a new halo shadow with the given ⟨color⟩ which overlaps the colorbox on all sides by ⟨size⟩.

```
\tcbset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo, halo=2mm with green] This is a tcolorbox.
\end{tcolorbox}
```

/tcb/fuzzy halo=⟨size⟩ with ⟨color⟩ (style, default 0.9mm with yellow)
Adds a new fuzzy halo shadow with the given ⟨color⟩ which overlaps the colorbox on all sides by ⟨size⟩ plus 0.48mm.

For all following shadows, the optionally given \(\langle\text{color}\rangle\) for the shadow can be changed equivalent to the preceding examples.

\[\text{/tcb/drop shadow southeast=\langle\text{color}\rangle}\]  
(\text{style, default black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \(\text{/tcb/drop shadow}\) \(\rightarrow\) P.200.

\begin{tcolorbox}  
\begin{verbatim}  
\begin{tcolorbox}[drop shadow southeast,  
enhanced, colback=red!5!white, colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
\end{verbatim}  
\end{tcolorbox}

\[\text{/tcb/drop shadow south=\langle\text{color}\rangle}\]  
(\text{style, default black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \(\text{/tcb/drop midday shadow}\) \(\rightarrow\) P.200.

\begin{tcolorbox}  
\begin{verbatim}  
\begin{tcolorbox}[drop shadow south,  
enhanced, colback=red!5!white, colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
\end{verbatim}  
\end{tcolorbox}

\[\text{/tcb/drop shadow southwest=\langle\text{color}\rangle}\]  
(\text{style, default black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}  
\begin{verbatim}  
\begin{tcolorbox}[drop shadow southwest,  
enhanced, colback=red!5!white, colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
\end{verbatim}  
\end{tcolorbox}

\[\text{/tcb/drop shadow west=\langle\text{color}\rangle}\]  
(\text{style, default black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}  
\begin{verbatim}  
\begin{tcolorbox}[drop shadow west,  
enhanced, colback=red!5!white, colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
\end{verbatim}  
\end{tcolorbox}

\[\text{/tcb/drop shadow northwest=\langle\text{color}\rangle}\]  
(\text{style, default black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}  
\begin{verbatim}  
\begin{tcolorbox}[drop shadow northwest,  
enhanced, colback=red!5!white, colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
\end{verbatim}  
\end{tcolorbox}

\[\text{/tcb/drop shadow north=\langle\text{color}\rangle}\]  
(\text{style, default black!50!white})

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}  
\begin{verbatim}  
\begin{tcolorbox}[drop shadow north,  
enhanced, colback=red!5!white, colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
\end{verbatim}  
\end{tcolorbox}
/tcb/drop shadow northeast=\texttt{\protect\color{style, default \protect\texttt{\textcolor{black}{black}}!50!white}
 Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow northeast, enhanced,colback=red!5!white,colframe=red!75!black]
 This is a tcolorbox.
\end{tcolorbox}

/tcb/drop shadow east=\texttt{\protect\color{style, default \protect\texttt{\textcolor{black}{black}}!50!white}
 Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop shadow east, enhanced,colback=red!5!white,colframe=red!75!black]
 This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow southeast=\texttt{\protect\color{style, default \protect\texttt{\textcolor{black}{black}}!50!white}
 Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy shadow \textsuperscript{P.200}.

\begin{tcolorbox}[drop fuzzy shadow southeast, enhanced,colback=red!5!white,colframe=red!75!black]
 This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow south=\texttt{\protect\color{style, default \protect\texttt{\textcolor{black}{black}}!50!white}
 Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tcb/drop fuzzy midday shadow \textsuperscript{P.201}.

\begin{tcolorbox}[drop fuzzy shadow south, enhanced,colback=red!5!white,colframe=red!75!black]
 This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow southwest=\texttt{\protect\color{style, default \protect\texttt{\textcolor{black}{black}}!50!white}
 Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow southwest, enhanced,colback=red!5!white,colframe=red!75!black]
 This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow west=\texttt{\protect\color{style, default \protect\texttt{\textcolor{black}{black}}!50!white}
 Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow west, enhanced,colback=red!5!white,colframe=red!75!black]
 This is a tcolorbox.
\end{tcolorbox}
/tcb/drop fuzzy shadow northwest=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop fuzzy shadow northwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow north=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop fuzzy shadow north, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow northeast=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop fuzzy shadow northeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/drop fuzzy shadow east=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

```
\begin{tcolorbox}[drop fuzzy shadow east, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
```

This is a tcolorbox.
10.6.2 Lifted Shadows

/tcb/drop lifted shadow=(color) (style, default black!50!white)

Adds a new lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

\tcset{enhanced, colback=red!5!white, boxrule=0.4pt, sharp corners, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop lifted shadow]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, drop lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop small lifted shadow=(color) (style, default black!50!white)

Adds a new small lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

\tcset{enhanced, colback=red!5!white, boxrule=0.4pt, sharp corners, colframe=red!75!black, fonttitle=\bfseries}
\tcbox[drop small lifted shadow, size=fbox]
{This is a tcolorbox.}
\par
\begin{tcolorbox}[title=Another shadow, drop small lifted shadow=black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop large lifted shadow=(color) (style, default black!50!white)

Adds a new large lifted shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

\tcset{enhanced, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[drop large lifted shadow]
This is a tcolorbox.
\end{tcolorbox}
\par
\begin{tcolorbox}[title=Another shadow, drop large lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
10.6.3 Generic Shadows

\tcb/shadow=\{\langle xshift \rangle\}\{\langle yshift \rangle\}\{\langle offset \rangle\}\{\langle options \rangle\} (no default)

Adds a new shadow to the stack of shadows. This shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift \rangle and \langle yshift \rangle. The \langle offset \rangle value is a distance value from the frame outline. A positive \langle offset \rangle value shrinks the shadow and a negative \langle offset \rangle value enlarges the shadow. The shadow is filled along a Ti\kZ path with the given Ti\kZ \langle options \rangle.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrinked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But \texttt{/tcb/sharp corners} \textsuperscript{P.53} have sharp shadows.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlaped by the following content. But, the bounding box can be adapted if necessary.

\begin{tcolorbox}[title=My own shadow, shadow={2mm}{-1mm}{0mm}{black!50!white}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, shadow={-1mm}{-2mm}{0mm}{fill=blue, opacity=0.5}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Double shadow, shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue, opacity=0.25}, shadow={1.5mm}{-1.5mm}{0mm}{fill=red, opacity=0.25}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Far shadow, shadow={5.5mm}{-3.5mm}{2mm}{fill=black, opacity=0.25}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Halo shadow, shadow={0mm}{0mm}{-1.5mm}{fill=yellow!75!red, opacity=0.5}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
/tcb/fuzzy shadow={(xshift)}{(yshift)}{(offset)}{(step)}{(options)}  (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the \tcolorbox but is shifted by \{(xshift)\} and \{(yshift)\}. The \{(offset)\} value is a distance value from the frame outline. A positive \{(offset)\} value shrinks the shadow and a negative \{(offset)\} value enlarges the shadow. The \{(step)\} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\kZ path with the given Ti\kZ \{(options)\} but any opacity value will be ignored.
If set to \texttt{true}, the shadow drawing algorithm tries to do a somewhat smart calculation of the arc for the shadow. The result is pleasing for typical boxes with rounded corners, but gives strange results for circular boxes.

\begin{tcolorbox}[drop shadow]
Smart shadow arc (arguably better than normal)
\end{tcolorbox}
\hfill
\begin{tcolorbox}[smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
\hfill
\begin{tcolorbox}[circular arc, drop shadow]
Smart shadow arc (worse than normal)
\end{tcolorbox}
\hfill
\begin{tcolorbox}[circular arc, smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}

\texttt{/tcb/lifted shadow={\langle xshift \rangle}{\langle yshift \rangle}{\langle bend \rangle}{\langle step \rangle}{\langle options \rangle}} (no default)

Adds a new lifted shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This lifted shadow follows the outline of the \texttt{tcolorbox} but is shifted by \(\langle xshift \rangle\) and \(\langle yshift \rangle\) on the lower left corner and by \(-\langle xshift \rangle\) and \(\langle yshift \rangle\) on the lower right corner. Additionally, there is a \(\langle bend \rangle\) in the middle. The \{\langle step \rangle\} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a Ti\LaTeX\ path with the given Ti\LaTeX\ \langle options \rangle but any \texttt{opacity} value will be ignored.

\begin{tcolorbox}[title=My own shadow, lifted shadow={1mm}{-2mm}{3mm}{0.1mm}]
This is a tcolorbox.
\end{tcolorbox}
10.6.4 TikZ Shadows

Alternatively to the package shadow options described before, shadows from the «Shadows Library» of TikZ can be used. Such shadows can be added directly to the frame path using \texttt{/tcb/frame style} \cite{p.165}.

\begin{tcolorbox}
[enhanced, colback=red!5!white,colframe=red!75!black, frame style={drop shadow}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced,height=3cm, colback=red!5!white,colframe=red!75!black, halign=center,valign=center, frame style={circular drop shadow}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced,width=2.5cm, square,circular arc, halign=center,valign=center, colback=red!5!white,colframe=red!75!black, frame style={circular glow={fill=red}}]
tcolorbox
\end{tcolorbox}
10.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \textsuperscript{\cite{p.151}. Therefore, the skin \texttt{standard} \textsuperscript{\cite{p.225}} does not support these options, but most other skins, e.g. \texttt{enhanced} \textsuperscript{\cite{p.227}}.

\texttt{/tcb/tikz=⟨tikz option list⟩} \hspace{1cm} (no default, initially empty)

Adds the given \texttt{⟨tikz option list⟩} to the main \texttt{tikzpicture} environment used to draw the color box, see \cite{22}. If this option is applied a second time, the new \texttt{⟨tikz option list⟩} is appended to the current option list.

\begin{tcolorbox}[title=Transparent box, tikz={opacity=0.5,transparency group}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Rotated box, tikz={rotate=30}]
Sold!
\end{tcolorbox}

\texttt{/tcb/tikz reset} \hspace{1cm} (initially set)

Removes all options given by \texttt{/tcb/tikz}.

\texttt{/tcb/at begin tikz=⟨tikz code⟩} \hspace{1cm} (no default, initially empty)

The given \texttt{⟨tikz code⟩} is executed at the beginning of the \texttt{tikzpicture} environment after the TikZ option \texttt{execute at begin picture} was applied. If this option is applied a second time, the new \texttt{⟨tikz code⟩} is appended to the current code.

\texttt{/tcb/at begin tikz reset} \hspace{1cm} (initially set)

Removes all code given by \texttt{/tcb/at begin tikz}.

\texttt{/tcb/at end tikz=⟨tikz code⟩} \hspace{1cm} (no default, initially empty)

The given \texttt{⟨tikz code⟩} is executed at the ending of the \texttt{tikzpicture} environment before the TikZ option \texttt{execute at end picture} was applied. If this option is applied a second time, the new \texttt{⟨tikz code⟩} is appended to the current code.

\texttt{/tcb/at end tikz reset} \hspace{1cm} (initially set)

Removes all code given by \texttt{/tcb/at end tikz}.
/tcb/rotate={angle} (no default, initially unset)
Rotates the tcolorbox by the given \( \text{angle} \). Note that this is a \text{TikZ} coordinate transformation i.e. not all graphical elements like shadings will really be rotated.

\begin{tcolorbox}[title=Rotated box,rotate=30]
This is a tcolorbox.
\end{tcolorbox}

/tcb/scale={fraction} (no default, initially unset)
Scales the tcolorbox by the given \( \text{fraction} \). Note that this is a \text{TikZ} coordinate transformation i.e. not all graphical elements like line widths will really be scaled.

\begin{tcolorbox}[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}

/tcb/remember (style, initially unset)
Shortcut for \texttt{tikz={remember picture}}. This allows one to reference nodes in other \text{TikZ} pictures.

\begin{tcolorbox}[enhanced,remember,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries,title=The four corners of a paper, overlay={
\draw[red!50!white,line width=1mm,opacity=0.5,shorten >=3mm]
(frame.north west) edge[->] (current page.north west)
(frame.north east) edge[->] (current page.north east)
(frame.south west) edge[->] (current page.south west)
(frame.south east) edge[->] (current page.south east);}]
This is a tcolorbox.
\end{tcolorbox}
The frame node will be remembered by the given <name> to be referenced in other TikZ pictures.
10.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 79. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 9.4 on page 158 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins standard \textsuperscript{P.225} and standard jigsaw \textsuperscript{P.226}, whereas overlays are applicable also for these skins. The skin spartan \textsuperscript{P.271} supports underlays but no overlays.

  \begin{itemize}
  \item If an underlay is used with the standard \textsuperscript{P.225} skin, it is silently ignored.
  \end{itemize}

- Underlays are stackable, i.e. several different underlays can be used on the same \texttt{tcolorbox}. Overlays are not stackable by default (but with some help of the library \texttt{hooks}).

- Boxed titles are implemented with underlays (Section 10.2 on page 172), watermarks are implemented with overlays (Section 10.3 on page 183).

\texttt{/tcb/underlay=(graphical code)}

(no default, initially unset)

Adds \texttt{(graphical code)} to the box drawing process. This \texttt{(graphical code)} is drawn after the frame and interior and before the text content.

\begin{tcbitemize}
\item \texttt{\newtcolorbox{mybox}[1][\]{}\{enhanced, colback=red!5!white, colbacktitle=red!85!black!50!white, colframe=red!75!black, fonttitle=\textbf, watermark color=yellow!50!white, underlay={\begin{tcbclipinterior}
\draw[red!40!white, line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}}, attach boxed title to top center={yshift=-2mm},#1} \end{tcbitemize}

\begin{mybox}[title=My box, watermark text=My Watermark]
\lipsum[2]
\end{mybox}

\texttt{/tcb/no underlay}

(style, no default, initially set)

Removes the underlay if set before.
/tcb/underlay broken\=(\textit{graphical code}) (no default, initially unset)

If the box is set to be /tcb/breakable\textsuperscript{P.403} and is broken actually, then the (\textit{graphical code}) is added to the box drawing process. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/underlay unbroken\=(\textit{graphical code}) (no default, initially unset)

If the box is set to be /tcb/breakable\textsuperscript{P.403} but \textit{is not} broken actually or if the box is set to be /tcb/unbreakable\textsuperscript{P.404}, then the (\textit{graphical code}) is added to the box drawing process. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/no underlay unbroken (style, no default, initially set)

Removes the unbroken underlay if set before.

/tcb/underlay first\=(\textit{graphical code}) (no default, initially unset)

If the box is set to be /tcb/breakable\textsuperscript{P.403} and is broken actually, then the (\textit{graphical code}) is added to the box drawing process for the \textit{first} part of the break sequence. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/no underlay first (style, no default, initially set)

Removes the first underlay if set before.

/tcb/underlay middle\=(\textit{graphical code}) (no default, initially unset)

If the box is set to be /tcb/breakable\textsuperscript{P.403} and is broken actually, then the (\textit{graphical code}) is added to the box drawing process for the \textit{middle} parts (if any) of the break sequence. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/no underlay middle (style, no default, initially set)

Removes the middle underlay if set before.

/tcb/underlay last\=(\textit{graphical code}) (no default, initially unset)

If the box is set to be /tcb/breakable\textsuperscript{P.403} and is broken actually, then the (\textit{graphical code}) is added to the box drawing process for the \textit{last} part of the break sequence. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/no underlay last (style, no default, initially set)

Removes the last underlay if set before.

/tcb/underlay boxed title\=(\textit{graphical code}) (no default, initially unset)

If the box has a \textit{boxed title}, see Section \ref{sec:boxed} on page \pageref{sec:boxed}, then the (\textit{graphical code}) is added to the box drawing process \textit{before} the boxed title is drawn.

/tcb/no underlay boxed title (style, no default, initially set)

Removes the boxed title underlay if set before.

/tcb/underlay unbroken and first\=(\textit{graphical code}) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay first together. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/underlay middle and last\=(\textit{graphical code}) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay middle and /tcb/underlay last together. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/underlay unbroken and last\=(\textit{graphical code}) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay last together. /tcb/underlay\textsuperscript{P.213} overwrites this key.

/tcb/underlay first and middle\=(\textit{graphical code}) (no default, initially unset)

This is an abbreviation for setting /tcb/underlay first and /tcb/underlay middle together. /tcb/underlay\textsuperscript{P.213} overwrites this key.
10.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 10.8 on page 213 and overlays described in Section 4.12 on page 79. Finishes are drawn after the text content is drawn; see Section 9.4 on page 158 for the general drawing scheme. Therefore, a finish will reduce the readability of the text content. Finishes are intended for special effects like highlights or glosses or text over text.

- Finishes are only applicable for the skins enhanced\textsuperscript{P. 227}, empty\textsuperscript{P. 261}, freelance\textsuperscript{P. 274}, bicolor\textsuperscript{P. 239}, beamer\textsuperscript{P. 254}, and widget\textsuperscript{P. 258}.

If a finish is used with the standard\textsuperscript{P. 225} skin, it is silently ignored.

- Finishes are stackable, i.e. several different finishes can be used on the same \texttt{tcolorbox}.

\begin{verbatim}
/tcb/finish=⟨graphical code⟩ (no default, initially unset)

Adds ⟨graphical code⟩ to the box drawing process. This ⟨graphical code⟩ is drawn after the text content.
\end{verbatim}

\begin{tcolorbox}[mybox][1][enhanced,colback=red!5!white,colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries,finish={\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.north east) -- (frame.north west) -- cycle;
\end{tcbclipframe}},#1]
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{tcolorbox}

My box


\begin{tcolorbox}[mybox][1][enhanced,colback=red!5!white,colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries,finish={\node[draw,fill=white,fill opacity=0.85,inner sep=5mm,rounded corners] at (frame.center) {\Huge\bfseries Finish!};},#1]
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{tcolorbox}

My box

/tcb/no finish (style, no default, initially set)
Removes the finish if set before.

/tcb/finish broken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/finish unbroken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} but is not broken actually or if the box is set to be /tcb/unbreakable \textsuperscript{P.404}, then the ⟨graphical code⟩ is added to the box drawing process. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/no finish unbroken (style, no default, initially set)
Removes the unbroken finish if set before.

/tcb/finish first=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the first part of the break sequence. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/no finish first (style, no default, initially set)
Removes the first finish if set before.

/tcb/finish middle=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/no finish middle (style, no default, initially set)
Removes the middle finish if set before.

/tcb/finish last=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.403} and is broken actually, then the ⟨graphical code⟩ is added to the box drawing process for the last part of the break sequence. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/no finish last (style, no default, initially set)
Removes the last finish if set before.

/tcb/finish unbroken and first=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish first together. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/finish middle and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish middle and /tcb/finish last together. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/finish unbroken and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish last together. /tcb/finish \textsuperscript{P.215} overwrites this key.

/tcb/finish first and middle=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish first and /tcb/finish middle together. /tcb/finish \textsuperscript{P.215} overwrites this key.
10.10 Hyper Option Keys

All options of this section need the package `hyperref`\textsuperscript{[15]} to be loaded separately. All these options are implemented as `/tcb/finish`\textsuperscript{\[P.215]} and can be disabled by `/tcb/no finish`\textsuperscript{\[P.216]}.

If the package `hyperref`\textsuperscript{[15]} is not loaded or if the standard\textsuperscript{\[P.225]} skin is used, all hyper option are silently ignored.

\begin{tcolorbox}
\[enhanced, colback=red!50, hyperref=sec:skins\] \begin{beamercolorpage}{BeamerPage}
Jump to the heading of Section~\ref*{sec:skins}.
\end{beamercolorpage}
\end{tcolorbox}

\begin{tcolorbox}
\[enhanced, colback=blue!10, colframe=blue!50!black, hypertarget=hypertwinB, hyperlink=hypertwinA, title=Box B\] \begin{beamercolorpage}{BeamerPage}
Click me to jump to Box A.
\end{beamercolorpage}
\end{tcolorbox}
Identical to /tcb/hyperlink \(^\text{P.217}\), but only the interior of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to /tcb/hyperlink \(^\text{P.217}\), but only the title of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperlink \(^\text{P.217}\), but only the given \TeX{} \langle node \rangle is made a hyperlink. This \langle node \rangle may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \langle node \rangle may be defined inside /tcb/underlay \(^\text{P.213}\), /tcb/overlay \(^\text{P.79}\) or /tcb/finish \(^\text{P.215}\). If the later is used, define the node before /tcb/hyperlink node is applied.

The whole \texttt{frame} of a \texttt{tcolorbox} is make an active hyperlink for an \langle url \rangle in the same manner as using \texttt{	extbackslash href} or \texttt{	extbackslash url}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).

\begin{tcolorbox}[enhanced,colback=red!50, hyperurl=https://www.ctan.org/pkg/tcolorbox]
View CTAN with a browser.
\end{tcolorbox}

Identical to /tcb/hyperurl, but only the interior of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to /tcb/hyperurl, but only the title of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperurl, but only the given \TeX{} \langle node \rangle is made a hyperlink. This \langle node \rangle may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \langle node \rangle may be defined inside /tcb/underlay \(^\text{P.213}\), /tcb/overlay \(^\text{P.79}\) or /tcb/finish \(^\text{P.215}\). If the later is used, define the node before /tcb/hyperurl node is applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref} \([15]\) \langle options \rangle are applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref} \([15]\) \langle options \rangle are applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref} \([15]\) \langle options \rangle are applied.
10.11 Jigsaw Skin Variants

As described in Section 9.1 on page 150, a \texttt{tcolorbox} is drawn by up to four \textit{engines}. Typically, the \textit{frame} engine fills the complete box area with color and the other engines fill certain areas with other colors. Finally, only the area which you see as \textit{frame} of the box will display the frame color. For most applications, this is a good approach.

For certain boxes, a more delicate procedure is needed. E.g., if the box should be translucent, an already painted area cannot be made unpainted. Therefore, more elaborate frame engines saw holes into the frame where the interior area and optionally the title area will be painted. The resulting skins are called \textit{jigsaw} skins. For standard \textsuperscript{P.225}, enhanced \textsuperscript{P.227}, and bicolor \textsuperscript{P.239}, there are variants called standard jigsaw \textsuperscript{P.226}, enhanced jigsaw \textsuperscript{P.233}, and bicolor jigsaw \textsuperscript{P.246}:

\begin{tikzpicture}
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}

\tcbset{enhanced,colback=blue!5!white,\par
frame style={left color=red!75!black,right color=red!10!yellow},\par
fonttitle=\bfseries}

\begin{tcolorbox}[title=A normal box]\lipsum[2]\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box,\par
enhanced jigsaw,opacityback=0.35]\lipsum[2]\end{tcolorbox}

\newcommand{\ballexample}{\begin{tikzpicture}\par
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);\par
\shadedraw [shading=ball] (0,0) circle (1cm);\par
\shadedraw [ball color=red] (3,-2.2) circle (1cm);\par
\end{tikzpicture}}

\begin{tcolorbox}[title=A normal box]\lipsum[2]\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box,\par
enhanced jigsaw,opacityback=0.35]\lipsum[2]\end{tcolorbox}

10.12 Draft Mode

To reduce the compilation time while drafting a document, the draft mode can be applied. Basically, it changes all skins to spartan $P.271$ and sets the /tcb/fit algorithm $P.453$ to squeeze. Especially, when fuzzy shadows are used, the speedup will be considerable high.

It is strongly recommended that the draft mode is not used for the final document. Use spartan $P.271$ directly, if you want to stay with it. The draft mode implementation may change in future.

Normally, switching to the draft mode should not alter the geometry of your document. Since overlays are deactivated, any code placed there (e.g. counter changes) is not executed anymore! Also, /tcb/remember as $P.212$ will not have any effect. You may exclude critical code with \tcbinderruptdraftmode / \tcbcontinuedraftmode from converting to draft mode.

\tcbindraftmode

Any following tcolorbox code is put into draft mode. All skin settings are overruled with spartan $P.271$. Overlays, watermarks, shadows, borderlines, and rounded corners are deactivated for all tcolorbox layers.

\tcbstopdraftmode

The draft mode is deactivated for the following code.

\tcbinderruptdraftmode

If the compilation is in draft mode, the draft mode is deactivated until a following \tcbcontinuedraftmode is detected.

If the compilation is not in draft mode, nothing happens and a following \tcbcontinuedraftmode will not start the draft mode.

The pair \tcbinderruptdraftmode and \tcbcontinuedraftmode cannot be used nested.

\tcbcontinuedraftmode

Continues the draft mode which was suspended by a preceding \tcbinderruptdraftmode. Nothing happens, if there was no draft mode before \tcbinderruptdraftmode.

Code, which is place between \tcbinderruptdraftmode and \tcbcontinuedraftmode is shielded from draft mode.
If set to \texttt{true}, the \textit{draft mode} is started. If set to \texttt{false}, the \textit{draft mode} is stopped.

\newtcolorbox{mybeamer}[2]{beamer,colback=Salmon!50!white, colframe=FireBrick!75!black,adjusted title={#2},#1}
\begin{mybeamer}{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}
\begin{mybeamer}[draftmode]{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{mybeamer}

\begin{mybeamer}
\begin{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{Beamer box}
\end{mybeamer}

\begin{mybeamer}
\begin{Beamer box}
This box looks like a box provided by the \texttt{beamer} class.
\end{Beamer box}
\end{mybeamer}
The \texttt{skins} library provides a catalog of skins to choose from which is documented in the following. The \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\usepackage{skins}
\end{verbatim}

See Section 10 on page 165 for the documentation of all other options of the \texttt{skins} library.

- In principle, a skin is applied by choosing a value for \texttt{/tcb/skin}, e.g. \texttt{enhanced}. Since the parts of a breakable box should look different, there are individual skins for breakable boxes, also see Section 19.8 on page 417. Skins for breakable boxes derived from a base skin are called a skin family in the following.

- Instead of setting values for \texttt{/tcb/skin}, equally named options can be used which are shortcuts and which sometimes also change some geometry or style settings. These are the intended options for normal users. Typically, one of the following options is sufficient to select a skin:

  - \texttt{/tcb/standard} \texttt{P.225}
  - \texttt{/tcb/standard jigsaw} \texttt{P.226}
  - \texttt{/tcb/enhanced} \texttt{P.227}
  - \texttt{/tcb/enhanced jigsaw} \texttt{P.233}
  - \texttt{/tcb/enhanced standard} \texttt{P.229}
  - \texttt{/tcb/enhanced standard jigsaw} \texttt{P.233}
  - \texttt{/tcb/bicolor} \texttt{P.240}
  - \texttt{/tcb/tile} \texttt{P.250}
  - \texttt{/tcb/beamer} \texttt{P.254}
  - \texttt{/tcb/widget} \texttt{P.258}
  - \texttt{/tcb/empty} \texttt{P.261}
  - \texttt{/tcb/spartan} \texttt{P.271}
  - \texttt{/tcb/draft} \texttt{P.272}

Additionally, there are some special applications:

  - \texttt{/tcb/marker} \texttt{P.235}
  - \texttt{/tcb/blank} \texttt{P.229}
  - \texttt{/tcb/blanker} \texttt{P.262}
  - \texttt{/tcb/blankest} \texttt{P.263}
The auxiliary macro `\skinExampleSet` is used for the following examples to display skin applications. Note that `\skinExampleSet` is not part of the package, but is defined just for this documentation.

```latex
\NewDocumentCommand{\skinExampleSet}{m}{%
  \begin{tcbraster}[raster equal height,raster columns=3,  
    colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,  
    #1,  
    left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,  
    sidebyside gap=4mm]
    \begin{tcolorbox}
    This is my content.
    \end{tcolorbox}
    \begin{tcolorbox}
    This is my content.
    \tcblower
    More content.
    \end{tcolorbox}
    \begin{tcolorbox}[sidebyside]
    My content.
    \tcblower
    More content.
    \end{tcolorbox}
    \begin{tcolorbox}[adjusted title=My title]
    This is my content.
    \end{tcolorbox}
    \begin{tcolorbox}[adjusted title=My title]
    This is my content.
    \tcblower
    More content.
    \end{tcolorbox}
    \begin{tcolorbox}[adjusted title=My title,sidebyside]
    My content.
    \tcblower
    More content.
    \end{tcolorbox}
  \end{tcbraster}
}
11.1 Skin Family “standard”

Note that the option keys \texttt{/tcb/frame style} \textsuperscript{P.165}, \texttt{/tcb/interior style} \textsuperscript{P.166}, \texttt{/tcb/segmentation style} \textsuperscript{P.168}, and \texttt{/tcb/title style} \textsuperscript{P.168} are not applicable to the standard skin. Also, watermarks (see Subsection 10.3) are not usable with the standard skin.

\texttt{/tcb/skin=standard} \textsuperscript{(skin)}

This is the standard skin from the core package. All drawing engines are set to type \texttt{standard}. The drawing is based on \texttt{pgf} commands and does not need the \texttt{tikz} package.

Environment and engines for the skin “standard”

- \texttt{/tcb/graphical environment} \textsuperscript{P.151}: \texttt{pgfpicture}
- \texttt{/tcb/frame engine} \textsuperscript{P.151}: \texttt{standard}
- \texttt{/tcb/interior titled engine} \textsuperscript{P.151}: \texttt{standard}
- \texttt{/tcb/interior engine} \textsuperscript{P.152}: \texttt{standard}
- \texttt{/tcb/segmentation engine} \textsuperscript{P.152}: \texttt{standard}
- \texttt{/tcb/title engine} \textsuperscript{P.152}: \texttt{standard}

\texttt{/tcb/standard} \textsuperscript{(style, no value)}

This is an abbreviation for setting \texttt{skin=standard}.

\texttt{\skinExampleSet{standard}}
This is the standard jigsaw skin from the core package. It differs from the skin standard \textsuperscript{P.225} by its frame engine, see Section 10.11 on page 219.

<table>
<thead>
<tr>
<th>Environment and engines for the skin “standard jigsaw”</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{/tcb/graphical environment} \textsuperscript{P.151}: pgfpicture</td>
</tr>
<tr>
<td>\texttt{/tcb/frame engine} \textsuperscript{P.151}: standardjigsaw</td>
</tr>
<tr>
<td>\texttt{/tcb/interior titled engine} \textsuperscript{P.151}: standard</td>
</tr>
<tr>
<td>\texttt{/tcb/interior engine} \textsuperscript{P.152}: standard</td>
</tr>
<tr>
<td>\texttt{/tcb/segmentation engine} \textsuperscript{P.152}: standard</td>
</tr>
<tr>
<td>\texttt{/tcb/title engine} \textsuperscript{P.152}: standard</td>
</tr>
</tbody>
</table>

This is an abbreviation for setting \texttt{skin=standard jigsaw}.

\begin{verbatim}
\skeinExampleSet{standard jigsaw, 
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, }
\end{verbatim}

This is my content. More content.

My title

This is my content. More content.

My title

This is my content. More content.
11.2 Skin Family “enhanced”

If you like the standard appearance of a \texttt{tcolorbox} but you want to have some “enhanced” features, the \texttt{enhanced} skin is what you are looking for.

\texttt{/tcb/skin=enhanced} \hspace{1cm} (skin)

This skin translates the drawing commands of the core package into \texttt{tikz} path commands. Therefore, it allows all \texttt{tikz} high level options for these paths and has more flexibility compared to the \texttt{standard} \cite{p.225} skin. You pay for this with some prolonged compilation time. The \texttt{tikz} path options can be given with the option keys \texttt{/tcb/frame style} \cite{p.165}, \texttt{/tcb/interior style} \cite{p.166}, \texttt{/tcb/segmentation style} \cite{p.168}, and \texttt{/tcb/title style} \cite{p.168}.

\textbf{Environment and engines for the skin “enhanced”}

\texttt{/tcb/graphical environment} \cite{p.151}: \texttt{tikzpicture}
\texttt{/tcb/frame engine} \cite{p.151}: \texttt{path}
\texttt{/tcb/interior titled engine} \cite{p.151}: \texttt{path}
\texttt{/tcb/interior engine} \cite{p.152}: \texttt{path}
\texttt{/tcb/segmentation engine} \cite{p.152}: \texttt{path}
\texttt{/tcb/title engine} \cite{p.152}: \texttt{path}

\texttt{/tcb/enhanced} \hspace{1cm} (style, no value)

This is an abbreviation for setting \texttt{skin=enhanced}.

\begin{tcolorbox}[enhanced]
This is my content.
\hline
This is my content.
\hline
More content.
\end{tcolorbox}

\begin{tcolorbox}[enhanced]
My content. \hline
More content.
\end{tcolorbox}

\begin{tcolorbox}[enhanced]
My content. \hline
More content.
\end{tcolorbox}

\begin{tcolorbox}[enhanced]
My content. \hline
More content.
\end{tcolorbox}
Nice box in rainbow colors

With the “enhanced” skin, it is quite easy to produce fancy looking effects.

Note that this is still a \texttt{tcolorbox}.

A listing box with shadow and some specials

Of course, skins can be used for listings also.
\begin{equation}
\int_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation}

\begin{equation}
\int_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation} (2)
For unbreakable boxes, this is identical to using /tcb/enhanced \( \cdot \) P.227. But, for breakable boxes, the break sequence is identical to the standard \( \cdot \) P.225 skin, see Section 19.8 from page 417.

This style relies on the skin enhanced \( \cdot \) P.227. All drawing operations are hidden and all margins are set to \( 0 \)pt. See /tcb/blanker \( \cdot \) P.262 for switching off the drawing engines.

\begin{tcolorbox}[blank,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}

Sometimes, a line is only a line. With \textbackslash tcb\textasciitilde{}^{P.12} you separate the box content into two functional units. \texttt{\texttt{tcline}} draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use \texttt{tcline} more than just once. \texttt{tcline} always uses the \texttt{path} drawing engine. Therefore, the \texttt{tcb/segmentation style}^{P.168} can be applied.

\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}


\texttt{tcblower}\textasciitilde{}

Equivalent to \texttt{tcline}, but in a breakable box, \texttt{tcline}\textasciitilde{} is removed if at a page/box break. Also, it is removed at the end of a box.
This is a flavor of enhanced \(^{\text{P.227}}\) which is used as a \textit{first} part in a break sequence for enhanced \(^{\text{P.227}}\). Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “enhancedfirst”

- `/tcb/graphical environment` \(^{\text{P.151}}\): \texttt{tikzpicture}
- `/tcb/frame engine` \(^{\text{P.151}}\): \texttt{pathfirst}
- `/tcb/interior titled engine` \(^{\text{P.151}}\): \texttt{pathfirst}
- `/tcb/interior engine` \(^{\text{P.152}}\): \texttt{pathfirst}
- `/tcb/segmentation engine` \(^{\text{P.152}}\): \texttt{path}
- `/tcb/title engine` \(^{\text{P.152}}\): \texttt{pathfirst}

\[\texttt{\{skin=enhancedfirst\}}\]

This is my content.  
This is my content.  
My content.  
More content.  
My title  
This is my content.  
This is my content.  
More content.  
My title  
My title  
My title  
My title  
My content.  
More content.

This is a flavor of enhanced \(^{\text{P.227}}\) which is used as a \textit{middle} part in a break sequence for enhanced \(^{\text{P.227}}\). Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “enhancedmiddle”

- `/tcb/graphical environment` \(^{\text{P.151}}\): \texttt{tikzpicture}
- `/tcb/frame engine` \(^{\text{P.151}}\): \texttt{pathmiddle}
- `/tcb/interior titled engine` \(^{\text{P.151}}\): \texttt{pathmiddle}
- `/tcb/interior engine` \(^{\text{P.152}}\): \texttt{pathmiddle}
- `/tcb/segmentation engine` \(^{\text{P.152}}\): \texttt{path}
- `/tcb/title engine` \(^{\text{P.152}}\): \texttt{pathmiddle}

\[\texttt{\{skin=enhancedmiddle\}}\]

This is my content.  
This is my content.  
My content.  
More content.  
My title  
This is my content.  
This is my content.  
More content.  
My title  
My title  
My title  
My title  
My content.  
More content.

231
This is a flavor of enhanced\textsuperscript{P.227} which is used as a last part in a break sequence for enhanced\textsuperscript{P.227}. Nevertheless, this skin can be applied independently.

\begin{center}
\begin{tabular}{|c|}
\hline
Environment and engines for the skin “enhancedlast” \\
\hline
\end{tabular}
\end{center}

\begin{itemize}
\item [/tcb/graphical environment\textsuperscript{P.151}]: \texttt{tikzpicture}
\item [/tcb/frame engine\textsuperscript{P.151}]: \texttt{pathlast}
\item [/tcb/interior titled engine\textsuperscript{P.151}]: \texttt{pathlast}
\item [/tcb/interior engine\textsuperscript{P.152}]: \texttt{pathlast}
\item [/tcb/segmentation engine\textsuperscript{P.152}]: \texttt{path}
\item [/tcb/title engine\textsuperscript{P.152}]: \texttt{pathlast}
\end{itemize}

\begin{tikzpicture}
\begin{scope}
\path[fill=green!20!white]
\path (-2,0) rectangle (2,2);
\end{scope}
\end{tikzpicture}

\begin{tikzpicture}
\begin{scope}
\path[fill=green!20!white]
\path (-2,0) rectangle (2,2);
\end{scope}
\end{tikzpicture}

\begin{tikzpicture}
\begin{scope}
\path[fill=green!20!white]
\path (-2,0) rectangle (2,2);
\end{scope}
\end{tikzpicture}

\begin{tikzpicture}
\begin{scope}
\path[fill=green!20!white]
\path (-2,0) rectangle (2,2);
\end{scope}
\end{tikzpicture}

This is my content.

This is my content.

My content.

More content.

My title

This is my content.

This is my content.

My content.

More content.

My title

This is my content.

This is my content.

My content.

More content.

My title

This is my content.

This is my content.

My content.

More content.

This is my content.

This is my content.

My content.

More content.

This is my content.

This is my content.

My content.

More content.

This is my content.

This is my content.

My content.

More content.
This is the jigsaw variant of skin enhanced. It differs by its frame engine, see Section 10.11 on page 219.

### Environment and engines for the skin “enhanced jigsaw”

- `/tcb/graphical environment` → \texttt{tikzpicture}
- `/tcb/frame engine` → \texttt{pathjigsaw}
- `/tcb/interior titled engine` → \texttt{path}
- `/tcb/interior engine` → \texttt{path}
- `/tcb/segmentation engine` → \texttt{path}
- `/tcb/title engine` → \texttt{path}

This is an abbreviation for setting \texttt{skin=enhanced jigsaw}.

For unbreakable boxes, this is identical to using `/tcb/enhanced jigsaw`. But, for breakable boxes, the \textit{break sequence} is identical to the \texttt{standard jigsaw} skin, see Section 19.8 from page 417.
This is the jigsaw variant of skin `enhancedfirst`\textsuperscript{\textsuperscript{\textsuperscript{\textsuperscript{P.231}}}}. It differs by its frame engine, see Section 10.11 on page 219.

**Environment and engines for the skin “enhancedfirst jigsaw”**

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment\textsuperscript{\textsuperscript{\textsuperscript{P.151}}}</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine\textsuperscript{\textsuperscript{\textsuperscript{P.151}}}</td>
<td>pathfirstjigsaw</td>
</tr>
<tr>
<td>/tcb/interior titled engine\textsuperscript{\textsuperscript{\textsuperscript{P.151}}}</td>
<td>pathfirst</td>
</tr>
<tr>
<td>/tcb/interior engine\textsuperscript{\textsuperscript{\textsuperscript{P.152}}}</td>
<td>pathfirst</td>
</tr>
<tr>
<td>/tcb/segmentation engine\textsuperscript{\textsuperscript{\textsuperscript{P.152}}}</td>
<td>path</td>
</tr>
<tr>
<td>/tcb/title engine\textsuperscript{\textsuperscript{\textsuperscript{P.152}}}</td>
<td>pathfirst</td>
</tr>
</tbody>
</table>

```latex
\skinExampleSet{skin=enhancedfirst jigsaw, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,}
```

This is my content. More content. My title

This is my content. More content. My title

This is my content. More content. My title

My content. More content. My title

My content. More content. My title

My content. More content. My title

My title

This is my content. More content. My title

My content. More content. My title

My content. More content. My title

My title

This is my content. More content. My title

My content. More content. My title

My content. More content. My title

My title
This is the jigsaw variant of skin `enhancedmiddle`. It differs by its frame engine, see Section 10.11 on page 219.

**Environment and engines for the skin “enhancedmiddle jigsaw”**

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>pathmiddlejigsaw</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>path</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

```latex
\skinExampleSet{skin=enhancedmiddle jigsaw, opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5, }
```

This styles relies on the skin `enhancedmiddle jigsaw`. It is intended to be used as an optical marker like a highlighter pen.

```latex
\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}
```

This examples demonstrates the creation of several text marker environments based on \textit{enhancedmiddle} \textsuperscript{+P.231}.

\begin{tcblist}[
    \textbf{\textmarker{\textcolor{yellow}{\textcolor{black}{\textnormal{\textit{\textcolor{yellow}{\textsuperscript{\textit{\textnormal{\textnorma...


This is the jigsaw variant of skin enhancedlast$^{\text{P.232}}$. It differs by its frame engine, see Section 10.11 on page 219.

### Environment and engines for the skin “enhancedlast”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>Frame engine</td>
<td>pathlastjigsaw</td>
</tr>
<tr>
<td>Interior titled engine</td>
<td>pathlast</td>
</tr>
<tr>
<td>Interior engine</td>
<td>pathlast</td>
</tr>
<tr>
<td>Segmentation engine</td>
<td>path</td>
</tr>
<tr>
<td>Title engine</td>
<td>pathlast</td>
</tr>
</tbody>
</table>

```latex
\texttt{\textbackslash skinExampleSet\{skin=enhancedlast jigsaw, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, \}}
```

This is my content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.

My title

This is my content.

More content.
11.3 Skin Family “bicolor”

This skin is quite similar to the standard \cite{P.225} and enhanced \cite{P.227} skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

**Environment and engines for the skin “bicolor”**

- The most basic usage of this skin is to set the background color of the lower part by \texttt{/tcb/colbacklower} \cite{P.241} and all other options like for the standard \cite{P.225} skin.

\begin{tcolorbox} [skin=bicolor, title=The title,  
  colframe=FireBrick!75!black, colback=Salmon!50!white, colbacklower=Salmon]  
  The upper part.  
  \tcblower  
  The lower part.  
\end{tcolorbox}

- The more advanced usage of this skin is to apply the \texttt{/tcb/frame style} \cite{P.165} and the \texttt{/tcb/interior style} \cite{P.166} like for the enhanced \cite{P.227} skin. Also, the \texttt{/tcb/segmentation style} \cite{P.168} can be used, but it is applied to the whole lower part.

\begin{tcolorbox} [skin=bicolor, title=The title,  
  frame style={top color=FireBrick,  
    bottom color=FireBrick!15!white, draw=black},  
  interior style={left color=Salmon, right color=Salmon!50!white},  
  segmentation style={right color=Salmon, left color=Salmon!50!white}]  
  The upper part.  
  \tcblower  
  The lower part.  
\end{tcolorbox}
This is an abbreviation for setting `skin=bicolor`.

```
\skinExampleSet{bicolor,
  colbacklower=LimeGreen!75!LightGreen,
}
```
The following options \texttt{/tcb/colbacklower} and \texttt{/tcb/opacitybacklower} are executed before \texttt{/tcb/segmentation style}\textsuperscript{P.168}, i.e. \texttt{/tcb/segmentation style}\textsuperscript{P.168} overrules them.

**/tcb/colbacklower**\textsuperscript{(color)} (no default, initially black!15!white)

Sets the background \textit{(color)} of the lower part. It depends on the skin, if this value is used.

**/tcb/opacitybacklower**\textsuperscript{(fraction)} (no default, initially 1.0)

Sets the background opacity of the lower part to the given \textit{(fraction)}. It depends on the skin, if this value is used.

\begin{tcolorbox}[bicolor, frame style={preaction={fill=blue!50!black}, pattern=checkerboard,pattern color=blue!50!gray}, fonttitle=\texttt{\bfseries}, overlaplower=0mm, colback=blue!10, colbacklower=white, opacitybacklower=0.65, title={Example for a semilucent lower part}]
This is the upper part.
\end{tcolorbox}

\begin{tcolorbox}[bicolor, frame style={draw=black, left color=Gold, right color=Goldenrod!50!Gold}, colback=black, colbacklower=Goldenrod!75!Gold, colupper=white, collower=black, listing options={language={bash}, above skip=Opt, below skip=Opt, no lol, basic style=\texttt{ttfamily} /\texttt{\bfseries}, extended chars=true}]
\begin{tclisting}{title={Snapshot of the staging area}, gitexample={The option \texttt{-a} automatically stages all tracked and modified files before the commit.\par This can be combined with the message option \texttt{-m} as seen in the third line.}}
\begin{verbatim}
git commit
\end{verbatim}
\end{tclisting}
\end{tcolorbox}

\begin{tcolorbox}[bicolor, frame style={draw=black, left color=Gold, right color=Goldenrod!50!Gold}, colback=black, colbacklower=Goldenrod!75!Gold, colupper=white, collower=black, listing options={language={bash}, above skip=Opt, below skip=Opt, no lol, basic style=\texttt{ttfamily} /\texttt{\bfseries}, extended chars=true}]
\begin{tclisting}{title={Snapshot of the staging area}, gitexample={The option \texttt{-a} automatically stages all tracked and modified files before the commit. This can be combined with the message option \texttt{-m} as seen in the third line.}}
\begin{verbatim}
git commit
\end{verbatim}
\end{tclisting}
\end{tcolorbox}
The backgrounds of the lower parts for the skin families “bicolor”, “tile”, and “beamer” are drawn differently than the backgrounds of the upper parts. If the distance between these backgrounds of upper and lower parts is 0pt, some previewers show the frame color as thin line between upper and lower part. To avoid this glitch, the lower part is drawn with an overlap of \textbackslash length over the upper part.

This value can be adapted for special applications. For example, semilucent lower parts better use 0pt, see \textbackslash tcb\textbackslash opacitybacklower \textbackslash P.241. Also see \texttt{\textbackslash tcb\textbackslash overlaplower} for using a larger value.

\texttt{\textbackslash tcb\textbackslash overlaplower}

Macro which contains the length value set by \textbackslash tcb\textbackslash overlaplower. May be used for fine positioning at the segmentation between upper and lower part and should be seen \textit{read-only}.

\begin{tcolorbox}
[bicolor, sharp corners, 
  colframe=blue!50!black, colback=blue!10, colbacklower=red!10, 
  top=5mm, bottom=2mm, middle=3.5mm, overlaplower=1.5mm, 
  underlay=
  \begin{tcolorbox}
    \node[minimum width=1cm,minimum height=0.5cm,outer sep=auto, 
          anchor=north east,fill=white] at (interior.north east) 
          {\textitshape\small upper}; 
    \node[minimum width=1cm,minimum height=0.5cm,outer sep=auto, 
          anchor=north east,fill=white] at ([yshift=\texttt{\textbackslash tcb\textbackslash overlaplower}]segmentation.east) 
          {\textitshape\small lower}; 
  \end{tcolorbox}
  ]
\end{tcolorbox}

This is the upper part.
\texttt{\textbackslash tcb\textbackslash lower}

And that is the lower part.
\texttt{\textbackslash end\{tcolorbox\}}
This is a flavor of \texttt{bicolor}\textsuperscript{P.239} which is used as a \textit{first} part in a break sequence for \texttt{bicolor}\textsuperscript{P.239}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “bicolorfirst”

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{tcb/graphical environment}</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>\texttt{tcb/frame engine}</td>
<td>\texttt{pathfirst}</td>
</tr>
<tr>
<td>\texttt{tcb/interior titled engine}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{tcb/interior engine}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{tcb/segmentation engine}</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>\texttt{tcb/title engine}</td>
<td>\texttt{pathfirst}</td>
</tr>
</tbody>
</table>

\begin{verbatim}
\skinExampleSet{skin=bicolorfirst, 
              colbacklower=LimeGreen!75!LightGreen, 
}
\end{verbatim}

```latex
This is my content. 
This is my content. 
My content. 
More content.

My title 
This is my content. 
This is my content. 
My content. 
More content.
```

```latex
This is my content. 
This is my content. 
My content. 
More content.

My title 
This is my content. 
This is my content. 
My content. 
More content.
```
This is a flavor of \texttt{bicolor}\textsuperscript{P.239} which is used as a \textit{middle} part in a break sequence for \texttt{bicolor}\textsuperscript{P.239}. Nevertheless, this skin can be applied independently.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
\texttt{/tcb/graphical\ environment}\textsuperscript{P.151} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine}\textsuperscript{P.151} & \texttt{pathmiddle} \\
\texttt{/tcb/interior\ titled\ engine}\textsuperscript{P.151} & \texttt{special} \\
\texttt{/tcb/interior\ engine}\textsuperscript{P.152} & \texttt{special} \\
\texttt{/tcb/segmentation\ engine}\textsuperscript{P.152} & \texttt{special} \\
\texttt{/tcb/title\ engine}\textsuperscript{P.152} & \texttt{pathmiddle} \\
\hline
\end{tabular}
\caption{Environment and engines for the skin “bicolormiddle”}
\end{table}

\begin{verbatim}
\skinExampleSet{skin=bicolormiddle, 
  colbacklower=LimeGreen!75!LightGreen, 
}
\end{verbatim}

This is my content.

My title

This is my content.

More content.

My content.

More content.

This is my content.

My title

This is my content.

More content.
This is a flavor of \texttt{bicolor} \textsuperscript{P. 239} which is used as a \textit{last} part in a break sequence for \texttt{bicolor} \textsuperscript{P. 239}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “\texttt{bicolorlast}”

\begin{verbatim}
\skinExampleSet{skin=bicolorlast,
    colbacklower=LimeGreen!75!LightGreen,}
\end{verbatim}

This is my content. This is my content. My content. More content.

My title
This is my content. This is my content. My content. More content.
This is the jigsaw variant of skin \textit{bicolor} \textsuperscript{P.239}. It differs by its frame engine, see Section 10.11 on page 219.

### Environment and engines for the skin “bicolor jigsaw”

- \texttt{/tcb/graphical environment} \textsuperscript{P.151}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine} \textsuperscript{P.151}: \texttt{pathjigsaw}
- \texttt{/tcb/interior titled engine} \textsuperscript{P.151}: \texttt{special}
- \texttt{/tcb/interior engine} \textsuperscript{P.152}: \texttt{special}
- \texttt{/tcb/segmentation engine} \textsuperscript{P.152}: \texttt{special}
- \texttt{/tcb/title engine} \textsuperscript{P.152}: \texttt{path}

This is an abbreviation for setting \texttt{skin=enhanced jigsaw}.

