Typesetting Papers with \LaTeX

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Goal of Today’s Tutorial

To enable you to use LaTeX to produce term papers, reports, conference papers, and journal articles in professional quality using existing layouts.
Not Covered

- Designing and defining layouts
- “Drawing” pictures in \LaTeX
- Concurrent web/paper publishing
- Most lot of the gory details
Covered

- What is \LaTeX{} and Why Use It?
- Basic \LaTeX{} Syntax
- Tables
- Typesetting Mathematical Formulas
- “Floats” (Figures and Tables)
- Defining Commands and Environments
- Cross-References
- Footnotes
- Citations and Lists of References
- Organizing Large Documents
- Importing Graphics
What is \LaTeX? 

Not a word processor
⇒ can’t be compared directly with Word

Technically, a macro package for D. Knuth’s \textit{typesetting system} T\TeX

Conceptually, a \textit{document processing system}

- separates content from presentation
- good layout is difficult ⇒ leave it to experts

Best seen as a programming language: A source is compiled into a paper or printable online document.
“If Latex doesn’t run on your machine, your machine is either incredibly old, incredibly new, or unbelievably obscure.”

(From one of the many LaTeX FAQs)
The \LaTeX `philosophy' separates content and presentation on purpose. Don’t fiddle with layout while you write.

\LaTeX produces postscript and PDF. How much more WYSIWYG do you want?

How much \textit{synchronous} WYSIWYG you get depends on your choice of editor. There is at least one WYSIWYG frontend for \LaTeX called Lyx (http://www.lyx.org).
Hopefully, this tutorial will convince you that it is not.
Why Use \LaTeX? — Technical Reasons

- Portable across platforms, i.e., truly device-independent
- Transparent (once you’ve figured out the gory details)
- Mature, stable, well-maintained
- Able to handle very large documents (e.g., *your thesis*) reliably and gracefully
- Slow versioning cycle (fewer version incompatibilities)
- Huge support community
Why Use \LaTeX? — Workflow Reasons

- Explicitly designed for scientific publishing (formulas, citations, references)
- Easy integration of material from other sources (figures, data, code)
- Facilitates modular document design
- De-facto an industry standard in our field; many conferences/publishers use/prefer/require \LaTeX
- Facilitates uniform typographic conventions
  - within one document
  - across multiple documents (conference proceedings, journals, multi-authored books)
Why Use \textsc{LaTeX}? — Other Reasons

- Money: FREE!
- Politics/Religion: Open source
- Looks better:

\textbf{definitions} vs. \textbf{definitions}
First Steps in \LaTeX: ‘Hello World’

\documentclass{article}
\begin{document}
Hello World!
\end{document}

\texttt{hello-world.tex}

\% latex hello-world
...
\% dvips hello-world
...
\% gv hello-world &
\documentclass{article}
\title{Yet Another Publication}
\author{Susan Sample \ and Ronald Random}
\date{May 17, 2034} \%default:\today
\begin{document}
\maketitle
\begin{abstract}
We found ... \\
\end{abstract}
\section{Introduction}
There’s ... \\
\section{Related Work}
\subsection{Some Previous Approach}
\subsubsection{What They Tried}
\end{document}
Abstract
We found a neat solution to a nasty problem.

1 Introduction
There’s this problem that everybody has been scratching their heads about. In this paper we tell you how we finally solved it.

2 Related Work

2.1 Some Previous Approach
2.1.1 What They Tried
2.1.2 Why It Doesn’t Work

2.2 Some Other Approach
LaTeX Syntax

- Multiple spaces are treated as one
  \[ \Rightarrow \text{Hello} \quad \text{World} \quad \text{same as} \quad \text{Hello} \quad \text{World} \]

- Single EOL char’s count as spaces

- `\ ` and `\newline` force line break

- `\ `* forces line break but prohibits page break

- One or more empty lines mean ‘new paragraph’
LaTeXSyntax

Quotes:

\begin{itemize}
  \item `single' \rightarrow `single'
  \item `double'' \rightarrow "double"
\end{itemize}

Dashes:

\begin{itemize}
  \item foo-bar \rightarrow hyphen
  \item 126\,--\,134 \rightarrow "en-dash"
  \item foo --- bar \rightarrow "em-dash"
\end{itemize}
Special Characters

% comment character: everything to the end of line and all leading spaces on the next line are ignored
\ commands and declarations start with \ 
{ } scope delimiters: scope of declarations obligatory arg’s of commands
~ non-breakable space: \LaTeX{} won’t break the line here
$ used to enter/exit text style math mode
_ , ^ produce \texttt{subscript} / \texttt{superscript} in math mode
& ‘tab’ character in tabular and array environments
# used to distinguish arguments in the definition of commands (macros) and environments
Declarations

\langle name = string of letters \rangle

Commands

\langle special char or name \rangle

\langle special char or name \rangle \{ mandatory arg1 \}{ mand. arg2 }...

