

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

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Abstract

One can choose from a wide variety of templates to write a thesis. Many universities provide very rigorous style guides and force their students to obey to those guides, even though they might be questionable from a typographics point of view. Other universities do not provide such guides and leave it to their students to choose or come up with a template. The latter is causing very differently-looking theses.

To avoid such a situation in the future this bundle combines several L^AT_EX packages and classes for the use at the Chair of Software Engineering II at the University of Passau. We provide, among others, a document class for theses that shall be used by our students. The bundle is designed in a way that one can use the basic components as standalone packages to allow their reuse for other projects.

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Part I

User Documentation

The first part of this file provides the documentation for the user of the se2thesis bundle. We provide the implementation in the second part of this document, starting at page 15, for those who are curious.

1 Introduction

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

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

The bundle itself consists of several L^AT_EX classes and packages that also allow reuse of various parts of it. Its main class is the se2thesis document class, an extension of the KOMA-Script scrreprt document class. The packages se2colors and se2fonts provide necessary colour and font settings for the se2thesis class; 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 CTAN¹. It is part of both MiK_TE_X and T_EXLive. You can find its development version from GitHub². The easiest way of installing it is through your T_EX distribution; please check your distribution's documentation on this. Note that it might be necessary to update your T_EX distribution because they might not provide you updates; for example, there is a new version of T_EXLive 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_EX 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_EX” project provides Docker images of T_EXLive³. If you do not want to install/update T_EXLive on your system you might want to consider their latest image, which contains a recent T_EXLive 2023 build. They build their images weekly, thus also recent releases of se2thesis will be part of the image soon after their release date.

¹ctan.org/pkg/se2thesis

²github.com/se2p/se2thesis

³islandoftex.gitlab.io/community/projects/docker/

1.2 General Macros

They all have in common one macro, `\IfFormatAtLeastTF`; this macro is part of the latest \LaTeX kernel. However, not all users might have upgraded their \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:

<code>\IfFormatAtLeastTF</code>	<code>\IfFormatAtLeastTF {<version>} {<then block>} {<else-block>}</code>
---------------------------------	---

Checks whether the used \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 \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 \LaTeX kernel from before 2022-06-01, `graphicx`, `translations`, `KOMA-Script`, `xcolor`, `ifthen`, as well as `fontspec`, `unicode-math`, and `libertinus-otf` if one uses \LuaTeX ; for \pdfLaTeX we load `fontenc`, `libertinus-type1`, and `AnonymousPro` instead of the latter three. Furthermore, we load `microtype`; when using \LuaTeX , we also load `lua-widow-control` and `selnolig`.

However, we recommend to use a couple of further packages, together with some further options to those package. We describe these settings in Section 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.

<code>\slcd_package_if_loaded:n</code>	<code>\slcd_package_if_loaded:nTF {<package name>} {<true code>} {<false code>}</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.

<code>class</code>	<code>class = <choice></code>
--------------------	-------------------------------------

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`.

<hr/> <code>paper</code>	<code>paper = <choice></code>	Set the paper format. Possible values are a4 or b5. Default is a4.
<hr/> <code>logfile</code>	<code>logfile = {(path-to-file)}</code>	Defines the path to the University's logo for the title page.
<hr/> <code>thesistype</code>	<code>thesistype = <choice></code>	Defines the type of the thesis. Possible values are: bachelor for a bachelor thesis, bachelorproposal for a proposal to a bachelor thesis, master for a master thesis, masterproposal for a proposal to a master thesis, phdproposal for a proposal to a PhD thesis, and phd for a PhD thesis.
<hr/> <code>colormode</code>	<code>colormode = <choice></code>	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.

<hr/> <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.
<hr/> <code>\version</code>	<code>\version {(version)}</code>	Specify the version of the document. This can, for example, be a git hash of the current version.
<hr/> <code>\degreeprogramme</code>	<code>\degreeprogramme {(programme-name)}</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.
<hr/> <code>\matrnumber</code>	<code>\matrnumber {(matriculation-number)}</code>	Specify the matriculation number of the student writing the thesis. This is required for Bachelor and Master theses.
<hr/> <code>\supervisor</code> <hr/> <code>\cosupervisor</code>	<code>\supervisor {(name)}</code> <code>\cosupervisor {(name)}</code>	Specify the name of your supervisor and co-supervisor. Both people usually are professors.

<hr/> <code>\advisor</code>	<code>\advisor {<name>}</code>
<code>\coadvisor</code>	<code>\coadvisor {<name>}</code>
<hr/>	Specify the name of your advisor and co-advisor. Both people usually are PhD students or postdocs.
<hr/> <code>\department</code>	<code>\department {<name>}</code>
<code>\institute</code>	<code>\institute [<short-name>] {<name>}</code>
<hr/>	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.
<hr/> <code>\external</code>	<code>\external {<name>}</code>
<hr/>	Specify the name of an external referee.
<hr/> <code>\location</code>	<code>\location {<name-of-town>}</code>
<hr/>	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 <code>se2thesis</code> class called <code>logfile</code> (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.
<hr/> <code>\@lowertitleback</code>	<code>\l@lowertitleback</code>
<hr/>	Override this internal macro of KOMA-Script to print this information on the back side of the title page.
	Additionally, we provide some interal rewritings to standard macros from KOMA-Script that allow to automatically split authors using the <code>\and</code> command.
<hr/> <code>\author</code>	<code>\author {<author>}</code>
<code>\@author</code>	We rewrite the definitions of <code>\author</code> and <code>\@author</code> 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.

<hr/> <code>\abstract</code> <hr/>	<code>\abstract</code>
	We ensure that the <code>\abstract</code> command is defined for all document classes.
<code>abstract (env.)</code>	To typeset an abstract, we provide an environment called <code>abstract</code> . 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.
	<pre>\begin{abstract}[language] Your abstract text. \end{abstract}</pre>

3.5 Acknowledgements

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

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

3.6 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.

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

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

3.7 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.

<hr/> <code>\authorshipDeclaration</code> <hr/>	<code>\authorshipDeclaration</code>
	Print the authorship declaration text.

