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 \LaTeX\ 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

This documentation is split into two parts: the first part is the documentation for the user, which provides all macros, variables, and functions that are provided by the se2thesis bundle. The second part (starting on page 14) shows the implementation. This might be interesting for you if you are curious how certain things are defined or if you need to change some of the default implementation.

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 lead 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 LATEX 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 (documented in Section 4) and se2fonts (documented in Section 5) provide necessary colour and font settings for the se2thesis class. They are available as separate packages, however, to allow their reuse for other classes, packages, and projects, as well.

They all have in common one macro, \IfFormatAtLeastTF; this macro is part of the latest 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:

\IfFormatAtLeastTF \IfFormatAtLeastTF {{version}} {{then block}} {{else-block}}

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 and unicode-math if one uses \LaTeX{}; for pd\LaTeX{} we load fonttype; when using \LaTeX{}, we also load lua-widow-control and selnolig.

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

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

\slcd_package_if_loaded:TF {⟨true code⟩} {⟨false code⟩}
\slcd_package_if_loaded_p: ⋆
\slcd_package_if_loaded:TF *

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

3.1 Load-time options

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

\begin{verbatim}
\slcd_package_if_loaded_p: * \slcd_package_if_loaded:TF {(true code)} {(false code)}
\slcd_package_if_loaded:TF *
\end{verbatim}

\texttt{Updated: 2022-09-27}

\begin{description}
\item[\textit{class}] \texttt{class = ⟨choice⟩}
\hspace{1cm} Set the base document class. Values are \texttt{scrrprt}, \texttt{scratcl}, or \texttt{scrbook}. Default is \texttt{scrrprt}.
\item[\textit{paper}] \texttt{paper = ⟨choice⟩}
\hspace{1cm} Set the paper format. Possible values are \texttt{a4}, \texttt{a5}, or \texttt{b5}. Default is \texttt{a4}.
\item[\textit{logofile}] \texttt{logofile = ⟨path-to-file⟩}
\hspace{1cm} Defines the path to the University’s logo for the title page.
\item[\textit{thesistype}] \texttt{thesistype = ⟨choice⟩}
\hspace{1cm} Defines the type of the thesis. Possible values are: \texttt{bachelor} for a bachelor thesis, \texttt{bachelorproposal} for a proposal to a bachelor thesis, \texttt{master} for a master thesis, \texttt{masterproposal} for a proposal to a master thesis, \texttt{phdproposal} for a proposal to a PhD thesis, and \texttt{phd} for a PhD thesis.
\item[\textit{biblatex}] \texttt{biblatex = ⟨true,false⟩}
\hspace{1cm} Whether se2thesis shall load the \texttt{biblatex} package together with some settings automatically.
\end{description}
Select the color scheme used by the automatically loaded \texttt{se2colors} package, see Section 4 for a description.

Select the font scheme used by the automatically loaded \texttt{se2fonts} package, see Section 5 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 redefine the standard \texttt{\maketitle} macro from \texttt{KOMA-Script} and customise it to our needs.

We override the definition of the \texttt{\maketitle} macro for our needs.

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

Specify the version of the document. This can, for example, be a \texttt{git} hash of the current version.

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.

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

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

Specify the name of your advisor and co-advisor. Both people usually are PhD students or postdocs.
\department {} \department {⟨name⟩}
\institute [⟨short-name] {}⟨name⟩

Specify the department and institute. The department is, for example, ‘Faculty of Computer Science and Mathematics’, the institute, for example, ‘Chair of Software Engineering II’. If the \department value is not 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.

\external {} \external {⟨name⟩}

Specify the name of an external referee.

\location {} \location {⟨name-of-town⟩}

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

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

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 \and command.

\author {} \author {⟨author⟩}
\@author \@author

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

### 3.3 Type-area settings

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

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

Several packages can be useful for writing a thesis. We list them in this section; for
the recommended option settings, please have a look at our examples. Please note that
you might not need all these packages, however, having a look at them (especially their
documentation) might give you an insight, whether to use a package. Our general re-
commendation 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 \texttt{siunitx} package together with
\texttt{SIunits}) or they might require to be loaded at special places in your preamble (for ex-
ample, \texttt{hyperref} is usually meant to be loaded as the last package, except you are also
using \texttt{cleveref}, which needs to be loaded \textit{after} \texttt{hyperref}).

3.4.1 Quoting with \texttt{csquotes}

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

3.4.2 Number formatting with \texttt{siunitx}

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

When using the \texttt{siunitx} package, we recommend adding the following lines to your
document's preamble.

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

3.4.3 Code listings with \texttt{minted}

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

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When using minted we recommend the following settings:

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

3.4.4 Code listing with listings

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

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

Please be aware to use either minted or listings!

3.4.5 Designing tables

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

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

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

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

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

3.4.7 Use \texttt{cleveref} for internal references

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

Please note that, in contrast to most other packages, \texttt{cleveref} has to be loaded \textit{after} the \texttt{hyperref} package!

