

# se2thesis – A Thesis Class for the Chair of Software Engineering II at the University of Passau, Germany\*

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## Abstract

One can choose from a wide variety of templates to write a thesis. Many universities provide very rigorous style guides and force their students to obey to those guides, even though they might be questionable from a typographics point of view. Other universities do not provide such guides and leave it to their students to choose or come up with a template. The latter is causing very differently-looking theses. To avoid such a situation in the future this bundle combines several L<sup>A</sup>T<sub>E</sub>X packages and classes for the use at the Chair of Software Engineering II at the University of Passau. We provide, among others, a document class for theses that shall be used by our students. The bundle is designed in a way that one can use the basic components as standalone packages to allow their reuse for other projects.

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# Part I

## User Documentation

The first part of this file provides the documentation for the user of the `se2thesis` bundle. We provide the implementation in the second part of this document, starting at page 13, for those who are curious.

### 1 Introduction

The University of Passau does not provide a common thesis template to its students. For theses, written at the Chair of Software Engineering II, many students chose between two templates that were provided by different people from the chair; other students chose from the large variety of templates available from the internet, causing each thesis looking differently.

The author of this package provided a template, which he initially created for his bachelor and master thesis, that was recommended and used by many students. The implementation of that template, however, was very hacky and required some changes over time. This led to the idea of creating a new template from scratch, that shall be used by all our students for their various types of theses, from bachelor to PhD level. The result is the `se2thesis` bundle.

The bundle itself consists of several L<sup>A</sup>T<sub>E</sub>X classes and packages that also allow reuse of various parts of it. Its main class is the `se2thesis` document class, an extension of the KOMA-Script `scrreprt` document class. The packages `se2colors` and `se2fonts` provide necessary colour and font settings for the `se2thesis` class. They are available as separate packages, however, to allow their reuse for other classes, packages, and projects, as well.

They all have in common one macro, `\IfFormatAtLeastTF`; this macro is part of the latest L<sup>A</sup>T<sub>E</sub>X kernel. However, not all users might have upgraded their T<sub>E</sub>X installation to a level using a recently-enough kernel version. Therefore, every class and package of this bundle will conditionally define the following macro:

---

```
\IfFormatAtLeastTF \IfFormatAtLeastTF {<version>} {<then block>} {<else-block>}
```

---

Checks whether the used L<sup>A</sup>T<sub>E</sub>X format is at least the one from the given date value. The date needs to be specified either in YYYY/MM/DD or in YYYY-MM-DD format.

### 2 License

Permission is granted to copy, distribute, and/or modify this software under the terms of the L<sup>A</sup>T<sub>E</sub>X Project Public License (LPPL), version 1.3c or later (<https://www.latex-project.org/lppl.txt>). The software has the status ‘maintained’.

### 3 The `se2thesis` class

The `se2thesis` class is the central component of this bundle. It provides a wide variety of settings, mostly regarding the title page (see Section 3.2) and the type area (see Section 3.3).

We aim to keep the `se2thesis` class relatively small, especially considering packages that we load. Currently, the class itself loads the `se2colors` (see Section 4) and `se2fonts` (see Section 5) packages. The following packages and classes are loaded: `expl3`, `l3keys2e` in case one uses a  $\text{\LaTeX}$  kernel from before 2022-06-01, `graphicx`, `translations`, `KOMA-Script`, `xcolor`, `ifthen`, as well as `fontspec`, `unicode-math`, and `libertinus-otf` if one uses  $\text{\LuaTeX}$ ; for  $\text{\pdfLaTeX}$  we load `fontenc`, `libertinus-type1`, and `AnonymousPro` instead of the latter three. Furthermore, we load `microtype`; when using  $\text{\LuaTeX}$ , we also load `lua-widow-control` and `selnolig`.

However, we recommend to use a couple of further packages, together with some further options to those package. We describe these settings in Section 3.4. Please consider looking at this section when starting to write your document.

Before we start with a detailed documentation of the class, we explain one helper macro that can be used to check whether a package has been loaded.

---

```
\slcd_package_if_loaded_p:n * \slcd_package_if_loaded:nTF {(package name)} {(true code)} {(false code)}
\slcd_package_if_loaded:nTF *
```

---

Updated: 2022-09-27

Checks whether a package has been loaded and conditionally executes code.

### 3.1 Load-time options

The `se2thesis` class defines several load-time options, all of them optional, on top of the options provided by the `KOMA-Script` document classes.

---

**class** `class = <choice>`

Set the base document class. Values are `scrreprt`, `scartcl`, or `scrbook`. Default is `scrreprt`.

---

**paper** `paper = <choice>`

Set the paper format. Possible values are `a4`, `a5`, or `b5`. Default is `a4`.

---

**logfile** `logfile = {(path-to-file)}`

Defines the path to the University's logo for the title page.

---

**thesistype** `thesistype = <choice>`

Defines the type of the thesis. Possible values are: `bachelor` for a bachelor thesis, `bachelorproposal` for a proposal to a bachelor thesis, `master` for a master thesis, `masterproposal` for a proposal to a master thesis, `phdproposal` for a proposal to a PhD thesis, and `phd` for a PhD thesis.

---

**biblatex** `biblatex = {true,false}`

Whether `se2thesis` shall load the `biblatex` package together with some settings automatically.

---

**colormode** `colormode = <choice>`

Select the color scheme used by the automatically loaded `se2colors` package, see Section 4 for a description.

---

`fontmode`      `fontmode = <choice>`

---

Updated: 2023-01-10      Select the font scheme used by the automatically loaded `se2fonts` package, see Section 5 for a description.

*This option is deprecated and will be removed in the future!*

### 3.2 The title page

Designing a title package for a thesis can be complicated. There might be some requirements that are not obvious to the user, especially considering the positioning of elements. The University of Passau, for example, requires the logo to be positioned on the top right of a page; theses—especially PhD theses that shall be published through the University’s library system—could be rejected from publication by the library until this is fixed.

We thus redeclare the standard `\maketitle` macro from KOMA-Script and customise it to our needs.

---

`\@maketitle`      `\@maketitle`

We override the definition of the `\@maketitle` macro for our needs.

In addition to the macros provided by the KOMA-Script classes for the title-page values (e.g. `\author`, `\title`), we provide some further macros that can be used. Setting values to these macros is optional in any case, if they are not set, the corresponding value is not put to the title page.

---

`\version`      `\version <{version}>`

Specify the version of the document. This can, for example, be a `git` hash of the current version.

---

`\degreeprogramme`      `\degreeprogramme <{programme-name}>`

Specify the degree programme the thesis is meant to be accepted in. Possible values are, among others, ‘Informatik’ if you are writing your thesis in German, or ‘Computer Science’ if you are writing the thesis in English.

---

`\matrnumber`      `\matrnumber <{matriculation-number}>`

Specify the matriculation number of the student writing the thesis. This is required for Bachelor and Master theses.

---

`\supervisor`      `\supervisor <{name}>`  
`\cosupervisor`      `\cosupervisor <{name}>`

Specify the name of your supervisor and co-supervisor. Both people usually are professors.

---

`\advisor`      `\advisor <{name}>`  
`\coadvisor`      `\coadvisor <{name}>`

Specify the name of your advisor and co-advisor. Both people usually are PhD students or postdocs.

---

`\department` `\department {<name>}`  
`\institute` `\institute [<short-name>] {<name>}`

Specify the department and institute. The department is, for example, ‘Faculty of Computer Science and Mathematics’, the institute, for example, ‘Chair of Software Engineering II’. If the `\department` value is not specified, we use ‘Faculty of Computer Science’ as the default value for English theses and ‘Fakultät für Informatik und Mathematik’ as the default value of German theses.

---

`\external` `\external {<name>}`

Specify the name of an external referee.

---

`\location` `\location {<name-of-town>}`

Specify the name of your residence town for the signature field.

To define the path to the logo graphics we require a different workflow: We do not bundle logo graphics with this package due to legal restrictions. They can be downloaded from the University’s website; please note that the website for downloading the logo graphics is only accessible from within the University’s campus network or a VPN connection. To specify the path to the logo graphics, we provide a load-time option to the `se2thesis` class called `logfile` (see Section 3.1).

When printing the thesis in two-side mode—which we recommend—the back of the title page again denotes author and title on the bottom.

---

`\@lowertitleback` `\l@lowertitleback`

Override this internal macro of KOMA-Script to print this information on the back side of the title page.

Additionally, we provide some internal rewritings to standard macros from KOMA-Script that allow to automatically split authors using the `\and` command.

---

`\author` `\author {<author>}`

`\@author` We rewrite the definitions of `\author` and `\@author` to do this splitting automatically. Additionally, this also adds a correctly translated version of ‘and’ between the author names if required.

### 3.3 Type-area settings

The `se2thesis` class manipulates the type area compared to the default settings of the KOMA-Script classes. Our settings are inspired by the `classicthesis` package, which itself is inspired by the style used by famous statistician Edward Tufte. We provide predefined settings for DIN-A4, DIN-A5, and DIN-B5 papers. If you need settings for other paper sizes, please open an issue on this package’s GitHub repository (<https://github.com/se2p/se2thesis>) and we will happily include those settings in a future release of this bundle.

Additionally, we are setting the page footer in a way that it contains the page numbers in the outer margin and the headmarks split from the page numbers by a vertical bar.

## 3.4 Recommended additional packages

Several packages can be useful for writing a thesis. We list them in this section; for the recommended option settings, please have a look at our examples. Please note that you might not need all these packages, however, having a look at them (especially their documentation) might give you an insight, whether to use a package. Our general recommendation is to use as few packages as you can; some might have conflicts, others basically do the same or are outdated. Please consider reading the documentation of each package you are using to figure out whether they have any conflicts with other packages (for example, one cannot use the recommended `siunitx` package together with `Slunits`) or they might require to be loaded at special places in your preamble (for example, `hyperref` is usually meant to be loaded as the last package, except you are also using `cleveref`, which needs to be loaded *after* `hyperref`).

### 3.4.1 Quoting with `csquotes`

The `csquotes` package allows for intelligent quoting of text. While verbose quotes are not that common on computer science, the package still provides some useful macros to the user.

### 3.4.2 Number formatting with `siunitx`

While `siunitx`'s original purpose was to format physical quantities, it provides a lot of useful features when typesetting theses (and other documents) in computer science. When you skim through its documentation, especially look at the `\qty` and `\num` macros, as well as the section on typesetting tabular material. We also recommend reading an extensive discussion on number formatting, precision of presented numbers, and many more related topics in Beyer et al.'s journal paper on requirements and solutions for reliable benchmarking [1].