\langle name \rangle [ optional arg1 ]{ mand. arg2 }...

Environments

\begin{name} [opt. arg] {mand. arg} {mand. arg} ... 

... 

\end{name}
Declarations

- change the way things look until the end of scope, e.g.

\{one \{two \bfseries three \\itshape four\} \Huge five\} six

\Rightarrow one two \textbf{three} \textit{four} \textbf{five} six

- \large, \Large, \huge, \Huge, \small,
\footnotesize, \tiny,
\bfseries, \itshape, \sffamily, \rmfamily,
\centering, \raggedright, \sloppy, ...
Commands

- may have optional ([...]) and mandatory ({...}) arguments
- numerous functions
  - insert stuff ($\LaTeX \rightarrow \LaTeX$)
  - declare new commands, environments, counters, lengths etc. (explained later)
  - set stuff in a certain way, e.g.

\begin{verbatim}
A\parbox{3mm}{B\b\B\c}
A\parbox[t]{3mm}{B\b\B\c}
\end{verbatim}

\begin{verbatim}
AB\c
A\b\B
\end{verbatim}
\begin{quote}
... \\
\end{quote}

\LaTeX runs practically everywhere. As one FAQ puts it,

"If \LaTeX doesn’t run on your machine, your machine is either incredibly old, incredibly new, or unbelievably obscure."

(From one of the many \LaTeX FAQs)
Environments

\begin{equation}
... \\
\end{equation}

Entropy is defined as

\[ H(x) = - \sum_{i=1}^{n} p(x_i) \log_2 p(x_i). \] (1)
The `tabular` and `array` Environments

- **tabular** is for text; **array** for math
  
  \begin{tabular} \textbf{[b]} \{p\{1.5cm\}|r@{.\}lc\} \ldots
  
- **optional argument:** \textit{b, t, or c}
  
  \begin{itemize}
    \item \textbf{t} \quad \text{align top row of table with line}
    \item \textbf{b} \quad \text{bottom row of table with line}
    \item \textbf{c} \quad \text{center (default)}
  \end{itemize}

- **mandatory argument:** column formatter
  
  \begin{itemize}
    \item \textbf{l/r/c} \quad \text{left/right-aligned/centered column}
    \item \textbf{p\{width\}} \quad \text{fixed-width column of width \textit{width}}
    \item \textbf{|} \quad \text{vertical line \textit{between} columns}
    \item @\{\ldots\} \quad \text{other stuff between col’s (on every row!)}
    \item *\{3\}\{c|\} \quad \text{= c | c | c |}
  \end{itemize}
The \textbf{tabular} and \textbf{array} Environments

in the table/array body:

\begin{itemize}
  \item \& – separates columns; ends formatting scope!
  \item \texttt{\textbackslash multicolumn}\{\textit{num}\}\{\textit{col}\}\{\textit{stuff}\}
    – cell spanning \textit{num} columns, containing \textit{stuff},
      formatted according to \textit{col}
  \item \texttt{\textbackslash \textbackslash}
    – marks end of row
  \item \texttt{[length]}
    – extra vertical space \textit{length}
  \item \texttt{\textbackslash hline}
    – creates a horizontal line, two a double line
  \item \texttt{\textbackslash vline}
    – creates a vertical line within a cell
  \item \texttt{\textbackslash cline}\{\textit{col}_1–\textit{col}_2\}
    – creates horizontal line between cols \textit{col}_1 and \textit{col}_2
\end{itemize}
**The tabular and array Environments**

\begin{tabular}[b]{p{1.5cm}|r@{.}lc}
foo & 2321 & 23 \\
\cline{1-1}
bar & 3 & 23423 \\
[3ex] \hline
foobar & 2324 & 46423
\end{tabular}

<table>
<thead>
<tr>
<th>foo</th>
<th>2321.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>3.23423</td>
</tr>
<tr>
<td>foobar</td>
<td>2324.46423</td>
</tr>
</tbody>
</table>
The \texttt{tabular} and \texttt{array} Environments

- **line breaks within cells:**
  - Possible only in $p\{\}$ columns
  - Forced linebreak can be tricky if respective column is the last. $\\$ is ambiguous; use $\backslash\texttt{newline}$ instead.

