

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

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Released 2024-07-31

## 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 typography 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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\*This file describes v4.3.1, last revised 2024-07-31.

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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 16, 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's and master's 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 scrbook document class. The packages se2colors and se2fonts provide necessary colour and font settings for the se2thesis class; the se2packages allows to load several recommended packages (see Section 6) with our recommended, predefined settings. They are available as separate packages, however, to allow their reuse for other classes, packages, and projects, as well.

### 1.1 Installation

The se2thesis bundle is available from CTAN<sup>1</sup>. It is part of both MiK<sub>T</sub>E<sub>X</sub> and T<sub>E</sub>XLive. You can find its development version from GitHub<sup>2</sup>. The easiest way of installing it is through your T<sub>E</sub>X distribution; please check your distribution's documentation on this. Note that it might be necessary to update your T<sub>E</sub>X distribution because they might not provide you updates; for example, there is a new version of T<sub>E</sub>XLive every year which needs to be installed separately. If you have installed an older version of se2thesis consider updating it to the latest version available from CTAN through your distribution.

For manual installation, we recommend to clone the Git repository and run the l3build tool that we also use for building the bundle. Running l3build ctan builds the source files and compiles the documentation. This creates a folder build containing these artefacts; build/doc contains the documentation, build/local the source files. See the documentation of l3build and your T<sub>E</sub>X distribution on how to install them manually. Please note that l3build also provides a l3build install target to install the bundle files to your local texmf tree.

The "Island of T<sub>E</sub>X" project provides Docker images of T<sub>E</sub>XLive<sup>3</sup>. If you do not want to install/update T<sub>E</sub>XLive on your system you might want to consider their latest image, which contains a recent T<sub>E</sub>XLive 2023 build. They build their images weekly, thus also recent releases of se2thesis will be part of the image soon after their release date.

---

<sup>1</sup>[ctan.org/pkg/se2thesis](https://ctan.org/pkg/se2thesis)

<sup>2</sup>[github.com/se2p/se2thesis](https://github.com/se2p/se2thesis)

<sup>3</sup>[islandoftex.gitlab.io/community/projects/docker/](https://islandoftex.gitlab.io/community/projects/docker/)

## 1.2 Availability on Overleaf

Since April 3, 2024, the `se2thesis` document template is also available from Overleaf. The document that is in Overleaf's gallery is based on the example document that comes with this package. Any Overleaf user can just create a new thesis document based on the template by clicking the respective button on Overleaf's gallery page.

The gallery entry for `se2thesis` is available from <https://www.overleaf.com/latex/templates/se2thesis-a-thesis-class-for-the-chair-of-software-engineering-ii-at-the-university-of-passau-germany/fpymkxmxbgpc>.

*Important remark:* Currently, the Overleaf template does not support Lua $\text{\TeX}$  but requires builds with pdf $\text{\TeX}$ . The reason is that Overleaf does not yet ship  $\text{\TeX}$ Live 2024, but only  $\text{\TeX}$ Live 2023, which does not provide the respective font package (notably `inconsolata-nerd-font`). Until the latest  $\text{\TeX}$ Live will be available from Overleaf, one can only use the pdf $\text{\TeX}$  mode, which has some drawbacks on the fonts, but works fine otherwise. From the Overleaf blog, we assume that  $\text{\TeX}$ Live 2024 might be available from some time in autumn 2024. We will update this documentation accordingly, as soon as the new version is available.

## 1.3 General Macros

They all have in common one macro, `\IfFormatAtLeastTF`; this macro is part of the latest  $\text{\LaTeX}$  kernel. However, not all users might have upgraded their  $\text{\TeX}$  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 <version> <then block> <else-block>
```

Checks whether the used  $\text{\LaTeX}$  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  $\text{\LaTeX}$  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`, `inconsolata-nerd-font` and `libertinus-otf` if one uses Lua $\text{\TeX}$ ; for pdf $\text{\LaTeX}$  we load `fontenc`, `libertinus-type1`, and `inconsolata` instead of the latter three. Furthermore, we load `microtype`; when using Lua $\text{\TeX}$ , 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 6. 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 * Checks whether a package has been loaded and conditionally executes code.
```

---

Updated: 2022-09-27

### 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` or `scrbook`. *Note:* you cannot use `scartcl` because it does not provide the required chapter sectioning. Default is `scrbook`.

Please note that if you want to have the bibliography numbered or use an appendix with alpha-numbering (A, B, ...), you want to explicitly use `scrreprt` as the base class; for some (currently unknown) reason this does not work with the default `scrbook`.

---

`paper` `paper = <choice>`

Set the paper format. Possible values are `a4` 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's thesis, `bachelorproposal` for a proposal to a bachelor's thesis, `master` for a master's thesis, `masterproposal` for a proposal to a master's thesis, `phdproposal` for a proposal to a PhD thesis, `phd` for a PhD thesis in the natural sciences, `phdeng` for a PhD thesis in engineering, and `phdphil` for a PhD thesis in natural philosophy.

---

`colormode` `colormode = <choice>`

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

### 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.

<code>\@maketitle</code>	<code>\@maketitle</code>
	We override the definition of the <code>\@maketitle</code> macro for our needs. In addition to the macros provided by the KOMA-Script classes for the title-page values (e.g. <code>\author</code> , <code>\title</code> ), 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.
<code>\version</code>	<code>\version {&lt;version&gt;}</code>
	Specify the version of the document. This can, for example, be a git hash of the current version.
<code>\degreeprogramme</code>	<code>\degreeprogramme {&lt;programme-name&gt;}</code>
	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.
<code>\matrnumber</code>	<code>\matrnumber {&lt;matriculation-number&gt;}</code>
	Specify the matriculation number of the student writing the thesis. This is required for bachelor’s and master’s theses.
<code>\supervisor</code> <code>\cosupervisor</code>	<code>\supervisor {&lt;name&gt;}</code> <code>\cosupervisor {&lt;name&gt;}</code>
	Specify the name of your supervisor and co-supervisor. Both people usually are professors.
<code>\advisor</code> <code>\coadvisor</code>	<code>\advisor {&lt;name&gt;}</code> <code>\coadvisor {&lt;name&gt;}</code>
	Specify the name of your advisor and co-advisor. Both people usually are PhD students or postdocs.
<code>\department</code> <code>\institute</code>	<code>\department {&lt;name&gt;}</code> <code>\institute [ &lt;short-name&gt; ] {&lt;name&gt;}</code>
	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 <code>\department</code> value is not specify, 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.
<code>\external</code>	<code>\external {&lt;name&gt;}</code>
	Specify the name of an external referee.
<code>\location</code>	<code>\location {&lt;name-of-town&gt;}</code>
	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 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`

We ensure that the `\abstract` command is defined for all document classes.

`abstract (env.)` 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}
```

### 3.5 Acknowledgements

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



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

### 3.6 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.

---

```
\frontmatter \frontmatter
\mainmatter \mainmatter
\backmatter \backmatter
```

---

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

### 3.7 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.

---

```
\authorshipDeclaration \authorshipDeclaration
```

---

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>4</sup> as its main language and support for German.

---

```
\signatureBox \signatureBox [width] {signature-name}
```

---

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.

---

<sup>4</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/>.

### 3.8 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.

- `resq` (*env.*)      The `resq` environment shall be used to specify a research question.  
`hyp` (*env.*)      The `hyp` environment shall be used to specify a hypothesis.  
`summary` (*env.*)    After describing the results, we recommend to give an explicit summary of the findings 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.

### 3.9 Language Support and Hyphenation

The study regulations of the University of Passau require students to write their thesis in either German or English. For both cases it is recommended to load a package for the correct hyphenation patters. Usually, one can either choose between the `babel` and `polyglossia` package. For a detailed discussion in the differences and which to choose, please use the search engine of your choice.

For this documentation we stick with the `babel` package, which is often considered to be the standard package.

If you write your thesis in German, load `babel` in your preamble like follows

```
\usepackage[ngerman]{babel}
```

For a thesis in English, you have to also load the German variant plus the English one as the default (see Section 3.7 for an explanation)

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

Note that by default, L<sup>A</sup>T<sub>E</sub>X does not provide hyphenation for compound words, which is explained in the T<sub>E</sub>X Book [?, p. 454] and a StackExchange post<sup>5</sup>. The `babel` package provides a way (called shorthands) for German, which allows to reenable hyphenation for compound words (as they are common on German). These shorthands are by default not available for English, but they can easily be added by adding

```
\usesshorthands{"}  
\addto\extrasUKenglish{\languageshorthands{ngerman}}
```

after loading `babel` with the aforementioned `\usepackage` macro<sup>6</sup>.

*Please note:* loading the `hyphenat` package is strongly discouraged by the `se2thesis` maintainer because it conflicts with the `hyp` environment provided by `se2thesis` (see Section 3.8).

---

<sup>5</sup><https://tex.stackexchange.com/a/63234/14622>

<sup>6</sup>see <https://tex.stackexchange.com/a/298844/14622>

## 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>7</sup> for serif, sans-serif, and math typesetting and the *Inconsolata* font<sup>8</sup> as a monospaced font.

*Please note:* this change might affect they 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>L<sub>A</sub>T<sub>E</sub>X!

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

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 Inconsolata

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>7</sup><https://github.com/alerque/libertinus>

<sup>8</sup><http://levien.com/type/myfonts/inconsolata.html>

## 6 The se2packages package

Several packages can be useful for writing a thesis. We provide a simple package for the user that loads these support packages with the recommended options. 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 certain 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).

### 6.1 The Recommended Packages

We first present the packages we recommend and give a rationale why we believe they should be used. Afterwards, we will discuss how to load the se2packages package to use one or the other of these recommended packages in the next section.

#### 6.1.1 Quoting with csquotes

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

#### 6.1.2 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 more related topics in Beyer et al.'s journal paper on requirements and solutions for reliable benchmarking [1].

#### 6.1.3 Code Listings

We prefer using the minted package for code listings because it provides a lot of options for styling as well as built-in support for a huge number of languages. 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; the aforementioned Docker images from the Island of  $\TeX$  project provide you everything set up already.

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

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

*Attention:* The way how minted is implemented causes the resulting code to be typeset in gray scale, if you use the se2colors package with option `cmode=bw` or the se2thesis class with `colormode=bw` (or their respective aliases). Students were requesting that they want to use the black-and-white mode of se2color because it saves lots of money when printing their thesis, while they want the colours in the syntax highlighting of minted. One can achieve this by adding hooks to the preamble of the document, after loading the minted package (which is recommended by setting `minted=true` as an option to se2packages):