3.5 Abstract for the thesis

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

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

3.6 Acknowledgements

We provide the \texttt{acknowledgements} environment to typeset acknowledgements for your thesis. Using this environment is optional. Usually, bachelor and master thesis do not contain such an acknowledgements section, however, there is no general rule to this.

\begin{acknowledgements}[language]
Your acknowledgements.
\end{acknowledgements}
3.7 Document structuring

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

\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.

3.8 Authorship declaration

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

\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\footnote{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/.} 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.

3.9 Research Questions and findings summaries

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

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

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

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

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 feature. One can load it using \usepackage{se2colors} in the document preamble.

\begin{Verbatim}
cmode = \langle \text{choice} \rangle
\end{Verbatim}

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

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-Orange with its derivatives
  UPSE2-Orange1, UPSE2-Orange2, UPSE2-Orange3, UPSE2-Orange4, and UPSE2-Orange5.

• UPSE2-LightRed with its derivatives

• 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 for the document. By default, we recommend using Hermann Zapf’s beautiful Palatino font as the main text font, accompanied with the sans-serif font Helvetica and Neo Euler as the default math font; we set Meslo LGS Nerd Font Mono as the monospaced font. Palatino and Helvetica get shipped with any macOS system, the user, however, needs to download Neo Euler themself\textsuperscript{2}. Being aware that these fonts might not be available on every user’s system, we recommend using TeX Gyre Pagella as an alternative to Palatino, TeX Gyre Heros as an alternative to Helvetica, and the TeX Gyre Pagella Math as the default math font; Fira Code is a nice monospaced font. Although they look different in various details they still provide a nice-looking alternative that is bundled with a recent standard TeX distribution.

If you are using LuaTeX, fonts are expected to be present as open-type fonts; using pdfLaTeX will fallback to Type-1 fonts, and will use TeX Gyre Pagella, TeX Gyre Heros, Fira Code, and TeX Gyre Pagella Math as the default fonts.

\textsuperscript{2}for example from https://fontlibrary.org/en/font/euler-otf.
Note that the package does not support Xe\TeX!

The following option is defined by the \texttt{se2fonts} package to influence the selection of the fonts.

\begin{verbatim}
\texttt{fmode} \hspace{1cm} \texttt{fmode = \langle choice \rangle}
\end{verbatim}

Sets the font-selection mode based on a choice: \texttt{original} selects the fonts we recommend for using, \texttt{replacement} selects fonts that are part of a standard \TeXX\ distribution, in case one has no access to the original fonts; \texttt{auto} selects fonts automatically, preferring the original fonts if available. The default is \texttt{auto}.

The fonts are automatically scaled based on their lower-case characters using the mechanisms provided by \texttt{fontspec} when using \texttt{Lua\TeX}.

The following list provides examples for each of the fonts:

- An example text in Palatino
- An example text in \TeX\ Gyre Pagella
- An example text in Helvetica
- An example text in \TeX\ Gyre Hero\s
- An example text in MesloLGS
- An example text in Fira Code
- An example text in Neo Euler
- An example text in \TeX\ Gyre Pagella Math

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

\begin{verbatim}
\%pdf\texttt{exengine} \%pdf\texttt{exengine} \\
\%xetex\texttt{exengine} \%xetex\texttt{exengine} \\
\%luatex\texttt{exengine} \%luatex\texttt{exengine}
\end{verbatim}

These commands alias the built-in \LaTeXX\3 macros \texttt{sys_if_engine_pdftex_p}, \texttt{sys_if_engine_xetex_p}, and \texttt{sys_if_engine_luatex_p}. They can be used to check which engine the user is currently running.

\begin{verbatim}
\%ifengineTF \%ifengineTF \%ifengineTF \%ifengineF \%ifengineF \%ifengineF \%ifengineF
\end{verbatim}

Allows to execute code based on the running engine. The base variant \texttt{ifengineTF} expects the user to specify a condition, which can be built of combinations of the \texttt{pdftexengine}, \texttt{xetexengine}, and \texttt{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 \texttt{ifengineT} and \texttt{ifengineF} that allow to omit an empty then or else branch, respectively.
Part II
Implementation

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.

(+init)
Load only the essential support (expl3) ‘up-front’, and only if required.
\ifundefined{ExplLoaderFileDate}
\{ \RequirePackage{expl3} \}
\}

Make sure that the version of \texttt{l3kernel} in use is sufficiently new. We use \texttt{\ExplFileDate} as \texttt{\@ifpackagelater} does not work for pre-loaded expl3 in the absence of the package.
\if@filedate{\ExplLoaderFileDate}{2020-01-09}
\{}
\%
\PackageError{se2colors}{Support package expl3 too old}
\%
You need to update your installation of the bundles 'l3kernel' and 'l3packages'.\MessageBreak
Loading-se2colors-will-abort!%
\}%
\endinput
\IfFormatAtLeastTF
This macro is not present in older kernels, thus we use the \texttt{LATeX3} mechanism as this is correct for this case.
\providecommand \IfFormatAtLeastTF { \@ifl@t@r \fmtversion }
(End definition for \texttt{\IfFormatAtLeastTF}. This function is documented on page \pageref{ifformatatleasttf}.)
\end{init}