- \texttt{parbox}/\texttt{minipage} allowed only in $p\{\}$ columns

- **nested \texttt{tabular} environments** allowed everywhere; can be used as a hack to force linebreaks

\begin{verbatim}
... \& \begin{tabular}{@{}l@{}}
foo\\bar
\end{tabular} ... \\
\end{verbatim}
line spacing between rows:

- controlled by \texttt{arraystretch} command, adjust with
  \begin{verbatim}
  \renewcommand{\arraystretch}{(number)}
  \end{verbatim}

- valid within scope, e.g.
  \begin{verbatim}
  {\renewcommand{\arraystretch}{2}
  \begin{tabular}{ll}
  ... \\
  \end{tabular}}
  \end{verbatim}
more parameters:

\texttt{\textbackslash tabcolsep} – half the space between two tabular columns; margin at the edges of the table

\texttt{\textbackslash arraycolsep} – same thing for arrays

\texttt{\textbackslash arrayrulewidth} – thickness of lines created by \texttt{\textbackslash hline} etc.

\texttt{\textbackslash doublerulesep} – space between two adjacent lines

- can be adjusted with \texttt{\textbackslash setlength\{parameter\}\{value\}},

  e.g. \texttt{\textbackslash setlength\{\textbackslash tabcolsep\}\{2pt\}}

- such changes are valid within the current scope; use \texttt{\{\ldots\}} to delimit scope of changes
The `\texttt{tabular*}` Environment

\begin{tabular*}{\textwidth}{c@{\extracolsep{\fill}}lr@{\extracolsep{0pt}::}l} 
\hline
bla & bla & bla & bla \\
blabla & blabla & blabla & blabla \\
\hline
\end{tabular*}

\begin{verbatim}
\begin{tabular*}{\linewidth}{\extrarowheight 1pt}
\hline
bla & bla & bla & bla \\
blabla & blabla & blabla & blabla & blabla \\
\hline
\end{tabular*}
\end{verbatim}
Entropy is defined as

$$H(x) = -\sum_{i=1}^{n} p(x_i) \log_2 p(x_i).$$
Entropy is defined as

\[ H(x) = -\sum_{i=1}^{n} p(x_i) \log_2 p(x_i). \]
Entropy is defined as
\[H(x) = -\sum_{i=1}^{n} p(x_i) \log_2 p(x_i).\]
Entropy is defined as
\begin{equation}
H(x) = -\sum_{i=1}^{n} p(x_i) \log_2 p(x_i).
\label{eq-entropy}
\end{equation}

We can refer to Equation \ref{eq-entropy} in the text as
\begin{equation}
H(x) = -\sum_{i=1}^{n} p(x_i) \log_2 p(x_i).
\end{equation}

\begin{equation}
\tag{2}
\end{equation}
Math Mode: Caveats

- no spaces between ‘words’; all letters set in italics
- don’t use $\ldots$ as poor man’s italics

\[ \text{function} \quad \rightarrow \quad function \]
\[ \textit{function} \quad \rightarrow \quad function \]

- you can insert plain text in math mode via \texttt{rm}, \texttt{sf}, or \texttt{mbox}.

\[ p(n) = \frac{1}{m} \text{ for } n \leq m \]

\[ p(n) = \frac{1}{m} \text{ for } n \leq m \]
In order to entire formulas in **bold**, declare \texttt{\boldmath} outside the respective math environment

\begin{verbatim}
{\boldmath$\sqrt[4]{x^{\alpha}}$}
\end{verbatim}

$\sqrt[4]{x^{\alpha}}$

Individual words can be set in bold, italics (default anyway), plain text with \texttt{\textbf{mathbf}}, \texttt{\textit{mathit}}, \texttt{\textsc{mathrm}}, \texttt{\textsf{mathsf}}.
Math Mode — Braces, Brackets, etc.