```
\AddToHook{env/minted/begin}{\selectcolormodel{cmyk}}
\AddToHook{cmd/mintinline/before}{\selectcolormodel{cmyk}}
```

Thanks to Ulrike Fischer for pointing out this hook mechanism.<sup>9</sup>

Another option, if you do not want colours in the minted output when you use the grayscale mode of `se2colors` is the change the highlighting style, `minted` uses. The package for this provides the macro `\usemintedstyle`, which accepts a style available in your local `pygments` installation, see the `pygments` documentation<sup>10</sup> for an overview over the available styles; the `bw` style is explicitly designed for this kind of scenario.

#### 6.1.4 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 instead of `\hline` from standard  $\text{\LaTeX}$ : `\toprule` for a rule on the top of a table, above the column heads; `\midrule` to separate column heads and the content, and `\bottomrule` to mark the bottom of a table. We highly recommend that you follow this style when writing your thesis.

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 or less self explaining while 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 macros to typeset all kinds of floats.

#### 6.1.5 Controlling Ligatures, Orphans, and Widows

When using  $\text{\LuaTeX}$  (which we recommend anyway), we additionally recommend to use the `selnolig` and `lua-widow-control` packages. The former implements a better control over ligatures, the latter provides better control over orphans and widows.

For some reason we were not yet able to fix properly, `lua-widow-control` works on some machine but fails on others, although they are using the same version of  $\text{\TeX Live}$ . We therefore deactivate `lua-widow-control` by default.

#### 6.1.6 Use `microtype` for Microtypographic Optimisation

`microtype` is a game changer when writing documents. While standard  $\text{\LaTeX}$  provides reasonably good typography, the `microtype` package brings it to the next level. We refer you to the documentation of the package for details.

Additionally, we prefer to have a thin space around the m-dash. Although we are aware of the discussion whether to have such a space in English, we think it looks more beautiful and thus recommend it.

---

<sup>9</sup>[tex.stackexchange.com/a/718719/14622](https://tex.stackexchange.com/a/718719/14622)

<sup>10</sup>[pygments.org/styles/](https://pygments.org/styles/)

### 6.1.7 Use biblatex for Bibliographic References

The standard way of typesetting bibliographic references used to be BibTeX. The original BibTeX, however, seems to be very outdated in various ways: it originally only supported 7 bit character sets and creating citation styles requires the usage of a kind 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.

### 6.1.8 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 in drafts artefacts 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 an additional, common mistake: between the name of the element and its reference one needs to have a non-breaking space that is often forgotten. Instead people are using normal spaces that can break at the end of a line which looks very ugly.

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

## 6.2 Loading se2packages

When you load the `se2packages` package it will automatically load the `csquotes` and `booktabs` packages because we believe that you definitely should use them. Still, it is possible to avoid this by setting the following load-time options to the package.

---

<code>csquotes</code>	<code>csquotes = <math>\langle true, false \rangle</math></code>
<code>nocsquotes</code>	<code>nocsquotes</code>

The argument to `csquotes` can be one of `true` or `false`. The latter does not load `csquotes`, the former is the default value. By using `nocsquotes` you can also avoid that `csquote` is loaded.

---

<code>booktabs</code>	<code>booktabs = <math>\langle true, false \rangle</math></code>
<code>nobooktabs</code>	<code>nobooktabs</code>

The argument to `booktabs` can be one of `true` or `false`. The latter does not load `booktabs`, the former is the default value. By using `nobooktabs` you can also avoid that `booktabs` is loaded.

The `siunitx` package is helpful to set quantities and to automatically format numbers consistently. The following load-time option loads it automatically.

---

<code>siunitx</code>	<code>siunitx = <math>\langle true, false \rangle</math></code>
----------------------	-----------------------------------------------------------------

Decides whether the package loads `siunitx` and sets the options for `siunitx` to the values we recommend. The default value is `false`, set it to `true` to load `siunitx`.

We provide a load-time option to load `minted` and configure it.

---

<code>minted</code>	<code>minted = <math>\langle true, false \rangle</math></code>
---------------------	----------------------------------------------------------------

Decides whether the package loads `minted` and sets the options for `minted` to the values we recommend. The default value is `false`, set it to `true` to load `minted`. Note that `minted` requires additional installation effort and the use of the `-shell-escape` option, see its documentation.



We also provide a load-time option to load listings and configure it. This option and the minted option are mutually exclusive!

---

`listings` `listings =  $\langle true, false \rangle$`

Decides whether the package loads listings and sets the options for listings to the values we recommend. The default value is `false`, set it to `true` to load listings.

We provide a load-time option to load `selnolig`.

---

`selnolig` `selnolig =  $\langle true, false \rangle$`   
`noselnolig` `noselnolig`

The argument to `selnolig` can be one of `true` or `false`. The latter does not load `selnolig`, the former is the default value. By using `noselnolig` you can also avoid that `selnolig` is loaded.

We provide a load-time option to load `lua-widow-control`.

---

`widowcontrol` `widowcontrol =  $\langle true, false \rangle$`   
`nowidowcontrol` `nowidowcontrol`

The argument to `widowcontrol` can be one of `true` or `false`. The former loads `lua-widow-control`, the latter is the default value. By using `nowidowcontrol` you can also avoid that `lua-widow-control` is loaded.

We provide a load-time option to load and configure `microtype`.

---

`microtype` `microtype =  $\langle true, false \rangle$`   
`nomicrotype` `nomicrotype`

The argument to `microtype` can be one of `true` or `false`. The latter does not load `microtype`, the former is the default value. By using `nomicrotype` you can also avoid that `microtype` is loaded.

We provide a load-time option to load and configure `biblatex`.

---

`biblatex` `biblatex =  $\langle true, false, alphabetic, numeric \rangle$`

Decides whether the package loads `biblatex` and sets the options for `biblatex` to the values we recommend. The default value is `false`, set it to `true` to load `biblatex`.

By setting the value to `alphabetic`, `se2packages` sets the citation style for `biblatex` to its alphabetic one; selecting `numeric` loads the numeric style as provided by the `acmart` bundle of the ACM. The value `true` also loads the latter style as a default.

Note that for the `numeric` style, we provide an enhanced `\autocite` command, which does not only print the citation mark in the text but also a short entry listing of the bibliography entry in the margin column of the page. This entry is only printed for the first occurrence of a citation per chapter to not clutter the margin column too much. The other citation commands from `biblatex` work as usual.

Additionally, we provide a load-time option to load `cleveref`. This option makes use of  $\text{\LaTeX}$ 's hook system to load it as the very last thing in the preamble. You shall not use this option, but load `cleveref` on your own, if your document requires packages that need to be loaded even *after* `cleveref`.

---

`cleveref` `cleveref =  $\langle true, false \rangle$`

Decides whether the package load `cleveref`. The default value is `false`, set it to `true` to load `cleveref`.

Lastly, we provide one option to load all recommended packages (with `minted` preferred over `listings`).

---

`all` `all = <true, false>`

Decides whether the package loads all recommended packages. The default value is false, set it to true to load them.

### 6.3 Additional Recommended Packages

The following packages are not part of `se2packages` because they serve a very specific purpose. They might not be needed by many thesis writers, however, we mention them here in order to give you a pointer. We list them in alphabetic order.

- `algorithm2e`: provides tooling for typesetting algorithm diagrams. We recommend loading it with the following options:

```
\usepackage[ruled,noline,noend,linesnumbered]{algorithm2e}
```

- `hvfloat`: a package to control captions, fullpage, and double-page floats. We recommend to load it and use its `\tabcaption` for table captions.
- `lettrine`: allows to start a paragraph with a large initial. This is a beautiful opener for the first paragraph of a thesis' main content.
- `mathtools`: an enhanced version of the famous  $\mathcal{A}\mathcal{M}\mathcal{S}$ mathpackage that provides more functionality and fixes some of the known bugs.
- `pdfx`: adds support for PDF/X and PDF/A, which is useful for creating documents that can be archived, for example, by the University's library.
- `pgfplots`: a library for creating all kinds of plots, based on `pgf`, which is also the basis of the `tikz` package.
- `sidenotesplus`: a package to place all kinds of objects in the margin of a document, from footnotes (then called sidenotes) to figures and tables.
- `subcaption`: support for sub-captions and sub-figures.
- `tabularray`: a rewrite of  $\text{\LaTeX}$ 's `array` and `tabular` abilities in  $\text{\ETeX}$ 3. While the package offers a great combination of several other packages' functionality, it tends to be quite slow for large tables due to the way it is implemented internally.
- `tcolorbox`: allows to typeset coloured boxes, for example, for short summaries on research questions or hypotheses.
- `tikz`: for creating all kinds of figures. Beware: `TikZ` is a really huge package with a lot of functionality and a manual of more than 1300 pages.

## References

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

## **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
\ifpackage later 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 of definition for \IfFormatAtLeastTF. This function is documented on page 2.)*

```
17 </init>
```

## 2 The se2thesis implementation

Start the DocStrip guards.

```
18 <*class>
```

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.

```
19 <@=slcd>
```

Identify the class and give the overall version number.

```
20 \ProvidesExplClass {se2thesis} {2024-07-31} {4.3.1}
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 `\ifpackage loaded` macro to check whether a package has been loaded.

```
\slcd_package_if_loaded:nT
\slcd_package_if_loaded:nF
\slcd_package_if_loaded:nTF
\slcd_package_if_loaded:p:n
22 \prg_new_conditional:Nnn \slcd_package_if_loaded:n { p, T, F, TF }
23   {
24     \use:c { @ifpackage loaded }
25     { #1 }
26     { \prg_return_true: }
27     { \prg_return_false: }
28   }
```

(End of definition for `\slcd_package_if_loaded:nTF` and others. These functions are documented on page 3.)

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 of 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 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 of definition for `\l__slcd_base_class_tl`, `\l__slcd_clsopts_prop`, and `\l__slcd_unknown_clsopts_prop`.)

