Introduction to LATEX

RSI 2012 Staff

Contents

What is LATEX?

- Professional-quality typesetting program

- Standard in scientific communication

- Uses text-based commands to format

`\emph{This is very important.}` | *This is very important.*

- Flexible: can format letters, papers, even books

- Easy to effect changes to whole document

First Example

- To begin, type

  ```
  athena% cd ~/RSI/MiniPaper/
  athena% gedit first.tex &
  ```

- Now type the following in your document:

  ```
  \documentclass{article}
  \begin{document}
  This is my first \LaTeX\ document.
  \end{document}
  ```

Compiling

- To compile your document, save it and type at the prompt:

  `athena% make first.pdf`

- To look at it, type

  `athena% evince first.pdf &`

- You can also use `xpdf` or `acroread` instead of `evince`

Starting your LATEX document

- `\documentclass{···}` specifies the type of document being written (`article`, `report`, `beamer`, etc.) and takes various options (font size, double spacing).

- `\usepackage{···}` loads various features to your document.

- `\begin{document}···\end{document}` surrounds the body text of the document.

LATEX command syntax

LATEX uses commands to indicate document styles, formatting, etc.

- Commands begin with backslash \, required arguments go in curly braces { }, optional ones in square brackets [ ].

- Many commands are given by `\begin{foo}` … `\end{foo}`, which format the text between them based on `foo`.

```
\begin{center}
This text is centered.
\end{center}
\begin{equation}
\alpha \times \beta = \gamma
\end{equation}
```

This text is centered.
$\alpha \times \beta = \gamma$ (1)

Adding a title/author

- `\title{···}` and `\author{···}` are used to specify the title and author of the paper.

- `\maketitle` then inserts the given information into the document and formats it appropriately.

```
\documentclass{article}
\title{Odyssey}
\author{Homer}
\begin{document}
\maketitle
This is my first \LaTeX\ document.
\end{document}
```

Typesetting: Spacing

- Any number of whitespace characters is treated as one "space".

- Any number of blank lines is treated as a paragraph break.

```
It does not matter whether you
enter one or several      spaces
after a word.

An empty line starts a new
paragraph.
```

It does not matter whether you enter one or several spaces after a word.

An empty line starts a new paragraph.

Typesetting: Special characters

- For quotes, use `` (two backquotes) and '' (two apostrophes) instead of ". For single quotes, just use ` and '.

- However, emacs does the Right Thing^{TM} (most of the time) if you type ", so you don't need to do anything special.

- % is the comment character. Use \% to insert a % in your document. If you just use %, LaTeX will ignore the rest of that line.

- Similarly, _, \$, #, &, {, and } all mean something special. Use escapes like \\$ to put these in your document.

Layout: Sections

You can define sections in your paper.

```
\section{Introduction}
RSI is fun.

\subsection{First Part}
My mentor is nice.

\subsection{Second Part}
My counselor brought us ice cream!

\section{Conclusion}
This is the life.
```

Layout: Lists

- Use `itemize` to create bulleted lists and `enumerate` to create numbered lists:

```
RSI kids do not
\begin{itemize}
\item set things on fire.
\item lose their room keys.
\item terrorize MIT students.
\end{itemize}
My plan for this summer is to:
\begin{enumerate}
\item Do some research.
\item Stay awake at mentorship.
\item Beat my roommate at Set.
\end{enumerate}
```

RSI kids do not

- set things on fire.
- lose their room keys.
- terrorize MIT students.

My plan for this summer is to:

1. Do some research.
2. Stay awake at mentorship.
3. Beat my roommate at Set.

Layout: Footnotes and Bibliography

- For more casual references, use footnotes:

```
At some point during the summer,
the RSI students and the PROMYS~
\footnote{PROMYS sucks, we'll beat them this year.}
students will duke it out
on the ultimate field.
```

> At some point during the summer, the RSI students and the PROMYS [a] students will duke it out on the ultimate field.
>
> [a] PROMYS sucks, we'll beat them this year.

- To refer to an outside source, cite it from your bibliography.

```
Rumor has it that if you fall asleep in the lectures, you will be
assigned to cleaning all the bathrooms in Simmons.\cite{ugolini}

<biblio.bib>
@article {ugolini
...
}
```

Layout: References

- LATEX lets you refer to one part of the paper from another part.

```
\section{foo}
\label{sec:foo} Don't buy lots of Snapple on your meal card
to take to your rooms.  It makes the admins angry.

                          ...

\section{bar}
In Section~\ref{sec:foo}, we discussed how you shouldn't
hoard lots of Snapple from LaVerde's.
```

- This will replace the \ref command with foo's section number. You can \label almost anything, including sections, figures, tables, and equations.