2 The \texttt{se2thesis} implementation

Start the DocStrip guards.
\begin{class}
Identify the internal prefix (\texttt{\LaTeX} DocStrip convention): only internal material in this submodule should be used directly.
\end{class}
\begin{clcd}
Identify the class and give the overall version number.
\ProvidesExplClass {se2thesis} {2022-11-22} {1.3.1}
{A thesis class for the Chair of Software Engineering II}
\slcd_package_if_loaded:nTF \slcd_package_if_loaded:nT \slcd_package_if_loaded:nF \slcd_package_if_loaded:p:n

Defines various \LaTeX{}3 variants for the internal \texttt{@ifpackageloaded} macro to check whether a package has been loaded.

\begin{verbatim}
\prg_new_conditional:Nnn \slcd_package_if_loaded:n { p, T, F, TF }
{ \use:c { @ifpackageloaded } }
{ \prg_return_true: }
{ \prg_return_false: }
\end{verbatim}

(End definition for \texttt{\slcd_package_if_loaded:nTF} and others. These functions are documented on page ??.)

Load required packages early.

\begin{verbatim}
\RequirePackage{graphicx}
\RequirePackage{translations}
\LoadDictionary{se2translations}
\DeclareTranslationFallback{version-of-date}{
Version-\l__slcd_version_tl\ of-\@date
}
\DeclareTranslation{German}{version-of-date}{
Version-\l__slcd_version_tl\ vom-\@date
}
\DeclareTranslation{English}{version-of-date}{
Version-\l__slcd_version_tl\ of-\@date
}
\end{verbatim}

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.
\begin{verbatim}
\int_new:N \l__slcd_paper_int
\end{verbatim}
(End definition for \texttt{\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 \l__slcd_clsopts_prop \l__slcd_unknown_clsopts_prop

\begin{verbatim}
\tl_new:N \l__slcd_base_class_tl
\prop_new:N \l__slcd_clsopts_prop
\prop_new:N \l__slcd_unknown_clsopts_prop
\end{verbatim}
(End definition for \texttt{\l__slcd_base_class_tl, \l__slcd_clsopts_prop, and \l__slcd_unknown_clsopts_prop}.)

\l__slcd_biblatex_bool The user wants to load the \texttt{biblatex} package together with our settings.
\begin{verbatim}
\bool_new:N \l__slcd_biblatex_bool
\end{verbatim}
(End definition for \texttt{\l__slcd_biblatex_bool}.)

Define internal variables to hold the values of the fields of the title page.
Define several dimensions for the \texttt{typearea} package to define the package style.

\begin{verbatim}
\dim_new:N \l__slcd_marginspace_dim
\dim_new:N \l__slcd_headmarkspace_dim
\dim_new:N \l__slcd_rulespace_dim
\dim_new:N \l__slcd_pagemark_minipage_dim
\dim_new:N \l__slcd_ruleraise_dim
\dim_new:N \l__slcd_rulewidth_dim
\dim_new:N \l__slcd_rulethickness_dim
\dim_gset:Nn \l__slcd_marginspace_dim { -1.85cm }
\dim_gset:Nn \l__slcd_headmarkspace_dim { 0.75cm }
\dim_gset:Nn \l__slcd_rulespace_dim { 10pt }
\dim_gset:Nn \l__slcd_pagemark_minipage_dim { 1.5cm }
\dim_gset:Nn \l__slcd_ruleraise_dim { -100pt }
\dim_gset:Nn \l__slcd_rulewidth_dim { 1.25pt }
\dim_gset:Nn \l__slcd_rulethickness_dim { 110pt }
\end{verbatim}

(End definition for \texttt{\l__slcd_marginspace_dim} and others.)

\subsection{Load-time options}
We define the key-value interface for the class.

\begin{verbatim}
\keys_define:nn { seiithesis }
{ class .choice:,
  class / report .meta:n = {class=scrreprt},
  class / scrreprt .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrreprt},
  class / article .meta:n = {class=scrartcl},
  class / scrartcl .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrartcl},
  class / book .meta:n = {class=scrbook},
  class / scrbook .code:n = \tl_gset:Nn \l__slcd_base_class_tl {scrbook},
  class .initial:n = scrreprt,
  paper .choices:n = \{a4,a5,b5\}{
    \int_gset_eq:NN \l__slcd_paper_int \l_keys_choice_int
  },
}\end{verbatim}
Handle the options

\IfFormatAtLeastTF { 2022-06-01 } { \ProcessKeyOptions { seiithesis } } { \RequirePackage{ l3keys2e } \ProcessKeysOptions { seiithesis } } { Handle the known options for base class

\prop_map_inline:Nn \l__slcd_clsopts_prop
{ \tl_if_empty:nTF {#2} { \PassOptionsToClass {#1} {\l__slcd_base_class_tl} } { \clist_map_inline:nn {#2} { \PassOptionsToClass {#1=##1} {\l__slcd_base_class_tl} } } }
Load the base class
\LoadClass{\l__slcd_base_class_tl}

