Introduction to LaTeX: How To TeX, Beamer And Influence People

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Outline

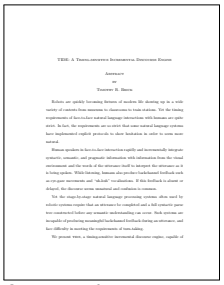
Outline

LaTeX

So... what is this thing again?

LaTeX is built so that you can:

- Write your paper once
- Easily change layouts
- Add, delete, and move, figures, tables, & sections without having to renumber or alter layout
- Easily manage references (with BibTeX)
- Easily build things like tables of contents, etc.



A page of typeset text

The Main Idea

Write Logically, Not Visually

LaTeX is designed to let you:

- Write logically, not visually.
- Mark things like *Chapter*, *Section*, and *Emphasis*.
- Not have to worry about things like spacing and style.

It is meant so that you don't have to worry about whether *emphasis* should be **bold**, underlined, or *italic*, or exactly which figure number had the picture of the deer.

A Short Demo

A paper I just submitted

DEMO!

Outline

Installation of LaTeX

You only need a few things

To install LaTeX, you need two parts: a typesetting engine, and a text editor.

On Windows

You can use *MiKTeX*, and either *TeXMaker*, *WinEdt*, or *E* as your editor.

On A Mac

MacTeX installs its own typesetter and the *TeXShop* editor. You can install *TeXMaker* or *TextMate* as an alternative.

You can get all the necessary components at `http://people.virginia.edu/~trb6e/tex/` for either platform.

Two quick notes

For MiKTeX:

1. Install for all users unless you don't have Administrator
2. Make sure to change the page size to **Letter**

For MacTeX:

1. You'll need to authenticate to install.
2. TeXShop will show up in Applications->TeX.

Packages

New Option Sets

- Packages are add-ons to basic LaTeX
- They include things like:
  - APA Style Format
  - Beamer
  - Sweave
- On Windows, MikTeX will handle most of the management and
  MiKTeX Package Manager will handle the rest
- On a Mac, the TeXLive Utility will do most of it

The Tough Way To Install Packages

Sadly, sometimes required

Steps to install a package the tough way:

1. Download the package
2. Copy it to the TeX folder
   - For Macs, this is /Library/texmf/tex/latex
   - For Windows, it's in the MiKTeX folder, under texmf/tex/latex
3. Rebuild the names database
   - For Windows, it's under MiKTeX's Settings.
   - For Macs, you run Terminal, and type `sudo texhash`.

Outline

Commands

- Commands begin with backslashes, like `\LaTeX{}` (Which does this: LaTeX).
- *Scope* is delimited by curly braces {}.
  - LaTeX ♡s curly braces ({}).
  - Some commands like `\emph{scopes}` need a *scope*.
  - Others, like `{\em scope}`, change the current *scope*.
- Environments begin with `\begin{}` and end with `\end{}`
  - So, for example, we use `\begin{document}` to start the paper.

Characters

Breaking Lines

- LaTeX ignores line breaks in most cases.
- You type: "`This is part<Enter> of a line.`"
- You get: This is part of a line.
- Use `<Enter><Enter>` between paragraphs.
- And: "`This is part<Enter><Enter>of a line.`"
- Becomes: This is part
  of a line.

Control Characters

Changing things

- Curly braces ({}) delimit a *scope*.
- Square brackets ([]) are for options.
- Use \\ to end a line.
- % Signs make LaTeX ignore the rest of the line. These are for *comments*.
- A Tilde (~) is for spaces.
- Use ‘ and ’ as single quotes, and “ and ” for doubles.
  " will give you either "flat" quoes or ”backward” quotes.

Characters

Some Handy Notes

- There are a few characters it’s tough to get.
- Most control characters (like { and }, or $) can be displayed by putting a \ first.
  (So \$, for example.)
- To get an actual \, use $\backslash$.
  (This draws the backslash in math mode. This works for [], too.)
- Tildes are trickier. In an article, you can use \verb{ ~ }.
  In Beamer, you need to use $\widetilde{}$.
- A single - is a minus sign.
  Use two (- -) to get – and three (- - -) for —

Outline

Figures

Yeah, it does.

- The `figure` environment marks an APA figure.
- Inside it, use `\includegraphics[]{}` command.
  - In the [], you can list size requirements: [width=5cm]
  - In the {}, list the filename.
- You can include a caption with \caption{}.
- To get a box around it, put the includegraphics in an \fbox{}
- Use figure* to span columns.

