The Senior Paper Class

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1 Introduction

This document describes the class file for the senior papers in Computer Science at Pomona College. It is intended as a guide to the options and restrictions of the style. Most of the basic information can be found in the file srpaper-sample.tex.

2 The Underlying Class

Our format is based upon the \LaTeX report class.
\begin{verbatim}
\LoadClass[11pt,oneside,openright,onecolumn]{report}
\end{verbatim}

3 Error Messages

We define a generic error message for the class.
\begin{verbatim}
\local@classerror
\newcommand{\local@classerror}[1]{\ClassError\classname{#1}\@ehc}
\end{verbatim}

4 Options

There are twelve options.

\texttt{finalcopy} and \texttt{draftcopy} control the pagination. With the \texttt{finalcopy} option, the text is single spaced with each section starting on a right-hand page. The \texttt{draftcopy} option avoids blank pages by not skipping left-hand pages and puts a heading “Draft of \texttt{(date and time)}” at the top of each page. The default is \texttt{finalcopy}.

\texttt{short} is used for short papers and fragments. Use it, for example, when you are asked to submit “one chapter” of your paper. It omits most of the front matter, provides a simple title, and does not start a chapter on a new page.
singlespace, onehalfspace, and doublespace control the inter-line spacing. As the names indicate, onehalfspace and doublespace increase the vertical distance between lines of text. The front matter is always single-spaced. The onehalfspace and doublespace options also make the side margins smaller—and the lines correspondingly wider. The default in draftcopy is doublespace. In finalcopy, it is singlespace.

lof and nolof determine the presence of a list of figures. These options are ignored in the presence of short. The default is lof.

lot and nolot determine the presence of a list of tables. These options are ignored in the presence of short. The default is lot.

cm and mathtime are the font options. The cm option gives the standard Computer Modern fonts for \LaTeX. The mathtime option gives Times Roman text with matching math fonts. Special files are required for mathtime. Only one of the two options may be used. The default is cm.

The paper submitted to the department must be created with the finalcopy option. With a bit of regret, we have chosen the option names draftcopy and finalcopy. We would have preferred the simpler names draft and final, but they conflict with options in some of the packages that may be used. For example, draft in the listings package suppresses output of the listings—clearly undesirable for our purposes. \LaTeX makes it difficult to stop the propagation of options to packages, so we simply use different names.

\begin{verbatim}
3 \DeclareOption{finalcopy}{\@draftfalse
4 \let\@drafttrue\incompat@mode}
5 \DeclareOption{draftcopy}{\@drafttrue
6 \let\@draftfalse\incompat@mode}
7 \DeclareOption{short}{\@shorttrue
8 \let\@shortfalse\incompat@short}
9 \DeclareOption{singlespace}{\@select@spacing{singlespacing}}
10 \DeclareOption{onehalfspace}{\@select@spacing{onehalfspacing}}
11 \DeclareOption{doublespace}{\@select@spacing{doublespacing}}
12 \DeclareOption{lof}{\@loftrue
13 \let\@loffalse\incompat@lof}
14 \DeclareOption{nolof}{\@loffalse
15 \let\@lofrue\incompat@lof}
16 \DeclareOption{lot}{\@lottrue
17 \let\@lotfalse\incompat@lot}
18 \DeclareOption{nolot}{\@lotfalse
19 \let\@lotrue\incompat@lot}
20 \DeclareOption{cm}{\@select@font{}}
21 \DeclareOption{mathtime}{\@select@font{mathtime}}
\end{verbatim}

Four global boolean values and two strings control the optional behavior and the defaults, which are finalcopy, singlespace, lof, lot, and cm.

\begin{verbatim}
21 \newif\if@draft \@draftfalse
22 \newif\if@short \@shortfalse
\end{verbatim}
We want users to declare the options to packages directly, so we complain if an unknown option appears.

\DeclareOption*{\local@classerror{Unknown option \CurrentOption}}

Incompatible options are announced by error messages.

