LATEX WORKSHOP

RESEARCH METHODS

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INTRODUCTION

WHAT IS LATEX?

- Stylised as LaTeX, or LaTeX
- Document preparation system
- Uses plain text to describe how documents should be formatted
- Markup tags for document structure
- Widely used in academia

PROS AND CONS

Pros:

- Separation of content and style (i.e. no compatibility issues)
- Consistency of citations and cross-references
- Layout of figures and tables
- Mathematical notation
- Time-saver, once learned
- It looks good!

Cons:

- Learning curve
- Not WYSIWYG (what you see is what you get)

LATEX EDITORS

Local editors:

- Texmaker, TeXstudio, MacTeX, LyX, etc.
- More secure
- Easier to back up

Online editors:

- Overleaf or ShareLaTeX
- No installation required
- Cross-platform
- Collaborative (in a similar way to Google Docs)
- More involved backup procedures (e.g. sharelatex-git)
- Limited (but sufficient) features for free versions

OVERLEAF

LaTeX and Word templates available for most conference papers and journal articles:

- ACM (e.g. Audio Mostly)
- CHI
- NIME
- etc.

Task:

- Create an account on Overleaf
- Download the NIME LaTeX template
- Create a new project from Zip on Overleaf: 
- Change the title, add yourself as the sole author, and modify the abstract
- Note: to comment out blocks of code, use Ctrl-/ (Windows) or ⌘-/ (Mac)

```
\documentclass[a4paper]{article}
```

- The document class corresponds to the type of your document
- e.g. `article`, `report`, `memoir`, or `beamer` (for presentations)
- Options can be added in between square brackets, separated by a comma
- e.g. `[10pt, a4paper, hidelinks, titlepage]`

Task:

- Create a new project with the ‘Sample Paper’ template
- Try out some of the different document-wide options listed on Wikibooks

```
\usepackage{amsmath}
\usepackage{graphicx}
```

- Packages provide extra functionality and options for customisation
- Some useful packages are listed on Wikibooks and StackExchange
- Head to CTAN for a comprehensive list sorted alphabetically or by topic
- A lot of thought has gone into the default layout, don't mess with it too much!

Task:

- Experiment with the settings of the `geometry` package
- Try out the `microtype` package and figure out what it does
- Try out the `textgreek` package and add some greek characters to your abstract

STRUCTURE


```
\documentclass[your options here]{your document class here}
\usepackage{your packages here}

\begin{document}

\title{your title here}
\author{your name here}
\date{date here}
\maketitle

\begin{abstract}
Your abstract here
\end{abstract}

\tableofcontents

\chapter{your chapter title here}

       \section{your section title here}

              \subsection{your subsection title here}

                     \subsubsection{your first subsubsection title here}
                     Your first subsubsection content here

                     \subsubsection{your second subsubsection title here}
                     Your second subsubsection content here

etc.

\bibliography

\end{document}
```

Text formatting:

- `\textbf{your sentence here}` → **your sentence here**
- `\textit{your sentence here}` → *your sentence here*
- `\underline{your sentence here}` → <u>your sentence here</u>
- ``` ``your sentence here" ``` → "your sentence"

Special characters:

- Special characters and some symbols are listed on Wikibooks

Paragraphs:

- Leave a blank line between two lines of text to create a new paragraph
- It is often practical to use one sentence per line

Task:

- Write this sentence in your abstract:

  I am “learning” a lot of *new* ***stuff*** about LaTeX, but **nothing** about *Napoléon*!

Unordered lists:

```
\begin{itemize}
    \item A bullet point here
    \item Another bullet point here
\end{itemize}
```

Ordered lists:

```
\begin{enumerate}
    \item Your first item point here
    \item Your second item point here
\end{enumerate}
```

- LaTeX has powerful tools to display equations and code within a document
- See Wikibooks for instructions on Maths, Advanced Maths, and Code Listings

Task:

- Load the `amsmath`, `mathtools`, and `minted` packages
- Copy the two following code segments in your document, and see what happens

```
\[
a =
    \begin{dcases}
    \int x\, \mathrm{d} x\\
    b^2
    \end{dcases}
\]
```

```
\begin{minted}{python}
def greet(name):
    print 'Hello', name
greet('Jack')
greet('Jill')
greet('Bob')
\end{minted}
```

- LaTeX is very good at including figures without messing up the layout
- It also optimises figure placement to make your document look professional

Task:

- Download an image and add it to a new “figures” folder
- Load the `graphicx` package
- Add `\graphicspath{{figures/}}` in your document header
- Include the following code in a paragraph:

```
\begin{figure}[your placement specifier here]
\includegraphics[width=0.3\textwidth]{yourimage.jpg}
\end{figure}
```

- Note: `h` is the recommended placement specifier, but other ones are available

- Similarly, LaTeX offers a lot of flexibility for the creation of tables
- However, the syntax is very involved. Use an online generator for simple tables!
- Also, the `tabulate` package in Python can help create tables in LaTeX
- Several packages add functionality, e.g. `booktabs` for professional-looking layouts
- For a list of useful packages, see StackExchange

CAPTIONS AND LABELS

- Captions can effortlessly be added to figures and tables
- The cross-referencing of labels is adjusted dynamically to reflect the position of figures, tables, and sections within the document

Task:

- Add a caption to your figure by including `\caption{your caption here}` between the `{figure}` tags
- Add a label to your figure by including `\label{your label here}` between the `{figure}` tags
- Reference your figure in a paragraph by including `\ref{your label here}`
- Note: `\label` should be placed after `\caption` or inside the `\caption` environment

- Bibliographies can be directly imported with `\bibliography{yourfile.bib}`
- Papers cited in the document are automatically added to the references
- Additional functionality is available with the `natbib` and `biblatex` packages

Task:

- Open `sample.bib` to check out the format of a .bib file
- Cite a paper by including `\cite{greenwade93}` in the text
- Load the `natbib` package and test the difference between `\citet`, and `\citep`
- Test the command `\citep[see][]{greenwade93}`
- Unload the `natbib` package and test the `acm` and `apalike` bibliography styles

VERSION CONTROL AND COLLABORATION

- Basic version control is available on Overleaf by clicking on 

- Similarly, collaboration tools are accessible by clicking on 

- Version control will be seen in more details in the software carpentry workshop

REFERENCE MANAGEMENT

Bibliography:

- All the sources you intend to cite should be included in a single .bib file
- Each entry is linked to a key, which can be accessed with the `\cite` command

Entry formatting:

- The formatting of special characters is very slightly different than in normal text
- For a list and explanation of the differences, see StackExchange
- To add several authors, use `and` as a separator, e.g. `John Smith and Jane R. Doe`
- The separator for page numbers is `--`, e.g. `175--179`
- To force the use of uppercase letters or any other character, enclose them in `{}`, e.g. `Studying {MAT} at {Q}ueen {M}ary` because capitalisation is handled by the selected bibliography format

- Bibliographies can be maintained on Mendeley, Zotero, and many others, and exported as .bib files
- But .bib exports do not always work perfectly
- Another option is to use JabRef, in which entries are directly added in the .bib format

RESOURCES

RESOURCES

- Overleaf, ShareLaTeX, and JabRef tutorials
- Wikibooks and StackExchange are your friends!