Attempt to handle the unknown options
\prop_map_inline:Nn \l__slcd_unknown_clsopts_prop
{\cs_if_exist:cT \KOMAWithOptions{\l__slcd_base_class_tl.cls@#1}}
{\tl_if_empty:nTF (#2)
  \KOMAOptions{#1}
  \KOMAOption{#1}{#2}}

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.
\PassOptionsToPackage{\l__slcd_colormode_tl}{se2colors}
\RequirePackage{se2colors}
\PassOptionsToPackage{\l__slcd_fontmode_tl}{se2fonts}
\RequirePackage{se2fonts}

Load the microtype package. We also set some options to microtype, namely the penalties for widows and orphans (which might also be corrected by lua-widow-control when using LuaTEX) and a thin space around the m-dash. We are aware of the discussion whether to have a space around the m-dash in English, however, we think it looks more beautiful. We took this from a \TeX\,StackExchange post.
\RequirePackage{microtype}
\clubpenalty=10000
\widowpenalty=10000
\displaywidowpenalty=10000
\SetExtraKerning{
  encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2}
}{
  \textemdash = {167,167},
  — = {167,167}
}

When using LuaTEX load the lua-widow-control package for a better control of orphans and widows.
\IfFileExists { lua-widow-control.sty } { \luaexenginen { \requirepackage{lua-widow-control} } { \msg:nnn { seithesis } { lua-widow-control-not-available } } }
Could not find lua-widow-control.sty. You might want to install it for better control over orphans and widows.

Similarly, load ligtype when using LuaTeX.

When the user requests the biblatex option, also load biblatex

Define strings for back-referencing.

Design the page-ref format.
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.
\ProvideDocumentCommand \version { m }
\tl_set:Nn \l__slcd_version_tl {#1}
(End definition for \version. This function is documented on page 5.)

\degreeprogramme Specify the degree programme the thesis is meant to be accepted in.
\ProvideDocumentCommand \degreeprogramme { m }
\tl_set:Nn \l__slcd_degreeprogramme_tl {#1}
(End definition for \degreeprogramme. This function is documented on page 5.)

\matrnumber Specify the matriculation number of the student.
\ProvideDocumentCommand \matrnumber { m }
\tl_set:Nn \l__slcd_matrnumber_tl {#1}
(End definition for \matrnumber. This function is documented on page 5.)

\supervisor \cosupervisor Specify the supervisor and co-supervisor of the thesis, usually a professor.
\ProvideDocumentCommand \supervisor { m }
\tl_set:Nn \l__slcd_supervisor_tl {#1}
\ProvideDocumentCommand \cosupervisor { m }
\tl_set:Nn \l__slcd_cosupervisor_tl {#1}
Specify the advisor and co-advisor of the thesis, usually a PhD student or postdoc.

```latex
\ProvideDocumentCommand \advisor { m } {
   \tl_set:Nn \l__slcd_advisor_tl {#1}
}
\ProvideDocumentCommand \coadvisor { m } {
   \tl_set:Nn \l__slcd_coadvisor_tl {#1}
}
```

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

```latex
\ProvideDocumentCommand \department { m } {
   \tl_set:Nn \l__slcd_department_tl {#1}
}
\ProvideDocumentCommand \institute { o m } {
   \tl_set:Nn \l__slcd_institute_tl {#2}
}
```

Specify an external referee.

```latex
\ProvideDocumentCommand \external { m } {
   \tl_set:Nn \l__slcd_external_tl {#1}
}
```

Specify the location for the signature field.

```latex
\ProvideDocumentCommand \location { m } {
   \tl_set:Nn \l__slcd_location_tl {#1}
}
```

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.

```latex
\l__slcd_logo_height_dim \l__slcd_logo_box
\dim_if_exist:NF \l__slcd_logo_height_dim {
   \dim_new:N \l__slcd_logo_height_dim
   \dim_gset:Nn \l__slcd_logo_height_dim { 67.5pt }
}\box_if_exist:NF \l__slcd_logo_box {
```
Set the paper size depending on the selected \texttt{paper} option.
\begin{verbatim}
\int_compare:nTF { \l__slcd_paper_int=1 }
{ \areaset[\text{current}]{389pt}{630pt}
  \setlength{\marginparsep}{8.5cm}
  \setlength{\marginparsep}{1em}
}
\int_compare:nTF { \l__slcd_paper_int=2 }
{ \areaset[\text{current}]{275pt}{445pt}
  \setlength{\marginparsep}{6.0cm}
  \setlength{\marginparsep}{0.71em}
}{ \areaset[\text{current}]{337pt}{545pt}
  \setlength{\marginparsep}{7.4cm}
  \setlength{\marginparsep}{0.87em}
}
\end{verbatim}