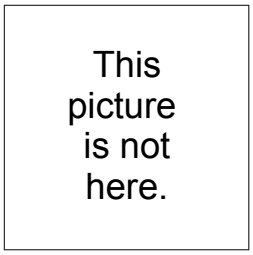


Figure: This is a figure.

Labels and References

Which Image Was That, Again?

1. In just about any environment that numbers things, you might want to refer back to a number.
2. You can do this by using a \label{} command.
3. For example, I'll label this item \label{item:AnItem}
4. Now I can type "Item \ref{item:AnItem}" to refer to Item 3.
5. Since I labelled the figure above as well, I can also refer to Figure 1. Or Table 1, below. Or Section 12.
6. Note that you should always put the label after the caption.

Tables

All Set. But Complicated

- Tables are trickier.
- The `table` environment marks an APA table.
- The `tabular`{}{} environment actually lays out the table.
  - In the {} after tabular, list the columns.
  - \begin{tabular}{lcc} is a 3-column table, with the middle cols centered.
- Inside the table, use & to separate columns.
- \thickline for horizontal lines.

Table: This table is an APA style template with `booktabs`.

Head1	Head2	Head3
5	5^2	etc

Introduction to Math
Math Basics

- The basic *inline* math environment can be started and ended with a $.
- But it's apparently better to use \(and \)
- From there, ^ means superscript, _ means subscript.
- Use { } to enclose more than one object.
- \(X^ 2_n \) gets you X_n^2
- and \(X^ {2e+15} \) gets you X^{2e+15}

- You can use these to write things like H_2O and HNO_3

Introduction to Math
Math Symbols

- In math mode, you can also use math characters
- Like $<$, $>$, which show up as < and >, otherwise.
- Also, most of the greek alphabet is available using \<*lettername*>
  - So, \alpha for α and \delta for δ
  - A couple also have capitals, so \gamma for γ or \Gamma for Γ.
  - Use google to find a full list.
- There're also useful other symbols like \pm for $\pm$

Introduction to Math
Math Environments

- To get the *display math* environment, use two $s
- (For better form, use \[and \])
- Display math sets off the equation from the rest of the text.

For example, I could write something here, then mention this equation:

$$X_i = \alpha_i^2$$

and then continue typing.
(For example, I could write something here, then mention this equation: $$ X_i = \ alphaˆ 2_i $$ and then continue typing.)

Introduction to Math
Math Environments

- The *equation environment* also numbers the equation
- Use \begin{equation} and \end{equation} to set it off.
- It looks like display math, but with numbers.

$$X_i = \alpha_i^2 \tag{1}$$

Then (if I label it) I can refer to Equation 1.

Outline

BibTeX

Keeping Your References Straight

- BibTeX is the tool LaTeX uses for reference management.
- To use it, you need to make a .bib file. But only one. Ever.
- .bib files keep the information about your citations.
- Reference your bib file at the bottom of your document, using \bibliography{filename}

Inline Citations

And How To Use 'Em

- Once you have a bibfile attached, you can cite using \cite{citeKey}.
- You need to run LaTeX, then BibTeX, then LaTeX again.
- But it will automatically fill in the information you request.
- And add the reference to your reference page.

Inline Citations

The Fun Ones

- There are trickier citations, too.
- \citeauthor{citeKey} gets just the name.
- Similarly, you can use \citeyear{citeKey}
- And add notes using \cite<pretext> [posttext]{citeKey}

APA Reformats

The Quick Switch

- The layout of the document is specified by the \documentclass[]{} line at the top.
- In the {}s is the name of the style you're using.
- Inside the [] are the options to that style file.
- Mostly for papers, we use {apa}.
- But the APA specifies several formats.
- Use [doc] for standard docs.
- [jou] gets you two-column reprints.
- [man] gets you submission-style manuscripts with figures at the end, etc.
- If you're switching column widths and want a page-wide figure or table, use figure* or table* environments instead.

APA Reformats

A few useful commands

- Sometimes you want things to change when you shift from a two-column to one-column preprint.
- The APA style provides a few standards for this.
- Use \ifapamode{man-code}{jou-code}{doc-code}
- Then fill in XXX-code with the code for that mode.
- There's also \ifapamodejou{jou-code}{man-or-doc-code}
- This will only do one part, depending on the mode.
- Try \newlength{\figurewidthChanges} \ifapamodejou{\figurewidthChanges 3.1in}{\figurewidthChanges \textwidth}
- If your figure uses [width= \figurewidthChanges] then the figure will get smaller in two-column mode.