```latex
\skinExampleSet{bicolor jigsaw, colbacklower=LimeGreen!75!LightGreen, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, opacitybacklower=0.5,}
```
This is the jigsaw variant of skin `bicolorfirst` \( \rightarrow \) P.243. It differs by its frame engine, see Section 10.11 on page 219.

### Environment and engines for the skin “bicolorfirst jigsaw”

- `/tcb/graphical environment` \( \rightarrow \) P.151: `tikzpicture`
- `/tcb/frame engine` \( \rightarrow \) P.151: `pathfirstjigsaw`
- `/tcb/interior titled engine` \( \rightarrow \) P.151: `special`
- `/tcb/interior engine` \( \rightarrow \) P.152: `special`
- `/tcb/segmentation engine` \( \rightarrow \) P.152: `special`
- `/tcb/title engine` \( \rightarrow \) P.152: `pathfirst`

```latex
\skinExampleSet{skin=bicolorfirst jigsaw, 
  colbacklower=LimeGreen!75!LightGreen, 
  opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, 
  opacitybacklower=0.5, 
}
```

This is my content.  
This is my content.  
My content.  
More content.  

My title  
This is my content.  
This is my content.  
My title  
More content.  

My title  
This is my content.  
This is my content.  
My title  
More content.  

247
This is the jigsaw variant of skin \textit{bicolormiddle}. It differs by its frame engine, see Section 10.11 on page 219.

\begin{itemize}
\item [/tcb/graphical environment → P.151]: \texttt{tikzpicture}
\item [/tcb/frame engine → P.151]: \texttt{pathmiddlejigsaw}
\item [/tcb/interior titled engine → P.151]: \texttt{special}
\item [/tcb/interior engine → P.152]: \texttt{special}
\item [/tcb/segmentation engine → P.152]: \texttt{special}
\item [/tcb/title engine → P.152]: \texttt{pathmiddle}
\end{itemize}

\begin{Verbatim}
\texttt{\skinExampleSet{skin=bicolormiddle jigsaw,}\nlcolbacklower=LimeGreen!75!LightGreen,\nopacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5,\nopacitybacklower=0.5,}\n\end{Verbatim}

This is my content.

More content.

My content. More content.

My title

This is my content.

This is my content.

My title

My content. More content.

My title

This is my content.

More content.
This is the jigsaw variant of skin \texttt{bicolorlast}\textsuperscript{P.245}. It differs by its frame engine, see Section 10.11 on page 219.

### Environment and engines for the skin “bicolorlast jigsaw”

- \texttt{/tcb/graphical environment}\textsuperscript{P.151}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}\textsuperscript{P.151}: \texttt{pathlastjigsaw}
- \texttt{/tcb/interior titled engine}\textsuperscript{P.151}: \texttt{special}
- \texttt{/tcb/interior engine}\textsuperscript{P.152}: \texttt{special}
- \texttt{/tcb/segmentation engine}\textsuperscript{P.152}: \texttt{special}
- \texttt{/tcb/title engine}\textsuperscript{P.152}: \texttt{pathlast}

```
\skinExampleSet{skin=bicolorlast jigsaw, 
colbacklower=LimeGreen!75!LightGreen, 
opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, 
opacitybacklower=0.5,}
```
11.4 Skin Family “tile”

This skin is a variant of skin bicolor \textsuperscript{P.239}. Especially, the optional lower part of the box is colored by \texttt{/tcb/colbacklower} \textsuperscript{P.241}. The main difference to bicolor \textsuperscript{P.239} is that tile has no frame.

**Environment and engines for the skin “tile”**

\begin{tabular}{|c|c|}
\hline
\texttt{/tcb/graphical environment} \textsuperscript{P.151}: & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine} \textsuperscript{P.151}: & \texttt{empty} \\
\texttt{/tcb/interior titled engine} \textsuperscript{P.151}: & \texttt{special} \\
\texttt{/tcb/interior engine} \textsuperscript{P.152}: & \texttt{special} \\
\texttt{/tcb/segmentation engine} \textsuperscript{P.152}: & \texttt{special} \\
\texttt{/tcb/title engine} \textsuperscript{P.152}: & \texttt{path} \\
\hline
\end{tabular}

This key applies skin=tile and in addition changes the geometry and some style options.

\begin{center}
\texttt{\skinExampleSet{tile, colbacklower=LimeGreen!75!LightGreen,}}
\end{center}
This is a flavor of \texttt{tile} which is used as a \emph{first} part in a break sequence for \texttt{tile}. Nevertheless, this skin can be applied independently.

\begin{table}
\centering
\begin{tabular}{|l|l|}
\hline
Environment and engines for the skin “tilefirst” & \\
\hline
\texttt{/tcb/graphical environment} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine} & \texttt{empty} \\
\texttt{/tcb/interior titled engine} & \texttt{special} \\
\texttt{/tcb/interior engine} & \texttt{special} \\
\texttt{/tcb/segmentation engine} & \texttt{special} \\
\texttt{/tcb/title engine} & \texttt{pathfirst} \\
\hline
\end{tabular}
\end{table}

\begin{verbatim}
\skinExampleSet{skin=tilefirst, colbacklower=LimeGreen!75!LightGreen, boxrule=0pt, }
\end{verbatim}
This is a flavor of tile\textsuperscript{\ref*{p.250}} which is used as a \textit{middle} part in a break sequence for tile\textsuperscript{\ref*{p.250}}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “tilemiddle”

\begin{itemize}
  \item [/tcb/graphical environment\textsuperscript{\ref*{p.151}}: tikzpicture \texttt{tikzpicture}]
  \item [/tcb/frame engine\textsuperscript{\ref*{p.151}}: empty \texttt{empty}]
  \item [/tcb/interior titled engine\textsuperscript{\ref*{p.151}}: special \texttt{special}]
  \item [/tcb/interior engine\textsuperscript{\ref*{p.152}}: special \texttt{special}]
  \item [/tcb/segmentation engine\textsuperscript{\ref*{p.152}}: special \texttt{special}]
  \item [/tcb/title engine\textsuperscript{\ref*{p.152}}: pathmiddle \texttt{pathmiddle}]
\end{itemize}

\begin{lstlisting}[language={latex}]
\skinExampleSet{skin=tilemiddle, colbacklower=LimeGreen!75!LightGreen, boxrule=0pt,}
\end{lstlisting}
This is a flavor of \textit{tile} which is used as a last part in a break sequence for \textit{tile}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “tilelast”

\begin{itemize}
\item [/tcb/graphical environment]: \texttt{tikzpicture}
\item [/tcb/frame engine]: \texttt{empty}
\item [/tcb/interior titled engine]: \texttt{special}
\item [/tcb/interior engine]: \texttt{special}
\item [/tcb/segmentation engine]: \texttt{special}
\item [/tcb/title engine]: \texttt{pathlast}
\end{itemize}

\begin{Verbatim}
\skinExampleSet{skin=tilelast, colbacklower=LimeGreen!75!LightGreen, boxrule=0pt,}
\end{Verbatim}
11.5 Skin Family “beamer”

This skin resembles boxes known from the \texttt{beamer} class and therefore is called “beamer”. It uses the normal colors from the core package but shades them a little bit.

Environment and engines for the skin “beamer”

```
/tcb/graphical environment \(^\text{P.151}\): \texttt{tikzpicture}
/tcb/frame engine \(^\text{P.151}\): \texttt{path}
/tcb/interior titled engine \(^\text{P.151}\): \texttt{special}
/tcb/interior engine \(^\text{P.152}\): \texttt{special}
/tcb/segmentation engine \(^\text{P.152}\): \texttt{special}
/tcb/title engine \(^\text{P.152}\): \texttt{path}
```

This key applies \texttt{skin=beamer} and in addition changes the geometry and some style options.

```latex
\skinExampleSet\{beamer,title filled=false\}
```

This box looks like a box provided by the \texttt{beamer} class.

```latex
\begin{tcolorbox}
\[beamer, colback=Salmon!50!white, colframe=FireBrick!75!black, 
adjusted title=A colored box with the \enquote{beamer} skin\]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}

A colored box with the “beamer” skin

This box looks like a box provided by the \texttt{beamer} class.
This is a flavor of \texttt{beamer} which is used as a \textit{first} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “\texttt{beamerfirst}”

\begin{verbatim}
\skinExampleSet{beamer,title filled=false,skin=beamerfirst}
\end{verbatim}

This is my content.  
This is my content.  
My content.  
More content.  
My title  
This is my content.  
This is my content.  
My content.  
More content.  

This is a flavor of \texttt{beamer} which is used as a \textit{middle} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “\texttt{beamermiddle}”

\begin{verbatim}
\skinExampleSet{beamer,title filled=false,skin=beamermiddle}
\end{verbatim}

This is my content.  
This is my content.  
My content.  
More content.  
My title  
This is my content.  
This is my content.  
My content.  
More content.  

256
This is a flavor of `beamer` which is used as a *last* part in a break sequence for `beamer`. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin “beamerlast”

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Engine/P.</th>
<th>Engine Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code></td>
<td>P.151</td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td><code>/tcb/frame engine</code></td>
<td>P.151</td>
<td><code>pathlast</code></td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code></td>
<td>P.151</td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/interior engine</code></td>
<td>P.152</td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code></td>
<td>P.152</td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/title engine</code></td>
<td>P.152</td>
<td><code>pathlast</code></td>
</tr>
</tbody>
</table>

\[
\text{\texttt{\textbackslash skinExampleSet\{beamer,title filled=false,skin=beamerlast\}}}
\]

This is my content. This is my content. My content. More content.

My title

This is my content. This is my content. My content. More content.
11.6 Skin Family “widget”

This skin uses the normal colors from the core package but shades them a little bit. The appearance of the skin can be controlled by /tcb/frame style → P.165, /tcb/interior style → P.166, and /tcb/segmentation style → P.168, if needed.

Environment and engines for the skin “widget”

/tcb/graphical environment → P.151: tikzpicture
/tcb/frame engine → P.151: path
/tcb/interior titled engine → P.151: path
/tcb/interior engine → P.152: path
/tcb/segmentation engine → P.152: special
/tcb/title engine → P.152: special

This key applies skin=widget and in addition changes the geometry and some style options.

\skinExampleSet{widget}

This is my content.
This is my content.
My content.
More content.

My title
This is my content.
This is my content.
My content.
More content.

A colored box with the “widget” skin
This is my content.
This is a flavor of `widget` which is used as a first part in a break sequence for `widget`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “widgetfirst”

<table>
<thead>
<tr>
<th>Engine</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code></td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td><code>/tcb/frame engine</code></td>
<td><code>pathfirst</code></td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code></td>
<td><code>pathfirst</code></td>
</tr>
<tr>
<td><code>/tcb/interior engine</code></td>
<td><code>pathfirst</code></td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code></td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/title engine</code></td>
<td><code>special</code></td>
</tr>
</tbody>
</table>

\skinExampleSet{widget,skin=widgetfirst}

This is my content.  
This is my content.  
More content.  

My title  
This is my content.  
More content.  


This is a flavor of `widget` which is used as a middle part in a break sequence for `widget`. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “widgetmiddle”

<table>
<thead>
<tr>
<th>Engine</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code></td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td><code>/tcb/frame engine</code></td>
<td><code>pathmiddle</code></td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code></td>
<td><code>pathmiddle</code></td>
</tr>
<tr>
<td><code>/tcb/interior engine</code></td>
<td><code>pathmiddle</code></td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code></td>
<td><code>special</code></td>
</tr>
<tr>
<td><code>/tcb/title engine</code></td>
<td><code>special</code></td>
</tr>
</tbody>
</table>

\skinExampleSet{widget,skin=widgetmiddle}

This is my content.  
This is my content.  
More content.  

My title  
This is my content.  
More content.  


This is a flavor of \texttt{widget\textsuperscript{P.258}} which is used as a \textit{last} part in a break sequence for \texttt{widget\textsuperscript{P.258}}. Nevertheless, this skin can be applied independently.

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\texttt{/tcb/graphical environment\textsuperscript{P.151}:} & \texttt{tikzpicture} \\
\texttt{/tcb/frame engine\textsuperscript{P.151}:} & \texttt{pathlast} \\
\texttt{/tcb/interior titled engine\textsuperscript{P.151}:} & \texttt{pathlast} \\
\texttt{/tcb/interior engine\textsuperscript{P.152}:} & \texttt{pathlast} \\
\texttt{/tcb/segmentation engine\textsuperscript{P.152}:} & \texttt{special} \\
\texttt{/tcb/title engine\textsuperscript{P.152}:} & \texttt{special} \\
\hline
\end{tabular}
\caption{Environment and engines for the skin “widgetlast”}
\end{table}

\begin{code}
\begin{Verbatim}
\texttt{\skinExampleSet{widget,skin=widgetlast}}
\end{Verbatim}
\end{code}

This is my content. This is my content. My content. More content. My content. More content. My title
This is my content. This is my content. My content. More content. My content. More content.
11.7 Skin Family “empty”

/tcb/skin=empty (skin)

This skin sets all engines to empty, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

Environment and engines for the skin “empty”

/tcb/graphical environment \(^{\text{P.151}:}\) \text{tikzpicture}
/tcb/frame engine \(^{\text{P.151}:}\) empty
/tcb/interior titled engine \(^{\text{P.151}:}\) empty
/tcb/interior engine \(^{\text{P.152}:}\) empty
/tcb/segmentation engine \(^{\text{P.152}:}\) empty
/tcb/title engine \(^{\text{P.152}:}\) empty

Note that the text colors stay unchanged when a skin is applied. Since the standard title color is white, the title of a box with skin empty becomes invisible, if not set to another color by /tcb/coltitle \(^{\text{P.33}}\).

/tcb/empty (style, no value)

This is an abbreviation for setting skin=empty.

\skinExampleSet{empty, 
    coltitle=Navy, borderline={2pt}{0pt}{black!10!white}, 
}

This is my content. 

This is my content. 

My content. More content.

My title

This is my content.

My title

This is my content.

My title

My content. More content.
This style relies on the skin `empty` \textsuperscript{P.261}. All engines are set to empty and all margins are set to 0pt. In contrast to `/tcb/blank` \textsuperscript{P.229}, the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}[blanker, watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}

A blank box


% `/tcbuselibrary{fitting}`
\begin{tcbboxfit}{\mybox}[blanker, width=4cm, height=7cm, top=4pt, watermark text=1]
\end{tcbboxfit}

\begin{tabular}{|c|c|c|}
\hline
A & B & C \\
\hline
\mybox{A}\{\lipsum[1]} & \mybox{B}\{\lipsum[2]} & \mybox{C}\{\lipsum[3]} \\
\hline
\end{tabular}

A & B & C

This style extends \texttt{/tcb/blankest} \textsuperscript{p. 262}. All engines are set to empty and all margins are set to 0pt. In contrast to \texttt{/tcb/blanker} \textsuperscript{p. 262}, also title, shadow, underlay, overlay, finish and borderline are removed.

\begin{tclrcode}
\begin{tcbclipframe}
\begin{tcolorbox}
\lipsum[4]\end{tcolorbox}
\end{tcbclipframe}
\begin{tcolorbox}[blanker]
\lipsum[4]\end{tcolorbox}
\begin{tcolorbox}[blankest]
\lipsum[4]\end{tcolorbox}
\end{tclrcode}
This is a flavor of \texttt{empty} \cite{p.261} which is used as a first part in a break sequence for \texttt{empty} \cite{p.261}. Nevertheless, this skin can be applied independently.

\textbf{Environment and engines for the skin “emptyfirst”}

\begin{itemize}
  \item \texttt{/tcb/graphical environment} \cite{p.151}: \texttt{tikzpicture}
  \item \texttt{/tcb/frame engine} \cite{p.151}: \texttt{empty}
  \item \texttt{/tcb/interior titled engine} \cite{p.151}: \texttt{empty}
  \item \texttt{/tcb/interior engine} \cite{p.152}: \texttt{empty}
  \item \texttt{/tcb/segmentation engine} \cite{p.152}: \texttt{empty}
  \item \texttt{/tcb/title engine} \cite{p.152}: \texttt{empty}
\end{itemize}

\begin{tcbexample}[structure={set},set={\texttt{skin=emptyfirst,}
  coltitle=Navy,\texttt{borderline={2pt}{0pt}{black!10!white}},}]

This is my content.
This is my content.
My content. More content.

My title
This is my content.
My title
This is my content.
My title

More content.

\end{tcbexample}
This is a flavor of empty which is used as a middle part in a break sequence for empty. Nevertheless, this skin can be applied independently.

Environment and engines for the skin “emptymiddle”

```
\skinExampleSet{skin=emptymiddle, coltitle=Navy,borderline={2pt}{0pt}{black!10!white},}
```

This is my content.  
This is my content.  
My content.  
More content.

My title  
This is my content.

My title  
This is my content.  
My content.  
More content.

```
/tcb/graphical environment\textsuperscript{P.151}: tikzpicture
/tcb/frame engine\textsuperscript{P.151}: empty
/tcb/interior titled engine\textsuperscript{P.151}: empty
/tcb/interior engine\textsuperscript{P.152}: empty
/tcb/segmentation engine\textsuperscript{P.152}: empty
/tcb/title engine\textsuperscript{P.152}: empty
```
This is a flavor of \texttt{empty} \textsuperscript{P.261} which is used as a \textit{last} part in a break sequence for \texttt{empty} \textsuperscript{P.261}. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin “emptylast”**

$\begin{align*}
/tcb/graphical\ environment \rightarrow & P.151: \texttt{tikzpicture} \\
/tcb/frame\ engine \rightarrow & P.151: \texttt{empty} \\
/tcb/interior\ titled\ engine \rightarrow & P.151: \texttt{empty} \\
/tcb/interior\ engine \rightarrow & P.152: \texttt{empty} \\
/tcb/segmentation\ engine \rightarrow & P.152: \texttt{empty} \\
/tcb/title\ engine \rightarrow & P.152: \texttt{empty}
\end{align*}$

\begin{Verbatim}
\texttt{\skinExampleSet{skin=emptylast,}
\qquad coltitle=Navy,borderline={2pt}{0pt}{black!10!white},
\qquad}
\end{Verbatim}

This is my content. This is my content. My content. More content. 

My title

This is my content. This is my content. My title

More content. More content.
This example demonstrates a breakable customized box. Here, we define an environment `freebox`. The first application of `freebox` produces an unbroken `tcolorbox`. The box is drawn by the code given by `/tcb/frame code` on page 154 and `/tcb/interior code` on page 155. The second application of `freebox` is broken into several parts which are drawn by the codes given by `/tcb/skin first is subskin of` on page 157, `/tcb/skin middle is subskin of` on page 157, and `/tcb/skin last is subskin of` on page 157.

```latex
\newtcolorbox{freebox}[1][]{empty,
  breakable,height fixed for=first and middle,
  leftrule=5mm,left=2mm,
  frame style={fill,top color=red!75!black,bottom color=red!75!black,middle color=red},
  colback=yellow!50!white,
  watermark color=red!50!yellow!75!white,
  watermark text on=unbroken is unbroken box,
  watermark text on=first is first part,
  watermark text on=middle is middle part,
  watermark text on=last is last part,
  \% code for unbroken boxes:
  frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
  --((yshift=-5mm)frame.north east)--((yshift=5mm)frame.north east)
  --((yshift=-5mm)frame.south east)--((xshift=-5mm)frame.south east)--cycle; },
  interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)
  --((xshift=-4.8mm)interior.north east)--((yshift=-4.8mm)interior.north east)
  --((yshift=4.8mm)interior.south east)--((xshift=-4.8mm)interior.south east)
  --cycle; },
  \% code for the first part of a break sequence:
  skin first is subskin of={emptyfirst}{
    frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --((xshift=-5mm)frame.north east)--((yshift=-5mm)frame.north east)
    --((frame.south east)--cycle;
    \path[coltria] ([xshift=2.5mm,yshift=1mm)frame.south west) -- +(120:2mm)
    -- +0(240:2mm) -- cycle; },
    interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)
    --((xshift=-4.8mm)interior.north east)--((yshift=-4.8mm)interior.south east)
    --cycle; },
  },
  \% code for the middle part of a break sequence:
  skin middle is subskin of={emptymiddle}{
    frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --(frame.north east)--(frame.south east)--cycle;
    \path[coltria] ([xshift=2.5mm,yshift=-1mm)frame.north west) -- +(240:2mm)
    -- +0(300:2mm) -- cycle;
    \path[coltria] ([xshift=2.5mm,yshift=1mm)frame.south west) -- +(0:2mm)
    -- +0(60:2mm) -- cycle; },
    interior code={\path[\tcb fill interior] (interior.south west)--(interior.north west)
    --(interior.north east)--(frame.south)
    --(interior.south east)--cycle; },
  },
  \% code for the last part of a break sequence:
  skin last is subskin of={emptylast}{
    frame code={\path[\tcb fill frame] (frame.south west)--(frame.north west)
    --(frame.north east)--((yshift=0mm)frame.south east)
    --((xshift=-5mm)frame.south east)--cycle;
    \path[coltria] ([xshift=2.5mm,yshift=-1mm)frame.north west) -- +(240:2mm)
    -- +0(300:2mm) -- cycle;
  }
```

\[267\]


11.8 Skin “spartan”

\texttt{/tcb/skin=spartan} \hspace{1cm} (skin)

This skin is quite ... spartan. It supports no rounded corners, no overlays, no shadows, no borderlines, and no finishes. The only exception are underlays. One cannot do very fancy things with this skin, but it compiles very fast. Therefore, the \texttt{spartan} skin is used for the draft mode, see Section 10.12 on page 221. Nevertheless, it can be used as a normal skin.

<table>
<thead>
<tr>
<th>Environment and engines for the skin “spartan”</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment \textsuperscript{\textsuperscript{P.151}}: tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine \textsuperscript{\textsuperscript{P.151}}: spartan</td>
</tr>
<tr>
<td>/tcb/interior titled engine \textsuperscript{\textsuperscript{P.151}}: spartan</td>
</tr>
<tr>
<td>/tcb/interior engine \textsuperscript{\textsuperscript{P.152}}: spartan</td>
</tr>
<tr>
<td>/tcb/segmentation engine \textsuperscript{\textsuperscript{P.152}}: spartan</td>
</tr>
<tr>
<td>/tcb/title engine \textsuperscript{\textsuperscript{P.152}}: spartan</td>
</tr>
</tbody>
</table>

\texttt{/tcb/spartan} \hspace{1cm} (style, no value)

This is an abbreviation for setting \texttt{skin=spartan}.

\texttt{\skinExampleSet{spartan}}

<table>
<thead>
<tr>
<th>This is my content.</th>
<th>This is my content.</th>
<th>My content.</th>
<th>More content.</th>
</tr>
</thead>
<tbody>
<tr>
<td>More content.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

My title

<table>
<thead>
<tr>
<th>This is my content.</th>
<th>My title</th>
<th>This is my content.</th>
<th>My content.</th>
<th>More content.</th>
</tr>
</thead>
<tbody>
<tr>
<td>More content.</td>
<td></td>
<td>This is my content.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

271
11.9 Skin “draft”

This skin is intended to be used while drafting new geometric settings for a \texttt{tcolorbox}.

\textbf{Environment and engines for the skin “draft”}

- \texttt{tcb/graphical environment\textsuperscript{P.151}}: \texttt{tikzpicture}
- \texttt{tcb/frame engine\textsuperscript{P.151}}: \texttt{special}
- \texttt{tcb/interior titled engine\textsuperscript{P.151}}: \texttt{special}
- \texttt{tcb/interior engine\textsuperscript{P.152}}: \texttt{special}
- \texttt{tcb/segmentation engine\textsuperscript{P.152}}: \texttt{path}
- \texttt{tcb/title engine\textsuperscript{P.152}}: \texttt{path}

This is an abbreviation for setting \texttt{skin=draft}.

\begin{verbatim}
\texttt{\skinExampleSet{draft}}
\end{verbatim}


{\lipsum[1-3]
{\lipsum[4-6]
11.10 Skin Family “freelance”

This skin family “freelance” is deprecated with \tcolorbox 3.00. It is not longer needed, because \tcb/frame code \(\rightarrow\) P.154, \tcb/interior code \(\rightarrow\) P.155, \tcb/interior titled code \(\rightarrow\) P.154, and \tcb/title code \(\rightarrow\) P.156 can be applied to every skin now. In this sense, everything has become freelance now.

For users of \tcb/freelance: Old code should continue to work. There may be exceptions for breakable freelance boxes under certain circumstances. For new code, use \tcb/empty \(\rightarrow\) P.261 or \tcb/enhanced \(\rightarrow\) P.227 where you would have used \tcb/freelance before.

\texttt{/tcb/skin=freelance} (skin)

This skin gives full freedom for the appearance of the \tcolorbox. All drawing engines are set to type freelance; they use the \texttt{tikz} package and compute the \tcb/geometry nodes \(\rightarrow\) P.153.

\begin{center}
\begin{tabular}{|l|}
\hline
\texttt{/tcb/graphical environment} \(\rightarrow\) P.151: tikzpicture \\
\texttt{/tcb/frame engine} \(\rightarrow\) P.151: freelance \\
\texttt{/tcb/interior titled engine} \(\rightarrow\) P.151: freelance \\
\texttt{/tcb/interior engine} \(\rightarrow\) P.152: freelance \\
\texttt{/tcb/segmentation engine} \(\rightarrow\) P.152: freelance \\
\texttt{/tcb/title engine} \(\rightarrow\) P.152: freelance \\
\hline
\end{tabular}
\end{center}

\texttt{/tcb/freelance} (style, no value)

This is an abbreviation for setting \texttt{skin=freelance}.

\texttt{/tcb/skin=freelancefirst} (skin)

This skin equals freelance with exception of the break sequence, see Section 19.8 on page 417.

\texttt{/tcb/skin=freelancemiddle} (skin)

This skin equals freelance with exception of the break sequence, see Section 19.8 on page 417.

\texttt{/tcb/skin=freelancelast} (skin)

This skin equals freelance with exception of the break sequence, see Section 19.8 on page 417.

\texttt{/tcb/extend freelance=(options)} (no default, initially empty)

The \texttt{(options)} are added to the skin definition of freelance.

\texttt{/tcb/extend freelancefirst=(options)} (no default, initially empty)

The \texttt{(options)} are added to the skin definition of freelancefirst which is used as first part of the break sequence of freelance. See \texttt{/tcb/skin first is subskin of} \(\rightarrow\) P.157 for a substitute of this key.

\texttt{/tcb/extend freelancemiddle=(options)} (no default, initially empty)

The \texttt{(options)} are added to the skin definition of freelancemiddle which is used as middle part of the break sequence of freelance. See \texttt{/tcb/skin middle is subskin of} \(\rightarrow\) P.157 for a substitute of this key.

\texttt{/tcb/extend freelancelast=(options)} (no default, initially empty)

The \texttt{(options)} are added to the skin definition of freelancelast which is used as last part of the break sequence of freelance. See \texttt{/tcb/skin last is subskin of} \(\rightarrow\) P.157 for a substitute of this key.
12 Inclusion of Boxed Image Files

The skins library adds some commands to conveniently include boxed image files. For the following macros and options, the skins library has to be loaded by a package option or inside the preamble by:

\tcbuselibrary{skins}

See Section 10 on page 165 for the documentation of all other options of the skins library.

12.1 Macros

\tcbincludegraphics{(options)}{(file name)}

In principle, this macro includes an image file denoted by (file name) using the standard \includegraphics and puts it into a tcolorbox. The (options) are tcolorbox keys to set up the colored box. Use /tcb/graphics options to specify options for the underlying \includegraphics. Some tcolorbox option keys are automatically set, namely /tcb/enhanced and options to center the image inside the box.

The sizing of the included image is done depending on the following:

- If a /tcb/width is specified, but no fixed /tcb/height, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
- If a fixed /tcb/height is specified, the image is sized to fill the fixed inner area of the box.
- If the /tcb/capture mode /tcb/hbox is specified, the image is sized according to given \includegraphics options only. The box adapts to the image.

\begin{tcbraster}
\tcbincludegraphics[title=Normal]{goldshade.png}
\tcbincludegraphics[title=Fixed height,height=3cm]{goldshade.png}
\tcbincludegraphics[title=hbox mode,hbox,graphics options={width=3cm}]{goldshade.png}
\end{tcbraster}
The auxiliary macro `\imagename` may be used inside `\tcbincluderaster` to display the name of the file. `\imagename` is already partially detokenized and is allowed to contain special characters like the underscore. Note that an appropriate font is required to display such characters.

```latex
\% \tcbuselibrary{raster}
\begin{tcbraster}[size=fbox, 
colframe=red!50!black,colback=red!20!black,
fonttitle=\bfseries\ttfamily,center title,drop fuzzy shadow]\tcbincluderaster[title=\imagename]{goldshade.png}\tcbincluderaster[finish={
\node[fill=white,fill opacity=0.5,text opacity=1]
at (frame.center) {\bfseries\ttfamily \imagename};}]{blueshade.png}\end{tcbraster}
```

![goldshade.png](goldshade.png) ![blueshade.png](blueshade.png)
This is a generalized version of \tcbincludegraphics\(^{P.275}\) which allows to include a complete PDF file denoted by \texttt{file name}. Every page is boxed into an own \texttt{tcolorbox}\(^{P.12}\) customized by the given \texttt{options}. It is reasonable to put such a series of boxes inside a \texttt{tcbmaster}\(^{P.310}\) for alignment.

Use /tcb\texttt{/graphics pages}\(^{P.278}\) to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{imagepage} may be used inside \texttt{tcbincludepdf} to display the current page number.

\begin{tcbmaster}[\texttt{raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\textit{small\bfseries}\ttfamily, left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, topmargin=1mm,bottommargin=1mm,draw lift shadow,center title, graphics pages={1,...,6},title=\texttt{\textcolor{black}{imagepage}}]}\end{tcbmaster}

\texttt{tcolorbox-example.pdf [1]}

\texttt{tcolorbox-example.pdf [2]}

\texttt{tcolorbox-example.pdf [3]}

\texttt{tcolorbox-example.pdf [4]}

\texttt{tcolorbox-example.pdf [5]}

\texttt{tcolorbox-example.pdf [6]}

\texttt{tcolorbox-example.pdf [1]}

\texttt{tcolorbox-example.pdf [2]}

\texttt{tcolorbox-example.pdf [3]}

\texttt{tcolorbox-example.pdf [4]}

\texttt{tcolorbox-example.pdf [5]}

\texttt{tcolorbox-example.pdf [6]}
12.2 Option Keys

/tcb/graphics options=(options)  (no default, initially empty)

Used for \texttt{\texttt{\texttt{tcbinclud}	exttt{e}graphics}} \textsuperscript{P.275} and \texttt{\texttt{\texttt{tcbinclud}	exttt{e}pdf}} \textsuperscript{P.277} to specify \texttt{\texttt{includegraphics}} \texttt{(options)}.

\begin{verbatim}
% \tcbuselibrary{raster}
\begin{tcbraster}[raster columns=3,size=fbox,raster equal height,
    colframe=red!50!black,colback=red!20!black,drop fuzzy shadow]
  \tcbinclud	exttt{e}graphics{goldshade.png}
  \newcommand{\myangle}{angle=20}\%
  \tcbinclud	exttt{e}graphics[graphics options=\myangle]{goldshade.png}
  \tcbinclud	exttt{e}graphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]
  {goldshade.png}
\end{tcbraster}
\end{verbatim}

\begin{tikzpicture}
  \node[anchor=south west,inner sep=0] at (0,0) {\includegraphics[width=\textwidth]{goldshade.png}};
  \node[anchor=south west,inner sep=0] at (0,\textwidth) {\includegraphics[width=\textwidth]{goldshade.png}};
  \node[anchor=south west,inner sep=0] at (0,2\textwidth) {\includegraphics[width=\textwidth]{goldshade.png}};
\end{tikzpicture}

/tcb/graphics directory=(directory)  (no default, initially empty)

Used for \texttt{\texttt{\texttt{tcbinclud}	exttt{e}graphics}} \textsuperscript{P.275} and \texttt{\texttt{\texttt{tcbinclud}	exttt{e}pdf}} \textsuperscript{P.277} to specify a file system \texttt{(directory)} where the image files are located.

\begin{verbatim}
\tcbset{
  graphics directory={.},
  graphics directory={examples},
  graphics directory={./././pictures},
}
\end{verbatim}

The \texttt{\texttt{\texttt{graphicspath}}} macro from the \texttt{\texttt{graphics}} package is superior to this option.

\texttt{\texttt{\texttt{\texttt{\texttt{tcbinclud}	exttt{e}pdf}}}} \textsuperscript{P.277} may be used especially for \texttt{\texttt{\texttt{tcbinclud}	exttt{e}pdf}} \textsuperscript{P.277}.

/tcb/graphics pages=(selection)  (no default, initially 1,...,\texttt{pdfpages})

Used for \texttt{\texttt{\texttt{tcbinclud}	exttt{e}pdf}} \textsuperscript{P.277} to specify a \texttt{(selection)} of pages to be included. The largest page number is accessible by \texttt{\texttt{pdfpages}}. The \texttt{(selection)} has to be given using the \texttt{\texttt{foreach}} syntax of \texttt{TikZ}.

\begin{verbatim}
\tcbset{
  graphics pages=(1,3,7),
  graphics pages=(1,...,10),
  graphics pages=(1,3,...,18),
  graphics pages=(100,...,\texttt{pdfpages}),
}
\end{verbatim}
Used for \tcbincludetext and \tcbincludetextpdf to guarantee a certain \textit{orientation} of the included image. After all other options for the image are processed, the result is possibly rotated to be in landscape or portrait mode.

Feasible values for \textit{orientation} are:

- \texttt{as-is}: no rotation of the processed image.
- \texttt{landscape}: the processed image is possibly rotated by 90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{landscape*}: the processed image is possibly rotated by -90 degrees to ensure that the final width is not smaller than the final height.
- \texttt{portrait}: the processed image is possibly rotated by 90 degrees to ensure that the final height is not smaller than the final width.
- \texttt{portrait*}: the processed image is possibly rotated by -90 degrees to ensure that the final height is not smaller than the final width.
The \texttt{skins} library adds some image and picture fill options to the vast option set of \LaTeX\ [22]. These options can be used in any \texttt{tikzpicture}. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 165 for the documentation of all other options of the \texttt{skins} library.

13.1 Fill Plain

/\texttt{tikz/fill plain image}=\texttt{(file name)} (no default, initially unset)

Fills the current path with an external image referenced by \texttt{(file name)}. The image is put in the center of the path, but it is not resized to fit into the path area.

\begin{verbatim}
\begin{tikzpicture}
\path[draw,fill plain image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}
\end{verbatim}

/\texttt{tikz/fill plain image**}=\texttt{(file name)} (no default, initially unset)

Fills the current path with an external image referenced by \texttt{(file name)}. The image is put in the center of the path, but it is not resized to fit into the path area. The \texttt{(graphics options)} are given to the underlying \texttt{includegraphics} command.

\begin{verbatim}
\begin{tikzpicture}
\path[draw,fill plain image**={width=2.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}
\end{verbatim}

/\texttt{tikz/fill plain picture}=\texttt{(graphical code)} (no default, initially unset)

Fills the current path with the given \texttt{(graphical code)}. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard path picture option.

\begin{verbatim}
\begin{tikzpicture}
\path[draw,fill plain picture=]{%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red!50!yellow,line width=5mm] (-1,-1) -- (1,1);
\draw[red!50!yellow,line width=5mm] (-1,1) -- (1,-1);
}%
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
foreach \w in {45,90,...,315}
{ -- \w:1.5cm } -- cycle;
\end{tikzpicture}
\end{verbatim}
13.2 Fill Stretch

/tikz/fill stretch image=(file name)  
Fills the current path with an external image referenced by \textit{(file name)}. The image is stretched to fill the path area.

\begin{tikzpicture} 
\path[fill stretch image=goldshade.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75) 
\foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle; 
\end{tikzpicture}

/tikz/fill stretch image*={(graphics options)}{(file name)}  
Fills the current path with an external image referenced by \textit{(file name)}. The \textit{(graphics options)} are given to the underlying \texttt{includegraphics} command. The image is stretched to fill the path area.

\begin{tikzpicture} 
\path[fill stretch image*={angle=90,origin=c}{goldshade.png}] (2.75,-0.75) -- (3,0) -- (2.75,0.75) 
\foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle; 
\end{tikzpicture}

/tikz/fill stretch picture=(graphical code)  
Fills the current path with the given \textit{(graphical code)}. The result is stretched to fill the path area.

\begin{tikzpicture} 
\path[draw,fill stretch picture={
\draw[red!50!yellow,line width=2mm] (0,0) circle (1cm); 
\draw[red,line width=5mm] (-1,-1) -- (1,1); 
\draw[red,line width=5mm] (-1,1) -- (1,-1); 
}] (2.75,-0.75) -- (3,0) -- (2.75,0.75) 
\foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle; 
\end{tikzpicture}
13.3 Fill Overzoom

/tikz/fill overzoom image=⟨file name⟩
(no default, initially unset)
Fills the current path with an external image referenced by ⟨file name⟩. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image=goldshade.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75) \foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill overzoom image*=⟨⟨graphics options⟩⟩{⟨file name⟩}
(no default, initially unset)
Fills the current path with an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image*=angle=90,origin=c]{goldshade.png} (2.75,-0.75) -- (3,0) -- (2.75,0.75) \foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill overzoom picture=⟨graphical code⟩
(no default, initially unset)
Fills the current path with the given ⟨graphical code⟩. The result is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[draw,fill overzoom picture={\draw[red!50!yellow,line width=2mm] (0,0) circle (1cm); \draw[red,line width=5mm] (-1,-1) -- (1,1); \draw[red,line width=5mm] (-1,1) -- (1,-1);}] (2.75,-0.75) -- (3,0) -- (2.75,0.75) \foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.4 Fill Zoom

\texttt{/tikz/fill zoom image=⟨file name⟩} (no default, initially unset)

Fills the current path with an external image referenced by ⟨file name⟩. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill zoom image*=⟨graphics options⟩\{⟨file name⟩\}} (no default, initially unset)

Fills the current path with an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \texttt{\includegraphics} command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image*=\{angle=90,origin=c\} goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill zoom picture=⟨graphical code⟩} (no default, initially unset)

Fills the current path with the given ⟨graphical code⟩. The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom picture={%
\draw[red!50!yellow, line width=2mm]
(0,0) circle (1cm);
\draw[red, line width=6mm] (-1,-1) -- (1,1);
\draw[red, line width=6mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.5 Fill Shrink

`tikz/fill shrink image=(file name)` (no default, initially unset)
Fills the current path with an external image referenced by `(file name)`. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

`tikz/fill shrink image*=(file name)` (no default, initially unset)
Fills the current path with an external image referenced by `(file name)`. The `(graphics options)` are given to the underlying `\includegraphics` command. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image*={width=1.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

`tikz/fill shrink picture=(graphical code)` (no default, initially unset)
Fills the current path with the given `(graphical code)`. The result is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.6 Fill Tile

\[ /tikz/fill\ tile\ image=⟨file\ name⟩ \]
(no default, initially unset)

Fills the current path with a tile pattern using an external image referenced by \langle file name \rangle.

\begin{tikzpicture}
\path[fill tile image=pink_marble.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\[ /tikz/fill\ tile\ image*=\{⟨graphics\ options⟩\}{⟨file\ name⟩} \]
(no default, initially unset)

Fills the current path with a tile pattern using an external image referenced by \langle file name \rangle. The \langle graphics options \rangle are given to the underlying \texttt{includegraphics} command.

\begin{tikzpicture}
\path[fill tile image*={width=1cm}{pink_marble.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\[ /tikz/fill\ tile\ picture=⟨graphical\ code⟩ \]
(no default, initially unset)

Fills the current path with a tile pattern using the given \langle graphical code \rangle.

\begin{tikzpicture}
\path[draw,fill tile picture={% \draw[red!50!yellow,line width=2mm] (0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\[ /tikz/fill\ tile\ picture*=\{⟨fraction⟩\}{⟨graphical\ code⟩} \]
(no default, initially unset)

Fills the current path with a tile pattern using the given \langle graphical code \rangle. The graphic is resized by \langle fraction \rangle.

\begin{tikzpicture}
\path[draw,fill tile picture*={0.25}{% \draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.7 Filling Options

/tikz/fill image opacity={(fraction)} (no default, initially 1.0)
Sets the fill opacity for the image or picture fill options to the given (fraction).

\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75] (2,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5] (4,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25] (6,0) circle (1cm);
\path[fill=red] (8,0) circle (1cm);
\end{tikzpicture}

/tikz/fill image scale={(fraction)} (no default, initially 1.0)
Stretches, zooms, overzooms or shrinks the image or picture to the given (fraction) of the width and height of the current path.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png] (0,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=0.75] (3,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=1.5] (6,0) rectangle +(2,2);
\end{tikzpicture}

/tikz/fill image options={(graphics options)} (no default, initially empty)
The (graphics options) are given to the underlying \texttt{\textbackslash includegraphics} command for the image fill options. This can be just together with \texttt{/tikz/fill stretch image} → P.281, \texttt{/tikz/fill overzoom image} → P.282, \texttt{/tikz/fill zoom image} → P.283, and \texttt{/tikz/fill tile image} → P.285.

\begin{tikzpicture}
\path[fill image options={width=1cm},
      fill tile image=pink_marble.png]
      (2.75,-0.75) -- (3,0) -- (2.75,0.75)
      \foreach \w in {45,90,...,315}
      { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
13.8 Straightening of the Arcs

This patch is considered as an experimental feature. It changes some of the original TikZ code. This change may break with future updates of TikZ.

`tcbpatcharcangular`

The TikZ package provides a nice rounded corners option to replace all corners by little arcs. \texttt{\textbackslash tcbpatcharcangular} is a patch which straightens the arcs. To say it more prosaic, the little arcs are replaced by little straight lines.

\begin{tikzpicture}
\draw[thick,rounded corners=8pt]
(0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
-- (0,2) -- (2,2) -- (0,0) -- (2,0);
\tcbpatcharcangular
\draw[thick,rounded corners=8pt,xshift=2.5cm]
(0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
-- (0,2) -- (2,2) -- (0,0) -- (2,0);
\end{tikzpicture}

\texttt{\textbackslash tcbpatcharcround}

This macro reverts \texttt{\textbackslash tcbpatcharcangular}, i.e., the patch from \texttt{\textbackslash tcbpatcharcangular} is replaced by the original code.
13.9 Extracting Node Dimensions

The following auxiliary macros are defined by the \texttt{skins} library. They allow to determine the width and height of an arbitrary \LaTeX{} node. To be more specific, they determine the east-to-west and the north-to-south dimensions which may be not the maximal dimensions for a non-rectangular node. Note that the following dimensions are measured exactly including the line width of the border line. If a new rectangle or node with the same dimensions and a border is to be drawn, this border width has to be substracted.

\begin{verbatim}
\tcpsettowidthofnode{(register)}{(node)}

Sets the east-to-west dimension of the given \texttt{(node)} to the \LaTeX{} \texttt{(register)}.

\tcpsetmacrotowidthofnode{(macro)}{(node)}

Defines \texttt{(macro)} as the east-to-west dimension of the given \texttt{(node)}.

\tcpsettoheightofnode{(register)}{(node)}

Sets the north-to-south dimension of the given \texttt{(node)} to the \LaTeX{} \texttt{(register)}.

\tcpsetmacrotoheightofnode{(macro)}{(node)}

Defines \texttt{(macro)} as the north-to-south dimension of the given \texttt{(node)}.
\end{verbatim}

\begin{tikzpicture}
\node[align=center,draw=red,fill=yellow] (A) {This is my\example node};
\tcpsetmacrotowidthofnode{mywidth}{A}
\tcpsetmacrotoheightofnode{myheight}{A}
\path[fill=blue!25!white] % rectangle widthout border
  (A.south east) rectangle node{Copy} + (mywidth,myheight);
\node[draw=blue,fill=blue!25!white, % standard border width 0.4pt
  minimum width=\mywidth-0.4pt,% minus width of border
  minimum height=\myheight-0.4pt,% minus height of border
] at ([xshift=5cm]A) {Copy 2};
\end{tikzpicture}

13.10 Hyper Nodes

The following auxiliary macro is defined by the \texttt{skins} library.

\begin{verbatim}
\tcphypernode{(macro)}{(node)}

Applies a hyperlink creating \texttt{(macro)} from the package \texttt{hyperref} [15] to an existing \texttt{tikz} \texttt{(node)}.
\texttt{\tcphypernode} can only be used inside a \texttt{tikzpicture} environment. The last argument of the \texttt{(macro)} is to be omitted and should stand for an object \texttt{(text)} which is to be made a hyperlink. For example, use \texttt{\hyperref[name]} instead of \texttt{\hyperref[name]{text}}.
\end{verbatim}

\begin{verbatim}
% \usepackage{hyperref}
\begin{tikzpicture}
\node[align=center,draw=red,fill=red!5] (mybutton)
  {Click me to jump to Section~\ref*{sec:tikzimagefilling}};
\tcphypernode{\hyperref[sec:tikzimagefilling]}{mybutton}
\end{tikzpicture}
\end{verbatim}

Click me to jump to Section 13

\hfill

288
14 Beamer Support

The \texttt{skins} library adds some supporting options for the \texttt{beamer} package [23]. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 165 for the documentation of all other options of the \texttt{skins} library.

\texttt{/tcb/only=<\{overlay specification\}>\{\{options\}\}} \hspace{1cm} \text{(style, no default, initially unset)}

Sets the given \texttt{tcolorbox} \texttt{(options)} in dependency of a \texttt{beamer} \texttt{(overlay specification)}. Note that this needs the \texttt{beamer} class [23]. The \texttt{(options)} will only be used on the specified \texttt{beamer} frames.

\begin{verbatim}
\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[
\begin{verbatim}
\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[title=My title,fonttitle=\bfseries, enhanced, colframe=red!50!black, colback=red!10, colbacktitle=red, sidebyside, righthand width=3cm, lowerbox=invisible, lower separated=false, drop lifted shadow, only=<1>{colbacktitle=yellow, coltitle=red!50!black, colframe=red}, only=<3>{colback=yellow!50, watermark text={Attention!}}, only=<3>{lowerbox=visible} ]
\begin{itemize}[<+->]
\item One
\item Two
\item \alert<3>{Three}
\item Four
\end{itemize}
\end{tcolorbox}
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\end{frame}
\end{document}
\end{verbatim}
\end{tcolorbox}
This is a test.
\begin{itemize}[<+->]
\item One
\item Two
\item \alert<3>{Three}
\item Four
\end{itemize}
\tcbower
\begin{equation*}
\int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\end{frame}
\end{document}
\end{verbatim}
\end{frame}
\end{document}
\end{verbatim}

\begin{center}
\begin{tabular}{|c|c|}
\hline
My title & My title \\
\hline
This is a test. & This is a test. \\
\begin{itemize}[<+->]
\item One
\end{itemize} & \begin{itemize}[<+->]
\item One
\item Two
\end{itemize} \\
\hline
\end{tabular}
\end{center}

289
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}[fragile]
\begin{tcblisting}{beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, title=Example,only=<1>{lowerbox=invisible},only=<2>{}}
This is an \textbf{example listing}
\end{tcblisting}
\end{frame}
\end{document}

The option /tcb/only→P.289 belonged to the base package before version 4.20.

\texttt{/tcb/hide=\langle overlay specification\rangle} \hspace{1cm} (style, no default, initially unset)

Sets the /tcb/beamer hidden style in dependency of a beamer \langle overlay specification\rangle. /tcb/beamer hidden can be redefined for customization.

\texttt{/tcb/beamer hidden} \hspace{1cm} (style, no options, initially \texttt{nirvana})

This style is not intended to be used directly, but in concealed way by applying /tcb/hide. The style can be redefined.

\texttt{\tcbset{}
  beamer hidden/.style={invisible,interior hidden,colframe=blue!20!gray!15},
\}
Sets the /tcb/beamer alerted style in dependency of a beamer \langle overlay specification \rangle. /tcb/beamer alerted can be redefined for customization.

This style is not intended to be used directly, but in concealed way by applying /tcb/alert. The style can be redefined.

The following examples use tcbitemize\textsuperscript{\textit{P.311}} from \texttt{raster} for convenient use of a list of boxes which are uncovered one by one.
One

First Statement

Two

Second Statement

Three

Test

Four

\[ \int_{1}^{x} \frac{1}{t} \, dt = \ln(x). \]

Five


Six

Test

\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}
\[raster equal height=rows, enhanced, colback=blue!5, colframe=blue!20!gray, coltitle=yellow, beamer hidden/.style={invisible, interior hidden, colframe=blue!20!gray!15}, beamer alerted/.style={colframe=red!50!gray}, \]
\tcbitem 
\[title=One, alert=<1>\]
First Statement
\tcbitem 
\[title=Two, hide=<-1>, alert=<2>\]
Second Statement
\tcbitem 
\[title=Three, hide=<-2>, alert=<3>\]
Test
\tcbitem 
\[title=Four, hide=<-3>, alert=<4>\]
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\tcbitem 
\[title=Five, hide=<-4>, alert=<5>\]
\includegraphics[width=1cm]{goldshade.png}
\tcbitem 
\[title=Six, hide=<-5>, alert=<6>\]
Test
\end{tcbitemize}
\end{frame}
\end{document}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, beamer']
\tcbitem \title=One,alert=<1>
First Statement
\tcbitem \title=Two,hide=<-1>,alert=<2>
Second Statement
\tcbitem \title=Three,hide=<-2>,alert=<3>
\end{tcbitemize}
\end{frame}
\end{document}
\textbf{One}
First Statement

\textbf{Two}
Second Statement

\textbf{Three}
Test
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}

\textbf{Four}
Test

\textbf{Five}

\textbf{Six}
Test

\begin{frame}
\begin{tcbitemize}
\item[title=Four,hide=<-3>,alert=<4>]
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\end{tcbitemize}
\end{frame}
\end{document}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{vignette}

This also loads the \texttt{skins} library, see Section 10 on page 165, and the \texttt{fadings} library of \texttt{tikz} [22].

### 15.1 Vignette Drawing

\texttt{\tcbvignette\{\textit{options}\}}

In this context, a \textit{vignette} is a four part rectangular frame. It is constructed as several \texttt{TikZ} paths and, therefore, can only be used inside a \texttt{tikzpicture} environment or inside \texttt{tcolorbox}$^\text{\texttt{P.12}}$ options.

The \texttt{\{\textit{options}\}} control position, size and style settings of the vignette. Theses options have the common key path /tcb/vig/ and are described in the following.

The next examples show direct \texttt{\tcbvignette} usage without a \texttt{tcolorbox}$^\text{\texttt{P.12}}$.

\begin{tikzpicture}
\tcbvignette{}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Test};
\tcbvignette{outside node=A,raised color=blue}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Another Test};
\tcbvignette{size=3mm,outside node=A,north style=red,east style=yellow,
south style=blue,west style=green}
\end{tikzpicture}

\begin{tikzpicture}
\node[inner sep=3mm,fill=red!75] (A) {Test};
\tcbvignette{over node=A,fade in}
\end{tikzpicture}

\texttt{\tcbvignette} can be used directly inside appropriate options keys for \texttt{tcolorbox}$^\text{\texttt{P.12}}$. Note that options like /tcb/underlay$^\text{\texttt{P.213}}$ need /tcb/enhanced$^\text{\texttt{P.227}}$ or similar settings.

\begin{tcolorbox}
[enhanced,size=small,sharp corners,
colback=green!10,colframe=green!50!black,
boxrule=1mm,titalrule=0mm,
title=My title,center title,fonttitle=\texttt{bfseries},
underlay={\tcbvignette{size=1mm,inside node=frame,
raised color=green!50!black}}]
This is a tcolorbox.
\end{tcolorbox}
Mostly, convenient short cuts like \texttt{/tcb/underlay vignette} \textsuperscript{P.303} can be used to add a vignette to a \texttt{tcolorbox} \textsuperscript{P.12}. Here, \texttt{tcbvignette} is used internally.

\begin{tcolorbox}
\[\text{enhanced,size=small,sharp corners,}
\text{colback=green!10,colframe=green!50!black,}
\text{boxrule=1mm,titlerule=0mm,}
\text{title=My title,center title,fonttitle=\bfseries,}
\text{underlay vignette}]
\text{This is a tcolorbox.}
\end{tcolorbox}

15.2 Generic Geometry Settings

\texttt{\textbackslash n 2016-04-22 /tcb/vig/xmin=(length)}  
(no default, initially 0pt)
Sets the lower horizontal limit of a \texttt{tcbvignette} \textsuperscript{P.295}.