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

(End of 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 58 \dim_new:N \l__slcd_marginspace_dim
\l__slcd_rulespace_dim      59 \dim_new:N \l__slcd_headmarkspace_dim
\l__slcd_pagemark_minipage_dim 60 \dim_new:N \l__slcd_rulespace_dim
\l__slcd_rulerraise_dim     61 \dim_new:N \l__slcd_pagemark_minipage_dim
\l__slcd_rulewidth_dim      62 \dim_new:N \l__slcd_rulerraise_dim
\l__slcd_rulethickness_dim  63 \dim_new:N \l__slcd_rulewidth_dim
64 \dim_new:N \l__slcd_rulethickness_dim
65 \dim_gset:Nn \l__slcd_marginspace_dim { -1.85cm }
66 \dim_gset:Nn \l__slcd_headmarkspace_dim { 0.75cm }
67 \dim_gset:Nn \l__slcd_rulespace_dim { 10pt }
68 \dim_gset:Nn \l__slcd_pagemark_minipage_dim { 1.5cm }
69 \dim_gset:Nn \l__slcd_rulerraise_dim { -5pt }
70 \dim_gset:Nn \l__slcd_rulewidth_dim { 1.25pt }
71 \dim_gset:Nn \l__slcd_rulethickness_dim { 15pt }

```

*(End of 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 72 \keys_define:nn { seiithesis }
\l__slcd_paper_int           73 {
\l__slcd_thesis_type_tl     74   class .choice:,
\l__slcd_license_type_tl    75   class / report .meta:n = {class=scrreprt},
\l_slcd_licensemodifier_tl  76   class / scrreprt .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrreprt},
\l__slcd_licenseversion_tl  77   class / book .meta:n = {class=scrbook},
\l__slcd_colormode_tl       78   class / scrbook .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrbook},
79   class .initial:n = scrbook,
80
81   paper .choices:nn = {a4,b5}{
82     \int_gset_eq:NN \l__slcd_paper_int \l_keys_choice_int
83   },
84   paper .initial:n = a4,
85
86   logfile .tl_gset:N = \l__slcd_logofile_tl,
87   logfile .initial:n = ,
88
89   thesistype .choice:,
90   thesistype / bachelor .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {bachelor},
91   thesistype / bachelorproposal .code:n = {
92     \tl_gset:Nn \l__slcd_thesis_type_tl {bachelorproposal}
93   },
94   thesistype / master .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {master},
95   thesistype / masterproposal .code:n = {
96     \tl_gset:Nn \l__slcd_thesis_type_tl {masterproposal}
97   },
98   thesistype / phd .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {phd},
99   thesistype / phdeng .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {phdeng},
100  thesistype / phdphil .code:n = \tl_gset:Nn \l__slcd_thesis_type_tl {phdphil},
101  thesistype / phdproposal .code:n = {
102    \tl_gset:Nn \l__slcd_thesis_type_tl {phdproposal}

```

```

103   },
104   thesistype .initial:n = master,
105
106   colormode .choices:nn = {4C,CMYK,cmyk,RGB,rgb,BW,bw,gray}{
107     \tl_gset_eq:NN \l__slcd_colormode_tl \l_keys_choice_tl
108   },
109   colormode .initial:n = cmyk,
110
111   unknown .code:n = {
112     \prop_gput:NvN \l__slcd_unknown_clsopts_prop \l_keys_key_tl {#1}
113   },
114 }

```

*(End of definition for \l\_\_slcd\_base\_class\_tl and others.)*

#### Handle the options

```

115 \IfFormatAtLeastTF { 2022-06-01 }
116 { \ProcessKeyOptions [ seiithesis ] }
117 {
118   \RequirePackage{ l3keys2e }
119   \ProcessKeysOptions { seiithesis }
120 }

```

#### Handle the known options for base class

```

121 \prop_map_inline:Nn \l__slcd_clsopts_prop
122 {
123   \tl_if_empty:nTF {#2}
124     { \PassOptionsToClass {#1} {\l__slcd_base_class_tl} }
125     {
126       \clist_map_inline:nn {#2}
127         { \PassOptionsToClass {#1=#1} {\l__slcd_base_class_tl} }
128     }
129 }

```

#### Load the base class

```

130 \LoadClass{\l__slcd_base_class_tl}

```

#### Attempt to handle the unknown options

```

131 \prop_map_inline:Nn \l__slcd_unknown_clsopts_prop
132 {
133   \cs_if_exist:cT {KV@KOM.A.\l__slcd_base_class_tl.cls@#1}
134   {
135     \tl_if_empty:nTF {#2}
136       { \KOMAOptions{#1} }
137       { \KOMAOption{#1}{#2}}
138   }
139 }

```

## 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.

```

140 \PassOptionsToPackage{\l__slcd_colormode_tl}{se2colors}
141 \RequirePackage{se2colors}
142

```

```
143 \RequirePackage{se2fonts}
```

## 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.

```
144 \ProvideDocumentCommand \version { m }
145 {
146   \tl_set:Nn \l__slcd_version_tl {#1}
147 }
```

*(End of definition for `\version`. This function is documented on page 4.)*

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

```
148 \ProvideDocumentCommand \degreeprogramme { m }
149 {
150   \tl_set:Nn \l__slcd_degreeprogramme_tl {#1}
151 }
```

*(End of definition for `\degreeprogramme`. This function is documented on page 4.)*

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

```
152 \ProvideDocumentCommand \matrnumber { m }
153 {
154   \tl_set:Nn \l__slcd_matrnumber_tl {#1}
155 }
```

*(End of definition for `\matrnumber`. This function is documented on page 4.)*

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

```
\cosupervisor 156 \ProvideDocumentCommand \supervisor { m }
157 {
158   \tl_set:Nn \l__slcd_supervisor_tl {#1}
159 }
160 \ProvideDocumentCommand \cosupervisor { m }
161 {
162   \tl_set:Nn \l__slcd_cosupervisor_tl {#1}
163 }
```

*(End of definition for `\supervisor` and `\cosupervisor`. These functions are documented on page 4.)*

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

```
\coadvisor 164 \ProvideDocumentCommand \advisor { m }
165 {
166   \tl_set:Nn \l__slcd_advisor_tl {#1}
167 }
168 \ProvideDocumentCommand \coadvisor { m }
169 {
170   \tl_set:Nn \l__slcd_coadvisor_tl {#1}
171 }
```

*(End of definition for `\advisor` and `\coadvisor`. These functions are documented on page 4.)*



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

```
\institute 172 \ProvideDocumentCommand \department { m }
173 {
174   \tl_set:Nn \l__slcd_department_tl {#1}
175 }
176 \ProvideDocumentCommand \institute { o m }
177 {
178   \tl_set:Nn \l__slcd_institute_tl {#2}
179 }
```

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

`\external` Specify an external referee.

```
180 \ProvideDocumentCommand \external { m }
181 {
182   \tl_set:Nn \l__slcd_external_tl {#1}
183 }
```

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

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

```
184 \ProvideDocumentCommand \location { m }
185 {
186   \tl_set:Nn \l__slcd_location_tl {#1}
187 }
```

*(End of 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
188 \dim_if_exist:NF \l__slcd_logo_height_dim
189 {
190   \dim_new:N \l__slcd_logo_height_dim
191   \int_compare:nTF { \l__slcd_paper_int=1 }
192     {
193       \dim_gset:Nn \l__slcd_logo_height_dim { 67.5pt }
194     } {
195       \dim_gset:Nn \l__slcd_logo_height_dim { 56.8pt }
196     }
197 }
198 \box_if_exist:NF \l__slcd_logo_box
199 {
200   \box_new:N \l__slcd_logo_box
201 }
202 \tl_if_empty:NF \l__slcd_logofile_tl
203 {
204   \hbox_gset:Nn \l__slcd_logo_box
205     {
206       \includegraphics[%
207         height=\l__slcd_logo_height_dim%
```

```

208     ]{\l__slcd_logofile_tl}
209   }
210 }

```

(End of definition for `\l__slcd_logo_height_dim` and `\l__slcd_logo_box`.)

Set the paper size depending on the selected paper option.

```

211 \int_compare:nTF { \l__slcd_paper_int=1 }
212 {
213   \areaset[current]{350pt}{567pt}
214   \setlength{\marginparsep}{8.5cm}
215   \setlength{\marginparsep}{1em}
216 }{
217   \areaset[current]{350pt}{567pt}
218   \setlength{\marginparsep}{7.4cm}
219   \setlength{\marginparsep}{0.87em}
220 }

```

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

```

221 \PassOptionsToPackage{automark}{scrlayer-scrpage}
222 \RequirePackage{scrlayer-scrpage}
223 \clearpaairofpagestyles
224 \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.

```

225 \rofoot[{%
226   \group_begin: \ \group_end:
227   \footnotesize%
228   \hspace*{\l__slcd_headmarkspace_dim}%
229   \group_begin:
230     \color{UPSE2-Blue}%
231     \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
232   \group_end:
233   \hspace*{\l__slcd_rulespace_dim}%
234   \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
235     \normalsize\textbf{\pagemark}%
236   \end{minipage}%
237   \hspace{\l__slcd_marginspace_dim}%
238 ]]{%
239   \group_begin: \ \group_end:
240   \footnotesize%
241   \group_begin:
242     \color{UPSE2-Blue}\headmark
243   \group_end:
244   \hspace*{\l__slcd_rulespace_dim}%
245   \group_begin:
246     \color{UPSE2-Blue}%
247     \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
248   \group_end:
249   \hspace*{\l__slcd_rulespace_dim}%
250   \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
251     \normalsize\textbf{\pagemark}%

```

```

252 \end{minipage}%
253 \hspace{\l__slcd_marginspace_dim}%
254 }

```

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

```

255 \leftfoot[{\%
256 \null\hspace{\l__slcd_marginspace_dim}%
257 \footnotesize%
258 \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
259 \raggedleft\normalsize\textbf{\pagemark}%
260 \end{minipage}%
261 \footnotesize%
262 \hspace*{\l__slcd_rulespace_dim}%
263 \group_begin:
264 \color{UPSE2-Blue}%
265 \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
266 \group_end:
267 ]]{\%
268 \null\hspace{\l__slcd_marginspace_dim}%
269 \footnotesize%
270 \begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
271 \raggedleft\normalsize\textbf{\pagemark}%
272 \end{minipage}%
273 \footnotesize%
274 \hspace*{\l__slcd_rulespace_dim}%
275 \group_begin:
276 \color{UPSE2-Blue}%
277 \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
278 \group_end:
279 \hspace*{\l__slcd_headmarkspace_dim}%
280 \group_begin:
281 \color{UPSE2-Blue}\headmark
282 \group_end:
283 }

```

Finally, set the page style.

```

284 \pagestyle{scrheadings}

```

## 2.6 The title page

We start out by adjusting some KOMA-Script fonts.

```

285 \setkomafont{title}{\Huge}
286 \setkomafont{subtitle}{\Large}
287 \setkomafont{subject}{\normalsize}
288 \setkomafont{author}{\large}
289 \setkomafont{date}{\normalsize}
290 \setkomafont{publishers}{\normalsize}

```

`\author` Allow for automated splitting of author's names.

```

\@author
291 \seq_new:N \l__slcd_author_seq
292 \renewcommand*\author[2][{}{
293 \seq_gset_split:Nnn \l__slcd_author_seq {\and} {#2}
294 \tl_if_empty:nTF {#1}

```

```

295 { \tl_set:Nn \l__slcd_signature_tl {#2} }
296 { \tl_set:Nn \l__slcd_signature_tl {#1} }
297 }
298 \renewcommand*{\@author}{
299   \group_begin:
300   \hyphenpenalty=100000
301   \seq_use:Nnnn \l__slcd_author_seq {\~\GetTranslation{and}~} {,~} {\~\&~}
302   \group_end:
303 }

```

(End of definition for \@author and \@author. These functions are documented on page 5.)

