An Introduction to LaTeX

Robert Dyer

Department of Computer Science
Iowa State University
rdyer@cs.iastate.edu

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Why Use LaTeX?

- LaTeX lets you focus on the content and not how a document looks
- Excellent support for mathematical formatting
- Good bibliography management

Windows

- MiKTeX - `http://miktex.org/`
  - Automatically downloads/installs missing components as needed
  - Updates somewhat frequently
- TeX Live - `http://www.tug.org/texlive/`
  - Comes with everything at once, no need to download missing components
  - Updates less frequently (yearly)

Linux

- TeX Live - `http://www.tug.org/texlive/`
  - Same distribution as available on Windows
- teTeX - `http://www.tug.org/tetex/`
  - No longer actively supported

Mac OS X

- MacTeX-2007 - `http://www.tug.org/mactex/`
  - Based on the TeX Live distribution
  - Includes some nice front-ends, such as:
    - TeXShop - `http://www.uoregon.edu/~koch/texshop/`
    - BibDesk - `http://bibdesk.sourceforge.net/`

Departmental Servers

- pyrite.cs.iastate.edu
  - Already installed, no setup required

- LaTeX files are plain text, you can use your favorite text editor
- Emacs, VI(m), etc tend to have built-in syntax hi-lighting
- Use a GUI
  - Texmaker (cross-platform)
    `http://www.xm1math.net/texmaker/`
  - TeXShop (mac)
    `http://www.uoregon.edu/~koch/texshop/`
  - Texlipse (plugin for Eclipse)
    `http://texlipse.sourceforge.net/`

- Environments
  - Declared with the `\begin` and `\end` commands
  - Changes how the document is formatted between the two commands
  - Commonly used environments: `document`, `abstract`, `verbatim`, `figure`, `table`
  - Syntax: `\begin{environment}` `...\end{environment}`
- Commands
  - Start with a backslash and have optional and/or required argument(s)
  - Syntax: `\command[optArg1]{reqArg}`, `\command2{reqArg}`, `\command[optArg1]`, `\command3`

- Packages
  - Included with the `\usepackage{PkgName}` command in the preamble, this declares extra features you wish to use
  - Commonly used packages: graphics, amsmath, float, subfigure, listings
- Preamble
  - Everything before the `document` environment
  - This is where you declare packages you are using and declare the type of document you are generating (with `\documentclass{class}`)

```
\documentclass{class}

\usepackage{graphics}

\begin{document}

\title{A LaTeX Report}
\author{Some Author}
\maketitle

\begin{abstract}
\input{abstract}
\end{abstract}

\input{file1}

\bibliographystyle{style}
\bibliography{refs}

\end{document}
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- Allows you to break large documents up into separate files
- `\input{filename}` - includes `filename.tex` at that location, as if the contents of the file were placed there

Including an Image

- Include images with the `\includegraphics{filename}` command
- Looks for available graphics files, such as PNG, JPG, GIF, PDF, etc
- Note: `\usepackage{graphics}` is needed for `\includegraphics`

Making Figures

- Instead of just including the image, make it a figure in your document
- Usually contains a caption and a label (so you can refer to it with `\ref{figureLabel}`)
- Syntax:

```
\begin{figure}[htp]
    \includegraphics{filename}
    \caption{figureCaption}
    \label{figureLabel}
\end{figure}
```

- Several commands are available to help section documents
- Syntax: `\section{title}`, `\subsection{title}`, and `\subsubsection{title}`

- Any existing `\label` can be referenced using the `\ref{labelName}` command
- For example, to refer to the figure defined previously you might say:
  "As you can see in Figure~`\ref{figureLabel}`, ..."
- To refer to another section you might say:
  "In Section~`\ref{sectionLabel}`, we ..."
- Tip: the tilde (~) is a special space that keeps the two words on the same line

- Lists are created using the `itemize` (bulleted lists) and `enumerate` (numbered lists) environments
- Each item inside the list begins with an `\item` command
- For example:

```
\begin{itemize}
    \item 1
    \item 2
    ...
\end{itemize}
```

- You can use custom labels by doing `\item[label] ...`

- Math should be typeset in *math mode*, which is indicated using dollar signs ($)
- Syntax: $A \cup B$ (displays $\boldsymbol{A} \cup \boldsymbol{B}$)
- Some common symbols can be seen here: `http://www.artofproblemsolving.com/LaTeX/AoPS_L_GuideSym.php` or `http://omega.albany.edu:8008/Symbols.html`
- Comprehensive list here: `http://www.ctan.org/tex-archive/info/symbols/comprehensive/symbols-a4.pdf`

- BibTeX is a bibliography format, commonly used by most computer science journals and conferences
- You can usually find a BibTeX entry for a paper on the publisher's website (ACM digital library, IEEE archives, Springer, etc)
- Each entry has a unique name, allowing you to reference it in your document
- The actual citation is automatically handled and a bibliography list is created for you at the end of your document

- `\bibliographystyle{style}` - use the `style.bst` bibliography style file to format your bibliography entries
- `\bibliography{refs}` - use the `refs.bib` file as the source containing all your bibliography entries (in BibTeX format)
- These commands should be inside the `document` environment

- Similar to referencing a label, but uses the `\cite{name}` command
- Example:
  "Jones and Smith said it was so~`\cite{jones2006}`."

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Questions?

View the source to this presentation at
`http://www.cs.iastate.edu/~rdyer/latex/`