

# L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Document Styles for the University of Southampton File version v2.2, dated 2019/03/12

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## 1 Quickstart

This guide assumes you have installed MiKTeX or TeX live distributions. It also requires having the program “make” for producing the templates again.

The folder labelled tex-mf should be installed in your local tex files source or whatever your tex distro uses.

The Templates have been built for the Department of Electronics and Computer Science in the Faculty of Engineering and Physical Science at the University of Southampton.

The basic settings for University, Faculty and School are explained in Section 6

If a user only wishes to change the file for their thesis it is probably easier to navigate to the class file labeled uosthesis and change the department and faculty naming there. This will be located in the subdirectory where you unzipped the files under tex/latex/uosdocs/

## 2 Description

These L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> document classes are designed to produce thesis, mini-thesis, progress, project, report, GDP report and GDP summary report documents which conformed to the University of Southampton guidelines of April 2001. They were updated in Jan 2019 to conform to changes in those guidelines. Specifically copy-right and authorship declaration changes. They are based on the document class `book`, but modify some of its layout decisions. An article class is also provided which is based on the document class `article`.

## 3 The DOCSTRIP modules

The following modules are used in the implementation to direct DOCSTRIP when generating the external files:

thesis	produce the <code>uosthesis</code> document class
minithesis	produce the <code>uosminithesis</code> document class
progress	produce the <code>uosprogress</code> document class
project	produce the <code>uosproject</code> document class
report	produce the <code>uosreport</code> document class
article	produce the <code>uosarticle</code> document class
gdp	produce the <code>uosgdp</code> document class
gdpsummary	produce the <code>uosgdpsummary</code> document class
testthesis	produce an example thesis
testminithesis	produce an example minithesis
testprogress	produce an example progress
testproject	produce an example project
testreport	produce an example report
testarticle	produce an example article
testgdp	produce an example GDP report
testgdpsummary	produce an example GDP summary report
introduction	produce an example introduction chapter
conclusions	produce an example conclusions chapter
appendix	produce an example appendix chapter
figure	produce an example figure file
definitions	produce an example definitions file
references	produce an example references file
bst	produce a bibliography style file
driver	produce a documentation driver file

## 4 Implementation

The checksum is to determine if there has been a truncation in the file during transmission over a network

The class has a custom option to define what colours should be used for links. This option defines `sotoncolour` to use UoS palette colours. Colour Code taken from <http://edshare.soton.ac.uk/10481>

All options are passed on to the `book` or `article` class.

```
1 <{*thesis | minithesis | progress | project | report | article | gdp | gdpsummary}>
```

```
\baseclass
```

```
2 %% ----- Class/Formating Adjustment -----
3 %% Adjust the book class to match the requirements
4 %% Set spacing, line and paragraph options
5 %% Set LaTeX builder options (work break penalties etc.)
6 <{*thesis | minithesis | progress | project | report | gdp | gdpsummary}>
7 \def\baseclass{book}
8 </thesis | minithesis | progress | project | report | gdp | gdpsummary>
9 <{*article}>
10 \def\baseclass{article}
11 </article>

12 \RequirePackage{xcolor}
13 \colorlet{linkBlue}{blue}
14 \colorlet{custGray}{gray}
15 \colorlet{chapRed}{red}
```

```

16 \DeclareOption{sotoncolour}{
17 \definecolor{sotonMarineBlue}{RGB}{1,67,89} % Soton marine blue (P 7469C)
18 \definecolor{sotonGrey}{RGB}{153,153,166} % Soton grey (P 443C)
19 \definecolor{sotonRed}{RGB}{171,18,16} % Soton Red (P 484C)
20 \colorlet{linkBlue}{sotonMarineBlue}
21 \colorlet{custGray}{sotonGrey}
22 \colorlet{chapRed}{sotonRed}
23 }
24 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{\baseclass}}

```

`\@checkoptions` Before we can process the options we must deal with a small problem. That is, we want to change the default options of the `book` or `article` class to `a4paper` and `11pt` or `12pt` but the macro `\ProcessOptions` used by the `book` or `article` class processes the options in the order specified in the file. Because `a4paper` is the first of the paper sizing options it will be overridden by any user defined option. But the same is not true of the font size option `11pt` or `12pt`. To remedy this we define a macro `\@checkoptions{<default>}{<option-list>}` which checks to see if any options in `<option-list>` have been specified and if not adds `<default>` to the option list.

```

25 \def\@checkoptions#1#2{
26   \edef\@curroptions{\@optionlist{\@currname.\@current}}
27   \@tempwafalse
28   \@tfor\@this:=#2\do{
29     \@expandtwoargs\in@{,\@this,}{,\@curroptions,}
30     \ifin@ \@tempswatruet \break@tfor \fi
31     \let\@this\@empty
32     \if@tempswa \else \PassOptionsToClass{#1}{\baseclass}\fi
33 }

```

With this macro at our disposal we can continue to process the options

```

34 <*thesis | minithesis | progress | report | article | gdp | gdpsummary>
35 \@checkoptions{11pt}{10pt}{11pt}{12pt}
36 </thesis | minithesis | progress | report | article | gdp | gdpsummary>
37 <*project>
38 \@checkoptions{12pt}{10pt}{11pt}{12pt}
39 </project>
40 \PassOptionsToClass{a4paper}{\baseclass}
41 \ProcessOptions\relax

```

and load the `book` or `article` document class with `A4` as the default paper size.

```

42 \LoadClass{\baseclass}

```

## 4.1 Banner

`\bhrule` Provide a function to produce a banner on the output making the location of the current section simpler.

```

43 \newcommand\bhrule{\typeout{-----}}
44 \newcommand\btypeout[1]{\bhrule\typeout{\space #1}\bhrule}

```

## 4.2 Date

`\today` This macro uses the  $\TeX$  primitives `\month`, `\day` and `\year` to provide the date of the  $\LaTeX$ -run in a suitable format.

```
45 <*thesis>
46 \def\today{\ifcase\month\or
47   January\or February\or March\or April\or May\or June\or
48   July\or August\or September\or October\or November\or December\fi
49   \space \number\year}
50 </thesis>
```

## 5 Document Layout

### 5.1 Font

```
51 %% \usepackage[T1]{fontspec}
52 %   Set font for copyright statement body text
53 \usepackage[defaultsans]{droidsans}
54 %   Set a particular style of font for the thesis. A font that has smallcaps
55 \usepackage{mathpazo}
56 %%\usepackage[T1]{fontenc} %This may not be necessary for english only text
```

### 5.2 Spacing

Load the `setspace` package so that spacing can easily be set. The text in all three styles is set to one and a half spacing, paragraphs not indented, and a newline between paragraphs.

```
57 \usepackage{setspace}
58 <thesis | minithesis | progress | project | report | gdp | gdpsummary>\onehalfspacing
59 <article>\singlespacing
60 \setlength{\parindent}{0pt}
61 \setlength{\parskip}{2.0ex plus0.5ex minus0.2ex}
```

### 5.3 Margins

Load the `vmargin` package to setup the page dimensions.

```
62 \usepackage{vmargin}
63 <*thesis | minithesis | progress | project | report | gdp | gdpsummary>
64 \setmarginsrb          { 1.5in} % left margin
65                       { 0.6in} % top margin
66                       { 1.0in} % right margin
67                       { 0.8in} % bottom margin
68                       { 20pt}  % head height
69                       {0.25in} % head sep
70                       { 9pt}   % foot height
71                       { 0.3in} % foot sep
72 </thesis | minithesis | progress | project | report | gdp | gdpsummary>
73 <*article>
74 \setmarginsrb          { 0.8in} % left margin
75                       { 0.6in} % top margin
76                       { 0.8in} % right margin
77                       { 0.8in} % bottom margin
78                       { 20pt}  % head height
```

```

79 {0.25in} % head sep
80 { 9pt} % foot height
81 { 0.3in} % foot sep
82 </article>

```

## 5.4 Breaks

Control how pages and lines are broken.

```

83 \raggedbottom
84 \setlength{\topskip}{1\topskip \@plus 5\p@}
85 \doublehyphendemerits=10000 % No consecutive line hyphens.
86 \brokenpenalty=10000 % No broken words across columns/pages.
87 \widowpenalty=9999 % Almost no widows at bottom of page.
88 \clubpenalty=9999 % Almost no orphans at top of page.
89 \interfootnotelinepenalty=9999 % Almost never break footnotes.

```

## 5.5 Fancy Page Headers

Setup the the default fancy page headers with an underlined header containing chapter, name and page number.

```

90 \usepackage{fancyhdr}
91 % Help from https://texblog.org/2007/11/07/headerfooter-in-latex-with-fancyhdr/#comment-4783
92 \fancyhead[LE]{\textrm\thepage}
93 \fancyhead[LO]{\fancyplain{}{\textsl{\rightmark}}}}
94 \fancyhead[RE]{\fancyplain{}{\textsl{\leftmark}}}}
95 \fancyhead[RO]{\textrm\thepage}
96 \chead{}\lfoot{}\rfoot{}\cfoot{}
97 \pagestyle{fancy}
98 \fancypagestyle{plain}{
99   \fancyhf{}
100   \fancyhead[OR]{\thepage}
101   \renewcommand{\headrulewidth}{0pt}
102 }

```

<pre> \chaptermark \sectionmark \subsectionmark </pre>	<pre> Redefine chaptermark and sectionmark to set up the correct header name and produce a banner on the output making the location of messages simpler. The \btypeout command is for console logging where chapters start \chapapp expands to "Chapter" or "Appendix" </pre>
--	---

```

103 <thesis | minithesis | progress | project | report | gdp>
104 \renewcommand{\chaptermark}[1]{\btypeout{\thechapter.\space #1}\markboth{\chaptername\ \thechapter}{\thepage}}
105 \renewcommand{\sectionmark}[1]{\markright{\thesection.\hspace{1em}#1}}
106 \renewcommand{\subsectionmark}[1]{}
107 </thesis | minithesis | progress | project | report | gdp>
108 <*article>
109 \renewcommand{\sectionmark}[1]{\btypeout{\thesection\hspace{1em}}\markboth{}{\thesection.\hspace{1em}#1}}
110 \renewcommand{\subsectionmark}[1]{}
111 \renewcommand{\subsubsectionmark}[1]{}
112 </article>
113 \gdpsummary\markboth{GDP Summary Report}{GDP Summary Report}

```

<pre> \cleardoublepage </pre>	<pre> Redefine cleardoublepage to remove headers from blank pages in twosided documents. </pre>
-------------------------------	---

```

114 \def\cleardoublepage{\clearpage\if@twoside \ifodd\c@page\else
115 \hbox{}
116 \thispagestyle{empty}
117 \newpage
118 \if@twocolumn\hbox{}\newpage\fi\fi\fi}

```

`\cleartoeven` Define `cleartoeven` to remove headers from blank pages and force to even page for appendix or index.

```

119 \def\cleartoeven{\clearpage\if@twoside \ifodd\c@page
120 \hbox{}
121 \thispagestyle{empty}
122 \newpage
123 \if@twocolumn\hbox{}\newpage\fi\fi\fi}

```

## 5.6 Mathematics

Load the `amsmath` packages, so we can do some serious math, and setup the theorem environments.

```

124 %% ----- Figure/Table/Equation/Listing Styling -----
125 %% Set the styling for non text elements of the document
126 \usepackage{amsmath,amsfonts,amssymb,amscd,amsthm,xspace}
127 \theoremstyle{plain}
128 \newtheorem{example}{Example}[chapter]
129 \newtheorem{theorem}{Theorem}[chapter]
130 \newtheorem{lemma}{Lemma}[chapter]
131 \newtheorem{proposition}{Proposition}[chapter]
132 \newtheorem{axiom}{Axiom}[chapter]
133 \newtheorem{definition}{Definition}[chapter]
134 \newtheorem{remark}{Remark}[chapter]
135 \newtheorem{corollary}{Corollary}[chapter]
136 \newtheorem{lemma}{Lemma}[chapter]
137 \newtheorem{proposition}{Proposition}[chapter]
138 \newtheorem{axiom}{Axiom}[chapter]
139 \newtheorem{definition}{Definition}[chapter]
140 \newtheorem{remark}{Remark}[chapter]
141 \newtheorem{corollary}{Corollary}[chapter]
142 \newtheorem{lemma}{Lemma}[chapter]
143 \newtheorem{proposition}{Proposition}[chapter]

```

## 5.7 Captions

`\fref` Load the `caption` package to improve formatting of captions, and provide short  
`\tref` referencing commands.

```

\eref 144 \usepackage[justification=centerlast,font=small,labelfont=sc]{caption}
\cref 145 \setlength{\captionmargin}{20pt}
\sref 146 \newcommand{\fref}[1]{Figure~\ref{#1}}
\aref 147 \newcommand{\tref}[1]{Table~\ref{#1}}
148 \newcommand{\eref}[1]{Equation~\ref{#1}}
149 \newcommand{\cref}[1]{Chapter~\ref{#1}}
150 \newcommand{\sref}[1]{Section~\ref{#1}}
151 \newcommand{\aref}[1]{Appendix~\ref{#1}}