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

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

for a thesis with *traditional English*⁴ as its main language and support for German.

```
\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.

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.

⁴there 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/>.

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 = <choice></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^AT_EX 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^AT_EX installation: we use the *Libertinus* fonts⁵ for serif, sans-serif, and math typesetting and the *Inconsolata* font⁶ as a monospaced font.

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

If you are using LuaT_EX, fonts are expected to be present as open-type fonts; using pdfL^AT_EX will fallback to Type-1 fonts.

Please note: the package does not support X_YL^AT_EX!

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^AT_EX3 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 {<engine>} {<then block>} {<else block>}
\ifengineT {<engine>} {<then block>}
\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.

⁵<https://github.com/alquier/libertinus>

⁶<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, especiall 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!

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 \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 Lua \TeX (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 \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 \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.

6.1.7 Use biblatex for Bibliographic References

The standard way of typesetting bibliographic references used to be `Bib \TeX` . The original `Bib \TeX` , 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. `Bib \LaTeX` resolves many of the drawbacks of `Bib \TeX` ; 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 = <true,false></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 = <true,false></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 = <true,false></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 = <true,false></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!

<code>listings</code>	<code>listings = <true,false></code>
-----------------------	--

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`.

<code>selnolig</code>	<code>selnolig = <true,false></code>
<code>noselnolig</code>	<code>noselnolig</code>

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`.

<code>widowcontrol</code>	<code>widowcontrol = <true,false></code>
<code>nowidowcontrol</code>	<code>nowidowcontrol</code>

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 = $\langle \text{true}, \text{false} \rangle$
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 = $\langle \text{true}, \text{false} \rangle$
----------	--

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`.

Additionally, we provide a load-time option to load `cleveref`. This option makes use of L^AT_EX'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 = $\langle \text{true}, \text{false} \rangle$
----------	--

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 = $\langle \text{true}, \text{false} \rangle$
-----	---

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}`

- `hvfloa`: 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 L^AT_EX's array and tabular abilities in L^AT_EX3. 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 \ifpackagelater does not work for pre-loaded expl3 in the absence of the package.

```

5 \ifl@t@r\ExplLoaderFileDate{2020-01-09}
6 {}
7 {%
8   \PackageError{se2colors}{Support package expl3 too old}
9   {%
10    You need to update your installation of the bundles 'l3kernel' and
11    'l3packages'.\MessageBreak
12    Loading-se2colors-will-abort!%
13   }%
14   \endinput
15 }%

```

`\IfFormatAtLeastTF` This macro is not present in older kernels, thus we use the L^AT_EX 2_ε 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^AT_EX3 DocStrip convention): only internal material in this *submodule* should be used directly.

```

19 <@@=slcd>

```

Identify the class and give the overall version number.

```

20 \ProvidesExplClass {se2thesis} {2023-09-12} {3.2.0}
21 {A thesis class for the Chair of Software Engineering II}

```

`\slcd_package_if_loaded:nTF` Defines various L^AT_EX3 variants for the internal \ifpackageloaded macro to check whether a package has been loaded.

```

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

```

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

Load required packages early.

```

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

```

2.1 Define Variables

The following variables are necessary for the argument handling.

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

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

(End 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
\l__slcd_rulespace_dim
\l__slcd_pagemark_minipage_dim
\l__slcd_ruleraise_dim
\l__slcd_rulewidth_dim
\l__slcd_rulethickness_dim

58 \dim_new:N \l__slcd_marginspace_dim
59 \dim_new:N \l__slcd_headmarkspace_dim
60 \dim_new:N \l__slcd_rulespace_dim
61 \dim_new:N \l__slcd_pagemark_minipage_dim
62 \dim_new:N \l__slcd_ruleraise_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_ruleraise_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
\l__slcd_paper_int
\l__slcd_thesis_type_tl
\l__slcd_licensetype_tl
\l__slcd_licensemodifier_tl
\l__slcd_licenseversion_tl
\l__slcd_colormode_tl

72 \keys_define:nn { seiithesis }
73 {
74   class .choice:,
75   class / report .meta:n = {class=scrreprt},
76   class / scrreprt .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrreprt},
77   class / book .meta:n = {class=scrbook},
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 / phdproposal .code:n = {
100     \tl_gset:Nn \l__slcd_thesis_type_tl {phdproposal}
101   },
102   thesistype .initial:n = master,

```

```

103     colormode .choices:nn = {cmyk,rgb,bw}{
104         \tl_gset_eq:NN \l__slcd_colormode_tl \l_keys_choice_tl
105     },
106     colormode .initial:n = cmyk,
107
108
109     unknown .code:n = {
110         \prop_gput:NvN \l__slcd_unknown_clsopts_prop \l_keys_key_tl {#1}
111     },
112 }

```

(End of definition for \l__slcd_base_class_tl and others.)

Handle the options

```

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

```

Handle the known options for base class

```

119 \prop_map_inline:Nn \l__slcd_clsopts_prop
120 {
121     \tl_if_empty:nTF {#2}
122     { \PassOptionsToClass {#1} {\l__slcd_base_class_tl} }
123     {
124         \clist_map_inline:nn {#2}
125         { \PassOptionsToClass {#1==#1} {\l__slcd_base_class_tl} }
126     }
127 }

```

Load the base class

```

128 \LoadClass{\l__slcd_base_class_tl}

```

Attempt to handle the unknown options

```

129 \prop_map_inline:Nn \l__slcd_unknown_clsopts_prop
130 {
131     \cs_if_exist:cT {KV@KOMA.\l__slcd_base_class_tl.cls@#1}
132     {
133         \tl_if_empty:nTF {#2}
134         { \KOMAoptions{#1} }
135         { \KOMAoption{#1}{#2}}
136     }
137 }

```

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.

```

138 \PassOptionsToPackage{\l__slcd_colormode_tl}{se2colors}
139 \RequirePackage{se2colors}
140
141 \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.

```
142 \ProvideDocumentCommand \version { m }
143 {
144   \tl_set:Nn \l__slcd_version_tl {#1}
145 }
```

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

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

```
146 \ProvideDocumentCommand \degreeprogramme { m }
147 {
148   \tl_set:Nn \l__slcd_degreeprogramme_tl {#1}
149 }
```

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

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

```
150 \ProvideDocumentCommand \matrnumber { m }
151 {
152   \tl_set:Nn \l__slcd_matrnumber_tl {#1}
153 }
```

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

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

```
154 \ProvideDocumentCommand \supervisor { m }
155 {
156   \tl_set:Nn \l__slcd_supervisor_tl {#1}
157 }
158 \ProvideDocumentCommand \cosupervisor { m }
159 {
160   \tl_set:Nn \l__slcd_cosupervisor_tl {#1}
161 }
```

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

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

```
162 \ProvideDocumentCommand \advisor { m }
163 {
164   \tl_set:Nn \l__slcd_advisor_tl {#1}
165 }
166 \ProvideDocumentCommand \coadvisor { m }
167 {
168   \tl_set:Nn \l__slcd_coadvisor_tl {#1}
169 }
```

(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
170 \ProvideDocumentCommand \department { m }
171 {
172   \tl_set:Nn \l__slcd_department_tl {#1}
173 }
174 \ProvideDocumentCommand \institute { o m }
175 {
176   \tl_set:Nn \l__slcd_institute_tl {#2}
177 }
```

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

`\external` Specify an external referee.

```
178 \ProvideDocumentCommand \external { m }
179 {
180   \tl_set:Nn \l__slcd_external_tl {#1}
181 }
```

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

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

```
182 \ProvideDocumentCommand \location { m }
183 {
184   \tl_set:Nn \l__slcd_location_tl {#1}
185 }
```

(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
186 \dim_if_exist:NF \l__slcd_logo_height_dim
187 {
188   \dim_new:N \l__slcd_logo_height_dim
189   \int_compare:nTF { \l__slcd_paper_int=1 }
190   {
191     \dim_gset:Nn \l__slcd_logo_height_dim { 67.5pt }
192   } {
193     \dim_gset:Nn \l__slcd_logo_height_dim { 56.8pt }
194   }
195 }
196 \box_if_exist:NF \l__slcd_logo_box
197 {
198   \box_new:N \l__slcd_logo_box
199 }
200 \tl_if_empty:NF \l__slcd_logofile_tl
201 {
202   \hbox_gset:Nn \l__slcd_logo_box
203   {
204     \includegraphics[%
205       height=\l__slcd_logo_height_dim%
```

```

206     ]{\l__slcd_logofile_tl}
207   }
208 }

```

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

Set the paper size depending on the selected paper option.