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

```

304 \DeclareNewLayer[
305   mode=picture,
306   foreground,
307   align=tr,
308   hoffset=\oddsidemargin+1.5in+\textwidth,
309   voffset=\coverpagetopmargin+1.5in+\ht\strutbox,
310   width=\textwidth - \box_wd:N \l__slcd_logo_box,
311   height=\box_ht:N \l__slcd_logo_box,
312   contents={\putUL{\box_use:N \l__slcd_logo_box}},
313 ]{title.seii.logo}
314 \DeclareNewPageStyleByLayers{title.seii}{title.seii.logo}
315 \renewcommand*{\titlepagestyle}{title.seii}

```

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

```

316 \renewcommand*{\maketitle}[1][1]{
317   \begin{titlepage}
318     \setcounter{page}{#1}
319     \def\thefootnote{\fnsymbol{footnote}}
320     \edef\titlepage@restore{%
321       \noexpand\endgroup
322       \noexpand\global\noexpand\colht\the\colht
323       \noexpand\global\noexpand\colroom\the\colroom
324       \noexpand\global\vsizethe\vsizethe
325       \noexpand\global\noexpand\@titlepageiscoverpagefalse
326       \noexpand\let\noexpand\titlepage@restore\noexpand\relax
327     }%
328     \begingroup
329     \topmargin=\dimexpr \coverpagetopmargin-1in\relax
330     \oddsidemargin=\dimexpr 0in\relax
331     \evensidemargin=\dimexpr 0in\relax
332     \textwidth=\dimexpr \paperwidth-2in\relax
333     \textheight=\dimexpr
334     \paperheight-\coverpagetopmargin-\coverpagebottommargin\relax
335     \headheight=0pt
336     \headsep=0pt
337     \footskip=\baselineskip
338     \colht=\textheight
339     \colroom=\textheight
340     \vsizethe\textheight
341     \columnwidth=\textwidth
342     \hsizethe\textwidth

```

```

343 \linewidth=\hsize
344 \setparsizes{\z@}{\z@}{\z@\@plus 1fil}\par@updaterelative
345 \thispagestyle{title.seii}
346 %
347 \@maketitle
348 %
349 \if@twoside
350 \@tempwatrue
351 \if@tempswa
352 \next@tpage
353 \begin{minipage}[t]{\textwidth}
354 \@uppertitleback
355 \end{minipage}
356 \vfill
357 \begin{minipage}[b]{\textwidth}
358 \@lowertitleback
359 \end{minipage}\par
360 \@thanks\let\@thanks\@empty
361 \fi
362 \fi
363 \ifx\titlepage@restore\relax\else\clearpage\titlepage@restore\fi
364 \end{titlepage}
365 }

```

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

```

366 \box_if_exist:NF \l__slcd_title_box
367 {
368 \box_new:N \l__slcd_title_box
369 }

```

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

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

```

370 \renewcommand*{\@maketitle}{%
371 \group_begin:
372 \setparsizes{\z@}{\z@}{\z@\@plus 1fil}\par@updaterelative
373 \thispagestyle{title.seii}
374 \hbox_gset:Nn \l__slcd_title_box
375 {
376 \parbox{\textwidth}{\l__slcd_print_title:}
377 }
378 \null
379 \skip_vertical:n { 2.5 \box_ht:N \l__slcd_logo_box }
380 \box_use:N \l__slcd_title_box
381 \skip_vertical:n { .5 \box_ht:N \l__slcd_logo_box }
382 \group_end:
383 \@thanks\let\@thanks\@empty
384 }

```

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

Load the `ifthen` package.

```

385 \RequirePackage{ifthen}

```

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

```

386 \cs_new:Nn \__slcd_print_title:
387 {
388   \group_begin:
389     \usekomafont{title}\centering\@title\par
390   \group_end:
391   \ifx\@subtitle\empty\else{%
392     \medskip\usekomafont{subtitle}\centering\@subtitle\par%
393   }\fi
394   \bigskip
395   \group_begin:
396     \usekomafont{author}\centering\@author\par
397   \group_end:
398   \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's or master's 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.

```

399   \exp_args:NV
400   {
401     \begin{center}
402       \tl_if_eq:NnTF \l__slcd_thesis_type_tl { phd }
403       {
404         Dissertation~ zur~ Erlangung~ des~ Doktorgrades\\
405         der~ Naturwissenschaften~ (Dr.\,rer.\,nat.)\\
406         eingereicht~ an~ der~ Fakultät~ für~ Informatik~ und~ Mathematik\\
407         der~ Universität~ Passau\\
408         \rule{\textwidth}{.1pt}\\
409         Dissertation~ submitted~ to\\
410         the~ Faculty~ of~ Computer~ Science~ and~ Mathematics\\
411         of~ the~ University~ of~ Passau\\
412         in~ partial~ fulfillment~ of~ obtaining\\
413         the~ degree~ of~ a~ Doctor~ of~ Natural~ Sciences
414       } {
415         \tl_if_eq:NnTF \l__slcd_thesis_type_tl { phdeng }
416         {
417           Dissertation~ zur~ Erlangung~ des~ Doktorgrades\\
418           der~ Ingenieurwissenschaften~ (Dr.-Ing.)\\
419           eingereicht~ an~ der~ Fakultät~ für~ Informatik~ und~ Mathematik\\
420           der~ Universität~ Passau\\
421           \rule{\textwidth}{.1pt}\\
422           Dissertation~ submitted~ to\\
423           the~ Faculty~ of~ Computer~ Science~ and~ Mathematics\\
424           of~ the~ University~ of~ Passau\\
425           in~ partial~ fulfillment~ of~ obtaining\\
426           the~ degree~ of~ a~ Doctor~ of~ Engineering
427         } {
428           \tl_if_eq:NnTF \l__slcd_thesis_type_tl { phdphil }
429           {
430             Dissertation~ zur~ Erlangung~ des~ Doktorgrades\\
431             der~ Naturphilosophie~ (Dr.\,phil.\,nat.)\\
432             eingereicht~ an~ der~ Fakultät~ für~ Informatik~ und~ Mathematik\\

```

```

433         der~ Universität~ Passau\\
434         \rule{\textwidth}{.1pt}\\
435         Dissertation~ submitted~ to\\
436         the~ Faculty~ of~ Computer~ Science~ and~ Mathematics\\
437         of~ the~ University~ of~ Passau\\
438         in~ partial~ fulfillment~ of~ obtaining\\
439         the~ degree~ of~ a~ Doctor~ of~ Natural~ Philosophy
440     } {
441         \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor }
442         { \GetTranslation{Bachelor-thesis} }
443         \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelorproposal }
444         { \GetTranslation{Bachelor-thesis-proposal} }
445         \tl_if_eq:NnT \l__slcd_thesis_type_tl { master }
446         { \GetTranslation{Master-thesis} }
447         \tl_if_eq:NnT \l__slcd_thesis_type_tl { masterproposal }
448         { \GetTranslation{Master-thesis-proposal} }
449         \tl_if_eq:NnT \l__slcd_thesis_type_tl { phdproposal }
450         { \GetTranslation{PhD-thesis-proposal} }
451         \tl_if_empty:NF \l__slcd_degreeprogramme_tl
452         {
453             \ in~\l__slcd_degreeprogramme_tl
454         }
455         \par
456         \tl_if_empty:NF \l__slcd_department_tl { \l__slcd_department_tl \par }
457         \tl_if_empty:NF \l__slcd_institute_tl { \l__slcd_institute_tl \par }
458     }
459 }
460 }
461 \end{center}\par\bigskip

```

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

```

462 \begin{center}
463 \begin{tabular}{@{} l @{\quad} l}
464     \tl_if_empty:NF \l__slcd_matrnumber_tl
465     {
466         \GetTranslation{Matrnumber} & \l__slcd_matrnumber_tl \\
467     }
468     \tl_if_empty:NF \l__slcd_supervisor_tl
469     {
470         \GetTranslation{Supervisor} & \l__slcd_supervisor_tl \\
471     }
472     \tl_if_empty:NF \l__slcd_cosupervisor_tl
473     {
474         \GetTranslation{Co-supervisor} & \l__slcd_cosupervisor_tl \\
475     }
476     \tl_if_empty:NF \l__slcd_advisor_tl
477     {
478         \GetTranslation{Advisor} & \l__slcd_advisor_tl \\
479     }
480     \tl_if_empty:NF \l__slcd_coadvisor_tl
481     {
482         \GetTranslation{Co-advisor} & \l__slcd_coadvisor_tl \\
483     }
484     \tl_if_empty:NF \l__slcd_external_tl
485     {

```

```

486             \GetTranslation{External}      & \l__slcd_external_tl \\
487         }
488     \end{tabular}
489 \end{center}
490 \par\medskip

```

Last, print the date or the version.

