Introduction to LaTeX Workshop Exercises

Fall 2020

1 Basics

Objective: Practice several basic LaTeX commands in a new project.

1. Open new project
2. Create Title
   - After `\title`, add "Introduction to LaTeX Assignment"
   - After `\author`, add your name
   - Confirm that the date is correct or edit if needed
   - Display **Title** using command `\maketitle` inserted after `\begin{document}`
3. Add a new section labeled "Practice" using the `\section*` command
4. Add the following paragraph under that section using "inline" math commands:

We know the initial pressure $P_0 = 7.00X10^5Pa$, the initial temperature $T_0 = 18.0°C$, and the final temperature $T_f = 35.0°C$.

Commands needed:
`\section{}`
subscript `_` and superscript `^`, `$.....$`
Package needed: `\usepackage{gensymb}` to use with `\degree`

2 Math

Objective: Experiment with mathematical notations in LaTeX.

2.1 Recreate this text in your document:

A quadratic equation is an equation of the form $ax^2+bx+c = 0$ and such equations can be solved using the quadratic formula:

$$x = \frac{b \pm \sqrt{b^2 - 4ac}}{2a}$$

Commands needed: `\frac{}{}`, `\pm`, `\sqrt{}`, `\[...\]` or `$$...$$ \\`

2.2 Recreate this equation in your document:

$$i\hbar\frac{\partial}{\partial t}\psi = \hat{H}\psi$$

Commands needed: `\partial`, `\psi`, `\hbar`, `\hat{H}`
Packages needed: `\usepackage{amsmath}`, `\usepackage{amssymb}`
Environment needed: `\begin{equation*} ... \end{equation*}`

2.3 Additional challenge:

$$\frac{d\sigma}{d\lambda} = \left| \frac{2\mu}{\hbar^2} \int_0^{\infty} \frac{sin(\Delta kr)}{\Delta kr} V(r) r^2 dr \right|^2$$

Commands needed: `\infty`, `\sigma`, `\lambda`, `\mu`, `\Delta`, `\left|`, `\right|`
Environment needed: `\begin{equation*} ... \end{equation*}`

3 Bibliographies

Objective: Learn to create, edit or upload a .bib file, use basic citation commands, and display a bibliography.

3.1 Creating a .bib file and adding references

- Create a new file within your project (click on the paper icon in the upper left) and name it references.bib
- Search for these three articles and books in Google Scholar and locate their BibTeX formatted citations.
  - 10.1126/science.1214319
  - Hydraulic power system analysis
  - 10.1103/PhysRevB.100.094418
- Paste each citation within your .bib file. (No preamble is needed).

3.2 Adding a bibliography

- To display bibliography in APA style, add package and style command to preamble:
  ```
  \usepackage[backend=biber,style=authoryear]{biblatex}
  \addbibresource{references.bib}
  ```

- And use these commands within document:
  ```
  \printbibliography
  \nocite{*}
  ```

3.3 Citation commands

Try using the citation commands to recreate the sentence below.

In the example provided, Weber et al. 2012 describes the experiment, but Akers, Gassman, and Smith contradicts these conclusions.

Commands needed: `\cite{}`, `\citeauthor{}`

4 Tables and Figures

Objective: Learn the basic commands to create and edit tables.

4.1 Create basic table

- Use the tabularx package to create a simple table of the US Women's Soccer Team's 2019 World Cup Starting Roster: `https://www.ussoccer.com/players`
- Begin with a header row and two columns.
  - Your two column headers will be: Position and Last Name
  - Left align the text of the left column
  - Center the text of the right column
  - Add vertical and horizontal lines
- Add a caption "2019 Team Roster" and center the table
  Note: Using the `\caption{}` command will add the phrase "Table 1" in front of caption.

Use package needed: tabularx

Commands needed:
`\begin{table}...\end{table}`
`\begin{tabular}...\end{tabular}`
`&` = column separator
`\\` = begin new row
l, r, c = column alignment
`\hline` = horizontal line

Position	Last Name
GK	Naeher
D	Sauerbrunn
D	Dahlkemper
D	O'Hara
D	Dunn
M	Mewis
M	Ertz

Table 1: 2019 Team Roster

4.2 Challenge Table: Create a table with columns spanning multiple rows or rows spanning multiple columns

Use packages needed: `\usepackage{multirow}`, `\usepackage[table]{xcolor}`

Information sources:

- `https://www.ussoccer.com/players`
- `https://en.wikibooks.org/wiki/LaTeX/Tables`
- Multicolumn/Multirow: `https://en.wikibooks.org/wiki/LaTeX/Tables#Defining_multiple_columns`

	Goals Scored		
	2011	2015	2019
Morgan	2	1	6
Lloyd	1	6	3
Rapinoe	1	2	6
Lavelle	N/A	N/A	3

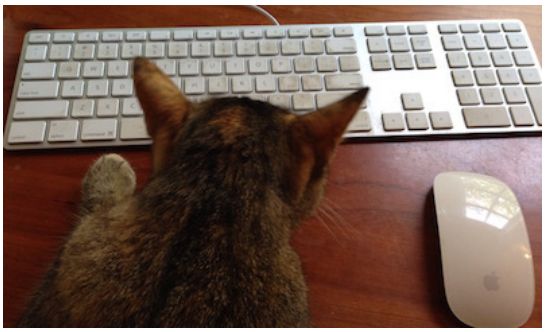
Table 2: World Cup Goals Scored

4.3 Figures

Objective: Learn to upload and position figures in Overleaf. To upload image, choose an image of your own, or find file at: `https://github.com/samteplitzky/EPS-Latex-Workshop`
Download keyboard_cat.png, and upload file to the Overleaf project.

1. Place image with these commands

```
\usepackage{graphicx}
\includegraphics[width=0.4\textwidth]{keyboard_cat.png}
```



2. Designate figure position. Use b, t, h to see where figure moves. You might need to add additional text in the document to see how the figure placement varies. Try adding the float package to use the H specifier for placement.

```
\begin{figure}[b]
\centering
\includegraphics[width=0.6\textwidth]{keyboard_cat.png}
\end{figure}
```

References

Akers, Arthur, Max Gassman, and Richard Smith (2006). *Hydraulic power system analysis*. CRC press.
Kenney, Eric M et al. (2019). "Coexistence of static and dynamic magnetism in the Kitaev spin liquid material Cu 2 IrO 3". In: *Physical Review B* 100.9, p. 094418.
Weber, Bent et al. (2012). "Ohm's law survives to the atomic scale". In: *Science* 335.6064, pp. 64–67.