```

209 \int_compare:nTF { \l__slcd_paper_int=1 }
210 {
211   \areaset[current]{350pt}{567pt}
212   \setlength{\marginparsep}{8.5cm}
213   \setlength{\marginparsep}{1em}
214 }{
215   \areaset[current]{350pt}{567pt}
216   \setlength{\marginparsep}{7.4cm}
217   \setlength{\marginparsep}{0.87em}
218 }

```

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

```

219 \PassOptionsToPackage{automark}{sclayer-scrpage}
220 \RequirePackage{sclayer-scrpage}
221 \clearpairofpagetypes
222 \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.

```

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

```

```

250 \end{minipage}%
251 \hspace{\l__slcd_marginspace_dim}%
252 }

```

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

```

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

```

Finally, set the page style.

```

282 \pagestyle{scrheadings}

```

2.6 The title page

We start out by adjusting some KOMA-Script fonts.

```

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

```

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

```

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

```

```

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

```

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

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

```

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

```

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

```

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

```

```

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

```

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

```

364 \box_if_exist:NF \l__slcd_title_box
365 {
366   \box_new:N \l__slcd_title_box
367 }

```

(End of definition for \l__slcd_title_box.)

`\@maketitle` Redecclare the `\@maketitle` macro.

```

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

```

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

Load the `ifthen` package.

```

383 \RequirePackage{ifthen}

```

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

```

384 \cs_new:Nn \__slcd_print_title:
385 {
386   \group_begin:
387     \usekomafont{title}\centering\@title\par
388   \group_end:
389   \ifx\@subtitle\empty\else{%
390     \medskip\usekomafont{subtitle}\centering\@subtitle\par%
391   }\fi
392   \bigskip
393   \group_begin:
394     \usekomafont{author}\centering\@author\par
395   \group_end:
396   \bigskip

```

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

```

397 \exp_args:NV
398 {
399   \begin{center}
400     \tl_if_eq:NnTF \l__slcd_thesis_type_tl { phd }
401     {
402       Dissertation~ zur~ Erlangung~ des~ Doktorgrades\\
403       der~ Naturwissenschaften~ (Dr.\,rer.\,nat.)\\
404       eingereicht~ an~ der~ Fakultät~ für~ Informatik~ und~ Mathematik\\
405       der~ Universität~ Passau\\
406       \rule{\textwidth}{.1pt}\\
407       Dissertation~ submitted~ to\\
408       the~ Faculty~ of~ Computer~ Science~ and~ Mathematics\\
409       of~ the~ University~ of~ Passau\\
410       in~ partial~ fulfillment~ of~ obtaining\\
411       the~ degree~ of~ a~ Doctor~ of~ Natural~ Sciences
412     } {
413       \tl_if_eq:NnTF \l__slcd_thesis_type_tl { bachelor }
414       { \GetTranslation{Bachelor-thesis} }
415       \tl_if_eq:NnTF \l__slcd_thesis_type_tl { bachelorproposal }
416       { \GetTranslation{Bachelor-thesis-proposal} }
417       \tl_if_eq:NnTF \l__slcd_thesis_type_tl { master }
418       { \GetTranslation{Master-thesis} }
419       \tl_if_eq:NnTF \l__slcd_thesis_type_tl { masterproposal }
420       { \GetTranslation{Master-thesis-proposal} }
421       \tl_if_eq:NnTF \l__slcd_thesis_type_tl { phdproposal }
422       { \GetTranslation{PhD-thesis-proposal} }
423       \tl_if_empty:NF \l__slcd_degreeprogramme_tl
424       {
425         \ in~\l__slcd_degreeprogramme_tl
426       }
427       \par
428       \tl_if_empty:NF \l__slcd_department_tl { \l__slcd_department_tl \par }
429       \tl_if_empty:NF \l__slcd_institute_tl { \l__slcd_institute_tl \par }
430     }

```

```
431 \end{center}\par\bigskip
```

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

```
432 \begin{center}
433 \begin{tabular}{@{} l @{\quad} l}
434 \tl_if_empty:NF \l__slcd_matrnumber_tl
435 {
436 \GetTranslation{Matrnumber} & \l__slcd_matrnumber_tl \\
437 }
438 \tl_if_empty:NF \l__slcd_supervisor_tl
439 {
440 \GetTranslation{Supervisor} & \l__slcd_supervisor_tl \\
441 }
442 \tl_if_empty:NF \l__slcd_cosupervisor_tl
443 {
444 \GetTranslation{Co-supervisor} & \l__slcd_cosupervisor_tl \\
445 }
446 \tl_if_empty:NF \l__slcd_advisor_tl
447 {
448 \GetTranslation{Advisor} & \l__slcd_advisor_tl \\
449 }
450 \tl_if_empty:NF \l__slcd_coadvisor_tl
451 {
452 \GetTranslation{Co-advisor} & \l__slcd_coadvisor_tl \\
453 }
454 \tl_if_empty:NF \l__slcd_external_tl
455 {
456 \GetTranslation{External} & \l__slcd_external_tl \\
457 }
458 \end{tabular}
459 \end{center}
460 \par\medskip
```

Last, print the date or the version.

```
461 \group_begin:
462 \usekomafont{date}
463 \centering
464 \tl_if_empty:NTF \l__slcd_version_tl
465 { \@date }
466 { \GetTranslation{version-of-date} }
467 \par\smallskip
468 \group_end:
469 }
470 }
```

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

```
471 \renewcommand*{\@lowertitleback}{%
472 \group_begin:
473 \noindent\textbf{\@author}:\!
474 \emph{\@title}\!
475 \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor }
476 { \GetTranslation{Bachelor-thesis},~ }
477 \tl_if_eq:NnT \l__slcd_thesis_type_tl { master }
478 { \GetTranslation{Master-thesis},~ }
479 \tl_if_eq:NnT \l__slcd_thesis_type_tl { phd }
```

```

480     { \GetTranslation{PhD-thesis},~ }
481     \GetTranslation{up},~\the\year.
482     \group_end:
483 }