When using the `siunitx` package, we recommend adding the following lines to your document's preamble

```
\usepackage[
  group-minimum-digits=4,
  list-final-separator={, and },
  add-integer-zero=false,
  free-standing-units,
  round-mode=figures,
  round-precision=3,
  detect-weight=true,
  detect-inline-weight=math,
  separate-uncertainty=true,
  uncertainty-mode=separate,
]{siunitx}
```

### 3.4.3 Code listings with `minted`

We prefer using the `minted` package for code listings. However, this package requires the installation of Python and the setting of the `-shell-escape` option to your  $\TeX$  engine. Please read the package's documentation to set it up. If you do not want to install Python and the dependencies, we also provide settings for the alternative `listings` package in the next subsection.

When using `minted` we recommend the following settings:

```
\usepackage[newfloat=true]{minted}
\setminted{
  autogobble,
  breaklines=true,
  fontsize=\footnotesize,
  linenos=false,
  resetmargins=true,
  xleftmargin=1em,
  xrightmargin=1em,
  frame=single,
}
```

#### 3.4.4 Code listing with `listings`

In case you do not want to use the aforementioned `minted` package, please consider using `listings` for typesetting your code listings.

```
\usepackage{listings}
\lstset{
  frame=single,
  extendedchars=true,
  basicstyle=\footnotesize\ttfamily,
  keywordstyle=\color{blue}\bfseries,
  showstringspaces=false,
  showspace=false,
  tabsize=2,
  breaklines=true,
  showtabs=false,
  captionpos=t,
}
```

Please be aware to use *either* `minted` *or* `listings`!

#### 3.4.5 Designing tables

A basically mandatory package to all users of tables is the `booktabs` package. Especially its documentation is a must read! It provides a large variety of hints for designing tables, most notably that one should never ever use vertical lines; horizontal lines should be used sparsely; `booktabs` provides three macros for lines that shall be used: `\toprule` for a rule on the top of a table, above the column heads, `\midrule` to separate column heads and the content but, and `\bottomrule` to mark the bottom of a table.

Note that captions of tables shall be put *above* the table whereas captions of figures shall go *below* the figure. The rationale is that a figure should be more of less self explaining whereas a table almost always needs some explanation.

Unfortunately, the distances when using a `\caption` above a table are wrong by default; when creating tables, consider loading the `hvfloats` package and use its `\tabcaption` instead of `\caption` for tables. The `hvfloats` package furthermore provides additional useful things to typeset all kinds of floats.



### 3.4.6 Use `biblatex` for bibliographic references

The standard way of typesetting bibliographic references was using `BIBTEX`. The original `BIBTEX`, however, seems to be very outdated in various ways: it originally supported only 7 bit character sets and creating citation styles requires the usage of an archaic language. `BibLATEX` resolves many of the drawbacks of `BIBTEX`; when combined with the `biber` engine, it supports full UTF-8 unicode, therefore correct sorting of the references now works out of the box; also creating citation styles can now be done using simple `LATEX` commands.

For easier usage, we provide the load-time option `biblatex` that already sets all settings (see Section 3.1. Set this options to `se2thesis` and add your reference file using the `\addbibresource` macro. `\printbibliography` will print your references.

### 3.4.7 Use `cleveref` for internal references

`LATEX` provides an easy-to-use reference mechanism using the `\label` and `\ref` macros. However, this requires some manual effort and the text needs to specify whether a reference is to a figure, section, or table. We often see things in drafts such as ‘we discuss our findings in 4’; but what is ‘4’ here? Is it a section, a table, a figure? To avoid such confusion, use the `cleveref` package, which automatically infers the type of the reference (see its documentation on how this works). The `cleveref` package furthermore avoids one additional mistake: between the name of the element and its reference one needs to have a non-breaking space that often is forgotten.

Please note that, in contrast to most other packages, `cleveref` has to be loaded *after* the `hyperref` package!

## 3.5 Abstract for the thesis

Each thesis shall come with an abstract that summarises its content. The abstract should be written in the language the thesis is written in. Additionally, there is the requirement to provide a German abstract if the thesis is written in a foreign language.

---

`\abstract` `\abstract`

`abstract` (*env.*) We ensure that the `\abstract` command is defined for all document classes. To typeset an abstract, we provide an environment called `abstract`. The environment takes an optional argument that specifies the language that is used in this abstract. Setting the abstract’s language will cause its title to change to the respective language; additionally, hyphenation is also changed for that language.

```
\begin{abstract}[language]
  Your abstract text.
\end{abstract}
```

## 3.6 Acknowledgements

`acknowledgements` (*env.*) We provide the `acknowledgements` environment to typeset acknowledgements for your thesis. Using this environment is optional. Usually, bachelor and master thesis do not contain such an acknowledgements section, however, there is no general rule to this.

```
\begin{acknowledgements}[language]
  Your acknowledgements.
\end{acknowledgements}
```

### 3.7 Document structuring

A larger work, such as a thesis, is usually structured in three large blocks: a frontmatter that provides all the overview, such as abstract, table of contents, etc., a mainmatter that contains all the actual content, and a backmatter for appendices. `se2thesis` ensures that the following macros are defined because they are not provided by all KOMA-Script classes.

---

<code>\frontmatter</code>	<code>\frontmatter</code>
<code>\mainmatter</code>	<code>\mainmatter</code>
<code>\backmatter</code>	<code>\backmatter</code>

---

Switches between frontmatter, mainmatter, and backmatter. Most notably, the frontmatter will have roman page numbers, while the other two will have arabic page numbers.

### 3.8 Authorship declaration

The University of Passau requires its students to provide an authorship declaration as part of their thesis for submission. They provide a template form, which would not fit the style of the `se2thesis` class. Thus, we provide the `\authorshipDeclaration` macro to typeset such a declaration. It uses the original (German) text of the declaration and fills in the values that are specified by the `\author` and `\location` macros.

---

<code>\authorshipDeclaration</code>	<code>\authorshipDeclaration</code>
-------------------------------------	-------------------------------------

---

Print the authorship declaration text.

*Please note:* the authorship declaration will always be printed in German, no matter what the language of the thesis is. This happens due to legal requirements. In order to make this work, you have to load the `babel` or `polyglossia` package in a way that it also supports German hyphenation. For example, use

```
\usepackage[ngerman,main=UKenglish]{babel}
```

for a thesis with *traditional English*<sup>1</sup> as its main language and support for German.

---

<code>\signatureBox</code>	<code>\signatureBox</code> [ <i>&lt;width&gt;</i> ] { <i>&lt;signature-name&gt;</i> }
----------------------------	---

---

A helper macro to print the signature box for the authorship declaration. The optional argument [*<width>*] allows to specify a custom width for the signature line. The default is 5 cm. The mandatory argument {*<signature-name>*} specifies the name of the signee, which will be typeset below the signature line.

### 3.9 Research Questions and findings summaries

Most theses written at our Chair will require the student to provide some empirical evaluation of their work to shed insights whether their proposed ideas are actually useful. For an empirical study, one needs to specify research questions and maybe also hypotheses. The `se2thesis` class supports this by providing environments for this.

<code>resq</code> ( <i>env.</i> )	The <code>resq</code> environment shall be used to specify a research question.
<code>hyp</code> ( <i>env.</i> )	The <code>hyp</code> environment shall be used to specify a hypothesis.
<code>summary</code> ( <i>env.</i> )	After describing the results, we recommend to give an explicit summary of the find-

---

<sup>1</sup>there is a nice, probably photoshopped, picture of a Steam setup dialogue stating that American English is a ‘simplified version’ of British English, see <https://jakubmarian.com/is-american-english-simplified-and-british-english-traditional/>.

ings for a research question or hypothesis. This summary shall be given in one or two sentences. The `summary` environment provides a convenient way for this; it will be typeset in a highlighted box that is easy to spot and also allows readers of the work to quickly grasp the main findings.

```
\begin{summary}{label-reference}
  The summary text itself.
\end{summary}
```

The environment expects as a parameter a label, for example, to a research question; however, this can also be arbitrary text.

## References

- [1] Dirk Beyer, Stefan Löwe, and Philipp Wendler: *Reliable benchmarking: requirements and solutions*. STTT 21(1): 1–29 (2019)

## 4 The se2colors package

Several colours are specific to the university and we want to have a comprehensive interface to access them throughout all our packages.

The se2colors package provides this exact features. One can load it using `\usepackage{se2colors}` in the document preamble.





<code>cmode</code>	<code>cmode = &lt;choice&gt;</code>
Updated: 2022-11-03	Selects the colour mode that shall be used for creating the results, a choice from the options specified in Table 1. The default setting is 4C.

Table 1: Options provided by se2colors.

























Option	Description
<code>cmode=4C</code>	Define colours in CMYK colour space ( <i>default</i> ).
<code>cmode=CMYK</code>	Alias for the previous.
<code>CMYK, cmyk</code>	Aliases for the previous.
<code>cmode=RGB</code>	Define colours in RGB colour space.
<code>RGB, rgb</code>	Aliases for the previous.
<code>cmode=BW</code>	Define colours in black-and-white colour space.
<code>cmode=1C</code>	Alias for the previous.
<code>gray</code>	Alias for the previous.































We define two basic colours that are taken from the University’s logo, namely UPSE2-Gray  and UPSE2-Orange .

Additionally, we define four colours for the four faculties of the University:

- the Faculty of Law UPSE2-JUR ,
- the School of Business, Economics and Information Systems UPSE2-WIWI ,
- the Faculty of Arts and Humanities UPSE2-PHIL , and
- the Faculty of Computer Science and Mathematics UPSE2-FIM .

Finally, we define a full set of supplementary colours:

- UPSE2-DarkGray  with its derivatives  
UPSE2-DarkGray1 , UPSE2-DarkGray2 , UPSE2-DarkGray3 , UPSE2-DarkGray4 , and UPSE2-DarkGray5 .
- UPSE2-White  with its derivatives  
UPSE2-White1 , UPSE2-White2 , UPSE2-White3 , UPSE2-White4 ,  
and UPSE2-White5 .
- UPSE2-MediumGray  with its derivatives  
UPSE2-MediumGray1 , UPSE2-MediumGray2 , UPSE2-MediumGray3 , UPSE2-MediumGray4 , and UPSE2-MediumGray5 .
- UPSE2-LightGray  with its derivatives  
UPSE2-LightGray1 , UPSE2-LightGray2 , UPSE2-LightGray3 , UPSE2-LightGray4 , and UPSE2-LightGray5 .