\texttt{\textbackslash n 2016-04-22 /tcb/vig/xmax=(length)}  
(no default, initially 1cm)
Sets the upper horizontal limit of a \texttt{tcbvignette} \textsuperscript{P.295}.

\texttt{\textbackslash n 2016-04-22 /tcb/vig/ymin=(length)}  
(no default, initially 0pt)
Sets the lower vertical limit of a \texttt{tcbvignette} \textsuperscript{P.295}.

\texttt{\textbackslash n 2016-04-22 /tcb/vig/ymax=(length)}  
(no default, initially 1cm)
Sets the upper vertical limit of a \texttt{tcbvignette} \textsuperscript{P.295}.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (3,2);
\texttt{\textbackslash tcbvignette\{xmin=1cm,xmax=2.5cm,ymin=0.5cm,ymax=1.75cm\}}
\end{tikzpicture}

\texttt{\textbackslash n 2016-04-22 /tcb/vig/lower left corner=(coordinates)}  
(style, initially 0,0)
Sets the lower left corner of a \texttt{tcbvignette} \textsuperscript{P.295}. This style sets \texttt{/tcb/vig/xmin} and \texttt{/tcb/vig/ymin}.

\texttt{\textbackslash n 2016-04-22 /tcb/vig/upper right corner=(coordinates)}  
(style, initially 1,1)
Sets the upper right corner of a \texttt{tcbvignette} \textsuperscript{P.295}. This style sets \texttt{/tcb/vig/xmax} and \texttt{/tcb/vig/ymax}.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (3,2);
\path [pattern=checkerboard,pattern color=black!30]
(0,0) rectangle (3,2);
\texttt{\textbackslash tcbvignette\{lower left corner={(1,0.5)},}
\texttt{upper right corner={(2.5,1.75)}}\}
\end{tikzpicture}

\texttt{\textbackslash n 2016-04-22 /tcb/vig/inside node=(name)}  
(style, initially unset)
Places the \texttt{tcbvignette} \textsuperscript{P.295} inside the node with the given \texttt{(name)}. The outer limits of the \texttt{vignette} are adapted to the node geometry.

\begin{tikzpicture}
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};
\texttt{\textbackslash tcbvignette\{inside node=A\}}
\draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}
Placing the \texttt{tcbvignette}\textsuperscript{→P.\textsuperscript{295}} outside the node with the given \texttt{(name)}. The inner limits of the \texttt{vignette} are adapted to the node geometry.

\begin{tikzpicture}
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};
\tcbvignette{outside node=A}
\draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

Placing the \texttt{tcbvignette}\textsuperscript{→P.\textsuperscript{295}} over the node with the given \texttt{(name)}. The outer limits of the \texttt{vignette} are adapted to the node geometry, but are shifted to the outside by \texttt{/tcb/vig/over node offset}.

\begin{tikzpicture}
\node[minimum width=2cm,minimum height=1cm] (A) {Node A};
\tcbvignette{over node offset=1mm,over node=A}
\draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

Determines the shift value for \texttt{/tcb/vig/over node}. Note that \texttt{/tcb/vig/over node offset} has to be set before \texttt{/tcb/vig/over node} is used.

Sets the thickness of the north \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{north size=4mm}
\end{tikzpicture}

Sets the thickness of the south \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{south size=4mm}
\end{tikzpicture}

Sets the thickness of the east \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{east size=4mm}
\end{tikzpicture}

Sets the thickness of the west \texttt{vignette} part.

\begin{tikzpicture}
\tcbvignette{west size=4mm}
\end{tikzpicture}
Sets /tcb/vig/north size \textsuperscript{P.297} and /tcb/vig/south size \textsuperscript{P.297}, to the given \langle length \rangle.

\begin{tikzpicture}
\tcbvignette{vertical size=4mm}
\end{tikzpicture}

Sets /tcb/vig/east size \textsuperscript{P.297} and /tcb/vig/west size \textsuperscript{P.297}, to the given \langle length \rangle.

\begin{tikzpicture}
\tcbvignette{horizontal size=4mm}
\end{tikzpicture}

Sets /tcb/vig/north size \textsuperscript{P.297}, /tcb/vig/south size \textsuperscript{P.297}, /tcb/vig/east size \textsuperscript{P.297}, and /tcb/vig/west size \textsuperscript{P.297} to the given \langle length \rangle.

\begin{tikzpicture}
\tcbvignette{size=4mm}
\end{tikzpicture}

/tcb/vig/north size \textsuperscript{P.297}, /tcb/vig/south size \textsuperscript{P.297}, etc. have to be set \textit{before} /tcb/vig/outside node \textsuperscript{P.297} is used.

15.3 Generic Color and Style Settings

Sets TikZ \langle style \rangle options for the north \textit{vignette} part.

\begin{tikzpicture}
\tcbvignette{north style=blue}
\end{tikzpicture}

Sets TikZ \langle style \rangle options for the south \textit{vignette} part.

\begin{tikzpicture}
\tcbvignette{south style={draw=blue,fill=yellow}}
\end{tikzpicture}

Sets TikZ \langle style \rangle options for the east \textit{vignette} part.

\begin{tikzpicture}
\tcbvignette{east style={left color=yellow!75!black, right color=blue!75!black}}
\end{tikzpicture}
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>\tcb/vig/west style={(style)} {(no default, initially red!75!white)}</code></td>
<td>Sets TikZ (\textit{style}) options for the west \textit{vignette} part.</td>
<td></td>
</tr>
</tbody>
</table>

\begin{tikzpicture} \tcbvignette{west style={preaction={fill=black!20}, pattern=checkerboard, pattern color=black!30}} \end{tikzpicture} |
| `\tcb/vig/scope={(\textit{style})} {(no default, initially empty)}` | The four \textit{vignette} parts are drawn inside a TikZ \textit{scope} environment which takes the given \textit{style} as option. | 

\begin{tikzpicture} \tcbvignette{scope={transparency group,opacity=0.25}} \end{tikzpicture} |
| `\tcb/vig/raised color=(color) (no default)` | Creates a raised frame impression by setting the four style options \textit{tcb/vig/north style} \textsuperscript{P.298}, \textit{tcb/vig/south style} \textsuperscript{P.298}, \textit{tcb/vig/east style} \textsuperscript{P.298}, and \textit{tcb/vig/west style} to darkened and lightened variations of the given \textit{color}. | 

\begin{tikzpicture} \tcbvignette{raised color=blue} \end{tikzpicture} |
| `\tcb/vig/lowered color=(color) (no default)` | Creates a lowered frame impression by setting the four style options \textit{tcb/vig/north style} \textsuperscript{P.298}, \textit{tcb/vig/south style} \textsuperscript{P.298}, \textit{tcb/vig/east style} \textsuperscript{P.298}, and \textit{tcb/vig/west style} to darkened and lightened variations of the given \textit{color}. | 

\begin{tikzpicture} \tcbvignette{lowered color=green!75!black} \end{tikzpicture} |
| `\tcb/vig/color from=\textit{inner} to \textit{outer} (no default)` | Sets the four style options \textit{tcb/vig/north style} \textsuperscript{P.298}, \textit{tcb/vig/south style} \textsuperscript{P.298}, \textit{tcb/vig/east style} \textsuperscript{P.298}, and \textit{tcb/vig/west style} such that the color shades from the \textit{inner} color to the \textit{outer} color. | 

\begin{tikzpicture} \tcbvignette{color from=red to blue!50} \end{tikzpicture} |
| `\tcb/vig/base color=(color) (no default)` | Sets the base color for \textit{tcb/vig/raised color}, \textit{tcb/vig/lowered color}, \textit{tcb/finish fading vignette} \textsuperscript{P.306}. Typically, this value has not to be set directly. | 

Especially, if shadings or fadings are used, the drawn vignette graphs are displayed sometimes not as perfect as expected. Glitches and imperfections are very dependent on the previewer software. The /tcb/vig/draw method intends to give a choice of alternative drawing methods.

- **direct**: The vignette parts are drawn/filled by using a single TikZ graph. This is the preferred (and default) method for solid color graphs.
- **clipped**: The vignette parts are drawn somewhat oversized and are clipped to the intended region. In combination with shadings and fadings this seems to give a better/different optical result (depends on the previewer).

\begin{tikzpicture}
\tcbvignette[color from=red to yellow]
\end{tikzpicture}
\begin{tikzpicture}
\tcbvignette[color from=red to yellow, draw method=clipped]
\end{tikzpicture}

This option is a stopgap and may be changed or preferably removed in future.

### 15.4 Generic Fading Settings

The fadings library of tikz [22] is loaded automatically by the vignette library. Amongst others, the fadings west, east, north, and south are defined inside the fadings library.

The vignette library adds some more fadings called semi west, semi east, semi north, and semi south. These fadings are much weaker than the normal fadings.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard, pattern color=black!30] (0,0) rectangle (1,1);
\fill [path fading=semi west, blue] (0,0) rectangle (1,1);
\end{tikzpicture}

#### Comparison of the Fadings

<table>
<thead>
<tr>
<th>west</th>
<th>east</th>
</tr>
</thead>
<tbody>
<tr>
<td>north</td>
<td>south</td>
</tr>
<tr>
<td>semi west</td>
<td>semi east</td>
</tr>
<tr>
<td>semi north</td>
<td>semi south</td>
</tr>
</tbody>
</table>
\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade in=blue}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{fade out=blue}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade in=blue}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade out=blue}
\end{tikzpicture}
It is possible to assign different fadings for each side of the vignette, if needed. Therefore, the fadings have to be applied individually with the four style options 
\tcb/vig/north style → P.298, \tcb/vig/south style → P.298, \tcb/vig/east style → P.298, and \tcb/vig/west style → P.299.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{
  north style={blue,path fading=south},
  east style ={blue,path fading=semi west},
  south style={blue,path fading=semi north},
  west style ={blue,path fading=east}
}
\end{tikzpicture}

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{
  north style={blue,path fading=west},
  east style ={blue,path fading=south},
  south style={red,path fading=east},
  west style ={red,path fading=north}
}
\end{tikzpicture}
15.5 Vignette as Underlay

\tcb/underlay vignette={⟨options⟩} (style, no default)

This puts a \tcbvignette \textsuperscript{P.295} with the given \langle options \rangle as \tcb/underlay \textsuperscript{P.213} to a \texttt{tcolorbox} \textsuperscript{P.12}. The dimensions of the \textit{vignette} are matched to the dimensions of the \texttt{tcolorbox} \textsuperscript{P.12}. For example, \texttt{/tcb/leftrule} \textsuperscript{P.40} is used as \texttt{/tcb/vig/west size} \textsuperscript{P.297}. Also, \texttt{/tcb/colframe} \textsuperscript{P.32} is used as \texttt{/tcb/vig/raised color} \textsuperscript{P.299}.

For a \texttt{/tcb/breakable} \textsuperscript{P.403} \texttt{tcolorbox}, the \textit{vignette} is also been broken. Alternatively, \texttt{\tcbvignette} \textsuperscript{P.295} could be used directly inside an \texttt{/tcb/underlay} \textsuperscript{P.213} with appropriate settings.

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=green!10,colframe=green!50!black, boxrule=2mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, underlay vignette] This is a tcolorbox. \end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,arc=0pt, colback=blue!10,colframe=blue,boxrule=2mm, underlay vignette={size=1.5mm}] This is a tcolorbox. \end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, colframe=red,interior hidden,boxrule=2mm, colupper=white,center upper,fontupper=\bfseries, underlay vignette] This is a tcolorbox. \end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners, colback=red!50!yellow,frame hidden,boxrule=2mm, underlay vignette={color from=red!50!yellow to white, draw method=clipped,size=2.1mm}] This is a tcolorbox. \end{tcolorbox}

\tcbx{enhanced,sharp corners,colback=red!10,colframe=red}{Test}
\tcbx{enhanced,sharp corners,colback=red!10,colframe=red, underlay vignette}{Test}
/tcb/underlay raised shading vignette={⟨options⟩} (style, no default)
This is a special style derived from /tcb/underlay vignette→ P.303, where the frame color is shaded to create a soft raised frame impression.

\begin{tcolorbox}[enhanced,sharp corners,
colback=green!10,
colframe=green!50!black,
size=small,boxrule=2mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
underlay raised shading vignette]
This is a tcolorbox.
\end{tcolorbox}

/tcb/underlay raised fading vignette={⟨options⟩} (style, no default)
This style gives a similar effect as /tcb/underlay raised shading vignette, but a path fading is used here. Different optical impression are very previewer-dependent.

\begin{tcolorbox}[enhanced,sharp corners,
colback=green!10,
colframe=green!50!black,
size=small,boxrule=2mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
underlay raised fading vignette]
This is a tcolorbox.
\end{tcolorbox}

/tcb/underlay shade in vignette={⟨options⟩} (style, no default)
This is a special style derived from /tcb/underlay vignette→ P.303, where the frame color is shaded into the interior color.

\begin{tcolorbox}[enhanced,sharp corners,frame hidden,
colback=green!10,
colframe=green!50!black,
size=small,boxrule=2mm,titlerule=0mm,
underlay shade in vignette]
This is a tcolorbox.
\end{tcolorbox}
15.6 Vignette as Finish

\[\text{/tcb/finish vignette=\langle options\rangle}\] (style, no default)

This puts a \texttt{\tcbvignette}→P.295 with the given \langle options\rangle as \texttt{/tcb/finish}→P.215 to a \texttt{tcolorbox}→P.12. The default style settings create a raised frame impression by drawing black and white color parts with reduced opacity.

\begin{tcolorbox}[enhanced,size=small, colback=green!10,colframe=green!50!black, boxrule=0.5mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, finish vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\texttt{\tcbincludegraphics[blankest,width=3cm, finish vignette={size=3mm}]{pink_marble.png}}

\[\text{/tcb/finish raised fading vignette=\langle options\rangle}\] (style, no default)

This puts a \texttt{\tcbvignette}→P.295 with the given \langle options\rangle as \texttt{/tcb/finish}→P.215 to a \texttt{tcolorbox}→P.12. The default style settings create a soft raised frame impression by drawing fading black and white color parts.

\begin{tcolorbox}[enhanced,size=small, colback=green!10,colframe=green!50!black, boxrule=0.5mm,titlerule=0mm, title=My title,center title,fonttitle=\bfseries, finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}

\texttt{\tcbincludegraphics[blankest,width=3cm, finish raised fading vignette={size=3mm}]{pink_marble.png}}
This puts a \texttt{tcbvignette} \cite{P.295} with the given \texttt{\{options\}} as \texttt{/tcb/finish} \cite{P.215} to a \texttt{tcolorbox} \cite{P.12}. The default style settings fade the box into white from inside to outside. Note that \texttt{/tcb/vig/over node} \cite{P.297} is used here. \texttt{/tcb/vig/over node offset} \cite{P.297} can be adapted to overlap the box more or less. The fade color can be set using \texttt{/tcb/vig/base color} \cite{P.299}. 

\begin{tcolorbox}
[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish fading vignette={size=2mm}]
This is a tcolorbox.
\end{tcolorbox}
The library is loaded by a package option or inside the preamble by:

\cbusellibrary{raster}

### 16.1 Concept of Rasters

A *raster* is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the matrix construct of TikZ, but it differs in many aspects.

In principle, `tcolorboxes` are arranged in rows and columns when put inside a `tcbraster` environment. The boxes are fluently added to the raster like adding text to a paragraph. Especially, line/row breaks are done automatically and one cannot end a line/row ahead of schedule. Further, a *raster* is not restricted to a single page but may break into an arbitrary series of pages.
16.2 Macros of the Library

\begin{tcbraster}\[\textcolor{red}{\textbf{tcbraster}}\]\[\langle\text{options}\rangle\]\langle\text{environment content}\rangle\end{tcbraster}

A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The \langle\text{options}\rangle are used to control the raster parameters and to set the properties for the enclosed boxes.

- The raster is only allowed to contain a series of \texttt{tcolorbox}\[P.\texttt{12}\] environments or derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit}\[P.\texttt{452}\] can also be added. Boxes created with \texttt{tcbox}\[P.\texttt{14}\] are not reasonable here, but may be used to a certain degree.
- Do not add anything else between the boxes inside the raster with exception of whitespace. Especially, do not use \texttt{\textbackslash{} or \texttt{par}} to end a row; row breaks are done automatically.
- The boxes inside a raster are numbered automatically. \texttt{\textbackslash{}thetcbrasternum} may be used inside a box to access this number. The \LaTeX{} counter \texttt{tcbrastercolumn} holds the current column, the counter \texttt{tcbrasterrow} holds the current row, and the counter \texttt{tcbrasternum} holds the current box number.

\begin{tcbraster}\[raster columns=3, raster equal height,\]
\begin{tcolorbox}\texttt{First box}\end{tcolorbox}
\begin{tcolorbox}\texttt{Second box}\end{tcolorbox}
\begin{tcolorbox}This is a box\texttt{\textbackslash{} with a second line}\end{tcolorbox}
\begin{tcolorbox}\texttt{Another box}\end{tcolorbox}
\begin{tcolorbox}\texttt{A box again}\end{tcolorbox}\end{tcbraster}

\begin{tcbraster}\[raster columns=2, raster equal height=rows,\]
\begin{tcolorbox}\texttt{First box}\end{tcolorbox}
\begin{tcolorbox}\texttt{Second box}\end{tcolorbox}
\begin{tcolorbox}This is a box\texttt{\textbackslash{} with a second line}\end{tcolorbox}
\begin{tcolorbox}\texttt{Another box}\end{tcolorbox}
\begin{tcolorbox}\texttt{A box again}\end{tcolorbox}\end{tcbraster}
This is a special case of a \tcbraster \textsuperscript{P.310} with the given \textit{(options)}.  

- Here, the enclosed boxes are created using \texttt{\tcbitem}.
- There has to be at least one \texttt{\tcbitem}.
- One cannot use anything else than \texttt{\tcbitem} to add something to the \textit{raster}.

This leads to a very compact syntax.

\begin{tcbitemize}[raster columns=2, raster equal height=rows,  
  size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white,  
  title={Box \# \thetcbrasternum}]
\tcbitem First box
\tcbitem Second box
\tcbitem This is a box\ with a second line
\tcbitem[colback=yellow,colbacktitle=yellow!50!black] Another box
\tcbitem A box again
\end{tcbitemize}

\begin{center}
\begin{tabular}{|c|c|}
\hline
Box \# 1 & Box \# 2 \\
\hline
First box & Second box \\
\hline
Box \# 3 & Box \# 4 \\
\hline
This is a box & Another box \\
with a second line & \\
\hline
Box \# 5 & \\
A box again & \\
\hline
\end{tabular}
\end{center}

\textbf{tcbitemize} has more restrictions than \tcbraster \textsuperscript{P.310}. Especially, the \texttt{/tcb/capture} \textsuperscript{P.109} mode has to be \textit{minipage}. For example, \texttt{/tcb/fit} \textsuperscript{P.457} cannot be used safely. If \texttt{/tcb/fit} \textsuperscript{P.457} should be used, turn over to \texttt{tcbraster} \textsuperscript{P.310}.

\begin{tcbitemize}[(options)]
\end{tcbitemize}

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This is a convenience environment which combines a `tcolorbox` with an embedded `tcbraster`. The (box options) are given to the outer `tcolorbox`, while the (raster options) are given to the embedded `tcbraster`. This environment is especially useful for rasters inside rasters.
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### Option Keys of the Library

#### /tcb/raster columns={(number)}

Sets the \( (\text{number}) \) of columns for a \textit{raster}.

\begin{tcbitemize}[
\texttt{raster columns=3, size=small, colframe=red!50!black, colback=red!10!white}]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\begin{tcbitemize}[
\texttt{raster columns=4, size=small, colframe=blue!50!black, colback=blue!10!white}]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

#### /tcb/raster rows={(number)}

Sets the \( (\text{number}) \) of rows for a \textit{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} \( ^{\text{P.316}} \) to a value greater than \texttt{0pt}. Then, it defines the number of rows per given height.

#### /tcb/raster width={(length)}

Sets the total raster width to the given \( (\text{length}) \). \texttt{/tcb/raster left skip} \( ^{\text{P.317}} \) and \texttt{/tcb/raster right skip} \( ^{\text{P.317}} \) are part of the total width. Note that both skip values are not changed by this option.
\begin{tcbitemize}[raster width flush left=\linewidth/2, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four

Note that the results of /tcb/raster width \(^{P.314}\) and /tcb/raster width flush left look identical, but differ on technical side since the later always fills the available \linewidth.

\begin{tcbitemize}[raster width center=\linewidth/2, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four

/tcb/raster width flush right=\(\langle length \rangle\) (style, no default)

Sets the total /tcb/raster width \(^{P.314}\) to \linewidth and adapts /tcb/raster left skip \(^{P.317}\) and /tcb/raster right skip \(^{P.317}\) to place the raster on the right hand side with a visual width of the given \(\langle length \rangle\).

\begin{tcbitemize}[raster width flush right=\linewidth/2, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four

N 2018-11-30
/tcb/raster width flush left=\(\langle length \rangle\) (style, no default)

Sets the total /tcb/raster width \(^{P.314}\) to \linewidth and adapts /tcb/raster left skip \(^{P.317}\) and /tcb/raster right skip \(^{P.317}\) to place the raster on the left hand side with a visual width of the given \(\langle length \rangle\).

\begin{tcbitemize}[raster width flush left=\linewidth/2, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four
Sets the raster height per \texttt{/tcb/raster rows} to the given \langle length \rangle. This forces an appropriate height for the enclosed boxes. \texttt{/tcb/raster before skip} and \texttt{/tcb/raster after skip} are not part of this calculation. If the \langle length \rangle is set to 0pt, this feature is deactivated.

\begin{tcbitemize}[raster height=4cm, raster rows=2, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem[enhanced, finish={\draw[blue,very thick,<->] (frame.south) -- node[right,pos=.75]{4cm} +(0,4); }]
Three
\tcbitem Four
\tcbitem Five
\end{tcbitemize}

\texttt{/tcb/raster before skip=\langle glue \rangle} \hspace{1cm} \text{(no default, initially 2mm)}

Space of the given \langle glue \rangle is inserted vertically before the raster. This space is discardable.

\texttt{/tcb/raster after skip=\langle glue \rangle} \hspace{1cm} \text{(no default, initially 2mm)}

Space of the given \langle glue \rangle is inserted vertically after the raster. This space is discardable.

\texttt{/tcb/raster equal skip=\langle length \rangle} \hspace{1cm} \text{(style, no default)}

Shortcut to set \texttt{/tcb/raster before skip}, \texttt{/tcb/raster after skip}, \texttt{/tcb/raster column skip} \hspace{1cm} \text{\textsuperscript{P.317}}, and \texttt{/tcb/raster row skip} \hspace{1cm} \text{\textsuperscript{P.317}} to the same \langle length \rangle value.

\begin{tcbitemize}[raster equal skip=4mm, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
/tcb/raster left skip\equal{}\langle length \rangle (\text{no default, initially 0pt})
Space of the given \langle length \rangle is inserted horizontally left of the raster.

\begin{tcbitemize}[raster left skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

/tcb/raster right skip\equal{}\langle length \rangle (\text{no default, initially 0pt})
Space of the given \langle length \rangle is inserted horizontally right of the raster.

\begin{tcbitemize}[raster right skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

/tcb/raster column skip\equal{}\langle length \rangle (\text{no default, initially 2mm})
Space of the given \langle length \rangle is inserted horizontally between the columns.

\begin{tcbitemize}[raster column skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

/tcb/raster row skip\equal{}\langle length \rangle (\text{no default, initially 2mm})
Space of the given \langle length \rangle is inserted vertically between the rows.

\begin{tcbitemize}[raster row skip=0pt, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
/tcb/raster halign=(alignment) (no default, initially left)

Defines the horizontal alignment for the boxes of the rows of a raster, if these rows are not completely filled (mainly: the last one).

Feasible values for (alignment) are:
- left: align to the left side,
- center: align to the center,
- right: align to the right side.

\begin{tcbitemize}[raster halign=center, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem Three
\end{tcbitemize}

/tcb/raster valign=(alignment) (no default, initially center)

Defines the vertical alignment for the boxes of a row, if the boxes do not have equal height. This sets the /tcb/box align \^{P.91} option.

Feasible values for (alignment) are:
- top: align to the top side,
- center: align to the center,
- bottom: align to the bottom side.

\begin{tcbitemize}[raster valign=top, raster columns=3, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=center, raster columns=3, size=small, colframe=blue!50!black, colback=blue!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=bottom, raster columns=3, size=small, colframe=green!50!black, colback=green!10!white]
\tcbitem \Huge One
\tcbitem \Large Two
\tcbitem Three
\end{tcbitemize}
/tcb/raster equal height=⟨type⟩  
(default all, initially none)

Puts the enclosed boxes into a common /tcb/equal height group. The ⟨id⟩ of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group. Also see /tcb/minimum for current equal height group.

Feasible values for ⟨type⟩ are:

- **none**: no equal height setting,
- **rows**: all boxes in a row are set to equal height,
- **all**: all boxes in the raster are set to equal height.

Note that you have to compile twice to see changes.

\begin{tcbitemize}[raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two Three Four

\begin{tcbitemize}[raster equal height, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two Three Four

/tcb/raster equal height group=⟨id⟩  
(no default)

Overwrites the automatically chosen id with the given ⟨id⟩. If this is used to share a common height between the raster and another raster or box, the /tcb/raster equal height option should be set to all.

\tcbset{size=small,colframe=red!50!black,colback=red!10!white}
\begin{tcolorbox}[equal height group=raster-manual-id]
A single box
\end{tcolorbox}

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
\tcbitem One
\tcbitem Huge Two
\end{tcbitemize}

A single box

One Two
Enforces the raster size computations onto the enclosed boxes. If set to `false`, individual settings can be used (for the better or worse).

\begin{tcbitemize}[raster force size=false, raster halign=center, size=small, colframe=red!50!black, colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem[add to width=-3cm] Three
\tcbitem[add to width=-3cm] Four
\tcbitem[add to width=-3cm] Five
\tcbitem[add to width=3cm] Six
\end{tcbitemize}

\begin{tcbitemize}
\tcbitem One
\tcbitem Two
\tcbitem[add to width=-3cm] Three
\tcbitem[add to width=-3cm] Four
\tcbitem[add to width=-3cm] Five
\tcbitem[add to width=3cm] Six
\end{tcbitemize}

Sets all raster settings back to their default values. Note that `/tcb/reset` does not execute this option. Style settings like `/tcb/raster odd column` etc. are not touched by `/tcb/raster reset`.

16.4 Adding Styles for Specific Boxes

The following styles can be defined to address certain boxes inside a `raster`. Note that such style definitions are not removed by `/tcb/reset` or `/tcb/raster reset`. The style definitions are used in the order given below.

This style is used for every box.

This style is used for every box in an odd column.

This style is used for every box in an even column.

This style is used for every box in the \textit{n}-th column. \textit{n} has to be replaced by a number.

This style is used for every box in an odd row.
This style is used for every box in an even row.

This style is used for every box in the $m$-th row. $m$ has to be replaced by a number.

This style is used for every box with an odd number.

This style is used for every box with an even number.

This style is used for the box in the $m$-th row and $n$-th column. $m$ and $n$ have to be replaced by numbers.

This style is used for the box with number $n$. $n$ has to be replaced by a number.
16.5 Combining Columns or Rows

\begin{tcbitemize}
[raster equal height=rows,raster columns=3, title=\texttt{\tcbitemnum},colframe=red!50!black,colback=red!10!white]
\tcbitem[title=multicolumn=1] [colframe=blue!50!black,colback=blue!10!white,raster multicolumn=1]
\tcbitem
\tcbitem
\tcbitem[multicolumn=2]
\tcbitem[multicolumn=3]
\tcbitem[multicolumn=2]
\end{tcbitemize}

1
multicolumn=1

4
multicolumn=2

7
multicolumn=3

10
multicolumn=2
This option has to be set inside the option list of \texttt{tcolorbox}\textsuperscript{P.12} inside a \texttt{tcbraster}\textsuperscript{P.310} or inside \texttt{tcbitem}\textsuperscript{P.311} inside \texttt{tcbitemize}\textsuperscript{P.311}. This option not really merges boxes, but simply sizes the current box to fit the space of \texttt{⟨number⟩} rows.

\texttt{/tcb/raster multirow} needs \texttt{/tcb/raster height}\textsuperscript{P.316} to be set. How to achieve a similar result for boxes without fixed \texttt{/tcb/raster height}\textsuperscript{P.316} is shown afterwards.

\begin{tcbitemize}[raster rows=3,raster columns=3,raster height=6cm, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem[\texttt{colframe=blue!50!black,\texttt{colback=blue!10!white}},\texttt{raster multirow=2}] multirow=2
\tcbitem[\texttt{raster multicolumn=2,\texttt{raster multirow=2,\texttt{blankest}}}]
\begin{tcbitemize}[raster rows=2,raster columns=2,raster height=\texttt{tcbtextheight}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem
\end{tcbitemize}
\end{tcbitemize}
For rasters without fixed `/tcb/raster height` \(^{P.316}\), `/tcb/raster multirow` \(^{P.323}\) cannot be used. Note that `/tcbtextheight` \(^{P.164}\) also cannot be used like in the previous example. But, with combination of `/tcb/raster equal height` \(^{P.319}\) and `/tcb/space to` \(^{P.64}\), a similar effect can be created:

\[
\begin{tcbitemize}[
\text{raster columns}=3,\text{raster equal height}=\text{rows},
\text{raster every box}/.\text{style}={\text{colframe}=\text{red!50!black},\text{colback}=\text{red!10!white}}]
\tcbitem
\tcbitem
\tcbitem[\text{colframe}=\text{blue!50!black},\text{colback}=\text{blue!10!white}]
\text{\text{\textipa{\textipa{\lipsum}[2]}}}
\tcbitem[\text{raster multicolumn}=2,\text{blankest},\text{space to}=\myspace]
\begin{tcbitemize}[
\text{raster columns}=2]
\tcbitem
\tcbitem[\text{height}=\myspace]
\tcbitem[\text{height}=\myspace]
\end{tcbitemize}
\end{tcbitemize}
\]

16.6 Rasters inside Rasters

A raster inside a raster cannot be used directly, because a raster can only contain a \texttt{tcolorbox} or something derived from a \texttt{tcolorbox}. So, a raster can be put inside a \texttt{tcolorbox} inside a raster.

Some examples for such constructions can be found at \texttt{tcboxedraster} → P.312, \texttt{/tcb/raster multicolumn} → P.322, \texttt{/tcb/raster multirow} → P.323.

16.6.1 Raster Setup

The intermediating \texttt{tcolorbox} → P.12 can be made invisible by using \texttt{/tcb/blankest} → P.263.

\begin{tcbraster}
\begin{tcolorbox}
\begin{tcbraster}
\begin{tcolorbox}
One
\end{tcolorbox}
\begin{tcolorbox}
Two
\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}
\begin{tcolorbox}
\text{raster+tcolorbox+raster}
\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}
\begin{tcolorbox}
\begin{tcbraster}
\begin{tcolorbox}
One
\end{tcolorbox}
\begin{tcolorbox}
Two
\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}
\begin{tcolorbox}
\text{raster+tcboxedraster}
\end{tcolorbox}
\end{tcbraster}

\begin{tcbitemize}
\begin{tcbitemize}
\begin{tcbitemize}
\item One
\item Two
\end{tcbitemize}
\item \text{tcbitemize+tcbitem+tcbitemize}
\end{tcbitemize}
\end{tcbitemize}

\begin{tcbraster}
\begin{tcolorbox}
\begin{tcbraster}
\begin{tcolorbox}
One
\end{tcolorbox}
\begin{tcolorbox}
Two
\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}
\begin{tcolorbox}
\text{tcbitemize+tcbitem+tcbitemize}
\end{tcolorbox}
\end{tcbraster}
16.6.2 Placing Spaces

If the heights of boxes inside staggered rasters should be matched, the space has to be distributed accordingly.

- For fixed height boxes/rasters using `/tcb/raster height`\textsuperscript{P.316}, the height of boxes is available by `/tcbtextheight`\textsuperscript{P.164}. This can be used to size deeper layered boxes/rasters.
- For boxes/rasters layed out using `/tcb/raster equal height`\textsuperscript{P.319}, space can be distributed by `/tcb/space to`\textsuperscript{P.64}. It can take several compilations until all spaces are distributed correctly.

\begin{tcbitemize}[raster rows=2,raster height=6cm,raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem[blankest]
\begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
\tcbitem One
\tcbitem Two
\end{tcbitemize}
\tcbitem This is a fixed height box.
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\begin{tcbitemize}[raster columns=4,raster rows=4,raster height=0.8\linewidth,  raster every box/.style={size=small,beamer,  colframe=blue!75!yellow,colback=red!75!yellow!20,  center title,title=Box}]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
  \begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
    \tcbitem Twelve
    \tcbitem Eleven
  \end{tcbitemize}
  \begin{tcbitemize}[raster multirow=2,blankest]
    \tcbitem\begin{tcbitemize}[raster columns=1,raster rows=2,raster height=\tcbtextheight]
      \tcbitem Five
      \tcbitem Six
    \end{tcbitemize}
    \tcbitem Ten
    \tcbitem Nine
    \tcbitem Eight
    \tcbitem Seven
  \end{tcbitemize}
\end{tcbitemize}

This is an example with fixed height boxes.
One

This box will adapt its height.


This is a flexible height box.

One

This box will adapt its height.
17 Libraries \texttt{\colorbox{blue}{\tiny listings}}, \texttt{\colorbox{blue}{\tiny listingsutf8}}, and \texttt{\colorbox{blue}{\tiny minted}}

17.1 Loading the Libraries

In contrast to other \texttt{tcolorbox} libraries, the libraries \texttt{\colorbox{blue}{\tiny listings}}, \texttt{\colorbox{blue}{\tiny listingsutf8}}, and \texttt{\colorbox{blue}{\tiny minted}} are concurrent in the sense that they all do the same thing, i.e. displaying listings with or without typesetting the listing in \LaTeX parallel. The difference is the underlying \LaTeX package which does the core job for displaying a listing. So, typically, you need just one of these libraries. If you do not have a clue which one of them you should use and you are using \texttt{pdflatex}, you should take \texttt{\colorbox{blue}{\tiny listingsutf8}}. If you are using \texttt{xelatex} or \texttt{lualatex}, you should take \texttt{\colorbox{blue}{\tiny listings}} as \texttt{xelatex} and \texttt{lualatex} are not compatible with \texttt{\colorbox{blue}{\tiny listingsutf8}}.

The order in which the libraries are included influences the default settings and the \texttt{/tcb/reset} behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

17.1.1 Loading \texttt{\colorbox{blue}{\tiny listings}}

This library uses the package \texttt{listings} \cite{6} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{listings}
\end{verbatim}

This also loads the package \texttt{listings} \cite{6}.

The \texttt{/tcb/listing engine} \cite{345} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}

17.1.2 Loading \texttt{\colorbox{blue}{\tiny listingsutf8}}

This library is not needed (and troublesome) when using Xe\LaTeX or Lua\LaTeX. Therefore, loading this library is automatically replaced by loading \texttt{\colorbox{blue}{\tiny listings}} only, if pdffonts is not used.

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} \cite{11} by loading the library variant \texttt{\colorbox{blue}{\tiny listingsutf8}}.

\begin{verbatim}
\tcbuselibrary{listingsutf8}
\tcbset{listing utf8=latin1}\% optional; 'latin1' is the default.
\end{verbatim}

This also loads the library \texttt{\colorbox{blue}{\tiny listings}} and the packages \texttt{listings} \cite{6} and \texttt{listingsutf8} \cite{11}.

The \texttt{/tcb/listing engine} \cite{345} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}
17.1.3 Loading \texttt{minted}

This library uses the package \texttt{minted} \cite{12} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{quote}
\texttt{\texttt{tcbuselibrary}}\texttt{(minted)}
\end{quote}

This also loads the package \texttt{minted} \cite{12}.

\begin{quote}
\textbf{The \texttt{minted} package uses the external tool \texttt{Pygments} \cite{14} to apply syntax highlighting. It has to be installed and set up, before the library can be used, see \cite{12} and \cite{14}. The \texttt{tcolorbox} \textsuperscript{P.12} library \texttt{\texttt{minted}} does not work, if the package \texttt{minted} \cite{12} does not work.}
\end{quote}

The /tcb/listing engine \textsuperscript{P.345} is set to \texttt{minted} by the library. To reactivate this setting, if overwritten by other libraries, use:

\begin{quote}
\texttt{\texttt{tcbset}}\texttt{(listing engine=minted)}
\end{quote}

17.2 Common Macros of the Libraries

\begin{quote}
\begin{tcblisting}{(options)}
\langle environment content \rangle
\end{tcblisting}
\end{quote}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.12}. Controlled by the given \texttt{(options)}, the environment content is typeset normally and/or as a listing. Furthermore, the \texttt{(options)} control appearance and functions of the \texttt{tcolorbox} \textsuperscript{P.12}. By default, the listing is interpreted as a \LaTeX\ listing.

\begin{quote}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}
\end{quote}

This is a \LaTeX\ example which displays the text as source code and in compiled form.
This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir="."/>
<description>
    Apache Ant build file (http://ant.apache.org/)
</description>
</project>
```

This box is as wide as needed (listing only !!)

```latex
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
```
Saves the environment content to a file which is named by the key value of `/tcb/listing file`→P.345. Later, this file can be loaded by \texttt{tcbinputlisting} or \texttt{tcbuselistingtext} or \texttt{tcbuselistinglisting}.

\texttt{\begin{tcboutputlisting}
\begin{environment content}
\end{environment content}
\end{tcboutputlisting}}

\texttt{\begin{tcboutputlisting}}
This \texttt{\textbf{text}} is written to a standardized file for later usage.
\texttt{\end{tcboutputlisting}}

\texttt{\tcbinputlisting\{\texttt{\texttt{(options)}}\}}

Creates a colored boxed based on a \texttt{tcolorbox}→P.12. The text content is read from a file named by the key value of `/tcb/listing file`→P.345. Apart from that, the function is equal to that of \texttt{tcblisting}→P.331.

\texttt{\begin{tcbinputlisting}\{\texttt{colback=red!5!white, colframe=red!75!black, text only}\}\end{tcbinputlisting}}

\texttt{\begin{tcbinputlisting}\{\texttt{colback=green!5, colframe=green!75!black, listing only}\}\end{tcbinputlisting}}

\texttt{\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}}

\texttt{\tcbuselistingtext}

Loads text from a file named by the key value of `/tcb/listing file`→P.345.

\texttt{\begin{tcbuselistingtext}}
\texttt{\end{tcbuselistingtext}}

\texttt{\tcbuselistinglisting}

Typesets text as listing from a file named by the key value of `/tcb/listing file`→P.345.

\texttt{\begin{tcbuselistinglisting}}
\texttt{\end{tcbuselistinglisting}}

\texttt{\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}}

\texttt{\tcbusetemplisting}

Typesets text as listing from a temporary file which was written by \texttt{tcbwritetemp}→P.142.
17.3 Producing tcblisting Environments

If a new sort of `tcblisting` environments should be created with one optional argument only, one is highly recommended to use `\DeclareTCBListing` or `\NewTCBListing` instead of `\newtcblisting` to avoid content scanning problems.

\newtcblisting[(init options)]{(name)}{(number)}{(default)}{(options)}

Creates a new environment `(name)` based on `tcblisting`. Basically, `\newtcblisting` operates like `\newenvironment`. This means, the new environment `(name)` optionally takes `(number)` arguments, where `(default)` is the default value for the optional first argument. The `(options)` are given to the underlying `tcblisting`. Note that `/tcb/savedelimiter` is set to the given `(name)` automatically. The `(init options)` allow setting up automatic numbering, see Section 5 from page 123.

```
\newtcblisting{mybox}{%}
colback=red!5!white,
colframe=red!75!black}
\begin{mybox}
This is my \LaTeX\ box.
\end{mybox}
```

This is my \LaTeX\ box.

```
\newtcblisting{mybox}[1]{%}
colback=red!5!white,
colframe=red!75!black,
fonttitle=bfseries,
title={#1}}
\begin{mybox}{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
```

Listing Box

This is my \LaTeX\ box.

```
\newtcblisting{mybox}[2][]{%}
colback=red!5!white,
colframe=red!75!black,
fonttitle=bfseries,
title={#2},#1}
\begin{mybox}{listing only}
{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
\bigskip
\begin{mybox}{listing side text}
{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
```

Listing Box

This is my \LaTeX\ box.

This is my \LaTeX\ box.
Definition in the preamble:
\newtcblisting[auto counter]{mybox}[1]{%  
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
title=Listing \thetcbcounter: #1}

\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}

\renewtcblisting[\langle init options\rangle]{\langle name\rangle}{\langle number\rangle}{\langle default\rangle}{\langle options\rangle}

Operates like \newtcblisting \textsuperscript{P.334}, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.
\DeclareTCBListing{\textcolor{red}{init options}}{\textcolor{blue}{name}}{\textcolor{green}{specification}}{\textcolor{purple}{options}}

Creates a new environment \textit{name} based on \texttt{tcblisting}\textsuperscript{P.331}. Basically, \texttt{\ DeclareTCBListing} operates like \texttt{\ DeclareDocumentEnvironment}. This means, the new environment \texttt{\ name} is constructed with the given argument \texttt{\ specification}. The \texttt{\ options} are given to the underlying \texttt{tcblisting}\textsuperscript{P.331}. Note that \texttt{/tcb/savedelimiter}\textsuperscript{P.31} is set to the given \texttt{\ name} automatically. The \texttt{\ init options} allow setting up automatic numbering, see Section 5 from page 123. The new environment is always created, irrespective of an already existing environment with the same name.

\begin{mybox}{\textcolor{red}{Listing Box}}
This is my \texttt{\LaTeX} box.
\end{mybox}
\begin{mybox}{\textcolor{blue}{Listing Box}}
This is my \texttt{\LaTeX} box. \texttt{\LaTeX} box.
\end{mybox}
\begin{mybox}{\textcolor{green}{Listing Box}}
This is my \texttt{\LaTeX} box. \texttt{\LaTeX} box.
\end{mybox}
\begin{mybox}{\textcolor{purple}{Listing Box}}
This is my \texttt{\LaTeX} box. \texttt{\LaTeX} box.
\end{mybox}

\NewTCBListing{\textcolor{red}{init options}}{\textcolor{blue}{name}}{\textcolor{green}{specification}}{\textcolor{purple}{options}}

Operates like \texttt{\ DeclareTCBListing}, but based on \texttt{\ NewDocumentEnvironment} instead of \texttt{\ DeclareDocumentEnvironment}. An error is issued if \texttt{\ name} has already been defined.

\RenewTCBListing{\textcolor{red}{init options}}{\textcolor{blue}{name}}{\textcolor{green}{specification}}{\textcolor{purple}{options}}

Operates like \texttt{\ DeclareTCBListing}, but based on \texttt{\ RenewDocumentEnvironment} instead of \texttt{\ DeclareDocumentEnvironment}. An existing environment is redefined.

\ProvideTCBListing{\textcolor{red}{init options}}{\textcolor{blue}{name}}{\textcolor{green}{specification}}{\textcolor{purple}{options}}

Operates like \texttt{\ DeclareTCBListing}, but based on \texttt{\ ProvideDocumentEnvironment} instead of \texttt{\ DeclareDocumentEnvironment}. The environment \texttt{\ name} is only created if it is not already defined.
With date of 2018-05-12, the `xparse` package changed the argument collection process (now part of the LaTeX kernel). Spaces are ignored which leads to a serious change for listing environments ending with an optional argument like `O{}`. The former behavior of respecting spaces can be preserved by adding a «!». Note that the following code uses `!O{}` now.

- For older `xparse` versions, the following code is correct when using `O{}`.
- For `xparse` of 2018-05-12, only the first two examples of the following code using `O{}` are really «good» – all others do not work.
- For `xparse` of 2018-05-12 and later, the following code is correct when using `!O{}`.

## Caveats of using an environment ending with an optional argument

```latex
\DeclareTCLListing{mybox}{ \!O{} }{listing only,#1}
\begin{mybox}[colframe=red]
\good
\end{mybox}
\begin{mybox}[colframe=red]\good\end{mybox}
\begin{mybox}
\good
\end{mybox}
\begin{mybox} \good\end{mybox}
\begin{mybox}\bad!\end{mybox}
\begin{mybox}\good\end{mybox}
\begin{mybox}\bad!\end{mybox}
```

337
17.4 Producing `\texttt{\textbackslash inputlisting}` Commands

\begin{lstlisting}[language=LaTeX]
\newtcbinputlisting{(init options)}{(name)}{(number)}{(default)}{(options)}
\end{lstlisting}

Creates a new macro `{name}` based on `\texttt{\textbackslash inputlisting}`. Basically, `\newtcbinputlisting` operates like `\newcommand`. The new macro `{name}` optionally takes `{number}` arguments, where `{default}` is the default value for the optional first argument. The `{options}` are given to the underlying `\texttt{\textbackslash inputlisting}`. The `{init options}` allow setting up automatic numbering, see Section 5 from page 123.

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]{\jobname.tcbtemp}
```

Listing (2) of `tcolorbox.tcbtemp`

This is the included file content:

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing engine=minted,minted language=latex,minted style=colorful,
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]{\jobname.tcbtemp}
```

Listing (3) of `tcolorbox.tcbtemp`

This is the included file content:

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing engine=minted,minted language=latex,minted style=colorful,
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  listing only,breakable,#1}
\mylisting[before upper=\textit{This is the included file content:}]{\jobname.tcbtemp}
```

\begin{lstlisting}[language=LaTeX]
\renewtcbinputlisting{(init options)}{(name)}{(number)}{(default)}{(options)}
\end{lstlisting}

Operates like `\newtcbinputlisting`, but based on `\renewcommand` instead of `\newcommand`. An existing macro is redefined.
\DeclareTCBInputListing\[\langle init\ options\rangle\]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}

Creates a new command \(\langle name\rangle\) based on \texttt{tcbinputlisting} \textsuperscript{P.333}. Basically, \texttt{\textbackslash DeclareTCBInputListing} operates like \texttt{\textbackslash DeclareDocumentCommand}. This means, the new command \(\langle name\rangle\) is constructed with the given argument \(\langle specification\rangle\). The \(\langle options\rangle\) are given to the underlying \texttt{tcbinputlisting} \textsuperscript{P.333}.

The \(\langle init\ options\rangle\) allow setting up automatic numbering, see Section 5 from page 123.

The new command is always created, irrespective of an already existing command with the same name.

\begin{frame}{Listing 17.1}

\begin{verbatim}
% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{ O{} O{red} m }{%
  listing file={#3},title=Listing-\thetcbcounter,
  colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
  fonttitle=\bfseries,listing only,#1}
\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
\end{verbatim}
\end{frame}

\NewTCBInputListing\[\langle init\ options\rangle\]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}

Operates like \texttt{\textbackslash DeclareTCBInputListing}, but based on \texttt{\textbackslash NewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An error is issued if \(\langle name\rangle\) has already been defined.

\RenewTCBInputListing\[\langle init\ options\rangle\]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}

Operates like \texttt{\textbackslash DeclareTCBInputListing}, but based on \texttt{\textbackslash RenewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An existing command is redefined.

\ProvideTCBInputListing\[\langle init\ options\rangle\]{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}

Operates like \texttt{\textbackslash DeclareTCBInputListing}, but based on \texttt{\textbackslash ProvideDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. The command \(\langle name\rangle\) is only created if it is not already defined.
17.5 Option Keys of the \texttt{listings} Library

\texttt{/tcb/listing options=\langle key list\rangle} \quad \text{(no default, initially \texttt{style=tcblatex})}

Sets the options from the package \texttt{listings} \cite{listings} which are used during typesetting of the listing. For \LaTeX\ listings, there is a predefined \texttt{listings} \texttt{style} named \texttt{tcblatex} which can be used.

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm, listing options={style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}}}
This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.
\end{tcblisting}

This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.

\texttt{/tcb/no listing options} \quad \text{(no value, initially unset)}

Abbreviation for \texttt{listing options=\{}\texttt{\}. This removes all options for the \texttt{listings} package. This includes the \texttt{tcblisting} \cite{tcblisting} standard style \texttt{tcblatex} and the encoding presets. Use this option, if you want to set the \texttt{listings} options outside of \texttt{tcblisting} \cite{tcblisting}, e.g. globally in the preamble.

\begin{tcblisting}{no listing options}
All \texttt{\textit{listings}} options removed.
\end{tcblisting}

All \texttt{\textit{listings}} options removed.

\texttt{/tcb/listing style=\langle style\rangle} \quad \text{(no default, initially \texttt{tcblatex})}

Abbreviation for \texttt{listing options=\{}\texttt{\langle style\rangle}}. This key sets a \texttt{\langle style\rangle} for the \texttt{listings} package, see \cite{listings}. For \LaTeX, there is a predefined style named \texttt{tcblatex}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black, listing style=tcblatex}
Here, we use the predefined style.
\end{tcblisting}

Here, we use the predefined style.
/tcb/listing inputencoding=(encoding) (no default, initially \inputencodingname)

Sets the input encoding value for the predefined listing style tcblatex and
tcbdocumentation from the library \documentclass. The initial value is derived
from the package inputenc if used.

/tcb/listing remove caption=true|false (default true, initially true)

If set to true, some part of the caption building code of the listings package is silenced to
prevent some unwanted interaction with the hyperref package resulting in additional vertical
space. If set to false, the listings package code is kept unchanged. Note that listings
outside tcblisting\textsuperscript{P.331} and tcbinputlisting\textsuperscript{P.333} are always processed normally.
Typically, a user is not expected to use this key at all.

/tcb/every listing line=(text) (no default, initially unset/empty)

Inserts some \text{\textlangle}text\textrangle to the begin of every line of a listing. Note that this a hack of the
listings package code. This may become unusable or superfluous in the future.

```
\newtcblisting{commandshell}{colback=black,colupper=white,colframe=yellow!75!black,
listing only,listing options={style=tcblatex,language=sh},
every listing line={\textcolor{red}{\small\ttfamily\bfseries root \$> }}}

\begin{commandshell}
ls -al
\end{commandshell}
```

```
root \$> ls -al
```

/tcb/every listing line*=\text{\textlangle}text\textrangle (no default, initially unset/empty)

Identical to /tcb/every listing line plus additional enlargement of /tcb/rightupper\textsuperscript{P.46}
by the width of \text{\textlangle}text\textrangle. Therefore, this option has to be used after the geometry settings
are done. This option is intended to be used in conjunction with /tcb/hbox\textsuperscript{P.105}.

```
\newtcblisting{commandshell}{colback=black,colupper=white,colframe=yellow!75!black,
listing only,listing options={style=tcblatex,language=sh},hbox,
every listing line*=\textcolor{red}{\small\ttfamily\bfseries root \$> }}}

\begin{commandshell}
ls -al
\end{commandshell}
```

```
root \$> ls -al
```

See further options in Section 17.8 on page 345.