Provide the package style. We start by loading the \texttt{scrlayer-scrpage} package with the appropriate options and set some basic properties.
\begin{verbatim}
\PassOptionsToPackage{automark}{scrlayer-scrpage}
\RequirePackage{scrlayer-scrpage}
\clearpairofpagestyles
\setkomafont{pagefoot}{\normalfont\sffamily}
\end{verbatim}

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 \texttt{pagestyle} set to \texttt{empty}, i.e., a page where a new chapter starts, and afterwards the style of a regular right-hand side page.
\begin{verbatim}
\rofoot{%
\group_begin: \ \group_end:
\footnotesize
\hspace*{\l__slcd_headmarkspace_dim}%
\group_begin:
  \color{UPSE2-Blue}%
  \rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}%
\group_end:
\hspace*{\l__slcd_rulespace_dim}%
\begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}%
\normalsize\textbf{\pagemark}%
\end{minipage}%
\end{verbatim}
Similarly, we define the footer for even pages, which will appear on the left side of the page’s footer.

\edef\lefoot{
\null\hspace{\l__slcd_marginspace_dim}\
\footnotesize\
\begin{minipage}[b]{\l__slcd_pagemark_minipage_dim}\
\raggedleft\normalsize\textbf{\pagemark}\
\end{minipage}\
\footnotesize\
\hspace{\l__slcd_rulespace_dim}\
\group_begin: \color{UPSE2-Blue}\headmark\
\group_end: \\
\hspace{\l__slcd_rulespace_dim}\
\rule[\l__slcd_ruleraise_dim]{\l__slcd_rulewidth_dim}{\l__slcd_rulethickness_dim}\
\group_end: \\
}\}

Finally, set the page style.
\pagestyle{scrheadings}
2.6 The title page

We start out by adjusting some KOMA-Script fonts.

```latex
\setkomafont{title}{\Huge}
\setkomafont{subtitle}{\Large}
\setkomafont{subject}{\normalsize}
\setkomafont{author}{\large}
\setkomafont{date}{\normalsize}
\setkomafont{publishers}{\normalsize}
```

Allow for automated splitting of author’s names.

```latex
\author
\@author
```

```latex
\seq_new:N \l__slcd_author_seq
\renewcommand*{\author}[2]{\if\empty{\l__slcd_signature_tl}{#2}{#1}}
\renewcommand*{\@author}{\group_begin:
  \hyphenpenalty=100000
  \seq_use:Nnnn \l__slcd_author_seq {~\&~} {,~} {~\GetTranslation{and}~}
\group_end:}
```

(End definition for \author and \@author. These variables are documented on page 6.)

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

```latex
\DeclareNewLayer[mode=picture, foreground, align=tr, hoffset=\oddsidemargin+1.5in+\textwidth, voffset=\coverpagetopmargin+1.5in+\ht\strutbox, width=\textwidth-\box_wd:N \l__slcd_logo_box, height=\box_h:N \l__slcd_logo_box, contents={\putUL{\box_use:N \l__slcd_logo_box}}]
```

```latex
\DeclareNewPageStyleByLayers{title.seii}{title.seii.logo}
```

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

```latex
\renewcommand*{\maketitle}[1][1]{
  \begin{titlepage}
  \setcounter{page}{#1}
  \def\thefootnote{\fnsymbol{footnote}}
  \edef\titlepage@restore{%
    \noexpand\endgroup
    \noexpand\global\noexpand\@colht\the\@colht
    \noexpand\global\noexpand\@colroom\the\@colroom
    \noexpand\global\noexpand\vsize\the\vsize
    \noexpand\global\noexpand\the\vsize
    \noexpand\global\noexpand\titlepageiscoverpagefalse
    \noexpand\let\noexpand\titlepage@restore\noexpand\relax
  }%
  \end{titlepage}
```

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

\box_if_exist:NF \l__slcd_title_box
\box_new:N \l__slcd_title_box

(End definition for \l__slcd_title_box.)

Redeclare the \@maketitle macro.

\renewcommand*{\@maketitle}{%
Load the `ifthen` package.

\RequirePackage{ifthen}

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

\exp_args:NV
\begin{center}
\tl_if_eq:NnTF \l__slcd_thesis_type_tl { phd } { phd }
{ \Dissertation- zur- Erlangung- des- Doktorgrades\
der- Naturwissenschaften- (Dr.,rer.,nat.)/\
eingereicht- an- der- Fakultät- für- Informatik- und- Mathematik\
der- Universität- Passau\
\rule{\textwidth}{.1pt}\
Dissertation- submitted- to\
the- Faculty- of- Computer- Science- and- Mathematics\
of- the- University- of- Passau\
in- partial- fulfillment- of- obtaining\
the- degree- of- a- Doctor- of- Natural- Sciences }
{ \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor } { bachelor }
 { \GetTranslation{Bachelor-thesis} }
 \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelorproposal }
Finally, generate a table with information about supervisors, advisors, etc.