```

491     \group_begin:
492     \usekomafont{date}
493     \centering
494     \tl_if_empty:NTF \l__slcd_version_tl
495     { \@date }
496     { \GetTranslation{version-of-date} }
497     \par\smallskip
498     \group_end:
499 }
500 }

```

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

```

501 \renewcommand*{\@lowertitleback}{%
502 \group_begin:
503 \noindent\textbf{\@author}:\!
504 \emph{\@title}\!
505 \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor }
506 { \GetTranslation{Bachelor-thesis},~ }
507 \tl_if_eq:NnT \l__slcd_thesis_type_tl { master }
508 { \GetTranslation{Master-thesis},~ }
509 \tl_if_eq:NnT \l__slcd_thesis_type_tl { phd }
510 { \GetTranslation{PhD-thesis},~ }
511 \GetTranslation{up},~\the\year.
512 \group_end:
513 }

```

*(End of definition for \@lowertitleback. This function is documented on page 5.)*

## 2.7 Styling of the sectioning commands

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

```

514 \addtokomafont{chapterprefix}{\raggedleft\bfseries}
515 \addtokomafont{chapter}{\mdseries}
516 \addtokomafont{section}{\large\mdseries}
517 \addtokomafont{subsection}{\normalsize\mdseries}
518 \renewcommand*{\chapterformat}{%
519 \enskip\mbox{%
520 \scalebox{3}{\color{UPSE2-DarkGray}\thechapter\autodot}%
521 }%
522 }
523 \renewcommand{\chapterlinesformat}[3]{%
524 \parbox[b]{\textwidth}{\hrulefill#2}\par%
525 #3\par\bigskip%
526 \hrule%
527 }
528 \RedeclareSectionCommand[afterskip=1.5\baselineskip]{chapter}
529 \renewcommand*{\chapterlineswithprefixformat}[3]{%

```



```

530 \Ifstr{#1}{chapter}
531   {#2\textls*[75]{\MakeUppercase{#3}}}% change definition for chapter
532   {#2#3}% original definition
533 }%
534 \renewcommand*\sectionlinesformat[4]{%
535   #3\textls*[75]{\MakeUppercase{#4}}%
536 }

```

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

```

537 \setkomafont{paragraph}{\normalsize\normalfont\itshape}
538 \AddtoDoHook{heading/endgroup/paragraph}{\headingdot}
539 \newcommand*\headingdot[1]{.}

```

Change the width of a dictum

```

540 \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`

```

541 \providecommand{\abstract}{}

```

*(End of definition for `\abstract`. This function is documented on page 5.)*

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.

```

542 \RenewDocumentEnvironment { abstract } { o }
543 {
544   \group_begin:
545   \IfNoValueF {#1} { \selectlanguage{#1} }
546   \scr@ifundefinedorrelax{chapter}{
547     \IfTOCfeature{toc}{leveldown}
548     {\subsection*}
549     {\section*}
550   }{
551     \let\clearpage\relax
552     \IfTOCfeature{toc}{leveldown}
553     {\section*}
554     {\chapter*}
555   } { \GetTranslation{Abstract} }
556 } {
557   \group_end:
558 }

```

## 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.

```
559 \NewDocumentEnvironment { acknowledgements } { o }
560 {
561   \group_begin:
562   \IfNoValueF {#1} { \selectlanguage{#1} }
563   \scr@ifundefinedorrelax{chapter}{
564     \Iftocfeature{toc}{leveldown}
565     {\subsection*}
566     {\section*}
567   }{
568     \Iftocfeature{toc}{leveldown}
569     {\section*}
570     {\chapter*}
571   } { \GetTranslation{Acknowledgements} }
572 } {
573   \group_end:
574 }
```

## 2.10 Document structuring macros

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

```
575 \newif\if@mainmatter\@mainmattertrue
```

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

```
576 \providecommand*\frontmatter{
577 {
578   \if@twoside\cleardoubleoddpagel\else\clearpage\fi
579   \@mainmatterfalse
580   \pagenumbering { roman }
581 }
```

*(End of definition for \frontmatter. This function is documented on page 6.)*

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

```
582 \providecommand*\mainmatter{
583 {
584   \if@twoside\cleardoubleoddpagel\else\clearpage\fi
585   \@mainmattertrue
586   \pagenumbering { arabic }
587 }
588 \providecommand*\backmatter{
589 {
590   \if@twoside\cleardoubleoddpagel\else\clearpage\fi
591   \@mainmatterfalse
592 }
```

*(End of definition for \mainmatter and \backmatter. These functions are documented on page 6.)*

## 2.11 Declaration of authorship

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

```
593 \NewDocumentCommand \authorshipDeclaration { o }
594 {
595   \par
596   \group_begin:
597     \selectlanguage{ngerman}
598     \IfNoValueF {#1}
599       { \tl_gset:Nn \l__slcd_location_tl {#1} }
600
601   \tl_if_empty:NT \l__slcd_location_tl
602     {
603       \msg_new:nnn { seiithesis }
604         { no-location-specified }
605       {
606         You~ need~ to~ specify~ a~ location~ for~ the~ authorship~
607         declaration.~ Either~ via~ the~ location~ macro~ or~ via~ the~
608         optional~ argument~ of~ the~ authorshipDeclaration~ macro.
609       }
610       \msg_warning:nn { seiithesis } { no-location-specified }
611     }
612
613   \scr@ifundefinedorrelax{chapter}{
614     \IfTocFeature{toc}{leveldown}
615       {\subsection*}
616       {\section*}
617   }{
618     \IfTocFeature{toc}{leveldown}
619       {\section*}
620       {\chapter*}
621   } { Eigenständigkeitserklärung }
622
623   Hiermit~ versichere~ ich,~ \l__slcd_signature_tl,
624   \begin{enumerate}
625     \item dass~ ich~ die~ vorliegende~ Arbeit~ selbstständig~ und~ ohne~
626     unzulässige~ Hilfe~ verfasst~ und~ keine~ anderen~ als~ die~
627     angegebenen~ Quellen~ und~ Hilfsmittel~ benutzt,~ sowie~ die~
628     wörtlich~ und~ sinngemäß~ übernommenen~ Passagen~ aus~ anderen~
629     Werken~ kenntlich~ gemacht~ habe.
630     \item Außerdem~ erkläre~ ich,~ dass~ ich~ der~ Universität~ ein~
631     einfaches~ Nutzungsrecht~ zum~ Zwecke~ der~ Überprüfung~ mittels~
632     einer~ Plagiatssoftware~ in~ anonymisierter~ Form~ einräume.
633   \end{enumerate}\par
634   \bigskip
635   \noindent \l__slcd_location_tl,~ \@date\hfill
636   \signatureBox{\l__slcd_signature_tl}
637   \group_end:
638   \\strut\cleardoublepage
639 }
```

*(End of definition for `\authorshipDeclaration`. This function is documented on page 6.)*

`\signatureBox` Provide a box for the signature.

```

640 \newcommand*{\signatureBox}[2][5cm]{
641   \parbox[t]{#1}{
642     \centering
643     \rule{\linewidth}{.3pt}\makebox[0pt][c]{#2}
644   }
645 }

```

(End of definition for `\signatureBox`. This function is documented on page 6.)

## 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. `ntheorem`.

```

646 \sld_package_if_loaded:nT { amsmath }
647 {
648   \PassOptionsToPackage{amsmath}{ntheorem}
649 }
650 \RequirePackage{ntheorem}
651 \theoremseparator{:}

```

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

```

652 \newtheorem{resq}{Research~ Question}
653 \newtheorem{hyp}{Hypothesis}

```

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

```

654 \RequirePackage{tcolorbox}

```

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

```

655 \ExplSyntaxOff
656 \NewDocumentEnvironment { summary } { m +b }
657 {%
658   \begin{tcolorbox}[%
659     size=fbox,%
660     rounded corners=all,%
661     attach title to upper,%
662     coltitle=black,%
663     fonttitle=\bfseries,%
664     title={Summary #1},
665     after title={\ },
666   ]
667   #2
668 } {%
669   \end{tcolorbox}%
670 }
671 \ExplSyntaxOn

```

`\summarybox` The `summarybox` macro simplifies the usage of the `summary` environment.

```

672 \NewDocumentCommand { \summarybox } { m m }
673 {
674   \begin{summary}{#1} #2 \end{summary}
675 }

```

(End of definition for `\summarybox`. This function is documented on page ??.)

676 `</class>`

### 3 Translations for `se2thesis`

677 `<*translations>`

#### 3.1 English Translations

678 `<*english>`

We provide the following English translations.

679 `\ProvideDictionaryFor{English}{se2translations}[2024/07/31]`

680 `\ProvideDictTranslation{abstract}{abstract}`

681 `\ProvideDictTranslation{Abstract}{Abstract}`

682 `\ProvideDictTranslation{acknowledgement}{acknowledgement}`

683 `\ProvideDictTranslation{Acknowledgement}{Acknowledgement}`

684 `\ProvideDictTranslation{acknowledgements}{acknowledgements}`

685 `\ProvideDictTranslation{Acknowledgements}{Acknowledgements}`

686 `\ProvideDictTranslation{advisor}{advisor}`

687 `\ProvideDictTranslation{Advisor}{Advisor}`

688 `\ProvideDictTranslation{advisors}{advisors}`

689 `\ProvideDictTranslation{Advisors}{Advisors}`

690 `\ProvideDictTranslation{co-advisor}{co-advisor}`

691 `\ProvideDictTranslation{Co-advisor}{Co-advisor}`

692 `\ProvideDictTranslation{co-advisors}{co-advisors}`

693 `\ProvideDictTranslation{Co-advisors}{Co-advisors}`

694 `\ProvideDictTranslation{matrnumber}{matriculation number}`

695 `\ProvideDictTranslation{Matrnumber}{Matriculation number}`

696 `\ProvideDictTranslation{supervisor}{supervisor}`

697 `\ProvideDictTranslation{Supervisor}{Supervisor}`

698 `\ProvideDictTranslation{co-supervisor}{co-supervisor}`

699 `\ProvideDictTranslation{Co-supervisor}{Co-supervisor}`

700 `\ProvideDictTranslation{external}{external examiner}`

701 `\ProvideDictTranslation{External}{External Examiner}`

702 `\ProvideDictTranslation{degreeprogramme}{programme}`

703 `\ProvideDictTranslation{Degreeprogramme}{Programme}`

704 `\ProvideDictTranslation{Bachelor-thesis}{Bachelor's Thesis}`

705 `\ProvideDictTranslation{Bachelor-thesis-proposal}{Bachelor's Thesis Proposal}`

706 `\ProvideDictTranslation{Master-thesis}{Master's Thesis}`

707 `\ProvideDictTranslation{Master-thesis-proposal}{Master's Thesis Proposal}`

708 `\ProvideDictTranslation{PhD-thesis}{PhD Thesis}`

709 `\ProvideDictTranslation{PhD-thesis-proposal}{PhD Thesis Proposal}`

710 `\ProvideDictTranslation{date}{date}`

711 `\ProvideDictTranslation{Date}{Date}`

712 `\ProvideDictTranslation{university-of-passau}{University of Passau}`

713 `\ProvideDictTranslation{up}{University of Passau}`

714 `\ProvideDictTranslation{fim}{Faculty of Computer Science and Mathematics}`

715 `</english>`

#### 3.2 German Translations

716 `<*german>`

We provide the following German translations.