\textbf{For an combined example of using \lstinline inside a tcolorbox\textsuperscript{P.12}, see
\DeclareTotalTCBox\textsuperscript{P.21}.}
17.6 Option Keys of the \texttt{listingsutf8} Library

The \texttt{listingsutf8} library is not needed (and troublesome) when using Xe\LaTeX{} or \LaTeX. Therefore, loading this library is automatically replaced by loading \texttt{listings} only, if pdf\LaTeX{} is \textit{not} used.

The \texttt{listingsutf8} library is an extension of the \texttt{listings} library, so all options from Section 17.5 on page 340 are applicable.

\texttt{/tcb/listing utf8=\{one-byte-encoding\}} (style, no default, initially \texttt{latin1})

Abbreviation for using \texttt{/tcb/listing inputencoding} \textsuperscript{+P.341} together with UTF-8 support from the package \texttt{listingsutf8} \textsuperscript{[11]}. This option is available only for the library variant \texttt{listingsutf8}. The \texttt{\{one-byte-encoding\}} is one of the applicable encodings from \textsuperscript{[11]}, e.g. \texttt{latin1} which is the default.

Be aware that this means restriction to this specific \texttt{\{one-byte-encoding\}}: e.g. \texttt{latin1} comprises umlauts and other accented characters, but not the Euro sign. If you want to use the \texttt{listings} package and \textit{real} UTF-8 source code, then do \textit{not} use \texttt{listingsutf8} but \texttt{listings} with \texttt{/tcb/listing inputencoding} \textsuperscript{+P.341} = \texttt{utf8} and with specific manual hacks for specific UTF-8-encoded characters.

See further options in Section 17.8 on page 345.
17.7 Option Keys of the \minted Library

\texttt{/tcb/minted language=(programming language)}
(no default, initially \texttt{latex})

Sets a \texttt{⟨programming language⟩} known to \texttt{Pygments} [14].

\begin{tcblisting}{listing engine=minted,minted style=trac,
minted language=java,
colback=red!5!white,colframe=red!75!black,listing only}
public class HelloWorld {
  // A `Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{tcblisting}

\texttt{\texttt{tcb/minted options=(key list)}}
(no default, initially see \texttt{/tcb/default minted options} → P.344)

Sets the options from the package \texttt{minted} [12] which are used during typesetting of the listing. Also see \texttt{/tcb/minted options app} → P.477 and \texttt{/tcb/minted options pre} → P.477.

\begin{verbatim}
\texttt{% \tcbuselibrary{skins}
\newtcblisting{myjava}{listing engine=minted,
minted style=colorful,
minted language=java,
minted options={fontsize=\small,breaklines,autogobble,linenos,numbersep=3mm},
colback=blue!5!white,colframe=blue!75!black,listing only,
left=5mm,enhanced,
overlay={\begin{tcbclipinterior}\fill[red!20!blue!20!white] (frame.south west)
  rectangle ([xshift=5mm]frame.north west);\end{tcbclipinterior}}}
\begin{myjava}
public class HelloWorld {
  // A `Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{myjava}
\end{verbatim}

1 public class HelloWorld {
  // A `Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
Sets the options from the package `minted` [12] which are used during typesetting of the listing, if `/tcb/minted options` → P.343 are not used. The intended use is inside the preamble to change the default behavior. Note that setting `/tcb/default minted options` also resets `/tcb/minted options` → P.343.

\[
\text{% inside the preamble}
\]
\[
\text{\tcbset{%
    \text{default minted options={tabsize=4,fontsize=\smallsize},
}}}
\]

Sets a ⟨style⟩ known to Pygments [14]. This is independent from `/tcb/minted options` → P.343. Note that styles are always applied globally; all following examples will be set in the given ⟨style⟩ until a new style is set. Also note that setting `\usemintedstyle{⟨style⟩}` only once per document is more economic, if all styles in a document are the same. For examples of different styles, see `/tcb/minted language` → P.343 and `/tcb/minted options` → P.343.

See further options in Section 17.8 on the following page.
17.8  Common Option Keys of all Libraries

For the \{options\} in \texttt{tcblisting} \textsuperscript{P.331} respectively \texttt{tcbinputlisting} \textsuperscript{P.333} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros.

\begin{itemize}
  
  \item /tcb/listing\texttt{ engine=\{engine\}}\textsuperscript{(no default)}
  
    Sets the \{engine\} which typesets the listings. Feasible values are
    \begin{itemize}
      \item listings, if library \texttt{freelistsings} or \texttt{listingsutf8} is loaded.
      \item minted, if library \texttt{freeminted} is loaded.
    \end{itemize}

  \item /tcb/listing\texttt{ file=\{file name\}}\textsuperscript{(no default, initially \texttt{\jobname.listing})}
  
    Sets the \{file name\} of the file which is used to save listings.

  \item /tcb/listing\texttt{ and text}\textsuperscript{(no value, initially set)}
  
    Typesets the environment content as listing in the upper part and as compiled text in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is a \TeX\ example.

\item /tcb/text\texttt{ and listing}\textsuperscript{(no value)}
  
    Typesets the environment content as compiled text in the upper part and as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \TeX\ example.

This is a \LaTeX\ example.

\item /tcb/listing\texttt{ only}\textsuperscript{(no value)}
  
    Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\end{itemize}
/tcb/text only

Typesets the environment content as compiled text.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text only}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX\ example.

/tcb/comment=(text)

(no default, initially empty)

Records a comment with \langle text \rangle as content. The comment is displayed e.g. in conjunction with /tcb/listing and comment \rightarrow P.349 and /tcb/comment and listing \rightarrow P.349.

```
\begin{tcblisting}{comment={This comment is really only a comment},
    colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}
```

This is a \textbf{tcolorbox}.

This is a tcolorbox.

/tcb/comment only

(no value)

Typesets the environment content with the comment text.

```
\begin{tcblisting}{comment only,
    comment={This is a comment.},
    colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}
```

This is a comment.

/tcb/image comment={(options)}{(filename)}

(style, no default, initially unset)

Uses an image denoted by \langle filename \rangle as comment for the listing. The image is included by the standard \texttt{\includegraphics} macro with given \langle options \rangle.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
    image comment={width=2.5cm}{example-image-a.pdf},center lower}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX\ example.

A
Uses an image denoted by \texttt{\langle filename \rangle} as comment for the listing. The image is included by the \texttt{\tcbincludegraphics} \texttt{\rightarrow P.275} macro. The inclusion can be customized by \texttt{/tcb/comment} style \texttt{\rightarrow P.349}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbimage comment={example-image-a.pdf}, comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners, drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=3cm,lower separated=false, tcbimage comment={example-image-a.pdf}, comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners, drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}

The library \texttt{skins} is needed to apply this option.
For all natural number \( n \) it holds:
\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]
Sets the PDF file name extension for `/tcb/pdf comment` to `<extension>`. Note that `<extension>` always overwrites any actual extension given inside `/tcb/pdf comment`.

Sets the `<options>` for `/tcb/tcbimage comment` and `/tcb/pdf comment`. These are `tcolorbox` options to customize the colored box drawn around the image(s), also image options encapsulated by `/tcb/graphics options`, and `tcbraster` options for `/tcb/pdf comment`.

Typsets the environment content as listing in the upper part and a given comment in the lower part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment, comment={This is my comment. It may contain line breaks.\par
It can even use the environment content «This is a \LaTeX\ example.»}}
This is a \LaTeX\ example.
\end{tcblisting}
```

```
This is my comment. It may contain line breaks.
It can even use the environment content «This is a \LaTeX\ example.»
```

Typsets a given comment in the upper part and the environment content as listing in the lower part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing, comment={This is my comment.}}
This is a \LaTeX\ example.
\end{tcblisting}
```

```
This is my comment.
```

```
This is a \LaTeX\ example.
```
/tcb/listing side text

Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part. This is a shortcut for setting /tcb/listing and text \textsuperscript{P.345} and /tcb/sidebyside \textsuperscript{P.132}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX example.
\end{tcblisting}

This is a \LaTeX example. This is a \LaTeX example.

Note that \texttt{sidebyside=false} has to be added, if the setting of /tcb/listing side text is to be annihilated.

/tcb/text side listing

Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting /tcb/text and listing \textsuperscript{P.345} and /tcb/sidebyside \textsuperscript{P.132}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX example.
\end{tcblisting}

This is a \LaTeX example. This is a \LaTeX example.

/tcb/listing outside text

Typesets the environment content side by side as listing in a \texttt{tcolorbox} \textsuperscript{P.12} and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} \textsuperscript{P.12} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 132.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX example.
\end{tcblisting}

This is a \LaTeX example. This is a \LaTeX example.
Typesets the environment content side by side as listing in a `tcolorbox` and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the `tcolorbox` and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 132.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \TeX\ example.

Typesets the environment content side by side as listing in the left (upper) part and a given comment in the right (lower) part. This is a shortcut for setting `/tcb/listing` and `/tcb/comment` and `/tcb/sidebyside`

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

Typesets the environment content side by side with a given comment in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting `/tcb/comment` and `/tcb/listing`

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment side listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given comment outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 132.

\begin{tcblisting}[colback=red!5!white,colframe=red!75!black,listing outside comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}]
This is a \LaTeX\ example.
\end{tcblisting}

Typesets the environment content side by side as listing in a \texttt{tcolorbox} and a given comment outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 132.

\begin{tcblisting}[colback=red!5!white,colframe=red!75!black,comment outside listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}]
This is a \LaTeX\ example.
\end{tcblisting}

Typesets the environment content as listing in a \texttt{tcolorbox} and as compiled text outside and below the box. The outside text is treated as lower part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and text is controlled by \texttt{/tcb/middle}.

\begin{tcblisting}[colback=red!5!white,colframe=red!75!black,listing above text]
This is a \LaTeX\ example.
\end{tcblisting}

Widely equal to \texttt{/tcb/listing above text}, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by \texttt{/tcb/after}.

\begin{tcblisting}[colback=red!5!white,colframe=red!75!black,listing above* text]
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
Typesets the environment content as listing in a \texttt{tcolorbox}\(^{P.12}\) and as compiled text outside and above the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox}\(^{P.12}\) and can be formatted with all lower part options. The distance between box and text is controlled by \texttt{/tcb/middle}\(^{P.48}\).

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

Widely equal to \texttt{/tcb/text above listing}, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by \texttt{/tcb/before}\(^{P.86}\).

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower, image comment={width=3cm}{example-image-a.pdf}}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

Typesets the environment content as listing in a \texttt{tcolorbox}\(^{P.12}\) and a given comment outside and below the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox}\(^{P.12}\) and can be formatted with all lower part options. The distance between box and comment is controlled by \texttt{/tcb/middle}\(^{P.48}\).

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower, image comment={width=3cm}{example-image-a.pdf}}
  This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

Widely equal to \texttt{/tcb/listing above comment}, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by \texttt{/tcb/after}\(^{P.86}\).
Typesets the environment content as listing in a `tcolorbox` and a given comment outside and above the box. The outside text is treated as `lower` part of the `tcolorbox` and can be formatted with all lower part options. The distance between box and comment is controlled by `/tcb/middle`.

\begin{tcblisting}[colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}]
This is a \LaTeX\ example.
\end{tcblisting}

Widely equal to `/tcb/comment above listing`, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by `/tcb/before`.

\begin{tcblisting}[colback=red!5!white,colframe=red!75!black,comment above* listing, center lower,image comment={width=3cm}{example-image-a.pdf}]
This is a \LaTeX\ example.
\end{tcblisting}
17.9 Option Keys for Processing and Full Document Examples

A complete \LaTeX document including \texttt{\documentclass, \begin{document} and \end{document}} cannot be processed directly by \texttt{tcolorbox} \textsuperscript{P.12}. It always has to be compiled separately. There are two methods supported by the package to process and display such a full document example:

- Prepare and compile the example document independent from your main document. The source file and the resulting PDF file can be included into the main document afterwards. This is the most economic way since the example document can be left untouched after the example is complete.

- The other possibility is to compile the example on the fly while the main document is compiled. This way has some charm, because the example can be edited inside the main document. But be aware that the compilation of the example is issued on every run of the main document. Also, there are fewer degrees of freedom how the example is compiled.

For both methods, the resulting example PDF file can be included as a \texttt{/tcb/pdf comment} \textsuperscript{P.348}.

The following example shows how to apply the first method. There already is a file \texttt{tcolorbox-example.tex} and a PDF file \texttt{tcolorbox-example.pdf}. Both of them are input partly by the following:

\begin{verbatim}
% \tcbuselibrary{breakable,skins,raster}
\tcbinputlisting{
  enhanced,jigsaw,breakable,pad at break=2mm,height fixed for=first and middle,
  lower separated=false,
  leftlower=Opt,rightlower=Opt,middle=Opt,
  colframe=red!50!black,colback=yellow!10!white,
  listing and comment,
  listing file={tcolorbox-example},
  listing options=
    {style=tcblatex,texcsstyle=\col{red!70!black},firstline=20,lastline=85},
  after upper=\par\bigskip\texttt{\ldots}\par,
  pdf comment,
  comment style={drop lifted shadow,graphics pages={1,...,4}},
}
\end{verbatim}

\begin{verbatim}
% arara: pdflatex: { }
% arara: pdflatex: { synctex: yes }
% \documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}
\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\end{document}
\end{verbatim}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
  Upper part of my box.
  \tcblower
  Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!5!white,colframe=yellow!50!black, colbacktitle=yellow!75!black,title=My title]
  I can do this also with a title.
  \tcblower
  Lower part of my box.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,lowerbox=invisible, savelowerto=\jobname_ex.tex]
  Now, we play hide and seek. Where is the lower part?
  \tcblower
  I'm invisible until you find me.
\end{tcolorbox}

\begin{tcolorbox}[colback=yellow!10!white,colframe=red!75!black,title=Here I am]
  \input{\jobname_ex.tex}
\end{tcolorbox}

\begin{tcolorbox}[enhanced,sharp corners=uphill, colback=blue!50!white,colframe=blue!25!black,coltext=yellow, fontupper=\Large\bfseries,arc=6mm,boxrule=2mm,boxsep=5mm, borderline={0.3mm}{0.3mm}{white}]
  Funny settings.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,frame style image=blueshade.png, opacityback=0.75,opacitybacktitle=0.25, colback=blue!5!white,colframe=blue!75!black, title=My title]
  This box is filled with an external image.\par
  Title and interior are made partly transparent to show the image.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,attach boxed title to top center={yshift=-3mm, yshifttext=-1mm}, colback=blue!5!white,colframe=blue!75!black,colbacktitle=red!80!black, title=My title,fonttitle=\bfseries, boxed title style={size=small,colframe=red!50!black} ]
...
\end{tcolorbox}
1 Colored boxes

My box

My box with my title.

My box with my title.

My box with my title.

My box

My box with my title.

My title

This box uses a boxed title. The box of the title can be formatted independently from the main box.

2 2L-Examples

This is a 2L-example (unpaginated)

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

This is a 2L-example (unpaginated)

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

3 Theorems

Theorem 3.2: Summation of Numbers

For all natural numbers \( n \),

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

Theorem 3.3: Summation of Numbers

For all natural numbers \( n \),

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

4 Watermarks

How to use a watermark picture

Download this example. This picture is automatically scaled to fit the dimensions of my box. Instead of a picture, some text could be used or arbitrary graphical code. See documentation for more options.

5 Boxes in boxes

How one box sits inside another

And now for something completely different: Boxes!

6 Breakable Boxes

LaTeX example:

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]

This is a LaTeX example:

\[ \sum_{i=1}^{n} i = \frac{n(n+1)}{2}. \]
/tcb/no process  (no default)

Removes all processing commands if set before.

/tcb/process code=(code)  (no default, initially empty)

Adds \langle code \rangle which is executed during \texttt{\textbackslash tcbinputlisting}\textsuperscript{P.333} and \texttt{tcblisting}\textsuperscript{P.331}. At the time of executing the given \langle code \rangle, the listing is already written to /tcb/listing file\textsuperscript{P.345}, but the colored box is not constructed yet. Its intended use is to process the listing somehow before displaying. The processing result can be used inside a \texttt{\textbackslash tcb/comment}\textsuperscript{P.346}. Several /tcb/process code options can be given which are processed in the given order. Typically, \langle code \rangle is added by using the following styles /tcb/run system command, /tcb/run pdflatex, etc.

To use the further options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk. Anyway, it’s more economic to compile examples independent from the main document and to include them as shown in the previous pages.

/tcb/run system command=(system command)  (style, no default, initially unset)

Runs a \langle system command \rangle, if the document is compiled with the \texttt{-shell-escape} permission. The current listing file can be accessed as \texttt{\filename@area\filename@base\filename@ext}.

This \langle system command \rangle is added to /tcb/process code.

/tcb/compilable listing  (style, no default)

Sets /tcb/listing file\textsuperscript{P.345} to \jobname-listing-\langle counter \rangle.

The default /tcb/listing file\textsuperscript{P.345} setting cannot be used to compile a listing, since the base name equals the \jobname and the included PDF files should be unique. Therefore, to use /tcb/run pdflatex etc., the /tcb/listing file\textsuperscript{P.345} has to be set to a unique value. One may use /tcb/compilable listing for this purpose.

/tcb/run pdflatex=(arguments)  (style, no default, initially unset)

Issues a pdflatex compilation of the listing with the given \langle arguments \rangle.

• The main document has to be compiled with the \texttt{-shell-escape} permission.
• The /tcb/listing file\textsuperscript{P.345} has to be unique for the listing.
• If the listing has to be compiled twice, add run pdflatex two times to the option list.

\begin{tcblisting}{enhanced jigsaw,lower separated=false, leftlower=0pt, rightlower=0pt, colframe=red!50!black, colback=yellow!10!white, listing options={style=tcblatex, texcsstyle=\color{red!70!black}}, listing and comment, pdf comment,freeze pdf, compilable listing, run pdflatex }
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[<+->]
\item One
\item Two
\end{itemize}
\end{block}
\end{frame}
\end{document}
\begin{alertblock}{Integral}
\begin{equation}
\int_1^x \frac{1}{t} \, dt = \ln(x).
\end{equation}
\end{alertblock}

\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}
\item One
\item Two
\end{itemize}
\end{block}
\begin{alertblock}{Integral}
\begin{equation}
\int_1^x \frac{1}{t} \, dt = \ln(x).
\end{equation}
\end{alertblock}
\end{frame}
\end{document}
\documentclass{article}
\usepackage{pstricks,multido}
\begin{document}
\psset{unit=3}\
multido{\nHue=0.01+0.01}{100}{% 
\definecolor{MyColor}{hsb}{\nHue,1,1} 
\pscircle[linewidth=0.01,linecolor=MyColor]{\nHue}}\end{document}
For most applications, you will like to add `/tcb/freeze pdf` as option, since the included pdf file is only refreshed, if the source for this file has changed.

```
/tcb/freeze file=⟨file⟩ (no default, initially unset)
```

Observes some ⟨file⟩, usually the final file produced by `/tcb/process code` \(^{P.358}\), `/tcb/run system command` \(^{P.358}\), `/tcb/run pdflatex` \(^{P.358}\), etc. If the MD5 checksum of the current `/tcb/listing file` \(^{P.345}\) is unchanged and ⟨file⟩ exists, the processing is skipped and the ⟨file⟩ is kept (frozen). Typically, the style `/tcb/freeze pdf` can be used for convenience.

```
/tcb/freeze none (no default, initially set)
```

Freeze no file and always execute the given process commands.

```
/tcb/freeze extension=⟨text⟩ (style, no default)
```

Calls `/tcb/freeze file` with the current `/tcb/listing file` \(^{P.345}\) stripped with its extension plus ⟨text⟩ as new extension.

```
... listing file=myfile.tex,
freeze extension=modified.pdf,  % -> myfile-modified.pdf is observed
...```

```
/tcb/freeze pdf (no value)
```

Calls `/tcb/freeze file` with the current `/tcb/listing file` \(^{P.345}\) stripped with its extension plus .pdf as new extension.

```
/tcb/freeze png (no value)
```

Calls `/tcb/freeze file` with the current `/tcb/listing file` \(^{P.345}\) stripped with its extension plus .png as new extension. See the examples for `/tcb/run pdflatex` \(^{P.358}\) and `/tcb/run ps2pdf` \(^{P.360}\).

```
/tcb/freeze jpg (no value)
```

Calls `/tcb/freeze file` with the current `/tcb/listing file` \(^{P.345}\) stripped with its extension plus .jpg as new extension.
17.10 Creation of \LaTeX{} Tutorials

The following source code gives a guideline for the creation of \LaTeX{} tutorials. In the next section, a framework for \LaTeX{} exercises is described. All examples shall be numbered optionally.

Firstly, some additional \texttt{tcb} keys are defined for the appearance. For the examples, three environments \texttt{texexp}, \texttt{texexptitled}, and \texttt{texexptitledspec} are defined with automatic numbering.

- \texttt{texexp} is used for untitled examples,
- \texttt{texexptitled} is used for titled examples,
- \texttt{texexptitledspec} is used for titled examples with special treatment.

\begin{Verbatim}
\texttt{\textbf{Definition in the preamble:}}
\end{Verbatim}

\begin{Verbatim}
\tcbset{
  \texttt{texexp}.style={colframe=red!50!yellow!50!black, colback=red!50!yellow!5!white,}
  \texttt{coltitle=red!50!yellow!3!white,}
  \texttt{fonttitle=\small\textbf{\textsf{\textsc{small},}} fontupper=\small, fontlower=\small},
  \texttt{example/.style 2 args={\texttt{texexp,}}
    \texttt{title={Example \thetcbcounter: #1},label={#2}}},
}
\end{Verbatim}

\begin{Verbatim}
\begin{tcblisting}{\texttt{texexp}}
This is a \LaTeX{} example which displays the text as source code
and in compiled form.
\end{tcblisting}
\end{Verbatim}

\begin{Verbatim}
\begin{texexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{texexptitled}
\end{Verbatim}

\begin{Verbatim}
\begin{tcblisting}{\texttt{texexp}}
This is a \LaTeX{} example which displays the text as source code
and in compiled form.
\end{tcblisting} \begin{tcblisting}{\texttt{texexp}}
This is a \LaTeX{} example which displays the text as source code
and in compiled form.
\end{tcblisting}
\end{Verbatim}

\begin{Verbatim}
\begin{texexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{texexptitled}
\end{Verbatim}

\begin{Verbatim}
Example 17.1: First example with a title line

Here, we use Example \ref{firstExample} with a title line.
\end{Verbatim}
This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code only.

This is a \LaTeX\ example which displays the text as source code only.

This is a \LaTeX\ example which displays the text in compiled form only.

Here, we see Example 17.2.

Example 17.2: An Example with a Heading

This is a \LaTeX\ example with a numbered heading line which can be referred to.

Here, we see Example 17.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example \ref{heading2}.

Example 17.3: Another Example with a Heading

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example 17.3.

Example 17.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on page \pageref{heading3}.

The floating box of the last example is seen as Example 17.4 on page 364.

Example 17.5: Special application

Some \LaTeX\ source code.

For special cases, the environment \texttt{tcolorbox} with style \texttt{example} can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

The following series of examples demonstrate the application of \texttt{tcolorbox} options for diversification.
Example 17.6: How to use options (1):
The basic example

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 17.7: How to use options (2):
The text output is centered and the segmentation line has vanished.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 17.8: How to use options (3):
Here, the \texttt{tikzpicture} is totally hidden. The \texttt{bicolor} skin highlights the output.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 17.9: How to use options (4):
The \texttt{bicolor} skin also works with side by side mode

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 17.10: How to use options (5):
Putting our picture outside is just a matter of one word.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 17.11: How to use options (6):
The picture may also be put above the listing box.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 17.12: How to use options (7): Our style is easily transformed into a beamerish one.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);} \end{tikzpicture}
17.11 Creation of LATEX Exercises

In the following, a guideline is given for the creation of LATEX exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file \jobname.records for automatic processing. The solution contents themselves are saved to a subdirectory named solutions. Also see Section 8 on page 144.

- Before the first exercise is given, \tcbstartrecording \(^{\text{P.144}}\) has to be called to start recording.
- The solution is given as content of a \tcboutputlisting \(^{\text{P.333}}\) environment. Note, that you can use this content also inside the exercise with \tcbuselistingtext \(^{\text{P.333}}\) in compiled form.
- After the last exercise is given (and before using the solutions), \tcbstoprecording \(^{\text{P.144}}\) has to be called to stop recording.
- The solutions are loaded by \tcbinputrecords \(^{\text{P.144}}\).

Inside the exercise text, there may be text parts which are needed as LATEX source code and as compiled text as well. These parts can be saved by \tcbwritetemp \(^{\text{P.142}}\) and used in compiled form by \tcbusetemp \(^{\text{P.142}}\) or as source code by \tcbusetemplisting \(^{\text{P.333}}\).

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label \textlangle marker\rangle. Automatically, the label \texttt{exe:⟨marker⟩} is used to mark the exercise and the label \texttt{sol:⟨marker⟩} is used to mark the solution.

\begin{tcolorbox}[texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\sffamily\bfseries, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle=*\color{red!40!black}},}]
\end{tcolorbox}

With these preparations, the kernel environment \texttt{texercise} for our exercises is created quickly:

\begin{verbatim}
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{%
texercisestyle, listing file={solutions/texercise\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter\hfill\mdseries Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
\end{verbatim}
Create the following table:

<table>
<thead>
<tr>
<th>Antike</th>
<th>Mittelalter</th>
<th>Teilstaaten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republik</td>
<td>Kaiserreich</td>
<td>Franken</td>
</tr>
</tbody>
</table>

The following examples demonstrate the application.
Create a new macro \verb+\headingline+ which produces the following output:

```
\headingline{Very important heading}
```

Exercise 17.2

Solution on page 373

Create a new macro \verb+\minitable+ which produces the following output:

```
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}
```

Exercise 17.3

Solution on page 373

Create a new macro \verb+\minitable+ which produces the following output:

```
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}
```

My heading

In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.
Exercise 17.4

Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\begin{verbatim}
\synop{Neil Armstrong}
{That's one small step for a man, one giant leap for mankind.}
{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}
\end{verbatim}

\begin{tabular}{@{}p{1\textwidth/2}|p{1\textwidth/2}@{}}
\hline
\multicolumn{2}{c}{\bfseries Neil Armstrong} \\
\hline
\textit{English} & \textit{German} \\
\hline
That's one small step for a man, one giant leap for mankind. & Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit. \\
\hline
\end{tabular}

\tcbstoprecording

Now, we give a list of all exercises with:

\begin{verbatim}
\tcblistof
[subsection]{exam}{List of Exercises}
\end{verbatim}

17.12 List of Exercises

17.1 Exercise with solution on page 373 ............................................. 370
17.2 Exercise with solution on page 373 ............................................. 371
17.3 Exercise with solution on page 373 ............................................. 371
17.4 Exercise with solution on page 374 ............................................. 372

\tcblabel{listofexercises}
17.13 Solutions for the given \LaTeX \text{ Exercises}

For all solutions, a macro `\processsol` was written to the file `\jobname.records`. Now, we need a definition for this macro to use the solutions.

```latex
% \usepackage{hyperref} % for phantomlabel
\newtcbinputlisting{\processsol}[2]{%
texercisestyle, listing only, listing file={#1}, phantomlabel={sol:#2},%
title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},}
```

The loading of all solutions is done by:

\tcbinputrecords

With this, we get:

**Solution for Exercise 17.1 on page 370**

```
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|} \hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien} \\
\hline
\multicolumn{2}{|c|}{\bfseries\itshape Antike} & \multicolumn{2}{c|}{\bfseries\itshape Mittelalter} \\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
In den Zeiten der r"{o}mischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das r"{o}mische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der V"{o}lkerwanderungszeit "{u}bernahmen die Goten und sp"{a}ter die Franken die Vorherrschaft. & Im sp"{a}teren Mittelalter regierten F"{u}rsten einen Fleckenteppich von Einzelstaaten. \hline
\end{tabular}
```

**Solution for Exercise 17.2 on page 371**

```
\newcommand{\headingline}[1]{% 
  \begin{center}\Large\bfseries #1\end{center}}
```

**Solution for Exercise 17.3 on page 371**

```
\newcommand{\minitable}[2]{% 
  \begin{center}\begin{tabular}{p{10cm}}% 
  \multicolumn{1}{c}{\bfseries #1} \\
  \hline
  #2 \hline
  \end{tabular}\end{center}}
```

373
Solution for Exercise 17.4 on page 372

\newcommand{\synop}[3]{%
\begin{tabular}{@{}p{\textwidth-\tabcolsep*2-\arrayrulewidth/2}|%}
\hline
\multicolumn{2}{c}{\bfseries #1}\
\hline
\multicolumn{1}{c|}{\itshape English}&
\multicolumn{1}{c}{\itshape German}\
\hline
#2 & #3 \\
\hline
\end{tabular}}%

\begin{tabular}{@{}|p{\textwidth-\tabcolsep*2-\arrayrulewidth/2}|%}
\hline
\multicolumn{2}{c}{\bfseries #1}\
\hline
\multicolumn{1}{c|}{\itshape English}&
\multicolumn{1}{c}{\itshape German}\
\hline
#2 & #3 \\
\hline
\end{tabular}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{theorems}

This also loads the package `amsmath`.

18.1 Macros of the Library

\texttt{\newtcbtheorem\[\langle init options\rangle\]\{\langle name\rangle\}\{\langle display name\rangle\}\{\langle options\rangle\}\{\langle prefix\rangle\}\}}

Creates new environments \langle name\rangle and \langle name\rangle* based on \texttt{tcolorbox} to frame a (mathematical) theorem. The \langle display name\rangle is used in the title line with a number, e.g. «Theorem 5.1». The \langle options\rangle are given to the underlying \texttt{tcolorbox} to control the appearance. The \langle init options\rangle allow setting up automatic numbering, see Section 5 on page 123. The new environment \langle name\rangle takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and is also set as \texttt{/tcb/nameref\rightarrow P.111} identifier. The second mandatory parameter is a \langle marker\rangle. The theorem is automatically labeled with \langle prefix\rangle/\langle separator\rangle/\langle marker\rangle where \langle separator\rangle is predefined as “:”, see \texttt{/tcb/label separator\rightarrow P.382}.

The new environment \langle name\rangle* takes one optional and one mandatory parameter and represents an unnumbered variant of the environment \langle name\rangle. This variant is not labeled and not listed in lists of theorems.

\texttt{\begin{mytheo}\{This is my title\}\{theoexample\}}

This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with \texttt{\ref{th:theoexample}}, it is given on page \texttt{\pageref{th:theoexample}}, and it is titled \texttt{\llq\nameref{th:theoexample}\frqq}.

\texttt{\end{mytheo}}

My Theorem 18.1: This is my title

This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with 18.1, it is given on page 375, and it is titled «This is my title».

\texttt{\begin{mytheo}\[\label=myownlabel\]\{This is my title\}\{\}}

The label parameter can be left empty without \LaTeX error. Or you may use an own label to reference Theorem \texttt{\ref{myownlabel}}.

\texttt{\end{mytheo}}

My Theorem 18.2: This is my title

The label parameter can be left empty without \LaTeX error. Or you may use an own label to reference Theorem 18.2.
\begin{mytheo}{}
The title can also be left empty without problem. Note that the ":" vanished magically.
\end{mytheo}

My Theorem 18.3

The title can also be left empty without problem. Note that the ":" vanished magically.

\begin{mytheo*}{Unnumbered Theorem}
This theorem is not numbered.
\end{mytheo*}

My Theorem: Unnumbered Theorem

This theorem is not numbered.

\begin{mytheo*}{}
This theorem has no number and no title.
\end{mytheo*}

My Theorem

This theorem has no number and no title.

\begin{itemize}
\item To switch off the nameref feature permanently, add \texttt{nameref/.style={}} inside the \texttt{⟨options⟩} list.
\end{itemize}

\renewtcbtheorem[\texttt{⟨init options⟩}]\{\texttt{⟨name⟩}\}\{\texttt{⟨display name⟩}\}\{\texttt{⟨options⟩}\}\{\texttt{⟨prefix⟩}\}

Operates like \texttt{\newtcbtheorem} \textsuperscript{→} P.375, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\textbf{tcbmath}\textsl{(options)}\{\textit{mathematical box content}\}\}

Creates a \texttt{tcolorbox}→P.12 which is fitted to the width of the given \textit{mathematical box content}. This box is intended to be applied as part of a larger formula and may be used as replacement for the \texttt{boxed} macro of \texttt{amsmath}.

\begin{equation}
\texttt{tcbset}\{\texttt{fonttitle=\texttt{\scriptsize}}\}
\texttt{tcbmath}\{\texttt{colback=LightBlue!25!white,colframe=blue}\} \{ \texttt{\texttt{a}^2 = 16} \}
\quad \Rightarrow \quad
\texttt{tcbmath}\{\texttt{colback=Salmon!25!white,colframe=red,title=Implication}\} \%
\{ \texttt{\texttt{a} = 4 \land \texttt{-a} = -4} \}
\end{equation}

\texttt{tcbhighmath}\textsl{(options)}\{\textit{mathematical box content}\}\}

This is a special case of the \texttt{tcbmath} macro which uses the style \texttt{/tcb/highlight math}→P.387. It is intended to provide context sensitive highlighting of formula parts. The color settings via \texttt{/tcb/highlight math style}→P.387 may be different inside theorems or other colored areas and outside.

\begin{align}
\texttt{tcbhighmath}\{\texttt{\sum\limits_{n=1}^{\infty} \frac{1}{n}} \} &= \infty. \\tag{4} \\
\int x^2 \mathrm{d}x &= \frac{1}{3} x^3 + c. \tag{5}
\end{align}

\begin{align}
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\tag{6} \\
\int x^2 \mathrm{d}x &= \frac{1}{3} x^3 + c. \tag{7}
\end{align}
\texttt{tcbhighmath}\textsuperscript{\textsuperscript{P.377}} can be used in symbiosis with the \texttt{empheq} package which allows to specify own boxing commands to mark multiline formulas.

\begin{empheq}[box=tcbhighmath]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{empheq}[box=tcbhighmath]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}

Besides \texttt{tcbhighmath}\textsuperscript{\textsuperscript{P.377}}, one can easily define an independent new box based on \texttt{tcbbox}\textsuperscript{\textsuperscript{P.14}} which acts like \texttt{tcbhighmath}\textsuperscript{\textsuperscript{P.377}}:

\begin{empheq}[box=otherbox]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{equation}
  E = mc^2
\end{equation}

\begin{empheq}[box=otherbox]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{empheq}[box=otherbox]{align}
  a &= \sin(z) \\
  E &= mc^2 + \int_a^b x \, dx
\end{empheq}

\begin{equation}
  E = mc^2
\end{equation}
18.2 Option Keys of the Library

/\texttt{tcb.separator sign}={\langle sign\rangle} \quad \text{(no default, initially :)}

The given \langle sign\rangle is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
  colback=white,colframe=red!50!black,fonttitle=\bfseries,
  separator sign={\ $\blacktriangleright$}]{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\textbf{Theorem 18.4} \(\triangleright\) My example

My theorem text.

/\texttt{tcb.separator sign colon} \quad \text{(style, no value, initially set)}

Sets /\texttt{tcb.separator sign} to the default colon : sign.

/\texttt{tcb.separator sign dash} \quad \text{(style, no value)}

Sets /\texttt{tcb.separator sign} to an en-dash sign.

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
  colback=white,colframe=red!50!black,fonttitle=\bfseries,
  separator sign dash]{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\textbf{Theorem 18.5} – My example

My theorem text.

/\texttt{tcb.separator sign none} \quad \text{(style, no value)}

Sets /\texttt{tcb.separator sign} to empty.

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}[
  colback=white,colframe=red!50!black,fonttitle=\bfseries,
  separator sign none]{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\textbf{Theorem 18.6} My example

My theorem text.
The given \langle left \rangle and \langle right \rangle delimiter signs are used to frame the descriptive title text of a theorem.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters={\flqq}{\frqq}\{theo\}}
My theorem text.
\end{sometheorem}

Theorem 18.7: «My example»
My theorem text.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters parenthesis\{theo\}}
My theorem text.
\end{sometheorem}

Theorem 18.8: (My example)
My theorem text.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters none\{theo\}}
My theorem text.
\end{sometheorem}

Theorem 18.9: My example
My theorem text.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,description delimiters color=red!25!yellow\{theo\}}
My theorem text.
\end{sometheorem}

Theorem 18.9: My example
My theorem text.
\/tcb\description\ font\text{=(text)}\ \ (default\ empty,\ initially\ empty)

Sets \langle\text{font settings}\rangle\ before\ the\ descriptive\ title\ text\ deviating\ from \/tcb/fonttitle\ →\ P.\ 34.\ The\ \text{(text)}\ is\ removed,\ if\ description\ font\ is\ used\ without\ value.

\newtcbtheorem[use\ counter\ from=mytheo]{sometheorem}{Theorem}{
colback=white,colframe=red!50!black,fonttitle=\textbf{series},
description\ delimiters={\guillemotleft}{\guillemotright},
description\ font=\textit{series}/\textstroke{shape}\{theo\}
\begin{sometheorem}{My\ example}{}
My\ theorem\ text.
\end{sometheorem}

Theorem 18.10: „My example.“
My theorem text.

\/tcb\description\ formatter\text{=(macro)}\ \ (default\ empty,\ initially\ empty)

Sets \langle\text{macro}\rangle\ as\ formatter\ for\ the\ descriptive\ title\ text.\ The\ \langle\text{macro}\rangle\ has\ to\ take\ one\ mandatory\ argument\ (the\ description\ text).
Note\ that \/tcb\description\ delimiters\ →\ P.\ 380, \/tcb\description\ color\ →\ P.\ 380,\ and\ 
\/tcb\description\ font\ are\ ignored,\ if\ this\ option\ is\ used.
If\ description\ formatter\ is\ used\ without\ value,\ the\ formatter\ is\ reset\ to\ its\ standard\ behavior.

\newtcbbox{\formbox}{enhanced,frame\ empty,size=minimal,boxsep=2pt,arc=1pt,
on\ line,interior\ style\ image=goldshade.png}
\newtcbtheorem[use\ counter\ from=mytheo]{sometheorem}{Theorem}{
colback=white,colframe=red!50!black,fonttitle=\textbf{series},
description\ formatter=\texttt{formbox}\{theo\}
\begin{sometheorem}{My\ example}{}
My\ theorem\ text.
\end{sometheorem}

Theorem 18.11: My example.
My theorem text.

\/tcb\termination\ sign\text{=(sign)}\ \ (no\ default,\ initially\ empty)

The\ given \langle\text{sign}\rangle\ is\ used\ as\ terminator\ at\ the\ end\ of\ the\ title\ text\ of\ a\ theorem.

\newtcbtheorem[use\ counter\ from=mytheo]{sometheorem}{Theorem}{
colback=white,colframe=red!50!black,fonttitle=\textbf{series},
termination\ sign={.}}{theo}
\begin{sometheorem}{My\ example}{}
My\ theorem\ text.
\end{sometheorem}

Theorem 18.12: My example.
My theorem text.

381
Sets /tcb/terminator sign colon \textsuperscript{P.381} to the colon : sign.

\begin{quote}
My theorem text.
\end{quote}

\textbf{Theorem 18.13 – My example:}

My theorem text.

Sets /tcb/terminator sign dash \textsuperscript{P.381} to an en-dash sign.

\begin{quote}
My theorem text.
\end{quote}

\textbf{Theorem 18.14: My example – }

My theorem text.

Sets /tcb/terminator sign none \textsuperscript{P.381} to the default empty text.

\begin{quote}
My theorem text.
\end{quote}

\textbf{Theorem 18.15: My example}

My theorem text.

\textbf{See Example 18.15.}
The given \langle style \rangle is used in connection with labels created with environments which are defined themselves by \newtcbtheorem \textsuperscript{P.375}. This \langle style \rangle uses one argument which is automatically set to the full label marker of the environment, i.e., a text consisting of \langle prefix \rangle (defined by \newtcbtheorem \textsuperscript{P.375}), /tcb/label separator \textsuperscript{P.382}, and \langle marker \rangle (defined by an actual theorem environment).

A second usage of /tcb/theorem full label supplement overwrites the first setting.

Theorem 18.16: My example

My theorem text.

This automated hyper target can be linked to with a hyper link.

A second usage of /tcb/theorem label supplement overwrites the first setting.

The given \langle style \rangle is used in connection with labels created with environments which are defined themselves by \newtcbtheorem \textsuperscript{P.375}. This \langle style \rangle uses one argument which is automatically set to the label \langle marker \rangle defined by an actual theorem environment.

A second usage of /tcb/theorem label supplement overwrites the first setting, but /tcb/theorem full label supplement and /tcb/theorem label supplement can be used independently.

Theorem 18.17: My example

My theorem text.

This automated hyper target can be linked to with a hyper link.
Sets the hanging indent of the theorem title to \texttt{auto} or the given \langle \texttt{length} \rangle. For \texttt{auto}, the hanging indent matches the display name, number and separator sign of the theorem. If \langle \texttt{length} \rangle is negative, the theorem title is indented positively without hanging indent.

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA1}
My theorem text.
\end{sometheorem}

\begin{sometheorem}[\texttt{theorem hanging indent=5mm}]{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA2}
My theorem text.
\end{sometheorem}

\begin{sometheorem}[\texttt{theorem hanging indent=0pt}]{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA3}
My theorem text.
\end{sometheorem}

\begin{sometheorem}[\texttt{theorem hanging indent=-5mm}]{This is a very long and complicated title for a quite short and nearly empty theorem}{myexA4}
My theorem text.
\end{sometheorem}

\begin{tcbtheorem}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}

\begin{tcbset}{\texttt{theorem hanging indent}=\texttt{auto}|\langle \texttt{length} \rangle}

\texttt{(default \texttt{auto}, initially \texttt{auto})}

Theorem 18.18: This is a very long and complicated title for a quite short and nearly empty theorem
My theorem text.

Theorem 18.19: This is a very long and complicated title for a quite short and nearly empty theorem
My theorem text.

Theorem 18.20: This is a very long and complicated title for a quite short and nearly empty theorem
My theorem text.

Theorem 18.21: This is a very long and complicated title for a quite short and nearly empty theorem
My theorem text.
### tcb/theorem name and number

Prints theorem name followed by theorem number inside the title.

```latex
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
  colback=white,colframe=red!50!black,fonttitle=\bfseries,
  theorem name and number}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

**Theorem 18.22: My example**

My theorem text.

### tcb/theorem number and name

Prints theorem number followed by theorem name inside the title.

```latex
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
  colback=white,colframe=red!50!black,fonttitle=\bfseries,
  theorem number and name}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

**18.23 Theorem: My example**

My theorem text.

### tcb/theorem name

Prints theorem name without number inside the title.

```latex
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
  enhanced,cbcolback=white,cbcolframe=red!50!black,fonttitle=\bfseries,
  theorem name,watermark text=\thetcbcounter}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

**Theorem: My example**

My theorem text. **18.24**

### tcb/theorem number

Prints theorem number without name inside the title.

```latex
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
  enhanced,cbcolback=white,cbcolframe=red!50!black,fonttitle=\bfseries,
  theorem number}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

**18.25: My example**

My theorem text.
This key can be used directly in a \textcolorbox for a more flexible approach to create a theorem type box. The \textit{name} is used together with the increased \textit{counter} value and the \textit{title} for the title line of the box. Additionally, a \texttt{\label} with the given \textit{marker} is created.

\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm,\textit{theorem}=\textit{Test}\{\textit{texercise}\}\{\textit{Direct usage}\}\{\textit{myMarker}\}]
Here, we see the test \ref{myMarker}.
\end{tcolorbox}

For a common appearance inside the document, the key \texttt{theorem} should not be used directly as in the example above, but as part of a new environment created by hand or using \texttt{\newtcbtheorem} \textsuperscript{P.375}.
/tcb/highlight math

A style which is used for \texttt{tcbhighmath} and which is predefined as \texttt{notitle,nophantom,colframe=red,colback=yellow!25!white}.

It can be changed with the usual \texttt{pgf} techniques or with \texttt{/tcb/highlight math style}.

\begin{align*}
\texttt{tcbhighmath}\{1\} + 1 &= 2, \\
\texttt{tcbset}\{\text{highlight math/.append style={left=0mm,right=0mm,top=0mm,bottom=0mm}}\}
\texttt{tcbhighmath}\{1\} + 1 &= 2.
\end{align*}

/tcb/highlight math style=\langle\text{style definition}\rangle

Changes the definition for \texttt{tcb/highlight math} to \texttt{notitle,nophantom} plus the given \texttt{\langle\text{style definition}\rangle}. See \texttt{tcbhighmath} for another example.

% \texttt{tcbuselibrary{skins}}
\texttt{tcbset}\{\text{highlight math style=\langle\text{enhanced,\%-- needed for the 'remember' options}
colframe=red,colback=red!10!white,boxsep=0pt\rangle}\}
\begin{align*}
\texttt{tcbhighmath}[\text{remember as=fx}]\{f(x)\}
&= \int\limits_{1}^{x} \frac{1}{t^2} \, dt \\
&= \left[ -\frac{1}{t} \right]_{1}^{x} \\
&= -\frac{1}{x} + \frac{1}{1}
\end{align*}
Sets the upper part to mathematical mode with font $\textit{\textstyledisplaystyle}$.

Sets the lower part to mathematical mode with font $\textit{\textstyledisplaystyle}$.

Sets the upper part and lower part to mathematical mode with font $\textit{\textstyledisplaystyle}$.

The following styles are only tested to work with the original \textit{amsmath} environments. If e.g. the \textit{equation} environment is redefined as \textit{gather}, then \textit{/tcb/ams equation} should / could not be used. Obviously, you are encouraged to use \textit{/tcb/ams gather} → P.390 in this case.

\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
$\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.$
\end{tcolorbox}

\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
$\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.$
\end{tcolorbox}

\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
$\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.$
\end{tcolorbox}
/tcb/ams align upper
Adds an `amsmath align` environment to the start and end of the upper part.

/tcb/ams align lower
Adds an `amsmath align` environment to the start and end of the lower part.

/tcb/ams align
Adds an `amsmath align` environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \quad (16) \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c. \quad (17)
\end{tcolorbox}

/tcb/ams align* upper
Adds an `amsmath align*` environment to the start and end of the upper part.

/tcb/ams align* lower
Adds an `amsmath align*` environment to the start and end of the lower part.

/tcb/ams align*
Adds an `amsmath align*` environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}
/tcb/ams gather upper (style, no value)

Adds an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower (style, no value)

Adds an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather (style, no value)

Adds an amsmath gather environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{tcolorbox}

/tcb/ams gather* upper (style, no value)

Adds an amsmath gather* environment to the start and end of the upper part.

/tcb/ams gather* lower (style, no value)

Adds an amsmath gather* environment to the start and end of the lower part.

/tcb/ams gather* (style, no value)

Adds an amsmath gather* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{tcolorbox}
Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the upper part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the lower part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the upper part \textit{and} lower part. Note that the text content has to start with such a formula.

\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{gather}
\sum_{n=1}^\infty \frac{1}{n} = \infty. \\
\int x^2 \, \text{d}x = \frac13 x^3 + c.
\end{gather}
\end{tcolorbox}

And now for something completely different.

New colored mathematical environments are easily created using \texttt{\newtcolorbox}^\textit{P.15}.

\begin{tcolorbox}[mymath]{ams gather*,colback=yellow!10!white,colframe=red!50!black}
\begin{mymath}
\sum_{n=1}^\infty \frac{1}{n} = \infty.
\int x^2 \, \text{d}x = \frac13 x^3 + c.
\end{mymath}
\end{tcolorbox}

And now for something completely different.

All described options like /tcb/ams gather upper^\textit{P.390}, /tcb/ams gather lower^\textit{P.390}, /tcb/ams gather^\textit{P.390} are (partially) setting (overwritting) the keys /tcb/before upper^\textit{P.70}, /tcb/after upper^\textit{P.71}, /tcb/before lower^\textit{P.72}, /tcb/after lower^\textit{P.73}. Therefore, e.g. \texttt{\tcbset{ams gather,before upper={\text{Pythagoras:}}}} produces an invalid result. For this case, you are invited to use \texttt{\tcbset{ams gather,before upper app={\text{Pythagoras:}}}}, see /tcb/before upper app^\textit{P.467}.
Applies a predefined style \( \langle \text{name} \rangle \) to the theorem environment. Some of the feasible \( \langle \text{name} \rangle \) values resemble style names from the packages \texttt{theorem} and \texttt{ntheorem} to give convenient access to known patterns.

The styles alter \texttt{/tcb/separatorenvironment} \texttt{P.379}, \texttt{/tcb/description} \texttt{P.380}, \texttt{/tcb/terminatorenvironment} \texttt{P.381}, and more. Therefore, one should apply such keys \textit{after} a theorem style.

For the following examples, we use:

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{theorem}{Theorem}{
  fonttitle=\bfseries\upshape,fontupper=\itshape,
  colframe=green!50!black,colback=green!10!white,
  colbacktitle=green!20!white, coltitle=blue!75!black}{theo}
\end{verbatim}

The predefined styles are:
- \texttt{standard}: This is the initial value.
- \texttt{change standard}
- \texttt{plain}

\begin{verbatim}
\begin{theorem}{standard}{standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{verbatim}

\begin{verbatim}
\begin{theorem}{change standard}{change standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{verbatim}

\begin{verbatim}
\begin{theorem}{plain}{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{verbatim}
<table>
<thead>
<tr>
<th>Break</th>
<th>Theorem 18.29 (break):</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my theorem.</td>
<td>$a^2 + b^2 = c^2$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plain Apart</th>
<th>Theorem 18.30 (plain apart)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my theorem.</td>
<td>$a^2 + b^2 = c^2$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change</th>
<th>18.31 Theorem (change):</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my theorem.</td>
<td>$a^2 + b^2 = c^2$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change Break</th>
<th>18.32 Theorem (change break):</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my theorem.</td>
<td>$a^2 + b^2 = c^2$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change Apart</th>
<th>18.33 Theorem (change apart)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my theorem.</td>
<td>$a^2 + b^2 = c^2$.</td>
</tr>
</tbody>
</table>
• margin

\begin{theorem}[theorem style=margin,left=10mm]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

\begin{theorem}[theorem style=margin,left=10mm,oversize]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.34 Theorem (margin): This is my theorem.
\[ a^2 + b^2 = c^2. \]

18.35 Theorem (margin): This is my theorem.
\[ a^2 + b^2 = c^2. \]

• margin break

\begin{theorem}[theorem style=margin break,left=10mm]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

\begin{theorem}[theorem style=margin break,left=10mm,oversize]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.36 Theorem (margin break):
This is my theorem.
\[ a^2 + b^2 = c^2. \]

18.37 Theorem (margin break):
This is my theorem.
\[ a^2 + b^2 = c^2. \]

• margin apart

\begin{theorem}[theorem style=margin apart,left=10mm]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

\begin{theorem}[theorem style=margin apart,left=10mm,oversize]
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{theorem}

18.38 Theorem (margin apart)
This is my theorem.
\[ a^2 + b^2 = c^2. \]

18.39 Theorem (margin apart)
This is my theorem.
\[ a^2 + b^2 = c^2. \]
18.3 Examples for Definitions and Theorems

In the following, the application of \newtcbtheorem\textsuperscript{P.375} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional \texttt{tcb} keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the \texttt{cleveref} package \cite{5} is used for clever references.

\begin{verbatim}
Definition in the preamble:
% \usepackage{cleveref}
\tcbsset{
  defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
                   arc=0mm, colback=blue!5!white,colframe=blue!75!black},
  theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
                   colback=red!10!white,colframe=red!75!black},
}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]{Definition}{Definition}{defstyle}{def}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]{Theorem}{Theorem}{theostyle}{theo}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]{Corollary}{Corollary}{theostyle}{cor}
\end{verbatim}

By \newtcbtheorem\textsuperscript{P.375}, commonly numbered theorem environments are created now. \texttt{defstyle} and \texttt{theostyle} are used for the appearance.

Now, everything is prepared for the following examples.

The following theorem is numbered as \Cref{theo:diffbarstetig} and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to \mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}

The following theorem is numbered as Theorem 18.3.1 and referenced with the marker \texttt{theo:diffbarstetig}.

\textbf{Theorem 18.3.1:} Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist

\begin{flushleft}
Eine Funktion $f:I \to \mathbb{R}$ ist in $x_0 \in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{flushleft}
Die folgende Definition ist numeriert als \Cref{def:diffbarkeit} und referenziert mit dem Marker \texttt{def:diffbarkeit}.

\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
Eine Funktion \( f: I \to \mathbb{R} \) auf einem Intervall \( I \) heißt in \( x_0 \in I \) differenzierbar oder linear approximierbar, wenn der Grenzwert
\[
\lim_{x \to x_0} \frac{f(x) - f(x_0)}{x - x_0} = \lim_{h \to 0} \frac{f(x_0 + h) - f(x_0)}{h}
\]
einstellt. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von \( f \) in \( x_0 \) und man schreibt für ihn
\[
f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).
\]
\end{Definition}

The following corollary is numbered as \Cref{cor:nullstellen} and referenced with the marker \texttt{cor:nullstellen}.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist \( f: [a,b] \to \mathbb{R} \) stetig und haben \( f(a) \) und \( f(b) \) entgegengesetzte Vorzeichen, also \( f(a)f(b) < 0 \), so besitzt \( f \) eine Nullstelle \( x_0 \in ]a,b[ \), also \( f(x_0) = 0 \).
\end{Corollary}
Theorem 18.3.4: Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $\[a,b\]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in \[a,b\]$ und $f'''(x_0) \neq 0$, so ist $(x_0,f(x_0))$ ein Wendepunkt von $f$.

Theorem 18.3.5 (Mittelwertsatz für $n$ Variable)

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0)$$

Here, \texttt{cleveref} support is used to reference \Cref{theo:meanvaluetheorem} on Page 397. This theorem can also be referenced by \texttt{\Vref} resulting in Theorem 18.3.5.
Here, using \Vref\ resulting in \Vref{theo:meanvaluetheorem} is more interesting...

Here, using \Vref\ resulting in Theorem 18.3.5 on the preceding page is more interesting...

\begin{YetAnotherTheorem}{Mittelwertsatz f"{u}r $n$ Variable}{mittelwertsatz_n2}
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)
\]
\end{YetAnotherTheorem}

18.3.6 Theorem (Mittelwertsatz für $n$ Variable)

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$, so dass gilt

\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)
\]

\begin{YetAnotherTheorem}{Mittelwertsatz für $n$ Variable}{mittelwertsatz_n3}
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)
\]
\end{YetAnotherTheorem}

Theorem 18.3.7: Mittelwertsatz für $n$ Variable

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subset D$ einen Punkt $\xi \in [x_0,x]$, so dass gilt

\[
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)
\]
Theorem 18.3.8: Fundamental Theorem of Theorems


Let’s try a more conservative approach:

Theorem 18.3.9 (Mittelwertsatz für \( n \) Variable): Es sei \( n \in \mathbb{N} \), \( D \subseteq \mathbb{R}^n \) eine offene Menge und \( f \in C^1(D, \mathbb{R}) \). Dann gibt es auf jeder Strecke \([x_0, x] \subseteq D\) einen Punkt \( \xi \in [x_0, x] \), so dass gilt

\[
f(x) - f(x_0) = \operatorname{grad} f(\xi) \cdot (x - x_0)
\]
### 18.4 Using other theorem environments with \texttt{tcolorbox}

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a \texttt{tcolorbox}.

Environments may be created e.g. by methods from the \texttt{theorem} package or the \texttt{amsthm} package. \texttt{\colorbox{environment}} \textsuperscript{P. 22} can be used to put a box around these environments.

\begin{center}
\begin{minipage}{0.9\textwidth}
\textbf{Definition in the preamble:}
\begin{verbatim}
\usepackage{amsthm}
\theoremstyle{plain}\% from `amsthm'
\newtheorem{lem}{Lemma}\% from `amsthm'
\colorbox{environment}{lem}{
  enhanced jigsaw, colframe=cyan, interior hidden,
  breakable, before skip=10pt, after skip=10pt}
\colorbox{environment}{proof}\% `proof' from `amsthm'
  blanker, breakable, left=5mm,
  before skip=10pt, after skip=10pt,
  borderline west={1mm}{0pt}{red}
\begin{lem}
\lipsum[2]
\end{lem}
\lipsum[3]
\begin{proof}
\lipsum*[4]
\end{proof}
\end{verbatim}
\end{minipage}
\end{center}


400
The library is loaded by a package option or inside the preamble by:

```latex
\tcbuselibrary{breakable}
```

This also loads the package `pdftex`.

## 19.1 Technical Overview

The library \texttt{breakable} supports the automatic breaking of a \texttt{tcolorbox}. This feature is enabled by `/tcb/breakable` \textsuperscript{P.403} and disabled by `/tcb/unbreakable` \textsuperscript{P.404}.

If a \texttt{tcolorbox} is set to be `/tcb/breakable` \textsuperscript{P.403}, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.

### Unbroken Box

The box.

3. Otherwise, it is checked if at least `/tcb/lines before break` \textsuperscript{P.404} of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.

4. Now, the \textit{break sequence} starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{first part} of the \textit{break sequence} and shipped out.

### Broken Box

The box.

5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.

6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{middle part} of the \textit{break sequence} and shipped out. Then, the algorithm goes back to Step 5.

### Middle Box

The box.

7. The remaining part is named \textit{last part} of the \textit{break sequence} and shipped out. The algorithm stops.

### Last Box

The box.

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least `/tcb/lines before break` \textsuperscript{P.404}.
In principle, all boxes of the *break sequence* share the same geometric parameters. The differences are:

- The given `/tcb/before`\(^{P.86}\) and `/tcb/after`\(^{P.86}\) values are used only before the *first* and after the *last* part of the *break sequence*.

- A special behavior between the parts of the *break sequence* can be given by `/tcb/toprule at break`\(^{P.408}\), `/tcb/bottomrule at break`\(^{P.408}\), `/tcb/enlarge top at break`\(^{P.94}\), and `/tcb/enlarge bottom at break`\(^{P.94}\).

- The `/tcb/skin`\(^{P.150}\) decides how the *first*, *middle*, and *last* part look like. Actually, every part type has its own skin given by the options `/tcb/skin first`\(^{P.150}\), `/tcb/skin middle`\(^{P.150}\), and `/tcb/skin last`\(^{P.150}\). Typically, these options are set automatically by the main skin, see Subsection 19.8 from page 417.

### 19.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable `tcolorbox`es is about 65536pt (ca. 2300 cm) apiece. If such a part gets longer, the output will get buggy without warning. For very oversized boxes which are longer than 65536pt, use the `unlimited` value for `/tcb/breakable`\(^{P.403}\). With the `unlimited` setting, the applied algorithm has (virtually) no height limit for boxes, but very likely the compiler memory will have to be increased for boxes longer than 300 pages (depending on compiler settings and box content). But it is recommended to use `unlimited` for critical large boxes only.

- You can nest an unbreakable `tcolorbox` inside another `tcolorbox`, even inside a breakable one. But you cannot nest a breakable box inside a breakable box. The `/tcb/breakable`\(^{P.403}\) key for a nested box is ignored automatically\(^3\), i.e. inner boxes are always unbreakable.

After all, in the unlikely case you really want to have the nested box to be breakable, use `/tcb/enforce breakable`\(^{P.404}\) for the nested box\(^4\). **But, a breakable box inside a breakable box will usually give a mess.**

- Depending on the E\(\LaTeX\) engine, if your text content contains some text color changing commands, your color may not survive the break to the next box. See the documentation for `/tcb/use color stack`\(^{P.406}\) for more information.

- The `perpage` option of the `footmisc` package is deliberately deactivated inside a breakable box since all footnotes are placed at the end of the box (possibly far away from the reference point).

- Making a box `/tcb/breakable`\(^{P.403}\) which actually is not broken creates a box which acts *almost* like an unbreakable box. Visual differences are kept as indiscernible as possible, but can appear with certain `/tcb/before`\(^{P.86}\) and `/tcb/after`\(^{P.86}\) settings, especially, if there is an automatic page break before the box.

- Lua\(\LaTeX\) version 0.95 changes the behavior of the basic `\vsplit` (a bug?) resulting in badly broken boxes. Thanks to Jeremy Engel, the `\[\text{\texttt{breakable}}\]` library contains a patch for this which also loads the the `ifluatex` package.

---

\(^3\)Until `tcolorbox` 3.04, the `/tcb/breakable`\(^{P.403}\) key was not ignored for nested boxes.

\(^4\) `/tcb/enforce breakable`\(^{P.404}\) acts like `/tcb/breakable`\(^{P.403}\) until `tcolorbox` 3.04.
19.3 Main Option Keys

\texttt{/tcb/breakable=\texttt{true|false|unlimited}} \hspace{1cm} (default \texttt{true}, initially \texttt{false})

Allows the \texttt{tcolorbox} to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next page. All sorts of \texttt{tcolorbox} can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use \texttt{/tcb/enhanced} \textsuperscript{P.227} for breaking a box. The parts of the \textit{break sequence} are numbered by the counter \texttt{tcbbreakpart}.

- \texttt{false}: Sets the \texttt{tcolorbox} to be unbreakable.
- \texttt{true}: Breaks the \texttt{tcolorbox} from one page to another. The maximal total height of the upper and of the lower part is about 65536pt (ca. 2300cm or ca. 90 pages) apiece.
- \texttt{unlimited}: Experimental code for unlimited total height of breakable boxes. For boxes longer than 300 pages (or even shorter ones) the compiler memory will have to be increased.

\begin{verbatim}
% \usepackage{lipsum} % preamble
\tcbset{enhanced jigsaw, colback=red!5!white, colframe=red!75!black, 
       watermark color=yellow!25!white, watermark text=\arabic{tcbbreakpart}, 
       fonttitle=\bfseries}
\begin{tcolorbox}[breakable, title=My breakable box]
\lipsum[1-6]
\end{tcolorbox}
\end{verbatim}

My breakable box


/tcb/unbreakable (no value, initially set)

Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable (no value)

A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using /tcb/breakable→P.403 on such an inner box has no effect. If one really wants the inner box to be breakable, use /tcb/enforce breakable. **This will usually give a mess of shattered boxes. You are advised to not use this option.**

Note that /tcb/enforce breakable has the functionality that /tcb/breakable→P.403 had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=(text) (no default, initially empty)

The /tcb/title→P.23 is used only for the first part of a break sequence. Use title after break to create a heading line with ⟨text⟩ as content for all following parts. Also see /tcb/extras title after break→P.411 for formatting the title text.

/tcb/notitle after break (no value, initially set)

Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=(text) (style, no default, initially unset)

Works like /tcb/adjusted title→P.23 but applied to /tcb/title after break.

/tcb/lines before break=(number) (no default, initially 2)

Assures that the given ⟨number⟩ of lines of the upper box part or the lower box part are placed before a break happens.
/tcb/break at=⟨length⟩/⟨length⟩/.../⟨length⟩

(no default, initially 0pt)

Defines break points at the given ⟨length⟩ values. The first ⟨length⟩ defines the (maximal) height of the first partial box, the second ⟨length⟩ defines the (maximal) height of the second partial box, and so on. The last ⟨length⟩ value is applied to all following partial boxes if any.

- Setting a ⟨length⟩ to Opt means that the naturally available space is used for breaking.
- Setting a ⟨length⟩ to a negative value means that the sum of this negative value and the naturally available space is used for breaking (boxes will shrink in height). Note that before version 4.10 negative values were treated like 0pt.

% \usepackage{multicol,lipsum}
\begin{multicols}{3}\footnotesize
Breakable boxes inside a \texttt{multicols} environment need special attendance. They are broken by default at \texttt{\texttheight}. The \texttt{break at} option can be used to insert better break points by hand.

\begin{tcolorbox}[enhanced jigsaw,size=small,vfill before first,
colframe=red,colback=yellow!10!white,before title=\raggedright,
title={Broken box inside a \texttt{multicols} environment},fonttitle=\bfseries, 
break at=3cm/6.3cm ]
\lipsum[1]
\end{tcolorbox}

\refKey{/tcb/height fixed for} may also be considered for \texttt{multicols} environments.
\end{multicols}

/tcb/enlargepage=⟨length⟩/⟨length⟩/.../⟨length⟩

(no default, initially 0pt)

Inserts a \texttt{\enlargethispage{⟨length⟩}} to the pages of the break sequence, i.e. allows one to enlarge (or shrink) partial boxes. The first ⟨length⟩ is applied to the first partial box, the second ⟨length⟩ is applied to the second partial box, and so on. The last ⟨length⟩ value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

\begin{tcolorbox}{breakable,\enlargepage=0mm/\baselineskip/2/\baselineskip/0mm,...}
The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

/tcb/height fixed for→ P 409

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box and again to the page of the first partial box. Insert a manual break to prevent this.

In general, \enlargepage should be used at the final stage of a document for fine-tuning only.
/tcb/enlargepage flexible=⟨length⟩ (no default, initially 0pt)

This allows an automated page enlargement for up to ⟨length⟩. The algorithm can use this to avoid breaking a box, if there is enough room after enlargement. Also, the last partial box of a break sequence may be enlarged to avoid further breaking.

Note that this potential enlargement is additive to settings of /tcb/enlargepage → P.405.
But /tcb/enlargepage flexible overwrites settings of /tcb/pad before break* → P.408 or /tcb/pad at break* → P.408.

% The following setting hinders orphan lines for the last partial box
/tcbset{enlargepage flexible=\baselineskip}

/tcb/compress page=⟨option⟩ (default all, initially baselineskip)

This option controls the space management on the page which contains the unbroken box or the first part of a break sequence. Feasible ⟨option⟩ values are:

- **all** (default value): All shrinkable glue on the page is potentially used for the unbroken box or the first part of a break sequence. Thus, all vertical spaces on the page will potentially be reduced to their minimal values.
- **baselineskip** (initial value): Shrinkable glue up to one \baselineskip on the page is potentially used for the unbroken box or the first part of a break sequence.
- **none**: The break algorithm respects the target size of the given glue values on the page. This was the initial value before version 3.34.

Note that the box content is not influenced by this option.

/tcb/shrink break goal=⟨length⟩ (no default, initially 0pt)

This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by ⟨length⟩ which may result in smaller boxes. Never use negative values. Usually, this option will never be needed at all.

/tcb/use color stack=true|false (default true, initially false)

Depending on the \LaTeX{} engine and loaded packages, if your text contains some color changing commands, your color may not survive the break to the next box. For some engines, there is support for additional color stacks which allow colors to survive breaks. Such an color stack can be activated by /tcb/use color stack with help of the pdfcol package. This can be done globally or per box.

Note that activating /tcb/use color stack inserts a color command with a \texttt{whatsit} at the begin of the upper part and of the lower part of a \texttt{tcolorbox} → P.12. This may add additional vertical space, e.g. if your box text starts with a list like \texttt{enumerate}!

- \texttt{pdfTEX}: color stacks supported.
- \texttt{LuaTEX}: color stacks supported, but you should consider loading the \texttt{luacolor} package instead which avoids the spacing problem.
- \texttt{XeTEX}: color stacks not supported (yet?). From hearsay, with the \texttt{fontspec} package, you may use \texttt{\textbackslash addfontfeatures\{Color=mycolor\}} to add a font color which survives the break.

If \texttt{pdfcol} cannot initialize an additional color stack for the used engine, /tcb/use color stack is silently ignored.
Breakable box without color stack.

- Some blue text.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, nisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspen-


More blue text.

Text after box.

We do again with /tcb/ use color stack → P.406. Observe the additional spacing at the begin of the box:

Breakable box with color stack.

- Some blue text.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, nisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspen-


More blue text.

Text after box.
Option Keys for the Break Appearance

\[\text{/tcb/toprule at break}=(\text{length})\] (no default, initially 0.5mm)

Sets the line width of the top rule to \(\text{length}\) if the box is \text{/tcb/breakable} \(\rightarrow\) P.403. In this case, it is applied to middle and last parts in a break sequence. Note that \text{/tcb/toprule} \(\rightarrow\) P.40 overwrites this value if used afterwards.

\[\text{/tcb/bottomrule at break}=(\text{length})\] (no default, initially 0.5mm)

Sets the line width of the bottom rule to \(\text{length}\) if the box is \text{/tcb/breakable} \(\rightarrow\) P.403. In this case, it is applied to first and middle parts in a break sequence. Note that \text{/tcb/bottomrule} \(\rightarrow\) P.40 overwrites this value if used afterwards.

\[\text{/tcb/topsep at break}=(\text{length})\] (no default, initially 0mm)

Additional vertical space of \(\text{length}\) which is added at the top of middle and last parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

\[\text{/tcb/bottomsep at break}=(\text{length})\] (no default, initially 0mm)

Additional vertical space of \(\text{length}\) which is added at the bottom of first and middle parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

\[\text{/tcb/pad before break}=(\text{length})\] (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the text content and before the break point to \(\text{length}\). This style sets \text{/tcb/toprule at break} to 0pt and changes \text{/tcb/topsep at break} as required. In general, it is not advisable to change this value if these parts end with a rule.

\[\text{/tcb/pad before break*}=(\text{length})\] (style, no default)

Sets \text{/tcb/pad before break} to \(\text{length}\) and \text{/tcb/enlargepage flexible} \(\rightarrow\) P.406 to an appropriate value such that empty closing frames are avoided.

\[\text{/tcb/pad after break}=(\text{length})\] (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the break point and before the text content to \(\text{length}\). This style sets \text{/tcb/bottomrule at break} to 0pt and changes \text{/tcb/bottomsep at break} as required. In general, it is not advisable to change this value if the first and middle parts in a break sequence end with a rule.

\[\text{/tcb/pad at break}=(\text{length})\] (style, no default, initially 3.5mm)

Abbreviation for setting \(\text{length}\) to \text{/tcb/pad before break} and \text{/tcb/pad after break}.

\[\text{/tcb/pad at break*}=(\text{length})\] (style, no default)

Sets \text{/tcb/pad at break} to \(\text{length}\) and \text{/tcb/enlargepage flexible} \(\rightarrow\) P.406 to an appropriate value such that empty closing frames are avoided.

\begin{tcboxed}[enhanced,jigsaw,breakable,pad at break*=0mm, title={For this box, the pad space at the break point is set to 0mm}]
\lipsum[1-2]
\end{tcboxed}

For this box, the pad space at the break point is set to 0mm


/tcb/pad at break \*P.408 or /tcb/pad at break\*P.408 should be used as very last option in an option list, because they adapt other settings.

Also see /tcb/enlarge top at break by \*P.94 and /tcb/enlarge bottom at break by \*P.94.

/tcb/height fixed for=(part) (no default, initially none)

When certain amount of space is available for a partial box of a break sequence, the partial box typically is smaller than this space (depending on the box content). For given (part)(s), the height can be set to all available space.

- none: Every partial tcolorbox is set with its natural height.
- first: The first partial box is set to a height which matches the available space.
- middle: All middle partial boxes are set to a height which matches the available space.
- last: The last partial box is set to a height which matches the available space.
- first and middle: The first and all middle partial boxes are set to a height which matches the available space.
- middle and last: All middle partial boxes and the last partial box are set to a height which matches the available space.
- all: All partial boxes are set to a height which matches the available space.

If the box keeps unbroken, this option is not applied. See /tcb/height \*P.58 for setting a fixed height for unbroken boxes. See /tcb/height fill \*P.61 for giving unbroken boxes maximum height.

/tcb/vfill before first=true|false (default true, initially false)

Inserts a \texttt{vfill} at the begin of the first partial box to move this partial box to the end of the current page. This may be used as an alternative to /tcb/height fixed for=first to get justified columns or pages. The \texttt{vfill} is not inserted, if the box gets not actually broken.

/tcb/segmentation at break=true|false (default true, initially true)

If a breakable box contains an upper part and a lower part and the break happens at the segmentation between both parts, then

- the segmentation line (or similar) is drawn as first element of the partial box containing the lower part, if /tcb/segmentation at break is set to be true.
- the segmentation line (or similar) is not drawn at all, if /tcb/segmentation at break is set to be false. This may be preferable for skins like bicolor*P.239, tile*P.250, or beamer*P.254.
19.5 Extra Options for Partial Boxes

/tcb/extras={⟨options⟩} (no default, initially unset)

Adds \texttt{tcolorbox} \langle options \rangle to every box of a \texttt{break sequence} after skin settings are done. This is quite late in box processing. Geometry and break settings should not be used here, because they will either be ignored or have unexpected negative results. But it is possible to change most colors, skin effects, shadows, borders, frame code, etc. Note that using \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly. Usually, \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly.

/tcb/no extras (style, no default, initially set)

Removes all extras if set before.

/tcb/extras broken={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.403} and is broken actually, then the \langle options \rangle are added to every box of the \texttt{break sequence}. \texttt{/tcb/extras} overwrites this key.

/tcb/extras unbroken={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.403} but is not broken actually or if the box is set to be \texttt{/tcb/unbreakable} \textsuperscript{P.404}, then the \langle options \rangle are added to the box. \texttt{/tcb/extras} overwrites this key.

/tcb/no extras unbroken (style, no default, initially set)

Removes the unbroken extras if set before.

/tcb/extras first={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.403} and is broken actually, then the \langle options \rangle are added to the first box of the break sequence. \texttt{/tcb/extras} overwrites this key.

/tcb/no extras first (style, no default, initially set)

Removes the first extras if set before.

/tcb/extras middle={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.403} and is broken actually, then the \langle options \rangle are added to every middle box (if any) of the break sequence. \texttt{/tcb/extras} overwrites this key.

/tcb/no extras middle (style, no default, initially set)

Removes the middle extras if set before.

/tcb/extras last={⟨options⟩} (no default, initially unset)

If the box is set to be \texttt{/tcb/breakable} \textsuperscript{P.403} and is broken actually, then the \langle options \rangle are added to the last box of the break sequence. \texttt{/tcb/extras} overwrites this key.

/tcb/no extras last (style, no default, initially set)

Removes the last extras if set before.

/tcb/extras unbroken and first={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras first} together. \texttt{/tcb/extras} overwrites this key.

/tcb/extras middle and last={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras middle} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.

/tcb/extras unbroken and last={⟨options⟩} (no default, initially unset)

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras last} together. \texttt{/tcb/extras} overwrites this key.
/tcb/extras first and middle\{(options)\} (no default, initially unset)

This is an abbreviation for setting /tcb/extras first\textsuperscript{10} and /tcb/extras middle\textsuperscript{10} together. /tcb/extras\textsuperscript{10} overwrites this key.

/tcb/extras title after break\{(options)\} (no default, initially unset)

If the box has a /tcb/title after break\textsuperscript{10}, then the \{(options)\} are added for all titles after the first break, i.e. all middle and last. The color, font, and alignment of titles after break can be adapted choosing \{(options)\}, e.g. by /tcb/coltitle\textsuperscript{10}, /tcb/fonttitle\textsuperscript{10}, /tcb/halign title\textsuperscript{10}. Note that /tcb/colbacktitle\textsuperscript{10} has to be placed into /tcb/extras middle and last\textsuperscript{10}.

/tcb/no extras title after break (style, no default, initially set)

Removes the title after break extras if set before.

19.6 Breakable boxes and the multicol package

With version 4.10, the algorithm for detecting the available height for a \texttt{tcolorbox} inside a \texttt{multicol} environment was improved with help of Frank Mittelbach. This change may impact existing user code which may have to be adapted.

Unbreakable \texttt{tcolorbox}es can be used without special care inside a \texttt{multicols} environment from the \texttt{multicol} package \cite{multicol}.

Since version 3.10, a breakable \texttt{tcolorbox} detects, if it is used inside a \texttt{multicols} environment. But choosing break points for a breakable box cannot be done by the balancing routine of \texttt{multicols}. By default, boxes will break at maximum column height. To get pleasant results, use the \texttt{/tcb/break at $^\text{P.405}$} and \texttt{/tcb/height fixed for $^\text{P.409}$} options.

```latex
% \usepackage{lipsum,multicol} % preamble
\footnotesize
\begin{multicols}{2}
\lipsum[1]
\begin{tcolorbox}[enhanced jigsaw,breakable,size=title,
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=My breakable box,pad at break=1mm, break at=-\baselineskip/0pt ]
\lipsum[2-4]
\end{tcolorbox}
\lipsum[4]
\end{multicols}
```


My breakable box


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy


This example is already set inside a `multicol` environment. This time, a `middle` part has full column height (here \texttt{\textbackslash textheight}). \texttt{/tcb/height fixed for=\texttt{\textbackslash Ph.\texttt{409}}} is used to spread this box part over the full height to align with neighboring columns.

My breakable box


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristi- que, libero. Vivamus viverra fermentum felis.


quia dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.


The following example has a \texttt{tcolorbox} which fills the \texttt{multicols} environment completely. Here, \texttt{/tcb/height fixed for} \footnote{P.409} is used to give all three columns the full height. Note that the appropriate \texttt{/tcb/break at} \footnote{P.405} value is not computed automatically but set manually.

\begin{verbatim}
\% \usepackage{lipsum,multicol} \% preamble
\small
\begin{multicols}{3}
\begin{tcolorbox}[enhanced jigsaw,breakable,size=small,
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=My breakable box,pad at break=2mm,drop fuzzy shadow,
  height fixed for=all, break at=11.4cm ]
\lipsum[1-3]
\end{tcolorbox}
\end{multicols}
\end{verbatim}

My breakable box


415
19.7 Break Point Insertion

\texttt{\textbackslash tcbbreak}

A \textit{breakable} box is not broken, if there is enough space on the current page or column. Therefore, typical penalty insertion with \texttt{\textbackslash break}, \texttt{\textbackslash pagebreak}, \texttt{\textbackslash columnbreak}, \ldots may only work as expected, if the box is broken at least into two parts \textit{without} inserting the penalties.

To \textit{force} a page or column break, \texttt{\textbackslash tcbbreak} starts a new paragraph and inserts an insane tall rule which causes a break and which is immediately discarded. You may ignore this technical information and just use it as you would use \texttt{\textbackslash pagebreak}.

For an \textit{unbreakable box}, \texttt{\textbackslash tcbbreak} is identical to insert \texttt{\textbackslash par}, i.e. it just starts a new paragraph.

Also see \texttt{/tcb/break} at $P.405$ for defining height dependend breaks.

% \usepackage{lipsum,multicol} % preamble
\begin{multicols}{3}
\begin{tcolorbox}[breakable,enhanced jigsaw,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=Break into parts]
\end{tcolorbox}
\end{multicols}

\begin{multicols}{3}
\begin{tcolorbox}[enhanced jigsaw,size=small, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=You shall not break]
\end{tcolorbox}
\end{multicols}
19.8 Break Sequence for the Skins

The following diagrams document the break sequence for different skins. Depending on the main skin of a \texttt{tcolorbox}, the actual skins of the break sequence parts are displayed.

Unbroken Box
\begin{itemize}
\item skin=standard
\end{itemize}

Broken Boxes
\begin{itemize}
\item skin=standard
\item skin=standard
\item skin=standard
\end{itemize}

Unbroken Box
\begin{itemize}
\item skin=standard jigsaw
\end{itemize}

Broken Boxes
\begin{itemize}
\item skin=standard jigsaw
\item skin=standard jigsaw
\item skin=standard jigsaw
\end{itemize}

Unbroken Box
\begin{itemize}
\item skin=spartan
\end{itemize}

Broken Boxes
\begin{itemize}
\item skin=spartan
\item skin=spartan
\item skin=spartan
\end{itemize}
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhanced</td>
<td>skin=enhancedfirst</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedfirst</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhancedmiddle</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
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<td></td>
<td>skin=enhancedmiddle</td>
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<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
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<tbody>
<tr>
<td>skin=enhancedlast</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhancedfirst jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhancedmiddle jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
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<td>skin=enhancedmiddle jigsaw</td>
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<td>skin=enhancedmiddle jigsaw</td>
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<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhancedlast jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
<tr>
<td>Skin Status</td>
<td>First</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>skin=empty</td>
<td>skin=emptyfirst</td>
</tr>
<tr>
<td>skin=emptyfirst</td>
<td>skin=emptyfirst</td>
</tr>
<tr>
<td>skin=emptymiddle</td>
<td>skin=emptymiddle</td>
</tr>
<tr>
<td>skin=emptylast</td>
<td>skin=emptymiddle</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>skin=bicolor</td>
<td></td>
</tr>
<tr>
<td>skin=bicolorfirst</td>
<td></td>
</tr>
<tr>
<td>skin=bicolormiddle</td>
<td></td>
</tr>
<tr>
<td>skin=bicolorlast</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
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</thead>
<tbody>
<tr>
<td>skin=bicolorfirst</td>
<td></td>
</tr>
<tr>
<td>skin=bicolormiddle</td>
<td></td>
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<tr>
<td>skin=bicolormiddle</td>
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<thead>
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<th>Unbroken Box</th>
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<tbody>
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<td>skin=bicolormiddle</td>
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<tr>
<td>skin=bicolormiddle</td>
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<tr>
<td>skin=bicolormiddle</td>
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<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
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</thead>
<tbody>
<tr>
<td>skin=bicolorlast</td>
<td></td>
</tr>
<tr>
<td>skin=bicolormiddle</td>
<td></td>
</tr>
<tr>
<td>skin=bicolorlast</td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=bicolor jigsaw</td>
<td>skin=bicolorfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=bicolorlast jigsaw</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=bicolorfirst jigsaw</td>
<td>skin=bicolorfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=bicolormiddle jigsaw</td>
<td>skin=bicolormiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
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<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=bicolorlast jigsaw</td>
<td>skin=bicolormiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle jigsaw</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>skin=beamer</td>
<td>skin=beamerfirst</td>
</tr>
<tr>
<td></td>
<td>skin=beamermiddle</td>
</tr>
<tr>
<td></td>
<td>skin=beamerlast</td>
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<tr>
<td></td>
<td>skin=beamermiddle</td>
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<td></td>
<td>skin=beamermiddle</td>
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<td>skin=beamerlast</td>
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<td></td>
<td>skin=beamermiddle</td>
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<tr>
<td></td>
<td>skin=beamerlast</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=widget</td>
<td>skin=widgetfirst</td>
</tr>
<tr>
<td></td>
<td>skin=widgetmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=widgetlast</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>skin=widgetfirst</td>
<td>skin=widgetfirst</td>
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<tr>
<td>skin=widgetmiddle</td>
<td>skin=widgetmiddle</td>
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<tr>
<td>skin=widgetmiddle</td>
<td>skin=widgetmiddle</td>
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<td></td>
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<td>skin=widgetmiddle</td>
<td>skin=widgetmiddle</td>
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<td>skin=widgetmiddle</td>
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<td></td>
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<tr>
<td>skin=widgetlast</td>
<td>skin=widgetmiddle</td>
</tr>
<tr>
<td>skin=widgetmiddle</td>
<td></td>
</tr>
<tr>
<td>skin=widgetlast</td>
<td></td>
</tr>
</tbody>
</table>

**Frame Dimensions**

- Unbroken Box: w=199.16928pt, h=108.12054pt
- Broken Boxes: w=199.16928pt, h=39.83368pt

**Upper Dimensions**

- Unbroken Box: w=167.87134pt, h=73.43599pt
- Broken Boxes: w=167.87134pt, h=5.14912pt

**Interior Dimensions**

- Unbroken Box: w=196.32404pt, h=90.50758pt
- Broken Boxes: w=196.32404pt, h=25.6075pt

**Frame**

- Unbroken Box: w=196.52494pt, h=90.9758pt
- Broken Boxes: w=196.52494pt, h=25.6075pt
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelance</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancefirst</td>
<td>skin=freelancefirst</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancemiddle</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=freelancelast</td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancemiddle</td>
</tr>
<tr>
<td></td>
<td>skin=freelancelast</td>
</tr>
</tbody>
</table>
19.9 Break by Hand (Faked Break)

See Section 19.6 on page 413 for real column breaks.

Since the appearance of broken boxes is done by skins, it is quite easy to ‘fake a break’. For this, you actually don’t need the \texttt{breakable} library at all.

\begin{tcolorbox}[title=My broken box, skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}\hfill
\begin{tcolorbox}[skin=enhancedmiddle]
column. I am sorry to say that this is a trick. Nevertheless, you may use this trick for your
\end{tcolorbox}\hfill
\begin{tcolorbox}[skin=enhancedlast]
own purposes.
\end{tcolorbox}
The main purpose of this library is to store a \texttt{tcolorbox} into an array of box registers for later usage.

If the \texttt{tcolorbox} is not breakable, there is not much add-on compared to usual \LaTeX\ box storage and usage (and you do not really need this library for that use case). For a breakable \texttt{tcolorbox}, this library allows to capture all partial boxes into a sequence of registers. The partial boxes can be used anywhere in arbitrary order.

The name of this library indicates \textit{magazine} in the sense of storage, but also in the sense of a journal where an article often is continued on page \textit{x}. An example for this kind of application is given throughout this section starting on the right hand side. The creation of this library was motivated by Ulrike Fischer and Steven B. Segletes.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{magazine}
\end{verbatim}

This also loads the library \texttt{breakable}, see Section 19 on page 401.

The box register operations of this library are global. \LaTeX\ grouping will not clear the registers when leaving the current group. Also be aware that extensive use of large box arrays may eat up \LaTeX\’s available memory and registers.

\subsection*{20.1 Creation and Resetting of Box Arrays}

\begin{verbatim}
\newboxarray{(name)}
\end{verbatim}

This creates a new box array called \texttt{(name)}. There already is a box array available with name \texttt{default} which can be used directly. Note that the creation is a global operation.

\begin{verbatim}
\newboxarray{myarray}
\end{verbatim}

\begin{verbatim}
\boxarrayreset[(name)]
\end{verbatim}

Resets the size counter of a box array \texttt{(name)} to zero. If \texttt{(name)} is not provided, \texttt{default} is used as name. Use this or \texttt{/tcb/reset box array} before you apply \texttt{/tcb/store to box array}. Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

\begin{verbatim}
\boxarrayreset % resets \texttt{default}'
\boxarrayreset{myarray} % resets \texttt{myarray}'
\end{verbatim}

\begin{verbatim}
/tcb/reset box array=(name)\texttt{(default default, initially unset)}
\end{verbatim}

Resets the size counter of a box array \texttt{(name)} to zero. Use this or \texttt{\boxarrayreset} (which does the same) before you apply \texttt{/tcb/store to box array}.

\begin{verbatim}
/tcbset{
  reset box array, % resets \texttt{default}'
  reset box array=myarray, % resets \texttt{myarray}'
}
\end{verbatim}
\texttt{\textbackslash boxarrayclear[(name)]}

Works like \texttt{\textbackslash boxarrayreset} \footnote{P.428} to reset the size counter of a box array \texttt{(name)} to zero. Additionally, all allocated box registers of the box array are cleared of their content. Note that the allocated box registers stay allocated. So, this may be useful to clear memory, but not to free registers for other applications. If \texttt{\textbackslash consumeboxarray} \footnote{P.432} or \texttt{\textbackslash consumetcboxarray} \footnote{P.432} was used to apply the stored boxes, there is no advantage in using \texttt{\textbackslash boxarrayclear}.

\begin{verbatim}
\boxarrayclear % clears ‘default’
\boxarrayclear{myarray} % clears ‘myarray’
\end{verbatim}

20.2 Storing Content

\texttt{\textbackslash tcb@store to box array=(name)} \footnote{(default default, initially unset)}

Stores a \texttt{tcolorbox} or all parts of a break sequence of a \texttt{tcolorbox} into a box array \texttt{(name)}. If no \texttt{(name)} is given, the already existing \texttt{default} box array is used. Otherwise, the box array has to be created beforehand with \texttt{\textbackslash newboxarray} \footnote{P.428}. Note that the box has to be \texttt{\textbackslash tcb/breakable} \footnote{P.403}, if the box shall break into several parts. Typically, manual break points are additionally defined by \texttt{\textbackslash tcb/break at} \footnote{P.405}. Otherwise, the box parts will have a length of about \texttt{\textheight}. For most use cases, a \texttt{\textbackslash tcb/reset box array} \footnote{P.428} should be applied to reset the box array counter.

\begin{verbatim}
\usepackage{lipsum}
\begin{tcolorbox}[enhanced jigsaw,size=fbox,width=4cm, colback=yellow!10,colframe=yellow!10!black, enforce breakable, ]% use only breakable in the real world!
break at=7cm/4cm, height fixed for=all, watermark text=\arabic{tcbbreakpart},
reset box array, store to box array
\]
\lipsum[1]
\end{tcolorbox}
\useboxarray{1}\hfill
\begin{tabular}{cc}
\multicolumn{2}{c}{\includegraphics[width=7cm]{Basilica_5.png}}
\useboxarray{2} & \useboxarray{3}
\end{tabular}
\end{verbatim}

tor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, male-
If the first box part should fill the rest of the available space of the current page, you can use `\text{\textbackslash pagegoal}\text{-}\text{\textbackslash pagetotal}` minus some distance for the first element of `/tcb/break at` → P.405. You may want to have some additional distance to the preceding text.

% \usepackage{lipsum}
\begin{tcolorbox}
[enhanced,breakable, reset box array, store to box array, break at=\text{\textbackslash pagegoal}\text{-}\text{\textbackslash pagetotal}-5mm/0pt, height fixed for=first and middle]
\lipsum[1-15]
\end{tcolorbox}
% \consumeboxarray{1}{blanker,before=\par\vfill\noindent}
\begin{tcolorbox}
[blanker,width=4cm, fontupper=\footnotesize, enforce breakable,\% use only breakable in the real world/ break at=4cm, height fixed for=all, watermark text=arabic\{tcbbreakpart\}, reset box array, store to box array]
\includegraphics[width=\linewidth]{Basilica_5.png}\par
\lipsum[1-2]
\end{tcolorbox}
\begin{tcbitemize}
[raster columns=3,raster equal height, size=small,halign=center,sharp corners,colback=blue!5]
\tcbitem\consumeboxarray{5}
\tcbitem\consumeboxarray{6}
\tcbitem\consumeboxarray{1}
\tcbitem\consumeboxarray{2}
\tcbitem\consumeboxarray{3}
\tcbitem\consumeboxarray{4}
\end{tcbitemize}

"Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam lacin..."

"Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam lacus..."
/tcb/reset and store to box array=⟨name⟩ (style, default default, initially unset)

Combination of /tcb/reset box array → P.428 and /tcb/store to box array → P.429.

/tcb/do not store to box array (style, no default, initially set)

Disables the /tcb/store to box array → P.429 option, if set before.

\begin{boxarraystore}{⟨name⟩}
⟨environment content⟩
\end{boxarraystore}

Stores the environment content into a box array ⟨name⟩. This corresponds to the standard \LaTeX environment \texttt{lrbox}, but the storage operation is global. As long as \texttt{\boxarrayreset} → P.428 is not used, every new \texttt{boxarraystore} adds a further box to the array.

\begin{verbatim}
\boxarrayreset
\begin{boxarraystore}{default}\fbox{Mary}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Had}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{a}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Little}\end{boxarraystore}
\begin{boxarraystore}{default}\fbox{Lamb}\end{boxarraystore}
\useboxarray{5}\useboxarray{4}\useboxarray{3}\useboxarray{2}\useboxarray{1}\hfill
\useboxarray{1}\useboxarray{5}
\end{verbatim}

20.3 Retrieving Content

\texttt{\boxarraygetsize}[⟨name⟩]{⟨macro⟩}

Stores the current size of a box array ⟨name⟩ into a given ⟨macro⟩. If no ⟨name⟩ is given, the already existing default box array is used.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \useboxarray{\n} }
\end{verbatim}

\texttt{\useboxarray}[⟨name⟩]{⟨index⟩}

Typesets the box with the given ⟨index⟩ number from the box array ⟨name⟩. If no ⟨name⟩ is given, the already existing default box array is used. It is considered an error, if a not existing box array ⟨name⟩ is used. It is silently ignored, if the ⟨index⟩ is out of range. Note that \texttt{\useboxarray} corresponds to the standard \texttt{\usebox} macro, respectively, \texttt{\copy}.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \useboxarray{\n} }
\end{verbatim}
\usetcboxarray\((name)\)\{\(index\)\}\{\(options\)\}

Typesets the box with the given \(index\) number from the box array \(name\) using \useboxarray \(\rightarrow\) P.431 as content of a \tcbox \(\rightarrow\) P.14. If no \(name\) is given, the already existing default box array is used. It is considered an error, if a not existing box array \(name\) is used. It is silently ignored, if the \(index\) is out of range. The \tcbox \(\rightarrow\) P.14 can be customized by tcolorbox \(options\).

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \usetcboxarray{\n}{on line,colframe=yellow, colback=yellow!10} }
\end{verbatim}

First run: Mary
Second run: Mary

\consumeboxarray\((name)\)\{\(index\)\}

Typesets the box with the given \(index\) number from the box array \(name\). If no \(name\) is given, the already existing default box array is used. It is considered an error, if a not existing box array \(name\) is used. It is silently ignored, if the \(index\) is out of range. In contrast to \useboxarray \(\rightarrow\) P.431, \consumeboxarray corresponds to the standard \box macro, i.e. after typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize{\mysize}
First run: \foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }
\par
Second run: \foreach \n in {1,...,\mysize} { \consumeboxarray{\n} }
\end{verbatim}

First run: Mary
Second run: Mary

\consumetcboxarray\((name)\)\{\(index\)\}\{\(options\)\}

Typesets the box with the given \(index\) number from the box array \(name\) using \consumetcboxarray as content of a \tcbox \(\rightarrow\) P.14. If no \(name\) is given, the already existing default box array is used. It is considered an error, if a not existing box array \(name\) is used. It is silently ignored, if the \(index\) is out of range. The \tcbox \(\rightarrow\) P.14 can be customized by tcolorbox \(options\). After typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize{\mysize}
\foreach \n in {1,...,\mysize} { \consumetcboxarray{\n} }
\end{verbatim}

First run: Mary
Second run: Mary

--- continued from page 431 ---

The linking texts like continued on page 431 are created by /tcb/finish \(\rightarrow\) P.215 commands for the embedding \tcbox \(\rightarrow\) P.14. To label the box parts, /tcb/phantomlabel \(\rightarrow\) P.110 is used.

These quite small partial boxes are --- continued on page 435 ---

Assigns the box with the given \langle index\rangle number from the box array \langle name\rangle to a \langle macro\rangle. If no \langle name\rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name\rangle is used. If the \langle index\rangle is out of range, the \langle macro\rangle will be undefined.

Tests the box with the given \langle index\rangle number from the box array \langle name\rangle for emptiness be empty and executes \langle true\rangle if it is empty, and \langle false\rangle otherwise. If no \langle name\rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name\rangle is used.
20.4 Box Dimensions

\boxarraygetwidth[(name)]{(macro)}{(index)}

Assigns the width of the box with the given \langle index \rangle number from the box array \langle name \rangle to a \langle macro \rangle. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. If the \langle index \rangle is out of range, the \langle macro \rangle will be set to 0pt.

\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & width of box 1: \boxarraygetwidth{\mylen}{1} \mylen \\
\useboxarray{2} & width of box 2: \boxarraygetwidth{\mylen}{2} \mylen
\end{tabular}

Test width of box 1: 30.35799pt
width of box 2: 0pt

\boxarraygetheight[(name)]{(macro)}{(index)}

Assigns the height of the box with the given \langle index \rangle number from the box array \langle name \rangle to a \langle macro \rangle. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. If the \langle index \rangle is out of range, the \langle macro \rangle will be set to 0pt.

\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & height of box 1: \boxarraygetheight{\mylen}{1} \mylen \\
\useboxarray{2} & height of box 2: \boxarraygetheight{\mylen}{2} \mylen
\end{tabular}

Test height of box 1: 9.89883pt
height of box 2: 0pt

\boxarraygetdepth[(name)]{(macro)}{(index)}

Assigns the depth of the box with the given \langle index \rangle number from the box array \langle name \rangle to a \langle macro \rangle. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. If the \langle index \rangle is out of range, the \langle macro \rangle will be set to 0pt.

\tcbox[size=small,colframe=blue!20,colback=yellow!5,on line, reset and store to box array]{Test}
\begin{tabular}{ll}
\useboxarray{1} & depth of box 1: \boxarraygetdepth{\mylen}{1} \mylen \\
\useboxarray{2} & depth of box 2: \boxarraygetdepth{\mylen}{2} \mylen
\end{tabular}

Test depth of box 1: 3.69884pt
depth of box 2: 0pt
Assigns the total height of the box with the given \(index\) number from the box array \(name\) to a \(macro\). If no \(name\) is given, the already existing default box array is used. It is considered an error, if a not existing box array \(name\) is used. If the \(index\) is out of range, the \(macro\) will be set to 0pt.

\(\textbf{boxarraygettotalheight}[\langle name\rangle][\langle macro\rangle][\langle index\rangle]\)

\(\texttt{boxarrayreset}\)
\(\texttt{tcbox[size=small,colframe=blue!20,colback=yellow!5, on line, store to box array]{Test}}\)

\begin{tabular}{ll}
\useboxarray{1} & \texttt{total height of box 1: } \texttt{boxarraygettotalheight}{\mylen}{1} \mylen \\
\useboxarray{2} & \texttt{total height of box 2: } \texttt{boxarraygettotalheight}{\mylen}{2} \mylen
\end{tabular}

\begin{tabular}{l}
\texttt{Test} \\
\texttt{total height of box 1: 13.59767pt} \\
\texttt{total height of box 2: 0pt}
\end{tabular}

— continued from page 432 —

for demonstration purposes. With the tools of this section, a magazine type document could be created, but this still needs a lot of manual control.
20.5 Leaflet Example

The following full application example can be used to create leaflets. Obviously, the code can be adapted and customized in many ways.

\documentclass[a4paper,landscape]{article}
\usepackage[noheadfoot,margin=0pt]{geometry}
\usepackage[skins,raster,magazine]{tcolorbox}
\usepackage{lipsum}
\newenvironment{leaflet}{[1][]{% 
\begin{tcolorbox}[nobeforeafter,empty,colback=white, sharp corners,size=minimal,left=10mm,right=10mm,top=10mm,bottom=10mm, width=\textwidth/3, breakable, break at=\textwidth, height fixed for=all, reset box array, store to box array,#1]}{\end{tcolorbox}]
\begin{tcbitemize}[raster columns=3,raster equal skip=0pt,blankest]
\tcbitem\consumeboxarray{5}
\tcbitem\consumeboxarray{6}
\tcbitem\consumeboxarray{1}
\tcbitem\consumeboxarray{2}
\tcbitem\consumeboxarray{3}
\tcbitem\consumeboxarray{4}
\end{tcbitemize}
}%}
\pagestyle{empty}
\begin{document}
\begin{leaflet}[underlay={\node[above=5mm,font=\footnotesize] at (frame.south) {- \arabic{tcbbreakpart} -};}]
\includegraphics[width=\linewidth]{Basilica_5.png}
\begin{center}
\bfseries\LARGE Example
\end{center}
\section{Introduction}
\lipsum[1]
\section{Main Part A}
\lipsum[2-8]
\section{Main Part B}
\lipsum[9-15]
\section{Conclusion}
\lipsum[16-18]
\end{leaflet}
\end{document}
Example

1 Introduction

Lorem ipsum dolor et amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing sed, diam. Curabitur elit neque, fringilla ut, vehicula ac, nunc.

2 Main Part

3 Main B Part


3 Main B Part

3 Main B Part

3 Main B Part

3 Main B Part


3 Main B Part

3 Main B Part

The main purpose of this library is to support creation of single page posters with \tcolorbox\es. A \texttt{tcbposter}\textsuperscript{P.\,439} is a \texttt{tikzpicture} where \texttt{tcolorbox}es can be placed in a column oriented manner using \texttt{\posterbox}\textsuperscript{P.\,444} commands. This base concept is more or less copied from the great \texttt{baposter} package.

The \texttt{raster} library, see Section 16 on page 308, can produce similar looking results and may be more appropriate depending on the actual project.

- The \texttt{raster} library has a flow oriented concept, just like a conventional text flow. The text flow (box flow) is a merely endless ribbon which gets broken into lines (and paragraphs) and the lines are broken into pages. \texttt{raster} shapes the boxes to convenient sizes to fill lines and pages in a pleasant way.

- The \texttt{tcbposter} library supports a quite free placement of boxes inside a page. Basically, boxes are placed like \texttt{nodes} are placed inside a \texttt{tikzpicture}. In contrast to \texttt{raster}, this is a \textit{single} page and not a flow of pages. The poster is divided into columns and rows. There is a more or less gentle force to use the columns (or spans of columns) for positioning and sizing while the row placement is completely optional.

The creation of this library was motivated by Ignasi.

> Inside a \texttt{tikzpicture} there should be no embedded \texttt{tikzpictures}. This rule is violated by the \texttt{poster} library. Be aware that there may be some unwanted interactions between the main \texttt{tikzpicture} and the embedded ones inside the \texttt{tcolorbox}es.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{poster}
\end{verbatim}

This also loads the libraries \texttt{skins}, see Section 10 on page 165, \texttt{breakable}, see Section 19 on page 401, \texttt{magazine}, see Section 20 on page 428, and \texttt{fitting}, see Section 22 on page 452.

### 21.1 Overview

You get the best overview of the \texttt{poster} library and its facilities, if you look at the \texttt{Poster Tutorial} which is part of the \texttt{tcolorbox} documentation:

\texttt{tcolorbox-tutorial-poster.pdf}
21.2 Main Poster Environment

\begin{tcbposter}{(options)}
\end{tcbposter}

This creates a \texttt{tikzpicture} environment with suitable additional settings defined by the given \texttt{(options)}. Basically, \texttt{posterbox} \cite{P.444} and \texttt{posterboxenv} \cite{P.444} are used to place \texttt{tcolorboxes} as nodes into the environment, but additional \LaTeX{} code can also be used. As \texttt{(options)} all \texttt{/tcb/posterset/} keys may be applied, namely:

- \texttt{/tcb/posterset/poster} \cite{P.441}: poster settings like columns, rows, sizes...
- \texttt{/tcb/posterset/coverage} \cite{P.442} and \texttt{/tcb/posterset/no coverage} \cite{P.442}: settings for a surrounding \texttt{tcolorbox} for background and margins.
- \texttt{/tcb/posterset/boxes} \cite{P.443}: style of the \texttt{tcolorboxes} used for the poster.
- \texttt{/tcb/posterset/fontsize} \cite{P.443}: scaling of used fonts.

\begin{tcbposter}[
    poster = {showframe,height=10cm,spacing=2mm},
    boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
]
\posterbox{name=A,column=3,row=2}{My first box}
\posterbox[adjusted title=Second box]{name=B,column=2,span=2,below=A}{My second box}
\posterbox[adjusted title=Third box]{name=C,column=2,between=B and bottom}{My third box}
\end{tcbposter}
Inside \texttt{tcbposter} \textsuperscript{\texttt{P.439}}, there are several predefined Ti\textit{k}Z nodes. These nodes share a common \texttt{/tcb/poster/prefix} \textsuperscript{\texttt{P.441}} which is \texttt{TCBPOSTER@} by default. This prefix is used to discriminate the poster nodes from local nodes of any embedded \texttt{tikzpicture} environment. You will never need this prefix using \texttt{\textbackslash posterbox} \textsuperscript{\texttt{P.444}} and its placement options, but if you want to refer to a predefined node using pure Ti\textit{k}Z code. The predefined nodes (shown without prefix) are:

- \texttt{poster}: defines the bounding box of the poster (without the coverage).
- \texttt{top}: top position plus row spacing
- \texttt{bottom}: bottom position minus row spacing
- \texttt{middle}: vertical middle position
- \texttt{col1}, \texttt{col2}, \ldots: bounding box of column 1, column 2, \ldots
- \texttt{row1}, \texttt{row2}, \ldots: bounding box of row 1, row 2, \ldots

Further nodes are defined using the \texttt{/tcb/posterloc/name} \textsuperscript{\texttt{P.445}} option.

\begin{verbatim}
Never use a \texttt{tcbposter} \textsuperscript{\texttt{P.439}} inside a \texttt{tcbposter} \textsuperscript{\texttt{P.439}}. But, if you do anyway, use a different \texttt{/tcb/poster/prefix} \textsuperscript{\texttt{P.441}} for the embedded poster or you surely get a total mess.
\end{verbatim}

There are several properties inside a \texttt{tcbposter} \textsuperscript{\texttt{P.439}} which may be useful for advanced code (skip the following on first reading):

- \texttt{\textbackslash tcbposterwidth}: Width of the poster (without margins).
- \texttt{\textbackslash tcbposterheight}: Height of the poster (without margins).
- \texttt{\textbackslash tcbpostercolspacing}: Column distance.
- \texttt{\textbackslash tcbposterrowspacing}: Row distance.
- \texttt{\textbackslash tcbpostercolumns}: Column quantity.
- \texttt{\textbackslash tcbposterrows}: Row quantity.
- \texttt{\textbackslash tcbpostercolwidth}: Width of a column.
- \texttt{\textbackslash tcbposterrowheight}: Height of a row.

\texttt{\textbackslash tcbposterset\{\texttt{\langle options\rangle}\}}

Sets options for every following \texttt{tcbposter} \textsuperscript{\texttt{P.439}} inside the current \texttt{\TeX} group. For example, the numbers for rows and columns may be defined for the whole document by this:

\begin{verbatim}
\texttt{\textbackslash \textbackslash tcbposterset\{\texttt{poster=\{columns=2,rows=3\}}\}}
\end{verbatim}

See \texttt{tcbposter} \textsuperscript{\texttt{P.439}} for all feasible options.
21.3 Poster Settings

This option can be applied inside `tcbposter`\textsuperscript{P.439} and \texttt{tcbposterset}\textsuperscript{P.440} to set the given poster \texttt{(option list)}, e.g.

\begin{verbatim}
\tcbposterset{width=20cm,height=15cm}
\end{verbatim}

For the \texttt{(option list)}, see the following keys.

Sets the \texttt{(number)} of columns for a \texttt{tcbposter}.

\begin{verbatim}
\begin{tcbposter}
  \[ poster = \{\text{showframe,columns=5,rows=2,spacing=1mm,\text{height}=4cm}\}, \]
\end{tcbposter}
\end{verbatim}

Sets \texttt{(number)} as distance between columns.

Sets \texttt{(length)} as distance between rows.

Sets \texttt{(length)} as distance between columns and rows.

Displays a red auxiliary mesh as optical support during poster creation. Also, every \texttt{/tcb/posterloc/name} is displayed.

Sets \texttt{(length)} as width of the poster. For a typical poster, this has not to be set manually. Especially, if \texttt{/tcb/posterset/coverage} is present, use \texttt{coverage=\{width=\text{(length)}\}} instead to change the overall width.

Sets \texttt{(length)} as height of the poster. For a typical poster, this has not to be set manually, but is set automatically to an appropriate value. If \texttt{/tcb/posterset/coverage} is present, use only one if any option \texttt{coverage=\{height=\text{(length)}\}} or \texttt{poster=\{height=\text{(length)}\}}.

\texttt{(name)} is set as prefix for any Ti\kZ node which is generated automatically by the \texttt{tcbposter} library. This encompasses predefined nodes like \texttt{top, bottom, ...}, and nodes defined by using \texttt{/tcb/posterloc/name}. Also, see Section 21.2 on page 439. For a typical poster, this value can stay as it is.
21.4 Coverage

\texttt{/tcb/posterset/coverage=\{(option list)\}} (style, no default)

This option can be applied inside \texttt{tcbposter}^{P.439} and \texttt{\tcbposterset}^{P.440} and it adds an optional coverage for the poster which is a surrounding \texttt{tcolorbox} with the given \texttt{(option list)}. Here, margins and background settings for the poster can be given. The \texttt{coverage} has several default \texttt{tcolorbox} settings suitable for the purpose:

\begin{quote}
\texttt{enhanced, frame hidden, sharp corners, boxsep=0pt, boxrule=0pt, top=4mm, bottom=4mm, left=4mm, right=4mm, toptitle=2mm, bottomtitle=2mm, colback=white}
\end{quote}

The \texttt{(option list)} can contain any \texttt{tcolorbox} option.

\begin{verbatim}
\begin{tcbposter}[ 
    poster = {showframe, spacing=1mm}, 
    coverage = \{height=5cm, 
        interior style={top color=yellow, bottom color=yellow!50!red}, 
        watermark text={My Poster}, watermark color=white, 
    \}, 
]\end{tcbposter}
\end{verbatim}

- For a typical poster, the option \texttt{/tcb/spread}^{P.99} will use the whole page for the poster coverage.
- Poster margins can be adapted by \texttt{/tcb/left}^{P.44}, \texttt{/tcb/right}^{P.45}, \texttt{/tcb/top}^{P.47}, \texttt{/tcb/bottom}^{P.48}.
- Poster background can be changed by \texttt{/tcb/colback}^{P.32}, \texttt{/tcb/interior style}^{P.166}, \texttt{/tcb/interior style image}^{P.167}, etc.
- Do not use \texttt{/tcb/poster/width}^{P.441} and \texttt{/tcb/poster/height}^{P.441} in combination with a \texttt{coverage}. Note that you may use \texttt{/tcb/width}^{P.39} and \texttt{/tcb/height}^{P.58} inside the \texttt{coverage} \texttt{(option list)}. Note that this also is not necessary when \texttt{/tcb/spread}^{P.99} is applied.

\texttt{/tcb/posterset/no coverage} (style, no value, initially set)

Removes the surrounding \texttt{tcolorbox} completely.

442
21.5 Common Box Settings

This option can be applied inside \texttt{tcbposter} and \texttt{tcbposterset} and it is used to set up the style of the \texttt{tcolorbox} inside the poster. The \texttt{⟨option list⟩} can contain any \texttt{tcolorbox} option, but box size options are not assumed to be useful here, because the size will be determined by the placement options.

\begin{tcbposter}
\begin{quote}
poster = \{spacing=2mm, columns=3, rows=2\},
coverage = \{height=5cm, 
interior style={top color=yellow, bottom color=yellow!50!red}, 
\},
boxes = \{sharp corners=downhill, arc=3mm, boxrule=1mm, 
colback=white, colframe=cyan, 
title style={left color=black, right color=cyan}, 
fonttitle=bfseries\}
\end{quote}
\end{tcbposter}

21.6 Font Scaling

This option can be applied inside \texttt{tcbposter} and \texttt{tcbposterset}. It uses \texttt{/tcb/fit basedim} and \texttt{/tcb/fit fontsize macros} to redefine \texttt{\normalsize} to \texttt{⟨length⟩} and all other standard font size macros like \texttt{\small} and \texttt{\large} accordingly. This needs a freely scalable font family like \texttt{lmodern} to work. If \texttt{/tcb/posterset/fontsize} is not applied, there standard font size macros are not changed in any way.

\begin{tcbposter}
\begin{quote}
poster = \{spacing=2mm, columns=3, rows=2\},
coverage = \{height=5cm, 
interior style={top color=yellow, bottom color=yellow!50!red}, 
\},
fontsize = 15pt, \% \texttt{\normalsize} is now 15pt
\end{quote}
\end{tcbposter}
21.7 Box Placement

\posterbox\{\textit{options}\}\{\textit{placement}\}\{\textit{box content}\}

Inside a \texttt{tcbposter}^{P.439} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \textit{options} and the given \textit{box content} at a place determined by \textit{placement}. All \textit{placement} options are described in the following. Note that \textit{box content} cannot contain \texttt{verbatim} material, see \texttt{posterboxenv}.

\begin{verbatim}
\begin{tcbposter}
\texttt{poster = \{showframe,height=4cm,spacing=2mm,rows=2\},}
\texttt{boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\},}
\end{tcbposter}
\end{verbatim}

\begin{verbatim}
\begin{posterboxenv}[\textit{options}]\{\textit{placement}\}\{\textit{environment content}\}
\end{posterboxenv}
\end{verbatim}

This is the environment version of \texttt{posterbox}, i.e. inside a \texttt{tcbposter}^{P.439} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \textit{options} and the given \textit{environment content} at a place determined by \textit{placement}. In contrast to \texttt{posterbox}, the \textit{environment content} is allowed to contain \texttt{verbatim} material. Note that the implementation of \texttt{posterbox} is more efficient than the implementation of \texttt{posterboxenv}.

\begin{verbatim}
\begin{tcbposter}
\texttt{poster = \{showframe,height=4cm,spacing=2mm,rows=2\},}
\texttt{boxes = \{size=small,beamer,}
\texttt{ \quad colframe=blue!50!black,colback=blue!50,colupper=yellow!50\},}
\end{tcbposter}
\end{verbatim}

\begin{verbatim}
\begin{posterboxenv}[\textit{title}=My title]\{\textit{name}=A,\textit{column}=2,\textit{row}=2\}\{My first box\}
\\begin{tcblisting}[\textit{size}=small,\textit{colback}=yellow!10]
My \textbf{first} poster listing.
\end{tcblisting}
\end{posterboxenv}
\end{verbatim}
Sets \( \langle \text{name} \rangle \) as reference for the current \texttt{posterbox} \p.444 or \texttt{posterboxenv} \p.444. A TikZ shape name is constructed automatically as combination of \texttt{/tcb/poster/prefix} \p.441 and \( \langle \text{name} \rangle \).

\begin{tcbposter}
\[\text{poster} = \{\text{showframe}, \text{height}=2.5\text{cm}, \text{spacing}=2\text{mm}, \text{rows}=2\},\]
\[\text{boxes} = \{\text{beamer}, \text{colframe}=\text{blue!50!black}, \text{colback}=\text{blue!50}, \text{colupper}=\text{yellow!50}\},\]
\]
\texttt{posterbox}\{\text{name=A, column=2, row=2}\}\{\text{My first box}\}
\texttt{node}\{\text{below right}=4\text{mm}, \text{fill}=\text{yellow}\}\{\text{X}\}\{\text{at (TCBPOSTER@poster.north west)}\}\{\text{Example A}\};
\texttt{draw}\{\text{blue, very thick, ->}\}\{\text{X} \mid \rightarrow \text{ (TCBPOSTER@A)}\};
\end{tcbposter}

\begin{tcbposter}
\[\text{poster} = \{\text{showframe}, \text{height}=2.5\text{cm}, \text{spacing}=2\text{mm}, \text{rows}=2\},\]
\[\text{boxes} = \{\text{beamer}, \text{colframe}=\text{blue!50!black}, \text{colback}=\text{blue!50}, \text{colupper}=\text{yellow!50}\},\]
\]
\texttt{posterbox}\{\text{row=1, column=2, span=2}\}\{\text{First box}\}
\texttt{posterbox}\{\text{row=2, column=2, span=0.8}\}\{\text{Second box}\}
\end{tcbposter}

\begin{tcbposter}
\[\text{poster} = \{\text{showframe}, \text{height}=2.5\text{cm}, \text{spacing}=2\text{mm}, \text{rows}=2\},\]
\[\text{boxes} = \{\text{beamer}, \text{colframe}=\text{blue!50!black}, \text{colback}=\text{blue!50}, \text{colupper}=\text{yellow!50}\},\]
\]
\texttt{posterbox}\{\text{row=1, column*=2, span=2}\}\{\text{First box}\}
\texttt{posterbox}\{\text{row=2, column*=2, span=0.8}\}\{\text{Second box}\}
\end{tcbposter}
Sets the width of the current box to span \( \langle \text{number} \rangle \) columns. \( \langle \text{number} \rangle \) is also allowed to be a real number like 0.5 or 1.7. See \texttt{/tcb/posterloc/column} \p 445 and \texttt{/tcb/posterloc/column*} \p 445 for examples.

If this option is applied, the box is placed at the row denoted by \( \langle \text{number} \rangle \). Also, the height is set as fixed according to \texttt{/tcb/posterloc/rowspan}.

Sets the height of the current box to span \( \langle \text{number} \rangle \) rows. \( \langle \text{number} \rangle \) is also allowed to be a real number like 0.5 or 1.7.

Sets the height of the current box span rows as denoted by \texttt{/tcb/posterloc/rowspan}. This can be used, if not \texttt{/tcb/posterloc/row}, but another height placement option is applied.
The box is placed below another box with the given \langle\text{name}\rangle. Also, \langle\text{name}\rangle can be a predefined node, see Section 21.2 on page 439.

\begin{tcbposter}
\posterbox[name=A,column=1,below=top]{First box}
\posterbox[name=B,column=1,below=A]{Second box}
\posterbox[name=C,column=2,below=B]{Third box}
\posterbox[name=D,column=3,below=row1]{Fourth box}
\end{tcbposter}

The box is placed above another box with the given \langle\text{name}\rangle. Also, \langle\text{name}\rangle can be a predefined node, see Section 21.2 on page 439.

\begin{tcbposter}
\posterbox[name=A,column=1,above=bottom]{First box}
\posterbox[name=B,column=1,above=A]{Second box}
\posterbox[name=C,column=2,above=B]{Third box}
\posterbox[name=D,column=3,above=row2]{Fourth box}
\end{tcbposter}
The box is placed at the position with the given \(name\). This is quite likely a predefined node, see Section 21.2 on page 439.

\begin{tcbposter}
\[ \text{poster} = \{ \text{showframe, height=3cm, spacing=2mm, rows=2}, \]
\[ \text{boxes} = \{ \text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50} \}, \]
\] \begin{tcbposter}
\posterbox{name=A, column=1, at=middle}{First box}
\posterbox{name=B, column=2, at=row1}{Second box}
\end{tcbposter}

The box is placed below a box \(name1\) and above another box \(name2\). Also, \(name1\) and \(name2\) can be predefined nodes, see Section 21.2 on page 439.

\begin{tcbposter}
\[ \text{poster} = \{ \text{showframe, height=3cm, spacing=2mm, rows=2}, \]
\[ \text{boxes} = \{ \text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50} \}, \]
\] \begin{tcbposter}
\posterbox{name=A, column=1, below=top}{First box}
\posterbox{name=B, column=1, between=A and bottom}{Second box}
\posterbox{name=C, column=2, above=bottom}{Third box}
\posterbox{name=D, column=2, between=top and C, span=2}{Fourth box}
\posterbox{name=E, column=3, between=D and bottom}{Fifth box}
\end{tcbposter}
The box is broken into partial boxes. These partial boxes are placed following the given <code>(sequence)</code> of placements. The feasible syntax for the <code>(sequence)</code> is:

<code>(column a) between (name a1) and (name a2) then</code>
<code>(column b) between (name b1) and (name b2) then</code>
<code>(column c) between (name c1) and (name c2) then...</code>

Obviously, this places the first part box at <code>(column a)</code> between <code>(name a2)</code> and <code>(name a2)</code>. The second box part is placed at <code>(column b)</code> between <code>(name b2)</code> and <code>(name b2)</code>, and so on.