RSI Papers: Setting Up

You must do the following to work on your papers,

1. Go to destination directory
   `athena% cd ~/RSI/MiniPaper`

2. Put text and formatting instructions into a text file (`paper.tex`) using your choice of text editor.

3. To spellcheck, you can use
   `athena% ispell -t` *filename*

RSI Papers: Using the Templates

For your minipaper:

- Edit `abstract.tex`, `biblio.bib`, `cover.tex` (title), and `paper.tex` Do NOT modify `main.tex`!

Latex Ouput: For Future Reference

There are various output formats for your paper:

- Device independent (DVI) - standard output format of T$_E$X

- Postscript (PS) - compiled version of document for printing

- Portable document format (PDF) - compressed version of document for sharing

	Creating	Viewing	Printing
.dvi	latex main.tex	xdvi main.dvi	dvips main.dvi
.ps	dvips main.dvi -o	gv main.ps	lpr main.ps
.pdf	pdflatex main.tex	acroread main.pdf	Print from xpdf

What does that "make" command do?

- "make" reads a file called "Makefile" from the current directory and uses it to describe how to create a file.

- We've provided a makefile containing:

  ```
  include /mit/rsi/misc/texenv.make

  all: main.pdf

  %.pdf: %.tex
  rubber --pdf $<

  .PHONY: clean
  clean:
  rm *.aux *.log *.dvi
  ```

- This says to use `rubber --pdf $<` to select the necessary commands to compile `.tex` and related files into `.pdf` files.

Errors

Sometimes things will go wrong. When you get an error:

- Look for the line number. `M-x goto-line` in emacs will take you there.

- Hit `x` to stop the compiler.

- Hit `return` to tell the compiler to continue past the error.

Your papers must compile cleanly when you submit them, without having to press return.

Typesetting: The Hyphen and Its Friends

The hyphen character (-) is used to generate three distinct punctuation marks.

- Hyphen (in a compound word): just -, as in `path-homotopic`.

- En-dash (in a numerical range): --, as in `1984--2008`.

- Em-dash (break in a sentence): ---, as in `Yes---just not today` or `No---I just tested positive`.

That absent-minded TA threw pages 8--12 away---what a fool!	That absent-minded TA threw pages 8–12 away—what a fool!

Typesetting: Hacking Spacing

There are various ways to force LATEX to create spaces:

- `\ ` (backslash-space) and ~ force a space after a command: the latter prevents a linebreak (e.g., `In Section~2, we ...`)

- `\\` forces a linebreak. Don't use this unless you're really sure!

- `\hspace{###}` and `\vspace{###}` force horizontal and vertical spaces respectively, with size `###` (a positive, real number with units of length, e.g., `\hspace{0.5cm}`).

Typesetting: Hacking Text Formatting

LATEX is all about not worrying about formatting. But *very* occasionally it's useful to have different font attributes.

- Various font adjustments:

```
This is \emph{emphasis}.
This is \textbf{bold}.
This is \texttt{teletype}.
```

> This is *emphasis*. This is **bold**. This is `teletype`.

- Various font sizes:

```
This is {\large large}.
This is {\Large Large}.
This is {\LARGE LARGE}.
```

> This is large. This is Large. This is LARGE.

Using BibTeX

The template is in the file biblio.bib and looks like below.
Fill in the spaces between the curly braces with the proper information.

```
@article{name,
 author={   },
 title={   },
 journal={   },
 volume={   },
 year = {   },
 pages = {   }
}
```

You will have access to three BibTeX templates (i.e., Article, Book, Website) in biblio.bib. Copy them as needed.

Getting Help

- For frequently asked questions and answers, `http://web.mit.edu/rsi/www/` and follow the help link.

- `rsi-help` zephyr class. Use the `zrsihelp` command.

- A student association known as SIPB also offers advice at

    `http://www.mit.edu/sipb/docs.html`.

  Its office is located just outside the w20-575 cluster. Also, SIPB's "Inessential LATEX," found at

    `/mit/sipb/doc/iLaTeX.PS`,

  is a useful reference.

- "The Not So Short Introduction to LATEX" is at

    `http://tobi.oetiker.ch/lshort/lshort.pdf`