717 \ProvideDictionaryFor{German}{se2translations}[2024/07/31]  
718 \ProvideDictTranslation{abstract}{Zusammenfassung}  
719 \ProvideDictTranslation{Abstract}{Zusammenfassung}  
720 \ProvideDictTranslation{acknowledgement}{Danksagung}  
721 \ProvideDictTranslation{Acknowledgement}{Danksagung}  
722 \ProvideDictTranslation{acknowledgements}{Danksagungen}  
723 \ProvideDictTranslation{Acknowledgements}{Danksagungen}  
724 \ProvideDictTranslation{advisor}{Betreuer}  
725 \ProvideDictTranslation{Advisor}{Betreuer}  
726 \ProvideDictTranslation{advisors}{Betreuer}  
727 \ProvideDictTranslation{Advisors}{Betreuer}  
728 \ProvideDictTranslation{co-advisor}{Mitbetreuer}  
729 \ProvideDictTranslation{Co-advisor}{Mitbetreuer}  
730 \ProvideDictTranslation{co-advisors}{Mitbetreuer}  
731 \ProvideDictTranslation{Co-advisors}{Mitbetreuer}  
732 \ProvideDictTranslation{matrnumber}{Matrikelnummer}  
733 \ProvideDictTranslation{Matrnumber}{Matrikelnummer}  
734 \ProvideDictTranslation{supervisor}{Prüfer}  
735 \ProvideDictTranslation{Supervisor}{Prüfer}  
736 \ProvideDictTranslation{co-supervisor}{Zweitprüfer}  
737 \ProvideDictTranslation{Co-supervisor}{Zweitprüfer}  
738 \ProvideDictTranslation{external}{Externer Gutachter}  
739 \ProvideDictTranslation{External}{Externer Gutachter}  
740 \ProvideDictTranslation{degreeprogramme}{Studiengang}  
741 \ProvideDictTranslation{Degreeprogramme}{Studiengang}  
742 \ProvideDictTranslation{Bachelor-thesis}{Bachelorarbeit}  
743 \ProvideDictTranslation{Bachelor-thesis-proposal}{Bachelorarbeitsproposal}  
744 \ProvideDictTranslation{Master-thesis}{Masterarbeit}  
745 \ProvideDictTranslation{Master-thesis-proposal}{Masterarbeitsproposal}  
746 \ProvideDictTranslation{PhD-thesis}{Dissertation}  
747 \ProvideDictTranslation{PhD-thesis-proposal}{Dissertationsproposal}  
748 \ProvideDictTranslation{date}{Datum}  
749 \ProvideDictTranslation{Date}{Datum}  
750 \ProvideDictTranslation{university-of-passau}{Universität Passau}  
751 \ProvideDictTranslation{up}{Universität Passau}  
752 \ProvideDictTranslation{fim}{Fakultät für Informatik und Mathematik}  
753 </german>  
754 </translations>

## 4 se2colors implementation

Start the DocStrip guards.

```
755 <*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.

```
756 <@=slcd_colors>
```

Identify the package and give the overall version information.

```
757 \ProvidesExplPackage {se2colors} {2024-07-31} {4.3.1}
```

```
758 {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.

```
759 \keys_define:nn { seiicolors }
760 {
761   cmode .choice:,
762   cmode / 4C .code:n = {
763     \PassOptionsToPackage{cmyk}{xcolor}
764     \tl_gset:Nn \l__slcd_colors_colormode_tl {4C}
765   },
766   cmode / RGB .code:n = {
767     \PassOptionsToPackage{rgb}{xcolor}
768     \tl_gset:Nn \l__slcd_colors_colormode_tl {RGB}
769   },
770   cmode / BW .code:n = {
771     \PassOptionsToPackage{gray}{xcolor}
772     \tl_gset:Nn \l__slcd_colors_colormode_tl {BW}
773   },
774   cmode / CMYK .meta:n = {cmode=4C},
775   cmode / cmyk .meta:n = {cmode=4C},
776   cmode / rgb .meta:n = {cmode=RGB},
777   cmode / gray .meta:n = {cmode=BW},
778   cmode / bw .meta:n = {cmode=BW},
779   RGB .meta:n = {cmode=RGB},
780   rgb .meta:n = {cmode=RGB},
781   CMYK .meta:n = {cmode=4C},
782   cmyk .meta:n = {cmode=4C},
783   BW .meta:n = {cmode=BW},
784   bw .meta:n = {cmode=BW},
785   gray .meta:n = {cmode=BW},
786 }
787 \keys_set:nn { seiicolors } { cmode = 4C }
```

(End of definition for `\l__slcd_colors_colormode_tl`.)

### 4.2 Option handling

```
788 \IfFormatAtLeastTF { 2022-06-01 }
789 { \ProcessKeyOptions [ seiicolors ] }
790 {
791   \RequirePackage { l3keys2e }
```

```

792 \ProcessKeysOptions { seicolors }
793 }

```

### 4.3 Colour definitions

Load the xcolor package for colour definitions.

```

794 \RequirePackage{xcolor}

```

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

```

795 \definecolorset[named]{RGB/cmyk}{UPSE2-}{}{%
796 Orange,242,148,0/0.00,0.44,0.95,0.01;%
797 Gray,153,159,158/0.40,0.28,0.28,0.00;%
798 JUR,229,49,56/0.01,0.90,0.81,0.01;%
799 WIWI,0,96,57/0.87,0.20,0.87,0.36;%
800 PHIL,188,42,51/0.06,0.93,0.81,0.11;%
801 FIM,0,90,161/0.93,0.63,0.01,0.02;%
802 DarkGray,77,77,77/0.74,0.67,0.62,0.18;%
803 White,255,255,255/0.00,0.00,0.00,0.00;%
804 MediumGray,127,127,127/0.52,0.43,0.40,0.02;%
805 LightGray,229,229,229/0.08,0.06,0.04,0.00;%
806 LightRed,229,49,56/0.01,0.90,0.81,0.01;%
807 DarkRed,188,42,51/0.06,0.93,0.80,0.11;%
808 Green,0,96,57/0.87,0.20,0.86,0.35;%
809 Blue,0,90,161/0.93,0.63,0.01,0.02;%
810 AccentGray,153,159,158/0.40,0.28,0.28,0.00%
811 }

```

Define the derived colours.

```

812 \colorlet{UPSE2-DarkGray1}{UPSE2-DarkGray!20!white}
813 \colorlet{UPSE2-DarkGray2}{UPSE2-DarkGray!40!white}
814 \colorlet{UPSE2-DarkGray3}{UPSE2-DarkGray!60!white}
815 \colorlet{UPSE2-DarkGray4}{UPSE2-DarkGray!75!black}
816 \colorlet{UPSE2-DarkGray5}{UPSE2-DarkGray!50!black}
817 \colorlet{UPSE2-White1}{UPSE2-White!95!black}
818 \colorlet{UPSE2-White2}{UPSE2-White!85!black}
819 \colorlet{UPSE2-White3}{UPSE2-White!75!black}
820 \colorlet{UPSE2-White4}{UPSE2-White!65!black}
821 \colorlet{UPSE2-White5}{UPSE2-White!50!black}
822 \colorlet{UPSE2-MediumGray1}{UPSE2-MediumGray!20!white}
823 \colorlet{UPSE2-MediumGray2}{UPSE2-MediumGray!40!white}
824 \colorlet{UPSE2-MediumGray3}{UPSE2-MediumGray!60!white}
825 \colorlet{UPSE2-MediumGray4}{UPSE2-MediumGray!75!black}
826 \colorlet{UPSE2-MediumGray5}{UPSE2-MediumGray!50!black}
827 \colorlet{UPSE2-LightGray1}{UPSE2-LightGray!90!black}
828 \colorlet{UPSE2-LightGray2}{UPSE2-LightGray!75!black}
829 \colorlet{UPSE2-LightGray3}{UPSE2-LightGray!55!black}
830 \colorlet{UPSE2-LightGray4}{UPSE2-LightGray!25!black}
831 \colorlet{UPSE2-LightGray5}{UPSE2-LightGray!10!black}
832 \colorlet{UPSE2-Orange1}{UPSE2-Orange!20!white}
833 \colorlet{UPSE2-Orange2}{UPSE2-Orange!40!white}
834 \colorlet{UPSE2-Orange3}{UPSE2-Orange!60!white}
835 \colorlet{UPSE2-Orange4}{UPSE2-Orange!75!black}
836 \colorlet{UPSE2-Orange5}{UPSE2-Orange!50!black}
837 \colorlet{UPSE2-LightRed1}{UPSE2-LightRed!20!white}

```



```

838 \colorlet{UPSE2-LightRed2}{UPSE2-LightRed!40!white}
839 \colorlet{UPSE2-LightRed3}{UPSE2-LightRed!60!white}
840 \colorlet{UPSE2-LightRed4}{UPSE2-LightRed!75!black}
841 \colorlet{UPSE2-LightRed5}{UPSE2-LightRed!50!black}
842 \colorlet{UPSE2-DarkRed1}{UPSE2-DarkRed!20!white}
843 \colorlet{UPSE2-DarkRed2}{UPSE2-DarkRed!40!white}
844 \colorlet{UPSE2-DarkRed3}{UPSE2-DarkRed!60!white}
845 \colorlet{UPSE2-DarkRed4}{UPSE2-DarkRed!75!black}
846 \colorlet{UPSE2-DarkRed5}{UPSE2-DarkRed!50!black}
847 \colorlet{UPSE2-Green1}{UPSE2-Green!10!white}
848 \colorlet{UPSE2-Green2}{UPSE2-Green!25!white}
849 \colorlet{UPSE2-Green3}{UPSE2-Green!50!white}
850 \colorlet{UPSE2-Green4}{UPSE2-Green!75!white}
851 \colorlet{UPSE2-Green5}{UPSE2-Green!90!white}
852 \colorlet{UPSE2-Blue1}{UPSE2-Blue!20!white}
853 \colorlet{UPSE2-Blue2}{UPSE2-Blue!40!white}
854 \colorlet{UPSE2-Blue3}{UPSE2-Blue!60!white}
855 \colorlet{UPSE2-Blue4}{UPSE2-Blue!75!black}
856 \colorlet{UPSE2-Blue5}{UPSE2-Blue!50!black}
857 \colorlet{UPSE2-AccentGray1}{UPSE2-AccentGray!20!white}
858 \colorlet{UPSE2-AccentGray2}{UPSE2-AccentGray!40!white}
859 \colorlet{UPSE2-AccentGray3}{UPSE2-AccentGray!60!white}
860 \colorlet{UPSE2-AccentGray4}{UPSE2-AccentGray!75!black}
861 \colorlet{UPSE2-AccentGray5}{UPSE2-AccentGray!50!black}
862 </package>

```

## 5 se2fonts implementation

Start the DocStrip guards.

```
863 <*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.

