LaTeX

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Abstract

This report provides a basic overview of LaTeX, the popular document formatter.It will help you quickly get started.

1 Introduction

LaTeXis a free software for document processsing. Given a text file as the input, LaTeXcompiler would make a nicely formatted document out of it.

2 Document creation on Linux

Method 1

1. Create the document as a text file with latex tags with .tex extension

   e.g., myfile.tex

2. latex myfile

3. xdvi myfile (shows it on screen)

4. dvips -o myfile.ps myfile (creates a postscript file called myfile.ps)

5. ps2pdf myfile.ps (makes a pdf file called myfile.pdf)

Method 2

1. Create the document as a text file with latex tags with .tex extension

   e.g., myfile.tex

2. pdflatex myfile

3 Document structure

3.1 Form

```
\documentclass[options]{class}

preamble

\begin{document]
This is my great document.
\end{document}
```

3.2 class

- article: For articles in scientific journals, presentations, short reports, program documentation, invitations,...
- report: For longer reports containing several chapters, small books, Ph.D. Theses,...
- book: for books
- slides: for slides

3.3 option

10pt, 11pt, 12pt: Sets the size of main font in the document. (default10pt)

a4paper,letterpaper,a5paper, b5paper,executivepaper, legalpaper: Defines the paper size. (default: letterpaper)

fleqn: Typesets displayed formula left-aligned instead of centred.

leqno: Places the numbering of formulae on the left hand side instead of the right.

titlepage,notitlepage: Specifies whether a new page should be started after the document title or not. The "article" class does not start a new page by default, while "report" and "book" do.

onecolumn,twocolumn: Instructs Latex to typeset the document in one or two columns.

landscape: landscape mode.

openright, openany: Makes chapters begin iether only on right hand pages or on the next page available. Does not work with "article" class as it does not know about chapters. The "report" class by default starts chapters on the next page available and the "book" class starts them on right hand pages.

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3.4 Preamble

Definitions that apply to the entire document.

```
e.g.,
\textwidth  6.5in
\textheight 9in
\oddsidemargin 0in
\evensidemargin 0in
```

4 Blanks, paragraphs, newlines and pages

A sequence of blanks or tabs, or single line break, is equivalent to a single blank character.

Two or more consecutive line breaks (that is, one or more blank lines) indicate **end of paragraph**.

Also note the following:

```
Line break: \\ or \newline

Page break: \newpage or \clearpage
```

Can define a page style for the document through the following commands:

```
\pagestyle{style} âĂŞ Changes the style from
current page till the end of document
\thispagestyle{style} âĂŞ Changes page style for
the current page
```

styles:

plain: prints page numbers on the bottom of page, in the middle of the footer (default)

headings: prints the current chapter heading and the page number in the header of each page, while the footer remains empty.

empty: sets both header and footer to be empty.

5 Shapes and sizes

Latex font sizes

tiny, scriptsize, footnotesize, small, normalsize, large, Large, LARGE, huge, Huge

e.g.,

```
{\Large Elephant} - Only ‘‘Elephant’’ is
large.
\Large Elephant - all of the text until
next size command will be Large.
```

Fonts

rm - roman (default), bf - bold , it - italics, sc - Small Capitals, sf - sans serif, sl - slanted, tt -typewriter

e.g.,

```
{\it testing}
```

Note:

```
\underline{text} - Underlines text
\emph{text} - Emphasizes text
```

6 Sections

part, chapter, section, subsection, subsubsection, paragraph, subparagraph

e.g.,

```
\subsubsection{My Section}
```

Notes:

1. Commands `\part` and `\chapter` cannot be used with the article style, but are available in the book and report styles.

2. Following in the preamble of a document:

   ```
   \setcounter{secnumdepth}{5}
   ```

   means paragraphs and subparagraphs are numbered as well. (Default is 3, which means sections, subsections, and subsubsections are numbered.)