```

## 5.8 Float Placement

`\topfraction` Preventing figures from appearing on a page by themselves. L<sup>A</sup>T<sub>E</sub>X's figure placement algorithm is quite biased in favour of putting figures on a page by themselves, instead of on the top of a page with some text below it. Fortunately, the parameters of the algorithm can be changed. The main problem is that L<sup>A</sup>T<sub>E</sub>X per default only allows a part of the top of a text-page (70%) to contain figures, and requires at least 20% of a page to be text when text and figures share a page. These parameters should be set to more reasonable values, for example 85% and 10%.

```
152 \renewcommand{\topfraction}{0.85}
153 \renewcommand{\bottomfraction}{.85}
154 \renewcommand{\textfraction}{0.1}
155 \renewcommand{\dbltopfraction}{.85}
```

`\floatpagefraction` This helps, but sometimes L<sup>A</sup>T<sub>E</sub>X puts a figure on a page by itself, although it would fit perfectly well on the top of a page. This happens when the figure will not fit on the page where it was defined. L<sup>A</sup>T<sub>E</sub>X then attempts to put it on a figures-only page before it attempts to put it at the top of the next page. A page may contain figures alone if the figure(s) use at least half the page. To prevent half-empty pages this limit should probably be increased to around 75%.

```
156 \renewcommand{\floatpagefraction}{0.75}
157 \renewcommand{\dblfloatpagefraction}{.75}
```

Be careful not to make `floatpagefraction` larger than `topfraction`, then you risk to produce a figure that can neither go on the top of a text page, nor on a page by itself. If that happens, the figure and all later figures will be postponed until next time a `clearpage` is executed (typically at the end of a chapter or the end of the document). This will also happen if a figure is too large to fit on a page.

```
158 \setcounter{topnumber}{9}
159 \setcounter{bottomnumber}{9}
160 \setcounter{totalnumber}{20}
161 \setcounter{dbltopnumber}{9}
```

## 5.9 Graphics

Load the `graphicx` package, so we can include pictures easily. Load the `epstopdf`, so that eps files are automatically converted to pdf when pdfL<sup>A</sup>T<sub>E</sub>X is used. This requires a version of *epstopdf* to be installed on you system. You can find a windows version at

<http://www.ctan.org/tex-archive/support/epstopdf/epstopdf.exe>.

```
162 \usepackage{graphicx}
163 \usepackage{epstopdf}
```

## 5.10 Subfigures and subtables

Load the `subcaption` package, so we can include subfigures easily.

```
164 \usepackage[] {subcaption}
165 \usepackage{booktabs}
166 \usepackage{rotating}
```

## 5.11 Listings

Load the listings package, so we can include listings easily.

```
167 \usepackage{listings}
168 % \usepackage{lstpatch}
169 \lstset{captionpos=b,
170         frame=tb,
171         basicstyle=\scriptsize\ttfamily,
172         showstringspaces=false,
173         keepspaces=true}
174 \lstdefinestyle{matlab} {
175     language=Matlab,
176     keywordstyle=\color{blue},
177     commentstyle=\color[rgb]{0.13,0.55,0.13}\em,
178     stringstyle=\color[rgb]{0.7,0,0} }
```

## 5.12 Hyperlinks

Load the hyperref package to provide hyperlinks in pdf and dvi documents.

```
179 \usepackage[pdfpagemode={UseOutlines},bookmarks=true,bookmarksopen=true,
180     bookmarksopenlevel=0,bookmarksnumbered=true,hypertextnames=false,
181     colorlinks,linkcolor={linkBlue},citecolor={linkBlue},urlcolor={linkBlue},
182     pdfstartview={FitV},unicode,breaklinks=true]{hyperref}
183 \pdfstringdefDisableCommands{
184     \let\\\space
185 }
```

## 6 Internal Names

<code>\supervisor</code>	The various elements of the documents are defined as control sequences to make it
<code>\examiner</code>	easy to customize this style for other parts of the University. When the command
<code>\degree</code>	is run the other terms are defined by the args.
<code>\authors</code>	The examiner and supervisor commands can be pluralised so that it can print
<code>\addresses</code>	"Supervisors:". This is with an optional argument. [s] which will add and "s" to
<code>\university</code>	the word "Supervisor"
<code>\UNIVERSITY</code>	186 %% ----- Organisational Structure -----
<code>\department</code>	187 \newcommand*\supervisor{2} [] {\def\supname{#2}\def\supplural{#1}}
<code>\DEPARTMENT</code>	188 \newcommand*\examiner{2} [] {\def\examname{#2}\def\examplural{#1}}
<code>\group</code>	189 \newcommand*\degree{1} {\def\degreename{#1}}
<code>\GROUP</code>	190 \newcommand*\authors{1} {\def\authornames{#1}}
<code>\faculty</code>	191 \newcommand*\qualifications{1} {\def\quals{#1}}
<code>\FACULTY</code>	192 \newcommand*\addresses{1} {\def\addressnames{#1}}
<code>\subject</code>	193 \newcommand*\doi{1} {\def\doicode{#1}}
<code>\keywords</code>	194 \newcommand*\volume{2} {\def\volno{#1}\def\volof{#2}}
	195 \newcommand*\orcidid{1} {\def\orcid{#1}}
	196 \newcommand*\university{1} {\def\univname{#1}}
	197 \newcommand*\UNIVERSITY{1} {\def\UNIVNAME{#1}}
	198 \newcommand*\department{1} {\def\deptname{#1}}
	199 \newcommand*\DEPARTMENT{1} {\def\DEPTNAME{#1}}
	200 \newcommand*\group{1} {\def\groupname{#1}}
	201 \newcommand*\GROUP{1} {\def\GROUPNAME{#1}}



```

202 \newcommand*{\faculty}[1]{\def\facname{#1}}
203 \newcommand*{\FACULTY}[1]{\def\FACNAME{#1}}
204 \newcommand*{\subject}[1]{\def\subjectname{#1}}
205 \newcommand*{\keywords}[1]{\def\keywordnames{#1}}

\supname The internal names of the elements are set to defaults appropriate to the Depart-
\examname ment of Electronics and Computer Science.
\degreename By running these commands at the top of your tex file it will overwrite the
\authornames defaults.
\univname 206 %% ----- Organisational Structure -----
\UNIVNAME 207 \doi{}
\deptname 208 \supervisor {}
\DEPTNAME 209 \examiner {}
\groupname 210 \degree {}
\GROUPNAME 211 \authors {}
\facname 212 \qualifications{}
\FACNAME 213 \orcidid{}
\volume{}{}
\subjectname 214 \volume{}{}
\keywordnames 215 \university {\texorpdfstring{\href{http://www.southampton.ac.uk}
216 {University of Southampton}}
217 {University of Southampton}}
218 \UNIVERSITY {\MakeUppercase{\univname}}
219 \department {School of Electronics and Computer Science}
220 \DEPARTMENT {\MakeUppercase{\deptname}}
221 \group {Cyber Physical Systems Group}
222 \GROUP {\MakeUppercase{\groupname}}
223 \faculty {Faculty of Engineering and Physical Science}
224 \FACULTY {\MakeUppercase{\facname}}
225 \addresses {}
226 \subject {}
227 \keywords {}

```

## 7 Special Pages

### 7.1 Title Page

```

\maketitle Setup an appropriate title page and pdf strings if we are using pdfLATEX.
The
global
let
@title
@empty has been removed
Possibly the relax statement also needs to be removed
228 <{*thesis | minithesis | progress | project | report | gdp | gdpsummary}>
229 % Start by Adding meta data to the produced document
230 \usepackage{titling}
231 \AtBeginDocument{
232 \hypersetup{pdftitle={\thetitle}}
233 \hypersetup{pdfsubject={\subjectname}}
234 \hypersetup{pdfauthor={\authornames}}
235 \hypersetup{pdfkeywords={\keywordnames}}
236 }

```

```

237 %    Define the title page layout
238 \renewcommand\maketitle{
239   \btypeout{Title Page}
240   \thispagestyle{empty}
241   \begin{titlepage}
242     \let\footnotesize\small
243     \let\footnoterule\relax
244     \let \footnote \thanks
245     \setcounter{footnote}{0}
246     \null\vfil
247     \vskip 60\p@
248     \begin{center}
249       \setlength{\parskip}{0pt}
250       {\scshape\LARGE\textbf{\univname}\par}
251       %% TODO: Change all the descriptions to italic like the Thesis one
252 <thesis | minithesis | progress | project | gdp | gdpsummary>
253       \bigskip
254       {\large \facname \par}
255 </thesis | minithesis | progress | project | gdp | gdpsummary>
256 <*thesis | minithesis | progress | project>
257       {\large \deptname \par}
258 </thesis | minithesis | progress | project>
259       \vfill
260 <*minithesis>
261       {\large A mini-thesis submitted for transfer from}
262       {\large MPhil to PhD \par}
263 </minithesis>
264 <*progress>
265       {\large A progress report submitted for continuation}
266       {\large towards a PhD \par}
267 </progress>
268 <*project>
269       {\large A project report submitted for the}
270       {\large award of \par \degreename \par}
271 </project>
272 <*gdp>
273       {\large A group design project report submitted for}
274       {\large the award of \par \degreename \par}
275 </gdp>
276 <*gdpsummary>
277       {\large A group design project summary report submitted}
278       {\large for the award of \par \degreename \par}
279 </gdpsummary>
280 <*minithesis | progress | project | gdp | gdpsummary>
281       \vfill
282       {\normalsize Supervisor\supplural: \supname \par}
283       {\normalsize Examiner\examplural: \examname \par}
284       \vfill
285       \hspace{6mm}\parbox[t][51mm][s]{89mm}{
286         \center
287         \vfill
288         {\large \bf \@title \par}
289         \vfill
290         {\normalsize \textit{by} \textbf{authornames} \par}

```

```

291         \vfill
292         {\normalsize \@date \par}
293         \vfill
294     }
295     \parbox[t][95mm][s]{89mm}{
296 \</minithesis | progress | project | gdp | gdpsummary>
297 \<thesis | report>
298     {\huge \bf \@title \par
299 }
300     \ifthenelse{equal{\doicode}{}}
301     {}
302     {\smallskip DOI: \href{http://orcid.org/\doicode}{\doicode}\par}
303     \ifthenelse{equal{\volno}{}}
304     {}
305     {\smallskip Volume \volno{} of \volof}
306     \vfill
307     {\LARGE \textit{by} \par}
308     \smallskip
309     {\LARGE \textbf{authornames}
310     \ifthenelse{equal{\quals}{}}
311     {}
312     {\par\LARGE
313     \quals}
314     \par}
315     \ifthenelse{equal{\orcid}{}}
316     {}
317     {\smallskip
318     ORCID: \href{http://orcid.org/\orcid}{\orcid}}
319
320     \vfill
321 \<thesis>
322     {\large \textit{A thesis for the degree of} \par}
323     {\large \textit{Doctor of Philosophy} \par}
324 \</thesis>
325 \<report>     {\large \textit{Technical Report} \par}
326     \bigskip
327 \bigskip
328     {\large \facname \par}
329     {\large \deptname \par}
330 \</report>
331     \bigskip
332     \bigskip
333     \bigskip
334     {\Large \@date \par}
335     \bigskip
336 \</thesis | report>
337     \end{center}
338     \par
339     \@thanks
340     \vfil\null
341 \end{titlepage}
342 \setcounter{footnote}{0}%
343 \global\let\thanks\relax
344 \global\let\maketitle\relax

```

```

345 \global\let\@thanks\@empty
346 \global\let\@author\@empty
347 \global\let\@date\@empty
348 \global\let\title\relax
349 \global\let\author\relax
350 \global\let\date\relax
351 \global\let\and\relax
352 \cleardoublepage
353 }
354 </thesis | minithesis | progress | project | report | gdp | gdpsummary>
355 <*article>
356 \if@titlepage
357 \renewcommand\maketitle{
358 \btypeout{Title Page}
359 \markboth{\authornames}{\@title}
360 \begin{titlepage}
361 \thispagestyle{empty}
362 \let\footnotesize\small
363 \let\footnoterule\relax
364 \let \footnote \thanks
365 \null\vfil
366 \vskip 60\p@
367 \begin{center}
368 {\LARGE \@title \par}
369 \vskip 3em
370 {\large \lineskip .75em
371 \begin{tabular}[t]{c} \authornames \end{tabular}
372 \par}
373 \vskip 1em
374 {\large \lineskip .5em
375 \begin{tabular}[t]{c} \addressnames \end{tabular}
376 \par}
377 \vskip 1.5em
378 {\large \@date \par}
379 \if\keywordnames
380 \else
381 \quotation
382 \vskip 1.5em
383 {\noindent \normalsize
384 \textbf{Keywords:}
385 \textit{\keywordnames}
386 \par}
387 \endquotation
388 \fi
389 \end{center}
390 \par
391 \@thanks
392 \vfil\null
393 \end{titlepage}
394 \setcounter{footnote}{0}
395 \global\let\thanks\relax
396 \global\let\maketitle\relax
397 \global\let\@maketitle\relax
398 \global\let\@thanks\@empty