```
864 <@=slcd_fonts>
```

Identify the package and give the overall version information.

```
865 \ProvidesExplPackage {se2fonts} {2024-07-31} {4.3.1}
```

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

### 5.1 Load-time options

The package does not have any load-time options; the formerly defined option to set the font mode was removed with se2thesis version 4.0.0.

### 5.2 Helper macros

Define a warning message of users of pdfL<sup>A</sup>T<sub>E</sub>X that not all features of the fonts are available and that they should consider using LuaL<sup>A</sup>T<sub>E</sub>X instead.

```
867 \msg_new:nnnn { seiifonts } { pdflatex-used }
868 { You~ are~ using~ pdfLaTeX~ with~ the~ se2fonts~ packages.}
869 {
870   While~ this~ works~ some~ font~ features~ are~ not~ available,~ consider~
871   using~ lualatex~ instead.
872 }
```

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

`\xetexengine`

`\luatexengine`

```
873 \cs_new_eq:NN \pdftexengine \sys_if_engine_pdfdtx_p:
```

```
874 \cs_new_eq:NN \xetexengine \sys_if_engine_xetex_p:
```

```
875 \cs_new_eq:NN \luatexengine \sys_if_engine_luatex_p:
```

*(End of definition for `\pdftexengine`, `\xetexengine`, and `\luatexengine`. These functions are documented on page 10.)*

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

`\ifengineT`

`\ifengineF`

```
876 \NewExpandableDocumentCommand \ifengineTF { mmm }
877 {
878   \bool_if:nTF { #1 } { #2 } { #3 }
879 }
880 \NewExpandableDocumentCommand \ifengineT { mm }
881 {
882   \bool_if:nT { #1 } { #2 }
883 }
884 \NewExpandableDocumentCommand \ifengineF { mm }
885 {
886   \bool_if:nF { #1 } { #2 }
887 }
```

(End of definition for `\ifengineTF`, `\ifengineT`, and `\ifengineF`. These functions are documented on page 10.)

The package is not tested with Xe<sub>2</sub>TeX, thus we provide an error to the user and stop the execution if they want to use the package with Xe<sub>2</sub>TeX.

```
888 \ifengineT { \xetexengine }
889 {
890   \msg_new:nnnn { seiifonts } { xetex-not-supported }
891   { XeTeX~ is~ not~ supported~ by~ the~ se2fonts~ package. }
892   { Switch~ to~ pdfTeX~ or~ (preferably)~ LuaTeX. }
893   \msg_error:nn { seiifonts } { xetex-not-supported }
894 }
```

### 5.3 Font loading

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

```
895 \ifengineTF { \luatexengine }
896 {
897   If the user uses LuaTeX, load fontspec and unicode-math.
898   \RequirePackage{fontspec}
899   \PassOptionsToPackage{math-style=ISO,bold-style=ISO}{unicode-math}
900   \RequirePackage{unicode-math}
901 }
```

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

```
902 \defaultfontfeatures{ Scale = MatchLowercase }
903 \defaultfontfeatures[\rmfamily]{ Scale = 1 }
904 Load the respective libertinus-otf package and omit the monospaced font.
905 \PassOptionsToPackage{mono=false}{libertinus-otf}
906 \RequirePackage{libertinus-otf}
907 Load the Inconsolata Nerd Font monospaced font.
908 \RequirePackage{inconsolata-nerd-font}
909 }
```

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

```
910 \msg_warning:nn { seiifonts } { pdflatex-used }
911 \PassOptionsToPackage{T1}{fontenc}
912 \PassOptionsToPackage{scaled=0.9,varl}{inconsolata}
913 \PassOptionsToPackage{mono=false}{libertinus-type1}
914 \RequirePackage{fontenc}
915 \RequirePackage{inconsolata}
916 \RequirePackage{libertinus-type1}
917 }
918 </package>
```

## 6 se2packages implementation

Start the DocStrip guards.

```
915 <*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.

```
916 <@=slcd_packages>
```

Identify the package and give the overall version information.

```
917 \ProvidesExplPackage {se2packages} {2024-07-31} {4.3.1}
```

```
918 {Supporting packages for the se2thesis bundle}
```

### 6.1 Load-time options

Before we define the actual options, define some Boolean variables to store the selected values.

```
\l_slcd_packages_csquotes_bool Whether or not to load csquotes.  
919 \bool_new:N \l_slcd_packages_csquotes_bool  
(End of definition for \l_slcd_packages_csquotes_bool.)
```

```
\l_slcd_packages_booktabs_bool Whether or not to load booktabs.  
920 \bool_new:N \l_slcd_packages_booktabs_bool  
(End of definition for \l_slcd_packages_booktabs_bool.)
```

```
\l_slcd_packages_siunitx_bool Whether or not to load and configure siunitx.  
921 \bool_new:N \l_slcd_packages_siunitx_bool  
(End of definition for \l_slcd_packages_siunitx_bool.)
```

```
\l_slcd_packages_minted_bool Whether or not to load and configure minted.  
922 \bool_new:N \l_slcd_packages_minted_bool  
(End of definition for \l_slcd_packages_minted_bool.)
```

```
\l_slcd_packages_listings_bool Whether or not to load and configure listings.  
923 \bool_new:N \l_slcd_packages_listings_bool  
(End of definition for \l_slcd_packages_listings_bool.)
```

```
\l_slcd_packages_biblatex_tl Whether or not to load and configure biblatex.  
924 \tl_new:N \l_slcd_packages_biblatex_tl  
(End of definition for \l_slcd_packages_biblatex_tl.)
```

```
\l_slcd_packages_selnolig_bool Whether or not to load selnolig (LuaTEX only).  
925 \bool_new:N \l_slcd_packages_selnolig_bool  
(End of definition for \l_slcd_packages_selnolig_bool.)
```

```
\l_slcd_packages_luawindowcontrol_bool Whether or not to load luawindowcontrol (LuaTEX only).  
926 \bool_new:N \l_slcd_packages_luawindowcontrol_bool  
(End of definition for \l_slcd_packages_luawindowcontrol_bool.)
```

```

\l_slcd_packages_microtype_bool Whether or not to load microtype.
927 \bool_new:N \l_slcd_packages_microtype_bool
(End of definition for \l_slcd_packages_microtype_bool.)

\l_slcd_packages_cleveref_bool Whether or not to load and configure cleveref.
928 \bool_new:N \l_slcd_packages_cleveref_bool
(End of definition for \l_slcd_packages_cleveref_bool.)

\l_slcd_packages_all_bool Whether or not to load and configure all recommended packages.
929 \bool_new:N \l_slcd_packages_all_bool
(End of definition for \l_slcd_packages_all_bool.)
  Define the actual load-time options.
930 \keys_define:nn { seiipackages }
931 {
932   csquotes .bool_gset:N = \l_slcd_packages_csquotes_bool,
933   csquotes .initial:n = true,
934   nocsthrough .meta:n = {csquotes=false},
935
936   booktabs .bool_gset:N = \l_slcd_packages_booktabs_bool,
937   booktabs .initial:n = true,
938   nobooktabs .meta:n = {booktabs=false},
939
940   siunitx .bool_gset:N = \l_slcd_packages_siunitx_bool,
941   siunitx .initial:n = false,
942
943   minted .bool_gset:N = \l_slcd_packages_minted_bool,
944   minted .initial:n = false,
945
946   listings .bool_gset:N = \l_slcd_packages_listings_bool,
947   listings .initial:n = false,
948
949   biblatex .tl_gset:N = \l_slcd_packages_biblatex_tl,
950   biblatex .initial:n = false,
951
952   selnolig .bool_gset:N = \l_slcd_packages_selnolig_bool,
953   selnolig .initial:n = true,
954   noselnolig .meta:n = {selnolig=false},
955
956   widowcontrol .bool_gset:N = \l_slcd_packages_luawidowcontrol_bool,
957   widowcontrol .initial:n = false,
958   nowidowcontrol .meta:n = {widowcontrol=false},
959
960   microtype .bool_gset:N = \l_slcd_packages_microtype_bool,
961   microtype .initial:n = true,
962   nomicrotype .meta:n = {microtype=false},
963
964   cleveref .bool_gset:N = \l_slcd_packages_cleveref_bool,
965   cleveref .initial:n = false,
966
967   all .bool_gset:N = \l_slcd_packages_all_bool,
968   all .initial:n = false,
969 }

```

## 6.2 Option handling

```
970 \IfFormatAtLeastTF { 2022-06-01 }
971 { \ProcessKeyOptions [ seiipackages ] }
972 {
973   \RequirePackage{ l3keys2e }
974   \ProcessKeysOptions { seiipackages }
975 }
```

Define an error message if both minted and listings are requested.

```
976 \msg_set:nnnn { seiipackages } { conflicting-packages }
977 { Setting~ both~ minted~ and~ listings~ to~ true~ is~ not~ possible. }
978 { Choose~ either~ of~ them! }
```

Define a message for logging that a specific package will be loaded by se2packages. Expects as parameter the name of the package that will be loaded.

```
979 \msg_new:nnn { seiipackages } { load-package }
980 { se2packages~ loads~ the~ #1~ package now. }
```