```latex
\begin{tcbposter}
poster = \{showframe,height=6cm,spacing=2mm,rows=2\},
boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\},
\end{tcbposter}
\posterbox[adjusted title=A]{name=A,column=1,below=top,span=2}{First box}
\posterbox{name=B,column=2,above=bottom,span=2}{Second box}
\posterbox[adjusted title=C,colframe=red!50!black,colback=red!50]{name=C, sequence=1 between A and bottom then
2 between A and B then
3 between top and B}{\lipsum[2]}
\end{tcbposter}
```
If the box content of a `/tcb/posterloc/sequence` is too short to fill all reserved box parts, the empty boxes are drawn with the `/tcb/placeholder` style. This style can be redefined, e.g. to `/tcb/blankest` if nothing should be drawn for empty boxes.

\begin{tcbposter}
\[ poster = \{\text{showframe, height=2.5cm, spacing=2mm, rows=2}, \]
\[ \text{boxes} = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}, \} \]
\[ \text{\posterbox{name=A, column=1, below=top, span=2}\{First box\}} \]
\[ \text{\posterbox[name=B, sequence=1 between A and bottom then 2 between A and bottom then 3 between top and bottom]{Second box followed by placeholder boxes}} \]
\end{tcbposter}

\begin{tcbposter}
\[ poster = \{\text{showframe, height=3cm, spacing=2mm, rows=2}, \]
\[ \text{boxes} = \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}, \} \]
\[ \text{\posterbox[name=A, column=1, row=1, xshift=6mm]{First box}} \]
\[ \text{\posterbox[name=B, column=2, row=2, xshift=-6mm}{Second box}} \]
\end{tcbposter}

\textbf{N 2017-07-03} \hspace{1cm} \textbf{/tcb/placehol} (style, no value)

Horizontal shift of a box by \langle length \rangle.
Vertical shift of a box by \texttt{\langle length \rangle}.

\begin{tcbposter}
    \poster = {showframe, height=3cm, spacing=2mm, rows=2},
    \boxes = {beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50},
\end{tcbposter}

\begin{verbatim}
\begin{tcbposter}
    \poster = {showframe, height=3cm, spacing=2mm, rows=2},
    \boxes = {beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50},
\end{tcbposter}
\end{verbatim}
The library is loaded by a package option or inside the preamble by:
\usepackage\{\texttt{library}\}

\section{22.1 Macros of the Library}
\texttt{tcboxfit}(\{\texttt{options}\}\{\texttt{box content}\})

Creates a colored box where the given (\texttt{box content}) is fitted to the width and height of the box. A \texttt{tcboxfit} has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most (\texttt{options}) for a \texttt{tcolorbox} \cite{P.12} can be used for \texttt{tcboxfit} with some restrictions. A \texttt{tcboxfit} cannot have a lower part and cannot be broken.

\begin{verbatim}
\usepackage\{lipsum\}
\usepackage\{tcolorbox\}
\begin{tcolorbox}[colframe=blue!50!black,colback=red!10!white, boxsep=0pt,top=1mm,bottom=1mm,left=1mm,right=1mm, fit algorithm=hybrid*,raster equal skip=1mm}
\begin{tcolorbox}[raster columns=3,raster valign=bottom]
\begin{tcolorbox}[height=4cm]{\lipsum[1]}\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
set\%\{colframe=blue!50!black,colback=red!10!white, boxsep=0pt,top=1mm,bottom=1mm,left=1mm,right=1mm, fit algorithm=hybrid*,raster equal skip=1mm}
begin\{tcolorbox}\begin{tcolorbox}[raster columns=3,raster valign=bottom]
\begin{tcolorbox}[height=4cm]{\lipsum[1]}\end{tcolorbox}
\end{tcolorbox}\end{tcolorbox}
\end{verbatim}

This is a \LaTeX{} length adapted automatically by most variants of \texttt{/tcb/fit algorithm}. Therefore, it never is to be changed by the user, but may be applied read-only. The \texttt{tcbfitdim} corresponds to the font size and may also be used to calculate box margins or other distances in dependency. The initial and maximum value for \texttt{tcbfitdim} is set by \texttt{/tcb/fit basedim}.

\texttt{tcbfontsize}\{\langle factor\rangle\}

Selects a font size inside a tcolorbox which is scaled with the given \langle factor\rangle relative to \texttt{tcbfitdim}. Also see \texttt{/tcb/fit fontsize macros}.

\begin{tcolorbox}[fit basedim=10pt]
{\tcbfontsize{0.25} Very tiny,}\n{\tcbfontsize{0.5} Small,}\n{\tcbfontsize{1} Normal,}\n{\tcbfontsize{2} Large,}\n{\tcbfontsize{4} Huge.}
\end{tcolorbox}

\begin{tcolorbox}[fit basedim=10pt, fit to height=2cm]
{\tcbfontsize{0.25} Very tiny,}\n{\tcbfontsize{0.5} Small,}\n{\tcbfontsize{1} Normal,}\n{\tcbfontsize{2} Large,}\n{\tcbfontsize{4} Huge.}
\end{tcolorbox}
22.2 Producing \tcboxfit Commands

\newtcboxfit\{\langle init options \rangle\}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Creates a new macro \langle name \rangle based on \tcboxfit.\textsuperscript{P.452} Basically, \newtcboxfit operates like \newcommand. The new macro \langle name \rangle optionally takes \langle number \rangle+1 arguments, where \langle default \rangle is the default value for the optional first argument. The \langle options \rangle are given to the underlying \tcboxfit. The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 123.

\newtcboxfit{\mybox}{colback=red!5!white, colframe=red!75!black,width=4cm, height=1.5cm,halign=center}
\mybox{This is my own box.}\par
\mybox{This is my own box with more text to be written.}

% \usepackage{lipsum}
\newtcboxfit{\mybox}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}
\mybox{2.5cm}{1cm}{First box}
\mybox{2.5cm}{1cm}{Second box with more text}
\mybox{5cm}{2cm}{Third box with text}
\mybox{5cm}{3cm}{\lipsum[1]}

% \usepackage{lipsum}
\newtcboxfit{\mybox}{\langle init options \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}
\mybox{colback=yellow}{5cm}
\lipsum[2]

\renewtcboxfit\{\langle init options \rangle\}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Operates like \newtcboxfit, but based on \renewcommand instead of \newcommand. An existing macro is redefined.
\DeclareTCBoxFit{\langle init options\rangle}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}

Creates a new command \langle name\rangle based on \texttt{tcboxfit}\textsuperscript{P.452}. Basically, \DeclareTCBoxFit operates like \texttt{DeclareDocumentCommand}. This means, the new command \langle name\rangle is constructed with the given argument \langle specification\rangle. The \langle options\rangle are given to the underlying \texttt{tcboxfit}\textsuperscript{P.452}.

Note that \texttt{/tcb/savedelimiter}\textsuperscript{P.31} is set to the given \langle name\rangle automatically.

The \langle init options\rangle allow setting up automatic numbering, see Section 5 from page 123. The new command is always created, irrespective of an already existing command with the same name.

\input{lipsum}

\begin{Code}
\begin{Verbatim}
\usepackage{lipsum}
\\textbackslash DeclareTCBoxFit\{\texttt{mybox}\}\{0\}{m!o}\{colback=red!5!white,\}
\{colframe=red!75!black,\}
\{width=\#2, height=\#2/3*2,\}
\{IfValueT={\#3}{height=\#3},\}
\{#1\}
\end{Verbatim}
\end{Code}

\begin{Verbatim}
\mybox[\texttt{colback=yellow}]{5cm}\texttt{\{lipsum[2]\}}
\mybox[\texttt{colback=yellow}]{5cm}[4cm]\texttt{\{lipsum[2]\}}
\end{Verbatim}

\begin{Code}
\begin{Verbatim}
\NewTCBoxFit{\langle init options\rangle}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{Verbatim}
\end{Code}

Operates like \texttt{DeclareTCBoxFit}, but based on \texttt{NewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An error is issued if \langle name\rangle has already been defined.

\begin{Code}
\begin{Verbatim}
\RenewTCBoxFit{\langle init options\rangle}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{Verbatim}
\end{Code}

Operates like \texttt{DeclareTCBoxFit}, but based on \texttt{RenewDocumentCommand} instead of \texttt{DeclareDocumentCommand}. An existing command is redefined.

\begin{Code}
\begin{Verbatim}
\ProvideTCBoxFit{\langle init options\rangle}{\langle name\rangle}{\langle specification\rangle}{\langle options\rangle}
\end{Verbatim}
\end{Code}

Operates like \texttt{DeclareTCBoxFit}, but based on \texttt{ProvideDocumentCommand} instead of \texttt{DeclareDocumentCommand}. The command \langle name\rangle is only created if it is not already defined.
\DeclareTotalTCBoxFit\(\langle init\ options\rangle\)\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}

Creates a new command \(\langle name\rangle\) based on \texttt{tcboxfit}\footnote{P.452}. In contrast to \texttt{\DeclareTCBoxFit}\footnote{P.455}, also the \(\langle content\rangle\) of the \texttt{tcboxfit} is specified. Basically, \texttt{\DeclareTotalTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \(\langle name\rangle\) is constructed with the given argument \(\langle specification\rangle\). The \(\langle options\rangle\) are given to the underlying \texttt{\tcboxfit}\footnote{P.452} which is filled with the specified \(\langle content\rangle\).

Note that \texttt{/tcb/savedelimiter}\footnote{P.31} is set to the given \(\langle name\rangle\) automatically. The \(\langle init\ options\rangle\) allow setting up automatic numbering, see Section 5 from page 123. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\% \usepackage{lipsum}
\DeclareTotalTCBoxFit{\multibox}{ O{} m O{10} m }
{\langle nobeforeafter, colback=red!5!white, colframe=red!75!black, width=#2, height=#2/3*2, valign=center, #1\rangle}
{\forall \text{each \(\langle 1,\ldots,#3\rangle\)}}
\multibox{5cm}{[\text{I shall not repeat.}]}
\multibox{colframe=blue!75!white}{5cm}[20]{[\text{I shall not repeat.}]}
\multibox{colback=yellow,height=5cm}{14cm}{100}{[\text{I shall not repeat.}]}
\end{verbatim}

\texttt{\NewTotalTCBoxFit\{\langle init\ options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}}

 Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \(\langle name\rangle\) has already been defined.

\texttt{\RenewTotalTCBoxFit\{\langle init\ options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}}

 Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\texttt{\ProvideTotalTCBoxFit\{\langle init\ options\rangle\}\{\langle name\rangle\}\{\langle specification\rangle\}\{\langle options\rangle\}\{\langle content\rangle\}}

 Operates like \texttt{\DeclareTotalTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \(\langle name\rangle\) is only created if it is not already defined.
22.3 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the fitbox capture mode. Note that the fit control algorithm constructs a series of versions for the box and selects the “best”. Therefore, the compilation time is quite longer than for a normal box. The \tcboxfit macro uses this algorithm by default.

The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.

\tcb/fit

Sets the \tcb/capture mode to fitbox, i.e. enables the font size adjustment algorithm. Thereby, a tcolorbox acts like \tcboxfit where the given box content is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension \tcfitdim can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro \tcfitsteps for analysis.

\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}

\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}

\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
Shortcut for using \texttt{/tcb/fit} → P.457 and setting the \langle width \rangle and \langle height \rangle values separately.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[fit to=3cm and 2cm]
This box content is fitted to the given dimensions.
\end{tcolorbox}

Shortcut for using \texttt{/tcb/fit} → P.457 and setting the \langle height \rangle value separately.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[fit to height=2cm]
This box content is fitted to the given height.
\end{tcolorbox}

Sets the starting font dimension for the font size adjustment algorithm to \langle length \rangle. The algorithm never enlarges this dimension. Therefore, the final \texttt{tcbfitdim} → P.453 is identical to or smaller than \langle length \rangle.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[fit to=4cm and 2cm, fit basedim=50pt]

\lipsum[1]
\end{tcolorbox}

Sets the skip value of the selected font to \langle real value \rangle times \texttt{tcbfitdim} → P.453.

\% \usepackage{lipsum}
\tcbset{colback=red!5!white, colframe=red!75!black, left=1mm, right=1mm, boxsep=0mm}
\begin{tcolorbox}[fit to=5cm and 4cm, fit skip=1.0 ]
\lipsum[1]
\end{tcolorbox}
Redefines the standard \LaTeX font size macros \tiny, \scriptsize, \footnotesize, \small, \normalsize, \large, \Large, \Huge, and \huge, to set font sizes relative to the current \tcbbfitdim \textsuperscript{\textcopyright{453}}. Note that the display skip values for mathematical formulas are respected by the redefined macros. Also see \tcbbfontsize \textsuperscript{\textcopyright{453}}.

\begin{tcolorbox}[fit to height=4cm]
{\Large\bfseries This text is not adapted:\par}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit to height=4cm, fit fontsize macros]
{\Large\bfseries This text is adapted:\par}
\lipsum[2]
\end{tcolorbox}

The relative relative font size macros are also usable without the \textit{fit} algorithm.

\begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, font fontsize macros]
The relative relative font size macros are also usable without the \textit{fit} algorithm.\par
{\Huge Adapted Huge} ---
{\realHuge Original Huge}
\end{tcolorbox}

\begin{tcolorbox}[height=5cm, fit fontsize macros, fonttitle=\normalsize\bfseries, title=Adapted title]
{\lipsum[2]}
\end{tcolorbox}

\let\realHuge=\Huge

\let\real\Huge

\begin{tcolorbox}[fit basedim=7pt, fontupper=\normalsize, font fontsize macros]
The relative relative font size macros are also usable without the \textit{fit} algorithm.

Adapted Huge — Original Huge
\end{tcolorbox}

Adapted title

\lipsum
The box is allowed to enlarge the fixed height up to the given \( \langle \text{dimension} \rangle \), before a font size fit is applied. An optional \texttt{/tcb/fit width plus} is tried after the height adaption.

\begin{verbatim}
\usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm, right=1mm,boxsep=0mm,width=3cm,height=3cm,nobeforeafter}

\begin{tcolorbox}[fit] This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm] This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit] \lipsum[2] \end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm] \lipsum[2] \end{tcolorbox}
\end{verbatim}

The box is allowed to enlarge the fixed width up to the given \( \langle \text{dimension} \rangle \), before a font size fit is applied. An optional \texttt{/tcb/fit height plus} is tried after the width adaption.

\begin{verbatim}
\usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm, right=1mm,boxsep=0mm,width=3cm,height=3cm,nobeforeafter}

\begin{tcolorbox}[fit] This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm] This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit] \lipsum[2] \end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm] \lipsum[2] \end{tcolorbox}
\end{verbatim}
Typically but not necessarily, the optional title of a \texttt{tcolorbox} is not part of the fit operation. If a \texttt{/tcb/fit width plus} is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use \texttt{/tcb/phantom} \textsuperscript{P.110} or \texttt{/tcb/step and label} \textsuperscript{P.110} to set counters or use automatic numbering, see Subsection 5.1 from page 123.

\texttt{/tcb/fit width from=\langle min \rangle to \langle max \rangle} \hspace{1cm} \text{(style, no default)}

Sets the box width to \langle min \rangle and allows the width to grow up to \langle max \rangle.

\begin{verbatim}
% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,height=4cm}

\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}
\par
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}
\par
\end{verbatim}
Sets the box height to \( \langle \text{min} \rangle \) and allows the height to grow up to \( \langle \text{max} \rangle \).
/tcb/fit algorithm=(name) (no default, initially fontsize)

Sets the algorithm for the fitting process after optionally width and height are adapted. In
the following, adapting the font size means adapting \tcbfitdim. Feasible values for
(name) are:

- **fontsize** (initial): The algorithm is a bisection method that adapts the font size until
certain stop conditions are fulfilled. This is the most time-consuming method but it is
robust and gives pleasant results.

  ! The used font has to be freely scalable for this method! Other content than text
  is not scaled down. The aspect ratio is fully guaranteed.

- **fontsize**: First, the fontsize algorithm is applied. If the font was scaled down and
the resulting height is too small, the box is squeezed to fit the area.

  ! The used font has to be freely scalable for this method! Other content than text
  may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **areasize**: The algorithm calculates the area size for the text without scaling the font.
The text box is shaped for the needed aspect ratio in one or two steps. Finally, it is
scaled down with a standard \resizebox macro.

  ! The used font has not to be scalable. Every box content is scaled down. The
  aspect ratio cannot be fully guaranteed.

- **areasize**: The areasize algorithm is applied, but if the content was scaled down
and the resulting height is too small, the box is squeezed to fit the area.

  ! The used font has not to be scalable. Every box content is scaled down. The
  aspect ratio cannot be fully guaranteed.

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then
an areasize fitting as above is a applied.

  ! The used font has to be freely scalable for this method! Other content than text
  may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then
an areasize fitting as above is a applied.

  ! The used font has to be freely scalable for this method! Other content than text
  may be slightly rescaled. The aspect ratio cannot be fully guaranteed.

- **squeeze**: The text box is brutally scaled down to fit.

  ! The aspect ratio is very likely to be horrible. You should not use this method
  for final documents.
Quality \dotfill versus \dotfill Speed

\begin{itemize}
\item \textbf{fontsize} \hspace{1cm} \text{Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, visi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed, accumsan bibendum, erat ligula aliquet magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.}

\item \textbf{hybrid} \hspace{1cm} \text{Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, visi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed, accumsan bibendum, erat ligula aliquet magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.}

\item \textbf{areysize} \hspace{1cm} \text{Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, visi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed, accumsan bibendum, erat ligula aliquet magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.}

\item \textbf{squeeze} \hspace{1cm} \text{Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, visi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed, accumsan bibendum, erat ligula aliquet magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.}
\end{itemize}
The following options set control parameters for the fit algorithm. Mainly, they apply to the fontsize variant, see \texttt{/tcb/fit algorithm} \cite{p.463}. The options should be seen as experimental and are likely to change in future versions, if necessary.

\begin{verbatim}
\texttt{/tcb/fit maxstep=\langle number\rangle} \hspace{2.5cm} \text{(no default, initially 20)}
\end{verbatim}

Sets the maximal step size for the font size adjustment algorithm. In normal situations, the algorithm stops before reaching the intial value of 20 steps. If the box content does not shrink, this value prevents an endless loop.

\begin{verbatim}
\texttt{/tcb/fit maxfontdiff=\langle dimension\rangle} \hspace{2.5cm} \text{(no default, initially 0.1pt)}
\end{verbatim}

The algorithm stops, if the font size is determined within a deviation of \langle dimension\rangle.

\begin{verbatim}
\texttt{/tcb/fit maxfontdiffgap=\langle dimension\rangle} \hspace{2.5cm} \text{(no default, initially 1pt)}
\end{verbatim}

The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of \langle dimension\rangle.

\begin{verbatim}
\texttt{/tcb/fit maxwidthdiff=\langle dimension\rangle} \hspace{2.5cm} \text{(no default, initially 1pt)}
\end{verbatim}

The algorithm stops, if the (optionally) flexible box width is determined within a deviation of \langle dimension\rangle.

\begin{verbatim}
\texttt{/tcb/fit maxwidthdiffgap=\langle dimension\rangle} \hspace{2.5cm} \text{(no default, initially 10pt)}
\end{verbatim}

The algorithm stops, if the number of lines is determined and the (optionally) flexible box width is determined within a deviation of \langle dimension\rangle.

\begin{verbatim}
\texttt{/tcb/fit warning=\langle value\rangle} \hspace{2.5cm} \text{(no default, initially off)}
\end{verbatim}

Typically, the fit control algorithm constructs several auxiliary boxes to determine the optimal one. If not switched off, the construction of the auxiliary boxes may produce many \texttt{hbox} warnings. This option key changes the \texttt{\hbadness} value.

- \texttt{off}: Most of ‘Underfull \texttt{hbox}’ and ‘Overfull \texttt{hbox}’ warnings are switched off (including the ones for the finally used box).
- \texttt{on}: All warnings for all auxiliary boxes are displayed.
- \texttt{final}: Only warnings for the finally used box are displayed. Note that an additional box has to be contructed for theses messages.

465
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{hooks}

For the skin related options, the library \skins{} has to be loaded separately.

### 23.1 Concept of Hooks

A hook is a placeholder in some \LaTeX{} code where additional code can be added. For example, the \LaTeX{} macro \texttt{\textbackslash AtBeginDocument} adds code to a hook which is placed at the beginning of every document.

Several option keys of \texttt{tcolorbox} allow providing some code which is added to specific places of a colored box. For example, \texttt{/tcb/before upper} \textsuperscript{P.70} places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library \hooks{} extends \texttt{/tcb/before upper} \textsuperscript{P.70} and several more existing keys to “hookable” versions, e.g. \texttt{/tcb/before upper app} \textsuperscript{P.467} and \texttt{/tcb/before upper pre} \textsuperscript{P.467}. The “hookable” keys don’t overwrite prior settings but either append or prepend the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- \texttt{(option key) app}: works like \texttt{(option key)} but \texttt{app}ends its code to the existing code.
- \texttt{(option key) pre}: works like \texttt{(option key)} but \texttt{pre}pends its code to the existing code.

If the original \texttt{(option key)} is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.
23.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 69.

\texttt{/tcb\_before\_title\_app=⟨code⟩}

Appends the given \texttt{⟨code⟩} to \texttt{/tcb\_before\_title\textsuperscript{P.69}} after the color and font settings and before the content of the title.

\texttt{/tcb\_before\_title\_pre=⟨code⟩}

Prepends the given \texttt{⟨code⟩} to \texttt{/tcb\_before\_title\textsuperscript{P.69}} after the color and font settings and before the content of the title.

\texttt{/tcb\_after\_title\_app=⟨code⟩}

Appends the given \texttt{⟨code⟩} to \texttt{/tcb\_after\_title\textsuperscript{P.69}} after the content of the title.

\texttt{/tcb\_after\_title\_pre=⟨code⟩}

Prepends the given \texttt{⟨code⟩} to \texttt{/tcb\_after\_title\textsuperscript{P.69}} after the content of the title.

\texttt{/tcb\_before\_upper\_app=⟨code⟩}

Appends the given \texttt{⟨code⟩} to \texttt{/tcb\_before\_upper\textsuperscript{P.70}} or \texttt{/tcb\_before\_upper\textsuperscript{P.70}} after the color and font settings and before the content of the upper part.

\texttt{/tcb\_before\_upper\_pre=⟨code⟩}

Prepends the given \texttt{⟨code⟩} to \texttt{/tcb\_before\_upper\textsuperscript{P.70}} or \texttt{/tcb\_before\_upper\textsuperscript{P.70}} after the color and font settings and before the content of the upper part.

\texttt{/tcb\_after\_upper\_app=⟨code⟩}

Appends the given \texttt{⟨code⟩} to \texttt{/tcb\_after\_upper\textsuperscript{P.71}} or \texttt{/tcb\_after\_upper\textsuperscript{P.71}} after the content of the upper part.

\texttt{/tcb\_after\_upper\_pre=⟨code⟩}

Prepends the given \texttt{⟨code⟩} to \texttt{/tcb\_after\_upper\textsuperscript{P.71}} or \texttt{/tcb\_after\_upper\textsuperscript{P.71}} after the content of the upper part.

\begin{tcolorbox}
\begin{align*}
\frac{2}{\sqrt{2}} &= \sqrt{2}. & \text{(22)} \\
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. & \text{(23)} \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c. & \text{(24)} \\
\sin \left(\frac{\pi}{2}\right) &= 1. & \text{(25)}
\end{align*}
\end{tcolorbox}
/tcb/before lower app=(code) (no default)

Appends the given (code) to /tcb/before lower → P.72 or /tcb/before lower* → P.72 after the color and font settings and before the content of the lower part.

/tcb/before lower pre=(code) (no default)

Prepends the given (code) to /tcb/before lower → P.72 or /tcb/before lower* → P.72 after the color and font settings and before the content of the lower part.

/tcb/after lower app=(code) (no default)

Appends the given (code) to /tcb/after lower → P.73 or /tcb/after lower* → P.73 after the content of the lower part.

/tcb/after lower pre=(code) (no default)

Prepends the given (code) to /tcb/after lower → P.73 or /tcb/after lower* → P.73 after the content of the lower part.
23.3 Embedding into the Surroundings

The following option keys extend the options given in Subsection 4.14 from page 86.

The “hookable” versions are usable inside the document. In the preamble, they can only be used after explicit setting of \tcb/before* \tcb/after* or by e.g. \tcb/parskip*.

\tcb/before app\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\begin{itemize}
\item \tcb/before pre\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\item \tcb/after app\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\item \tcb/after pre\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\end{itemize}

\begin{tcolorbox}[title=My title,before app={The box follows:}\[4pt],
\quad after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries]
\begin{tcolorbox}[title=My title,before app={The box follows:}\[4pt],
\quad after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcolorbox}

\tcb/before float app\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\begin{itemize}
\item \tcb/before float pre\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\item \tcb/after float app\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\item \tcb/after float pre\(\langle \text{code} \rangle\) \hspace{1cm} \text{(no default)}
\end{itemize}

This is the end.
23.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 79.

`tcb/overlay app=⟨graphical code⟩` (no default)

Appends the given `⟨graphical code⟩` to `/tcb/overlay` \textsuperscript{P.79}.

