LaTeX Tutorial Notes

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If you have not yet created an account in Overleaf, please do so now. You will need to give an email address and make a password. Go to [Your Projects - Overleaf, Online LaTeX Editor]

Intro to LaTeX

- [Learn LaTeX in 30 minutes guide]

1) LaTeX is a tool so you can create a professional looking document by inserting the content and let the computer take care of the formatting.
    a) Creating a document
    b) Organizing lines, paragraphs and sections
    c) Basic formatting
    d) Displaying images
    e) Displaying math
    f) Table of Contents
    g) Bibliography
    h) Sharing a document to work together

- Start by going to [www.overleaf.com] and signing in
    - If you don't have an account enter your e-mail address and set a password in the corresponding boxes below Get started now, click Register and that's it, you will be redirected to the project management page where you will be guided into how to create a new project.

Creating a document

- Start a new project by going to top left and click on New Project, and select Blank Project, name it "[name]'s Practice" and click Create.
- Note the layout displayed – your code/workspace is on the left (.tex file) and the PDF output is on the right (and a file-tree panel on the left)

1) Show how to show/hide the 3 panels
2) 

At the top of the code section, there is a toggle:

a) I will be working with the Code Editor for this practice, but if you want to use the Visual for certain formatting you may

3) When you make edits to the .tex file, you can click Recompile to show the changes on the PDF

4) Note that the Blank Project has some code started for you:

```
\documentclass{article}
\usepackage{graphicx} % Required for inserting images

\title{Jan 2024 Tutorial Document}
\author{Bonnie McLoughlin}
\date{January 2024}
```

a) Everything before \begin{document} is called the Preamble, and you can add packages that do different editing along with editing the title page

```
\begin{document}

\maketitle

\section{Introduction}

\end{document}
```

5) You can edit the title, author and date in the brace brackets – do that now… reminder on the sections you might have in your project:

- Introduction
- History/Background
- What problem exists that this topic is trying to solve?
- Explanation of the math used in this topic
- 4 – 5 of your own examples related to this topic, with full solutions
- How this topic is used to solve problems today
- Conclusion

Sharing files with others

- https://www.overleaf.com/learn/how-to/Sharing_a_project
- The top right menu has a Share button, click it
  1) Link sharing – you have to turn this on by clicking a link
  2) Inviting people by entering email addresses
  3) Choice of Read or Edit permissions

Organizing lines, paragraphs and sections

https://www.overleaf.com/learn/latex/Paragraphs_and_new_lines

- Use the command \section{} to start a new section, and \subsection{} for a subsection. These commands will help build your Table of Contents too.
- New lines can be made by a blank line between paragraphs, using the command \par, \newline, \break, or a double backslash (see examples and try to practice)
- See https://www.overleaf.com/learn/latex/Line_breaks_and_blank_spaces for more

Basic formatting

- https://www.overleaf.com/learn/latex/Bold%2C_italics_and_underlining
  1) Bold face is \textbf{}, italics is \textit{}, underline is \underline{}
- https://www.overleaf.com/learn/latex/Lists
  1) Making lists can be unordered (bullets) or ordered (numbers), and you can nest them

Displaying images

- https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes#Adding_images
- https://www.overleaf.com/learn/how-to/Including_images_on_Overleaf
- **First add into the Preamble the \usepackage{graphicx}**
  1) This package gives new commands, \includegraphics{...} and \graphicspath{...}.
  2) The command \graphicspath{ {images/} } tells LATEX that the images are kept in a folder named images under the current directory.
  3) Practice uploading images to Overleaf – MAKE SURE THAT THE IMAGES ARE NOT COPYRIGHTED
     a) Create Folder in top right called images
     b) Click 3 dots on folder and select Upload
     c) Drag/drop or select directory on computer
  4) \includegraphics[width=5cm]{squirrel.JPG} note this image is way too big unless I use the size box, show what it looks like without it too
  5) Note how to use Figures that can be referenced later in the text

Displaying math

- https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes#Adding_math_to_LaTeX
- https://www.overleaf.com/learn/latex/Mathematical_expressions
- Inline math can be created using:
  1) \(...\)
  2) $...$
  3) \begin{math}...\end{math}.

- If you want to place your math in a block outside of other text, you can use:
  1) \[...\]
  2) $$...$$
  3) \begin{displaymath}...\end{displaymath}.
- **Add the package \usepackage{amsmath} to create math beyond basics**
- https://www.overleaf.com/learn/latex/List_of_Greek_letters_and_math_symbols

Further reading

The mathematics mode in LaTeX is very flexible and powerful, there is much more that can be done with it:

- Subscripts and superscripts
- Brackets and Parentheses
- Fractions and Binomials
- Aligning Equations
- Operators
- Spacing in math mode
- Integrals, sums and limits
- Display style in math mode
- List of Greek letters and math symbols
- Mathematical fonts

- PRACTICE: Try creating 2023 Purple Comet contest question examples

$$\prod_{n=1}^{50} \left(\sqrt[4]{2^n} - n\sqrt{2n} \right)$$

- $$z + 2\overline{z} + 3|z| = 3 - 7i.$$

  1) Hints – dynamically size parentheses by using \left(and \right)
  2) Look up symbols you may need from the links provided or the wiki https://en.wikibooks.org/wiki/LaTeX/Mathematics

Table of Contents

- https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes#Adding_a_Table_of_Contents
- the command \tableofcontents does all the work for you, as long as you have labeled sections, subsection etc

Bibliography

- https://www.overleaf.com/learn/latex/Bibliography_management_with_biblatex
- https://en.m.wikibooks.org/wiki/LaTeX/Bibliographies_with_biblatex_and_biber
  1) Start by putting \usepackage[backend=biber]{biblatex} in the Preamble
  2) Also with that you will need \addbibresource{sample.bib} with the correct bibliography file
  3) Sample files look like:

```
@article{wombat2016,
    author   = {Walther Wombat and Klaus Koala},
    title    = {The true meaning of 42},
    journal  = {Journal of modern skepticism},
    date     = {2016},
    keywords = {trusted},
}
@book{lion2010,
    author      = {Laura Lion and  Gabrielle Giraffe and Carl Capybara},
    title       = {The dangers of asking the wrong question},
    publisher   = {publishing house},
    date        = {2010},
    keywords    = {trusted},
}
@online{wikibook,
    title       = {Generating Bibliographies with biblatex and biber},
    organization = {Wikibooks},
    date        = {2016},
    urldate     = {2016-03-07},
    url         =
    { https://en.wikibooks.org/wiki/LaTeX/Generating_Bibliographies_with_biblatex_and_biber},
    keywords    = {untrusted},
}
```

- You with need to use the \cite{} function for all your sources, and then have \printbibliography before \enddocument to show all the sources you cited.

Another Citation example:
https://www.overleaf.com/project/new/template/19715?id=66713383&templateName=Example+using+BiBLaTeX&latexEngine=pdflatex&texImage=texlive-full%3A2020.1&mainFile=

- Next General Meeting is Feb 11, 2024
- HW for Discovery Topics is to
  1) create the collaborative file with your Team and share it with everyone in the group, including me.
  2) Enter all sources you have compiled already with the proper setup in a .bib file.
  3) Create title page, sections and subsections
  4) Create any mathematical examples you have created so far