\begin{center}
\begin{tabular}{@{} l @{\quad} l}
\tl_if_empty:NF \l__slcd_matrnumber_tl
{\GetTranslation{Matrnumber} & \l__slcd_matrnumber_tl \\\n}
\tl_if_empty:NF \l__slcd_supervisor_tl
{\GetTranslation{Supervisor} & \l__slcd_supervisor_tl \\\n}
\tl_if_empty:NF \l__slcd_cosupervisor_tl
{\GetTranslation{Co-supervisor} & \l__slcd_cosupervisor_tl \\\n}
\tl_if_empty:NF \l__slcd_advisor_tl
{\GetTranslation{Advisor} & \l__slcd_advisor_tl \\\n}
\tl_if_empty:NF \l__slcd_coadvisor_tl
{\GetTranslation{Co-advisor} & \l__slcd_coadvisor_tl \\\n}
\tl_if_empty:NF \l__slcd_external_tl
{\GetTranslation{External} & \l__slcd_external_tl \\\n}
\end{tabular}
\end{center}

Last, print the date or the version.
\texttt{\group_begin:}
\usekomafont{date}
\centering
\tl_if_empty:NTF \l__slcd_version_tl
{\@date}
{\GetTranslation{version-of-date}}

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\par\smallskip
\group_end:
}
\@lowertitleback

Afterwards, override the definition of \@lowertitleback.
\renewcommand*{\@lowertitleback}{% 
\group_begin:
  \noindent\textbf{\@author}:\\
  \emph{\@title}\\
  \tl_if_eq:NnT \l__slcd_thesis_type_tl { bachelor } 
  { \GetTranslation{Bachelor-thesis},~ } 
  \tl_if_eq:NnT \l__slcd_thesis_type_tl { master } 
  { \GetTranslation{Master-thesis},~ } 
  \tl_if_eq:NnT \l__slcd_thesis_type_tl { phd } 
  { \GetTranslation{PhD},~ } 
  \GetTranslation{up},~\the\year. 
\group_end:
}

(End definition for \@lowertitleback. This variable is documented on page 6.)

2.7 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
\providecommand{\abstract}{}

(End definition for \abstract. This function is documented on page 9.)

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.
\renewDocumentEnvironment { abstract } { o }

{ 
\group_begin: 
  \IfNoValueF {#1} { \selectlanguage{#1} } 
  \scr@ifundefinedorrelax{chapter}{\Iftocfeature{toc}{leveldown}} 
  {\section*} 
)(\section*)
\{ 
  \GetTranslation{Abstract} 
)} 
\group_end:
2.8 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.

\textbf{acknowledgements} (env.) Use to typeset the acknowledgements for the thesis.

\begin{verbatim}
\NewDocumentEnvironment { acknowledgements } { o }{
\group_begin:
\IfNoValueF {#1} { \selectlanguage{#1} }
\IfNotFeature{toc}{leveldown} {
\subsection*}
\section*}
\IfFeature{toc}{leveldown} {
\section*}
\GetTranslation{Acknowledgements} }
{
\group_end:
\end{verbatim}

2.9 Document structuring macros

Ensure that these macros are defined.

\textbf{\frontmatter} Starts the frontmatter. Most notably, set the page numbers to roman.

\begin{verbatim}
\providecommand*{\frontmatter}{
\if@twoside\cleardoublepage\else\clearpage\fi
@mainmatterfalse
\pagenumbering { roman }
}
(End definition for \frontmatter. This function is documented on page 10.)
\end{verbatim}

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

\begin{verbatim}
\providecommand*{\mainmatter}{
\if@twoside\cleardoublepage\else\clearpage\fi
@mainmattertrue
\pagenumbering { arabic }
}
\providecommand*{\backmatter}{
\if@twoside\cleardoublepage\else\clearpage\fi
@mainmatterfalse
}
(End definition for \mainmatter and \backmatter. These functions are documented on page 10.)
\end{verbatim}
2.10 Declaration of authorship

\begin{VerbatimBox}[commandchars=\{}\end{VerbatimBox}

\NewDocumentCommand \authorshipDeclaration { o } {
\par \group_begin: \selectlanguage{ngerman} \IfNoValueF {#1} { \tl_gset:Nn \l__slcd_location_tl {#1} } \tl_if_empty:NT \l__slcd_location_tl {
\msg_new:nnn { seiithesis } { no-location-specified } {
You need to specify a location for the authorship declaration.
Either via the \texttt{location} macro or via the optional argument of
the \texttt{authorshipDeclaration} macro. \}
\msg_warning:nn { seiithesis } { no-location-specified }
} \scr@ifundefinedorrelax{chapter}{\IfOptFeature{toc}{leveldown}{\subsection*}{\section*}}{\IfOptFeature{toc}{leveldown}{\section*}{\chapter*}} \l__slcd_location_tl, \l__slcd_signature_tl, \begin{enumerate}
\item dass ich die vorliegende Arbeit selbstständig und ohne
unzulässige Hilfe verfasst und keine anderen als die
angegebenen Quellen und Hilfsmittel benutzt, sowie die
wörtlich und sinngemäß übernommenen Passagen aus anderen
Werken kenntlich gemacht habe.
\item Außerdem erkläre ich, dass ich der Universität ein
einfaches Nutzungsrecht zum Zwecke der Überprüfung mittels
einer Plagiatssoftware in anonymisierter Form einräume.
\end{enumerate}\par \noindent \l__slcd_location_tl, \@date\hfill \signatureBox{\l__slcd_signature_tl}\group_end: \strut\cleardoublepage
}

(End definition for \texttt{authorshipDeclaration}. This function is documented on page 10.)