- UPSE2-Orange  with its derivatives  
UPSE2-Orange1 , UPSE2-Orange2 , UPSE2-Orange3 , UPSE2-Orange4 , and UPSE2-Orange5 .
- UPSE2-LightRed  with its derivatives  
UPSE2-LightRed1 , UPSE2-LightRed2 , UPSE2-LightRed3 , UPSE2-LightRed4 , and UPSE2-LightRed5 .
- UPSE2-DarkRed  with its derivatives  
UPSE2-DarkRed1 , UPSE2-DarkRed2 , UPSE2-DarkRed3 , UPSE2-DarkRed4 , and UPSE2-DarkRed5 .
- UPSE2-Green  with its derivatives  
UPSE2-Green1 , UPSE2-Green2 , UPSE2-Green3 , UPSE2-Green4 , and UPSE2-Green5 .
- UPSE2-Blue  with its derivatives  
UPSE2-Blue1 , UPSE2-Blue2 , UPSE2-Blue3 , UPSE2-Blue4 , and UPSE2-Blue5 .
- UPSE2-AccentGray  with its derivatives  
UPSE2-AccentGray1 , UPSE2-AccentGray2 , UPSE2-AccentGray3 , UPSE2-AccentGray4 , and UPSE2-AccentGray5 .

## 5 The se2fonts package

The `se2fonts` package sets the fonts of the document. In the first version of the bundle, we were running to use Hermann Zaph’s *Palatino*, *Helvetica*, and *Neo Euler* fonts. However, we figured out that they are not part of a standard L<sup>A</sup>T<sub>E</sub>X installation, and thus required manual work by the user to install them. Furthermore, loading the fonts did not always work in a correct way.

Thus, we decided to rethink this decision and—as a consequence—now use different fonts that are part of a recent standard L<sup>A</sup>T<sub>E</sub>X installation: we use the *Libertinus* fonts<sup>2</sup> for serif, sans-serif, and math typesetting and the *Anonymous Pro* font<sup>3</sup> as a monospaced font.

*Please note:* this change might affect the way your documents look, and also might affect paragraph and line breaks!

If you are using Lua<sub>T</sub><sub>E</sub>X, fonts are expected to be present as open-type fonts; using pdf<sub>L</sub><sub>A</sub>T<sub>E</sub>X will fallback to Type-1 fonts.

*Please note:* the package does not support X<sub>Y</sub><sub>T</sub><sub>E</sub>X!

The following options are defined by the `se2fonts` package to influence the selection of the fonts.

---

`fmode` `fmode = <choice>`

---

Updated: 2022-11-03 The argument is deprecated and will raise a warning. It is to be removed by a future version of the `se2thesis` bundle.

The following list provides examples for each of the fonts:

- An example text in Libertinus Serif
- An example text in Libertinus Sans
- An example text in Anonymous Pro

The package provides additional helper functions that are also available to the user.

---

`\pdftexengine` `\pdftexengine`  
`\xetexengine` `\xetexengine`  
`\luatexengine` `\luatexengine`

These commands alias the built-in L<sup>A</sup>T<sub>E</sub>X3 macros `\sys_if_engine_pdftex_p:`, `\sys_if_engine_xetex_p:`, and `\sys_if_engine_luatex_p:`. They can be used to check which engine the user is currently running.

---

`\ifengineTF` `\ifengineTF <engine> <then block> <else block>`  
`\ifengineT` `\ifengineT <engine> <then block>`  
`\ifengineF` `\ifengineF <engine> <then block>`

Allows to execute code based on the running engine. The base variant `\ifengineTF` expects the user to specify a condition, which can be built of combinations of the `\pdftexengine`, `\xetexengine`, and `\luatexengine` macros, followed by the code that will be executed if the condition holds and the code that will be executed if the condition does not hold.

For convenience, we provide the variants `\ifengineT` and `\ifengineF` that allow to omit an empty then or else branch, respectively.

---

<sup>2</sup><https://github.com/alerque/libertinus>

<sup>3</sup><https://www.marksimonson.com/fonts/view/anonymous-pro>

## Part II

# Implementation

The second part of this file provides the implementation of the package for a better understanding of what is happening.

# 1 Global helpers

These helpers might be useful for many exported packages and classes, thus we keep them on the global level of this implementation.

```
1 <*init>
   Load only the essential support (expl3) ‘up-front’, and only if required.
2 \ifundefined{ExplLoaderFileDate}
3   { \RequirePackage{expl3} }
4   {}
   Make sure that the version of l3kernel in use is sufficiently new. We use
\ExplFileDate as \@ifpackagelater does not work for pre-loaded expl3 in the absence
of the package.
5 \ifl@t@r\ExplLoaderFileDate{2020-01-09}
6   {}
7   {%
8     \PackageError{se2colors}{Support package expl3 too old}
9     {%
10      You need to update your installation of the bundles 'l3kernel' and
11      'l3packages'.\MessageBreak
12      Loading~se2colors~will~abort!%
13    }%
14  \endinput
15  }%
```

`\IfFormatAtLeastTF` This macro is not present in older kernels, thus we use the L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> mechanism as this is correct for this case.

```
16 \providecommand \IfFormatAtLeastTF { \ifl@t@r \fmtversion }
   (End definition for \IfFormatAtLeastTF. This function is documented on page 1.)
17 </init>
```

# 2 The se2thesis implementation

Start the DocStrip guards.

```
18 <*class>
   Identify the internal prefix (LATEX3 DocStrip convention): only internal material in
this submodule should be used directly.
19 <@@=slcd>
   Identify the class and give the overall version number.
20 \ProvidesExplClass {se2thesis} {2023-01-27} {2.1.0}
21 {A thesis class for the Chair of Software Engineering II}
```

`\slcd_package_if_loaded:nTF` Defines various L<sup>A</sup>T<sub>E</sub>X3 variants for the internal `\@ifpackageloaded` macro to check whether a package has been loaded.

```
\slcd_package_if_loaded:nT
\slcd_package_if_loaded:nF
\slcd_package_if_loaded_p:n
22 \prg_new_conditional:Nnn \slcd_package_if_loaded:n { p, T, F, TF }
23   {
24     \use:c { @ifpackageloaded }
25     { #1 }
26     { \prg_return_true: }
```



```

27     { \prg_return_false: }
28   }

```

(End definition for `\slcd_package_if_loaded:nTF` and others. These functions are documented on page 2.)

Load required packages early.

```

29 \RequirePackage{graphicx}
30 \RequirePackage{translations}
31 \LoadDictionary{se2translations}
32 \DeclareTranslationFallback{version-of-date}{%
33   Version~\l__slcd_version_tl\ of~\@date
34 }
35 \DeclareTranslation{German}{version-of-date}{%
36   Version~\l__slcd_version_tl\ vom~\@date
37 }
38 \DeclareTranslation{English}{version-of-date}{%
39   Version~\l__slcd_version_tl\ of~\@date
40 }

```

## 2.1 Define Variables

The following variables are necessary for the argument handling.

`\l__slcd_paper_int` A variable to store the key of the page size selected by the user.

```
41 \int_new:N \l__slcd_paper_int
```

(End definition for `\l__slcd_paper_int`.)

We also need properties to store class options that are not for us, thus shall be handled by the underlying base class.

`\l__slcd_base_class_tl` Store the base class, the known, and the unknown class options. The latter will be forwarded to the base class later.

```

\l__slcd_clsopts_prop
\l__slcd_unknown_clsopts_prop
42 \tl_new:N \l__slcd_base_class_tl
43 \prop_new:N \l__slcd_clsopts_prop
44 \prop_new:N \l__slcd_unknown_clsopts_prop

```

(End definition for `\l__slcd_base_class_tl`, `\l__slcd_clsopts_prop`, and `\l__slcd_unknown_clsopts_prop`.)

`\l__slcd_biblatex_bool` The user wants to load the biblatex package together with our settings.

```
45 \bool_new:N \l__slcd_biblatex_bool
```

(End definition for `\l__slcd_biblatex_bool`.)

Define internal variables to hold the values of the fields of the title page.

```

\l__slcd_version_tl
\l__slcd_degreeprogramme_tl
\l__slcd_matrnumber_tl
\l__slcd_supervisor_tl
\l__slcd_cosupervisor_tl
\l__slcd_advisor_tl
\l__slcd_coadvisor_tl
\l__slcd_department_tl
\l__slcd_institute_tl
\l__slcd_external_tl
\l__slcd_logofile_tl
\l__slcd_signature_tl
\l__slcd_location_tl
46 \tl_new:N \l__slcd_version_tl
47 \tl_new:N \l__slcd_degreeprogramme_tl
48 \tl_new:N \l__slcd_matrnumber_tl
49 \tl_new:N \l__slcd_supervisor_tl
50 \tl_new:N \l__slcd_cosupervisor_tl
51 \tl_new:N \l__slcd_advisor_tl
52 \tl_new:N \l__slcd_coadvisor_tl
53 \tl_new:N \l__slcd_department_tl
54 \tl_new:N \l__slcd_institute_tl

```

```

55 \tl_new:N \l__slcd_external_tl
56 \tl_new:N \l__slcd_logofile_tl
57 \tl_new:N \l__slcd_signature_tl
58 \tl_new:N \l__slcd_location_tl

```

(End definition for `\l__slcd_version_tl` and others.)

Define several dimensions for the `typearea` package to define the package style.

```

\l__slcd_marginspace_dim
\l__slcd_headmarkspace_dim
\l__slcd_rulespace_dim
\l__slcd_pagemark_minipage_dim
\l__slcd_rulerraise_dim
\l__slcd_rulewidth_dim
\l__slcd_rulethickness_dim
59 \dim_new:N \l__slcd_marginspace_dim
60 \dim_new:N \l__slcd_headmarkspace_dim
61 \dim_new:N \l__slcd_rulespace_dim
62 \dim_new:N \l__slcd_pagemark_minipage_dim
63 \dim_new:N \l__slcd_rulerraise_dim
64 \dim_new:N \l__slcd_rulewidth_dim
65 \dim_new:N \l__slcd_rulethickness_dim
66 \dim_gset:Nn \l__slcd_marginspace_dim { -1.85cm }
67 \dim_gset:Nn \l__slcd_headmarkspace_dim { 0.75cm }
68 \dim_gset:Nn \l__slcd_rulespace_dim { 10pt }
69 \dim_gset:Nn \l__slcd_pagemark_minipage_dim { 1.5cm }
70 \dim_gset:Nn \l__slcd_rulerraise_dim { -5pt }
71 \dim_gset:Nn \l__slcd_rulewidth_dim { 1.25pt }
72 \dim_gset:Nn \l__slcd_rulethickness_dim { 15pt }

```

(End definition for `\l__slcd_marginspace_dim` and others.)