And, in case both values are set to true, raise the error message.

```
981 \bool_lazy_and:nnT { \l__slcd_packages_minted_bool } { \l__slcd_packages_listings_bool }
982 {
983   \msg_error:nn { seiipackages } { conflicting-packages }
984 }
```

In case the all option is set, set all other values to true.

```
985 \bool_if:NT \l__slcd_packages_all_bool
986 {
987   \bool_gset_true:N \l__slcd_packages_csquotes_bool
988   \bool_gset_true:N \l__slcd_packages_booktabs_bool
989   \bool_gset_true:N \l__slcd_packages_siunitx_bool
990   \bool_gset_true:N \l__slcd_packages_minted_bool
991   \bool_gset_false:N \l__slcd_packages_listings_bool
992   \bool_gset_true:N \l__slcd_packages_selnolig_bool
993   \bool_gset_true:N \l__slcd_packages_luawindowcontrol_bool
994   \bool_gset_true:N \l__slcd_packages_microtype_bool
995   \tl_gset:Nn \l__slcd_packages_biblatex_bool {true}
996   \bool_gset_true:N \l__slcd_packages_cleveref_bool
997 }
```

## 6.3 Package loading

Conditionally load the csquotes package.

```
998 \bool_if:NT \l__slcd_packages_csquotes_bool
999 {
1000   \msg_info:nnn { seiipackages } { load-package } { csquotes }
1001   \RequirePackage{fvextra}
1002   \RequirePackage{csquotes}
1003 }
```

Conditionally load the booktabs package.

```
1004 \bool_if:NT \l__slcd_packages_booktabs_bool
1005 {
1006   \msg_info:nnn { seiipackages } { load-package } { booktabs }
1007   \RequirePackage{booktabs}
1008 }
```

Conditionally load and configure the siunitx package.

```
1009 \bool_if:NT \l__slcd_packages_siunitx_bool
1010 {
1011   \msg_info:nnn { seiipackages } { load-package } { siunitx }
1012   \RequirePackage[
1013     add-integer-zero=false,
1014     free-standing-units=true,
1015     group-minimum-digits=4,
1016     list-final-separator={,~ and~ },
1017     round-mode=figures,
1018     round-precision=3,
1019     separate-uncertainty=true,
1020     uncertainty-mode=separate,
1021     mode=match,
1022   ]{siunitx}
1023 }
```

Conditionally load and configure the minted package.

```
1024 \bool_if:NT \l__slcd_packages_minted_bool
1025 {
1026   \msg_info:nnn { seiipackages } { load-package } { minted }
1027   \RequirePackage[newfloat=true]{minted}
1028   \setminted{
1029     autogobble,
1030     breaklines=true,
1031     fontsize=\footnotesize,
1032     frame=single,
1033     linenos=false,
1034     resetmargins=true,
1035     xleftmargin=1em,
1036     xrightmargin=1em,
1037   }
1038 }
```

Conditionally load and configure the listings package.

```
1039 \bool_if:NT \l__slcd_packages_listings_bool
1040 {
1041   \msg_info:nnn { seiipackages } { load-package } { listings }
1042   \RequirePackage{listings}
1043   \lstset{
1044     basicstyle=\footnotesize\ttfamily,
1045     breaklines=true,
1046     captionpos=t,
1047     extendedchars=true,
1048     frame=single,
1049     keywordstyle=\color{blue}\bfseries,
1050     showspaces=false,
1051     showtabs=false,
1052     showstringspaces=false,
1053     tabsize=2,
1054   }
1055 }
```

Conditionally load selnolig if present and we run Lua $\TeX$ .

```
1056 \bool_lazy_and:nnT { \l__slcd_packages_selnolig_bool } { \sys_if_engine luatex_p: }
```

```

1057 {
1058   \IfFileExists { selnolig.sty }
1059   {
1060     \RequirePackage{selnolig}
1061   } {
1062     \msg:nnon { seiipackages }
1063     { selnolig-not-available }
1064     { Could~ not~ find~ selnolig.sty }
1065     { You~ might~ want~ to~ install~ it~ for~ better~ ligatures~ control.}
1066     \msg_note:nn { seiipackages } { selnolig-not-available }
1067   }
1068 }

```

Conditionally load luawidowcontrol if present and we run Lua $\TeX$ .

```

1069 \bool_lazy_and:nnT { \l__slcd_packages_luawidowcontrol_bool } { \sys_if_engine luatex_p: }
1070 {
1071   \IfFileExists { lua-widow-control.sty }
1072   {
1073     \RequirePackage{lua-widow-control}
1074   } {
1075     \msg:nnon { seiipackages }
1076     { lua-widow-control-not-available }
1077     { Could~ not~ find~ lua-widow-control.sty }
1078     {
1079       You~ might~ want~ to~ install~ it~ for~ better~ control~ over~
1080       widows~ and~ orphans.
1081     }
1082     \msg_note:nn { seiipackages } { lua-widow-control-not-available }
1083   }
1084 }

```

Conditionally load and configure microtype. If a package option requires for the lua-widow-control package, we do not set penalties for widows and orphans but let that package control these penalties.

```

1085 \bool_if:NT \l__slcd_packages_microtype_bool
1086 {
1087   \msg_info:nnn { seiipackages } { load-package } { microtype }
1088   \RequirePackage{microtype}
1089   \bool_if:NF \l__slcd_packages_luawidowcontrol_bool
1090   {
1091     \clubpenalty=10000
1092     \widowpenalty=10000
1093     \displaywidowpenalty=10000
1094   }
1095   \SetExtraKerning{
1096     encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2}
1097   }{
1098     \textendash = {167,167},
1099     - = {167,167}
1100   }
1101 }

```

Conditionally load and configure the biblalex package.

```

1102 \tl_if_eq:NnT \l__slcd_packages_biblalex_tl {alphabetic}
1103 {

```



```

1104 \msg_info:nnn { seiipackages } { load-package } { biblatex }
1105 \PassOptionsToPackage
1106 {
1107     backend=biber,
1108     backref=true,
1109     datamodel=software,
1110     giveninits=true,
1111     hyperref=auto,
1112     maxnames=100,
1113     minalphanames=3,
1114     sorting=nyt,
1115     style=alphabetic,
1116 } { biblatex }
1117 \RequirePackage{biblatex}
1118 \RequirePackage{software-biblatex}
1119 \ExecuteBibliographyOptions{
1120     halid=false,
1121     swhid=true,
1122     shortswid=false,
1123     swlabels=true,
1124     vcs=true,
1125     license=true,
1126 }
1127 }
1128
1129 \bool_new:N \l__slcd_packages_biblatex_numeric_variants_bool
1130 \tl_if_eq:NnT \l__slcd_packages_biblatex_tl {true}
1131 {
1132     \bool_gset_true:N \l__slcd_packages_biblatex_numeric_variants_bool
1133 }
1134 \tl_if_eq:NnT \l__slcd_packages_biblatex_tl {numeric}
1135 {
1136     \bool_gset_true:N \l__slcd_packages_biblatex_numeric_variants_bool
1137 }
1138
1139 \bool_if:NT \l__slcd_packages_biblatex_numeric_variants_bool
1140 {
1141     \msg_info:nnn { seiipackages } { load-package } { biblatex }
1142     \PassOptionsToPackage
1143     {
1144         backend=biber,
1145         backref=true,
1146         citereset=chapter+,
1147         citetracker=context,
1148         giveninits=true,
1149         hyperref=auto,
1150         sorting=nyt,
1151         datamodel=acmdatamodel,
1152         style=acmnumeric,
1153     } { biblatex }
1154     \RequirePackage{biblatex}
1155     \RequirePackage{ragged2e}
1156     \RequirePackage[mark=arabic,shape=up,Ragged]{sidenotesplus}
1157

```

```

1158 \newbibmacro{cite:authoryear}{%
1159   \printtext[labelnumberwidth]{%
1160     \usebibmacro{cite}%
1161   }%
1162   \setunit{\addspace}%
1163   \printnames{labelname}%
1164   \setunit{\labelnamepunct}\newblock%
1165   \usebibmacro{year}%
1166   \newunit%
1167   \printfield[title]{labeltitle}
1168 }
1169
1170 \newrobustcmd*{\makebibmarginnote}[1]{%
1171   \sidenote*{\blxmkbibnote{foot}{#1}}}
1172
1173 \DeclareCiteCommand{\maycite}[\makebibmarginnote]
1174   {\usebibmacro{prenote}}
1175   {\usebibmacro{citeindex}%
1176     \usebibmacro{cite:authoryear}}
1177   {\multicitedelim}
1178   {\usebibmacro{postnote}}
1179
1180 \newcommand*{\cbx@savedcites}{}
1181
1182 \newcommand*{\cbx@margcitewrap}[1]{%
1183   \global\let\cbx@savedcites\empty
1184   \mkbibbrackets{#1}%
1185   \cbx@savedcites
1186 }
1187
1188 \DeclareCiteCommand{\margincite}[\cbx@margcitewrap]
1189   {\usebibmacro{prenote}}
1190   {\usebibmacro{citeindex}%
1191     \usebibmacro{cite}%
1192     \ifciteseen
1193       {}
1194       {\xappto\cbx@savedcites{\noexpand\maycite{\thefield{entrykey}}}}
1195   {\multicitedelim}
1196   {\usebibmacro{postnote}}
1197
1198 \DeclareMultiCiteCommand{\margincites}[\cbx@margcitewrap]{\margincite}{\multicitedelim}
1199
1200 \DeclareAutoCiteCommand{margin}{\margincite}{\margincites}
1201 \ExecuteBibliographyOptions{autocite=margin}
1202 \newcommand{\bibliofont}{\footnotesize}
1203 \DeclareFieldFormat{titlecase}{#1}% Preserve capitalisation of titles
1204 }

```

Conditionally load the cleveref package as the last of the preamble.

```

1205 \bool_if:NT \l__slcd_packages_cleveref_bool
1206 {
1207   \msg_info:nnn { seiipackages } { load-package } { cleveref }
1208   \AddToHook { begindocument/before }
1209     {
1210       \RequirePackage[capitalise]{cleveref}

```

```

1211     \Crefname{resq}{Research Question}{Research Questions}
1212     \Crefname{hyp}{Hypothesis}{Hypotheses}
1213     }
1214 }
1215 </package>

```

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