```

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

2.7 Styling of the sectioning commans

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

```

484 \addtokomafont{chapterprefix}{\raggedleft\bfseries}
485 \addtokomafont{chapter}{\mdseries}
486 \addtokomafont{section}{\large\mdseries}
487 \addtokomafont{subsection}{\normalsize\mdseries}
488 \renewcommand*{\chapterformat}{%
489     \enskip\mbox{%
490         \scalebox{3}{\color{UPSE2-DarkGray}\thechapter\autodot}%
491     }%
492 }
493 \renewcommand{\chapterlinesformat}[3]{%
494     \parbox[b]{\textwidth}{\hrulefill#2}\par%
495     #3\par\bigskip%
496     \hrule%
497 }
498 \RedeclareSectionCommand[afterskip=1.5\baselineskip]{chapter}
499 \renewcommand*{\chapterlineswithprefixformat}[3]{%
500     \Ifstr{#1}{chapter}
501         {#2\textls*[75]{\MakeUppercase{#3}}}% change definition for chapter
502         {#2#3}% original definition
503 }%
504 \renewcommand*{\sectionlinesformat}[4]{%
505     #3\textls*[75]{\MakeUppercase{#4}}%
506 }

```

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

```

507 \setkomafont{paragraph}{\normalsize\normalfont\itshape}
508 \AddtoDoHook{heading/endgroup/paragraph}{\headingdot}
509 \newcommand*{\headingdot}[1]{.}

```

Change the width of a dictum

```

510 \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`

```

511 \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.

```

512 \RenewDocumentEnvironment { abstract } { o }
513 {
514   \group_begin:
515     \IfNoValueF {#1} { \selectlanguage{#1} }
516     \scr@ifundefinedorrelax{chapter}{
517       \Iftocfeature{toc}{leveldown}
518       {\subsection*}
519       {\section*}
520     }{
521       \let\clearpage\relax
522       \Iftocfeature{toc}{leveldown}
523       {\section*}
524       {\chapter*}
525     } { \GetTranslation{Abstract} }
526   } {
527     \group_end:
528   }

```

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.

```

529 \NewDocumentEnvironment { acknowledgements } { o }
530 {
531   \group_begin:
532     \IfNoValueF {#1} { \selectlanguage{#1} }
533     \scr@ifundefinedorrelax{chapter}{
534       \Iftocfeature{toc}{leveldown}
535       {\subsection*}
536       {\section*}
537     }{
538       \Iftocfeature{toc}{leveldown}
539       {\section*}
540       {\chapter*}
541     } { \GetTranslation{Acknowledgements} }
542   } {
543     \group_end:
544   }

```

2.10 Document structuring macros

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

```

545 \newif\if@mainmatter\@mainmattertrue

```

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

```

546 \providecommand*{\frontmatter}
547 {
548   \if@twoside\cleardoubleoddpages\else\clearpage\fi
549   \@mainmatterfalse

```

```

550 \pagenumbering { roman }
551 }

```

(End of definition for \frontmatter. This function is documented on page 5.)

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

```

\backmatter
552 \providecommand*\mainmatter{
553   {
554     \if@twoside\cleardoubleoddpagel\else\clearpagel\fi
555     \@mainmattertrue
556     \pagenumbering { arabic }
557   }
558 \providecommand*\backmatter{
559   {
560     \if@twoside\cleardoubleoddpagel\else\clearpagel\fi
561     \@mainmatterfalse
562   }

```

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

2.11 Declaration of authorship

\authorshipDeclaration Provide a command to typeset the authorship declaration.

```

563 \NewDocumentCommand \authorshipDeclaration { o }
564 {
565   \par
566   \group_begin:
567     \selectlanguage{ngerman}
568     \IfNoValueF {#1}
569       { \tl_gset:Nn \l__slcd_location_tl {#1} }
570
571   \tl_if_empty:NT \l__slcd_location_tl
572     {
573       \msg_new:nnn { seiithesis }
574         { no-location-specified }
575       {
576         You~ need~ to~ specify~ a~ location~ for~ the~ authorship~
577         declaration~ Either~ via~ the~ location~ macro~ or~ via~ the~
578         optional~ argument~ of~ the~ authorshipDeclaration~ macro.
579       }
580       \msg_warning:nn { seiithesis } { no-location-specified }
581     }
582
583   \scr@ifundefinedorrelax{chapter}{
584     \Iftocfeature{toc}{level\down}
585     {\subsection*}
586     {\section*}
587   }{
588     \Iftocfeature{toc}{level\down}
589     {\section*}
590     {\chapter*}
591   } { Eigenständigkeitserklärung }
592
593   Hiermit~ versichere~ ich,~ \l__slcd_signature_tl,

```

```

594 \begin{enumerate}
595 \item dass~ ich~ die~ vorliegende~ Arbeit~ selbstständig~ und~ ohne~
596 unzulässige~ Hilfe~ verfasst~ und~ keine~ anderen~ als~ die~
597 angegebenen~ Quellen~ und~ Hilfsmittel~ benutzt,~ sowie~ die~
598 wörtlich~ und~ sinngemäß~ übernommenen~ Passagen~ aus~ anderen~
599 Werken~ kenntlich~ gemacht~ habe.
600 \item Außerdem~ erkläre~ ich,~ dass~ ich~ der~ Universität~ ein~
601 einfaches~ Nutzungsrecht~ zum~ Zwecke~ der~ Überprüfung~ mittels~
602 einer~ Plagiatsoftware~ in~ anonymisierter~ Form~ einräume.
603 \end{enumerate}\par
604 \bigskip
605 \noindent \l__slcd_location_tl,~ \@date\hfill
606 \signatureBox{\l__slcd_signature_tl}
607 \group_end:
608 \\strut\cleardoublepage
609 }

```

(End of definition for \authorshipDeclaration. This function is documented on page 5.)

\signatureBox Provide a box for the signature.

```

610 \newcommand*{\signatureBox}[2][5cm]{
611 \parbox[t]{#1}{
612 \centering
613 \rule{\linewidth}{.3pt}\\makebox[0pt][c]{#2}
614 }
615 }

```

(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`.

```

616 \slcd_package_if_loaded:nT { amsmath }
617 {
618 \PassOptionsToPackage{amsmath}{ntheorem}
619 }
620 \RequirePackage{ntheorem}
621 \theoremseparator{:}

```

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

```

622 \newtheorem{resq}{Research~ Question}
623 \newtheorem{hyp}{Hypothesis}

```

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

```

624 \RequirePackage{tcolorbox}

```

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

```

625 \NewDocumentEnvironment { summary } { m }
626 { \begin{tcolorbox}[title={Summary~ (#1)}] }
627 { \end{tcolorbox} }
628 \</class>