## 2.2 Load-time options

We define the key-value interface for the class.

```

\l__slcd_base_class_tl
\l__slcd_unknown_clsopts_prop
\l__slcd_paper_int
\l__slcd_thesis_type_tl
\l__slcd_license_type_tl
\l__slcd_license_modifier_tl
\l__slcd_license_version_tl
\l__slcd_color_mode_tl
\l__slcd_font_mode_tl
73 \keys_define:nn { seiithesis }
74 {
75   class .choice:,
76   class / report .meta:n = {class=scrreprt},
77   class / scrreprt .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrreprt},
78   class / article .meta:n = {class=scrartcl},
79   class / scrartcl .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrartcl},
80   class / book .meta:n = {class=scrbook},
81   class / scrbook .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrbook},
82   class .initial:n = scrreprt,
83
84   paper .choices:nn = {a4,a5,b5}{
85     \int_gset_eq:NN \l__slcd_paper_int \l_keys_choice_int
86   },
87   paper .initial:n = a4,
88
89   logfile .tl_gset:N = \l__slcd_logofile_tl,
90   logfile .initial:n =,
91
92   thesistype .choice:,
93   thesistype / bachelor .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {bachelor},
94   thesistype / bachelorproposal .code:n = {
95     \tl_gset:Nn \l__slcd_thesis_type_tl {bachelorproposal}
96   },

```

```

97 thesistype / master .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {master},
98 thesistype / masterproposal .code:n = {
99   \tl_gset:Nn \l__slcd_thesis_type_tl {masterproposal}
100 },
101 thesistype / phd .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {phd},
102 thesistype / phdproposal .code:n = {
103   \tl_gset:Nn \l__slcd_thesis_type_tl {phdproposal}
104 },
105 thesistype .initial:n = master,
106
107 biblatex .bool_gset:N = \l__slcd_biblatex_bool,
108 biblatex .initial:n = false,
109
110 colormode .choices:nn = {cmyk,rgb,bw}{
111   \tl_gset_eq:NN \l__slcd_colormode_tl \l_keys_choice_tl
112 },
113 colormode .initial:n = cmyk,
114
115 fontmode .choices:nn = {original,replacement,auto}{
116   \tl_gset_eq:NN \l__slcd_fontmode_tl \l_keys_choice_tl
117 },
118 fontmode .initial:n = auto,
119
120 unknown .code:n = {
121   \prop_gput:NVn \l__slcd_unknown_clsopts_prop \l_keys_key_tl {#1}
122 },
123 }

```

(End definition for `\l__slcd_base_class_tl` and others.)

Handle the options

```

124 \IfFormatAtLeastTF { 2022-06-01 }
125 { \ProcessKeyOptions [ seiithesis ] }
126 {
127   \RequirePackage{ l3keys2e }
128   \ProcessKeysOptions { seiithesis }
129 }

```

Handle the known options for base class

```

130 \prop_map_inline:Nn \l__slcd_clsopts_prop
131 {
132   \tl_if_empty:nTF {#2}
133   { \PassOptionsToClass {#1} {\l__slcd_base_class_tl} }
134   {
135     \clist_map_inline:nn {#2}
136     { \PassOptionsToClass {#1=#1} {\l__slcd_base_class_tl} }
137   }
138 }

```

Load the base class

```

139 \LoadClass{\l__slcd_base_class_tl}

```

Attempt to handle the unknown options

```

140 \prop_map_inline:Nn \l__slcd_unknown_clsopts_prop
141 {
142   \cs_if_exist:cT {KV@KOMA.\l__slcd_base_class_tl.cls@#1}

```

```

143     {
144         \tl_if_empty:nTF {#2}
145             { \KOMAOptions{#1} }
146             { \KOMAOption{#1}{#2}}
147     }
148 }

```

## 2.3 Package loading

We load some packages with options that depend on options to the `se2thesis` class. Thus, we load them here to be able to hand them over the respective values.

We start with the `se2colors` and `se2fonts` packages.

```

149 \PassOptionsToPackage{\l__slcd_colormode_tl}{se2colors}
150 \RequirePackage{se2colors}
151
152 \RequirePackage{se2fonts}

```

Load the `microtype` package. We also set some options to `microtype`, namely the penalties for widows and orphans (which might also be corrected by `lua-widow-control` when using `LuaTeX`) and a thin space around the m-dash. We are aware of the discussion whether to have a space around the m-dash in English, however, we think it looks more beautiful. We took this from a [TeX.StackExchange post](#).

```

153 \RequirePackage{microtype}
154 \clubpenalty=10000
155 \widowpenalty=10000
156 \displaywidowpenalty=10000
157 \SetExtraKerning{
158     encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2}
159 }{
160     \textendash = {167,167},
161     - = {167,167}
162 }

```

When using `LuaTeX` load the `lua-widow-control` package for a better control of orphans and widows.

```

163 \ifengineT { \luatexengine }
164 {
165     \IfFileExists { lua-widow-control.sty }
166         { \RequirePackage{lua-widow-control} }
167         {
168             \msg:nnn { seiithesis }
169                 { lua-widow-control-not-available }
170                 {
171                     Could~ not~ find~ lua-widow-control.sty.~ You~ might~ want~ to~
172                     install~ it~ for~ better~ control~ over~ orphans~ and~ widows.
173                 }
174             \msg_note:nn { seiithesis } { lua-widow-control-not-available }
175         }
176 }

```

Similarly, load `ligtype` when using `LuaTeX`.

```

177 \ifengineT { \luatexengine }
178 {
179     \IfFileExists { selnolig.sty }

```

```

180 { \RequirePackage{selnolig} }
181 {
182   \msg:nnn { seiithesis }
183   { selnolig-not-available }
184   {
185     Could~ not~ find~ selnolig.sty.~ You~ might~ want~ to~ install~ it~
186     for~ better~ ligatures~ control.
187   }
188   \msg_note:nn { seiithesis } { selnolig-not-available }
189 }
190 }

```

When the user requests the `biblatex` option, also load `biblatex`

```

191 \bool_if:NT \l__slcd_biblatex_bool
192 {
193   \PassOptionsToPackage
194   {
195     backend=biber,
196     hyperref=auto,
197     backref=true,
198     style=alphabetic,
199     maxnames=100,
200     minalphames=3,
201     sorting=nyt,
202     giveninits=true,
203   }{biblatex}
204   \RequirePackage{biblatex}

```

End of the BibL<sup>A</sup>T<sub>E</sub>X settings.

```

205 }

```

## 2.4 User macros for the title page

In addition to the macros provided by the KOMA-Script classes for the title-page values (e.g. `\author`, `\title`), provide these additional macros to the user.

**`\version`** Specify the version of the document, e.g., a `git` hash.

```

206 \ProvideDocumentCommand \version { m }
207 {
208   \tl_set:Nn \l__slcd_version_tl {#1}
209 }

```

*(End definition for `\version`. This function is documented on page 3.)*

**`\degreeprogramme`** Specify the degree programme the thesis is meant to be accepted in.

```

210 \ProvideDocumentCommand \degreeprogramme { m }
211 {
212   \tl_set:Nn \l__slcd_degreeprogramme_tl {#1}
213 }

```

*(End definition for `\degreeprogramme`. This function is documented on page 3.)*

`\matrnumber` Specify the matriculation number of the student.

```
214 \ProvideDocumentCommand \matrnumber { m }
215 {
216   \tl_set:Nn \l__slcd_matrnumber_tl {#1}
217 }
```

*(End definition for \matrnumber. This function is documented on page 3.)*

`\supervisor` Specify the supervisor and co-supervisor of the thesis, usually a professor.

```
\cosupervisor 218 \ProvideDocumentCommand \supervisor { m }
219 {
220   \tl_set:Nn \l__slcd_supervisor_tl {#1}
221 }
222 \ProvideDocumentCommand \cosupervisor { m }
223 {
224   \tl_set:Nn \l__slcd_cosupervisor_tl {#1}
225 }
```

*(End definition for \supervisor and \cosupervisor. These functions are documented on page 3.)*

`\advisor` Specify the advisor and co-advisor of the thesis, usually a PhD student or postdoc.

```
\coadvisor 226 \ProvideDocumentCommand \advisor { m }
227 {
228   \tl_set:Nn \l__slcd_advisor_tl {#1}
229 }
230 \ProvideDocumentCommand \coadvisor { m }
231 {
232   \tl_set:Nn \l__slcd_coadvisor_tl {#1}
233 }
```

*(End definition for \advisor and \coadvisor. These functions are documented on page 3.)*

`\department` Specify the university's department and institute you are writing the thesis for.

```
\institute 234 \ProvideDocumentCommand \department { m }
235 {
236   \tl_set:Nn \l__slcd_department_tl {#1}
237 }
238 \ProvideDocumentCommand \institute { o m }
239 {
240   \tl_set:Nn \l__slcd_institute_tl {#2}
241 }
```

*(End definition for \department and \institute. These functions are documented on page 4.)*

`\external` Specify an external referee.

```
242 \ProvideDocumentCommand \external { m }
243 {
244   \tl_set:Nn \l__slcd_external_tl {#1}
245 }
```

*(End definition for \external. This function is documented on page 4.)*

`\location` Specify the location for the signature field.

```
246 \ProvideDocumentCommand \location { m }
247 {
248   \tl_set:Nn \l__slcd_location_tl {#1}
249 }
```

*(End definition for \location. This function is documented on page 4.)*

## 2.5 Define logo, paper size, and paper style

For the logo on the titlepage, we define further variables to store its height and a box to store the logo itself.

```
\l__slcd_logo_height_dim
\l__slcd_logo_box
250 \dim_if_exist:NF \l__slcd_logo_height_dim
251 {
252   \dim_new:N \l__slcd_logo_height_dim
253   \dim_gset:Nn \l__slcd_logo_height_dim { 67.5pt }
254 }
255 \box_if_exist:NF \l__slcd_logo_box
256 {
257   \box_new:N \l__slcd_logo_box
258 }
259 \tl_if_empty:NF \l__slcd_logofile_tl
260 {
261   \hbox_gset:Nn \l__slcd_logo_box
262   {
263     \includegraphics[%
264       height=\l__slcd_logo_height_dim%
265     ]{\l__slcd_logofile_tl}
266   }
267 }
```