\[
\begin{array}{ll}
1 & \text{for } x \geq 3 \\
0 & \text{otherwise}
\end{array}
\]

matches any single open \( \left( \right), \left[ \right], \text{ etc.} \)

\[ f(x) = \begin{cases} 
1 & \text{for } x \geq 3 \\
0 & \text{otherwise}
\end{cases} \]
\begin{eqnarray*}
3x^2 + 7x &=& 0 \nonumber \\
3x + 7 &=& 0 \\
x &=& \frac{7}{3} \label{james}
\end{eqnarray*}

\begin{align*}
3x^2 + 7x &= 0 \\
3x + 7 &= 0 \\
x &= \frac{7}{3}
\end{align*}
Math Mode — `eqnarray(*)`

\begin{eqnarray}
3x^2 + 7 & = & 0 \nonumber \\
3x + 7 & = & 0 \\
x & = & \frac{7}{3} \label{James} \\
\end{eqnarray}

- \texttt{\nonumber} suppresses equation number
- We can refer to the last row via \texttt{\ref{James}}
- \texttt{\eqnarray*} environment never prints equation numbers; \texttt{\label{...}} makes no sense in that case.
Figures and Tables

\begin{figure}[t]
\centering
\includegraphics[width=\textwidth]{figure.png}
\caption[Text for list of figures]{Caption text here \label{...}}
\end{figure}

\begin{table}[t]
\centering
\begin{tabular}{|c|c|c|}
\hline
Column 1 & Column 2 & Column 3 \\
\hline
Data 1 & Data 2 & Data 3 \\
\hline
\end{tabular}
\caption[Text for list of tables]{Caption text here \label{...}}
\end{table}
optional location parameter specifies where to put the figure/table:
\begin{figure}[loc]
\h – right here (does not work for figure* / table* environments in two-column mode!)
\! – really right here; try harder!
\t – top of page
\b – bottom of page
\p – separate page with figures and tables only

default is \[tbp\]

create lists of tables/figures with \listoffigures / \listoftables where you want them
Figures and Tables

- The `figure*` and `table*` environments create full-width figures/tables in articles with two-column format.

- \texttt{\renewcommand{\topfraction}{\textit{val}}, 0 \leq val \leq 1} in the \textit{document preamble} sets the fraction of the page that can be used for figures and tables; \texttt{\bottomfraction}, \texttt{\textfraction} work the same way.
Defining Commands

\newcommand{\textit{name}}{\textit{args}}{\textit{default}}{\textit{definition}}

- defines new command

\renewcommand{\textit{name}}{\textit{args}}{\textit{default}}{\textit{definition}}

- re-defines existing command

\providecommand{\textit{name}}{\textit{args}}{\textit{default}}{\textit{definition}}

- defines existing command unless it exists
\newcommand{\seq}[3][x]{{%}
\ensuremath{#1_{#2}, \ldots, #1_{#3}}}}

\ldots the sequence $\seq[k]{1}{n}$ is \ldots

\ldots the sequence $k_1, \ldots, k_n$ is \ldots
Defining Environments

\newenvironment{\textit{name}}[\textit{args}][\textit{default}]{\textit{begdef}}{\textit{enddef}}

- defines new environment

\renewenvironment{\textit{name}}[\textit{args}][\textit{default}]{\textit{begdef}}{\textit{enddef}}

- redefines existing environment

\newenvironment{\textit{itquote}}{\textit{\begin{quote}}\textit{\textit{itshape}}{\textit{\end{quote}}}{\textit{\end{quote}}
\newtheorem{lemma}{Lemma}[chapter]
  :
\begin{lemma}
$\mathcal{K}$ is transitive.
\label{K-transitive}
\end{lemma}

Lemma 3.1 $\mathcal{K}$ is transitive.
Theorem-like Environments

\begin{verbatim}
\newtheorem{name}{text}[within]
\newtheorem{name}[like]{text}
\end{verbatim}

name – name of the environment

text – text displayed before the counter

within – counts within a certain section such as chapter (theses), section, etc.

like – use the same counter as some other theorem-like environment
Theorem-like Environments

\begin{lemma}[\citet{key}]
\mathcal{K} is transitive.
\label{K-transitive}
\end{lemma}

Lemma 3.2 (Author, Year) $\mathcal{K}$ is transitive.
Cross-References

- refer to figures, tables etc. with \ref{label}
- works for all labeled and numbered thingies: figures, tables, footnotes, equations, sections (put label in the argument of the \section{...} command), etc.
- you can put a \label{...} everywhere and refer to the page with \pageref{...}
Footnotes