```

```

399 \global\let\@author\@empty
400 \global\let\@date\@empty
401 \global\let\title\relax
402 \global\let\author\relax
403 \global\let\date\relax
404 \global\let\and\relax
405 }
406 \else
407 \renewcommand\maketitle{
408 \btypeout{Title Page}
409 \markboth{\authornames}{\@title}
410 \thispagestyle{empty}
411 \par
412 \begingroup
413 \renewcommand\thefootnote{\@fnsymbol\c@footnote}
414 \def\@makefnmark{
415 \rlap{\@textsuperscript{\normalfont\@thefnmark}}
416 }
417 \long\def\@makefntext##1{
418 \parindent 1em\noindent \hb@xt@1.8em
419 {\hss\@textsuperscript{\normalfont\@thefnmark}}##1
420 }
421 \if@twocolumn
422 \ifnum \col@number=\@ne
423 \maketitle
424 \else
425 \twocolumn[\maketitle]%
426 \fi
427 \else
428 \newpage
429 % Prevent figures from going at top of page.
430 \global\@topnum\z@
431 \maketitle
432 \fi
433 \thispagestyle{plain}\@thanks
434 \endgroup
435 \setcounter{footnote}{0}%
436 \global\let\thanks\relax
437 \global\let\maketitle\relax
438 \global\let\@maketitle\relax
439 \global\let\@thanks\@empty
440 \global\let\@author\@empty
441 \global\let\@date\@empty
442 \global\let\title\relax
443 \global\let\author\relax
444 \global\let\date\relax
445 \global\let\and\relax
446 }
447 \def\@maketitle{
448 \newpage
449 \null
450 \vskip 2em
451 \begin{center}
452 \let \footnote \thanks

```

```

453     {\LARGE \@title \par}
454     \vskip 1.5em
455     {\large \lineskip .5em
456       \begin{tabular}[t]{c} \authornames \end{tabular}
457     \par}
458     \vskip 0.7em
459     {\large \lineskip .5em
460       \begin{tabular}[t]{c} \addressnames \end{tabular}
461     \par}
462     \vskip 1em
463     {\large \@date}
464   \end{center}
465   \par
466   \vskip 1.5em
467 }
468 \fi
469 \</article>

```

## 7.2 Abstract Page

`\abstract` Setup an appropriate abstract page.

```

470 <{*thesis | minithesis | progress | project | report | gdp}>
471 \newenvironment{abstract}
472 {
473   \btypeout{Abstract Page}
474   \thispagestyle{empty}
475   \null\vfil
476   \begin{center}
477     \setlength{\parskip}{0pt}
478     {\textsc\normalsize \univname \par}
479     \bigskip
480     {\underline{Abstract} \par}
481     \bigskip
482     {\textsc\normalsize \facname \par}
483 <{*thesis | minithesis | progress | project | report}>
484     {\textsc\normalsize \deptname \par}
485 </thesis | minithesis | progress | project | report>
486     \bigskip
487 <{*thesis}>
488     {\normalsize \underline{Doctor of Philosophy}\par}
489 </thesis>
490 <{*minithesis}>
491     {\normalsize \underline{A mini-thesis submitted for transfer from MPhil to PhD}\par}
492 </minithesis>
493 <{*progress}>
494     {\normalsize \underline{A progress report submitted for continuation towards a PhD}\par}
495 </progress>
496 <{*project}>
497     {\normalsize \underline{A project report submitted for the award of \degreename}\par}
498 </project>
499 <{*gdp}>
500     {\normalsize \underline{A group design project report submitted for the award of \degreename}\par}
501 </gdp>

```

```

502 \bigskip
503 {\normalsize\bf \@title \par}
504 \medskip
505 {\normalsize by \authornames \par}
506 \bigskip
507 \end{center}
508 }
509 {
510 \vfil\vfil\vfil\null
511 \cleardoublepage
512 }
513 </thesis | minithesis | progress | project | report | gdp>
514 <*article>
515 \if@titlepage
516 \renewenvironment{abstract}{
517 \titlepage
518 \null\vfil
519 \@beginparpenalty\@lowpenalty
520 \begin{center}
521 \bfseries \abstractname
522 \@endparpenalty\@M
523 \end{center}
524 \begin{itshape}
525 \noindent
526 }
527 {
528 \par
529 \end{itshape}
530 \if\keywordnames
531 \else
532 \quote
533 \vskip 1.5em
534 {\noindent \normalsize
535 \textbf{Keywords:}
536 \textit{\keywordnames}}
537 \par}
538 \endquote
539 \fi
540 \vfil\null\endtitlepage
541 }
542 \else
543 \renewenvironment{abstract}{
544 \if@twocolumn
545 \section*{\abstractname}
546 \else
547 \small
548 \begin{center}
549 {\bfseries \abstractname\vspace{-.5em}\vspace{\z@}}
550 \end{center}
551 \quote
552 \fi
553 \begin{itshape}
554 }
555 {

```

```

556     \end{itshape}
557     \if\keywordnames
558     \else
559         \vskip 1.5em
560         {\noindent \normalsize
561             \textbf{Keywords:}
562             \textit{\keywordnames}
563         \par}
564     \fi
565     \if@twocolumn\else\endquote\fi
566 }
567 \fi
568 \</article>

```

## 7.3 Contents Pages

Possibly all of these pages should be redone but using the `tocloft` package to reduce complexity in this style file.

### 7.3.1 Add to Table of Contents

`\addtotoc` Get a better list of contents package

Ensures numbering for sub-subsections in the table of contents, and provide for 6 levels to appear in toc. Define `addtotoc` to enable adding elements to the toc at chapter level, using a dummy counter to fix bookmarks in pdfL<sup>A</sup>T<sub>E</sub>X.

```

569 \<thesis | minithesis | progress | project | report | gdp | article>
570 \usepackage[nottoc]{tocbibind} % Put the Lists, Glossary, Biblog and Idx in the conten
571 \addtocounter{secnumdepth}{1}
572 \setcounter{tocdepth}{6}
573 \newcounter{dummy}
574 \newcommand\addtotoc[1]{
575 \refstepcounter{dummy}
576 \<thesis | minithesis | progress | project | report | gdp>
577 \addcontentsline{toc}{chapter}{#1}}
578 \</thesis | minithesis | progress | project | report | gdp>
579 \<*article>
580 \addcontentsline{toc}{section}{#1}}
581 \</article>

```

### 7.3.2 Table of Contents

`\tableofcontents` Adjust line and paragraph spacing.

```

582 \renewcommand\tableofcontents{
583 \hypersetup{linkcolor=black}}
584 \btypeout{Table of Contents}
585 \begin{spacing}{1}{
586     \setlength{\parskip}{1pt}
587     \if@twocolumn
588         \@restonecoltrue\onecolumn
589     \else
590         \@restonecolfalse
591     \fi
592 \<thesis | minithesis | progress | project | report | gdp>

```



```

593     \chapter*{\contentsname
594 \>/thesis | minithesis | progress | project | report | gdp)
595 (*article)
596     \section*{\contentsname
597 \>/article)
598     \mkboth{
599         \MakeUppercase\contentsname}{\MakeUppercase\contentsname}}
600     \@starttoc{toc}
601     \if@restonecol\twocolumn\fi
602 \>thesis | minithesis | progress | project | report | gdp)    \cleardoublepage
603 }\end{spacing}
604 }

```

### 7.3.3 List of Figures

\listoffigures Adjust line and paragraph spacing.

```

605 \renewcommand\listoffigures{
606 \addtotoc{\listfigurename}
607 \begin{spacing}{1}{
608     \setlength{\parskip}{1pt}
609     \if@twocolumn
610         \@restonecoltrue\onecolumn
611     \else
612         \@restonecolfalse
613     \fi
614 \>*thesis | minithesis | progress | project | report | gdp)
615     \chapter*{\listfigurename
616 \>/thesis | minithesis | progress | project | report | gdp)
617 (*article)
618     \section*{\listfigurename
619 \>/article)
620     \mkboth{\MakeUppercase\listfigurename}
621             {\MakeUppercase\listfigurename}}
622     \@starttoc{lof}
623     \if@restonecol\twocolumn\fi
624 \>*thesis | minithesis | progress | project | report | gdp)
625     \cleardoublepage
626 \>/thesis | minithesis | progress | project | report | gdp)
627 }\end{spacing}
628 }

```

### 7.3.4 List of Tables

\listoftables Adjust line and paragraph spacing.

```

629 \renewcommand\listoftables{
630 \addtotoc{\listtablename}
631 \begin{spacing}{1}{
632     \setlength{\parskip}{1pt}
633     \if@twocolumn
634         \@restonecoltrue\onecolumn
635     \else
636         \@restonecolfalse
637     \fi

```

```

638 <*thesis | minithesis | progress | project | report | gdp>
639     \chapter*{\listtablename
640 </thesis | minithesis | progress | project | report | gdp>
641 <*article>
642     \section*{\listtablename
643 </article>
644     \@mkboth{
645         \MakeUppercase\listtablename}{\MakeUppercase\listtablename}}
646     \@starttoc{lot}
647     \if@restonecol\twocolumn\fi
648 <*thesis | minithesis | progress | project | report | gdp>
649     \cleardoublepage
650 </thesis | minithesis | progress | project | report | gdp>
651 } \end{spacing}
652 }

```

### 7.3.5 List of Symbols

`\listsymbolname` Provide a `listofsymbols` command to produce a list of symbols,

```

\listofsymbols 653 <*thesis | minithesis | progress | report | article>
654 \newcommand\listsymbolname{Definitions and Abbreviations}
655 </thesis | minithesis | progress | report | article>
656 <*project | gdp>
657 \newcommand\listsymbolname{List of Symbols}
658 </project | gdp>
659 \usepackage{longtable}
660 \newcommand\listofsymbols[2]{
661     \btypeout{\listsymbolname}
662     \addtotoc{\listsymbolname}
663 <*thesis | minithesis | progress | project | report | gdp>
664     \chapter*{\listsymbolname
665 </thesis | minithesis | progress | project | report | gdp>
666 <*article>
667     \section*{\listsymbolname
668 </article>
669     \@mkboth{
670         \MakeUppercase\listsymbolname}{\MakeUppercase\listsymbolname}}
671 \begin{longtable}[c]{#1#2\end{longtable}\par
672 <*thesis | minithesis | progress | project | report | gdp>
673     \cleardoublepage
674 </thesis | minithesis | progress | project | report | gdp>
675 }
676 </thesis | minithesis | progress | project | report | gdp | article>

```

### 7.3.6 List of Additional Material

`\addmaterialname` Provide a `listofaddmaterial` command to produce a list of additional material,  
`\listofaddmaterial` the name can be changed with `\addmaterialname{NewName}`  
`\addtolom` Material can be added by using `\addcontentsline{lom}{chapter}{Material Name}`

```

677 \newcommand\addmaterialname{List of Additional Material}
678 \newcommand\listofaddmaterial{
679 \addtotoc{\addmaterialname}
680 \begin{spacing}{1}{

```

```

681 \setlength{\parskip}{1pt}
682 \if@twocolumn
683 \@restonecoltrue\onecolumn
684 \else
685 \@restonecolfalse
686 \fi
687 <*thesis | minithesis | progress | project | report | gdp>
688 \chapter*{\addmaterialname
689 </thesis | minithesis | progress | project | report | gdp>
690 <*article>
691 \section*{\addmaterialname
692 </article>
693 \@mkboth{
694 \MakeUppercase\addmaterialname}\MakeUppercase\addmaterialname}}
695 \@starttoc{lom}
696 \if@restonecol\twocolumn\fi
697 <*thesis | minithesis | progress | project | report | gdp>
698 \cleardoublepage
699 </thesis | minithesis | progress | project | report | gdp>
700 }\end{spacing}
701 }
702 \newcommand\addtolom[1]{%
703 \addtocontents{lom}{\protect\contentsline{chapter}{\protect\numberline{}}{#1}{}}}
704 }

```

## 7.4 Declaration of Authorship

`\authorshipdeclaration` Taken from Modified Template by Lovell 9.3

TODO: Consider a separate dissertation class for non technical?