```

3 Translations for se2thesis

629 $\langle *translations \rangle$

3.1 English Translations

630 $\langle *english \rangle$

We provide the following English translations.

```
631 \ProvideDictionaryFor{English}{se2translations}[2023/09/12]
632 \ProvideDictTranslation{abstract}{abstract}
633 \ProvideDictTranslation{Abstract}{Abstract}
634 \ProvideDictTranslation{acknowledgement}{acknowledgement}
635 \ProvideDictTranslation{Acknowledgement}{Acknowledgement}
636 \ProvideDictTranslation{acknowledgements}{acknowledgements}
637 \ProvideDictTranslation{Acknowledgements}{Acknowledgements}
638 \ProvideDictTranslation{advisor}{advisor}
639 \ProvideDictTranslation{Advisor}{Advisor}
640 \ProvideDictTranslation{advisors}{advisors}
641 \ProvideDictTranslation{Advisors}{Advisors}
642 \ProvideDictTranslation{co-advisor}{co-advisor}
643 \ProvideDictTranslation{Co-advisor}{Co-advisor}
644 \ProvideDictTranslation{co-advisors}{co-advisors}
645 \ProvideDictTranslation{Co-advisors}{Co-advisors}
646 \ProvideDictTranslation{matrnumber}{matriculation number}
647 \ProvideDictTranslation{Matrnumber}{Matriculation number}
648 \ProvideDictTranslation{supervisor}{supervisor}
649 \ProvideDictTranslation{Supervisor}{Supervisor}
650 \ProvideDictTranslation{co-supervisor}{co-supervisor}
651 \ProvideDictTranslation{Co-supervisor}{Co-supervisor}
652 \ProvideDictTranslation{external}{external examiner}
653 \ProvideDictTranslation{External}{External Examiner}
654 \ProvideDictTranslation{degreeprogramme}{programme}
655 \ProvideDictTranslation{Degreeprogramme}{Programme}
656 \ProvideDictTranslation{Bachelor-thesis}{Bachelor Thesis}
657 \ProvideDictTranslation{Bachelor-thesis-proposal}{Bachelor Thesis Proposal}
658 \ProvideDictTranslation{Master-thesis}{Master Thesis}
659 \ProvideDictTranslation{Master-thesis-proposal}{Master Thesis Proposal}
660 \ProvideDictTranslation{PhD-thesis}{PhD Thesis}
661 \ProvideDictTranslation{PhD-thesis-proposal}{PhD Thesis Proposal}
662 \ProvideDictTranslation{date}{date}
663 \ProvideDictTranslation{Date}{Date}
664 \ProvideDictTranslation{university-of-passau}{University of Passau}
665 \ProvideDictTranslation{up}{University of Passau}
666 \ProvideDictTranslation{fim}{Faculty of Computer Science and Mathematics}
667  $\langle /english \rangle$ 
```

3.2 German Translations

668 $\langle *german \rangle$

We provide the following German translations.

```
669 \ProvideDictionaryFor{German}{se2translations}[2023/09/12]
670 \ProvideDictTranslation{abstract}{Zusammenfassung}
671 \ProvideDictTranslation{Abstract}{Zusammenfassung}
672 \ProvideDictTranslation{acknowledgement}{Danksagung}
```

⁶⁷³ \ProvideDictTranslation{Acknowledgement}{Danksagung}
⁶⁷⁴ \ProvideDictTranslation{acknowledgements}{Danksagungen}
⁶⁷⁵ \ProvideDictTranslation{Acknowledgements}{Danksagungen}
⁶⁷⁶ \ProvideDictTranslation{advisor}{Betreuer}
⁶⁷⁷ \ProvideDictTranslation{Advisor}{Betreuer}
⁶⁷⁸ \ProvideDictTranslation{advisors}{Betreuer}
⁶⁷⁹ \ProvideDictTranslation{Advisors}{Betreuer}
⁶⁸⁰ \ProvideDictTranslation{co-advisor}{Mitbetreuer}
⁶⁸¹ \ProvideDictTranslation{Co-advisor}{Mitbetreuer}
⁶⁸² \ProvideDictTranslation{co-advisors}{Mitbetreuer}
⁶⁸³ \ProvideDictTranslation{Co-advisors}{Mitbetreuer}
⁶⁸⁴ \ProvideDictTranslation{matrnumber}{Matrikelnummer}
⁶⁸⁵ \ProvideDictTranslation{Matrnumber}{Matrikelnummer}
⁶⁸⁶ \ProvideDictTranslation{supervisor}{Prüfer}
⁶⁸⁷ \ProvideDictTranslation{Supervisor}{Prüfer}
⁶⁸⁸ \ProvideDictTranslation{co-supervisor}{Zweitprüfer}
⁶⁸⁹ \ProvideDictTranslation{Co-supervisor}{Zweitprüfer}
⁶⁹⁰ \ProvideDictTranslation{external}{Externer Gutachter}
⁶⁹¹ \ProvideDictTranslation{External}{Externer Gutachter}
⁶⁹² \ProvideDictTranslation{degreeprogramme}{Studiengang}
⁶⁹³ \ProvideDictTranslation{Degreeprogramme}{Studiengang}
⁶⁹⁴ \ProvideDictTranslation{Bachelor-thesis}{Bachelorarbeit}
⁶⁹⁵ \ProvideDictTranslation{Bachelor-thesis-proposal}{Bachelorarbeitsproposal}
⁶⁹⁶ \ProvideDictTranslation{Master-thesis}{Masterarbeit}
⁶⁹⁷ \ProvideDictTranslation{Master-thesis-proposal}{Masterarbeitsproposal}
⁶⁹⁸ \ProvideDictTranslation{PhD-thesis}{Dissertation}
⁶⁹⁹ \ProvideDictTranslation{PhD-thesis-proposal}{Dissertationsproposal}
⁷⁰⁰ \ProvideDictTranslation{date}{Datum}
⁷⁰¹ \ProvideDictTranslation{Date}{Datum}
⁷⁰² \ProvideDictTranslation{university-of-passau}{Universität Passau}
⁷⁰³ \ProvideDictTranslation{up}{Universität Passau}
⁷⁰⁴ \ProvideDictTranslation{fim}{Fakultät für Informatik und Mathematik}
⁷⁰⁵ </german>
⁷⁰⁶ </translations>

4 se2colors implementation

Start the DocStrip guards.

```
707 <*package>
```

Identify the internal prefix (L^AT_EX3 DocStrip convention): only internal material in this *submodule* should be used directly.

```
708 <@@=slcd_colors>
```

Identify the package and give the overall version information.

```
709 \ProvidesExplPackage {se2colors} {2023-09-12} {3.2.0}
```

```
710 {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.

```
711 \keys_define:nn { seicolors }
712 {
713   cmode .choice:,
714   cmode / 4C .code:n = {
715     \PassOptionsToPackage{cmyk}{xcolor}
716     \tl_gset:Nn \l__slcd_colors_colormode_tl {4C}
717   },
718   cmode / RGB .code:n = {
719     \PassOptionsToPackage{rgb}{xcolor}
720     \tl_gset:Nn \l__slcd_colors_colormode_tl {RGB}
721   },
722   cmode / BW .code:n = {
723     \PassOptionsToPackage{gray}{xcolor}
724     \tl_gset:Nn \l__slcd_colors_colormode_tl {BW}
725   },
726   cmode / CMYK .meta:n = {cmode=4C},
727   cmode / cmyk .meta:n = {cmode=4C},
728   cmode / rgb .meta:n = {cmode=RGB},
729   cmode / gray .meta:n = {cmode=BW},
730   RGB .meta:n = {cmode=RGB},
731   rgb .meta:n = {cmode=RGB},
732   CMYK .meta:n = {cmode=4C},
733   cmyk .meta:n = {cmode=4C},
734   gray .meta:n = {cmode=BW},
735 }
736 \keys_set:nn { seicolors } { cmode = 4C }
```

(End of definition for `\l__slcd_colors_colormode_tl`.)

4.2 Option handling

```
737 \IfFormatAtLeastTF { 2022-06-01 }
738 { \ProcessKeyOptions [ seicolors ] }
739 {
740   \RequirePackage { l3keys2e }
741   \ProcessKeysOptions { seicolors }
742 }
```

4.3 Colour definitions

Load the xcolor package for colour definitions.