- insert \footnote{...} command where you want the footnote in the text

\begin{quote}
... when used sparingly.\%
\%
\footnote{Like this one.}
\%
In \LaTeX, ...
\end{quote}

While excessive use of footnotes should be avoided, they can be useful when used sparingly.\footnote{Like this one.} In \LaTeX, you can just insert them into the source text wherever you want them to appear.
Citations and Bibliographies: \texttt{BIBTEX}

- \texttt{.bst} file specifies the \textit{bibliography style}
- what the entries in the list of references look like
- \texttt{.bst} file usually provided by someone else (e.g., publisher)
- \texttt{.bib} files contain the bibliographic data
.bib files

@String{PoPM = {Publish or Perish Magazine}}

@Book{sample00,
    author = {Susan Sample},
    title = {A General Solution to All Problems},
    publisher = {Random University Press},
    year = 2000,
    address = {Springfield, Idaho}
}

@Article{user97,
    author = {Joe User},
    title = {Yet Another Publication},
    journal = PoPM,
    year = 1997,
    volume = 23,
    number = 4,
    pages = {23--35}
}

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.bib Files: Caveats

- Titles of journal articles, conference papers, etc. are often automatically lowercased, regardless of what’s in the .bib file. Enclosing stuff in \{\ldots\} protects against that:

```
title = \{\texttt{Reinventing \{C\}anada}\}
```

- Accented characters should also be enclosed in \{\ldots\}

```
title = \{G\"o\}del’s Theorem\}
```
Citations

standard latex provides the command \cite{key}

default citation style is bla bla bla [1] bla bla

list of references is created like this:
\bibliography{DataFile1,DataFile2}
\bibliographystyle{StyleFile}

DataFile* are the names of the .bib files (without the extension)

StyleFile is the name of the .bst file

I highly recommend using the natbib package for citations
This Just In: Loading Packages

- packages provide additional functionality and can change the layout
- many conferences provide packages rather than classes
- packages are loaded with `\usepackage` in the preamble

\documentclass[options]{article}
\usepackage[options]{natbib}
\bibliographystyle{plainnat}
\begin{document}
...
\bibliography{biblio.bib}

- package options are separated by commas
The Natbib Package

accomodates all major citations styles
([1], Author (Year), [CITEKEY])

provides several citation commands, most importantly

\texttt{\citet{key}} \quad \text{Author (Year)}
\texttt{\citetp[see also]{:24}{key}} \quad \text{Author, Year}
\texttt{\citealt{key}} \quad \text{Author}
\texttt{\citealp{key}} \quad \text{Author, Year}

\texttt{\begin{lemma}\citealp{key}\end{lemma}}

\textbf{Lemma 3.3 (Author, Year)} \( \mathcal{K} \) is transitive.
The Natbib Package

is well documented and offers many customization options;

\usepackage[options]{natbib}

default $\rightarrow$ [Autor1, 1997, Author2, 2000]

[round, colon] $\rightarrow$ (Autor1, 1997; Author2, 2000)

[numbers] $\rightarrow$ [23,21]
Including Other \LaTeX Files

\begin{itemize}
  \item \texttt{\input{file}} \quad \text{Include } file\.tex \text{ at this point}
  \item \texttt{\include{file1, file2, \ldots}}
    \begin{itemize}
      \item Include contents of \texttt{file1\.tex, file2\.tex, \ldots} with page-breaks at the beginning and end, and between files
    \end{itemize}
  \item \texttt{\include} commands cannot be nested
  \item \texttt{\includeonly{file1, file2, \ldots}} \quad \text{in preamble!}
    \begin{itemize}
      \item Only those specified with \texttt{\includeonly} are processed and produce output.
      \item Allows you to print a single chapter with correct cross-references (provided the excluded files have not changed since last processed)
    \end{itemize}
\end{itemize}
Sample Thesis Master File

\documentclass{ut-thesis}
\usepackage[round,colon]{natbib}
...
\input{preamble} % all the preamble definitions like title, author, etc.
\includeonly{Intro,Conclusions} % print only Intro and Conclusions
\begin{document}
\include{Title-Stuff} % title page, dedication, table of content,
 % lists of figures and tables, preface, etc.
\include{Intro}
\include{Theory}
\include{RelWork}
\include{Implementation}
\include{Evaluation}
\include{Conclusions}
\include{Appendices}
\include{Bibliography}
\end{document}
\documentclass{article}
\usepackage[numbers]{natbib}
...
\title{...}
\author{...}
\begin{document}
\maketitle
\input{abstract}
\input{intro}
\input{conclusions}
...
\input{conclusions}
\bibliographystyle{plainnat}
\bibliography{biblio}
\end{document}
Including `.eps` Graphics