\signatureBox Provide a box for the signature.
2.11 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.

\RequirePackage{ntheorem}
\theoremseparator{:}
resq (env.) We can then define the resq and hyp environments using the \newtheorem macro from ntheorem.
\newtheorem{resq}{Research\ Question}
\newtheorem{hyp}{Hypothesis}

For the summary boxes, we utilise the tcolorbox package. We start with loading this package.
\RequirePackage{tcolorbox}

summary (env.) The summary environment expects a label and has the summary text in its content.
\NewDocumentEnvironment { summary } { m } { \begin{tcolorbox}[title=Summary\ (#1)] } { \end{tcolorbox} }

3 Translations for se2thesis

3.1 English Translations

We provide the following English translations.
\ProvideDictionaryFor{English}{se2translations}[2022/11/22]
\ProvideDictTranslation{abstract}{abstract}
\ProvideDictTranslation{Abstract}{Abstract}
\ProvideDictTranslation{acknowledgement}{acknowledgement}
\ProvideDictTranslation{Acknowledgement}{Acknowledgement}
\ProvideDictTranslation{acknowledgements}{acknowledgements}
\ProvideDictTranslation{Acknowledgements}{Acknowledgements}
\ProvideDictTranslation{advisor}{advisor}
3.2 German Translations

We provide the following German translations.

We provide the following German translations.
4 The `se2colors` implementation

Start the DocStrip guards.

Identify the internal prefix (LATEX3 DocStrip convention): only internal material in this submodule should be used directly.

Identify the package and give the overall version information.

A colour support package for the se2thesis bundle

4.1 Load-time options

Holds the colour mode selected by the user as a package load-time option.
4.2 Option handling

\IfFormatAtLeastTF { 2022-06-01 } {
  \ProcessKeyOptions [ seiicolors ]
} {
  \RequirePackage { l3keys2e }
  \ProcessKeysOptions { seiicolors }
}

4.3 Colour definitions

Load the xcolor package for colour definitions.
\RequirePackage{xcolor}

Define the primary colours gray and orange as given by the University of Passau’s style guides.
\definecolorset [named] {RGB/cmyk}{UPSE2-} {} {
  Orange,242,148,0/0.00,0.44,0.95,0.01;%
  Gray,153,159,158/0.40,0.28,0.28,0.00;%
  JUR,229,49,56/0.01,0.90,0.81,0.01;%
  WIWI,0,96,57/0.87,0.20,0.87,0.36;%
  PHIL,188,42,51/0.06,0.93,0.81,0.11;%
  FIM,0,90,161/0.93,0.63,0.01,0.02;%
  DarkGray,77,77,77/0.74,0.67,0.62,0.18;%
  White,255,255,255/0.00,0.00,0.00,0.00;%
  MediumGray,127,127,127/0.52,0.43,0.40,0.02;%
  LightGray,229,229,229/0.08,0.06,0.04,0.00;%
  LightRed,229,49,56/0.01,0.90,0.81,0.01;%
  DarkRed,188,42,51/0.06,0.93,0.80,0.11;%
  Green,0,96,57/0.87,0.20,0.86,0.35;%
  Blue,0,90,161/0.93,0.63,0.01,0.02;%
  AccentGray,153,159,158/0.40,0.28,0.28,0.00;%
}

Define the derived colours.
\colorlet{UPSE2-DarkGray1}{UPSE2-DarkGray!20!white}
\colorlet{UPSE2-DarkGray2}{UPSE2-DarkGray!40!white}
\colorlet{UPSE2-DarkGray3}{UPSE2-DarkGray!60!white}
\colorlet{UPSE2-DarkGray4}{UPSE2-DarkGray!75!black}
\colorlet{UPSE2-DarkGray5}{UPSE2-DarkGray!50!black}
\colorlet{UPSE2-White1}{UPSE2-White!95!black}
\colorlet{UPSE2-White2}{UPSE2-White!85!black}
\colorlet{UPSE2-White3}{UPSE2-White!75!black}
\colorlet{UPSE2-White4}{UPSE2-White!65!black}
5 The se2fonts implementation

Start the DocStrip guards.

Identify the internal prefix (\LaTeX DocStrip convention): only internal material in this submodule should be used directly.
Identify the package and give the overall version information.

\ProvidesExplPackage {se2fonts} {2022-11-22} {1.3.1}

{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.