TODO: Provide extra argument for putting the date into the Declaration

TODO: make slightly different declarations for theses and projects

This Authorship macro takes one argument for the case of People who have published part of their thesis already (perhaps in a paper).

xifthen else package used for the isempty command

```

705 <*thesis | minithesis | progress | report | article>
706 \usepackage{xifthen}
707 \newcommand\authorshipdeclaration[1]{
708 \btypeout{Declaration of Authorship}
709 \addtotoc{Declaration of Authorship}
710 \thispagestyle{plain}
711 \null\vfil
712 \vskip 60\p@
713 \begin{center}{\Large\bf Declaration of Authorship \par}\end{center}
714 I declare that this thesis and the work presented in it is my own and has
715 been generated by me as the result of my own original research.
716
717 I confirm that:
718
719 \begin{enumerate}
720 \item This work was done wholly or mainly while in candidature for a research degree at this U
721 \item Where any part of this thesis has previously been submitted for a degree or any other q
722 \item Where I have consulted the published work of others, this is always clearly attributed;
723 \item Where I have quoted from the work of others, the source is always given. With the except

```

```

724 \item I have acknowledged all main sources of help;
725 \item Where the thesis is based on work done by myself jointly with others, I have made clear
726
727 \ifthenelse{\isempty{#1}}
728 {\item None of this work has been published before submission}
729 {\item Parts of this work have been published as: #1}
730 \end{enumerate}
731
732 \vspace{15.0mm}
733 \begin{minipage}[t]{0.7\textwidth}
734   Signed:.....
735 \end{minipage}%
736 \begin{minipage}[t]{0.3\textwidth}
737   Date:.....
738 \end{minipage}
739 \vfil\vfil\null
740 \cleardoublepage
741 }
742 </thesis | minithesis | progress | report | article>

```

## 7.5 Copyright Statement

`\copyrightDeclaration` This standard Copyright statement is to be included for a thesis submission to University of Southampton Digital Repository

```

743 <*thesis>
744 \usepackage[export]{adjustbox} % for Soton logo alignment
745 \newcommand\copyrightDeclaration[1]{
746
747 \btypeout{Copyright declaration}
748 \thispagestyle{plain}
749
750 \hspace{-1.5in}\hspace{2.5cm}\begin{minipage}{17cm}
751 \null\vfil
752 \includegraphics[width=6cm,right]{UoSLogo.png}
753
754 \vskip 60\p@
755 \begin{center}{\selectfont\huge
756 \textcolor{custGray}{University~of~Southampton~Research~Repository}}\par}
757 \end{center}
758 \vspace{1cm}
759
760 {\fontfamily{fds}\selectfont
761
762 \noindent Copyright \textcopyright~ and Moral Rights for this thesis and, where
763 applicable, any accompanying data are retained by the author and/or other
764 copyright owners. A copy can be downloaded for personal non-commercial research
765 or study, without prior permission or charge. This thesis and the accompanying
766 data cannot be reproduced or quoted extensively from without first obtaining
767 permission in writing from the copyright holder/s. The content of the thesis
768 and accompanying research data (where applicable) must not be changed in any
769 way or sold commercially in any format or medium without the formal permission
770 of the copyright holder/s.
771

```

```

772 \vspace{0.5cm}
773
774 When referring to this thesis and any accompanying data, full bibliographic
775 details must be given, e.g.
776
777 \vspace{0.5cm}
778
779 Thesis: Author (Year of Submission) "Full thesis title", University of
780 Southampton, name of the University Faculty or School or Department,
781 PhD Thesis, pagination.
782
783 \vspace{0.5cm}
784
785 Data: Author (Year) Title. URI [dataset]]
786 \end{minipage}
787 \vfil\vfil\null
788 \cleardoublepage
789 }
790
791 \usepackage{lastpage} % counts the full number of pages
792
793 \</thesis>

```

## 7.6 Acknowledgements

`\acknowledgements` Thank someone!

```

794 \newcommand\acknowledgements[1]{
795 \btypeout{Acknowledgements}
796 \addtotoc{Acknowledgements}
797 \<thesis | minithesis | progress | project | report | gdp>
798 \thispagestyle{plain}
799 \null\vfil
800 \vskip 60\p@
801 \begin{center}{\Large\bf Acknowledgements \par}\end{center}
802 {\normalsize #1}
803 \vfil\vfil\null
804 \cleardoublepage
805 \</thesis | minithesis | progress | project | report | gdp>
806 \<article>
807 \section*{Acknowledgements}
808 {\normalsize #1}
809 \</article>
810 }

```

## 7.7 Dedicatory

`\dedicatory` Dedicate the document to someone!

```

811 \newcommand\dedicatory[1]{
812 \btypeout{Dedicatory}
813 \<thesis | minithesis | progress | project | report | gdp>
814 \thispagestyle{plain}
815 \null\vfil
816 \vskip 60\p@

```

```

817 \begin{center}{\Large \sl #1}\end{center}
818 \vfil\null
819 \cleardoublepage
820 </thesis | minithesis | progress | project | report | gdp>
821 }

```

## 8 Parts

```

\frontmatter Define frontmatter,mainmatter,backmatter for the article class and rename the
\mainmatter bibliography to something that makes more sense. For other classes make the
\backmatter Appendix entry in the table of contents better and rename the references in a
\appendix slightly different way.

822 <*article>
823 \newcommand\frontmatter{ }
824 \newcommand\mainmatter{ }
825 \newcommand\bibname{References}
826 \newcommand\backmatter{}
827 </article>
828 <*thesis | minithesis | progress | project | report | gdp>
829 \renewcommand\bibname{References}
830 \let\oldappendix\appendix % Put full appendix name in ToC
831 \renewcommand\appendix{%
832   \oldappendix
833   \let\oldacl@pp=\addcontentsline
834   \def\addcontentsline##1##2##3{\oldacl@pp{##1}{##2}{\appendixname\space ##3}}
835 }
836 \let\oldbackmatter\backmatter
837 \def\backmatter{%
838   \oldbackmatter
839   \let\addcontentsline=\oldacl@pp
840 }
841 </thesis | minithesis | progress | project | report | gdp>

842 </thesis | minithesis | progress | project | report | article | gdp | gdpsummary>

```

## 9 Example Documents

```

843 <*testthesis>
844 \documentclass[sotoncolour]{uosthesis} % Use the Thesis Style with custom link colour
845 </testthesis>
846 <*testminithesis>
847 \documentclass[sotoncolour]{uosminithesis} % Use the minithesis Style with custom link colour
848 </testminithesis>
849 <*testprogress>
850 \documentclass[sotoncolour]{uosprogress} % Use the progress Style with custom link colour
851 </testprogress>
852 <*testproject>
853 \documentclass[sotoncolour]{uosproject} % Use the Project Style with custom link colour
854 </testproject>
855 <*testreport>
856 \documentclass[sotoncolour]{uosreport} % Use the Report Style with custom link colour
857 </testreport>

```

```

858 <*testarticle>
859 \documentclass[sotoncolour]{uosarticle}      % Use the Article Style with custom link colour
860 </testarticle>
861 <*testgdp>
862 \documentclass[sotoncolour]{uosgdp}          % Use the GDP Report Style with custom link colour
863 </testgdp>
864 <*testgdpsummary>
865 \documentclass[sotoncolour]{uosgdpsummary}    % Use the GDP Summary Report Style with custom link
866 </testgdpsummary>
867 <*testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
868 \graphicspath{{../Figures/}}                % Location of your graphics files
869 \usepackage{natbib}                          % Use Natbib style for the refs.
870 <*testthesis | testminithesis | testproject | testreport | testgdp>
871 \usepackage{bibentry}                       % Use bibentry for prepublished works
872 \nobibliography*                            % Use bibentry for prepublished works
873 \usepackage{attrib}                         % Use the attrib package for quotations
874 </testthesis | testminithesis | testproject | testreport | testgdp>
875 \hypersetup{colorlinks=true}                % Set to false for black/white printing
876 \input{Definitions}                         % Include your abbreviations
877 %% -----
878 %% -----THESIS/DOC INFORMATION -----
879 \department {School of [Insert school]}
880 \DEPARTMENT {\MakeUppercase{\deptname}}
881 \group      {[Group name]}
882 \GROUP      {\MakeUppercase{\groupname}}
883 \faculty    {Faculty of [Insert faculty]}
884 \FACULTY    {\MakeUppercase{\facname}}
885 \title      {An Investigation into \dots}
886 <*testthesis>
887 \authors    {Insert name, for example, Sarah Alison Watson} % Use of Soton Email unadvised, use
888 </testthesis>
889 <*testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
890 \authors    {\texorpdfstring
891              {\href{mailto:S.A.Watson@soton.ac.uk}{Name and email, for example, Sarah Alison W
892              {Name and email, for example, Sarah Alison Watson}
893              }
894 </testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
895 \addresses  {\groupname\\deptname\\univname}
896 \date       {\today}
897 <*testminithesis | testprogress | testproject | testgdp | testgdpsummary>
898 % \supervisor[s] {Mr Beavis and Mrs S Supervisor}
899 \supervisor {Mr Beavis}
900 % \examiner[s] {Dr Butthead and Dr A.N. Other}
901 \examiner   {Dr Butthead}
902 </testminithesis | testprogress | testproject | testgdp | testgdpsummary>
903 <*testproject>
904 \degree     {BEng Electronic Engineering}
905 </testproject>
906 <*testgdp | testgdpsummary>
907 \degree     {Master of Engineering}
908 </testgdp | testgdpsummary>
909 %% Optional Fields
910 <testthesis | testminithesis | testprogress> \qualifications{MEng PhD}
911 <*testthesis>

```

```

912 \orcidid{0000-0002-1825-0097}
913 \doi{10.1002/0470841559.ch1}
914 \volume{n}{m} %Optional Volume Numbering Volume n of m
915 \testthesis)
916 \subject {}
917 \keywords {}
918
919 \begin{document}
920 %% ----- FRONT MATTER ORGANISATION -----
921 (*testthesis)
922 \pagenumbering{gobble} % removes page number
923 \copyrightDeclaration{} % !!! Comment this line when printing the hardcopy !!!
924 \raggedright %% Set the style to Left justification, remove for fill justification
925 %% Must be done after copyrightDeclaration
926 \testthesis)
927 \frontmatter
928 \maketitle
929 \testthesis|testminithesis|testprogress|testproject|testreport|testarticle|testgdp|testgdpsummary)
930 (*testthesis|testminithesis|testprogress|testproject|testreport|testarticle|testgdp)
931 \begin{abstract}
932 This work is all about \dots
933 (*testthesis|testminithesis|testprogress)
934 There are broad instructions for this template entitled: How to use the University of Southampton
935
936 There is no prescribed font, you should use a font appropriate to your discipline. See Product
937 \testthesis|testminithesis|testprogress)
938 \end{abstract}
939 (*testthesis|testminithesis|testprogress|testproject|testreport|testgdp)
940 \tableofcontents
941 \listoffigures
942 \listoftables
943 %% The List of listings does not, by default, appear in the ToC, so....
944 \addtotoc{Listings}
945 \lstlistoflistings
946 \listofaddmaterial
947 \addtolom{Material Name e.g Map}
948 \addtolom{Material Name e.g CD}
949 \addtolom{Test Material}
950 (*testthesis|testminithesis|testproject|testreport|testgdp)
951 %% ----- AUTHORSHIP DECLARATION/ ACKNOW. / DEDICATORY -----
952 %% Either include citations like below (as many as required spaced with commas or 'and').
953 %% \bibentry command must be used here with prepublished papers
954 % https://www.stefaanlippens.net/bibentry/
955 \authorshipdeclaration{\bibentry{Gunn:2001:pdflatex}, \bibentry{Lovell:2011:updated} and \bibentry{...}}
956 %% Or state no citations like below
957 %% \authorshipdeclaration{}
958 %% -----
959 \acknowledgements{Thanks to no one.}
960 \dedicatory{To \dots}
961 \testthesis|testminithesis|testproject|testreport|testgdp)
962 %%Lightweight Definitions and Abbreviations see package:nomencl for alternative
963 %% Include if relevant to discipline
964 \listofsymbols{lll}{\w$ & The weight vector\$\S$ & If relevant to discipline}
965 \testthesis|testminithesis|testprogress|testproject|testreport|testgdp)

```



```

966 </testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp>
967 < *testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
968 \mainmatter
969 %% ----- MAIN MATTER (CONTENT) -----
970 </testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
971 < *testthesis | testminithesis | testprogress | testproject | testreport | testgdp>
972 \include{Introduction}
973 \include{Conclusions}
974 \begin{lstlisting}[caption=Without a title it doesn't appear in the table]
975 This is a test listing
976
977 It has several lines
978 That
979 say not much at all
980 \end{lstlisting}
981 \appendix
982 \include{AppendixA}
983 \backmatter
984 < *testthesis | testminithesis | testprogress>
985 \chapter{Glossary [if relevant]}
986 </testthesis | testminithesis | testprogress>
987 \bibliographystyle{uos}
988 \bibliography{UOS}
989 < *testthesis | testminithesis | testprogress>
990 \chapter{Bibliography}
991 To use bibliography as well as the references section use the \texttt{multibbl} package.
992 \chapter{Index [if relevant]}
993 </testthesis | testminithesis | testprogress>
994 </testthesis | testminithesis | testprogress | testproject | testreport | testgdp>
995 < *testgdpsummary>
996 \section*{Introduction}
997 \section*{Objectives}
998 \section*{Resources}
999 \section*{Constraints}
1000 \section*{Approaching the task}
1001 \section*{Team Organisation}
1002 \section*{Important Results}
1003 \section*{Conclusions}
1004 \section*{Recommendations}
1005 </testgdpsummary>
1006 < *introduction>
1007 \chapter{Introduction} \label{Chapter:Introduction}
1008 </introduction>
1009 < *testarticle>
1010 \section{Introduction} \label{Section:Introduction}
1011 </testarticle>
1012 < *introduction | testarticle>
1013 You probably found all the files from \cite{Longman:2019:templ},
1014 they were originally made from \cite{Gunn:2001:pdflatex}.
1015 Template specific instructions can be found at:
1016 \url{https://git.soton.ac.uk/el7g15/uos-latex-template-instructions}.
1017
1018 \tref{Table:tabex} illustrates the results of some arbitrary example work.
1019 \begin{table}[!htb]