3. `\subsection*{Polonnaruwa Period}` writes an **unnumbered** subsection titled **Polonnaruwa Period**.

7 Tables and Figures

Tables and figures are the two floating environments supported by LaTeX. They are called ”floating” as they cannot be broken across pages.

Tables

Form

```
\begin{table}[PlacementSpecifier]
\begin{center}
\begin{tabular}{Cols}
Row descriptions with columns demarcated by &
\end{tabular}
\caption{My Great Table}
\label{greatTable}
\end{center}
\end{table}
```

Description

PlacementSpecifier could be:
h - place right here
t - place at the top of page
b - place at the bottom of page
p - place in a special page containing only floats
! - force it

Cols defines the format of the coulumns in the table:

l - contents left justified in column

c - contents centered in column

r - contents right justified in column

| - inter-column specifier (if omitted there will be **no** vertical rules between columns; e.g., cc specifies a vertical rule, two centered columns with inter-column space between them and another vertical rule

Note:
`\hline` is used to draw a horizontal line to cover the table width and \\ is used as usual to indicate line break.

An example of drawing a table is given in the sample .tex file of the supplementary note.

Figures

Form

```
\begin{figure}[PlacementSpecifier]
\begin{center}
\includegraphics[width=2in,height=1in]
{mygraphic}
\caption{My Great Picture}
\label{greatPicture}
\end{center}
\end{figure}
```

Description

PlacementSpecifier is same as for **table**.

pdflatex accepts .pdf or .jpg files [1]. However there is a utility called **convert**[2] in linux, that can convert graphics files from one format to another.

For the file name in the `\includegraphics` line, entering the extension of the graphics file (e.g., mygraphic.jpg) is not required.

An example of drawing a figure is given in the sample .tex file of supplementary note.

[1] A good, simple, free graphics package available in linux to draw images required for our documents is **xfig**. One can use it to save images in its native .fig file format which can then be **exported** by xfig to the required graphics format (e.g., .jpg)

[2] Use **man convert** at a linux prompt to get more information on convert

8 Special characters

`#` - introduces a command parameter
`$` - switches between text and math mode
`%` - introduces a comment
`&` - to align columns in tables and arrays
`_` provide subscripts in math mode
`{` and `}` are used for grouping
\ introduces LaTeXcommands
`^` provides superscripts in math mode
`~` prints a blank character but inhibits line breaking

```
To include first seven of above in the document
just write \ in front of them:
\# translates to # and so on. You can obtain the
last three by using \verb
followed by tbe required text bounded by two
demarcaters.

e.g, \verb|\| gives \
```

9 Cross referencing

use `\label{myName}` to label something and `\ref{name}` to use it elsewhere. This can be used to label sections, figures, tables etc. See code later.

10 Creating lists

itemize: Simple lists; enumerate: enumerated lists; description: for descriptions
e.g.,

```
\begin{enumerate}
\item You can:
  \begin{itemize}
  \item either eat it
  \item[-] or keep it to eat tomorrow
  \end{itemize}
\item But if you keep it till tomorrow:
  \begin{description}
  \item[Thieves] may eat it
  \item[Taste] will not be the same
  \end{description}
\end{enumerate}
```

11 Printing verbatim

Text that is enclosed between `\begin{verbatim}` and `\end{verbatim}` will be directly printed as it is. Can be used for example to print computer programs and for anything that we are not simply bothered to format for LaTeX.
e.g.,
`\begin {verbatim}`

Print this as it is.
\end{verbatim}

12 Justification

To generate either left-aligned, right-aligned or centered paragraphs.

e.g., \begin{flushleft}
Things to left align.
\end{flushleft}

13 Math mode

Enter math mode by enclosing text in $.

```
e.g. 1:  $x^2+y^2$

e.g. 2:
\begin{equation}
a^x+y \neq a^{x+y}
\end{equation}

\newpage
e.g. 3:
\begin{displaymath}
\mathbf{X} =
\left( \begin{array}{ccc}
  x_{11} & x_{12} & \ldots \\
  x_{21} & x_{22} & \ldots \\
  \vdots   & \vdots   & \ddots
\end{array} \right)
\end{displaymath}
```