\keys_define:nn { seiifonts }

{ fmode .choice:, fmode / original .code:n = {
  \tl_gset:Nn \l__slcd_fonts_fontmode_tl {original}
}, fmode / replacement .code:n = {
  \tl_gset:Nn \l__slcd_fonts_fontmode_tl {replacement}
}, fmode / auto .code:n = {
  \tl_gset:Nn \l__slcd_fonts_fontmode_tl {auto}
}, original .meta:n = {fmode=original}, replacement .meta:n = {fmode=replacement}, auto .meta:n = {fmode=auto},
}
\keys_set:nn { seiifonts } { fmode = auto }

(End definition for \l__slcd_fonts_fontmode_tl.)

5.2 Option handling

\IfFormatAtLeastTF { 2022-06-01 }
{ \ProcessKeyOptions [ seiifonts ] }
{ \RequirePackage{ l3keys2e }
  \ProcessKeysOptions { seiifonts } }
}

5.3 Helper macros

\pdftexengine \xetexengine \luatexengine

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

\cs_new_eq:NN \pdftexengine \sys_if_engine_pdftex_p:
\cs_new_eq:NN \xetexengine \sys_if_engine_xetex_p:
\cs_new_eq:NN \luatexengine \sys_if_engine_luatex_p:

(End definition for \pdftexengine, \xetexengine, and \luatexengine. These functions are documented on page 13.)

\ifengineTF \ifengineT \ifengineF

True, if the engine used matches the given first argument.

\NewExpandableDocumentCommand \ifengineTF { mmm }
{ \bool_if:nTF { #1 } { #2 } { #3 }
}
\NewExpandableDocumentCommand \ifengineT { mm }
{ \bool_if:nT { #1 } { #2 } }
\NewExpandableDocumentCommand \ifengineF { mm }
{ \bool_if:nF { #1 } { #2 } }

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\NewExpandableDocumentCommand \ifengineF { mm } { \bool_if:nF { #1 } { #2 } }

(End definition for \ifengineTF, \ifengineT, and \ifengineF. These functions are documented on page 13.)

The package is not tested with Xe\TeX, thus we provide an error to the user and stop the execution, when they want to use the package with Xe\TeX.

\ifengineT { \xetexengine }

\msg_set:nnnn { seiifonts } { xetex-not-supported } { Xe\TeX\ is\ not\ supported\ by\ the\ se2fonts\ package. } { Switch\ to\ pdf\TeX\ or\ (preferably)\ Lua\TeX. }

\msg_error:nn { seiifonts } { xetex-not-supported }

5.4 Font loading

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

\ifengineTF { \luatexengine }

If the user uses Lua\TeX, load fontspec and unicode-math.

\RequirePackage{fontspec}
\RequirePackage{unicode-math}

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

\defaultfontfeatures{ Scale = MatchLowercase }
\defaultfontfeatures{\rmfamily}{ Scale = 1 }

The user wants to have the original fonts, which are Palatino, Helvetica, MesloLGS Nerd Font Mono, and Neo Euler.

\tl_if_eq:NnT \l__slcd_fonts_fontmode_tl {original}
{ \setmainfont{Palatino} \setsansfont{Helvetica} \setmonofont{MesloLGS Nerd Font Mono} \setmathfont{Neo Euler}\math-style=upright }

The user wants to have the replacement fonts, which are \TeX Gyre Pagella, \TeX Gyre Heros, Fira Code, and \TeX Gyre Pagella Math.

\tl_if_eq:NnT \l__slcd_fonts_fontmode_tl {replacement}
{ \setmainfont{\TeX Gyre Pagella} \setsansfont{\TeX Gyre Heros} \setmonofont{Fira Code} \setmathfont{\TeX Gyre Pagella Math}\range={\mathcal,\mathbb} }

The user set the \texttt{auto} mode, which causes the package to check whether a font from the original fonts exists on the system. If such a font exists, it will be used; otherwise, a replacement font will be used.

\begin{verbatim}
\tl_if_eq:NnT \l__slcd_fonts_fontmode_tl {auto}
  \{
    \IfFontExistsTF { Palatino }
    { \setmainfont{Palatino} }
    \IfFontExistsTF { \TeX Gyre Pagella } 
    { \setmainfont{\TeX Gyre Pagella} }
    \IfFontExistsTF { Helvetica }
    { \setsansfont{Helvetica} }
    \IfFontExistsTF { TeX Gyre Heros } 
    { \setsansfont{TeX Gyre Heros} }
    \IfFontExistsTF{ MesloLGS Nerd Font Mono }
    { \setmonofont{MesloLGS Nerd Font Mono} }
    \IfFontExistsTF{ Fira Code }
    { \setmonofont{Fira Code} }
    \IfFontExistsTF { Neo Euler }
    { \setmathfont{Neo Euler}[math-style=upright] }
    { \setmathfont{\TeX Gyre Pagella Math} }
    \setmathfont{Latin Modern Math}[range={\mathcal,\mathbb}]
  \}
\}
\end{verbatim}

The user does neither use \LaTeX, fall back

\begin{verbatim}
\PassOptionsToPackage{T1}{fontenc}
\RequirePackage{fontenc}
\RequirePackage{FiraMono}
\RequirePackage{tgheros}
\RequirePackage{tgpagella}
\end{verbatim}

\section*{fonts}
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