*(End definition for \l\_\_slcd\_logo\_height\_dim and \l\_\_slcd\_logo\_box.)*

Set the paper size depending on the selected paper option.

```
268 \int_compare:nTF { \l__slcd_paper_int=1 }
269 {
270   \areaset[current]{350pt}{567pt}
271   \setlength{\marginparsep}{8.5cm}
272   \setlength{\marginparsep}{1em}
273 }{
274   \int_compare:nTF { \l__slcd_paper_int=2 }
275   {
276     \areaset[current]{247pt}{400pt}
277     \setlength{\marginparsep}{6.0cm}
278     \setlength{\marginparsep}{0.71em}
279   }{
280     \areaset[current]{303pt}{491pt}
281     \setlength{\marginparsep}{7.4cm}
282     \setlength{\marginparsep}{0.87em}
283   }
284 }
```

Provide the package style. We start by loading the `sclayer-scrpage` package with the appropriate options and set some basic properties.

```

285 \PassOptionsToPackage{automark}{sclayer-scrpage}
286 \RequirePackage{sclayer-scrpage}
287 \clearpairofpagestyles
288 \setkomafont{pagefoot}{\normalfont\sffamily}

```

We can then define the footer for odd pages, which will appear on the right side of the page's footer. This definition contains first, as an optional argument, the style of a page with `pagestyle` set to `empty`, i.e., a page where a new chapter starts, and afterwards the style of a regular right-hand side page.

```

289 \rofoot[{}%
290   \group_begin: \ \group_end:
291   \footnotesize%
292   \hspace*{\l__slcd_headmarkspace_dim}%
293   \group_begin:
294     \color{UPSE2-Blue}%
295     \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
296   \group_end:
297   \hspace*{\l__slcd_rulespace_dim}%
298   \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
299     \normalsize\textbf{\pagemark}%
300   \end{minipage}%
301   \hspace{\l__slcd_marginspace_dim}%
302 ]{}%
303   \group_begin: \ \group_end:
304   \footnotesize%
305   \group_begin:
306     \color{UPSE2-Blue}\headmark
307   \group_end:
308   \hspace*{\l__slcd_rulespace_dim}%
309   \group_begin:
310     \color{UPSE2-Blue}%
311     \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
312   \group_end:
313   \hspace*{\l__slcd_rulespace_dim}%
314   \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
315     \normalsize\textbf{\pagemark}%
316   \end{minipage}%
317   \hspace{\l__slcd_marginspace_dim}%
318 }

```

Similarly, we define the footer for even pages, which will appear on the left side of the page's footer.

```

319 \lefoot[{}%
320   \null\hspace{\l__slcd_marginspace_dim}%
321   \footnotesize%
322   \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
323     \raggedleft\normalsize\textbf{\pagemark}%
324   \end{minipage}%
325   \footnotesize%
326   \hspace*{\l__slcd_rulespace_dim}%
327   \group_begin:
328     \color{UPSE2-Blue}%

```



```

329   \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
330   \group_end:
331 }]{%
332   \null\hspace{\l__slcd_marginspace_dim}%
333   \footnotesize%
334   \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
335     \raggedleft\normalsize\textbf{\pagemark}%
336   \end{minipage}%
337   \footnotesize%
338   \hspace*{\l__slcd_rulespace_dim}%
339   \group_begin:
340     \color{UPSE2-Blue}%
341     \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
342   \group_end:
343   \hspace*{\l__slcd_headmarkspace_dim}%
344   \group_begin:
345     \color{UPSE2-Blue}\headmark
346   \group_end:
347 }

```

Finally, set the page style.

```

348 \pagestyle{scrheadings}

```

## 2.6 The title page

We start out by adjusting some KOMA-Script fonts.

```

349 \setkomafont{title}{\Huge}
350 \setkomafont{subtitle}{\Large}
351 \setkomafont{subject}{\normalsize}
352 \setkomafont{author}{\large}
353 \setkomafont{date}{\normalsize}
354 \setkomafont{publishers}{\normalsize}

```

```

\author Allow for automated splitting of author's names.
\@author
355 \seq_new:N \l__slcd_author_seq
356 \renewcommand*\author [2] []{
357   \seq_gset_split:Nnn \l__slcd_author_seq {\and} {#2}
358   \tl_if_empty:nTF {#1}
359     { \tl_set:Nn \l__slcd_signature_tl {#2} }
360     { \tl_set:Nn \l__slcd_signature_tl {#1} }
361 }
362 \renewcommand*\@author{
363   \group_begin:
364     \hyphenpenalty=100000
365     \seq_use:Nnnn \l__slcd_author_seq {-\GetTranslation{and}~} {,~} {~\&~}
366   \group_end:
367 }

```

(End definition for `\author` and `\@author`. These functions are documented on page 4.)

Define a new layer using the functionality from `scrlayer-scrpage` for the logo image.

```

368 \DeclareNewLayer[
369   mode=picture,
370   foreground,
371   align=tr,

```

```

372 hoffset=\oddsidemargin+1.5in+\textwidth,
373 voffset=\coverpagetopmargin+1.5in+\ht\strutbox,
374 width=\textwidth - \box_wd:N \l_slcd_logo_box,
375 height=\box_ht:N \l_slcd_logo_box,
376 contents={\putUL{\box_use:N \l_slcd_logo_box}},
377 ]{title.seii.logo}
378 \DeclareNewPageStyleByLayers{title.seii}{title.seii.logo}
379 \renewcommand*{\titlepagestyle}{title.seii}

```

Redefine the `\maketitle` command. The following code is an adapted version of the corresponding KOMA-Script macro by Markus Kohm.

```

380 \renewcommand*{\maketitle}[1][1]{
381   \begin{titlepage}
382     \setcounter{page}{#1}
383     \def\thefootnote{\fnsymbol{footnote}}
384     \edef\titlepage@restore{%
385       \noexpand\endgroup
386       \noexpand\global\noexpand\@colht\the\@colht
387       \noexpand\global\noexpand\@colroom\the\@colroom
388       \noexpand\global\vsizethe\vsizethe
389       \noexpand\global\noexpand\@titlepageiscoverpagefalse
390       \noexpand\let\noexpand\titlepage@restore\noexpand\relax
391     }%
392     \begingroup
393     \topmargin=\dimexpr \coverpagetopmargin-1in\relax
394     \oddsidemargin=\dimexpr 0in\relax
395     \evensidemargin=\dimexpr 0in\relax
396     \textwidth=\dimexpr \paperwidth-2in\relax
397     \textheight=\dimexpr
398     \paperheight-\coverpagetopmargin-\coverpagebottommargin\relax
399     \headheight=0pt
400     \headsep=0pt
401     \footskip=\baselineskip
402     \@colht=\textheight
403     \@colroom=\textheight
404     \vsizethe\textheight
405     \columnwidth=\textwidth
406     \hsize=\textwidth
407     \linewidth=\hsize
408     \setparsizes{\z@}{\z@}{\z@\@plus 1fil}\par@updaterelative
409     \thispagestyle{title.seii}
410     %
411     \@maketitle
412     %
413     \if@twoside
414       \@tempwatrue
415       \if@tempwa
416         \next@tpage
417         \begin{minipage}[t]{\textwidth}
418           \@uppertitleback
419         \end{minipage}
420         \vfill
421         \begin{minipage}[b]{\textwidth}
422           \@lowertitleback

```

```

423         \end{minipage}\par
424         \@thanks\let\@thanks\@empty
425     \fi
426 \fi
427 \ifx\tITLEPAGE@restore\relax\else\clearpage\tITLEPAGE@restore\fi
428 \end{titlepage}
429 }

```

`\l__slcd_title_box` Define a box for the title if it does not yet exist.

```

430 \box_if_exist:NF \l__slcd_title_box
431 {
432     \box_new:N \l__slcd_title_box
433 }

```

*(End definition for \l\_\_slcd\_title\_box.)*

`\@maketitle` Redeclare the `\@maketitle` macro.

```

434 \renewcommand*{\@maketitle}{%
435     \group_begin:
436     \setparsizes{\z@}{\z@}{\z@\@plus 1fil}\par@updaterelative
437     \thispagestyle{title.seii}
438     \hbox_gset:Nn \l__slcd_title_box
439     {
440         \parbox{\textwidth}{\__slcd_print_title:}
441     }
442     \null
443     \skip_vertical:n { 2.5 \box_ht:N \l__slcd_logo_box }
444     \box_use:N \l__slcd_title_box
445     \skip_vertical:n { .5 \box_ht:N \l__slcd_logo_box }
446     \group_end:
447     \@thanks\let\@thanks\@empty
448 }

```

*(End definition for \@maketitle. This function is documented on page 3.)*

Load the `ifthen` package.

```

449 \RequirePackage{ifthen}

```

Prints the title formatted appropriately. We start with printing the title, optional subtitle, and the author names.

```

450 \cs_new:Nn \__slcd_print_title:
451 {
452     \group_begin:
453     \usekomafont{title}\centering\@title\par
454     \group_end:
455     \ifx\@subtitle\@empty\else{%
456         \medskip\usekomafont{subtitle}\centering\@subtitle\par%
457     }\fi
458     \bigskip
459     \group_begin:
460     \usekomafont{author}\centering\@author\par
461     \group_end:
462     \bigskip

```

The next block generates the text that describes the thesis. In case of a PhD thesis, this text is predefined to match the requirements. In case of a bachelor or master thesis, or a proposal thereof, we generate a text based on the values of the `thesistype` load-time option and the values of the `\degreeprogramme`, `\department`, and `\institute` variables.

```

463 \exp_args:NV
464 {
465 \begin{center}
466 \tl_if_eq:NnTF \l__slcd_thesis_type_tl { phd }
467 {
468 Dissertation~ zur~ Erlangung~ des~ Doktorgrades\\
469 der~ Naturwissenschaften~ (Dr.\,rer.\,nat.)\\
470 eingereicht~ an~ der~ Fakultät~ für~ Informatik~ und~ Mathematik\\
471 der~ Universität~ Passau\\
472 \rule{\textwidth}{.1pt}\\
473 Dissertation~ submitted~ to\\
474 the~ Faculty~ of~ Computer~ Science~ and~ Mathematics\\
475 of~ the~ University~ of~ Passau\\
476 in~ partial~ fulfillment~ of~ obtaining\\
477 the~ degree~ of~ a~ Doctor~ of~ Natural~ Sciences
478 } {
479 \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor }
480 { \GetTranslation{Bachelor-thesis} }
481 \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelorproposal }
482 { \GetTranslation{Bachelor-thesis-proposal} }
483 \tl_if_eq:NnT \l__slcd_thesis_type_tl { master }
484 { \GetTranslation{Master-thesis} }
485 \tl_if_eq:NnT \l__slcd_thesis_type_tl { masterproposal }
486 { \GetTranslation{Master-thesis-proposal} }
487 \tl_if_eq:NnT \l__slcd_thesis_type_tl { phdproposal }
488 { \GetTranslation{PhD-thesis-proposal} }
489 \tl_if_empty:NF \l__slcd_degreeprogramme_tl
490 {
491 \ in~\l__slcd_degreeprogramme_tl
492 }
493 \par
494 \tl_if_empty:NF \l__slcd_department_tl { \l__slcd_department_tl \par }
495 \tl_if_empty:NF \l__slcd_institute_tl { \l__slcd_institute_tl \par }
496 }
497 \end{center}\par\bigskip