```
743 \RequirePackage{xcolor}
```

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

```
744 \definecolorset[named]{RGB/cmyk}{UPSE2-}{}{%
745   Orange,242,148,0/0.00,0.44,0.95,0.01;%
746   Gray,153,159,158/0.40,0.28,0.28,0.00;%
747   JUR,229,49,56/0.01,0.90,0.81,0.01;%
748   WIWI,0,96,57/0.87,0.20,0.87,0.36;%
749   PHIL,188,42,51/0.06,0.93,0.81,0.11;%
750   FIM,0,90,161/0.93,0.63,0.01,0.02;%
751   DarkGray,77,77,77/0.74,0.67,0.62,0.18;%
752   White,255,255,255/0.00,0.00,0.00,0.00;%
753   MediumGray,127,127,127/0.52,0.43,0.40,0.02;%
754   LightGray,229,229,229/0.08,0.06,0.04,0.00;%
755   LightRed,229,49,56/0.01,0.90,0.81,0.01;%
756   DarkRed,188,42,51/0.06,0.93,0.80,0.11;%
757   Green,0,96,57/0.87,0.20,0.86,0.35;%
758   Blue,0,90,161/0.93,0.63,0.01,0.02;%
759   AccentGray,153,159,158/0.40,0.28,0.28,0.00%
760 }
```

Define the derived colours.

```
761 \colorlet{UPSE2-DarkGray1}{UPSE2-DarkGray!20!white}
762 \colorlet{UPSE2-DarkGray2}{UPSE2-DarkGray!40!white}
763 \colorlet{UPSE2-DarkGray3}{UPSE2-DarkGray!60!white}
764 \colorlet{UPSE2-DarkGray4}{UPSE2-DarkGray!75!black}
765 \colorlet{UPSE2-DarkGray5}{UPSE2-DarkGray!50!black}
766 \colorlet{UPSE2-White1}{UPSE2-White!95!black}
767 \colorlet{UPSE2-White2}{UPSE2-White!85!black}
768 \colorlet{UPSE2-White3}{UPSE2-White!75!black}
769 \colorlet{UPSE2-White4}{UPSE2-White!65!black}
770 \colorlet{UPSE2-White5}{UPSE2-White!50!black}
771 \colorlet{UPSE2-MediumGray1}{UPSE2-MediumGray!20!white}
772 \colorlet{UPSE2-MediumGray2}{UPSE2-MediumGray!40!white}
773 \colorlet{UPSE2-MediumGray3}{UPSE2-MediumGray!60!white}
774 \colorlet{UPSE2-MediumGray4}{UPSE2-MediumGray!75!black}
775 \colorlet{UPSE2-MediumGray5}{UPSE2-MediumGray!50!black}
776 \colorlet{UPSE2-LightGray1}{UPSE2-LightGray!90!black}
777 \colorlet{UPSE2-LightGray2}{UPSE2-LightGray!75!black}
778 \colorlet{UPSE2-LightGray3}{UPSE2-LightGray!55!black}
779 \colorlet{UPSE2-LightGray4}{UPSE2-LightGray!25!black}
780 \colorlet{UPSE2-LightGray5}{UPSE2-LightGray!10!black}
781 \colorlet{UPSE2-Orange1}{UPSE2-Orange!20!white}
782 \colorlet{UPSE2-Orange2}{UPSE2-Orange!40!white}
783 \colorlet{UPSE2-Orange3}{UPSE2-Orange!60!white}
784 \colorlet{UPSE2-Orange4}{UPSE2-Orange!75!black}
785 \colorlet{UPSE2-Orange5}{UPSE2-Orange!50!black}
786 \colorlet{UPSE2-LightRed1}{UPSE2-LightRed!20!white}
787 \colorlet{UPSE2-LightRed2}{UPSE2-LightRed!40!white}
788 \colorlet{UPSE2-LightRed3}{UPSE2-LightRed!60!white}
789 \colorlet{UPSE2-LightRed4}{UPSE2-LightRed!75!black}
```

```

790 \colorlet{UPSE2-LightRed5}{UPSE2-LightRed!50!black}
791 \colorlet{UPSE2-DarkRed1}{UPSE2-DarkRed!20!white}
792 \colorlet{UPSE2-DarkRed2}{UPSE2-DarkRed!40!white}
793 \colorlet{UPSE2-DarkRed3}{UPSE2-DarkRed!60!white}
794 \colorlet{UPSE2-DarkRed4}{UPSE2-DarkRed!75!black}
795 \colorlet{UPSE2-DarkRed5}{UPSE2-DarkRed!50!black}
796 \colorlet{UPSE2-Green1}{UPSE2-Green!10!white}
797 \colorlet{UPSE2-Green2}{UPSE2-Green!25!white}
798 \colorlet{UPSE2-Green3}{UPSE2-Green!50!white}
799 \colorlet{UPSE2-Green4}{UPSE2-Green!75!white}
800 \colorlet{UPSE2-Green5}{UPSE2-Green!90!white}
801 \colorlet{UPSE2-Blue1}{UPSE2-Blue!20!white}
802 \colorlet{UPSE2-Blue2}{UPSE2-Blue!40!white}
803 \colorlet{UPSE2-Blue3}{UPSE2-Blue!60!white}
804 \colorlet{UPSE2-Blue4}{UPSE2-Blue!75!black}
805 \colorlet{UPSE2-Blue5}{UPSE2-Blue!50!black}
806 \colorlet{UPSE2-AccentGray1}{UPSE2-AccentGray!20!white}
807 \colorlet{UPSE2-AccentGray2}{UPSE2-AccentGray!40!white}
808 \colorlet{UPSE2-AccentGray3}{UPSE2-AccentGray!60!white}
809 \colorlet{UPSE2-AccentGray4}{UPSE2-AccentGray!75!black}
810 \colorlet{UPSE2-AccentGray5}{UPSE2-AccentGray!50!black}
811 </package>

```

5 se2fonts implementation

Start the DocStrip guards.

```
812 <*package>
```

Identify the internal prefix (L^AT_EX3 DocStrip convention): only internal material in this *submodule* should be used directly.

```
813 <@@=slcd_fonts>
```

Identify the package and give the overall version information.