\incompatible@options

Incompatible options are announced by error messages.

\incompatible@options{\local@classerror{Incompatible options: #1}}
\incompat@mode{\incompatible@options{finalcopy and draftcopy}}
\incompat@spacing{\incompatible@options{singlespace, onehalfspace, and doublespace}}
\incompat@lof{\incompatible@options{lof and nolof}}
\incompat@lot{\incompatible@options{lot and nolot}}
\incompat@font{\incompatible@options{cm and mathtime}}

It is safe at this point to process the options.

\ProcessOptions

We set the font and the default line spacing now; we will use the boolean values later. The actual line spacing code is in Section 8.4.

\ifx \@selectedfont\@empty \relax
\else
\RequirePackage{\@selectedfont}
\fi
\ifx \@selectedspacing\@empty
\if@draft
\def\@selectedspacing{doublespacing}
\else
\def\@selectedspacing{singlespacing}
\fi
\fi

It is handy to have a function to execute commands only in the finalcopy, non-short cases.

\newcommand{\@if@finalns}[1]{\if@draft\else\if@short\else#1\fi\fi}

5 Packages

We keep the number of required packages to a minimum. We need \alltt, \ifthen, and \verbatim. It is likely that students will need \graphicx, \url, and perhaps
listings. We do not load them automatically because we want the student to be able to choose the options.

The packages that we load do not, fortunately, have any options.

\RequirePackage{alltt}
\RequirePackage{ifthen}
\RequirePackage{verbatim}

The draftcopy and wide line spacing options cause \texttt{setspace} to be loaded, in Section 8.4 below.

\section{Special Words and Text}

We declare the names for parts of the paper: abstract, acknowledgments, preface, references, and so on. These declarations are handy in case the names ever have to change.

As stated in the headings to the files, the language in the copyright paragraph is from \texttt{hmcthesis.cls} by Claire Connolly and Melissa O’Neill. That work, like this one, is protected by the GNU General Public License. See Section 11.

\begin{verbatim}
\abstractname \def\abstractname{Abstract}
\acknowledgmentname \def\acknowledgmentname{Acknowledgments}
\prefacename \def\prefacename{Preface}
\institutionname \def\institutionname{Pomona College}
\subjectname \def\subjectname{Computer Science}
\departmentname \def\departmentname{Department of \subjectname}
\submissiontext \def\submissiontext{Submitted as part of the senior exercise for the degree of\ Bachelor of Arts in \subjectname}
\copyrighttext \def\copyrighttext{The author grants Pomona College the nonexclusive right to make this work available for noncommercial, educational purposes, provided that this copyright statement appears on the reproduced materials and notice is given that the copying is by permission of the author. To disseminate otherwise or to republish requires written permission from the author.}
\end{verbatim}

The text of the copyright notice is adapted from the senior thesis class for Computer Science and Mathematics at Harvey Mudd College.

In addition to the foregoing, we use the \LaTeX\ names \texttt{contentsname}, \texttt{listfigurename}, \texttt{listtablename}, and \texttt{bibname}.

\section{Front Matter}

The front matter was generated automatically in Version 1.00. That caused problems with other packages, whose \texttt{AtBeginDocument} code was executed after some of the document. We now require an explicit call to \texttt{frontmatter}, just like \texttt{maketitle} in other classes.
For the non-short option, the front matter consists of a title page, an abstract, acknowledgments, a table of contents, a list of figures, and a list of tables. The title page, abstract, and contents are required; the others are optional. We consider these components first; the different format for short is constructed later.

7.1 Front Matter Data

The author specifies the information for the title page in the preamble. The already-existing \LaTeX{} commands \texttt{\title}, \texttt{\author}, and \texttt{\date} are used. This style introduces four new commands: \texttt{\advisor}, \texttt{\abstract}, and \texttt{\acknowledgment}. They work similarly to the older commands.