```

```

1020 \centering
1021 \begin{tabular}{cc}
1022 \toprule
1023 \textbf{Training Error} & \textbf{Testing Error}\\
1024 \midrule
1025 0 &  $\infty$ \\
1026 \bottomrule
1027 \end{tabular}
1028 \caption{The Results}
1029 \label{Table:tabex}
1030 \end{table}
1031
1032 \fref{Figure:figex} shows why this is the case.
1033 \begin{figure}[!htb]
1034 \centering
1035 \includegraphics[width=8cm]{figure}
1036 \caption{A colourful picture.}
1037 \label{Figure:figex}
1038 \end{figure}
1039
1040 This page shows you a subfigure example in \fref{Figure:figsubex}.
1041 \begin{figure}[!htb]
1042 \centering
1043 \subcaptionbox{The left caption}{
1044 \includegraphics[width=4.2cm]{figure}
1045 \label{Figure:figsubex:left}
1046 }
1047 \subcaptionbox{The right caption}{
1048 \includegraphics[width=4.2cm]{figure}
1049 \label{Figure:figsubex:right}
1050 }
1051 \caption{A doubly colourful picture.}
1052 \label{Figure:figsubex}
1053 \end{figure}
1054 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec rutrum sodales ligula, ac aliquam
1055
1056 \section{A Section of a chapter}
1057 Nulla molestie velit sed dui ullamcorper viverra. Fusce placerat vulputate lacus eu consequat.
1058
1059 \subsection{Some quotes}
1060
1061 Nam egestas felis euismod erat tincidunt ornare. Nulla hendrerit tempor purus ac consequat. Aliquam
1062 \begin{quote}
1063 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec rutrum sodales ligula, ac aliquam
1064 \end{quote}
1065
1066 Pellentesque sodales lobortis feugiat. Vivamus volutpat mauris id odio aliquam maximus sed sit
1067 \begin{quote}
1068 The \verb|\attrib| macro attributes block elements, for example when citing
1069 a reference after a block quotation.
1070 \attrib{\cite{attribpackage}}
1071 \end{quote}
1072
1073 Donec vitae massa nisi. Praesent sed sollicitudin urna. Suspendisse vitae cursus tortor. In egestas

```

```

1074 </introduction | testarticle>
1075 <*conclusions>
1076 \chapter{Conclusions} \label{Chapter: Conclusions}
1077 </conclusions>
1078 <*testarticle>
1079 %% -----
1080 \section{Conclusions} \label{Section: Conclusions}
1081 </testarticle>
1082 <*conclusions | testarticle>
1083 It works.
1084 </conclusions | testarticle>
1085 <*testarticle>
1086 \acknowledgements{Thanks to no one.}
1087 \backmatter
1088 \appendix
1089 \bibliographystyle{uos}
1090 \bibliography{UOS}
1091 </testarticle>
1092 <*appendix | testarticle>
1093 <*appendix>
1094 \chapter{Stuff} \label{Chapter:Stuff}
1095 </appendix>
1096 <*testarticle>
1097 %% -----
1098 \section{Stuff} \label{Section:Stuff}
1099 </testarticle>
1100 The following gets in the way of the text....
1101 </appendix | testarticle>
1102 <*testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>
1103 \end{document}
1104 %% -----
1105 </testthesis | testminithesis | testprogress | testproject | testreport | testarticle | testgdp | testgdpsummary>

```

## 9.1 Example Figure

```

1106 <*figure>
1107 %%BoundingBox: 0 150 600 650
1108 %%EndComments
1109 0.0 setlinewidth
1110 /length 0.1 def
1111 /width 0.02 def
1112 /hsvcircle {
1113   gsave
1114     /h 0.0 def
1115     0 4 360 {
1116       pop
1117       gsave
1118       0.5 0.0 translate
1119       newpath
1120       0.0 0.0 moveto
1121       length 0.0 lineto
1122       length width lineto
1123       0.0 width lineto
1124       closepath
1125       h 1.0 1.0 sethsbcolor

```

```

1126     fill
1127     grestore
1128     /h h 4 360 div add def
1129     4 rotate
1130   } for
1131 grestore
1132 } def
1133 0.0 setlinewidth
1134 0.0 setgray
1135 300 400 translate
1136 500 500 scale
1137 30 rotate
1138 1.0 0.7 scale
1139 -30 rotate
1140 hsvcircle
1141 0.8 0.8 scale
1142 hsvcircle
1143 0.8 0.8 scale
1144 hsvcircle
1145 0.8 0.8 scale
1146 hsvcircle
1147 0.8 0.8 scale
1148 hsvcircle
1149 0.8 0.8 scale
1150 hsvcircle
1151 0.8 0.8 scale
1152 hsvcircle
1153 showpage
1154 </figure>

```

## 9.2 Definitions File

```

1155 <*definitions>
1156 \newcommand{\BibTeX}{\rm B\kern-.05em{\sc i\kern-.025em b}\kern-.08em T\kern-.1667em\lower.7ex\hbox{e}}
1157
1158 %% People
1159 \newcounter{address}
1160 \setcounter{address}{1}
1161 \renewcommand{\theaddress}{\textsuperscript{\fnsymbol{address}}}
1162 \newcommand{\address}[1]{\refstepcounter{address}\theaddress#1\\}
1163 \newcommand{\Name}[3]{\texorpdfstring{\href{mailto:#3}{#2}#1}{#2}\xspace}
1164 \newcommand{\SteveRGunn}[1]{\Name{#1}{Steve R. Gunn}{S.R.Gunn@ecs.soton.ac.uk}}
1165
1166 %% Dingbats
1167 \newcommand{\tick}{\ding{51}}
1168 \newcommand{\cross}{\ding{55}}
1169
1170 %% Calculus
1171 \newcommand{\pd}[2]{\ensuremath{\frac{\partial #1}{\partial #2}}\xspace}
1172 \newcommand{\fd}[2]{\ensuremath{\frac{d #1}{d #2}}\xspace}
1173 \newcommand{\dint}{\ensuremath{\int\!\!\!\int\!\!\!\int}\xspace}
1174 \newcommand{\tint}{\ensuremath{\int\!\!\!\int\!\!\!\int}\xspace}
1175
1176 %% Math Sets
1177 \newcommand{\Q}[1]{\ensuremath{\mathbb{#1}}\xspace}

```

```

1178 \newcommand{\R}{\mathbb{R}}
1179
1180 %% Matrix, Vector
1181 \newcommand{\V}[1]{\ensuremath{\boldsymbol{\#1}}\xspace}
1182 \newcommand{\M}[1]{\ensuremath{\boldsymbol{\#1}}\xspace}
1183 \newcommand{\0}{\mathbf{0}}
1184 \newcommand{\1}{\mathbf{1}}
1185 \newcommand{\I}{\mathbf{I}}
1186
1187 %% Math Functions
1188 \newcommand{\F}[1]{\ensuremath{\mathrm{\#1}}\xspace}
1189 \newcommand{\sgn}{\mathbf{sgn}}
1190 \newcommand{\tr}{\mathbf{tr}}
1191 \newcommand{\diag}{\mathbf{diag}}
1192
1193 %% Math Names
1194 \newcommand{\N}[1]{\ensuremath{\mathit{\#1}}\xspace}
1195
1196 %% Data
1197 \newcommand{\mc}[1]{\ensuremath{\mathcal{\#1}}\xspace}
1198 \newcommand{\Hyp}{\mc{H}}
1199 \newcommand{\D}{\mc{D}}
1200
1201 %% Kernel
1202 \newcommand{\K}{\mathbf{K}}
1203 \newcommand{\eins}{\texorpdfstring{\ensuremath{\epsilon}}{\text{epsilon}}-insensitive\xspace}
1204 \newcommand{\e}{\ensuremath{\epsilon}\xspace}
1205 \newcommand{\Bxi}{\ensuremath{\boldsymbol{\xi}}\xspace}
1206 \newcommand{\Kanova}{\ensuremath{\mathit{K}_{ANOVA}}\xspace}
1207 \newcommand{\Kspline}{\ensuremath{\mathit{K}_{spline}}\xspace}
1208
1209 %% Bayesian
1210 \newcommand{\MP}{\ensuremath{\mathit{\scriptscriptstyle M\hspace{-1.5pt}P}}\xspace}
1211 \newcommand{\ML}{\ensuremath{\mathit{\scriptscriptstyle M\hspace{-1.5pt}L}}\xspace}
1212 \newcommand{\Qw}{\ensuremath{Q_{\mathbf{w}}(\mathbf{w})}\xspace}
1213 \newcommand{\Qa}{\ensuremath{Q_{\mathbf{a}}(\mathbf{a})}\xspace}
1214 \newcommand{\Qb}{\ensuremath{Q_{\mathbf{b}}(\mathbf{b})}\xspace}
1215 \newcommand{\wMPab}{\ensuremath{w_{\mathbf{MP}|\mathbf{a},\mathbf{b}}}\xspace}
1216 \newcommand{\wMP}{\ensuremath{w_{\mathbf{MP}}}\xspace}
1217 \newcommand{\yMP}{\ensuremath{y_{\mathbf{MP}}}\xspace}
1218 \newcommand{\BaMP}{\ensuremath{\mathbf{a}_{\mathbf{MP}}}\xspace}
1219 \newcommand{\aMP}{\ensuremath{\alpha_{\mathbf{MP}}}\xspace}
1220 \newcommand{\bMP}{\ensuremath{\beta_{\mathbf{MP}}}\xspace}
1221 \newcommand{\Sab}{\ensuremath{M_{\Sigma}(\mathbf{a},\mathbf{b})}\xspace}
1222 \newcommand{\Ba}{\ensuremath{\boldsymbol{\alpha}}\xspace}
1223 \newcommand{\Bb}{\ensuremath{\boldsymbol{\beta}}\xspace}
1224 \newcommand{\Bm}{\ensuremath{\boldsymbol{\mu}}\xspace}
1225 \newcommand{\BL}{\ensuremath{\boldsymbol{\Lambda}}\xspace}
1226 \newcommand{\BPhi}{\ensuremath{\boldsymbol{\Phi}}\xspace}
1227 \newcommand{\SMP}{\ensuremath{M_{\Sigma}(\mathbf{MP})}\xspace}
1228
1229 \newcommand{\Pa}{\ensuremath{P(\alpha|\mathcal{H})}\xspace}
1230 \newcommand{\Pb}{\ensuremath{P(\beta|\mathcal{H})}\xspace}
1231 \newcommand{\Pab}{\ensuremath{P(\alpha,\beta|\mathcal{H})}\xspace}