```
814 \ProvidesExplPackage {se2fonts} {2023-09-12} {3.2.0}
```

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

5.1 Load-time options

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

```
816 \tl_new:N \l__slcd_fonts_fontmode_tl
817 \keys_define:nn { seiifonts }
818 {
819   fmode .choice:,
820   fmode / original .code:n = {
821     \tl_gset:Nn \l__slcd_fonts_fontmode_tl {original}
822   },
823   fmode / replacement .code:n = {
824     \tl_gset:Nn \l__slcd_fonts_fontmode_tl {replacement}
825   },
826   fmode / auto .code:n = {
827     \tl_gset:Nn \l__slcd_fonts_fontmode_tl {auto}
828   },
829   original .meta:n = {fmode=original},
830   replacement .meta:n = {fmode=replacement},
831   auto .meta:n = {fmode=auto},
832 }
```

(End of definition for `\l__slcd_fonts_fontmode_tl`.)

5.2 Option handling

```
833 \IfFormatAtLeastTF { 2022-06-01 }
834 { \ProcessKeyOptions [ seiifonts ] }
835 {
836   \RequirePackage{ l3keys2e }
837   \ProcessKeysOptions { seiifonts }
838 }
```

Define a warning message

```
839 \msg_set:nnnn { seiifonts } { deprecated-option }
840 { The~ option~ fmode~ to~ the~ se2fonts~ package~ is~ deprecated. }
841 { Remove~ it~ from~ your~ code.}
```

Raise the warning if the option was used

```
842 \tl_if_empty:NF \l__slcd_fonts_fontmode_tl
843 {
844   \msg_warning:nn { seiifonts } { deprecated-option }
```

```
845 }
```

5.3 Helper macros

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

```
\xetexengine 846 \cs_new_eq:NN \pdfTexengine \sys_if_engine_pdfTex_p:
\luatexengine 847 \cs_new_eq:NN \xetexengine \sys_if_engine_xetex_p:
848 \cs_new_eq:NN \luatexengine \sys_if_engine_luatex_p:
```

(End of definition for `\pdfTexengine`, `\xetexengine`, and `\luatexengine`. These functions are documented on page 9.)

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

```
\ifengineT 849 \NewExpandableDocumentCommand \ifengineTF { mmm }
\ifengineF 850 {
851 \bool_if:nTF { #1 } { #2 } { #3 }
852 }
853 \NewExpandableDocumentCommand \ifengineT { mm }
854 {
855 \bool_if:nT { #1 } { #2 }
856 }
857 \NewExpandableDocumentCommand \ifengineF { mm }
858 {
859 \bool_if:nF { #1 } { #2 }
860 }
```

(End of definition for `\ifengineTF`, `\ifengineT`, and `\ifengineF`. These functions are documented on page 9.)

The package is not tested with Xe_{La}TeX, thus we provide an error to the user and stop the execution if they want to use the package with Xe_{La}TeX.

```
861 \ifengineT { \xetexengine }
862 {
863 \msg_set:nnnn { seiifonts } { xetex-not-supported }
864 { XeTeX~ is~ not~ supported~ by~ the~ se2font~ package. }
865 { Switch~ to~ pdfTeX~ or~ (preferably)~ LuaTeX. }
866 \msg_error:nn { seiifonts } { xetex-not-supported }
867 }
```

5.4 Font loading

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

```
868 \ifengineTF { \luatexengine }
869 {
```

If the user uses Lua_{La}TeX, load fontspec and unicode-math.

```
870 \RequirePackage{fontspec}
871 \RequirePackage{unicode-math}
```

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

```
872 \defaultfontfeatures{ Scale = MatchLowercase }
873 \defaultfontfeatures[\rmfamily]{ Scale = 1 }
```

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

```
874 \PassOptionsToPackage{mono=false}{libertinus-otf}
875 \RequirePackage{libertinus-otf}
```

Load the *Inconsolata Nerd Font* monospaced font.

```
876 \RequirePackage{inconsolata-nerd-font}
```

```
877 } {
```

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

```
878 \PassOptionsToPackage{T1}{fontenc}
```

```
879 \PassOptionsToPackage{scaled=0.9,varl}{inconsolata}
```

```
880 \PassOptionsToPackage{mono=false}{libertinus-type1}
```

```
881 \RequirePackage{fontenc}
```

```
882 \RequirePackage{inconsolata}
```

```
883 \RequirePackage{libertinus-type1}
```

```
884 }
```

```
885 \end{package}
```

6 se2packages implementation

Start the DocStrip guards.

```
886 <*package>
```

Identify the internal prefix (L^AT_EX3 DocStrip convention): only internal material in this *submodule* should be used directly.

```
887 <@@=slcd_packages>
```

Identify the package and give the overall version information.

```
888 \ProvidesExplPackage {se2packages} {2023-09-12} {3.2.0}
```

```
889 {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.
```

```
890 \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.
```

```
891 \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.
```

```
892 \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.
```

```
893 \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.
```

```
894 \bool_new:N \l__slcd_packages_listings_bool
```

(End of definition for \l__slcd_packages_listings_bool.)

```
\l_slcd_packages_biblatex_bool Whether or not to load and configure biblatex.
```

```
895 \bool_new:N \l__slcd_packages_biblatex_bool
```

(End of definition for \l__slcd_packages_biblatex_bool.)

```
\l_slcd_packages_selnolig_bool Whether or not to load selnolig (LuaTEX only).
```

```
896 \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).
```

```
897 \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.

898 `\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.

899 `\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.

900 `\bool_new:N \l__slcd_packages_all_bool`

(End of definition for `\l__slcd_packages_all_bool`.)

Define the actual load-time options.

901 `\keys_define:nn { seiipackages }`

902 `{`

903 `csquotes .bool_gset:N = \l__slcd_packages_csquotes_bool,`

904 `csquotes .initial:n = true,`

905 `nocquotes .meta:n = {csquotes=false},`

906

907 `booktabs .bool_gset:N = \l__slcd_packages_booktabs_bool,`

908 `booktabs .initial:n = true,`

909 `nobooktabs .meta:n = {booktabs=false},`

910

911 `siunitx .bool_gset:N = \l__slcd_packages_siunitx_bool,`

912 `siunitx .initial:n = false,`

913

914 `minted .bool_gset:N = \l__slcd_packages_minted_bool,`

915 `minted .initial:n = false,`

916

917 `listings .bool_gset:N = \l__slcd_packages_listings_bool,`

918 `listings .initial:n = false,`

919

920 `biblatex .bool_gset:N = \l__slcd_packages_biblatex_bool,`

921 `biblatex .initial:n = false,`

922

923 `selnolig .bool_gset:N = \l__slcd_packages_selnolig_bool,`

924 `selnolig .initial:n = true,`

925 `noselnolig .meta:n = {selnolig=false},`

926

927 `widowcontrol .bool_gset:N = \l__slcd_packages_luawidowcontrol_bool,`

928 `widowcontrol .initial:n = false,`

929 `nowidowcontrol .meta:n = {widowcontrol=false},`

930

931 `microtype .bool_gset:N = \l__slcd_packages_microtype_bool,`

932 `microtype .initial:n = true,`

933 `nomicrotype .meta:n = {microtype=false},`

934

935 `cleveref .bool_gset:N = \l__slcd_packages_cleveref_bool,`

936 `cleveref .initial:n = false,`

937

938 `all .bool_gset:N = \l__slcd_packages_all_bool,`

939 `all .initial:n = false,`

940 `}`

6.2 Option handling

```
941 \IfFormatAtLeastTF { 2022-06-01 }
942 { \ProcessKeyOptions [ seiipackages ] }
943 {
944   \RequirePackage{ l3keys2e }
945   \ProcessKeysOptions { seiipackages }
946 }
```