```

Finally, generate a table with information about supervisors, advisors, etc.

```

498 \begin{center}
499 \begin{tabular}{@{} l @{\quad} l}
500 \tl_if_empty:NF \l__slcd_matrnumber_tl
501 {
502 \GetTranslation{Matrnumber} & \l__slcd_matrnumber_tl \\
503 }
504 \tl_if_empty:NF \l__slcd_supervisor_tl
505 {
506 \GetTranslation{Supervisor} & \l__slcd_supervisor_tl \\
507 }
508 \tl_if_empty:NF \l__slcd_cosupervisor_tl
509 {

```

```

510         \GetTranslation{Co-supervisor} & \l__slcd_cosupervisor_tl \\
511     }
512     \tl_if_empty:NF \l__slcd_advisor_tl
513     {
514         \GetTranslation{Advisor}      & \l__slcd_advisor_tl \\
515     }
516     \tl_if_empty:NF \l__slcd_coadvisor_tl
517     {
518         \GetTranslation{Co-advisor}   & \l__slcd_coadvisor_tl \\
519     }
520     \tl_if_empty:NF \l__slcd_external_tl
521     {
522         \GetTranslation{External}     & \l__slcd_external_tl \\
523     }
524     \end{tabular}
525     \end{center}
526     \par\medskip

```

Last, print the date or the version.

```

527     \group_begin:
528     \usekomafont{date}
529     \centering
530     \tl_if_empty:NTF \l__slcd_version_tl
531     { \@date }
532     { \GetTranslation{version-of-date} }
533     \par\smallskip
534     \group_end:
535 }
536 }

```

`\@lowertitleback` Afterwards, override the definition of `\@lowertitleback`.

```

537 \renewcommand*{\@lowertitleback}{%
538 \group_begin:
539 \noindent\textbf{\@author}:\!
540 \emph{\@title}\!
541 \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor }
542 { \GetTranslation{Bachelor-thesis},~ }
543 \tl_if_eq:NnT \l__slcd_thesis_type_tl { master }
544 { \GetTranslation{Master-thesis},~ }
545 \tl_if_eq:NnT \l__slcd_thesis_type_tl { phd }
546 { \GetTranslation{PhD-thesis},~ }
547 \GetTranslation{up},~\the\year.
548 \group_end:
549 }

```

*(End definition for \@lowertitleback. This function is documented on page 4.)*

## 2.7 Styling of the sectioning commans

We change the formatting of the chapter, section, and sub-section headings.

```

550 \addtokomafont{chapterprefix}{\raggedleft\bfseries}
551 \addtokomafont{chapter}{\mdseries}
552 \addtokomafont{section}{\large\mdseries}
553 \addtokomafont{subsection}{\normalsize\mdseries}

```

```

554 \renewcommand*{\chapterformat}{%
555   \mbox{%
556     \scalebox{1.3}{\chapappifchapterprefix{\nobreakspace}}%
557     \scalebox{3.5}{\color{UPSE2-Gray}\thechapter\autodot}\enskip%
558   }%
559 }
560 \renewcommand*{\chapterlineswithprefixformat}[3]{%
561   \Ifstr{#1}{chapter}
562     {#2\textls*[75]{\MakeUppercase{#3}}}% change definition for chapter
563     {#2#3}% original definition
564 }%
565 \renewcommand*{\sectionlinesformat}[4]{%
566   #3\textls*[75]{\MakeUppercase{#4}}%
567 }

```

Change the loop of a \paragraph to be italic and end with a full stop.

```

568 \setkomafont{paragraph}{\normalsize\normalfont\itshape}
569 \AddtoDoHook{heading/endgroup/paragraph}{\headingdot}
570 \newcommand*{\headingdot}[1]{.}

```

Change the width of a dictum

```

571 \renewcommand*{\dictumwidth}{0.42\linewidth}

```

## 2.8 Provide an environment for abstracts

We want to allow abstracts in German and English, which is also a requirement when writing a thesis in English. First, ensure that the `\abstract` macro is available for all classes.

### `\abstract`

```

572 \providecommand{\abstract}{}

```

(End definition for `\abstract`. This function is documented on page 7.)

Then redefine the `abstract` environment such that it provides an optional argument for language selection.

`abstract` (*env.*) Used to typeset an abstract for the thesis. The optional argument allows to specify a language. As a default the current document language will be used.

```

573 \RenewDocumentEnvironment { abstract } { o }
574 {
575   \group_begin:
576   \IfNoValueF {#1} { \selectlanguage{#1} }
577   \scr@ifundefinedorrelax{chapter}{
578     \Iftocfeature{toc}{leveledown}
579     {\subsection*}
580     {\section*}
581   }{
582     \let\clearpage\relax
583     \Iftocfeature{toc}{leveledown}
584     {\section*}
585     {\chapter*}
586   } { \GetTranslation{Abstract} }
587 } {
588   \group_end:
589 }

```

## 2.9 Provide an environment for acknowledgements

Often, especially in a PhD thesis, one wants to acknowledge the help of certain people, for example, supervisors, family, and friends.

`acknowledgements` (*env.*) Use to typeset the acknowledgements for the thesis.

```
590 \NewDocumentEnvironment { acknowledgements } { o }
591 {
592   \group_begin:
593     \IfNoValueF {#1} { \selectlanguage{#1} }
594     \scr@ifundefinedorrelax{chapter}{
595       \Iftocfeature{toc}{leveldown}
596         {\subsection*}
597         {\section*}
598     }{
599       \Iftocfeature{toc}{leveldown}
600         {\section*}
601         {\chapter*}
602     } { \GetTranslation{Acknowledgements} }
603 } {
604   \group_end:
605 }
```

## 2.10 Document structuring macros

Ensure that these macros are defined. These are the exact definitions from KOMA-Script.

```
606 \newif\if@mainmatter\@mainmattertrue
```

`\frontmatter` Starts the frontmatter. Most notably, set the page numbers to roman.

```
607 \providecommand*\frontmatter{
608   {
609     \if@twoside\cleardoubleoddpagel\else\clearpage\fi
610     \@mainmatterfalse
611     \pagenumbering { roman }
612   }

```

*(End definition for \frontmatter. This function is documented on page 8.)*

`\mainmatter` Starts the mainmatter or the backmatter. Most notably, set the page numbers to arabic.

```
\backmatter 613 \providecommand*\mainmatter{
614   {
615     \if@twoside\cleardoubleoddpagel\else\clearpage\fi
616     \@mainmattertrue
617     \pagenumbering { arabic }
618   }
619 \providecommand*\backmatter{
620   {
621     \if@twoside\cleardoubleoddpagel\else\clearpage\fi
622     \@mainmatterfalse
623   }

```

*(End definition for \mainmatter and \backmatter. These functions are documented on page 8.)*

## 2.11 Declaration of authorship

`\authorshipDeclaration` Provide a command to typeset the authorship declaration.

```
624 \NewDocumentCommand \authorshipDeclaration { o }
625 {
626   \par
627   \group_begin:
628     \selectlanguage{ngerman}
629     \IfNoValueF {#1}
630       { \tl_gset:Nn \l__slcd_location_tl {#1} }
631
632     \tl_if_empty:NT \l__slcd_location_tl
633       {
634         \msg_new:nnn { seiithesis }
635           { no-location-specified }
636           {
637             You~ need~ to~ specify~ a~ location~ for~ the~ authorship~
638             declaration.~ Either~ via~ the~ location~ macro~ or~ via~ the~
639             optional~ argument~ of~ the~ authorshipDeclaration~ macro.
640           }
641         \msg_warning:nn { seiithesis } { no-location-specified }
642       }
643
644     \scr@ifundefinedorrelax{chapter}{
645       \iftocfeature{toc}{leveldown}
646         {\subsection*}
647         {\section*}
648       }{
649         \iftocfeature{toc}{leveldown}
650           {\section*}
651           {\chapter*}
652       } { Eigenständigkeitserklärung }
653
654     Hiermit~ versichere~ ich,~ \l__slcd_signature_tl,
655     \begin{enumerate}
656       \item dass~ ich~ die~ vorliegende~ Arbeit~ selbstständig~ und~ ohne~
657         unzulässige~ Hilfe~ verfasst~ und~ keine~ anderen~ als~ die~
658         angegebenen~ Quellen~ und~ Hilfsmittel~ benutzt,~ sowie~ die~
659         wörtlich~ und~ sinngemäß~ übernommenen~ Passagen~ aus~ anderen~
660         Werken~ kenntlich~ gemacht~ habe.
661       \item Außerdem~ erkläre~ ich,~ dass~ ich~ der~ Universität~ ein~
662         einfaches~ Nutzungsrecht~ zum~ Zwecke~ der~ Überprüfung~ mittels~
663         einer~ Plagiatssoftware~ in~ anonymisierter~ Form~ einräume.
664     \end{enumerate}\par
665     \bigskip
666     \noindent \l__slcd_location_tl,~ \@date\hfill
667     \signatureBox{\l__slcd_signature_tl}
668   \group_end:
669   \\strut\cleardoublepage
670 }
```

*(End definition for `\authorshipDeclaration`. This function is documented on page 8.)*

`\signatureBox` Provide a box for the signature.



```

671 \newcommand*{\signatureBox}[2][5cm]{
672   \parbox[t]{#1}{
673     \centering
674     \rule{\linewidth}{.3pt}\makebox[0pt][c]{#2}
675   }
676 }

```

(End definition for `\signatureBox`. This function is documented on page 8.)