```

```

1232 \newcommand{\Pw}{\ensuremath{P(\w|\mathcal{H})}\xspace}
1233 \newcommand{\PD}{\ensuremath{P(\D|\mathcal{H})}\xspace}
1234 \newcommand{\PwIa}{\ensuremath{P(\w|\alpha,\mathcal{H})}\xspace}
1235 \newcommand{\PDIwb}{\ensuremath{P(\D|\w,\beta,\mathcal{H})}\xspace}
1236 \newcommand{\PDwab}{\ensuremath{P(\D,\w,\alpha,\beta|\mathcal{H})}\xspace}
1237 \newcommand{\PDIw}{\ensuremath{P(\D|\w,\mathcal{H})}\xspace}
1238 \newcommand{\PwID}{\ensuremath{P(\w|\D,\mathcal{H})}\xspace}
1239 \newcommand{\PwabID}{\ensuremath{P(\w,\alpha,\beta|\D,\mathcal{H})}\xspace}
1240
1241 \newcommand{\PanH}{\ensuremath{P(\alpha)}\xspace}
1242 \newcommand{\PbnH}{\ensuremath{P(\beta)}\xspace}
1243 \newcommand{\PabnH}{\ensuremath{P(\alpha,\beta)}\xspace}
1244 \newcommand{\PwnH}{\ensuremath{P(\w)}\xspace}
1245 \newcommand{\PDnH}{\ensuremath{P(\D)}\xspace}
1246 \newcommand{\PwIanH}{\ensuremath{P(\w|\alpha)}\xspace}
1247 \newcommand{\PDIwnH}{\ensuremath{P(\D|\w,\beta)}\xspace}
1248 \newcommand{\PDwabnH}{\ensuremath{P(\D,\w,\beta)}\xspace}
1249 \newcommand{\PDIwnH}{\ensuremath{P(\D|\w)}\xspace}
1250 \newcommand{\PwIDnH}{\ensuremath{P(\w|\D)}\xspace}
1251 \newcommand{\PwabIDnH}{\ensuremath{P(\w,\alpha,\beta|\D)}\xspace}
1252
1253 \newcommand{\PDwBab}{\ensuremath{P(\D,\w,\beta|\mathcal{H})}\xspace}
1254 \newcommand{\PwIBa}{\ensuremath{P(\w|\beta,\mathcal{H})}\xspace}
1255 \newcommand{\PBab}{\ensuremath{P(\beta|\mathcal{H})}\xspace}
1256 \newcommand{\PwBabID}{\ensuremath{P(\w,\beta|\D,\mathcal{H})}\xspace}
1257
1258 \newcommand{\PBanH}{\ensuremath{P(\beta)}\xspace}
1259 \newcommand{\PwIBanH}{\ensuremath{P(\w|\beta)}\xspace}
1260
1261 %% Snakes
1262 \newcommand{\Esnake}{\ensuremath{\mathit{E}_{\text{snake}}}\xspace}
1263 \newcommand{\Eimage}{\ensuremath{\mathit{E}_{\text{image}}}\xspace}
1264 \newcommand{\Econt}{\ensuremath{\mathit{E}_{\text{cont}}}\xspace}
1265 \newcommand{\Ecurv}{\ensuremath{\mathit{E}_{\text{curv}}}\xspace}
1266 \newcommand{\Eint}{\ensuremath{\mathit{E}_{\text{int}}}\xspace}
1267 \newcommand{\Eext}{\ensuremath{\mathit{E}_{\text{ext}}}\xspace}
1268 \newcommand{\Eterm}{\ensuremath{\mathit{E}_{\text{term}}}\xspace}
1269 \newcommand{\Eline}{\ensuremath{\mathit{E}_{\text{line}}}\xspace}
1270 \newcommand{\Edge}{\ensuremath{\mathit{E}_{\text{edge}}}\xspace}
1271 \newcommand{\Econ}{\ensuremath{\mathit{E}_{\text{con}}}\xspace}
1272 \newcommand{\Eangle}{\ensuremath{\mathit{E}_{\text{angle}}}\xspace}
1273 \newcommand{\Elshape}{\ensuremath{\mathit{E}_{\text{lshape}}}\xspace}
1274 \newcommand{\Eedgedir}{\ensuremath{\mathit{E}_{\text{edgedir}}}\xspace}
1275 \newcommand{\Emodel}{\ensuremath{\mathit{E}_{\text{model}}}\xspace}
1276 \newcommand{\wte}{\ensuremath{\mathit{w}_{\text{term}}}\xspace}
1277 \newcommand{\wli}{\ensuremath{\mathit{w}_{\text{line}}}\xspace}
1278 \newcommand{\wed}{\ensuremath{\mathit{w}_{\text{edge}}}\xspace}
1279 \newcommand{\wco}{\ensuremath{\mathit{w}_{\text{con}}}\xspace}
1280
1281
1282 %% Environments
1283 \newcounter{alg}
1284 \newenvironment{algorithm}[1]
1285 {

```

```

1286 \stepcounter{alg}
1287 \begin{table}[htb]
1288 \centering
1289 \begin{tabular}[t]{l}
1290 \hline&\\
1291 \multicolumn{2}{l}{\bf Algorithm \arabic{alg}: #1}&&\\
1292 } {
1293 &\\
1294 \hline
1295 \end{tabular}
1296 \end{table}
1297 }
1298 \end{definitions}

```

### 9.3 References File

```

1299 \begin{references}
1300 @MISC{Longman:2019:templ,
1301   author = {E. Longman},
1302   title = {{University of Southampton LaTeX documents}},
1303   year = {2019},
1304   NOTE = {"\url{https://library.soton.ac.uk/thesis/templates} and
1305           \url{https://git.soton.ac.uk/el7g15/uos-latex-template}"},
1306 }
1307 @MISC{Gunn:2001:pdflatex,
1308   author = {S.R. Gunn},
1309   title = {PDFLaTeX Instructions},
1310   year = {2001},
1311   url = {http://www.ecs.soton.ac.uk/~srg/softwaretools/document/}
1312 }
1313 @MISC{Lovell:2011:updated,
1314   author = {C. J. Lovell},
1315   title = {Updated templates},
1316   year = {2011}
1317 }
1318 @MISC{Gunn:2011:updated2,
1319   author = {S.R. Gunn and C. J. Lovell},
1320   title = {Updated templates reference 2},
1321   year = {2011}
1322 }
1323 @MISC{attribpackage,
1324   author = {Matt Swift},
1325   title = {The attrib LaTeX package
1326 attribution of block elements (Frankenstein's hat)},
1327   year = {1999},
1328   url = {http://cs.brown.edu/about/system/managed/latex/doc/attrib.pdf}
1329 }
1330
1331 \end{references}

```

### 9.4 Bibliography Style File

```

1332 \begin{bst}
1333 %% File: 'uos.bst'
1334 %% A modification of 'plainnat.bst' for use with natbib package
1335 %%

```

```

1336 %% Copyright 1993-1999 Patrick W Daly
1337 %% Max-Planck-Institut f\"ur Aeronomie
1338 %% Max-Planck-Str. 2
1339 %% D-37191 Katlenburg-Lindau
1340 %% Germany
1341 %% E-mail: daly@linmpi.mpg.de
1342 %%
1343 %% This program can be redistributed and/or modified under the terms
1344 %% of the LaTeX Project Public License Distributed from CTAN
1345 %% archives in directory macros/latex/base/lppl.txt; either
1346 %% version 1 of the License, or any later version.
1347 %%
1348 %% Includes field URL for Internet addresses
1349 %%
1350 ENTRY
1351 { address
1352   author
1353   booktitle
1354   chapter
1355   edition
1356   editor
1357   howpublished
1358   institution
1359   isbn
1360   issn
1361   journal
1362   key
1363   month
1364   note
1365   number
1366   organization
1367   pages
1368   publisher
1369   school
1370   series
1371   title
1372   type
1373   url
1374   volume
1375   year
1376 }
1377 {}
1378 { label extra.label sort.label short.list }
1379
1380 INTEGERS { output.state before.all mid.sentence after.sentence after.block }
1381
1382 FUNCTION {init.state.consts}
1383 { #0 'before.all :=
1384   #1 'mid.sentence :=
1385   #2 'after.sentence :=
1386   #3 'after.block :=
1387 }
1388
1389 STRINGS { s t }

```



```

1390
1391 FUNCTION {output.nonnull}
1392 { 's :=
1393   output.state mid.sentence =
1394   { ", " * write$ }
1395   { output.state after.block =
1396     { add.period$ write$
1397       newline$
1398       "\newblock " write$
1399     }
1400     { output.state before.all =
1401       'write$
1402       { add.period$ " " * write$ }
1403       if$
1404     }
1405     if$
1406     mid.sentence 'output.state :=
1407   }
1408   if$
1409   s
1410 }
1411
1412 FUNCTION {output}
1413 { duplicate$ empty$
1414   'pop$
1415   'output.nonnull
1416   if$
1417 }
1418
1419 FUNCTION {output.check}
1420 { 't :=
1421   duplicate$ empty$
1422   { pop$ "empty " t * " in " * cite$ * warning$ }
1423   'output.nonnull
1424   if$
1425 }
1426
1427 FUNCTION {fin.entry}
1428 { add.period$
1429   write$
1430   newline$
1431 }
1432
1433 FUNCTION {new.block}
1434 { output.state before.all =
1435   'skip$
1436   { after.block 'output.state := }
1437   if$
1438 }
1439
1440 FUNCTION {new.sentence}
1441 { output.state after.block =
1442   'skip$
1443   { output.state before.all =

```

```

1444         'skip$
1445         { after.sentence 'output.state := }
1446     if$
1447 }
1448 if$
1449 }
1450
1451 FUNCTION {not}
1452 { { #0 }
1453   { #1 }
1454   if$
1455 }
1456
1457 FUNCTION {and}
1458 { 'skip$
1459   { pop$ #0 }
1460   if$
1461 }
1462
1463 FUNCTION {or}
1464 { { pop$ #1 }
1465   'skip$
1466   if$
1467 }
1468
1469 FUNCTION {new.block.checka}
1470 { empty$
1471   'skip$
1472   'new.block
1473   if$
1474 }
1475
1476 FUNCTION {new.block.checkb}
1477 { empty$
1478   swap$ empty$
1479   and
1480   'skip$
1481   'new.block
1482   if$
1483 }
1484
1485 FUNCTION {new.sentence.checka}
1486 { empty$
1487   'skip$
1488   'new.sentence
1489   if$
1490 }
1491
1492 FUNCTION {new.sentence.checkb}
1493 { empty$
1494   swap$ empty$
1495   and
1496   'skip$
1497   'new.sentence

```

```

1498   if$
1499 }
1500
1501 FUNCTION {field.or.null}
1502 { duplicate$ empty$
1503   { pop$ "" }
1504   'skip$
1505   if$
1506 }
1507
1508 FUNCTION {emphasize}
1509 { duplicate$ empty$
1510   { pop$ "" }
1511   { "{\em " swap$ * "}" * }
1512   if$
1513 }
1514
1515 INTEGERS { nameptr namesleft numnames }
1516
1517 FUNCTION {format.names}
1518 { 's :=
1519   #1 'nameptr :=
1520   s num.names$ 'numnames :=
1521   numnames 'namesleft :=
1522   { namesleft #0 > }
1523   { s nameptr "{ff~}{vv~}{ll}{, jj}" format.name$ 't :=
1524     nameptr #1 >
1525     { namesleft #1 >
1526       { ", " * t * }
1527       { numnames #2 >
1528         { ", " * }
1529         'skip$
1530         if$
1531         t "others" =
1532         { " et~al." * }
1533         { " and " * t * }
1534         if$
1535       }
1536       if$
1537     }
1538     't
1539     if$
1540     nameptr #1 + 'nameptr :=
1541     namesleft #1 - 'namesleft :=
1542   }
1543   while$
1544 }
1545
1546 FUNCTION {format.key}
1547 { empty$
1548   { key field.or.null }
1549   { "" }
1550   if$
1551 }

```

```

1552
1553 FUNCTION {format.authors}
1554 { author empty$
1555   { "" }
1556   { author format.names }
1557   if$
1558 }
1559
1560 FUNCTION {format.editors}
1561 { editor empty$
1562   { "" }
1563   { editor format.names
1564     editor num.names$ #1 >
1565     { ", editors" * }
1566     { ", editor" * }
1567     if$
1568   }
1569   if$
1570 }
1571
1572 FUNCTION {format.isbn}
1573 { isbn empty$
1574   { "" }
1575   { new.block "ISBN " isbn * }
1576   if$
1577 }
1578
1579 FUNCTION {format.issn}
1580 { issn empty$
1581   { "" }
1582   { new.block "ISSN " issn * }
1583   if$
1584 }
1585
1586 %FUNCTION {format.url}
1587 %{ url empty$
1588 %   { "" }
1589 %   { new.block "URL \url{" url * "}" * }
1590 %   if$
1591 %}
1592 %
1593 %FUNCTION {format.title}
1594 %{ title empty$
1595 %   { "" }
1596 %   { title "t" change.case$ }
1597 %   if$
1598 %}
1599 FUNCTION {format.url}
1600 { ""
1601 }
1602
1603 FUNCTION {format.title}
1604 { title empty$
1605   { "" }

```

```

1606     { url empty$
1607       { title "t" change.case$ }
1608       { "\href{" url * "}{ " * title "t" change.case$ * "}" * }
1609       if$
1610     }
1611     if$
1612 }
1613
1614
1615 FUNCTION {format.full.names}
1616 { 's :=
1617   #1 'nameptr :=
1618   s num.names$ 'numnames :=
1619   numnames 'namesleft :=
1620   { namesleft #0 > }
1621   { s nameptr
1622     "{vv~}{ll}" format.name$ 't :=
1623     nameptr #1 >
1624     {
1625       namesleft #1 >
1626       { ", " * t * }
1627       {
1628         numnames #2 >
1629         { ", " * }
1630         'skip$
1631         if$
1632         t "others" =
1633         { " et~al." * }
1634         { " and " * t * }
1635         if$
1636       }
1637       if$
1638     }
1639     't
1640     if$
1641     nameptr #1 + 'nameptr :=
1642     namesleft #1 - 'namesleft :=
1643   }
1644   while$
1645 }
1646
1647 FUNCTION {author.editor.full}
1648 { author empty$
1649   { editor empty$
1650     { "" }
1651     { editor format.full.names }
1652     if$
1653   }
1654   { author format.full.names }
1655   if$
1656 }
1657
1658 FUNCTION {author.full}
1659 { author empty$