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

```
947 \msg_set:nnnn { seiipackages } { conflicting-packages }
948 { Setting~ both~ minted~ and~ listings~ to~ true~ is~ not~ possible. }
949 { 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.

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

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

```
952 \bool_lazy_and:nnT { \l__slcd_packages_minted_bool } { \l__slcd_packages_listings_bool }
953 {
954   \msg_error:nn { seiipackages } { conflicting-packages }
955 }
```

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

```
956 \bool_if:NT \l__slcd_packages_all_bool
957 {
958   \bool_gset_true:N \l__slcd_packages_csquotes_bool
959   \bool_gset_true:N \l__slcd_packages_booktabs_bool
960   \bool_gset_true:N \l__slcd_packages_siunitx_bool
961   \bool_gset_true:N \l__slcd_packages_minted_bool
962   \bool_gset_false:N \l__slcd_packages_listings_bool
963   \bool_gset_true:N \l__slcd_packages_selnolig_bool
964   \bool_gset_true:N \l__slcd_packages_luawindowcontrol_bool
965   \bool_gset_true:N \l__slcd_packages_microtype_bool
966   \bool_gset_true:N \l__slcd_packages_biblatex_bool
967   \bool_gset_true:N \l__slcd_packages_cleveref_bool
968 }
```

6.3 Package loading

Conditionally load the csquotes package.

```
969 \bool_if:NT \l__slcd_packages_csquotes_bool
970 {
971   \msg_info:nnn { seiipackages } { load-package } { csquotes }
972   \RequirePackage{fvextra}
973   \RequirePackage{csquotes}
974 }
```

Conditionally load the booktabs package.

```
975 \bool_if:NT \l__slcd_packages_booktabs_bool
976 {
977   \msg_info:nnn { seiipackages } { load-package } { booktabs }
978   \RequirePackage{booktabs}
979 }
```

Conditionally load and configure the siunitx package.

```

980 \bool_if:NT \l__slcd_packages_siunitx_bool
981 {
982   \msg_info:nnn { seiipackages } { load-package } { siunitx }
983   \RequirePackage[
984     add-integer-zero=false,
985     free-standing-units,
986     group-minimum-digits=4,
987     list-final-separator={, and },
988     round-mode=figures,
989     round-precision=3,
990     separate-uncertainty=true,
991     uncertainty-mode=separate,
992   ]{siunitx}
993 }

```

Conditionally load and configure the minted package.

```

994 \bool_if:NT \l__slcd_packages_minted_bool
995 {
996   \msg_info:nnn { seiipackages } { load-package } { minted }
997   \RequirePackage[newfloat=true]{minted}
998   \setminted{
999     autogobble,
1000     breaklines=true,
1001     fontsize=\footnotesize,
1002     frame=single,
1003     linenos=false,
1004     resetmargins=true,
1005     xleftmargin=1em,
1006     xrightmargin=1em,
1007   }
1008 }

```

Conditionally load and configure the listings package.

```

1009 \bool_if:NT \l__slcd_packages_listings_bool
1010 {
1011   \msg_info:nnn { seiipackages } { load-package } { listings }
1012   \RequirePackage{listings}
1013   \lstset{
1014     basicstyle=\footnotesize\ttfamily,
1015     breaklines=true,
1016     captionpos=t,
1017     extendedchars=true,
1018     frame=single,
1019     keywordstyle=\color{blue}\bfseries,
1020     showspaces=false,
1021     showtabs=false,
1022     showstringspaces=false,
1023     tabsize=2,
1024   }
1025 }

```

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

```

1026 \bool_lazy_and:nnT { \l__slcd_packages_selnolig_bool } { \sys_if_engine luatex_p: }
1027 {

```

```

1028 \IfFileExists { selnolig.sty }
1029 {
1030   \RequirePackage{selnolig}
1031 } {
1032   \msg:nnnn { seiipackages }
1033     { selnolig-not-available }
1034     { Could~ not~ find~ selnolig.sty }
1035     { You~ might~ want~ to~ install~ it~ for~ better~ ligatures~ control.}
1036   \msg_note:nn { seiipackages } { selnolig-not-available }
1037 }
1038 }

```

Conditionally load luawidowcontrol if present and we run Lua_{TeX}.

```

1039 \bool_lazy_and:nnT { \l__slcd_packages_luawidowcontrol_bool } { \sys_if_engine luatex_p: }
1040 {
1041   \IfFileExists { lua-widow-control.sty }
1042   {
1043     \RequirePackage{lua-widow-control}
1044   } {
1045     \msg:nnnn { seiipackages }
1046       { lua-widow-control-not-available }
1047       { Could~ not~ find~ lua-widow-control.sty }
1048       {
1049         You~ might~ want~ to~ install~ it~ for~ better~ control~ over~
1050         widows~ and~ orphans.
1051       }
1052     \msg_note:nn { seiipackages } { lua-widow-control-not-available }
1053   }
1054 }

```

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.

```

1055 \bool_if:NT \l__slcd_packages_microtype_bool
1056 {
1057   \msg_info:nnn { seiipackages } { load-package } { microtype }
1058   \RequirePackage{microtype}
1059   \bool_if:NF \l__slcd_packages_luawidowcontrol_bool
1060   {
1061     \clubpenalty=10000
1062     \widowpenalty=10000
1063     \displaywidowpenalty=10000
1064   }
1065   \SetExtraKerning{
1066     encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2}
1067   }{
1068     \textendash = {167,167},
1069     - = {167,167}
1070   }
1071 }

```

Conditionally load and configure the biblatex package.

```

1072 \bool_if:NT \l__slcd_packages_biblatex_bool
1073 {
1074   \msg_info:nnn { seiipackages } { load-package } { biblatex }

```

```

1075 \PassOptionsToPackage
1076 {
1077     backend=biber,
1078     backref=true,
1079     giveninits=true,
1080     hyperref=auto,
1081     maxnames=100,
1082     minalphanames=3,
1083     sorting=nyt,
1084     style=alphabetic,
1085 } { biblatex }
1086 \RequirePackage{biblatex}
1087 }

```

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

```

1088 \bool_if:NT \l__slcd_packages_cleveref_bool
1089 {
1090     \msg_info:nnn { seiipackages } { load-package } { cleveref }
1091     \AddToHook { begindocument/before }
1092     {
1093         \RequirePackage[capitalise]{cleveref}
1094     }
1095 }
1096 \end{package}

```

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