



Creating documents



Introduction to Latex

Introduction

- TeX is essentially a Markup Language (like HTML, XML and RTF)
- TeX written by Donald Knuth in 70's
 - A revolution in typesetting
- Latex is an extension of TeX
 - Macro packages to make TeX easier to use

presentaion is based on Troy D. Milner and Simon Cuce slides)

Latex vs. Word Processors

- High typeset quality
- Easy to include math formulas
- Source file format is not bounded to a particular OS or platform
- Latex implementations exists for all platforms (DOS, Windows, Unices,..)
- Latex is free

Latex vs. Word Processors

- De facto standard for scientific publishing
- Very few bugs
- Good for large documents
- Can run even on 386 PC
- Not very easy to learn

Example of Latex document

```
\documentclass{article}
\title{Simple Example}
\author{Andrei Gurtov}
\date{March 2000}
\begin{document}
\maketitle
Hello world!
\end{document}
```

Creating Latex Files

Your Latex File (a text file)

Your Bibtex File



Latex compile x3



Bibtex compile x2



Latex compile x3

Device independent
output .dvi



dvips compile x1

Your Postscript File

Latex File Structure

- **Document Class**
Predefined Formats (article, report, book,..).
- **Packages used**
Added Functionality (graphics, reference style,...).
- **Main Body**
Text and Bibliography References.

The Basics

- Document Class

```
\documentclass[options]{class}
options = a4paper, 11pt, 12pt, 10pt, twocolumn,
landscape,...
class = article, report, book,...
```

- Packages

```
\usepackage{package name}
epsfig = insert PS pictures into the
document
fancyhdr = easy definition of footer and
header
```


Body of Text

- Start with `\begin{document}`
- End with `\end{document}`
- Typesetting Text
 - `\\` or `\newline` and `\newpage`
 - Quotations
 - Bold `\textbf{.....}` or `\bf`
 - Italics `\emph{.....}` or `\textit{.....}` or `\it`
 - Underline `\underline{.....}` or `\u1`

Body of Text cont...

- Including Multiple Files
 - `\input{filename.tex}`

Format

- Sections
 - `\section{...}` = 1. Latex is Great
 - `\subsection{...}` = 1.1 Why Latex is Great
 - `\subsubsection{...}` = 1.1.1 Reason One
 - `\appendix` - changes numbering scheme
 - `\chapter{...}` - To be used with book and report document classes
- Titles, Authors and others
 - `\title{...}` `\author{...}`
 - `\footnote{...}`

Format Contd.

- `\maketitle` - Display Title and Author
- `\tableofcontents` - generates TOC
- `\listoftables` - generates LOT
- `\listoffigures` - generates LOF
- Labels
 - `\label{marker}` - Marker in document.
 - `\pageref{marker}` - Displays page no. of marker.
 - `\ref{marker}` - Displays section location of marker.
- Itemize
 - Use either *enumerate*, *itemize* or *description*.
 - see *handout* for example.

Lists

- Source
 - `\begin{itemize}`
 - `\item Apple`
 - `\item Orange`
 - `\end{itemize}`
- Result
 - Apple
 - Orange

Lists

- Enumerate instead of `itemize` gives a numbered list
- Lists can be recursive

Environment

- Something between
 - `\begin{name}`
 - `\end{name}`
- Many command, for example `\bf` affect the text until the end of environment
- Environments can be recursive
- Examples:
 - `itemize`, `center`, `abstract`

Group

- Group is some text between { and }
- Many commands work until the end of the group
- Code
 - put {one word \bf in bold} here
- Result
 - put one word **in bold** here

Alignment

- Environments `center`, `flushleft`, `flushright`
- Example
 - `\begin{flushright}`
 - Right aligned
 - `\end{flushright}`
- Result

Right aligned

Font size

`\tiny` `\scriptsize` `\footnotesize`

`\small` `\normalsize`

`\large` `\Large`

`\LARGE` `\huge`

`\Huge`

Tabular

- Columns

Two Columns

- `\begin{tabular}{|...|...|}`
- `\end{tabular}`

- Rows

- `&` - Split text into columns
- `\\` - End a row
- `\hline` - Draw line under row
- e.g. `123123 & 34.00\\ \hline`

l = automatically adjust size, left justify
r = automatically adjust size, right justify
p = set size
 e.g `p{4.7cm}`
c = centre text

Example of table

```
\begin{tabular}{|l|r|c|} \hline
Date & Price & Size \\ \hline
Yesterday & 5 & big \\ \hline
Today & 3 & small \\ \hline
\end{tabular}
```

Date	Price	Size
Yesterday	5	Big
Today	3	Small

Floating Objects

- Floating objects can stop splitting of tables and images over pages.

```
\begin{figure}[options]
```

```
\end{figure}
```

```
\begin{table}[options]
```

```
\end{table}
```

- They will now appear in the
 - List of Figures (LOF) and
 - List of Tables (LOT).

Options (recommendations)

h = place table here

t = place at top of page

b = place at bottom of page

Example of floating figure

- `\begin{figure}[ht]`
- `\centering\epsfig{file=uni.ps,
width=5cm}`
- `\caption{University of Helsinki}`
- `\label{uni}`
- `\end{figure}`

Figure~\ref{uni}
shows...

Images

- Use epsfig package
- `\usepackage{epsfig}`
- Including images in main body
- `\epsfig{file=filename.eps, width=10cm, height=9cm, angle=90}`
- Creating EPS - Use xv and/or xfig.
- MS Power Point, save as GIF and convert to EPS.

Bibliography by hand

```
\begin{thebibliography}{}  
\bibitem[Come95]{Come95} Comer,  
D. E., {\it Internetworking with TCP/IP:  
Principles, Protocols and Architecture},  
volume 1, 3rd edition. Prentice-Hall,  
1995.  
\end{thebibliography}
```

Bibliography contd.

- Citing references in text
 - `\cite{cuc98}` = (Cuce 1998)
 - `\citeN{cru98}` = Crud (1998)
 - `\shortcite{tom98}` = (Tom, et. al. 1998)

Some Math

```
\begin{center}
```

```
{\large
```

```
$$ y=\frac{a^3+2c_{\{x\}}}{1+\sqrt{b_{\{x\}}}} $
```

```
$ \\\
```

```
\vspace{0.2in}
```

```
$$
```

```
Q=\sum_{i=1}^j \int_{\{\mu\}}^{\{\infty\}} f(x_{\{j\}})
```

```
)dx $$ \\\
```

```
\vspace{0.2in}
```

```
$$ \Psi = \int_{-\infty}^{\infty} f_{\{xy\}}
```

```
(\frac{\partial}{\partial
```

```
Qx})(\frac{\partial}{\partial Qy})^{\{\text{Im}_{\{\pi\}}\}^{\prime}} $$ \\\ }
```

$$y = \frac{a^3 + 2c_x}{1 + \sqrt{b_x}}$$

$$Q = \sum_{i=1}^j \int_{\mu}^{\infty} f(x_j) dx$$

$$\Psi = \int_{-\infty}^{\infty} f_{xy} \left(\frac{\partial Q_x}{\partial Q_y} \right) dx$$

Tools

UNIX based systems

- xdvi, ghostview, fixps, emacs with latex/bibtex support.

Windows 98/NT

- Ghostview, Acrobat Distiller, Acrobat Reader, Scientific Workplace (not the best), the Bibtex viewer is good. Paint Shop Pro, Latex and Emacs

Conclusions

- Latex is optimal for master and phd thesis?
- Mathematical formulae are easy.
- Use bibtex search engines
- Consider converting Postscript files to PDF (more widespread in Windows world) and to conserve space.