```latex
\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[frogbox,ribbon,title=My title]
This is a \textbf{tcolorbox}.
Here, we apply a second overlay.
\end{tcolorbox}
```

`tcb/overlay pre=⟨graphical code⟩` (no default)

Prepends the given `⟨graphical code⟩` to `/tcb/overlay` \textsuperscript{P.79}.

`tcb/overlay unbroken app=⟨graphical code⟩` (no default)

Appends the given `⟨graphical code⟩` to `/tcb/overlay unbroken` \textsuperscript{P.80}.

`tcb/overlay unbroken pre=⟨graphical code⟩` (no default)

Prepends the given `⟨graphical code⟩` to `/tcb/overlay unbroken` \textsuperscript{P.80}.

`tcb/overlay first app=⟨graphical code⟩` (no default)

Appends the given `⟨graphical code⟩` to `/tcb/overlay first` \textsuperscript{P.80}.

`tcb/overlay first pre=⟨graphical code⟩` (no default)

Prepends the given `⟨graphical code⟩` to `/tcb/overlay first` \textsuperscript{P.80}.
/tcb/overlay middle app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay middle \textsuperscript{P.80}.

/tcb/overlay middle pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay middle \textsuperscript{P.80}.

/tcb/overlay last app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay last \textsuperscript{P.80}.

/tcb/overlay last pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay last \textsuperscript{P.80}.

/tcb/overlay broken app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay broken \textsuperscript{P.80}.

/tcb/overlay broken pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay broken \textsuperscript{P.80}.

/tcb/overlay unbroken and first app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay unbroken and first \textsuperscript{P.80}.

/tcb/overlay unbroken and first pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay unbroken and first \textsuperscript{P.80}.

/tcb/overlay middle and last app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay middle and last \textsuperscript{P.80}.

/tcb/overlay middle and last pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay middle and last \textsuperscript{P.80}.

/tcb/overlay unbroken and last app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay unbroken and last \textsuperscript{P.80}.

/tcb/overlay unbroken and last pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay unbroken and last \textsuperscript{P.80}.

/tcb/overlay first and middle app=(graphical code)  (no default)
    Appends the given \textit{(graphical code)} to /tcb/overlay first and middle \textsuperscript{P.80}.

/tcb/overlay first and middle pre=(graphical code)  (no default)
    Prepends the given \textit{(graphical code)} to /tcb/overlay first and middle \textsuperscript{P.80}.
23.5 Watermarks

The following option keys extend the options given in Subsection 10.3 from page 183.

Watermarks are special overlays. The \texttt{\footnotesize hooks} library allows the combination of several watermarks and overlays.

/tcb/watermark text app=⟨text⟩ (no default)

Appends a /tcb/watermark text \textsuperscript{\textasciitilde P.183} to the colored box.

\begin{tcolorbox}
\texttt{\footnotesize \tbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}}
\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png,
watermark opacity=0.25,
watermark text app=Basilica,watermark color=Navy]
\lipsum[1-2]
\tcblover
\end{tcolorbox}

This example uses a public domain picture from\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}

My title


This example uses a public domain picture from\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

/tcb/watermark text pre=⟨text⟩ (no default)

Prepends a /tcb/watermark text \textsuperscript{\textasciitilde P.183} to the colored box.

/tcb/watermark text app on=⟨part⟩ is ⟨text⟩ (no default)

Appends a /tcb/watermark text on \textsuperscript{\textasciitilde P.183} the named ⟨part⟩ of a break sequence.

/tcb/watermark text pre on=⟨part⟩ is ⟨text⟩ (no default)

Prepends a /tcb/watermark text on \textsuperscript{\textasciitilde P.183} the named ⟨part⟩ of a break sequence.
Appends a \texttt{/tcb/watermark graphics} \textsuperscript{P.184} referenced by \texttt{(file name)} to the colored box.

Prepends a \texttt{/tcb/watermark graphics} \textsuperscript{P.184} referenced by \texttt{(file name)} to the colored box.

Appends a \texttt{/tcb/watermark graphics on} \textsuperscript{P.184} the named \texttt{(part)} of a break sequence. The picture is referenced by \texttt{(file name)}.

Prepends a \texttt{/tcb/watermark graphics on} \textsuperscript{P.184} the named \texttt{(part)} of a break sequence. The picture is referenced by \texttt{(file name)}.

Appends a \texttt{/tcb/watermark tikz} \textsuperscript{P.185} with the given tikz \texttt{(graphical code)} to the colored box.

Prepends a \texttt{/tcb/watermark tikz} \textsuperscript{P.185} with the given tikz \texttt{(graphical code)} to the colored box.

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark, smiley]
\lipsum[1-2]
\end{tcolorbox}
\end{verbatim}

My title


Appends a \texttt{/tcb/watermark tikz on} \textsuperscript{P.184} the named \texttt{(part)} of a break sequence.

Prepends a \texttt{/tcb/watermark tikz on} \textsuperscript{P.184} the named \texttt{(part)} of a break sequence.
23.6 Underlays

The following option keys extend the options given in Section 10.8 on page 213. There are no app type keys since underlays are stackable by default.

/tcb/underlay pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay → P.213.

/tcb/underlay unbroken pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay unbroken → P.214.

/tcb/underlay first pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay first → P.214.

/tcb/underlay middle pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay middle → P.214.

/tcb/underlay last pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay last → P.214.

/tcb/underlay boxed title pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay boxed title → P.214.

/tcb/underlay broken pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay broken → P.214.

/tcb/underlay unbroken and first pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay unbroken and first → P.214.

/tcb/underlay middle and last pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay middle and last → P.214.

/tcb/underlay unbroken and last pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay unbroken and last → P.214.

/tcb/underlay first and middle pre=(graphical code) (no default)
   Prepends the given ⟨graphical code⟩ to /tcb/underlay first and middle → P.214.
23.7 Finishes

The following option keys extend the options given in Section 10.9 on page 215. There are no app type keys since finishes are stackable by default.

\[/tcb/finish \text{pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish \( \rightarrow P.215 \).

\[/tcb/finish \text{unbroken pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish unbroken \( \rightarrow P.216 \).

\[/tcb/finish \text{first pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish first \( \rightarrow P.216 \).

\[/tcb/finish \text{middle pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish middle \( \rightarrow P.216 \).

\[/tcb/finish \text{last pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish last \( \rightarrow P.216 \).

\[/tcb/finish \text{broken pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish broken \( \rightarrow P.216 \).

\[/tcb/finish \text{unbroken and first pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish unbroken and first \( \rightarrow P.216 \).

\[/tcb/finish \text{middle and last pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish middle and last \( \rightarrow P.216 \).

\[/tcb/finish \text{unbroken and last pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish unbroken and last \( \rightarrow P.216 \).

\[/tcb/finish \text{first and middle pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/finish first and middle \( \rightarrow P.216 \).

23.8 Skin Code

The following option keys extend the options given in Subsection 9.2 from page 154.

\[/tcb/frame \text{code app} = (\text{graphical code})\] (no default)

Appends the given \( (\text{graphical code}) \) to /tcb/frame code \( \rightarrow P.154 \).

\[/tcb/frame \text{code pre} = (\text{graphical code})\] (no default)

Prepends the given \( (\text{graphical code}) \) to /tcb/frame code \( \rightarrow P.154 \).

\[/tcb/\text{interior titled code app} = (\text{graphical code})\] (no default)

Appends the given \( (\text{graphical code}) \) to /tcb/interior titled code \( \rightarrow P.154 \).
My title


/tcb/interior_titled_code_pre=(graphical code)  (no default)

Prepends the given (graphical code) to /tcb/interior_titled_code → P.154.

/tcb/interior_code_app=(graphical code)  (no default)

Appends the given (graphical code) to /tcb/interior_code → P.155.

/tcb/interior_code_pre=(graphical code)  (no default)

Prepends the given (graphical code) to /tcb/interior_code → P.155.

/tcb/segmentation_code_app=(graphical code)  (no default)

Appends the given (graphical code) to /tcb/segmentation_code → P.155.

/tcb/segmentation_code_pre=(graphical code)  (no default)

Prepends the given (graphical code) to /tcb/segmentation_code → P.155.

/tcb/title_code_app=(graphical code)  (no default)

Appends the given (graphical code) to /tcb/title_code → P.156.

/tcb/title_code_pre=(graphical code)  (no default)

Prepends the given (graphical code) to /tcb/title_code → P.156.
23.9 Extras

The following option keys extend the options given in Section 19.5 on page 410. There are no app type keys since extras are stackable by default.

Prepends the given ⟨options⟩ to /tcb/extras → P.410.

Prepends the given ⟨options⟩ to /tcb/extras unbroken → P.410.

Prepends the given ⟨options⟩ to /tcb/extras first → P.410.

Prepends the given ⟨options⟩ to /tcb/extras middle → P.410.

Prepends the given ⟨options⟩ to /tcb/extras last → P.410.

Prepends the given ⟨options⟩ to /tcb/extras broken → P.410.

Prepends the given ⟨options⟩ to /tcb/extras unbroken and first → P.410.

Prepends the given ⟨options⟩ to /tcb/extras middle and last → P.410.

Prepends the given ⟨options⟩ to /tcb/extras unbroken and last → P.410.

Prepends the given ⟨options⟩ to /tcb/extras first and middle → P.411.

23.10 Listings

The following option keys extend the options given in Section 17 from page 330.

Appends the given ⟨options⟩ to /tcb/listing options → P.340.

Prepends the given ⟨options⟩ to /tcb/listing options → P.340.

Appends the given ⟨options⟩ to /tcb/minted options → P.343.

Prepends the given ⟨options⟩ to /tcb/minted options → P.343.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{xparse}

This loads the package \texttt{xparse} [13].

Note that up to version 5.0.2 this library contained code which needed the \texttt{xparse} package. Since nowadays this package has become basically a part of the \LaTeX{} kernel, the code of the library was migrated to other parts of the \texttt{tcolorbox} package. So, the remaining library is nearly a stub which only loads \texttt{xparse}.

Instead of including the \texttt{xparse} library, it is recommended to include the \texttt{xparse} package directly, if really needed (the \LaTeX{} kernel contains essentially everything needed). The library is kept for compatibility.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{external}

The purpose of this library is to support externalization of document snippets like graphics or boxes which can be compiled stand-alone. These snippets are written to external files, compiled and the resulting pdf files are included to the main document as images. The whole procedure saves compilation time, if such a snippet is costly to compile but needs to compile just once or very seldom.

There are very good alternatives to this library. One should consider the standalone package or the TikZ externalization library instead. The external library is something in between and can be seen as poor man variant of the TikZ externalization library.

The main differences between TikZ externalization and external are:

- TikZ external compiles the whole original document in a sophisticated way while external uses only the preamble or a part of the preamble of the original document.
- TikZ external can automatically externalize all tikzpicture environments while external externalizes marked snippets only.
- Code snippets to be externalized by external are not restricted to tikzpicture environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use external instead of the more powerful TikZ external? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ external tends to choke on complicated documents where the sophisticated mechanism stumbles. Since external does not use the original document body for compilation, this cannot happen.

Source snippets are compiled, if their md5 checksum has changed. They are not compiled automatically, if option settings are changed or anything outside the snippet is changed. Use /tcb/external/force remake → P.480 to force compilation in this case or simply delete the externalized pdf oder md5 files.

To use the externalization options, the compiler has to be called with the -shell-escape permission to authorize potentially dangerous system calls. Be warned that this is a security risk.
25.1 Preparation of a Document for Externalization

The preamble of the main document has to contain the \texttt{\textbackslash tcbEXTERNALIZE} command. Without this command, no externalization operation will be executed.

\texttt{\textbackslash tcbEXTERNALIZE}

It is mandatory for externalization that this command is used once in the preamble of the main document. Every setting before \texttt{\textbackslash tcbEXTERNALIZE} will also be used for compiling an external snippet. Every setting after \texttt{\textbackslash tcbEXTERNALIZE} will be ignored for compiling an external snippet. Place this command right before \texttt{\begin{document}}, if you are not absolutely sure about another place.

The main document has to look like the following:

\begin{verbatim}
\documentclass[a4paper]{book} \% for example
\usepackage{...} \% anything
\% ...
\% Typically, all or the very most settings for the document.
\texttt{\textbackslash tcbEXTERNALIZE} \% Typically, just before \texttt{\begin{document}}
\% Additional settings which are ABSOLUTELY irrelevant for the
\% stand-alone snippets.
\% \begin{document}
\% The document.
\% This also contains the marked snippets for externalization.
\end{document}
\end{verbatim}

During compilation, a \texttt{/tcb/external/runner} file is dynamically created (several times). This is the actual main file for compiling an externalized snippet.

\texttt{\textbackslash tcb/external/runner=(file name)} \hspace{1cm} (no default, initially \texttt{\jobname_run.tex})

Sets the (file name) for dynamically created runner file. This is the actual main file for a document snippet. Typically, the initial setting is not needed to be changed.

\texttt{\textbackslash tcbset\{external/runner=myrunner.tex\}}

\texttt{\textbackslash tcb/external/prefix=(text)} \hspace{1cm} (no default, initially \texttt{external/})

The (text) is prefixed to any \texttt{/tcb/external/name} for an externalization snippet. The initial setting implies saving all snippets into an external/ subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

\texttt{\textbackslash tcbset\{external/prefix=ext_\}}

\texttt{\textbackslash tcb/external/externalize=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{true})

If set to \texttt{true}, the marked snippets are compiled if necessary. If set to \texttt{false}, the marked snippets are not compiled but included as text. \texttt{/tcb/external/externalize} can only be used after \texttt{\textbackslash tcbEXTERNALIZE}.

\texttt{\textbackslash tcb/external/force remake=true|false} \hspace{1cm} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the marked snippets are always compiled. If set to \texttt{true}, the marked snippets are compiled only if necessary. The necessity is given, if a compiled pdf file is missing or the md5 checksum of the source snippet has changed.

\texttt{\textbackslash tcb/external/!} \hspace{1cm} (style)

Shortcut for setting \texttt{/tcb/external/force remake} to \texttt{true}.

\texttt{\textbackslash tcb/external/-} \hspace{1cm} (style)

Shortcut for setting \texttt{/tcb/external/externalize} to \texttt{false}.
25.2 Marking Externalization Snippets

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);
\end{tikzpicture}
\end{tcbexternal}

Marks the environment content as a snippet for externalization. Typically, the content is a \texttt{tikzpicture} or something similar. It is important to note that the snippet should not have any dependencies with the rest of the document, e.g. referencing counters or setting counters is not possible. The \texttt{(name)} is automatically prefixed with /tcb/external/prefix → P.480. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The \texttt{(options)} are keys from the /tcb/external/ key tree.

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);
\end{tikzpicture}
\end{tcbexternal}

If a \texttt{tcolorbox} → P.12 is externalized, one should use /tcb/nobeforeafter → P.86 for the box. Indention and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}{example_tcolorbox}
\begin{tcolorbox}[nobeforeafter,enhanced,
fonttitle=\bfseries,title=Externalized Box,
colframe=red!50!black,drop fuzzy shadow,
interior style={fill overzoom image=goldshade.png}]
This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\end{tcolorbox}
\end{tcbexternal}

Externalized Box

This complete tcolorbox is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\begin{tcolorbox}[enhanced,\nobeforeafter,fonttitle=\bfseries,title=Externalized Box,interior style={\textcolor{white}{fill overzoom image=blueshade.png}}]
\begin{tcbexternal}[\minipage]{example_tcolorbox2}
% The interior of the tcolorbox is externalized. One can use numbered boxes without problems. Note that the text color has to be set for the text manually since it is converted into an image.
\end{tcbexternal}
\end{tcolorbox}

\begin{tcbexternal}[\minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
\begin{tabularx}{\linewidth}{l|Y|Y|Y|Y||Y|}
\hline
\textbf{Group} & \textbf{One} & \textbf{Two} & \textbf{Three} & \textbf{Four} & \textbf{Sum} \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabularx}
\end{tcbexternal}

\begin{tcbexternal}[\minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}
% Group & One & Two & Three & Four & Sum\
\begin{tabularx}{\linewidth}{l|Y|Y|Y|Y|}
\hline
\textbf{Group} & \textbf{One} & \textbf{Two} & \textbf{Three} & \textbf{Four} & \textbf{Sum} \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabularx}
\end{tcbexternal}

\textbf{tcb/external/name}=(\textit{name})\quad\text{(no default, initially \textit{unnamed})}

The \textit{name} is automatically prefixed with \textsc{tcb/external/prefix}~\cite{P.480}. In combination, this has to be a unique file name for externalization. Typically, this key is not used directly but is set indirectly as mandatory parameter, see \texttt{tcbexternal}~\cite{P.481}.
This is an externalized version of \texttt{tcolorbox} created using \texttt{newtcbexternalizetcolorbox}:

\begin{extcolorbox}{\minipage}{example_extcolorbox}
[ enhanced,\texttt{colframe=red!50!black},\texttt{colback=yellow!10},
  fonttitle=\texttt{\bfseries},drop fuzzy shadow,
  title=My external box ]

This box is completely externalized.

\begin{tcolorbox}[\texttt{colframe=blue},\texttt{colback=blue!5},before skip=6pt]
Inner box.
\end{tcolorbox}

\end{extcolorbox}

My external box

This box is completely externalized.

Inner box.

\begin{itemize}
  \item \textbf{Never} externalize numbered boxes.
  \item \textbf{Never} externalize boxes which contain references to other things, e.g. using \texttt{\ref} or \texttt{\cite}.
  \item \textbf{Never} externalize breakable boxes.
\end{itemize}
This is an externalized version of \texttt{tikzpicture} created using \texttt{\newtcbexternalizeenvironment} \textsuperscript{P. 488}:

\begin{center}
\begin{tikzpicture}
\begin{preamble}{\usepackage{pgfplots}}, \% add package for external graph
input source on error=false, \% do not load source on error
\end{preamble}
\{\texttt{example_pgfplots}\}
\pgfplotsset{width=12cm,}
\begin{axis}[3d box=background,grid=major, xlabel=$x$, ylabel=$y$, zlabel=$z$, view/h=40, mesh/interior colormap name=hot, colormap/blackwhite, z buffer=sort,domain=0:90,y domain=0:60, zmin=0,zmax=2,z post scale=1.2, ]
\addplot3[surf,mesh/interior colormap name=blackwhite, colormap/hot,] (\{cos(x),sin(z), (2*sin(y)) \});\addplot3[surf] (\{2*cos(x)*cos(y)\},\{2*sin(z)+cos(y)\}, \{2*sin(y)\});\end{axis}
\end{tikzpicture}
\end{center}
The text content of a `\texttt{tcblisting}` is externalized with the given \texttt{name}. Note that
the listing part is not externalized.

\begin{tcblisting}{externalize listing=example_listing,
  bicolor,colback=yellow!10,colframe=yellow!50!black,
  colbacklower=white,center lower}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcblisting}

\begin{dispExample*}{sidebyside,externalize example=example_example}
\tikz\path[shading=ball,
  ball color=red] circle (7mm);
\end{dispExample*}
### 25.3 Customization

- **/tcb/external/safety=(length)**  
  (no default, initially 2mm)  
  The snippet box is surrounded with a safety border with a thickness of \( \text{<length>} \). This border is automatically trimmed during picture inclusion. The reason for this mechanism is to catch box content which extrudes over the bounding box. For example, shadows of a \texttt{tcolorbox} are painted outside the bounding box and would be lost otherwise.

- **/tcb/external/environment=(env)**  
  (no default, initially unset)  
  Surrounds the exported snippet text with an environment \( \text{<env>} \) without parameters. Note that this option is ignored for \texttt{/tcb/externalize listing}\(^\text{P.485}\).

- **/tcb/external/environment with percent=true|false**  
  (default true, initially true)  
  If set to true, the \texttt{begin} and \texttt{end} code of \texttt{/tcb/external/environment} is appended with a percent sign. For verbatim environments, this option typically has to be set to false.

- **/tcb/external/minipage=(length)**  
  (default \texttt{\linewidth}, initially unset)  
  Surrounds the exported snippet text with a minipage. The optional \( \text{<length>} \) parameter sets the width of the minipage. Note that the default width is the current line width of the main document. See \texttt{tcbexternal}\(^\text{P.481}\) for examples. Note that this option is ignored for \texttt{/tcb/externalize listing}\(^\text{P.485}\).

- **/tcb/external/plain**  
  (no value, initially set)  
  Removes any text which was set to surround the snippet. This removes the setting of \texttt{/tcb/external/minipage}, but is independent of \texttt{/tcb/external/safety}.

- **/tcb/external/compiler=(text)**  
  (no default, initially \texttt{pdflatex})  
  Sets the name of the compiler for the snippets. Note that this compiler has to support the \texttt{\pdfmdfivesum} primitive e.g. using the \texttt{pdftexcmds} package. This should work for \texttt{xelatex} and \texttt{lualatex}.

- **/tcb/external/runs=(number)**  
  (no default, initially 1)  
  Sets the number of compiler runs for the snippet.

- **/tcb/external/input source on error=true|false**  
  (default true, initially true)  
  If set to true, the source code of the snippet is loaded instead of the failed pdf picture. Typically, this will lead to an error stop at the faulty place of the source and such helps detecting the cause. If the source input compiles without error, the document setup may be incorrect, see Section 25.1 on page 480. Maybe, the \texttt{external/} subdirectory has to be created manually in this case, see \texttt{/tcb/external/prefix}\(^\text{P.480}\).

If the option is set to false, the compilation stops immediately on an error. The log file of the external snippet has to be consulted for error messages in this case.
The given \texttt{code} is added before the snippet document. Typically, this means before \texttt{documentclass}. This is not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{package} for the snippet document. This is a shortcut for using \texttt{PassOptionsToPackage} with \texttt{\PassOptionsToPackage}. This is not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{class} for the snippet document. This is a shortcut for using \texttt{PassOptionsToClass} with \texttt{\PassOptionsToClass}. This is not used for compilation of the main document.

Removes all additional \texttt{external/preclass} settings.

The given \texttt{code} is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \texttt{options} are added as parameter for \texttt{tcbset} to the preamble of the snippet document. This is not used for compilation of the main document.

Removes all additional \texttt{external/preamble} settings.

Expands to \texttt{true}, if executed during snippet compilation, and to \texttt{false}, if executed during main document compilation. This can be used before \texttt{tcbEXTERNALIZE} to give different setting to snippet and main document.

\begin{verbatim}
\tcbinexternal{
  \usepackage{onlyforexternal}
}
\usepackage{onlyformain}
\end{verbatim}

ewtcbexternalizeenvironment\{newenv\}\{env\}\{options\}\{begin\}\{end\}

Creates a new environment \(\textit{newenv}\) which is based on \texttt{tcbexternal} \footnote{P.481}. This environment takes \textit{at least} one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} \footnote{P.481}. Further, the given \(\textit{options}\) are always added to the option list of \texttt{tcbexternal} \footnote{P.481}.

The environment content is externalized and the external snippet is surrounded by an environment \(\textit{env}\). All further parameters of \(\textit{newenv}\) are given to \(\textit{env}\) as parameters. The included image is prepended by \(\textit{begin}\) and appended by \(\textit{end}\).

\extikzpicture \footnote{P.484} is an example application for \texttt{\newtcbexternalizeenvironment}.

\begin{extabular}{example_tabular}{|l|p{6cm}|r|}
\hline
A & B & C \\
\hline
a & This table is externalized as snippet. Obviously, this only makes sense for highly complex tables. & b \\
\hline
\end{extabular}

\renewtcbexternalizeenvironment\{newenv\}\{env\}\{options\}\{begin end options\}

Identical to \texttt{\newtcbexternalizeenvironment}, but the environment \(\textit{newenv}\) is created by \texttt{\renewenvironment} instead of \texttt{\newenvironment}.

\newtcbexternalizetcolorbox\{newenv\}\{env\}\{options\}\{begin end options\}

Creates a new environment \(\textit{newenv}\) which is based on \texttt{tcbexternal} \footnote{P.481}. This environment takes \textit{at least} one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} \footnote{P.481}. Further, the given \(\textit{options}\) are always added to the option list of \texttt{tcbexternal} \footnote{P.481}.

The environment content is externalized and the external snippet is surrounded by an environment \(\textit{env}\). All further parameters of \(\textit{newenv}\) are given to \(\textit{env}\) as parameters. \textbf{In contrast to \texttt{\newtcbexternalizeenvironment}, the environment \(\textit{env}\) is intended to be based on \texttt{tcolorbox} \footnote{P.12} or \texttt{tcblisting} \footnote{P.331}.}

The \(\textit{begin end options}\) are options for settings the space before and after the included image using \texttt{/tcb/before} \footnote{P.86}, \texttt{/tcb/before skip} \footnote{P.88}, \texttt{/tcb/after} \footnote{P.86}, or \texttt{/tcb/after skip} \footnote{P.88}. 

Use the exact identical values for \texttt{/tcb/before} \footnote{P.86} and \texttt{/tcb/after} \footnote{P.86} inside \(\textit{begin end options}\) as they where used for definition of \(\textit{env}\)! Otherwise, externalized and non-externalized version will have different spacings.

\extcolorbox \footnote{P.483} is an example application for \texttt{\newtcbexternalizetcolorbox}. 

488
**Definition in the preamble:**

\newtcblisting{myownlisting}[2][
  enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  colbacktitle=red!50!yellow,before skip=6pt,after skip=6pt,
  title={#2},#1]

\newtcbexternalizetcolorbox{exmyownlisting}{myownlisting}%
 {minipage,environment with percent=false}%
 {before skip=6pt,after skip=6pt} same values as for mylisting

\begin{exmyownlisting}{example_mylisting}%
 % <- name for the external file
 My externalized example box
 This is my \LaTeX\ box.
\end{exmyownlisting}

This is my \LaTeX\ box.

This is my \LaTeX\ box.

Identical to \newtcbexternalizetcolorbox \textsuperscript{P.488}, but the environment \langle newenv \rangle is created by \renewenvironment instead of \newenvironment.

This is a low-level macro which is internally used. The MD5 digest of a \langle source \rangle file is compared with a stored MD5 digest from an auxiliary \langle md5-file \rangle. If they are not equal, the auxiliary \langle md5-file \rangle is updated to store the current MD5 digest. Further,

- if \langle condition \rangle equals 0, \langle true \rangle is executed.
- if \langle condition \rangle equals 1:
  - If the current and stored MD5 digests were different, \langle true \rangle is executed.
  - Otherwise, if the \langle target \rangle file is not existing, \langle true \rangle is executed.
  - Otherwise, if the \langle target \rangle file is older than the \langle md5-file \rangle, \langle true \rangle is executed.
  - Otherwise, \langle false \rangle is executed.
- if \langle condition \rangle equals 2, \langle false \rangle is executed.

The intended processing purpose of the \langle true \rangle code is to produce a \langle target \rangle file from the given \langle source \rangle file.
25.4 Troubleshooting and FAQ

- I use the default settings, but the external subdirectory is not created. Depending on operating system and compiler, an external subdirectory is automatically created or not. If not, create such a directory manually or add the following to your document:\footnote{The \texttt{shellesc} package is loaded automatically by the library.}:

\begin{verbatim}
\ShellEscape{mkdir external}
\end{verbatim}

or

\begin{verbatim}
\ShellEscape{mkdir -p external}
\end{verbatim}

If the combination of /tcb/external/prefix\footnote{P.480} and chosen snippet name points to another subdirectory than external, this has to be adapted.

- I use the \texttt{minted} package and I get a cache directory for every externalized snippet. To avoid this problem, there are several ways.

  – If you do not need \texttt{minted} inside the snippet code, you may use \texttt{\usepackage{minted}} after \texttt{\tcbEXTERNALIZE\footnote{P.480}} or use \texttt{\tcbifexternal\footnote{P.487}} to switch \texttt{minted} off for the external code. If \texttt{minted} is already included by another package, add the following to your preamble:

\begin{verbatim}
\tcbset{external/PassOptionsToPackage={draft}{minted}}
\end{verbatim}

  – If \texttt{minted} is needed for the snippet code, caching can be switched off by adding the following to your preamble:

\begin{verbatim}
\tcbset{external/PassOptionsToPackage={cache=false}{minted}}
\end{verbatim}

Alternatively, the \texttt{cachedir} option of \texttt{minted} may be used to redirect the cache.
This library has the single purpose to support \LaTeX{} package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s \texttt{pgf} \cite{pgf} documentation. Typically, this library is assumed to be used in conjunction with the class \texttt{ltxdoc} or alike. Denis Bitouzé, Muzimuzhi, and many others provided very valuable input for this library.

The library is loaded by a package option or inside the preamble by:

\begin{quote}
\verb|\tcbuselibrary{documentation}|
\end{quote}

This also loads the library \texttt{skins}, see Section 10 on page 165, the library \texttt{raster}, see Section 16 on page 308, the library \texttt{listings}, see Section 17 on page 330, the library \texttt{xparse}, see Section 24 on page 478, and a bunch of packages, namely \texttt{makeidx}, \texttt{marginnote}, \texttt{refcount}, and \texttt{hyperref}. The packages \texttt{pifont} and \texttt{marvosym} should be installed for some symbols, but need not to be loaded.

! The package \texttt{makeidx} is loaded only, if \texttt{\printindex} is not already defined. Therefore, one can include an alternative to \texttt{makeidx} like \texttt{imakeidx} before the library \texttt{documentation} is used.

! The package \texttt{marginnote} is loaded only, if \texttt{\marginnote} is not already defined.

! In contrast to other \texttt{tcolorbox} options, the option settings for \texttt{documentation} are typically not getting reset by \texttt{/tcb/reset} \cite{reset}, i.e. they keep their values for embedded boxes.

! In combination with DocStrip, \texttt{/tcb/verbatim ignore percent} \cite{verbatim ignore percent} may be helpful.

For UTF-8 support load (ignore this when using Xe\LaTeX{}):

\begin{quote}
\verb|\tcbuselibrary{listingsutf8,documentation}|
\end{quote}

For \texttt{minted} \cite{minted} support, load:

\begin{quote}
\verb|\tcbuselibrary{documentation,minted}|
\verb|\tcbsset{listing engine=minted}|
\end{quote}

### 26.1 Macros of the Library

\begin{verbatim}
\begin{docCommand}[⟨options⟩]{⟨name⟩}{⟨parameters⟩}
⟨command description⟩
\end{docCommand}
\end{verbatim}

Documents a \LaTeX{} macro with given \texttt{⟨name⟩} where \texttt{⟨name⟩} is written without backslash. The given \texttt{⟨options⟩} are set with \texttt{\tcbsset} \cite{set}. This macro takes mandatory or optional \texttt{⟨parameters⟩}. It is automatically indexed and can be referenced with \texttt{\refCom} \cite{refCom}{⟨name⟩}.
\begin{docCommand}\{foomakedocSubKey\}{\marg\{name\}\marg\{key path\}}

Create a new environment \marg\{name\} based on \refEnv\{docKey\} for the documentation of keys with the given \marg\{key path\}.
\end{docCommand}

\begin\{foomakedocSubKey\}\{\{name\}\{key path\}\}

Creates a new environment \{name\} based on docKey \P.495 for the documentation of keys with the given \{key path\}.

\begin{docCommand}\[color definition=blue\]\{foomakedocSubKey\*\]

% \marg\{name\}\marg\{key path\}

Create a new environment \marg\{name\} based on \refEnv\{docKey\} for the documentation of keys with the given \marg\{key path\}.
\end{docCommand}

\begin\{foomakedocSubKey\*\}\{\{name\}\{key path\}\}

Creates a new environment \{name\} based on docKey \P.495 for the documentation of keys with the given \{key path\}.

U 2020-04-22
\begin\{docCommand\*\}\{\{options\}\{name\}\{parameters\}\}

\end{docCommand\*}

Identical to docCommand \P.491, but without index entry.

N 2020-04-22
\begin\{docCommands\}\{\{options\}\{\{variant1\}\{variant2\}\ldots\}\}

\end{docCommands}

Documents several (similar) \LaTeX{} macro variants simultaneously. The given \{options\} are set with \texttt{\tcbset} \P.13 and are valid for all variants and the documentation text. Every variant is described by an option set \{variant1\}, \{variant2\}, and so on. The most crucial options are \texttt{/tcb/doc name} \P.505 and \texttt{/tcb/doc parameter} \P.505.

\begin\{docCommands\}
\begin{enlist}
\item doc no index, \% no index entries for this example
\item doc name = newtheorem,
\item doc parameter = \marg\{envname\},
\end{enlist}
\{ 
\begin{enlist}
\item doc parameter = \marg\{envname\}\oarg\{numbered within\} 
\item doc parameter = \oarg\{numbered like\}\marg\{envname\} 
\item doc name = newtheorem* 
\end{enlist}
\}
\end{docCommands}

\newtheorem\{\{envname\}\}
\newtheorem\{\{envname\}\}{\{numbered within\}]
\newtheorem\{\{numbered like\}\{\{envname\}\}
\newtheorem\*\{\{envname\}\}

example
\begin{docEnvironment}[(options)]\{name\}\{parameters\} \\
\textit{environment description}\end{docEnvironment}

Documents a \LaTeX environment with given \textit{name}. The given \textit{options} are set with \texttt{\tcbset\textsuperscript{P.13}}. This environment takes mandatory or optional \textit{parameters}. It is automatically indexed and can be referenced with \texttt{\refEnv\textsuperscript{P.502}\textit{name}}.

\begin{docEnvironment}{foocolorbox}{\oarg\{options\}}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox}{(options)}
\textit{environment description}\end{foocolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment}\%
[doclang/\text{environment content}=My content text]\%
\{foocolorbox\}*{\oarg\{options\}}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox*}{(options)}
\textit{My content text}\end{foocolorbox*}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment*}{foocolorbox*}{\oarg\{options\}}
\textit{environment description}\end{docEnvironment*}

Identical to \texttt{docEnvironment}, but without index entry.
Documents several (similar) \LaTeX{} environment variants simultaneously. The given \langle options \rangle are set with \texttt{\textbackslash tcbset} \textsuperscript{\texttt{\textbackslash P.13}} and are valid for all variants and the documentation text. Every variant is described by an option set \langle variant1 \rangle, \langle variant2 \rangle, and so on. The most crucial options are /tcb/doc name \textsuperscript{\texttt{\textbackslash P.505}} and /tcb/doc parameter \textsuperscript{\texttt{\textbackslash P.505}}.

\begin{docEnvironments}
\{ \ \\
\begin{array}{l}
\text{\texttt{\textbackslash doc no index}},
\texttt{\% no index entries for this example} \\
\text{\texttt{\textbackslash doclang/environment content}} = \texttt{box content},
\end{array} \\
\{ \ \\
\begin{array}{l}
\text{\texttt{\textbackslash doc name}} = \texttt{redbox},
\text{\texttt{\textbackslash doc description}} = \texttt{a red colored box},
\end{array} \\
\{ \ \\
\begin{array}{l}
\text{\texttt{\textbackslash doc name}} = \texttt{greenbox},
\text{\texttt{\textbackslash doc description}} = \texttt{a green colored box},
\end{array} \\
\{ \ \\
\begin{array}{l}
\text{\texttt{\textbackslash doc name}} = \texttt{bluebox},
\text{\texttt{\textbackslash doc description}} = \texttt{a blue colored box},
\end{array} \\
\{ \ \\
\begin{array}{l}
\text{\texttt{\textbackslash doc name}} = \texttt{custombox},
\texttt{\textbackslash doc parameter}} = \texttt{\textbackslash oarg\{options\}\textbackslash margs\{color\}\textbackslash margs\{title\},}
\texttt{\textbackslash doc description}} = \texttt{a colored box,}
\end{array} \\
\}
\}
\end{docEnvironments}

\begin{redbox}{\langle options \rangle}{\langle title \rangle}
\langle box content \rangle
\end{redbox}
(a red colored box)

\begin{greenbox}{\langle options \rangle}{\langle title \rangle}
\langle box content \rangle
\end{greenbox}
(a green colored box)

\begin{bluebox}{\langle options \rangle}{\langle title \rangle}
\langle box content \rangle
\end{bluebox}
(a blue colored box)

\begin{custombox}{\langle options \rangle}{\langle color \rangle}{\langle title \rangle}
\langle box content \rangle
\end{custombox}
(a colored box)

\begin{example}
\end{example}
\begin{docKey}[(key path)] [(options)]{(name)}{(parameters)}{(description)}
\end{docKey}

Documents a key with given (name) and an optional (key path). The given (options) are set with \texttt{\tcbset\textsuperscript{*}P.13}. This key takes mandatory or optional (parameters) as value with a short (description). It is automatically indexed and can be referenced with \texttt{\refKey\textsuperscript{*}P.502\{name\}}.

\begin{docKey}[foo]{footitle}{=\meta\{text\}}{no default, initially empty}
\end{docKey}

\begin{itemize}
  \item Creates a heading line with \texttt{\meta\{text\}} as content.
\end{itemize}

/\texttt{foo/footitle}=\langle\text\rangle (no default, initially empty)

\begin{docKey*}
\end{docKey*}

Identical to \texttt{docKey}, but without index entry.

\begin{docKeys}[\{\{variant1\}\},\{\{variant2\}\},\ldots]}
\end{docKeys}

Documents several (similar) key variants simultaneously. The given (options) are set with \texttt{\tcbset\textsuperscript{*}P.13} and are valid for all variants and the documentation text. Every variant is described by an option set (variant1), (variant2), and so on. The most crucial options are /\texttt{tcb/doc keypath}\textsuperscript{\textsuperscript{*}P.505}, /\texttt{tcb/doc name}\textsuperscript{\textsuperscript{*}P.505}, /\texttt{tcb/doc parameter}\textsuperscript{\textsuperscript{*}P.505}, and /\texttt{tcb/doc description}\textsuperscript{\textsuperscript{*}P.506}.

\begin{docKeys}[
doc no index, % no index entries for this example
doc keypath = mykeyroot,
doc parameter = {=\meta\{length\}},
]
{
  {doc name = width,
  doc description = initially \texttt{10cm}},
},
{doc name = height,
  doc description = initially \texttt{7cm}},
}\end{docKeys}

\begin{itemize}
  \item \texttt{/mykeyroot/width=\langle\text\rangle} (initially 10cm)
  \item \texttt{/mykeyroot/height=\langle\text\rangle} (initially 7cm)
\end{itemize}

\begin{example}
\end{example}
Documents a TikZ path operation with given \textit{name}. The given \textit{options} are set with \texttt{\tcbset{}}. This TikZ path operation takes mandatory or optional \textit{parameters}. It is automatically indexed and can be referenced with \texttt{\refPathOperation{}}. This TikZ path operation takes mandatory or optional \textit{parameters}. It is automatically indexed and can be referenced with \texttt{\refPathOperation{}}.

\begin{docPathOperation}{fooop}{\oarg{opt}{\meta{name}}}{\colOpt{at{\meta{coord}}}}
    Imaginary path operation for illustration.
\end{docPathOperation}

\begin{docPathOperations}
    \doc no index, \% no index entries for this example
    \begin{example}
        \path ... rectangle{\meta{corner or cycle}} ...;
        \path ... circle{\oarg{options}} ...;
        \path ... ellipse{\oarg{options}} ...;
    \end{example}
\end{docPathOperations}
\textbf{\docValue}\{\langle \text{options} \rangle\}\{\langle \text{name} \rangle\}

Documents a value with given \langle \text{name} \rangle. Typically, this is a value for a key. The given \langle \text{options} \rangle are set with \texttt{\tcbset} \textsuperscript{-P.13}. This value is automatically indexed for \texttt{\docValue} and has no index entry for \texttt{\docValue*}.

A feasible value for \texttt{\refKey{/foo/footitle}} is \texttt{\docValue*{foovalue}}.

\textbf{\docAuxCommand}\{\langle \text{options} \rangle\}\{\langle \text{name} \rangle\}

Documents an auxiliary or minor \LaTeX macro with given \langle \text{name} \rangle where \langle \text{name} \rangle is written without backslash. The given \langle \text{options} \rangle are set with \texttt{\tcbset} \textsuperscript{-P.13}. This macro is automatically indexed for \texttt{\docAuxCommand} and has no index entry for \texttt{\docAuxCommand*}.

The macro \texttt{\docAuxCommand{fooaux}} holds some interesting data.

The macro \texttt{fooaux} holds some interesting data.

\textbf{\docAuxEnvironment}\{\langle \text{options} \rangle\}\{\langle \text{name} \rangle\}

Documents an auxiliary or minor \LaTeX environment with given \langle \text{name} \rangle. The given \langle \text{options} \rangle are set with \texttt{\tcbset} \textsuperscript{-P.13}. This macro is automatically indexed indexed for \texttt{\docAuxEnvironment} and has no index entry for \texttt{\docAuxEnvironment*}.

The environment \texttt{\docAuxEnvironment{fooauxenv}} holds some interesting data.

The environment \texttt{fooauxenv} holds some interesting data.

\textbf{\docAuxKey}\{\langle \text{key path} \rangle\}\{\langle \text{options} \rangle\}\{\langle \text{name} \rangle\}

Documents an auxiliary key with given \langle \text{name} \rangle and an optional \langle \text{key path} \rangle. The given \langle \text{options} \rangle are set with \texttt{\tcbset} \textsuperscript{-P.13}. It is automatically indexed for \texttt{\docAuxKey} and has no index entry for \texttt{\docAuxKey*}.

The key \texttt{\docAuxKey[foo]{fooaux}} holds some interesting data.

The key \texttt{/foo/fooaux} holds some interesting data.

\textbf{\docCounter}\{\langle \text{options} \rangle\}\{\langle \text{name} \rangle\}

Documents a counter with given \langle \text{name} \rangle. The given \langle \text{options} \rangle are set with \texttt{\tcbset} \textsuperscript{-P.13}. The counter is automatically indexed for \texttt{\docCounter} and has no index entry for \texttt{\docCounter*}.

The counter \texttt{\docCounter{foocounter}} can be used for computation.

The counter \texttt{foocounter} can be used for computation.
\textbf{\texttt{\textbackslash docLength}}\{\langle \texttt{name} \rangle \}\{\langle \texttt{options} \rangle \}

Documents a length with given \langle \texttt{name} \rangle. The given \langle \texttt{options} \rangle are set with \texttt{tcbset}\textsuperscript{P.13}. The length is automatically indexed for \texttt{docLength} and has no index entry for \texttt{docLength*}.

The length \texttt{\textbackslash foolength} can be used for computation.

The length \texttt{\foolength} can be used for computation.

\textbf{\texttt{\textbackslash docColor}}\{\langle \texttt{name} \rangle \}\{\langle \texttt{options} \rangle \}

Documents a color with given \langle \texttt{name} \rangle. The given \langle \texttt{options} \rangle are set with \texttt{tcbset}\textsuperscript{P.13}. The color is automatically indexed for \texttt{docColor} and has no index entry for \texttt{docColor*}.

The color \texttt{\textbackslash foocolor} is available.

The color \texttt{foocolor} is available.

\textbf{\texttt{\textbackslash cs}}\{\langle \texttt{name} \rangle \}

Macro from \texttt{ltxdoc} [3] to typeset a command word \langle \texttt{name} \rangle where the backslash is prefixed. The library overwrites the original macro.

This is a \texttt{\cs{foocommand}}.

This is a \texttt{\foocommand}.

\textbf{\texttt{\textbackslash meta}}\{\langle \texttt{text} \rangle \}

Macro from \texttt{doc} [8] to typeset a meta \langle \texttt{text} \rangle. The library overwrites the original macro.

This is a \texttt{\meta{text}}.

This is a \texttt{\langle \texttt{text} \rangle}.

\textbf{\texttt{\textbackslash marg}}\{\langle \texttt{text} \rangle \}

Macro from \texttt{ltxdoc} [3] to typeset a \langle \texttt{text} \rangle with curly brackets as a mandatory argument. The library overwrites the original macro.

This is a mandatory \texttt{\marg{argument}}.

This is a mandatory \texttt{\langle \texttt{argument} \rangle}.

\textbf{\texttt{\textbackslash oarg}}\{\langle \texttt{text} \rangle \}

Macro from \texttt{ltxdoc} [3] to typeset a \langle \texttt{text} \rangle with square brackets as an optional argument. The library overwrites the original macro.

This is an optional \texttt{\oarg{argument}}.

This is an optional \texttt{\langle \texttt{argument} \rangle}.
\texttt{\{\textit{text}\}}

Sets the given (\textit{text}) with curly brackets.

Here we use \texttt{\{some text\}}.

Here we use \{some text\}.

\texttt{\begin{dispExample}}
\texttt{\langle environment content \rangle}
\texttt{\end{dispExample}}

Creates a colored box based on a \texttt{tcolorbox}\textsuperscript{*}.\textsuperscript{12} It displays the environment content as source code in the upper part and as compiled text in the lower part of the box. The appearance is controlled by \texttt{/tcb/documentation listing style}\textsuperscript{*}.\textsuperscript{513} and the style \texttt{/tcb/docexample}\textsuperscript{*}.\textsuperscript{513}. It may be changed by redefining this style.

\texttt{\begin{dispExample}}
This is a \LaTeX\ example.
\texttt{\end{dispExample}}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\texttt{\begin{dispExample*}{\langle options \rangle}}
\texttt{\langle environment content \rangle}
\texttt{\end{dispExample*}}

The starred version of \texttt{dispExample} takes \texttt{tcolorbox}\textsuperscript{*} \langle \textit{options} \rangle as parameter. These \langle \textit{options} \rangle are executed after \texttt{/tcb/docexample}\textsuperscript{*}.\textsuperscript{513}.

\texttt{\begin{dispExample*}{\langle sidebyside \rangle}}
This is a \LaTeX\ example.
\texttt{\end{dispExample*}}

This is a \LaTeX\ example.

This is a \LaTeX\ example.
\begin{dispListing}
\begin{Verbatim}
This is a \LaTeX\ example.
\end{Verbatim}
\end{dispListing}

Creates a colored box based on a \texttt{tcolorbox}\textsuperscript{P.12}. It displays the environment content as source code. The appearance is controlled by \texttt{tcb/documentation listing style}\textsuperscript{P.513} and the style \texttt{tcb/docexample}\textsuperscript{P.513}. It may be changed by redefining this style.

\begin{dispListing*}{title=My listing}
\begin{Verbatim}
This is a \LaTeX\ example.
\end{Verbatim}
\end{dispListing*}

The starred version of \texttt{dispListing} takes \texttt{tcolorbox}\textsuperscript{P.12} (options) as parameter. These (options) are executed after \texttt{tcb/docexample}\textsuperscript{P.513}.

\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}

\begin{absquote}
tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}

Used to typeset an abstract as quoted and small text.
\texttt{tcbmakedocSubKey}\{\langle name \rangle\}{\langle key path \rangle}

Creates a new environment \langle name \rangle based on docKey $\textsuperscript{P.495}$ for the documentation of keys with the given \langle key path \rangle as root. The new environment \langle name \rangle takes the same parameters as docKey $\textsuperscript{P.495}$ itself. A second starred environment \langle name \rangle is also created, which is identical to \langle name \rangle but without index entry.

\begin{verbatim}
\tcbmakedocSubKey{docFooKey}{foo}
\begin{docFooKey}{foodummy}={\meta{nothing}}{no default, initially empty}
Some key.
\end{docFooKey}
\begin{docFooKey*}{foo another dummy}={\meta{nothing}}{no default, initially empty}
Some key (not indexed).
\end{docFooKey*}
\end{verbatim}

\texttt{tcbmakedocSubKeys}\{\langle name \rangle\}{\langle key path \rangle}

Creates a new environment \langle name \rangle based on docKeys $\textsuperscript{P.495}$ for the documentation of keys with the given \langle key path \rangle as root. The new environment \langle name \rangle takes the same parameters as docKeys $\textsuperscript{P.495}$ itself.

\begin{verbatim}
\tcbmakedocSubKeys{docFooKeys}{foo}
\begin{docFooKeys}[
  \langle doc parameter = {\meta{nothing}},
  doc description = {no default, initially empty},
  \rangle]
  {\langle doc name = foodummy 2,
    doc no index,
  }\end{docFooKeys}
\end{verbatim}

\texttt{tcbmakedocSubKeys} and \texttt{tcbmakedocSubKey} create environments for documenting keys. The former can document keys with any given key path as root, while the latter is more specific to key documentation.
\refCom\{langle namerangle\}  
References a documented \LaTeX{} macro with given \langle name \rangle where \langle name \rangle is written without backslash. The page reference is suppressed if it links to the same page.

| \textbf{We have created} \refCom\{foomakedocSubKey\} \textbf{as an example}. |
| \textbf{We have created} \foomakedocSubKey \textbf{P. 492} \textbf{as an example}. |

\refCom*\{langle namerangle\}  
References a documented \LaTeX{} macro with given \langle name \rangle where \langle name \rangle is written without backslash. There is no page reference.

| \textbf{We have created} \refCom*\{foomakedocSubKey\} \textbf{as an example}. |
| \textbf{We have created} \foomakedocSubKey \textbf{as an example}. |

\refEnv\{langle namerangle\}  
References a documented \LaTeX{} environment with given \langle name \rangle. The page reference is suppressed if it links to the same page.

| \textbf{We have created} \refEnv\{foocolorbox\} \textbf{as an example}. |
| \textbf{We have created} foocolorbox \textbf{P. 493} \textbf{as an example}. |

\refEnv*\{langle namerangle\}  
References a documented \LaTeX{} environment with given \langle name \rangle. There is no page reference.

| \textbf{We have created} \refEnv*\{foocolorbox\} \textbf{as an example}. |
| \textbf{We have created} foocolorbox \textbf{as an example}. |

\refKey\{langle namerangle\}  
References a documented key with given \langle name \rangle where \langle name \rangle is the full path name of the key. The page reference is suppressed if it links to the same page.

| \textbf{We have created} \refKey\{/foo/footitle\} \textbf{as an example}. |
| \textbf{We have created} /foo/footitle \textbf{P. 495} \textbf{as an example}. |

\refKey*\{langle namerangle\}  
References a documented key with given \langle name \rangle where \langle name \rangle is the full path name of the key. There is no page reference.

| \textbf{We have created} \refKey*\{/foo/footitle\} \textbf{as an example}. |
| \textbf{We have created} /foo/footitle \textbf{as an example}. |
### refPathOperation{⟨name⟩}

References a documented TikZ path operation with given ⟨name⟩. The page reference is suppressed if it links to the same page.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have created \refPathOperation{fooop} as an example.</td>
<td>We have created fooop\ref{P.496} as an example.</td>
</tr>
</tbody>
</table>

### refPathOperation*{⟨name⟩}

References a documented TikZ path operation with given ⟨name⟩. There is no page reference.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have created \refPathOperation*{fooop} as an example.</td>
<td>We have created fooop as an example.</td>
</tr>
</tbody>
</table>

### refAux{⟨name⟩}

References some auxiliary environment, key, value, or color. The ⟨name⟩ is colored according to \texttt{/tcb/color hyperlink\ref{P.515}}, if \hyperref colorlinks are set, but there is no real link.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some pages back, one can see \refAux{/foo/footitle} as an example.</td>
<td>Some pages back, one can see /foo/footitle as an example.</td>
</tr>
</tbody>
</table>

### refAuxcs{⟨name⟩}

References some auxiliary macro ⟨name⟩ where ⟨name⟩ is written without backslash. The ⟨name⟩ is colored according to \texttt{/tcb/color hyperlink\ref{P.515}}, if \hyperref colorlinks are set, but there is no real link.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some pages back, one can see \refAuxcs{fooaux} as an example.</td>
<td>Some pages back, one can see fooaux as an example.</td>
</tr>
</tbody>
</table>

### \colDef{⟨text⟩}

Sets ⟨text⟩ with the command color, see \texttt{/tcb/color command\ref{P.515}}.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my \colDef{text}.</td>
<td>This is my text.</td>
</tr>
</tbody>
</table>

### \colOpt{⟨text⟩}

Sets ⟨text⟩ with the option color, see \texttt{/tcb/color option\ref{P.515}}.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my \colOpt{text}.</td>
<td>This is my text.</td>
</tr>
</tbody>
</table>
\colFade\{text\}

Sets \textit{(text)} with the fade color, see \texttt{/tcb/color fade} \textsuperscript{P.515}.

This is my \colFade{text}.

This is my text.

\tcbdocmarginnote\{(options)\}\{text\}

Creates a \texttt{tcolorbox} note with the given \textit{(text)} inside the margin using the \texttt{marginnote} package. The style of the \texttt{tcolorbox} is predefined and can be altered by \texttt{/tcb/doc marginnote} \textsuperscript{P.507} and the given \textit{(options)}.

Some text \tcbdocmarginnote\{Note A\} which is commented by a note inside the margin. Alternatively to \texttt{\tcbdocmarginnote}, you can always use \texttt{\marginnote} with a \texttt{tcolorbox} directly. \par
This is further text\%
\tcbdocmarginnote\{colframe=blue!50!white,colback=blue!5!white\}\{Note B\} with another note.

Note A

Note B

\tcbdocnew\{date\}

Auxiliary macro which typesets the \texttt{/tcb/doclang/new} \textsuperscript{P.516} text with the given \textit{(date)}. It may be redefined for customization.

\texttt{\tcbdocnew\{1981-10-29\}.}

\% Next one is displayed in the margin:
\texttt{\tcbdocmarginnote\{\tcbdocnew\{1978-02-09\}\}}


\tcbdocupdated\{date\}

Auxiliary macro which typesets the \texttt{/tcb/doclang/updated} \textsuperscript{P.516} text with the given \textit{(date)}. It may be redefined for customization.

\texttt{\tcbdocupdated\{2014-09-19\}.}

26.2 Entry Content Option Keys

\textbf{/tcb/doc name\textasciitilde{name}} (no default, initially empty)

Sets the \textless{name}\textgreater{} of the entry to document, i.e. the \textless{name}\textgreater{} of the command, environment, key, etc. For \texttt{docCommand\textasciitilde{}P.491}, \texttt{docEnvironment\textasciitilde{}P.493}, etc. the \textless{name}\textgreater{} is set by a mandatory parameter, but can also be set by /tcb/doc name. /tcb/doc name also sets \textless{name}\textgreater{} to /tcb/doc label\textasciitilde{}P.506, /tcb/doc index\textasciitilde{}P.506, and /tcb/doc sort index\textasciitilde{}P.506.

\begin{docCommands}\[
\text{doc no index, } \% \text{ no index entries for this example}
\text{doc name\textasciitilde{}bfseries,}
\] {}
Font setting to bold face.
\end{docCommands}

\textbf{/tcb/doc parameter\textasciitilde{parameters}} (no default, initially empty)

Sets the \textless{parameters}\textgreater{} of the entry to document, i.e. the \textless{parameters}\textgreater{} of the command, environment, key, etc. For \texttt{docCommand\textasciitilde{}P.491}, \texttt{docEnvironment\textasciitilde{}P.493}, etc. the \textless{parameters}\textgreater{} is set by a mandatory option, but can also be set by /tcb/doc parameter.

\begin{docCommands}\[
\text{doc no index, } \% \text{ no index entries for this example}
\text{doc name\textasciitilde{}textbf,}
\text{doc parameter\textasciitilde{marg\{text\},}}
\] {}
Sets \texttt{meta\{text\}} in bold face.
\end{docCommands}

\textbf{/tcb/doc keypath\textasciitilde{key path}} (no default, initially empty)

Sets the \textless{key path}\textgreater{} of the key to document. For \texttt{docKey\textasciitilde{}P.495} and \texttt{docKey\textasciitilde{}P.495} the \textless{key path}\textgreater{} is set by a specialized option, but can also be set by /tcb/doc keypath.

\begin{docKeys}\[
\text{doc no index, } \% \text{ no index entries for this example}
\text{doc keypath\textasciitilde{tikz},}
\text{doc name\textasciitilde{fill,}}
\text{doc parameter\textasciitilde{colOpt\{=\texttt{meta\{color\}},}}
\text{doc description\textasciitilde{default is scope\textquoteright{}s color setting,}}
\] {}
This option causes the path to be filled.
\end{docKeys}

\texttt{/tikz/fill\textasciitilde{\texttt{color}}} (default is scope\textquoteright{}s color setting)

This option causes the path to be filled.
/tcb/doc description=(description) (no default, initially empty)
Sets a (short!) additional (description) for docCommand P.491, docEnvironment P.493, or
docPathOperation P.496. Such a description is mandatory for docKey P.495.

\begin{docCommand*}[doc description=my description]{myCommandF}{\marg{argument}}
   This is the documentation of \refCom{myCommandF} which takes one \meta{argument}.
   \refCom{myCommandF} does some funny things with its \meta{argument}.
\end{docCommand*}

\myCommandF{\langle argument \rangle} (my description)
This is the documentation of \myCommandF which takes one \langle argument \rangle. \myCommandF does some
funny things with its \langle argument \rangle.

Note that the description \langle text \rangle may overlap with the text on the left hand side if too long. Linebreaks can be used inside the \langle text \rangle.

/tcb/doc label=(text) (no default, initially unset)
If used inside the option list of docCommand P.491, docEnvironment P.493, docKey P.495,
etc, then \langle text \rangle is used for labeling instead of the name of the definition.

\begin{docPathOperation*}[doc label=pathline]{-{}-}{\meta{coordinate or cycle}}
   This is the documentation of \refPathOperation{pathline}.
\end{docPathOperation*}

\path ... --\langle coordinate or cycle \rangle ...;
This is the documentation of --.

/tcb/doc index=(text) (no default, initially unset)
If used inside the option list of docCommand P.491, docEnvironment P.493, docKey P.495,
etc, then \langle text \rangle is used for the index instead of the name of the definition.

\begin{docPathOperation}[doc index=foo path (horizontal then vertical),
   doc label=pathline2]{-\textbar}{\meta{coordinate or cycle}}
   This is the documentation of \refPathOperation{pathline2}.
\end{docPathOperation}

\path ... -\langle coordinate or cycle \rangle ...;
This is the documentation of -\textbar.

/tcb/doc sort index=(text) (no default, initially unset)
If used inside the option list of docCommand P.491, docEnvironment P.493, docKey P.495,
etc, then \langle text \rangle is used for as sort key for the index instead of the name of the definition.

\begin{docCommands}
   doc name = l_tcobox_example_tl,
   doc sort index = example_tl, % sorted unter e like example
\end{docCommands}
/tcb/doc into index=true|false  
(default true, initially true)

If set to false, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. docCommand*→P.492 instead of docCommand→P.491.

/tcb/doc no index  
(style, initially unset)

If set, no index entries are written for the main documentation environments. This is a shortcut for using /tcb/doc into index=false.

/tcb/doc marginnote=⟨options⟩  
(no default, initially empty)

Sets style ⟨options⟩ for the displayed box of the \tcbdocmarginnote→P.504 command.

\tcbset{doc marginnote={colframe=blue!50!white,colback=blue!5!white}}%
This is some text\tcbdocmarginnote{Note A}
which is commented by a note inside the margin.

Note A

This is some text which is commented by a note inside the margin.

/tcb/doc new=⟨date⟩  
(style, no default)

Adds a a marginnote with a “New: ⟨date⟩” message at the beginning of the upper box part. The intended use is inside the option list of docCommand→P.491, docEnvironment→P.493, etc.

\begin{docCommand}{doc new=2000-01-01}{foosomething}{\marg{text}}
Some command for something.
\end{docCommand}

New: 2000-01-01

\foosomething{⟨text⟩}

Some command for something.

/tcb/doc updated=⟨date⟩  
(style, no default)

Adds a marginnote with a “Updated: ⟨date⟩” message at the beginning of the upper box part.

/tcb/doc new and updated=⟨new date⟩{⟨update date⟩}  
(style, no default)

Adds a marginnote with “New: ⟨new date⟩” and “Updated: ⟨update date⟩” messages at the beginning of the upper box part. See /tcb/doc new.
26.3 Entry Customization Option Keys

/tcb/doc left=⟨length⟩
Sets the left hand offset of the documentation texts from \texttt{docCommand} \textsuperscript{P.491}, \texttt{docEnvironment} \textsuperscript{P.493}, \texttt{docKey} \textsuperscript{P.495}, etc, to \langle \text{length} \rangle.

\begin{docCommand*}\[doc left=2cm,doc left indent=-2cm\]{myCommandA}\{\marg\{argument\}\}
This is the documentation of \texttt{\refCom\{myCommandA\}} which takes one \texttt{\meta\{argument\}}. \texttt{\refCom\{myCommandA\}} does some funny things with its \texttt{\meta\{argument\}}.
\end{docCommand*}

\myCommandA\{⟨argument⟩\}
This is the documentation of \texttt{\myCommandA} which takes one \langle \texttt{argument} \rangle. \texttt{\myCommandA} does some funny things with its \langle \texttt{argument} \rangle.

/tcb/doc right=⟨length⟩
Sets the right hand offset of the documentation texts from \texttt{docCommand} \textsuperscript{P.491}, \texttt{docEnvironment} \textsuperscript{P.493}, \texttt{docKey} \textsuperscript{P.495}, etc, to \langle \text{length} \rangle.

\begin{docCommand*}\[doc right=2cm\]{myCommandB}\{\marg\{argument\}\}
This is the documentation of \texttt{\refCom\{myCommandB\}} which takes one \texttt{\meta\{argument\}}. \texttt{\refCom\{myCommandB\}} does some funny things with its \texttt{\meta\{argument\}}.
\end{docCommand*}

\myCommandB\{⟨argument⟩\}
This is the documentation of \texttt{\myCommandB} which takes one \langle \texttt{argument} \rangle. \texttt{\myCommandB} does some funny things with its \langle \texttt{argument} \rangle.

/tcb/doc left indent=⟨length⟩
Sets the left hand indent of documentation heads from \texttt{docCommand} \textsuperscript{P.491}, \texttt{docEnvironment} \textsuperscript{P.493}, \texttt{docKey} \textsuperscript{P.495}, etc, to \langle \text{length} \rangle.

\begin{docCommand*}\[doc left indent=2cm\]{myCommandC}\{\marg\{argument\}\}
This is the documentation of \texttt{\refCom\{myCommandC\}} which takes one \texttt{\meta\{argument\}}. \texttt{\refCom\{myCommandC\}} does some funny things with its \texttt{\meta\{argument\}}.
\end{docCommand*}

\myCommandC\{⟨argument⟩\}
This is the documentation of \texttt{\myCommandC} which takes one \langle \texttt{argument} \rangle. \texttt{\myCommandC} does some funny things with its \langle \texttt{argument} \rangle.

/tcb/doc right indent=⟨length⟩
Sets the right hand indent of documentation heads from \texttt{docCommand} \textsuperscript{P.491}, \texttt{docEnvironment} \textsuperscript{P.493}, \texttt{docKey} \textsuperscript{P.495}, etc, to \langle \text{length} \rangle.

\begin{docCommand*}\[doc right indent=-10mm,doc right=10mm,\]
\texttt{doc description=test value}\{myCommandD\}\{\marg\{argument\}\}
This is the documentation of \texttt{\refCom\{myCommandD\}} which takes one \texttt{\meta\{argument\}}. \texttt{\refCom\{myCommandD\}} does some funny things with its \texttt{\meta\{argument\}}.
\end{docCommand*}

\myCommandD\{⟨argument⟩\}
(test value)
This is the documentation of \texttt{\myCommandD} which takes one \langle \texttt{argument} \rangle. \texttt{\myCommandD} does some funny things with its \langle \texttt{argument} \rangle.
The head lines of the main documentation environments `docCommand`\(^{P.491}\), `docEnvironment`\(^{P.493}\), `docKey`\(^{P.495}\), etc, are `tcolorbox`es inside a `tcbraster`\(^{P.310}\). Options to the surrounding `tcbrasters` and the embedded `tcolorbox`es can be given using the following keys.

### /tcb/doc raster command\(^{(options)}\)
Sets `{options}` for the surrounding `tcbraster`\(^{P.310}\) of `docCommand`\(^{P.491}\), `docCommand*`\(^{P.492}\), and `docCommands`\(^{P.492}\).