\usepackage{graphicx}
\begin{document}
\includegraphics[opt1, opt2, ...]{file}

Includes encapsulated postscript file `file.eps`. 
\includegraphics\textbf{Options}

- \texttt{scale=scale} scale by factor \textit{scale}
- \texttt{width=w} scale picture to have width \textit{w}
- \texttt{height=h} scale picture to have height \textit{h}
- \texttt{angle=angle} rotation angle
- \texttt{origin=org} origin for rotation, default is center (c)

If both \texttt{width} and \texttt{height} are specified, keep aspect ratio and scale to \textit{at most} \textit{w} and \textit{at most} \textit{h}
\includegraphics\textbf{Options}

\texttt{viewport= llx lly urx ury}

override bounding box (BB)

\texttt{trim = l b r t}

reduce BB by \texttt{l,b,r,t} on the left, bottom, right, top; \texttt{l,b,r,t} are length measures

\texttt{clip}

clip picture at bounding box/viewport;

\\texttt{\includegraphics*}

has the same effect
List-making Environments

\begin{itemize}
  \item Gnus
    \begin{itemize}
      \item Green Gnus
    \end{itemize}
  \item Gnats
\end{itemize}
List-making Environments

\begin{enumerate}
\item ...
  \begin{enumerate}
  \item ...
  \end{enumerate}
\item ...
\end{enumerate}

1. Gnus
   (a) Green Gnus
2. Gnats
List-making Environments

\begin{description}
\item[Gnus] bla bla bla bla bla bla bla bla ...
\item[Green Gnus] bla bla bla ...
\item[Gnats] bla bla bla ...
\end{description}
Fine-tuning The Layout: Spaces

\noindent

\vspace{\ldots}

insert at beginning of paragraph; blocks paragraph indentation

\vspace{\ldots}

insert vertical space; no effect at top/bottom of page, use

\vspace{\ldots}

to force extra space at beginning/bottom of page

\hspace{\ldots}

same thing for horizontal space

\hspace{\ldots}

non-breakable space

\ \ ~ \ \\
\!, \ !, \ : , \ ;

\, \!, \ : , \ ;

thin / negative thin / medium / thick space
Fine-tuning The Layout: Breaks

\texttt{\textbackslash newline, \textbackslash\textbackslash}, \texttt{\textbackslash\textbackslash\textbackslash*}

line break

\texttt{\textbackslash\textbackslash newpage}

column break (in two-column mode); page break otherwise

\texttt{\textbackslash\textbackslash clearpage}

page break plus print all floats declared so far

\texttt{\textbackslash\textbackslash cleardoublepage}

like \texttt{\textbackslash\textbackslash clearpage}; start new page on a new sheet of paper
\begin{alignment style} ... \end{alignment style}

center \hspace{1cm} centering
flushleft \hspace{1cm} flush to the left (like a type writer)
flushright \hspace{1cm} flush to the right
Fine-tuning The Layout: Hyphenation

conjugation

• tells $\LaTeX$ that where this current word can be hyphenated if needed

\hyphenation{hy-phe-na-tion con-ju-ga-tion}

• declares hyphenation of words in general
Summary

- LaTeX syntax
- Tabular and Array Environments
- Typesetting Math
- Floats
- Defining Commands and Environments
- Theorems
- Cross-References
- Citations and Bibliographies
- Working with Multiple Files
- Integrating Postscript Figures
- List Environments
- Tweaking the Layout
Document Compilation Revisited

- run \texttt{latex} once \rightarrow \texttt{writes .aux} file with citation keys and label locations
- run \texttt{bibtex} to produce \texttt{.bbl} file
- run \texttt{latex} twice more to insert citations and get cross-references right
- use \texttt{dvips} to produce postscript; \texttt{dvipdf} to produce PDF
- \texttt{pslatex} and \texttt{pdflatex} produce these files directly; doesn’t always work

% latex thesis
% bibtex thesis
% latex thesis
% latex thesis
LaTeX Resources

- Leslie Lamport’s LaTeXBook
- TeX User Group (http://www.tug.org)
  - TexLive CD
  - TeX Catalogue
- Class file for DCS theses available at
http://www.cs.toronto.edu/~fpitt/Latex