The argument to the \texttt{\advisor} command must end with “advisor” or “advisors,” as appropriate.

```
\newcommand{\advisor}[1]{\gdef{\@advisor}{#1}}
\long\def{\abstract}{\gdef{\@abstract}{#1}}
\long\def{\acknowledgment}{\gdef{\@acknowledgment}{#1}}
```

Three global values hold the advisor, abstract, and acknowledgment.

\@advisor
\@abstract
\@acknowledgment

Three other, already-existing global values hold the title, author, and date.

\@title
\@author
\@date

7.2 Front Matter Checking

It is always an error not to specify the title, author, and date. For the finalcopy version, it is an error to not specify an advisor or an abstract.

```
def{\frontmattercheck}{% 
\ifx {\title}@empty \local@classerror{No title specified} \fi 
\ifx {\author}@empty \local@classerror{No author specified} \fi 
\ifx {\date}@empty \local@classerror{No date specified} \fi 
\ifx {\advisor}@empty \local@classerror{No advisor specified} \fi 
\ifx {\abstract}@empty \local@classerror{No abstract specified} \fi}
```

7.3 Title Page Layout

We modify the layout of the title page, adding some material and putting it on a separate page.

```
\renewcommand{\maketitle}{% 
\begin{titlepage} 
\begin{center} 
\institutionname\n

5
```
7.4 Copyright Page

The copyright notice contains a year of publication. We make the courageous assumption that the publication occurs in the same year as the date on the title page, and that the date is of the form “Month dd, yyyy.”

7.5 Abstract and Acknowledgments

The abstract and acknowledgments are created with the \@frontsection command. The heading is centered over a paragraph that is 80 percent the width of a normal page.
7.6 Contents Lists

The table of contents, the list of figures, and the list of tables are all constructed in the same way. They look like ordinary chapters, but appear in the table of contents as sections. There is a special check to avoid a self-referential entry for the table of contents itself.

\@frontlist

7.7 Generating the Front Matter

The front matter is created with the command \frontmatter, which simply calls the previously-described macros in the right order. With the finalcopy option, it is an error to have an empty abstract.

The command \frontmatter also sets the hook to change the page numbering to arabic at the first (real) chapter, restores the spacing and margins, and recycles some of the space used by definitions.
7.8 Front Matter for short

We do little more than copy the form for a title heading from the report class.

7.9 Cleaning Up

After the front matter has been typeset, we discard all the data that will not be used again.
\section{Appearance}

\subsection{Fonts}

We try to keep the fonts standard. The one concession is to modify \texttt{\bfseries} so that it makes mathematical expressions bold. That way, math in a section title is bold (if the current math fonts permit) but the same content in the table of contents is not bold.

\begin{verbatim}
\bfseries \DeclareRobustCommand\bfseries
{\not@math@alphabet\bfseries\mathbf
\fontseries\bfdefault\selectfont\boldmath}
\end{verbatim}

\subsection{Page Styles}

We use the usual \texttt{plain} and \texttt{empty} page styles from \LaTeX. With the \texttt{draftcopy} option, we modify them to have a heading. For each style, we remember the old one and construct the new style around it.

The contents of the heading is saved in \texttt{\draftheader}, so that someone could (if one wished) modify it. It is visible only in \texttt{draftcopy} mode. We would like the time to appear along with the date, so we need to create a string for the time.

\begin{verbatim}
\edef\drafttime{\number\@hours:\two@digits\@minutes
\ifnum\@tempcnta<720 am\else pm\fi}
\def\draftheader{Draft of \today, at \drafttime}
\end{verbatim}

\begin{verbatim}
\if@draft
\newcount\@hours
\newcount\@minutes
\@tempcnta \time
\@hours\@tempcnta
\divide\@hours 60
\@minutes -\@hours
\multiply\@minutes 60
\advance\@minutes 60
\edef\drafttime{\number\@hours:\two@digits\@minutes}
\ifnum\@tempcnta<720 am\else pm\fi
\edef\draftheader{Draft of \today, at \drafttime}
\let\ps@empty@saved\ps@empty
\def\ps@empty{%
\ps@empty@saved
\end{verbatim}
8.3 Margins

For double and one-and-a-half spacing, we narrow the margins and widen the text. The front matter is single-spaced, so we create macros for adjusting the margins after the front matter is completed. The margin-changing commands force a pagebreak.

