LaTeX Introduction

March 2022

What is LaTeX?

- Typesetting language developed by academics, for academics
- Open-source and FREE!
- Not platform-dependent

Comparison: LaTeX vs. Word Processing

LaTeX

- Standard for Scientific Publishing
- Bugs are only due to user error
- Ideal for large documents
- Superior Flexibility
- Runs on low-end hardware
- Compiles bibliography

Word

- Easy to learn and use
- Some objects are easier to manipulate

How To Get Started

To Download LaTeX locally:

1. Download MikTeX
2. Install TeXStudio for editing
3. Create project folder
4. Open TeXStudio

To work in the cloud:

1. Go to Overleaf.com
2. Create free account
3. Click on New Project
4. Done!

Benefits of Overleaf

- Free-to-use (subscriptions available)
- Cloud-based (work from anywhere)
- Easy to organize project files
- Shareable documents (Free gets one share)
- Live compiling
- Lots of documentation

Creating our first Document!

Basic Article Structure

1. Preamble
    I. Packages used
    II. Document type
2. Introduction
    I. Title
    II. Authors and Affiliations
    III. Abstract
3. Document Body
4. Bibliography

Preamble basics

- Document class:
  - What type of document is this? Article? Book? Report?
- What sort of paper will this be set on?
- What packages will be useful?
  - Complex math?
  - Specific reference style?
  - Lots of hyperlinks?

Contents of a preamble

- In overleaf, this is done for us!
  - If doing it on your own →

```
1  \documentclass{article}
2  \usepackage[utf8]{inputenc}
3
```

- Common packages to use:
  - Natbib
  - Spacing Guidelines
  - Formatting guidelines
  - Graphics packages (for figures)
  - Math packages (for equations)

```
3  \usepackage[doublespacing]{setspace}
4  \usepackage{amsfonts,amsmath,amssymb, amsthm, color, graphicx,graphics,verbatim}
```

- Note: Backslashes are important! Issue commands in LaTeX

Introduction

- Many ways to accomplish these (formats, styles) – Use online documentation or templates

- In its most basic form,

```
\title{some title}
\author{my name}
\date{today}
\affiliation{Darla Moore}
```

Things like affiliations are not standard. Google is your friend!

- *AFTER* you start your document, this command is how you bring in the title:
  - *maketitle*

Switch over to Overleaf!

- Let’s start by making a new project in overleaf!

1. Create an overleaf account, if not done already
2. Start a new project! Title it whatever you want
3. Bring in packages:
    1. Bibliography
    2. Graphics
    3. Change the Margins
4. Title, Author, and Date this whatever you want!

Document Body

- Objects need to start and end
  - Documents too!

```
\begin{document}

\maketitle
\begin{abstract}
\end{abstract}

I write my whole paper here…

\bibliography{}

\end{document}
```

Now designing a paper

- Things to know before we start:

- Math symbols:
  - Always in between dollar signs (ex. $ Y=4 $)
  - Alternatively, for longer expressions…
    - \begin{equation}
    - \end{equation}

- Text Formatting
  - \textbf – Bold
  - \emph – Italics
  - \ul – Underline

Activity: Create a short document

1. Create an abstract prior to the main document
2. Have 2 sections with a subsection under each (hint: \section and \subsection)
3. Write the following *in-text* expression: $Y = \alpha + \beta X + \mu$
4. Bold a phrase, underline a phrase, and italicize a phrase

Hands On: Equations

For a numbered equation…

Should we use the dollar-sign method? Or something more formal?

Hands on: References to Objects

- One simple command
- \ref{}
- But what does this require?
  - Unique Labels

Hands on: Figures

- Make sure you have uploaded the figure to overleaf
- Hint: Start it the same as you did the equation

Hands on: Bibliography management

- This requires a .bib file in overleaf
- Citation commands:
  - \citet – in-text
  - \citep – parenthetical
  - \citealt – easiest with multiple citations in parentheses
- See what happens to your bibliography, throw a couple references in, one at a time.

Useful resources:

- LaTeX cheat sheet (Winston Chang)
- Tons of documentation
  - Just google what you are trying to do. (e.g. “blue hyperlinks latex”)
- Understand symbols
  - % is a commenting symbol, like the # in python
  - \% or \$ will be useful if you actually want these in text

The most useful resource…

- Use your faculty and senior students!

- Need a specific journal template for citations and formatting?
  - Ask a faculty member