## 2.12 Research questions and summary boxes

We utilise the `ntheorem` package for defining new theorem environments that are used for defining research questions and hypotheses. Therefore, start with loading this package.

```

677 \sld_package_if_loaded:nT { amsmath }
678 {
679   \PassOptionsToPackage{amsmath}{ntheorem}
680 }
681 \RequirePackage{ntheorem}
682 \theoremseparator{:}

```

`resq` (*env.*) We can then define the `resq` and `hyp` environments using the `\newtheorem` macro from `ntheorem`.

```

683 \newtheorem{resq}{Research~ Question}
684 \newtheorem{hyp}{Hypothesis}

```

For the summary boxes, we utilise the `tcolorbox` package. We start with loading this package.

```

685 \RequirePackage{tcolorbox}

```

`summary` (*env.*) The `summary` environment expects a label and has the summary text in its content.

```

686 \NewDocumentEnvironment { summary } { m }
687 { \begin{tcolorbox}[title={Summary~ (#1)}] }
688 { \end{tcolorbox} }
689 </class>

```

## 3 Translations for `se2thesis`

```

690 <*translations>

```

### 3.1 English Translations

```

691 <*english>

```

We provide the following English translations.

```

692 \ProvideDictionaryFor{English}{se2translations}[2023/01/27]
693 \ProvideDictTranslation{abstract}{abstract}
694 \ProvideDictTranslation{Abstract}{Abstract}
695 \ProvideDictTranslation{acknowledgement}{acknowledgement}
696 \ProvideDictTranslation{Acknowledgement}{Acknowledgement}
697 \ProvideDictTranslation{acknowledgements}{acknowledgements}
698 \ProvideDictTranslation{Acknowledgements}{Acknowledgements}
699 \ProvideDictTranslation{advisor}{advisor}

```

```

700 \ProvideDictTranslation{Advisor}{Advisor}
701 \ProvideDictTranslation{advisors}{advisors}
702 \ProvideDictTranslation{Advisors}{Advisors}
703 \ProvideDictTranslation{co-advisor}{co-advisor}
704 \ProvideDictTranslation{Co-advisor}{Co-advisor}
705 \ProvideDictTranslation{co-advisors}{co-advisors}
706 \ProvideDictTranslation{Co-advisors}{Co-advisors}
707 \ProvideDictTranslation{matrnumber}{matriculation number}
708 \ProvideDictTranslation{Matrnumber}{Matriculation number}
709 \ProvideDictTranslation{supervisor}{supervisor}
710 \ProvideDictTranslation{Supervisor}{Supervisor}
711 \ProvideDictTranslation{co-supervisor}{co-supervisor}
712 \ProvideDictTranslation{Co-supervisor}{Co-supervisor}
713 \ProvideDictTranslation{external}{external examiner}
714 \ProvideDictTranslation{External}{External Examiner}
715 \ProvideDictTranslation{degreeprogramme}{programme}
716 \ProvideDictTranslation{Degreeprogramme}{Programme}
717 \ProvideDictTranslation{Bachelor-thesis}{Bachelor Thesis}
718 \ProvideDictTranslation{Bachelor-thesis-proposal}{Bachelor Thesis Proposal}
719 \ProvideDictTranslation{Master-thesis}{Master Thesis}
720 \ProvideDictTranslation{Master-thesis-proposal}{Master Thesis Proposal}
721 \ProvideDictTranslation{PhD-thesis}{PhD Thesis}
722 \ProvideDictTranslation{PhD-thesis-proposal}{PhD Thesis Proposal}
723 \ProvideDictTranslation{date}{date}
724 \ProvideDictTranslation{Date}{Date}
725 \ProvideDictTranslation{university-of-passau}{University of Passau}
726 \ProvideDictTranslation{up}{University of Passau}
727 \ProvideDictTranslation{fim}{Faculty of Computer Science and Mathematics}
728 </english>

```

## 3.2 German Translations

```

729 <*german>

```

We provide the following German translations.

```

730 \ProvideDictionaryFor{German}{se2translations}[2023/01/27]
731 \ProvideDictTranslation{abstract}{Zusammenfassung}
732 \ProvideDictTranslation{Abstract}{Zusammenfassung}
733 \ProvideDictTranslation{acknowledgement}{Danksagung}
734 \ProvideDictTranslation{Acknowledgement}{Danksagung}
735 \ProvideDictTranslation{acknowledgements}{Danksagungen}
736 \ProvideDictTranslation{Acknowledgements}{Danksagungen}
737 \ProvideDictTranslation{advisor}{Betreuer}
738 \ProvideDictTranslation{Advisor}{Betreuer}
739 \ProvideDictTranslation{advisors}{Betreuer}
740 \ProvideDictTranslation{Advisors}{Betreuer}
741 \ProvideDictTranslation{co-advisor}{Mitbetreuer}
742 \ProvideDictTranslation{Co-advisor}{Mitbetreuer}
743 \ProvideDictTranslation{co-advisors}{Mitbetreuer}
744 \ProvideDictTranslation{Co-advisors}{Mitbetreuer}
745 \ProvideDictTranslation{matrnumber}{Matrikelnummer}
746 \ProvideDictTranslation{Matrnumber}{Matrikelnummer}
747 \ProvideDictTranslation{supervisor}{Prüfer}
748 \ProvideDictTranslation{Supervisor}{Prüfer}
749 \ProvideDictTranslation{co-supervisor}{Zweitprüfer}

```

```

750 \ProvideDictTranslation{Co-supervisor}{Zweitprüfer}
751 \ProvideDictTranslation{external}{Externer Gutachter}
752 \ProvideDictTranslation{External}{Externer Gutachter}
753 \ProvideDictTranslation{degreeprogramme}{Studiengang}
754 \ProvideDictTranslation{Degreeprogramme}{Studiengang}
755 \ProvideDictTranslation{Bachelor-thesis}{Bachelorarbeit}
756 \ProvideDictTranslation{Bachelor-thesis-proposal}{Bachelorarbeitsproposal}
757 \ProvideDictTranslation{Master-thesis}{Masterarbeit}
758 \ProvideDictTranslation{Master-thesis-proposal}{Masterarbeitsproposal}
759 \ProvideDictTranslation{PhD-thesis}{Dissertation}
760 \ProvideDictTranslation{PhD-thesis-proposal}{Dissertationsproposal}
761 \ProvideDictTranslation{date}{Datum}
762 \ProvideDictTranslation{Date}{Datum}
763 \ProvideDictTranslation{university-of-passau}{Universität Passau}
764 \ProvideDictTranslation{up}{Universität Passau}
765 \ProvideDictTranslation{fim}{Fakultät für Informatik und Mathematik}
766 </german>
767 </translations>

```

## 4 se2colors implementation

Start the DocStrip guards.

```
768 \*package)
```

Identify the internal prefix (L<sup>A</sup>T<sub>E</sub>X3 DocStrip convention): only internal material in this *submodule* should be used directly.

```
769 \@@=slcd_colors)
```

Identify the package and give the overall version information.

```
770 \ProvidesExplPackage {se2colors} {2023-01-27} {2.1.0}
```

```
771 {A colour support package for the se2thesis bundle}
```

### 4.1 Load-time options

`\l_slcd_colors_colormode_tl` Holds the colour mode selected by the user as a package load-time option.

```
772 \keys_define:nn { seiicolors }
```

```
773 {
```

```
774   cmode .choice:,
```

```
775   cmode / 4C .code:n = {
```

```
776     \PassOptionsToPackage{cmyk}{xcolor}
```

```
777     \tl_gset:Nn \l_slcd_colors_colormode_tl {4C}
```

```
778   },
```

```
779   cmode / RGB .code:n = {
```

```
780     \PassOptionsToPackage{rgb}{xcolor}
```

```
781     \tl_gset:Nn \l_slcd_colors_colormode_tl {RGB}
```

```
782   },
```

```
783   cmode / BW .code:n = {
```

```
784     \PassOptionsToPackage{gray}{xcolor}
```

```
785     \tl_gset:Nn \l_slcd_colors_colormode_tl {BW}
```

```
786   },
```

```
787   cmode / CMYK .meta:n = {cmode=4C},
```

```
788   cmode / cmyk .meta:n = {cmode=4C},
```

```
789   cmode / rgb .meta:n = {cmode=RGB},
```

```
790   cmode / gray .meta:n = {cmode=BW},
```

```
791   RGB .meta:n = {cmode=RGB},
```

```
792   rgb .meta:n = {cmode=RGB},
```

```
793   CMYK .meta:n = {cmode=4C},
```

```
794   cmyk .meta:n = {cmode=4C},
```

```
795   gray .meta:n = {cmode=BW},
```

```
796 }
```

```
797 \keys_set:nn { seiicolors } { cmode = 4C }
```

(End definition for `\l_slcd_colors_colormode_tl`.)

### 4.2 Option handling

```
798 \IfFormatAtLeastTF { 2022-06-01 }
```

```
799 { \ProcessKeyOptions [ seiicolors ] }
```

```
800 {
```

```
801   \RequirePackage { l3keys2e }
```

```
802   \ProcessKeysOptions { seiicolors }
```

```
803 }
```

### 4.3 Colour definitions

Load the xcolor package for colour definitions.

```
804 \RequirePackage{xcolor}
```

Define the primary colours gray and orange as given by the University of Passau's style guides.

```
805 \definecolorset[named]{RGB/cmyk}{UPSE2-}{-}{-%
806   Orange,242,148,0/0.00,0.44,0.95,0.01;%
807   Gray,153,159,158/0.40,0.28,0.28,0.00;%
808   JUR,229,49,56/0.01,0.90,0.81,0.01;%
809   WIWI,0,96,57/0.87,0.20,0.87,0.36;%
810   PHIL,188,42,51/0.06,0.93,0.81,0.11;%
811   FIM,0,90,161/0.93,0.63,0.01,0.02;%
812   DarkGray,77,77,77/0.74,0.67,0.62,0.18;%
813   White,255,255,255/0.00,0.00,0.00,0.00;%
814   MediumGray,127,127,127/0.52,0.43,0.40,0.02;%
815   LightGray,229,229,229/0.08,0.06,0.04,0.00;%
816   LightRed,229,49,56/0.01,0.90,0.81,0.01;%
817   DarkRed,188,42,51/0.06,0.93,0.80,0.11;%
818   Green,0,96,57/0.87,0.20,0.86,0.35;%
819   Blue,0,90,161/0.93,0.63,0.01,0.02;%
820   AccentGray,153,159,158/0.40,0.28,0.28,0.00%
821 }
```