Outline

Basic Layout

Lists

Lists in LaTeX come in two forms: *enumeration* (numbers) and *itemize* (bullets).

1. Both are environments, so begin them with **begin**{*Listtype*}
   (Where *Listtype* is **itemize** or **enumerate**)
2. Each element of the list is a **item.**
3. **End them with \end{*Listtype*}**

Basic Layout

Enumerations

```
\begin{enumerate}
\item This is an example.
\item This is another.
\begin{enumerate}
    \item Subexample.
    \item Two, actually.
    \end{enumerate}
\item More examples.
\label{ex:AnExample}
\end{enumerate}
```

1. This is an example.
2. This is another.
   A. With parts.
   B. Two, actually.
3. More examples.

I've labelled Ex. 3.

Basic Layout

Enumerate

LaTeX:

```
\begin{enumerate}[Ex. I]
\item This is an example.
\item This is another.
\begin{enumerate}[{part} a)]
    \item Subexample.
    \item Two, actually.
    \end{enumerate}
\item More examples.
\label{EX2}
\end{enumerate}
```

Output:

Ex. I This is an example.

Ex. II This is another.

part a) With parts.

part b) Two, actually.

Ex. III More examples.

I've labelled Ex. III.

Basic Layout

Itemize

LaTeX:

```
\begin{itemize}
\item This is an example.
\item This is another.
\begin{itemize}
    \item With parts.
    \item Two, actually.
    \end{itemize}
\item[-] More examples.
\end{itemize}
```

Output:

- This is an example.
- This is another.
  - With parts.
  - Two, actually.
- More examples.

Basic Layout

Itemize

```
\begin{description}
\item[This] is an example.
\item[This] is another.
\begin{description}[{part} a)]
    \item[With] parts.
    \item[Two], actually.
    \end{description}
\item[More] examples.
\end{description}
```

This is an example.

This is another.

With parts.

Two actually.

More examples.

Outline

Beamer lets you write nifty-looking presentations.

- And reveal things
- One at a time
- And even hide them again

To use Beamer, you need to install the beamer package (like we talked about).

- Then you use beamer in the documentclass line:
- \documentclass[presentation]{beamer}
- Beamer requires you write your file like a slideshow from there.
- But just about everything that worked in APA format works here, too.

The Frame Enviroment

The Core Of Beamer

The `frame` environment in beamer is the main feature.

- Officially, use \begin{frame} and \end{frame}.
- Then titles are with \frametitle{A Title!}
- And subtitles are with \framesubtitle{Subtitles are optional, surely.}
- The faster way is with \frame{{A Title}{Subtitles are optional, surely.} and then the frame text and a }

A Simple Frame

That's self-referential

```
\frame{ {A Simple Frame} {That's self-referential}
...
}
```


Themes

The Beamer Themer

Layouts in Beamer have themes that define how they look.

- Themes are named after cities. Why? Dunno.
- Steve made a CVille theme for Charlottesville.
- But people like PaloAlto and Madrid a lot, too.
- Set themes using the `\usetheme{City}` command.
- This gets set at the top of the .tex file.
- There are also `\usecolortheme{mascot}`.
- Ours is `\usecolortheme{cavs}`.

Mode Changes

Like For Handouts

To change modes, just change the word presentation in
\documentclass[presentation]{beamer}
to something else.

- Handouts are the most common.
- You can define what's different in those modes using
  \mode<name>{
  options
  }
- That way you don't need to rewrite anything to make handouts.

Reveals

One-at-a-timing

To do reveals, use `\uncover<2->{Text}`

- The `2-` means from frame 2 on.
- You could use `2-4` to mean 2 through 4
- Or `-3` to mean until frame 3.
- If you remove the `\setbeamercovered{transparent}` command, you'll be able to see these a little bit.
- items in a list can just use `\item<2->` as a shortcut.
- And to hide an item in some modes, use something like `<handout:0>`

Conclusions

Not that I'm really concluding anything.

LaTeX and Beamer are awesome.

- Play with them a little, and you'll get used to them quickly.
- To start, copy and paste from templates. It's easier.
- If you have questions, the Internet is your friend.
- Also, my email is tbrick at virginia. Feel free to email.
  But be warned that I'm not always quick at replying.

What is it? Installation and Mgmt Basic Usage Figures, Tables, Math, Etc. Citing Lists Beamer

Conclusions

Not that I'm really concluding anything.

Thank You.

Brick UVa
LaTeX Intro: Part The First

Outline

This Section Wasn't Listed Before

A Hidden Slide

In case you like those

This slide won't show up on the Outline, but is here to answer questions.