```

```

1660     { "" }
1661     { author format.full.names }
1662   if$
1663 }
1664
1665 FUNCTION {editor.full}
1666 { editor empty$
1667   { "" }
1668   { editor format.full.names }
1669   if$
1670 }
1671
1672 FUNCTION {make.full.names}
1673 { type$ "book" =
1674   type$ "inbook" =
1675   or
1676   'author.editor.full
1677   { type$ "proceedings" =
1678     'editor.full
1679     'author.full
1680     if$
1681   }
1682   if$
1683 }
1684
1685 FUNCTION {output.bibitem}
1686 { newline$
1687   "\bibitem[" write$
1688   label write$
1689   ")" make.full.names duplicate$ short.list =
1690     { pop$ }
1691     { * }
1692     if$
1693   "]" * write$
1694   cite$ write$
1695   "]" write$
1696   newline$
1697   ""
1698   before.all 'output.state :=
1699 }
1700
1701 FUNCTION {n.dashify}
1702 { 't :=
1703   ""
1704   { t empty$ not }
1705   { t #1 #1 substring$ "-" =
1706     { t #1 #2 substring$ "--" = not
1707       { "--" *
1708         t #2 global.max$ substring$ 't :=
1709       }
1710       { { t #1 #1 substring$ "-" = }
1711         { "-" *
1712           t #2 global.max$ substring$ 't :=
1713         }

```

```

1714             while$
1715         }
1716         if$
1717     }
1718     { t #1 #1 substring$ *
1719       t #2 global.max$ substring$ 't :=
1720     }
1721     if$
1722 }
1723 while$
1724 }
1725
1726 FUNCTION {format.date}
1727 { year duplicate$ empty$
1728   { "empty year in " cite$ * warning$
1729     pop$ "" }
1730   'skip$
1731   if$
1732   month empty$
1733   'skip$
1734   { month
1735     " " * swap$ *
1736   }
1737   if$
1738   extra.label *
1739 }
1740
1741 FUNCTION {format.btitle}
1742 { title emphasize
1743 }
1744
1745 FUNCTION {tie.or.space.connect}
1746 { duplicate$ text.length$ #3 <
1747   { "~" }
1748   { " " }
1749   if$
1750   swap$ * *
1751 }
1752
1753 FUNCTION {either.or.check}
1754 { empty$
1755   'pop$
1756   { "can't use both " swap$ * " fields in " * cite$ * warning$ }
1757   if$
1758 }
1759
1760 FUNCTION {format.bvolume}
1761 { volume empty$
1762   { "" }
1763   { "volume" volume tie.or.space.connect
1764     series empty$
1765     'skip$
1766     { " of " * series emphasize * }
1767     if$

```

```

1768     "volume and number" number either.or.check
1769 }
1770 if$
1771 }
1772
1773 FUNCTION {format.number.series}
1774 { volume empty$
1775   { number empty$
1776     { series field.or.null }
1777     { output.state mid.sentence =
1778       { "number" }
1779       { "Number" }
1780       if$
1781       number tie.or.space.connect
1782       series empty$
1783       { "there's a number but no series in " cite$ * warning$ }
1784       { " in " * series * }
1785       if$
1786     }
1787   }
1788 }
1789 { "" }
1790 if$
1791 }
1792
1793 FUNCTION {format.edition}
1794 { edition empty$
1795   { "" }
1796   { output.state mid.sentence =
1797     { edition "l" change.case$ " edition" * }
1798     { edition "t" change.case$ " edition" * }
1799     if$
1800   }
1801   if$
1802 }
1803
1804 INTEGERS { multiresult }
1805
1806 FUNCTION {multi.page.check}
1807 { 't :=
1808   #0 'multiresult :=
1809   { multiresult not
1810     t empty$ not
1811     and
1812   }
1813   { t #1 #1 substring$
1814     duplicate$ "-" =
1815     swap$ duplicate$ "," =
1816     swap$ "+" =
1817     or or
1818     { #1 'multiresult := }
1819     { t #2 global.max$ substring$ 't := }
1820     if$
1821   }

```



```

1822 while$
1823 multiresult
1824 }
1825
1826 FUNCTION {format.pages}
1827 { pages empty$
1828   { "" }
1829   { pages multi.page.check
1830     { "pages" pages n.dashify tie.or.space.connect }
1831     { "page" pages tie.or.space.connect }
1832     if$
1833   }
1834   if$
1835 }
1836
1837 FUNCTION {format.vol.num.pages}
1838 { volume field.or.null
1839   number empty$
1840   'skip$
1841   { "\penalty0 (" number * ")" * *
1842     volume empty$
1843     { "there's a number but no volume in " cite$ * warning$ }
1844     'skip$
1845     if$
1846   }
1847   if$
1848   pages empty$
1849   'skip$
1850   { duplicate$ empty$
1851     { pop$ format.pages }
1852     { ":\penalty0 " * pages n.dashify * }
1853     if$
1854   }
1855   if$
1856 }
1857
1858 FUNCTION {format.chapter.pages}
1859 { chapter empty$
1860   'format.pages
1861   { type empty$
1862     { "chapter" }
1863     { type "1" change.case$ }
1864     if$
1865     chapter tie.or.space.connect
1866     pages empty$
1867     'skip$
1868     { ", " * format.pages * }
1869     if$
1870   }
1871   if$
1872 }
1873
1874 FUNCTION {format.in.ed.booktitle}
1875 { booktitle empty$

```

```

1876 { "" }
1877 { editor empty$
1878   { "In " booktitle emphasize * }
1879   { "In " format.editors * ", " * booktitle emphasize * }
1880   if$
1881 }
1882 if$
1883 }
1884
1885 FUNCTION {empty.misc.check}
1886 { author empty$ title empty$ howpublished empty$
1887   month empty$ year empty$ note empty$
1888   and and and and and
1889   key empty$ not and
1890   { "all relevant fields are empty in " cite$ * warning$ }
1891   'skip$
1892   if$
1893 }
1894
1895 FUNCTION {format.thesis.type}
1896 { type empty$
1897   'skip$
1898   { pop$
1899     type "t" change.case$
1900   }
1901   if$
1902 }
1903
1904 FUNCTION {format.tr.number}
1905 { type empty$
1906   { "Technical Report" }
1907   'type
1908   if$
1909   number empty$
1910   { "t" change.case$ }
1911   { number tie.or.space.connect }
1912   if$
1913 }
1914
1915 FUNCTION {format.article.crossref}
1916 { key empty$
1917   { journal empty$
1918     { "need key or journal for " cite$ * " to crossref " * crossref *
1919       warning$
1920       ""
1921     }
1922     { "In {\em " journal * "\/}" * }
1923     if$
1924   }
1925   { "In " key * }
1926   if$
1927   " \citep{" * crossref * "}" *
1928 }
1929

```

```

1930 FUNCTION {format.book.crossref}
1931 { volume empty$
1932   { "empty volume in " cite$ * "'s crossref of " * crossref * warning$
1933     "In "
1934   }
1935   { "Volume" volume tie.or.space.connect
1936     " of " *
1937   }
1938   if$
1939   editor empty$
1940   editor field.or.null author field.or.null =
1941   or
1942   { key empty$
1943     { series empty$
1944       { "need editor, key, or series for " cite$ * " to crossref " *
1945         crossref * warning$
1946         "" *
1947       }
1948       { "{\em " * series * "\/}" * }
1949       if$
1950     }
1951     { key * }
1952     if$
1953   }
1954   'skip$
1955   if$
1956   ", \citet{" * crossref * "}" *
1957 }
1958
1959 FUNCTION {format.incoll.inproc.crossref}
1960 { editor empty$
1961   editor field.or.null author field.or.null =
1962   or
1963   { key empty$
1964     { booktitle empty$
1965       { "need editor, key, or booktitle for " cite$ * " to crossref " *
1966         crossref * warning$
1967         ""
1968       }
1969       { "In {\em " booktitle * "\/}" * }
1970       if$
1971     }
1972     { "In " key * }
1973     if$
1974   }
1975   { "In " }
1976   if$
1977   " \citet{" * crossref * "}" *
1978 }
1979
1980 FUNCTION {article}
1981 { output.bibitem
1982   format.authors "author" output.check
1983   author format.key output

```

```

1984 new.block
1985 format.title "title" output.check
1986 new.block
1987 crossref missing$
1988 { journal emphasize "journal" output.check
1989   format.vol.num.pages output
1990   format.date "year" output.check
1991 }
1992 { format.article.crossref output.nonnull
1993   format.pages output
1994 }
1995 if$
1996 format.issn output
1997 format.url output
1998 new.block
1999 note output
2000 fin.entry
2001 }
2002
2003 FUNCTION {book}
2004 { output.bibitem
2005   author empty$
2006   { format.editors "author and editor" output.check
2007     editor format.key output
2008   }
2009   { format.authors output.nonnull
2010     crossref missing$
2011     { "author and editor" editor either.or.check }
2012     'skip$
2013   if$
2014 }
2015 if$
2016 new.block
2017 format.btitle "title" output.check
2018 crossref missing$
2019 { format.bvolume output
2020   new.block
2021   format.number.series output
2022   new.sentence
2023   publisher "publisher" output.check
2024   address output
2025 }
2026 { new.block
2027   format.book.crossref output.nonnull
2028 }
2029 if$
2030 format.edition output
2031 format.date "year" output.check
2032 format.isbn output
2033 format.url output
2034 new.block
2035 note output
2036 fin.entry
2037 }

```

```

2038
2039 FUNCTION {booklet}
2040 { output.bibitem
2041   format.authors output
2042   author format.key output
2043   new.block
2044   format.title "title" output.check
2045   howpublished address new.block.checkb
2046   howpublished output
2047   address output
2048   format.date output
2049   format.isbn output
2050   format.url output
2051   new.block
2052   note output
2053   fin.entry
2054 }
2055
2056 FUNCTION {inbook}
2057 { output.bibitem
2058   author empty$
2059   { format.editors "author and editor" output.check
2060     editor format.key output
2061   }
2062   { format.authors output.nonnull
2063     crossref missing$
2064     { "author and editor" editor either.or.check }
2065     'skip$
2066     if$
2067   }
2068   if$
2069   new.block
2070   format.btitle "title" output.check
2071   crossref missing$
2072   { format.bvolume output
2073     format.chapter.pages "chapter and pages" output.check
2074     new.block
2075     format.number.series output
2076     new.sentence
2077     publisher "publisher" output.check
2078     address output
2079   }
2080   { format.chapter.pages "chapter and pages" output.check
2081     new.block
2082     format.book.crossref output.nonnull
2083   }
2084   if$
2085   format.edition output
2086   format.date "year" output.check
2087   format.isbn output
2088   format.url output
2089   new.block
2090   note output
2091   fin.entry

```

```

2092 }
2093
2094 FUNCTION {incollection}
2095 { output.bibitem
2096   format.authors "author" output.check
2097   author format.key output
2098   new.block
2099   format.title "title" output.check
2100   new.block
2101   crossref missing$
2102     { format.in.ed.booktitle "booktitle" output.check
2103       format.bvolume output
2104       format.number.series output
2105       format.chapter.pages output
2106       new.sentence
2107       publisher "publisher" output.check
2108       address output
2109       format.edition output
2110       format.date "year" output.check
2111     }
2112     { format.incoll.inproc.crossref output.nonnull
2113       format.chapter.pages output
2114     }
2115   if$
2116   format.isbn output
2117   format.url output
2118   new.block
2119   note output
2120   fin.entry
2121 }
2122
2123 FUNCTION {inproceedings}
2124 { output.bibitem
2125   format.authors "author" output.check
2126   author format.key output
2127   new.block
2128   format.title "title" output.check
2129   new.block
2130   crossref missing$
2131     { format.in.ed.booktitle "booktitle" output.check
2132       format.bvolume output
2133       format.number.series output
2134       format.pages output
2135       address empty$
2136       { organization publisher new.sentence.checkb
2137         organization output
2138         publisher output
2139         format.date "year" output.check
2140       }
2141     { address output.nonnull
2142       format.date "year" output.check
2143       new.sentence
2144       organization output
2145       publisher output

```

```

2146     }
2147     if$
2148 }
2149 { format.incoll.inproc.crossref output.nonnull
2150     format.pages output
2151 }
2152 if$
2153 format.isbn output
2154 format.url output
2155 new.block
2156 note output
2157 fin.entry
2158 }
2159
2160 FUNCTION {conference} { inproceedings }
2161
2162 FUNCTION {manual}
2163 { output.bibitem
2164     format.authors output
2165     author format.key output
2166     new.block
2167     format.btitle "title" output.check
2168     organization address new.block.checkb
2169     organization output
2170     address output
2171     format.edition output
2172     format.date output
2173     format.url output
2174     new.block
2175     note output
2176     fin.entry
2177 }
2178
2179 FUNCTION {mastersthesis}
2180 { output.bibitem
2181     format.authors "author" output.check
2182     author format.key output
2183     new.block
2184     format.title "title" output.check
2185     new.block
2186     "Master's thesis" format.thesis.type output.nonnull
2187     school "school" output.check
2188     address output
2189     format.date "year" output.check
2190     format.url output
2191     new.block
2192     note output
2193     fin.entry
2194 }
2195
2196 FUNCTION {misc}
2197 { output.bibitem
2198     format.authors output
2199     author format.key output