\newenvironment{normalmargins}
{\let\@normalmargins\relax}
{\newcommand{\@normalmargins}{\@adjustmargins{0pt}}}

\newenvironment{narrowmargins}
{\let\@narrowmargins\relax}
{\newcommand{\@narrowmargins}{\@adjustmargins{-0.5in}}}

8.4 Line Spacing

We start with single spacing and change it, if necessary, at the end of \frontmatter. We have to do a bit of work to avoid double spacing where we do not want it—for example, anywhere in the front matter and in code listings.

The user can use \displayspacing and \restorespacing to alternate between single spaced displays and the default. These commands have no effect when the default is single spacing. Our definition of \displayspacing attempts to adjust the vertical space. The macro \@singlespacing is used internally in the package. We leave the commands and environments of the \setspace package intact.
8.5 Sectioning

\preface We create a chapter-like command for a preface.

\newcommand{\preface}{\chapter*{\prefacename}
\addcontentsline{toc}{chapter}{\prefacename}}

Our style is based on the \LaTeX report document class, but we choose not to use \part.

\renewcommand{\part}{\local@classerror{part is not used in srpaper.}}

The highest division of text is the \chapter. Under the short option, we change the chapter command so that there is no new page. Otherwise, we change the chapter command so that, on the first invocation, it calls \@chapter@one@hook. In the non-short front matter, that command is defined to change the page numbering from roman to arabic numerals.

\if@short
\renewcommand{\chapter}{\@startsection{chapter}{0}{-5ex \plus -1ex \minus -.2ex}{3ex \plus .2ex}{\normalfont \LARGE \bfseries}}
\else
\let\@chapter@saved\@chapter
\let\@chapter@one@hook\relax
\def\@chapter[#1]{\@chapter@one@hook\@chapter@saved[#1]{#2}}
\fi

The wider line spacing throws off the vertical space in the chapter and section headings, so we have to require single-spacing when setting them.

\let\saved@makechapterhead\@makechapterhead
\renewcommand{\@makechapterhead}[1]{%
This author’s personal preference is for indentation in the paragraph immediately following a section heading. The Computer Science faculty decided to retain the default \LaTeX convention of omitting the indentation. The following redefinition of \startsection does not appear in the class; it is preserved here for documentation.

\let\@startsection@saved\@startsection
\renewcommand{\@startsection}[4]{% 
  \@tempskipa #4\relax 
  \ifdim \@tempskipa <\z@ \@tempskipa -\@tempskipa \fi 
  \@startsection@saved{#1}{#2}{#3}{\@tempskipa}}

8.6 Two-sided Formatting

We really want two-sided printing, but we don’t like the different left and right margins. When we load the underlying report class, we give the options onecolumn, to get the proper margins, and texttopenright, to start chapters on the right hand pages. The only thing left is to redefine \cleardoublepage to work properly in one-sided mode.

\cleardoublepage
\renewcommand{\cleardoublepage}{% 
  \clearpage 
  \@if@finalns{\ifodd\c@page\else\strut\newpage\fi}}

8.7 Contents Style

Only chapters and sections go into the table of contents.