14 Creating a bibliography

1. Put your references in a .bib file (e.g., test.bib) e.g.,

   ```
   @article
   {
   perera2000,
   author = "C.Perera",
   title = "{Introduction to
   Grid Computing}",
   journal = "Unknown",
   year = 2000
   }
   ```

2. In the latex source file (test.tex) use:

   ```
   \bibliographystyle{plain}

   \begin{document}
   See \cite{perera2000} for details.

   \bibliography{test}
   \end{document}
   ```

3. Then run:

   pdflatex test

   bibtex test

   pdflatex test

A Bibliography styles

(to be used with the **bibliographystyle** command)

plain : Entries sorted alphabetically with the citation represented by a number

alpha : Entries sorted aphabetically with the citation represented by author surname and year instead of number

abbrv : The bibliography looks the same as for "plain" style except that first names and names of journals and months are abbreviated

e.g., Thomas Fernando → T. Fernando

unsrt : Entries sorted according to citation, with the citation represented by a number

Note: Harvard style referencing could be done by the inclusion of following to the preamble of your tex file. Note also that you should have the agsm.bst file in your working directory.

```
\usepackage{natbib}

\bibliographystyle{agsm}
```

B Entries for the .bib file

B.1 Entry types

article entry - An article from a journal or magazine

book entry - A book with an explicit publisher

booklet entry - A work that is printed and bound, but without a named publisher or sponsoring institution

conference entry - An article in the proceedings of a conference This entry is identical to the 'inproceedings' entry and is included for compatibility with another text formatting system

inproceedings entry - An article in the proceedings of a conference.

proceedings entry - The proceedings of a conference

inbook entry - A part of a book, which may be a chapter and/or a range of pages

incollection entry - A part of a book with its own title

manual entry - Technical documentation

mastersthesis entry A - Master's thesis

phdthesis entry - A PhD thesis

techreport entry - A report published by a school or other institution, usually numbered within a series

unpublished entry - A document with an author and title, but not formally published

misc entry - Use this type when nothing else seems appropriate

B.2 Entry details

```
@ARTICLE
  {citation_key,
author, title, journal, year,
--
volume, number, pages, month, note, key}
---------------

@BOOK{citation_key,
author or editor,title,publisher,year,
--
volume,series, address,edition, month,
note, key}
---------------

@BOOKLET{citation_key,
title,
--
author, howpublished, address, month,
year, note, key}
---------------

@CONFERENCE
{{citation_key,
author, title, booktitle, year,
--
editor,   pages, organization, publisher,
address, month, note, key}
---------------

@INPROCEEDINGS{citation_key,
author, title, booktitle, year,
--
editor,pages, organization, publisher,
address, month, note, key}
---------------

@PROCEEDINGS{citation_key,
title, year,
--
editor, publisher, organization, address,
month, note, key}
---------------

@INBOOK{citation_key,
author or editor, title, chapter and/or pages,
publisher, year,
--
volume, series, address, edition, month,
note, key}
---------------

@INCOLLECTION{citation_key,
author, title, booktitle, year,
--
editor, pages, organization, publisher,
address, month, note, key}

---------------
@MANUAL{citation_key,
title,
--
author, organization, address, edition,
month, year, note, key}
---------------

@MASTERSTHESIS{citation_key,
author, title, school, year,
--
address, month, note, key}
---------------

@PHDTHESIS{citation_key,
author, title, school, year,
--
address, month, note, key}
---------------

@TECHREPORT{citation_key,
author, title, institution, year,
--
type, number, address, month, note, key}
---------------

@UNPUBLISHED{citation_key,
author, title, note,
--
month, year, key}
---------------

@MISC{citation_key,
--
author, title, howpublished, month, year,
note, key}
```