```

```

2200 title howpublished new.block.checkb
2201 format.title output
2202 howpublished new.block.checka
2203 howpublished output
2204 format.date output
2205 format.issn output
2206 format.url output
2207 new.block
2208 note output
2209 fin.entry
2210 empty.misc.check
2211 }
2212
2213 FUNCTION {phdthesis}
2214 { output.bibitem
2215   format.authors "author" output.check
2216   author format.key output
2217   new.block
2218   format.btitle "title" output.check
2219   new.block
2220   "PhD thesis" format.thesis.type output.nonnull
2221   school "school" output.check
2222   address output
2223   format.date "year" output.check
2224   format.url output
2225   new.block
2226   note output
2227   fin.entry
2228 }
2229
2230 FUNCTION {proceedings}
2231 { output.bibitem
2232   format.editors output
2233   editor format.key output
2234   new.block
2235   format.btitle "title" output.check
2236   format.bvolume output
2237   format.number.series output
2238   address output
2239   format.date "year" output.check
2240   new.sentence
2241   organization output
2242   publisher output
2243   format.isbn output
2244   format.url output
2245   new.block
2246   note output
2247   fin.entry
2248 }
2249
2250 FUNCTION {techreport}
2251 { output.bibitem
2252   format.authors "author" output.check
2253   author format.key output

```



```

2254 new.block
2255 format.title "title" output.check
2256 new.block
2257 format.tr.number output.nonnull
2258 institution "institution" output.check
2259 address output
2260 format.date "year" output.check
2261 format.url output
2262 new.block
2263 note output
2264 fin.entry
2265 }
2266
2267 FUNCTION {unpublished}
2268 { output.bibitem
2269   format.authors "author" output.check
2270   author format.key output
2271   new.block
2272   format.title "title" output.check
2273   format.url output
2274   new.block
2275   note "note" output.check
2276   format.date output
2277   fin.entry
2278 }
2279
2280 FUNCTION {default.type} { misc }
2281
2282
2283 MACRO {jan} {"January"}
2284
2285 MACRO {feb} {"February"}
2286
2287 MACRO {mar} {"March"}
2288
2289 MACRO {apr} {"April"}
2290
2291 MACRO {may} {"May"}
2292
2293 MACRO {jun} {"June"}
2294
2295 MACRO {jul} {"July"}
2296
2297 MACRO {aug} {"August"}
2298
2299 MACRO {sep} {"September"}
2300
2301 MACRO {oct} {"October"}
2302
2303 MACRO {nov} {"November"}
2304
2305 MACRO {dec} {"December"}
2306
2307

```

```

2308
2309 MACRO {acmcs} {"ACM Computing Surveys"}
2310
2311 MACRO {acta} {"Acta Informatica"}
2312
2313 MACRO {cacm} {"Communications of the ACM"}
2314
2315 MACRO {ibmjrd} {"IBM Journal of Research and Development"}
2316
2317 MACRO {ibmsj} {"IBM Systems Journal"}
2318
2319 MACRO {ieeese} {"IEEE Transactions on Software Engineering"}
2320
2321 MACRO {ieeetc} {"IEEE Transactions on Computers"}
2322
2323 MACRO {ieeetcad}
2324 {"IEEE Transactions on Computer-Aided Design of Integrated Circuits"}
2325
2326 MACRO {ipl} {"Information Processing Letters"}
2327
2328 MACRO {jacm} {"Journal of the ACM"}
2329
2330 MACRO {jcss} {"Journal of Computer and System Sciences"}
2331
2332 MACRO {scp} {"Science of Computer Programming"}
2333
2334 MACRO {sicomp} {"SIAM Journal on Computing"}
2335
2336 MACRO {tocs} {"ACM Transactions on Computer Systems"}
2337
2338 MACRO {tods} {"ACM Transactions on Database Systems"}
2339
2340 MACRO {tog} {"ACM Transactions on Graphics"}
2341
2342 MACRO {toms} {"ACM Transactions on Mathematical Software"}
2343
2344 MACRO {toois} {"ACM Transactions on Office Information Systems"}
2345
2346 MACRO {toplas} {"ACM Transactions on Programming Languages and Systems"}
2347
2348 MACRO {tcs} {"Theoretical Computer Science"}
2349
2350
2351 READ
2352
2353 FUNCTION {sortify}
2354 { purify$
2355   "l" change.case$
2356 }
2357
2358 INTEGERS { len }
2359
2360 FUNCTION {chop.word}
2361 { 's :=

```

```

2362 'len :=
2363 s #1 len substring$ =
2364 { s len #1 + global.max$ substring$ }
2365 's
2366 if$
2367 }
2368
2369 FUNCTION {format.lab.names}
2370 { 's :=
2371 s #1 "{vv~}{ll}" format.name$
2372 s num.names$ duplicate$
2373 #2 >
2374 { pop$ " et~al." * }
2375 { #2 <
2376 'skip$
2377 { s #2 "{ff }{vv }{ll}{ jj}" format.name$ "others" =
2378 { " et~al." * }
2379 { " and " * s #2 "{vv~}{ll}" format.name$ * }
2380 if$
2381 }
2382 if$
2383 }
2384 if$
2385 }
2386
2387 FUNCTION {author.key.label}
2388 { author empty$
2389 { key empty$
2390 { cite$ #1 #3 substring$ }
2391 'key
2392 if$
2393 }
2394 { author format.lab.names }
2395 if$
2396 }
2397
2398 FUNCTION {author.editor.key.label}
2399 { author empty$
2400 { editor empty$
2401 { key empty$
2402 { cite$ #1 #3 substring$ }
2403 'key
2404 if$
2405 }
2406 { editor format.lab.names }
2407 if$
2408 }
2409 { author format.lab.names }
2410 if$
2411 }
2412
2413 FUNCTION {author.key.organization.label}
2414 { author empty$
2415 { key empty$

```

```

2416         { organization empty$
2417           { cite$ #1 #3 substring$ }
2418           { "The " #4 organization chop.word #3 text.prefix$ }
2419         if$
2420       }
2421       'key
2422     if$
2423   }
2424   { author format.lab.names }
2425 if$
2426 }
2427
2428 FUNCTION {editor.key.organization.label}
2429 { editor empty$
2430   { key empty$
2431     { organization empty$
2432       { cite$ #1 #3 substring$ }
2433       { "The " #4 organization chop.word #3 text.prefix$ }
2434     if$
2435   }
2436   'key
2437   if$
2438 }
2439 { editor format.lab.names }
2440 if$
2441 }
2442
2443 FUNCTION {calc.short.authors}
2444 { type$ "book" =
2445   type$ "inbook" =
2446   or
2447   'author.editor.key.label
2448   { type$ "proceedings" =
2449     'editor.key.organization.label
2450     { type$ "manual" =
2451       'author.key.organization.label
2452       'author.key.label
2453     if$
2454   }
2455   if$
2456 }
2457 if$
2458 'short.list :=
2459 }
2460
2461 FUNCTION {calc.label}
2462 { calc.short.authors
2463   short.list
2464   "("
2465   *
2466   year duplicate$ empty$
2467   short.list key field.or.null = or
2468   { pop$ "" }
2469   'skip$

```

```

2470 if$
2471 *
2472 'label :=
2473 }
2474
2475 FUNCTION {sort.format.names}
2476 { 's :=
2477   #1 'nameptr :=
2478   ""
2479   s num.names$ 'numnames :=
2480   numnames 'namesleft :=
2481   { namesleft #0 > }
2482   { nameptr #1 >
2483     { " " * }
2484     'skip$
2485     if$
2486     s nameptr "{vv{ } }{ll{ }}{ ff{ }}{ jj{ }}" format.name$ 't :=
2487     nameptr numnames = t "others" = and
2488     { "et al" * }
2489     { t sortify * }
2490     if$
2491     nameptr #1 + 'nameptr :=
2492     namesleft #1 - 'namesleft :=
2493   }
2494   while$
2495 }
2496
2497 FUNCTION {sort.format.title}
2498 { 't :=
2499   "A " #2
2500   "An " #3
2501   "The " #4 t chop.word
2502   chop.word
2503   chop.word
2504   sortify
2505   #1 global.max$ substring$
2506 }
2507
2508 FUNCTION {author.sort}
2509 { author empty$
2510   { key empty$
2511     { "to sort, need author or key in " cite$ * warning$
2512     ""
2513     }
2514     { key sortify }
2515     if$
2516   }
2517   { author sort.format.names }
2518   if$
2519 }
2520
2521 FUNCTION {author.editor.sort}
2522 { author empty$
2523   { editor empty$

```

```

2524         { key empty$
2525             { "to sort, need author, editor, or key in " cite$ * warning$
2526                 ""
2527             }
2528             { key sortify }
2529         if$
2530     }
2531     { editor sort.format.names }
2532 if$
2533 }
2534 { author sort.format.names }
2535 if$
2536 }
2537
2538 FUNCTION {author.organization.sort}
2539 { author empty$
2540     { organization empty$
2541         { key empty$
2542             { "to sort, need author, organization, or key in " cite$ * warning$
2543                 ""
2544             }
2545             { key sortify }
2546         if$
2547         }
2548         { "The " #4 organization chop.word sortify }
2549     if$
2550     }
2551     { author sort.format.names }
2552 if$
2553 }
2554
2555 FUNCTION {editor.organization.sort}
2556 { editor empty$
2557     { organization empty$
2558         { key empty$
2559             { "to sort, need editor, organization, or key in " cite$ * warning$
2560                 ""
2561             }
2562             { key sortify }
2563         if$
2564         }
2565         { "The " #4 organization chop.word sortify }
2566     if$
2567     }
2568     { editor sort.format.names }
2569 if$
2570 }
2571
2572 FUNCTION {presort}
2573 { calc.label
2574     label sortify
2575     " "
2576     *
2577     type$ "book" =

```

```

2578 type$ "inbook" =
2579 or
2580   'author.editor.sort
2581   { type$ "proceedings" =
2582     'editor.organization.sort
2583     { type$ "manual" =
2584       'author.organization.sort
2585       'author.sort
2586     }
2587   }
2588   if$
2589 }
2590 if$
2591 " "
2592 *
2593 year field.or.null sortify
2594 *
2595 " "
2596 *
2597 title field.or.null
2598 sort.format.title
2599 *
2600 #1 entry.max$ substring$
2601 'sort.label :=
2602 sort.label *
2603 #1 entry.max$ substring$
2604 'sort.key$ :=
2605 }
2606
2607 ITERATE {presort}
2608
2609 SORT
2610
2611 STRINGS { longest.label last.label next.extra }
2612
2613 INTEGERS { longest.label.width last.extra.num number.label }
2614
2615 FUNCTION {initialize.longest.label}
2616 { "" 'longest.label :=
2617   #0 int.to.chr$ 'last.label :=
2618   "" 'next.extra :=
2619   #0 'longest.label.width :=
2620   #0 'last.extra.num :=
2621   #0 'number.label :=
2622 }
2623
2624 FUNCTION {forward.pass}
2625 { last.label label =
2626   { last.extra.num #1 + 'last.extra.num :=
2627     last.extra.num int.to.chr$ 'extra.label :=
2628   }
2629   { "a" chr.to.int$ 'last.extra.num :=
2630     "" 'extra.label :=
2631     label 'last.label :=

```

```

2632     }
2633     if$
2634     number.label #1 + 'number.label :=
2635 }
2636
2637 FUNCTION {reverse.pass}
2638 { next.extra "b" =
2639   { "a" 'extra.label := }
2640   'skip$
2641   if$
2642   extra.label 'next.extra :=
2643   extra.label
2644   duplicate$ empty$
2645   'skip$
2646   { "{\natexlab{" swap$ * "}}" * }
2647   if$
2648   'extra.label :=
2649   label extra.label * 'label :=
2650 }
2651
2652 EXECUTE {initialize.longest.label}
2653
2654 ITERATE {forward.pass}
2655
2656 REVERSE {reverse.pass}
2657
2658 FUNCTION {bib.sort.order}
2659 { sort.label 'sort.key$ :=
2660 }
2661
2662 ITERATE {bib.sort.order}
2663
2664 SORT
2665
2666 FUNCTION {begin.bib}
2667 { preamble$ empty$
2668   'skip$
2669   { preamble$ write$ newline$ }
2670   if$
2671   "\begin{thebibliography}" number.label int.to.str$ * "}" *
2672   write$ newline$
2673   "\expandafter\ifx\csname natexlab\endcsname\relax\def\natexlab#1{#1}\fi"
2674   write$ newline$
2675   "\expandafter\ifx\csname url\endcsname\relax" write$ newline$
2676   " \def\url#1{{\tt #1}}\fi" write$ newline$
2677 }
2678
2679 EXECUTE {begin.bib}
2680
2681 EXECUTE {init.state.consts}
2682
2683 ITERATE {call.type$}
2684
2685 FUNCTION {end.bib}

```



```

2686 { newline$
2687   "\end{thebibliography}" write$ newline$
2688 }
2689
2690 EXECUTE {end.bib}
2691 </bst>

```

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