\setcounter{tocdepth}{1}

8.8 Bibliography Style

Normally, we use the standard \LaTeX \bibliography for the references section, with the alpha bibliography style. (Another bibliography style can be used by changing \thebibstyle.) We want a table of contents entry for the
bibliography, so we modify an existing command. It is hard to get into the workings of the `thebibliography` environment, so we (locally) redefine the call `\chapter*{\bibname}`. We also set the bibliography with single spacing, regardless of the convention for the rest of the document.

\begin{verbatim}
\def\thebibstyle{alpha}
\let\biblio@saved\bibliography
\renewcommand{\bibliography}[1]{%
  \bibliographystyle{\thebibstyle}
  \begingroup
  \displayspacing
  \let\bibchapter@saved\chapter
  \def\chapter##1##2{%
    \bibchapter@saved##1{##2}\
    \addcontentsline{toc}{chapter}{##2}
  }
  \biblio@saved{#1}
  \clearpage
  \endgroup}
\end{verbatim}

Everything changes for an annotated bibliography. We use the `annotate bibliography` style, which adds a field named `annotate`, and omit any chapter heading. We also add more vertical space before the bibliography and between the bibliography items. The line spacing is inherited from the surrounding environments.

The `annotate bibliography` style uses the `quotation` environment. We modify it to reduce the indentation and the leading vertical space. Additionally, we save the surrounding penalties so that the annotations are typeset with the ordinary spacing—not the “block style” of a bibliography.

At one’s own risk, the bibliography style can be changed by redefining `\theannbibstyle`.

\begin{verbatim}
\def\theannbibstyle{annotate}
\newcount\clubpenalty@saved
\newcount\widowpenalty@saved
\newcount\sfperiod@saved
\newcommand{\annotatedbibliography}[1]{%
  \bibliographystyle{\theannbibstyle}
  \begingroup
    \let\@listi@saved\@listi
    \def\@listi{\@listi@saved\
      \addtolength{\itemsep}{0.5\topsep}\
      \addtolength{\topsep}{0.5\topsep}}
    \clubpenalty@saved \clubpenalty
    \widowpenalty@saved \widowpenalty
    \sfperiod@saved \sfcode`.\n    \renewenvironment{quotation}{\par
      \clubpenalty \clubpenalty@saved
      \widowpenalty \widowpenalty@saved
      \sfcode`. \sfperiod@saved}\
  \def\@listi{\@listi@saved}\
  \addtolength{\itemsep}{0.5\topsep}\
  \addtolength{\topsep}{0.5\topsep}
  \clubpenalty@saved \clubpenalty
  \widowpenalty@saved \widowpenalty
  \sfperiod@saved \sfcode`
  \renewenvironment{quotation}{\par
  \def\chapter##1##2{%
  \biblio@saved{#1}
  \endgroup}
\end{verbatim}
9 Utility Environments

Often, we want a block indented. Here is an environment that simply indents from the left by the amount usual for \texttt{itemize} and similar environments. The \texttt{indented} environment does the trick.

\begin{verbatim}
\newenvironment{indented}{\list{}{}\item}{\endlist}
\end{verbatim}

When double spacing, one sometimes wants to display a single-spaced block. We try to do that with the \texttt{indented*} environment. The vertical space before or after a block may not be correct, however. If single-spacing is in effect, \texttt{indented*} is identical to \texttt{indented}.

\begin{verbatim}
\newenvironment{indented*}{\list{}{}\item\displayspacing}{\endlist}
\end{verbatim}

We create a \texttt{code} environment that is used inside our sample document. It is an \texttt{alltt} environment nested inside an \texttt{indented*} environment.

\begin{verbatim}
\newenvironment{code}{\begin{indented*}\begin{alltt}}{\end{alltt}\end{indented*}}
\end{verbatim}

Using the \texttt{verbatim} package, we can place a \texttt{verbatim} environment inside \texttt{indented*}. Because \texttt{verbatim} is so delicate, we have to do it directly.

\begin{verbatim}
\newenvironment{vcode}{\csname indented*\endcsname\verbatim}{\endverbatim\csname endindented*\endcsname}
\end{verbatim}

10 Local Configuration

We provide an option for simple changes. For example, to produce a paper for another institution or department, one could just have a one-line file named \texttt{srpaper.cfg} whose contents is one of the following.

\begin{verbatim}
\renewcommand{\institutionname}{Scripps College}\renewcommand{\subjectname}{Mathematics}
\end{verbatim}

11 License

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