```latex
\tcset{doc raster command={raster before skip=7mm,raster after skip=0mm}}
```

The is an example text.

```latex
\begin{docCommand*}{myCommandI}{\marg{argument}}
This is the documentation of `\refCom{myCommandI}` which takes one `\meta{argument}`. `\refCom{myCommandI}` does some funny things with its `\meta{argument}`.
\end{docCommand*}
```

This is the documentation of `\myCommandI{⟨argument⟩}` which takes one `⟨argument⟩`. `\myCommandI` does some funny things with its `⟨argument⟩`.

### /tcb/doc raster environment\(^{(options)}\)
Sets `{options}` for the surrounding `tcbraster`\(^{P.310}\) of `docEnvironment`\(^{P.493}\), `docEnvironment*`\(^{P.493}\), and `docEnvironments`\(^{P.494}\).

### /tcb/doc raster key\(^{(options)}\)
Sets `{options}` for the surrounding `tcbraster`\(^{P.310}\) of `docKey`\(^{P.495}\), `docKey*`\(^{P.495}\), and `docKeys`\(^{P.495}\).

### /tcb/doc raster path\(^{(options)}\)
Sets `{options}` for the surrounding `tcbraster`\(^{P.310}\) of `docPathOperation`\(^{P.496}\), `docPathOperation*`\(^{P.496}\), and `docPathOperations`\(^{P.496}\).

### /tcb/doc raster\(^{(options)}\)
Shortcut for setting the same `{options}` for `/tcb/doc raster command`, `/tcb/doc raster environment`, `/tcb/doc raster key`, and `/tcb/doc raster path`.

### /tcb/doc head command\(^{(options)}\)
Sets `{options}` for the head line of `docCommand`\(^{P.491}\), `docCommand*`\(^{P.492}\), and `docCommands`\(^{P.492}\).

```latex
\tcset{doc head command={interior style={fill,left color=red!20!white, right color=blue!20!white}}}
```

This is the documentation of `\refCom{myCommandE}` which takes one `\meta{argument}`. `\refCom{myCommandE}` does some funny things with its `\meta{argument}`.

```latex
\begin{docCommand*}{myCommandE}{\marg{argument}}
This is the documentation of `\myCommandE{⟨argument⟩}` which takes one `⟨argument⟩`. `\myCommandE` does some funny things with its `⟨argument⟩`.
\end{docCommand*}
```

This is the documentation of `\myCommandE{⟨argument⟩}` which takes one `⟨argument⟩`. `\myCommandE` does some funny things with its `⟨argument⟩`. 
/tcb/doc head environment={(options)} (no default, initially empty)
Sets \{options\} for the head line of docEnvironment→P.493, docEnvironment*→P.493, and docEnvironments→P.494.

\tcbset{doc head environment={beamer,boxsep=2pt,arc=2pt,colback=green!20!white}}
\begin{docEnvironment*}{myEnvironment}{⟨argument⟩}
  This is the documentation of myEnvironment which takes one \meta{argument}.
\end{docEnvironment*}

\begin{myEnvironment}{⟨argument⟩}{⟨environment content⟩}
\end{myEnvironment}
This is the documentation of myEnvironment which takes one ⟨argument⟩.

/tcb/doc head key={(options)} (no default, initially empty)
Sets \{options\} for the head line of docKey→P.495, docKey*→P.495, and docKeys→P.495.

\tcbset{doc head key={boxsep=4pt,arc=4pt,boxrule=0.6pt,frame style=fill,interior style=fill,colframe=green!50!black}}
\begin{docKey}{/foo/myKey}{}{no value}
  This is the documentation of /foo/myKey.
\end{docKey}
/foo/myKey (no value)
This is the documentation of /foo/myKey.

/tcb/doc head path={(options)} (no default, initially empty)
Sets \{options\} for the head line of docPathOperation→P.496, docPathOperation*→P.496, and docPathOperations→P.496.

\tcbset{doc head command={interior style={fill,left color=red!7!white,right color=blue!7!white}}}
\begin{docPathOperation*}{-{}-}{⟨coordinate or cycle⟩}
  This is the documentation of -{}-.
\end{docPathOperation*}
\path ... --⟨coordinate or cycle⟩ ...;
This is the documentation of --.

/tcb/doc head={(options)} (no default, initially empty)
Shortcut for setting the same \{options\} for /tcb/doc head command→P.509, /tcb/doc head environment, /tcb/doc head key, and /tcb/doc head path.
The description texts of the main documentation environments `docCommand\^P.491`, `docEnvironment\^P.493`, `docKey\^P.495`, etc, are set in a compact form without indentation and \texttt{parskip=Opt}. This settings can overruled by using the following keys to insert code before (or after) the description texts.

\begin{verbatim}
\tcbset{before doc body command={%
    \setlength{\parindent}{2.5em}%
    \setlength{\parskip}{1ex plus 0.75ex minus 0.25ex}%
  }}
\begin{docCommand*}{myCommandG}{\marg}{\meta}
  This is the documentation of \refCom{myCommandG} which takes one \meta{argument}. \refCom{myCommandG} does some funny things with its \meta{argument}.
\end{docCommand*}
\end{verbatim}

\texttt{myCommandG}{\langle argument\rangle}

This is the documentation of \texttt{myCommandG} which takes one \langle argument\rangle. \texttt{myCommandG} does some funny things with its \langle argument\rangle.

\begin{verbatim}
\tcbset{after doc body command={%
    \hfill\nolinebreak[1]\hspace*{\fill}\textcolor{red}{$\diamondsuit$}%
  }}
\begin{docCommand*}{myCommandH}{\marg}{\meta}
  This is the documentation of \refCom{myCommandH} which takes one \meta{argument}. \refCom{myCommandH} does some funny things with its \meta{argument}.
\end{docCommand*}
\end{verbatim}

\texttt{myCommandH}{\langle argument\rangle}

This is the documentation of \texttt{myCommandH} which takes one \langle argument\rangle. \texttt{myCommandH} does some funny things with its \langle argument\rangle. ♦

\begin{verbatim}
\tcbset{before doc body environment={code}}
\begin{docEnvironment*}{}{\marg}{\meta}
  This is the documentation of \refCom{docEnvironment*} which takes one \meta{argument}. \refCom{docEnvironment*} does some funny things with its \meta{argument}.
\end{docEnvironment*}
\end{verbatim}

\texttt{docEnvironment*}{\langle code\rangle}

This is the documentation of \texttt{docEnvironment*} which takes one \langle code\rangle. \texttt{docEnvironment*} does some funny things with its \langle code\rangle.

\begin{verbatim}
\tcbset{after doc body environment={code}}
\begin{docEnvironment*}{}{\marg}{\meta}
  This is the documentation of \refCom{docEnvironment*} which takes one \meta{argument}. \refCom{docEnvironment*} does some funny things with its \meta{argument}.
\end{docEnvironment*}
\end{verbatim}

\texttt{docEnvironment*}{\langle code\rangle}

This is the documentation of \texttt{docEnvironment*} which takes one \langle code\rangle. \texttt{docEnvironment*} does some funny things with its \langle code\rangle.

\begin{verbatim}
\tcbset{before doc body key={code}}
\begin{docKey*}{}{\marg}{\meta}
  This is the documentation of \refCom{docKey*} which takes one \meta{argument}. \refCom{docKey*} does some funny things with its \meta{argument}.
\end{docKey*}
\end{verbatim}

\texttt{docKey*}{\langle code\rangle}

This is the documentation of \texttt{docKey*} which takes one \langle code\rangle. \texttt{docKey*} does some funny things with its \langle code\rangle.

\begin{verbatim}
\tcbset{after doc body key={code}}
\begin{docKey*}{}{\marg}{\meta}
  This is the documentation of \refCom{docKey*} which takes one \meta{argument}. \refCom{docKey*} does some funny things with its \meta{argument}.
\end{docKey*}
\end{verbatim}

\texttt{docKey*}{\langle code\rangle}

This is the documentation of \texttt{docKey*} which takes one \langle code\rangle. \texttt{docKey*} does some funny things with its \langle code\rangle.
/tcb/before doc body path=⟨code⟩
(no default, initially empty)
Executes ⟨code⟩ before the description texts of docPathOperation* → P.496 and docPathOperation → P.496.

/tcb/after doc body path=⟨code⟩
(no default, initially empty)
Executes ⟨code⟩ after the description texts of docPathOperation* → P.496 and docPathOperation → P.496.

/tcb/before doc body=⟨options⟩
(no default, initially empty)
Shortcut for setting the same ⟨options⟩ for /tcb/before doc body command → P.511, /tcb/before doc body environment → P.511, /tcb/before doc body key → P.511, and /tcb/before doc body path.

/tcb/after doc body=⟨options⟩
(no default, initially empty)
Shortcut for setting the same ⟨options⟩ for /tcb/after doc body command → P.511, /tcb/after doc body environment → P.511, /tcb/after doc body key → P.511, and /tcb/after doc body path.
26.4 General Customization Option Keys

/tcb/docexample

Sets the style for dispExample \textsuperscript{P.499} and dispListing \textsuperscript{P.500} with the colors ExampleBack and ExampleFrame. To change the appearance of the examples, this style can be redefined.

\begin{verbatim}
% Predefined style:
\tcbset{
  docexample/.style={colframe=ExampleFrame,colback=ExampleBack,
    before skip=\medskipamount,after skip=\medskipamount,
    fontlower=\footnotesize}
}\end{verbatim}

/tcb/documentation listing options=\{key list\} (no default, initially style=tcbdocumentation)

Sets the options from the package listings \textsuperscript{[6]}. They are used inside dispExample \textsuperscript{P.499} and dispListing \textsuperscript{P.500} to typeset the listings. Note that this is not identical to the key /tcb/listing options \textsuperscript{P.340} which is used for “normal” listings.

Used for /tcb/listing engine \textsuperscript{P.345}=listings only.

/tcb/documentation listing style=\{listing style\} (no default, initially tcbdocumentation)

Abbreviation for documentation listing options=\{style=\ldots\}. This key sets a \{style\} for the listings package, see \textsuperscript{[6]}. Note that this is not identical to the key /tcb/listing style \textsuperscript{P.340} which is used for “normal” listings.

Used for /tcb/listing engine \textsuperscript{P.345}=listings only.

/tcb/documentation minted options=\{key list\} (no default, initially tabsize=2,fontsize=\small)

Sets the options from the package minted \textsuperscript{[12]} which are used during typesetting of the listing, if used. Note that this is not identical to the key /tcb/minted options \textsuperscript{P.343} which is used for “normal” listings.

Used for /tcb/listing engine \textsuperscript{P.345}=minted only.

/tcb/documentation minted style=\{key list\} (no default, initially unset)

Sets a \{style\} known to Pygments \textsuperscript{[14]} for the package minted \textsuperscript{[12]}, if used. Note that this is not identical to the key /tcb/minted style \textsuperscript{P.344} which is used for “normal” listings.

Used for /tcb/listing engine \textsuperscript{P.345}=minted only.

/tcb/documentation minted language=\{programming language\} (no default, initially latex)

Sets a \{programming language\} known to Pygments \textsuperscript{[14]} for the package minted \textsuperscript{[12]}, if used. Note that this is not identical to the key /tcb/minted language \textsuperscript{P.343} which is used for “normal” listings.

Used for /tcb/listing engine \textsuperscript{P.345}=minted only.

The following two keys are deprecated and without function (v3.50 and above). Use /tcb/before \textsuperscript{P.86} and /tcb/after \textsuperscript{P.86} with appropriate values instead. Also see /tcb/docexample.

/tcb/before example=\{macros\} (no default, initially empty)

Sets the \{macros\} which are executed before dispExample \textsuperscript{P.499} and dispListing \textsuperscript{P.500} additional to /tcb/before \textsuperscript{P.86}.

/tcb/after example=\{macros\} (no default, initially empty)

Sets the \{macros\} which are executed after dispExample \textsuperscript{P.499} and dispListing \textsuperscript{P.500} additional to /tcb/after \textsuperscript{P.86}.

513
Keyword used in \texttt{docEnvironment} \cite{tcb}, \texttt{docCommand} \cite{tcb}, etc. are printed boldface (or not). Since the typewriter font is used, the effect may be invisible with Computer Modern fonts or similar which do not have a bold variant. Note that references to keywords are not printed boldface at all.

\begin{verbatim}
\LARGE
\docAuxCommand{fooaux}, \refCom{tcbset}
\footnotesize
\texttt{fooaux}, \texttt{tcbset} & $\rightarrow$ & P.13
\end{verbatim}

Replaces the internally used \texttt{\index} macro by the given \texttt{⟨macro⟩}. The \texttt{⟨macro⟩} has to take one mandatory argument like \texttt{\index}. This option is mutually exclusive with \texttt{/tcb/index command name}.

\begin{verbatim}
\tcbset{index command=myindexcommand}
\end{verbatim}

Replaces the internally used \texttt{\index} macro by \texttt{\index[⟨name⟩]}, i.e. \texttt{\index{...}} is replaced by \texttt{\index[⟨name⟩]{...}}. This option is intended to be used with \texttt{imakeidx} and is mutually exclusive with \texttt{/tcb/index command}.

\begin{verbatim}
\tcbset{index command name=mydoc}
\end{verbatim}

Determines the basic \texttt{⟨format⟩} of the generated index. Feasible values are:

\begin{itemize}
  \item \texttt{pgfsection}: The index is formatted like in the \texttt{pgf} documentation (as a section).
  \item \texttt{pgfchapter}: The index is formatted like in the \texttt{pgf} documentation (as a chapter).
  \item \texttt{pgf}: Alias for \texttt{pgfsection}.
  \item \texttt{doc}: The index is assumed to be formatted by \texttt{doc} or \texttt{ltxdoc}. The usage of \texttt{makeindex} with \texttt{-s gind.ist} is assumed. The package \texttt{hypdoc} has to be loaded \texttt{before tcolorbox}. Only a limited set of customizations will work! This option cannot be unset when used!
  \item \texttt{off}: The index is not formatted by \texttt{tcolorbox}. Use this, if the index is formatted by other package like \texttt{imakeidx}.
\end{itemize}

Sets the character for “actual” in automatic indexing.

Sets the character for “quote” in automatic indexing.

Sets the character for “level” in automatic indexing.

Sets the \texttt{makeindex} default values for \texttt{/tcb/index actual}, \texttt{/tcb/index quote}, and \texttt{/tcb/index level}.

Sets the \texttt{makeindex} values recommended for German language texts. This is identical to setting the following:

\begin{verbatim}
\tcbset{index actual={=},index quote={!},index level={>}}
\end{verbatim}
/tcb/index annotate=true|false (default true, initially true)
If set to true, the index entries are annotated with short descriptions given by
/tcb/doclang/environment→P.516, /tcb/doclang/key→P.516, and others.

/tcb/index colorize=true|false (default true, initially false)
If set to true, the index entries colorized according to the color settings given by /tcb/color environment, /tcb/color key, and others.

/tcb/index gather colors=true|false (default true, initially true)
/tcb/index gather commands=true|false (default true, initially true)
/tcb/index gather environments=true|false (default true, initially true)
/tcb/index gather keys=true|false (default true, initially true)
/tcb/index gather lengths=true|false (default true, initially true)
/tcb/index gather paths=true|false (default true, initially true)
/tcb/index gather values=true|false (default true, initially true)
/tcb/index gather all (style, initially set)
/tcb/index gather none (style)
If set to true, an additional index grouping is created where entries are gath-
ered, e.g. /tcb/index gather counters creates an index entry ‘Colors’, see
/tcb/doclang/colors→P.516, which gets all colors as sub entries.

Switches all index gather options from above to true (all) or false (none).

/tcb/color command=(color) (no default, initially Definition)
Sets the highlight color used by macro definitions.

/tcb/color environment=(color) (no default, initially Definition)
Sets the highlight color used by environment definitions.

/tcb/color key=(color) (no default, initially Definition)
Sets the highlight color used by key definitions.

/tcb/color path=(color) (no default, initially Definition)
Sets the highlight color used by TikZ path operation definitions.

/tcb/color value=(color) (no default, initially Definition)
Sets the highlight color used by value definitions.

/tcb/color counter=(color) (no default, initially Definition)
Sets the highlight color used by counter definitions.

/tcb/color length=(color) (no default, initially Definition)
Sets the highlight color used by length definitions.

/tcb/color color=(color) (no default, initially Definition)
Sets the highlight color used by color definitions.

/tcb/color definition=(color) (no default, initially Definition)
Sets the highlight color for /tcb/color command, /tcb/color environment, /tcb/color key, /tcb/color path, /tcb/color value, /tcb/color counter, /tcb/color length, and /tcb/color color.

/tcb/color option=(color) (no default, initially Option)
Sets the color used for optional arguments.

/tcb/color fade=(color) (no default, initially Fade)
Sets the color used for faded text like \path in docPathOperation→P.496.

/tcb/color hyperlink=(color) (no default, initially Hyperlink)
Sets the color for all hyper-links, i.e. all internal and external links.

515
26.5 Language Option Keys

The following keys are provided for language specific settings. The English language is predefined.

/tcb/english language (style, no value)
Sets all language specific settings to English.

/tcb/doclang/color=(text) (no default, initially color)
Text used in the index for colors.

/tcb/doclang/colors=(text) (no default, initially Colors)
Heading text in the index for colors.

/tcb/doclang/command=(text) (no default, initially Commands)
Heading text in the index for commands.

/tcb/doclang/counter=(text) (no default, initially counter)
Text used in the index for counters.

/tcb/doclang/counters=(text) (no default, initially Counters)
Heading text in the index for counters.

/tcb/doclang/environment=(text) (no default, initially environment)
Text used in the index for environments.

/tcb/doclang/environments=(text) (no default, initially Environments)
Heading text in the index for environments.

/tcb/doclang/environment content=(text) (no default, initially environment content)
Text used in docEnvironment → P. 493.

/tcb/doclang/index=(text) (no default, initially Index)
Heading text for the index.

/tcb/doclang/key=(text) (no default, initially key)
Text used in the index for keys.

/tcb/doclang/keys=(text) (no default, initially Keys)
Heading text used in the index for keys.

/tcb/doclang/length=(text) (no default, initially length)
Text used in the index for lengths.

/tcb/doclang/lengths=(text) (no default, initially Lengths)
Heading text in the index for lengths.

/tcb/doclang/new=(text) (no default, initially New)
Announcement text for new content.

/tcb/doclang/path=(text) (no default, initially path operation)
Text used in the index for path operations.

/tcb/doclang/paths=(text) (no default, initially Path operations)
Heading text in the index for path operations.

/tcb/doclang/pageword=(text) (no default, initially P.)
Short text for page references.

/tcb/doclang/updated=(text) (no default, initially Updated)
Announcement text for updated content.
26.6 Predefined Colors of the Library

The following colors are predefined. They are used as default colors in some library commands.

- Option
- Definition
- ExampleFrame
- ExampleBack
- Hyperlink
- Fade

517
A  Picture Credits

The following pictures were used inside this documentation.

- **Basilica_5.png**
  - Photograph taken by Thomas F. Sturm.
  - [Link](http://commons.wikimedia.org/wiki/File:Basilica_5.png)

- **lichtspiel.jpg**
  - [Link](http://commons.wikimedia.org/wiki/File:lichtspiel.jpg)

- **crinklepaper.png**
  - Created with GIMP.
    - [Link](http://www.gimp.org)

- **pink_marble.png**
  - Created with GIMP.
    - [Link](http://www.gimp.org)

- **blueshade.png**
  - Created with GIMP.
    - [Link](http://www.gimp.org)

- **goldshade.png**
  - Created with GIMP.
    - [Link](http://www.gimp.org)
References


https://www.unibw.de/bw/professuren/thomas-sturm.

https://www.unibw.de/bw/professuren/thomas-sturm.


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<td>390</td>
</tr>
<tr>
<td><code>ams gather* lower</code></td>
<td>390</td>
</tr>
<tr>
<td><code>ams gather* upper</code></td>
<td>390</td>
</tr>
<tr>
<td><code>ams nodisplayskip</code></td>
<td>391</td>
</tr>
<tr>
<td><code>ams nodisplayskip lower</code></td>
<td>391</td>
</tr>
<tr>
<td><code>ams nodisplayskip upper</code></td>
<td>391</td>
</tr>
<tr>
<td><code>arc</code></td>
<td>41</td>
</tr>
<tr>
<td><code>arc is angular</code></td>
<td>43</td>
</tr>
<tr>
<td><code>arc is curved</code></td>
<td>43</td>
</tr>
<tr>
<td><code>areasisize</code></td>
<td>463</td>
</tr>
<tr>
<td><code>areasisize*</code></td>
<td>463</td>
</tr>
<tr>
<td><code>as-is value</code></td>
<td>279</td>
</tr>
<tr>
<td><code>at</code></td>
<td>448</td>
</tr>
<tr>
<td><code>at begin tikz</code></td>
<td>210</td>
</tr>
<tr>
<td><code>at begin tikz reset</code></td>
<td>210</td>
</tr>
<tr>
<td><code>at end tikz</code></td>
<td>210</td>
</tr>
<tr>
<td><code>at end tikz reset</code></td>
<td>210</td>
</tr>
<tr>
<td><code>attach boxed title to bottom</code></td>
<td>174</td>
</tr>
<tr>
<td><code>attach boxed title to bottom center</code></td>
<td>173</td>
</tr>
<tr>
<td><code>attach boxed title to bottom left</code></td>
<td>173</td>
</tr>
<tr>
<td><code>attach boxed title to bottom right</code></td>
<td>173</td>
</tr>
<tr>
<td><code>attach boxed title to bottom text left</code></td>
<td>173</td>
</tr>
<tr>
<td><code>attach boxed title to bottom text right</code></td>
<td>173</td>
</tr>
<tr>
<td><code>attach boxed title to bottom*</code></td>
<td>174</td>
</tr>
<tr>
<td><code>attach boxed title to top</code></td>
<td>174</td>
</tr>
<tr>
<td><code>attach boxed title to top center</code></td>
<td>172</td>
</tr>
<tr>
<td><code>attach boxed title to top left</code></td>
<td>172</td>
</tr>
<tr>
<td><code>attach boxed title to top right</code></td>
<td>172</td>
</tr>
<tr>
<td><code>attach boxed title to top text left</code></td>
<td>172</td>
</tr>
<tr>
<td><code>attach boxed title to top text right</code></td>
<td>172</td>
</tr>
<tr>
<td><code>attach boxed title to top*</code></td>
<td>174</td>
</tr>
<tr>
<td><code>attach title</code></td>
<td>25</td>
</tr>
<tr>
<td><code>attach title to upper</code></td>
<td>25</td>
</tr>
<tr>
<td><code>auto</code> value</td>
<td>109, 384</td>
</tr>
<tr>
<td><code>auto counter</code></td>
<td>123</td>
</tr>
<tr>
<td><code>auto limited</code> value</td>
<td>109</td>
</tr>
<tr>
<td><code>auto outer arc</code></td>
<td>43</td>
</tr>
<tr>
<td><code>autoparskip</code></td>
<td>90</td>
</tr>
<tr>
<td><code>base</code> value</td>
<td>91</td>
</tr>
<tr>
<td><code>base color</code></td>
<td>299</td>
</tr>
<tr>
<td><code>baseline</code></td>
<td>91</td>
</tr>
<tr>
<td><code>baselineskip</code> value</td>
<td>406</td>
</tr>
<tr>
<td><code>beamer</code></td>
<td>254</td>
</tr>
</tbody>
</table>
colon value, 128
colon hang value, 128
\colOpt, 503
color key, 516
color color key, 515
color command key, 515
color counter key, 515
color definition key, 515
color environment key, 515
color fade key, 515
color from key, 299
color hyperlink key, 515
color key key, 515
color length key, 515
color option key, 515
color path key, 515
color value key, 515
Colors
Definition, 517
ExampleBack, 517
ExampleFrame, 517
Fade, 517
foocolor, 498
Hyperlink, 517
Option, 517
tcbcolback, 162
tcbcolbacklower, 162
tcbcolbacktitle, 162
tcbcolframe, 162
tcb-collover, 162
tcbcoltitle, 162
tcbcolupper, 162
colors key, 516
colspacing key, 441
coltext key, 33
coltitle key, 33
column key, 445
column* key, 445
columns key, 441
colupper key, 33
Commands
\boxarrayclear, 429
\boxarraygetbox, 433
\boxarraygetdepth, 434
\boxarraygetheight, 434
\boxarraygetsize, 431
\boxarraygettotalheight, 435
\boxarraygetwidth, 434
\boxarrayreset, 428
\brackets, 499
\colDef, 503
\colFade, 504
\colOpt, 503
\consumeboxarray, 432
\consumetcbboxarray, 432
\cs, 498
\DeclareTCBInputListing, 339
\DeclareTCBListing, 336
\DeclareTCBox, 20
\DeclareTCBoxFit, 455
\DeclareTColorBox, 16
\DeclareTotalTCBox, 21
\DeclareTotalTCBoxFit, 456
\DeclareTotalTColorBox, 18
\docAuxCommand, 497
\docAuxCommand*, 497
\docAuxEnvironment, 497
\docAuxEnvironment*, 497
\docAuxKey, 497
\docAuxKey*, 497
\docColor, 498
\docColor*, 498
\docCounter, 497
\docCounter*, 497
\docLength, 498
\docLength*, 498
\docValue, 497
\docValue*, 497
\fooaux, 497, 514
\foomakedocSubKey, 492
\foomakedocSubKey*, 492
\foosomething, 507
\ifboxarrayempty, 433
\imagename, 276
\imagemage, 277
\marg, 498
\meta, 498
\newboxarray, 428
\newtcbexternalizeenvironment, 488
\newtcbexternalizetcolorbox, 488
\NewTCBInputListing, 339
\newtcbinputlisting, 338
\NewTCBListing, 336
\newtcblisting, 334
\NewTCBox, 20
\newtcbox, 19
\NewTCBoxFit, 455
\newtcboxfit, 454
\newtcbtheorem, 375
\NewTColorBox, 17
\newtcolorbox, 15
\NewTotalTCBox, 22
\NewTotalTCBoxFit, 456
\NewTotalTColorBox, 18
\oarg, 498
\pdfpages, 278
\posterbox, 444
\ProvideTCBInputListing, 339
\ProvideTCBListing, 336
\ProvideTCBox, 20
\ProvideTCBoxFit, 455
\ProvideTColorBox, 17
\ProvideTotalTCBox, 22
\ProvideTotalTCBoxFit, 456
\ProvideTotalTColorBox, 18
\refAux, 503
\refAuxcs, 503
\refCom, 502
extras last key, 410
extras last pre key, 477
extras middle key, 410
extras middle and last key, 410
extras middle and last pre key, 477
extras middle pre key, 477
extras pre key, 477
extras title after break key, 411
extras unbroken key, 410
extras unbroken and first key, 410
extras unbroken and first pre key, 477
extras unbroken and last key, 410
extras unbroken and last pre key, 477
extras unbroken pre key, 477
extrude bottom by key, 101
extrude by key, 101
extrude left by key, 100
extrude right by key, 100
extrude top by key, 101
Fade color, 517
fade in key, 301
fade out key, 301
Fadings
  east, 300
  north, 300
  semi east, 300
  semi north, 300
  semi south, 300
  semi west, 300
  south, 300
  west, 300
false value, 86, 92, 320, 403
fbox value, 49
figures value, 127
fill downwards key, 98
fill image opacity key, 286
fill image options key, 286
fill image scale key, 286
fill overzoom image key, 282
fill overzoom image* key, 282
fill overzoom picture key, 282
fill plain image key, 280
fill plain image* key, 280
fill plain picture key, 280
fill shrink image key, 284
fill shrink image* key, 284
fill shrink picture key, 284
fill stretch image key, 281
fill stretch image* key, 281
fill stretch picture key, 281
fill tile image key, 285
fill tile image* key, 285
fill tile picture key, 285
fill tile picture* key, 285
fill zoom image key, 283
fill zoom image* key, 283
fill zoom picture key, 283
final value, 465
finish key, 215
finish broken key, 216
finish broken pre key, 475
finish fading vignette key, 306
finish first key, 216
finish first and middle key, 216
finish first and middle pre key, 475
finish first pre key, 475
finish last key, 216
finish last pre key, 475
finish middle key, 216
finish middle and last key, 216
finish middle and last pre key, 475
finish middle pre key, 475
finish pre key, 475
finish raised fading vignette key, 305
finish unbroken key, 216
finish unbroken and first key, 216
finish unbroken and first pre key, 475
finish unbroken and last key, 216
finish unbroken and last pre key, 475
finish unbroken pre key, 475
finish vignette key, 305
first value, 183–185, 409
first and middle value, 183, 409
fit key, 457
fit algorithm key, 463
fit basedim key, 458
fit fontsize macros key, 459
fit height from key, 462
fit height plus key, 460
fit maxfontdiff key, 465
fit maxfontdiffgap key, 465
fit maxstep key, 465
fit maximwidthdiff key, 465
fit maximwidthdiffgap key, 465
fit skip key, 458
fit to key, 458
fit to height key, 458
fit warning key, 465
fit width from key, 461
fit width plus key, 460
fitbox value, 105
fitting key, 9
fixed height key, 446
flip title key, 174
float key, 84
float* key, 84
floatplacement key, 84
flush center value, 35, 37, 38
flush left key, 96
flush left value, 35, 37, 38
flush right key, 96
flush right value, 35, 37, 38
flushleft lower key, 37
flushleft title key, 38
flushleft upper key, 37
flushright lower key, 37
flushright title key, 38
flushright upper key, 37
ignore nobreak key, 92
ignore value, 29
image comment key, 346
\imagename, 276
\imagepage, 277
index key, 112, 516
index actual key, 514
index annotate key, 515
index colorize key, 515
index command key, 514
index command name key, 514
index default settings key, 514
index format key, 514
index gather all key, 515
index gather colors key, 515
index gather commands key, 515
index gather counters key, 515
index gather environments key, 515
index gather keys key, 515
index gather lengths key, 515
index gather none key, 515
index gather paths key, 515
index gather values key, 515
index german settings key, 514
index level key, 514
index quote key, 514
index* key, 112
inherit height key, 62
input source on error key, 486
inside node key, 296
interior code key, 155
interior code app key, 476
interior code pre key, 476
interior empty key, 155
interior engine key, 152
interior hidden key, 167
interior style key, 166
interior style image key, 167
interior style tile key, 167
interior titled code key, 154
interior titled code app key, 475
interior titled code pre key, 476
interior titled empty key, 154
interior titled engine key, 151
invisible key, 27
invisible value, 24, 27, 29
justify value, 35
key key, 516
Keys
/foo/myKey, 510
/foo/
    fooaux, 497
foodummy, 501
foodummy 2, 501
footitle, 495
/tcb/
    add to height, 60
    add to list, 111
add to natural height, 60
add to width, 39
adjust text, 23
adjusted title, 23
adjusted title after break, 404
after, 86
after app, 469
after doc body, 512
after doc body command, 511
after doc body environment, 511
after doc body key, 511
after doc body path, 512
after example, 513
after float, 85
after float app, 469
after float pre, 469
after lower, 73
after lower app, 468
after lower pre, 468
after lower*, 73
after pre, 469
after skip, 88
after skip balanced, 87
after title, 69
after title app, 467
after title pre, 467
after upper, 71
after upper app, 467
after upper pre, 467
after upper*, 71
alert, 291
ams align, 389
ams align lower, 389
ams align upper, 389
ams align*, 389
ams align* lower, 389
ams align* upper, 389
ams equation, 388
ams equation lower, 388
ams equation upper, 388
ams equation*, 388
ams equation* lower, 388
ams equation* upper, 388
ams gather, 390
ams gather lower, 390
ams gather upper, 390
ams gather*, 390
ams gather* lower, 390
ams gather* upper, 390
ams nodisplay, 391
ams nodisplay lower, 391
ams nodisplay upper, 391
arc, 41
arc is angular, 43
arc is curved, 43
at begin tikz, 210
at begin tikz reset, 210
at end tikz, 210
at end tikz reset, 210
extras first and middle, 411
electro first and middle pre, 477
electro first pre, 477
electro last, 410
electro last pre, 477
electro middle, 410
electro middle and last, 410
electro middle and last pre, 477
electro middle pre, 477
electro pre, 477
electro title after break, 411
electro unbroken, 410
electro unbroken and first, 410
electro unbroken and first pre, 477
electro unbroken and last, 410
electro unbroken and last pre, 477
electro unbroken pre, 477
extrude bottom by, 101
extrude by, 101
extrude left by, 100
extrude right by, 100
extrude top by, 101
fill downwards, 98
finish, 215
finish broken, 216
finish broken pre, 475
finish fading vignette, 306
finish first, 216
finish first and middle, 216
finish first and middle pre, 475
finish first pre, 475
finish last, 216
finish last pre, 475
finish middle, 216
finish middle and last, 216
finish middle and last pre, 475
finish middle pre, 475
finish pre, 475
finish raised fading vignette, 305
finish unbroken, 216
finish unbroken and first, 216
finish unbroken and first pre, 475
finish unbroken and last, 216
finish unbroken and last pre, 475
finish unbroken pre, 475
finish vignette, 305
fit, 457
fit algorithm, 463
fit baselim, 458
fit fontsize macros, 459
fit height from, 462
fit height plus, 460
fit maxfondiff, 465
fit maxfondiffgap, 465
fit maxstep, 465
fit maxwidthdiff, 465
fit maxwidthdiffgap, 465
fit skip, 458
fit to, 458
fit to height, 458
fit warning, 465
fit width from, 461
fit width plus, 460
flip title, 174
float, 84
float+, 84
floatplacement, 84
flush left, 96
flush right, 96
flushleft lower, 37
flushleft title, 38
flushleft upper, 37
flushright lower, 37
flushright title, 38
flushright upper, 37
fontlower, 34
fonttitle, 34
fontupper, 34
force nobeforeafter, 86
frame code, 154
frame code app, 475
frame code pre, 475
frame empty, 154
frame engine, 151
frame hidden, 166
frame style, 165
frame style image, 165
frame style tile, 166
freelance, 274
freeze extension, 361
freeze file, 361
freeze jpg, 361
freeze none, 361
freeze pdf, 361
freeze png, 361
fuzzy halo, 201
fuzzy shadow, 207
graphical environment, 151
graphics directory, 278
graphics options, 278
graphics orientation, 279
graphics pages, 278
grow sidewards by, 96
grow to left by, 95
grow to right by, 95
halign, 35
halign lower, 36
halign title, 37
halign upper, 35
halo, 201
hbox, 105
hbox boxed title, 181
height, 58
height fill, 61
height fixed for, 409
height from, 59
height plus, 58
tabulars, 75
tabulars*, 75
tabularx, 76
tabularx*, 76
tcbimage comment, 347
tcbox raise, 108
tcbox raise base, 108
tcbox width, 109
tempfile, 107
terminator sign, 381
terminator sign colon, 382
terminator sign dash, 382
terminator sign none, 382
text above listing, 353
text above* listing, 353
text and listing, 345
text fill, 74
text height, 59
text only, 346
text outside listing, 351
text side listing, 350
text width, 39
theorem, 386
theorem full label supplement, 383
theorem hanging indent, 384
theorem label supplement, 383
theorem name, 385
theorem name and number, 385
theorem number, 385
theorem number and name, 385
theorem style, 392
tikz, 210
tikz lower, 77
tikz reset, 210
tikz upper, 77
tikznode, 78
tikznode boxed title, 182
tikznode lower, 78
tikznode upper, 78
tile, 250
title, 23
title after break, 404
title code, 156
title code app, 476
title code pre, 476
title empty, 156
title engine, 152
title filled, 32
title hidden, 169
title style, 168
title style image, 169
title style tile, 169
titlebox, 24	itlerule, 41	itlerule style, 170	toggle enlargement, 97
toggle left and right, 51
top, 47
toprule, 40
toprule at break, 408
topsep at break, 408
toptitle, 47
unbreakable, 404
underlay, 213
underlay boxed title, 214
underlay boxed title pre, 474
underlay broken, 214
underlay broken pre, 474
underlay first, 214
underlay first and middle, 214
underlay first and middle pre, 474
underlay first pre, 474
underlay last, 214
underlay last pre, 474
underlay middle, 214
underlay middle and last, 214
underlay middle and last pre, 474
underlay middle pre, 474
underlay pre, 474
underlay raised fading vignette, 304
underlay raised shading vignette, 304
underlay shade in vignette, 304
underlay unbroken, 214
underlay unbroken and first, 214
underlay unbroken and first pre, 474
underlay unbroken and last, 214
underlay unbroken and last pre, 474
underlay unbroken pre, 474
underlay vignette, 303
upperbox, 27
use color stack, 406
use height from group, 68
valign, 38
valign lower, 38
valign scale limit, 38
valign upper, 38
varwidth boxed title, 182
varwidth boxed title*, 182
varwidth upper, 78
verbatim, 108
verbatim ignore percent, 143
vfill before first, 409
visible, 27
void, 122
watermark color, 188
watermark graphics, 184
watermark graphics app, 473
watermark graphics app on, 473
watermark graphics on, 184
watermark graphics pre, 473
watermark graphics pre on, 473
watermark opacity, 186
watermark overzoom, 187
watermark shrink, 187
watermark stretch, 188
watermark text, 183
watermark text app, 472
watermark text app on, 472
watermark text on, 183
watermark text pre, 472
watermark text pre on, 472
watermark tikz, 185
watermark tikz app, 473
watermark tikz app on, 473
watermark tikz on, 185
watermark tikz pre, 473
watermark tikz pre on, 473
watermark zoom, 180
widget, 258
width, 39
/tcb/boxtitle/
xshift, 175
yshift, 175
yshift*, 175
yshifttext, 175
/tcb/doclang/
color, 516
colors, 516
commands, 516
counter, 516
counters, 516
environment, 516
environment content, 516
environments, 516
index, 516
key, 516
keys, 516
length, 516
lengths, 516
new, 516
pageshort, 516
path, 516
paths, 516
updated, 516
value, 517
values, 517
/tcb/external/
~, 480
!, 480
clear preamble, 487
clear preclass, 487
compiler, 486
environment, 486
environment with percent, 486
externalize, 480
force remake, 480
input source on error, 486
minipage, 486
name, 482
PassOptionsToClass, 487
PassOptionsToPackage, 487
plain, 486
preamble, 487
preamble tcbset, 487
preclass, 487
prefix, 480
runner, 480
runs, 486
safety, 486
/tcb/library/
all, 10
breakable, 9
documentation, 10
external, 10
fitting, 9
hooks, 9
listings, 9
listingsutf8, 9
magazine, 9
many, 10
minted, 9
most, 10
poster, 9
raster, 9
skins, 9
theorems, 9
vignette, 9
xparse, 10
/tcb/new/
auto counter, 123
blend into, 127
Crefname, 126
crefname, 126
list inside, 130
list type, 130
no counter, 124
number format, 125
number freestyle, 125
number within, 125
reset counter on overlays, 124
use counter, 124
use counter from, 124
use counter*, 124
/tcb/poster/
colsspacing, 441
columns, 441
column height, 441
column prefix, 441
columns, 441
rows, 441
rowspacing, 441
showframe, 441
spacing, 441
width, 441
/tcb/posterloc/
above, 447
at, 448
below, 447
between, 448
column, 445
column*, 445
fixed height, 446
ame, 445
row, 446
537
\newtcbtheorem, 375
\NewTColorBox, 17
\newtcbox, 15
\NewTotalTCBox, 22
\NewTotalTCBoxFit, 456
\NewTotalTColorBox, 18
nirvana key, 122
no borderline key, 197
no boxed title style key, 180
no counter key, 124
no coverage key, 442
no extras key, 410
no extras first key, 410
no extras last key, 410
no extras middle key, 410
no extras title after break key, 411
no extras unbroken key, 410
no finish key, 216
no finish first key, 216
no finish last key, 216
no finish middle key, 216
no finish unbroken key, 216
no label type key, 110
no listing options key, 340
no overlay key, 80
no process key, 358
no recording key, 144
no shadow key, 200
no underlay key, 213
no underlay boxed title key, 214
no underlay first key, 214
no underlay last key, 214
no underlay middle key, 214
no underlay unbroken key, 214
no watermark key, 185
nobreafter key, 86
nofloat key, 84
none value, 51, 97, 139, 319, 406, 409
noparskip key, 90
nophantom key, 110
normal value, 49, 176
north fading, 300
north value, 53, 54
north size key, 297
north style key, 298
northeast value, 53, 54
northwest value, 53, 54
notitle key, 23
notitle after break key, 404
number format key, 125
number freestyle key, 125
number within key, 125
\oarg, 498
octogon arc key, 42
off value, 465, 514
on value, 465
on line key, 108
only key, 289
opacityback key, 56
raster multicolumn key, 322
raster multirow key, 323
raster number n key, 321
raster odd column key, 320
raster odd number key, 321
raster odd row key, 320
raster reset key, 320
raster right skip key, 317
raster row m key, 321
raster row m column n key, 321
raster row skip key, 317
raster rows key, 314
raster valign key, 318
raster width key, 314
raster width center key, 315
raster width flush left key, 315
raster width flush right key, 315
record key, 144
\refAux, 503
\refAuxcs, 503
\refCom, 502
\refCom*, 502
\refEnv, 502
\refEnv*, 502
\refKey, 502
\refKey*, 502
\refPathOperation, 503
\refPathOperation*, 503
remake key, 117
remember key, 211
remember as key, 212
\renewtcbexternalizeenvironment, 488
\renewtcbexternalizetcolorbox, 489
\RenewTCBInputListing, 339
\renewtcbinputlisting, 338
\RenewTCBListing, 336
\renewtcblisting, 335
\RenewTCBox, 20
\renewtcbox, 20
\RenewTCBoxFit, 455
\renewtcboxfit, 454
\renewtcbtheorem, 376
\RenewTCColorBox, 17
\renewtccolorbox, 15
\RenewTotalTCBox, 22
\RenewTotalTCBoxFit, 456
\RenewTotalTCColorBox, 18
reset key, 118
reset and store to box array key, 431
reset box array key, 428
reset counter on overlays key, 124
right key, 45
right value, 35, 139, 318
right skip key, 89
right* key, 46
righthand ratio key, 136
righthand width key, 135
rightrule key, 47
righttitle key, 46
rightupper key, 46
rotate key, 211
rounded corners key, 54
row key, 446
rows key, 441
rows value, 319
rowspacing key, 441
rowspan key, 446
run arara key, 360
run biber key, 360
run bibtex key, 360
run dvips key, 360
run latex key, 360
run lualatex key, 360
run makeindex key, 360
run pdflatex key, 358
run ps2pdf key, 360
run system command key, 358
run xelatex key, 360
runner key, 480
runs key, 486
safety key, 486
savedelimiter key, 31
savetokey key, 29
saveto key, 28
scale key, 211
scale value, 38
scale* value, 38
scope key, 299
segmentation at break key, 409
segmentation code key, 155
segmentation code app key, 476
segmentation code pre key, 476
segmentation empty key, 155
segmentation engine key, 152
segmentation hidden key, 168
segmentation style key, 168
semi east fading, 300
semi fade in key, 301
semi fade out key, 301
semi north fading, 300
semi south fading, 300
semi west fading, 300
separator sign key, 379
separator sign colon key, 379
separator sign dash key, 379
separator sign none key, 379
sequence key, 449
shadow key, 206
sharp corners key, 53
sharpish corners key, 54
shield externalize key, 117
show bounding box key, 197
showframe key, 441
shrink break goal key, 406
shrink tight key, 100
sidebyside key, 132
sidebyside adapt key, 139

541
sidebyside align key, 133
sidebyside gap key, 135
sidebyside switch key, 141
size key, 49, 298
skin key, 150
skin first key, 150
skin first is subskin of key, 157
skin last key, 150
skin last is subskin of key, 157
skin middle key, 150
skin middle is subskin of key, 157
\skinExampleSet, 224

Skins

beamer, 254
beamerfirst, 256
beameralast, 257
beamermiddle, 256
bicolor, 239
bicolor jigsaw, 246
bicolorfirst, 243
bicolorfirst jigsaw, 247
bicolorlast, 245
bicolorlast jigsaw, 249
bicolormiddle, 244
bicolormiddle jigsaw, 248
draft, 272
empty, 261
emptyfirst, 264
emptylast, 266
emptymiddle, 265
enhanced, 227
enhanced jigsaw, 233
enhancedfirst, 231
enhancedfirst jigsaw, 234
enhancedlast, 232
enhancedlast jigsaw, 238
enhancedmiddle, 231
enhancedmiddle jigsaw, 235
freelance, 274
freelancefirst, 274
freelancelast, 274
freelancemiddle, 274
spartan, 271
standard, 225
standard jigsaw, 226
tile, 250
tilefirst, 251
tilelast, 253
tilemiddle, 252
widget, 258
widgetfirst, 259
widgetlast, 260
widgetmiddle, 259

skins key, 9
small value, 49
smart shadow arc key, 208
south fading, 300
south value, 53, 54
south size key, 297

south style key, 298
southeast value, 53, 54
southwest value, 53, 54
space key, 63
space to key, 64
space to both key, 64
space to lower key, 63
space to upper key, 63
spacing key, 441
span key, 446
spartan key, 271
spartan Skin, 271
spartan value, 151, 152
split key, 65
spread key, 99
spread downwards key, 99
spread inwards key, 98
spread outwards key, 98
spread sidewards key, 99
spread upwards key, 99
spread upwards* key, 99
square key, 63
squeeze value, 463
squeezed title key, 24
squeezed title* key, 24
standard key, 225
standard Skin, 225
standard value, 151, 152, 176, 392
standard jigsaw key, 226
standard jigsaw Skin, 226
step key, 110
step and label key, 110
store to box array key, 429
subtitle style key, 26
tables value, 127
tabulars key, 75
tabulars* key, 75
tabularx key, 76
tabularx* key, 76
tcb fill frame key, 171
tcb fill interior key, 171
tcb fill title key, 171
\tcbbreak, 416
tcbclipframe environment, 190
tcbclipinterior environment, 192
tcbcliptitle environment, 192
tcbcolback color, 162
tcbcolbacklower color, 162
tcbcolbacktitle color, 162
tcbcolframe color, 162
tcbcollower color, 162
tcbcoltitle color, 162
tcbcolupper color, 162
\tcbcontinuedraftmode, 221
\tcbcnter, 123
\tcdocmarginnote, 504
\tcdocnew, 504
\tcdocupdated, 504
tcbexternal environment, 481
tikz reset key, 210
tikz upper key, 77
tikznode key, 78
tikznode boxed title key, 182
tikznode lower key, 78
tikznode upper key, 78
tile key, 250
tile Skin, 250
tilefirst Skin, 251
tilelast Skin, 253
tilemiddle Skin, 252
title key, 23
title value, 49, 176
title after break key, 404
title code key, 156
title code app key, 476
title code pre key, 476
title empty key, 156
title engine key, 152
title filled key, 32
title hidden key, 169
title style key, 168
title style image key, 169
title style tile key, 169
titlebox key, 24
titlerule key, 41
titlerule style key, 170
toggle enlargement key, 97
toggle left and right key, 51
top key, 47
top value, 38, 91, 133, 318
top seam value, 133
toprule key, 40
toprule at break key, 408
topsep at break key, 408
toptitle key, 47
ttrue value, 92, 403

unbreakable key, 404
unbroken value, 183–185
unbroken and first value, 183–185
underlay key, 213
underlay boxed title key, 214
underlay boxed title pre key, 474
underlay broken key, 214
underlay broken pre key, 474
underlay first key, 214
underlay first and middle key, 214
underlay first and middle pre key, 474
underlay first pre key, 474
underlay last key, 214
underlay last pre key, 474
underlay middle key, 214
underlay middle and last key, 214
underlay middle and last pre key, 474
underlay middle pre key, 474
underlay pre key, 474
underlay raised fading vignette key, 304
underlay raised shading vignette key, 304
underlay shade in vignette key, 304
underlay unbroken key, 214
underlay unbroken and first key, 214
underlay unbroken and first pre key, 474
underlay unbroken and last key, 214
underlay unbroken and last pre key, 474
underlay unbroken pre key, 474
underlay vignette key, 303
unlimited value, 402, 403
updated key, 516
uphill value, 53, 54
upper right corner key, 296
upperbox key, 27
use color stack key, 406
use counter key, 124
use counter from key, 124
use counter* key, 124
use height from group key, 68
\useboxarray, 431
\usetcboxarray, 432
valign key, 38
valign lower key, 38
valign scale limit key, 38
valign upper key, 38
value key, 517

Values
0, 164
1, 164
2, 164
all, 53, 54, 319, 406, 409
areasize, 463
areasize*, 463
as-in, 279
auto, 109, 384
auto limited, 109
base, 91
baselineskip, 406
both, 139
bottom, 38, 91, 133, 318
bottom seam, 133
break, 393
broken, 183–185
center, 35, 38, 91, 133, 318
center seam, 133
change, 393
change apart, 393
change break, 393
change standard, 392
clipped, 300
colon, 128
colon hang, 128
copy, 176
dash, 128
dash hang, 128
direct, 300
doc, 514
downhill, 53, 54
east, 53, 54
empty, 151, 152
evenpage, 51, 97

544
watermark tikz pre key, 473
watermark tikz pre on key, 473
watermark zoom key, 186
west fading, 300
west value, 53, 54
west size key, 297
west style key, 299
widget key, 258
widget Skin, 258
widgetfirst Skin, 259
widgetlast Skin, 260
widgetmiddle Skin, 259
width key, 39, 441
xmax key, 296
xmin key, 296
xparse key, 10
xshift key, 175, 450
ymax key, 296
ymin key, 296
yshift key, 175, 451
yshift* key, 175
yshifttext key, 175