Define the derived colours.

```
822 \colorlet{UPSE2-DarkGray1}{UPSE2-DarkGray!20!white}
823 \colorlet{UPSE2-DarkGray2}{UPSE2-DarkGray!40!white}
824 \colorlet{UPSE2-DarkGray3}{UPSE2-DarkGray!60!white}
825 \colorlet{UPSE2-DarkGray4}{UPSE2-DarkGray!75!black}
826 \colorlet{UPSE2-DarkGray5}{UPSE2-DarkGray!50!black}
827 \colorlet{UPSE2-White1}{UPSE2-White!95!black}
828 \colorlet{UPSE2-White2}{UPSE2-White!85!black}
829 \colorlet{UPSE2-White3}{UPSE2-White!75!black}
830 \colorlet{UPSE2-White4}{UPSE2-White!65!black}
831 \colorlet{UPSE2-White5}{UPSE2-White!50!black}
832 \colorlet{UPSE2-MediumGray1}{UPSE2-MediumGray!20!white}
833 \colorlet{UPSE2-MediumGray2}{UPSE2-MediumGray!40!white}
834 \colorlet{UPSE2-MediumGray3}{UPSE2-MediumGray!60!white}
835 \colorlet{UPSE2-MediumGray4}{UPSE2-MediumGray!75!black}
836 \colorlet{UPSE2-MediumGray5}{UPSE2-MediumGray!50!black}
837 \colorlet{UPSE2-LightGray1}{UPSE2-LightGray!90!black}
838 \colorlet{UPSE2-LightGray2}{UPSE2-LightGray!75!black}
839 \colorlet{UPSE2-LightGray3}{UPSE2-LightGray!55!black}
840 \colorlet{UPSE2-LightGray4}{UPSE2-LightGray!25!black}
841 \colorlet{UPSE2-LightGray5}{UPSE2-LightGray!10!black}
842 \colorlet{UPSE2-Orange1}{UPSE2-Orange!20!white}
843 \colorlet{UPSE2-Orange2}{UPSE2-Orange!40!white}
844 \colorlet{UPSE2-Orange3}{UPSE2-Orange!60!white}
845 \colorlet{UPSE2-Orange4}{UPSE2-Orange!75!black}
846 \colorlet{UPSE2-Orange5}{UPSE2-Orange!50!black}
847 \colorlet{UPSE2-LightRed1}{UPSE2-LightRed!20!white}
848 \colorlet{UPSE2-LightRed2}{UPSE2-LightRed!40!white}
849 \colorlet{UPSE2-LightRed3}{UPSE2-LightRed!60!white}
850 \colorlet{UPSE2-LightRed4}{UPSE2-LightRed!75!black}
```

```

851 \colorlet{UPSE2-LightRed5}{UPSE2-LightRed!50!black}
852 \colorlet{UPSE2-DarkRed1}{UPSE2-DarkRed!20!white}
853 \colorlet{UPSE2-DarkRed2}{UPSE2-DarkRed!40!white}
854 \colorlet{UPSE2-DarkRed3}{UPSE2-DarkRed!60!white}
855 \colorlet{UPSE2-DarkRed4}{UPSE2-DarkRed!75!black}
856 \colorlet{UPSE2-DarkRed5}{UPSE2-DarkRed!50!black}
857 \colorlet{UPSE2-Green1}{UPSE2-Green!10!white}
858 \colorlet{UPSE2-Green2}{UPSE2-Green!25!white}
859 \colorlet{UPSE2-Green3}{UPSE2-Green!50!white}
860 \colorlet{UPSE2-Green4}{UPSE2-Green!75!white}
861 \colorlet{UPSE2-Green5}{UPSE2-Green!90!white}
862 \colorlet{UPSE2-Blue1}{UPSE2-Blue!20!white}
863 \colorlet{UPSE2-Blue2}{UPSE2-Blue!40!white}
864 \colorlet{UPSE2-Blue3}{UPSE2-Blue!60!white}
865 \colorlet{UPSE2-Blue4}{UPSE2-Blue!75!black}
866 \colorlet{UPSE2-Blue5}{UPSE2-Blue!50!black}
867 \colorlet{UPSE2-AccentGray1}{UPSE2-AccentGray!20!white}
868 \colorlet{UPSE2-AccentGray2}{UPSE2-AccentGray!40!white}
869 \colorlet{UPSE2-AccentGray3}{UPSE2-AccentGray!60!white}
870 \colorlet{UPSE2-AccentGray4}{UPSE2-AccentGray!75!black}
871 \colorlet{UPSE2-AccentGray5}{UPSE2-AccentGray!50!black}
872 </package>

```

## 5 se2fonts implementation

Start the DocStrip guards.

```
873 <*package>
```

Identify the internal prefix (L<sup>A</sup>T<sub>E</sub>X3 DocStrip convention): only internal material in this *submodule* should be used directly.

```
874 <@@=slcd_fonts>
```

Identify the package and give the overall version information.

```
875 \ProvidesExplPackage {se2fonts} {2023-01-27} {2.1.0}
```

```
876 {A font-selection support package for the se2thesis bundle}
```

### 5.1 Load-time options

`\l__slcd_fonts_fontmode_tl` Holds the font-selection mode specified by the user as a package load-time option. *Please note:* this option is deprecated!

```
877 \tl_new:N \l__slcd_fonts_fontmode_tl
```

```
878 \keys_define:nn { seiifonts }
```

```
879 {
```

```
880   fmode .choice:,
```

```
881   fmode / original .code:n = {
```

```
882     \tl_gset:Nn \l__slcd_fonts_fontmode_tl {original}
```

```
883   },
```

```
884   fmode / replacement .code:n = {
```

```
885     \tl_gset:Nn \l__slcd_fonts_fontmode_tl {replacement}
```

```
886   },
```

```
887   fmode / auto .code:n = {
```

```
888     \tl_gset:Nn \l__slcd_fonts_fontmode_tl {auto}
```

```
889   },
```

```
890   original .meta:n = {fmode=original},
```

```
891   replacement .meta:n = {fmode=replacement},
```

```
892   auto .meta:n = {fmode=auto},
```

```
893 }
```

(End definition for `\l__slcd_fonts_fontmode_tl`.)

### 5.2 Option handling

```
894 \IfFormatAtLeastTF { 2022-06-01 }
```

```
895 { \ProcessKeyOptions [ seiifonts ] }
```

```
896 {
```

```
897   \RequirePackage{ l3keys2e }
```

```
898   \ProcessKeysOptions { seiifonts }
```

```
899 }
```

Define a warning message

```
900 \msg_set:nnnn { seiifonts } { deprecated-option }
```

```
901 { The~ option~ fmode~ to~ the~ se2fonts~ package~ is~ deprecated. }
```

```
902 { Remove~ it~ from~ your~ code. }
```

Raise the warning if the option was used

```
903 \tl_if_empty:NF \l__slcd_fonts_fontmode_tl
```

```
904 {
```

```
905   \msg_warning:nn { seiifonts } { deprecated-option }
```

```
906 }
```

### 5.3 Helper macros

`\pdfTEXengine` We define several alias macros to identify which engine the user is running.

```
\xetEXengine 907 \cs_new_eq:NN \pdfTEXengine \sys_if_engine_pdfTEX_p:
\luatEXengine 908 \cs_new_eq:NN \xetEXengine \sys_if_engine_xetEX_p:
909 \cs_new_eq:NN \luatEXengine \sys_if_engine_luatEX_p:
```

(End definition for `\pdfTEXengine`, `\xetEXengine`, and `\luatEXengine`. These functions are documented on page 12.)

`\ifengineTF` True, if the engine used matches the given first argument.

```
\ifengineT 910 \NewExpandableDocumentCommand \ifengineTF { mmm }
\ifengineF 911 {
912   \bool_if:nTF { #1 } { #2 } { #3 }
913 }
914 \NewExpandableDocumentCommand \ifengineT { mm }
915 {
916   \bool_if:nT { #1 } { #2 }
917 }
918 \NewExpandableDocumentCommand \ifengineF { mm }
919 {
920   \bool_if:nF { #1 } { #2 }
921 }
```

(End definition for `\ifengineTF`, `\ifengineT`, and `\ifengineF`. These functions are documented on page 12.)

The package is not tested with  $X_{\text{q}}\text{T}_{\text{E}}\text{X}$ , thus we provide an error to the user and stop the execution if they want to use the package with  $X_{\text{q}}\text{T}_{\text{E}}\text{X}$ .

```
922 \ifengineT { \xetEXengine }
923 {
924   \msg_set:nnnn { seiifonts } { xetEX-not-supported }
925   { XeTeX is not supported by the se2fonts package. }
926   { Switch to pdfTeX or (preferably) LuaTeX. }
927   \msg_error:nn { seiifonts } { xetEX-not-supported }
928 }
```

### 5.4 Font loading

Depending on the engine used by the user, we can use `fontspec` for loading fonts.

```
929 \ifengineTF { \luatEXengine }
930 {
    If the user uses  $\text{LuaT}_{\text{E}}\text{X}$ , load fontspec and unicode-math.
931   \RequirePackage{fontspec}
932   \RequirePackage{unicode-math}
```

To make sure the scaling of the fonts matches, we let `fontspec` do this matching based on the lower-case characters.

```
933   \defaultfontfeatures{ Scale = MatchLowercase }
934   \defaultfontfeatures[\rmfamily]{ Scale = 1 }
```

Load the respective `libertinus-otf` package and omit the monospaced font.

```
935   \PassOptionsToPackage{mono=false}{libertinus-otf}
936   \RequirePackage{libertinus-otf}
```



Load the *Anonymous Pro* monospaced font.

```

937 \setmonofont{AnonymousPro}[
938   RawFeature      = {+tnum, +lnum},
939   Scale           = {MatchLowercase},
940   FakeStretch     = {0.9},
941   UprightFont     = *-Regular,
942   ItalicFont      = *-Italic,
943   SlantedFont     = *-Italic,
944   BoldFont        = *-Bold,
945   BoldItalicFont = *-BoldItalic,
946   Extension       = .ttf,
947 ]
948 } {

```

The user does not use LuaTeX, thus fallback to T1 fonts.

```

949 \PassOptionsToPackage{T1}{fontenc}
950 \PassOptionsToPackage{scale=0.85}{AnonymousPro}
951 \PassOptionsToPackage{mono=false}{libertinus-type1}
952 \RequirePackage{fontenc}
953 \RequirePackage{AnonymousPro}
954 \RequirePackage{libertinus-type1}
955 }
956 </package>

```

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