

L^AT_EX II

Agenda

- > Recap from Latex I
- > Sections
- > Placement
- > Bibliographies

What are the basics of LaTeX?

> Why is it used

- Writing academic papers with predefined structure and consistent formatting, allows representation of maths formulas.

> Basic document structure

- Document typically contains paper name, date, and author name at top, and is split into sections. A document class is chosen out of many predefined templates to follow a set structure.

> Text formatting, lists, images, formulas

- All of the above are done by simple commands

Sections

- > Split the document into logical parts with bold subheadings
- > Different types of sections available depending on the document class (here is for the “article” class)
- > Allow a table of contents to be generated for the beginning of the paper, by placing the commands on the left after the paper title

```
\section{...}  
\subsection{...}  
\subsubsection{...}  
\paragraph{...}  
\subparagraph{...}
```

```
\tableofcontents  
\newpage
```

Section exercise - recreate this page

LaTeX II InfPALS

Insert your name

February 2024

1 Getting Started with LaTeX

This is the introduction.

2 Methods

2.1 Stage 1

The first part of the methods.

2.2 Stage 2

The second part of the methods.

3 Results

Here are my results.

Section exercise - solution

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

\title{LaTeX II InfPALS}
\author{Insert your name}
\date{February 2024}

\begin{document}

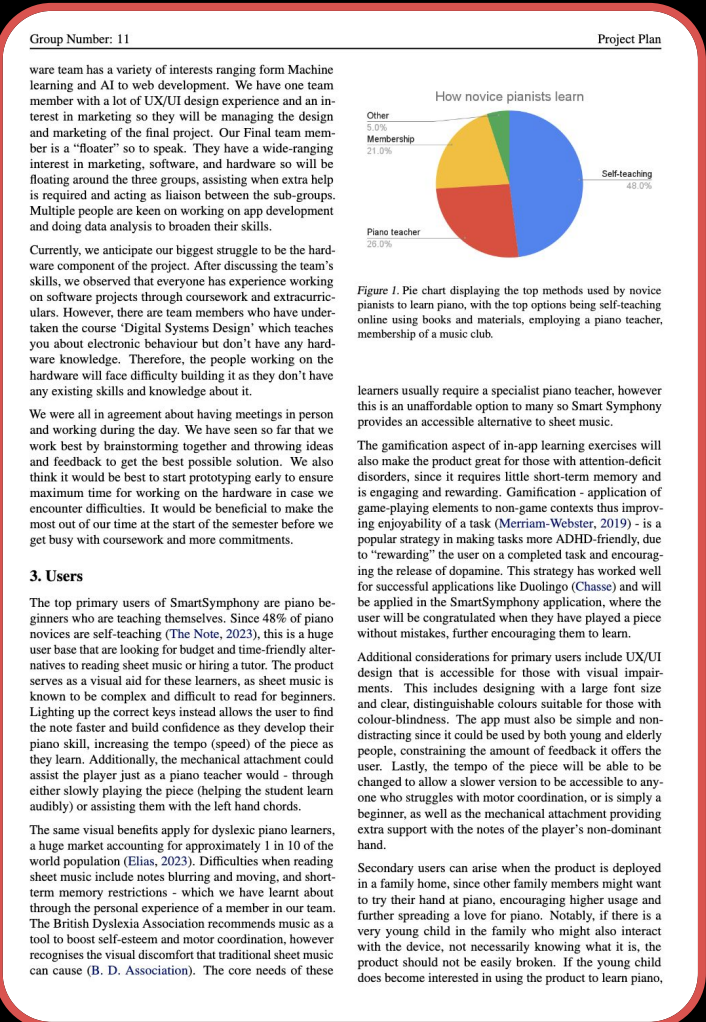
\maketitle

\section{Getting Started with LaTeX}
This is the introduction.
\section{Methods}
\subsection{Stage 1}
The first part of the methods.
\subsection{Stage 2}
The second part of the methods.
\section{Results}
Here are my results.

\end{document}
```

Placement in LaTeX

- > The principle of LaTeX is: the user does not need to control where the elements are on the page, the user only chooses the document class and content
- > Therefore, images are usually placed at the top of a page, since they are a float element in LaTeX, despite where they are within the code
- > Figures and subfigures can be tricky so appropriate packages must be included in the document



Packages

```
\usepackage[T1]{fontenc}
\usepackage{amssymb,amsmath}
\usepackage{txfonts}
\usepackage{microtype}
\usepackage{xspace}
\xspaceaddexceptions{\%}

% Lists with less spacing between items
\usepackage{paralist}

% For figures
\usepackage{graphicx}
\usepackage{subfig}

% For citations
\usepackage{natbib}

% For algorithms
\usepackage{algorithm}
\usepackage{algorithmic}
```

- > This is an example of just a part of the package dependencies in an average LaTeX file
- > In the example: fonts and text spacing, list customisation, figures and subfigures (for tables and images), bibliography, and algorithms
- > There are usually found at the top of the document, or in a separate file then referenced by `\input{<name_of_package_file>}`

Figures

- > Generally, to insert an image or a table it must be wrapped in a `\begin{figure}` component, showing it is not part of the text and needs a wide margin around it
- > Dimensions can be specified in the `\includegraphics[...]` line.
 - `keepaspectratio` can be used to force a constant aspect ratio.
- > Remember to include `\centering` when using centered alignment

```
\begin{figure}
\centering
\includegraphics[width=1\textwidth]{ImageFilename}
\caption{My test image}
\end{figure}
```

It is good practise to include concise and informative captions in academic papers to explain the figure

Placement (Revisited)

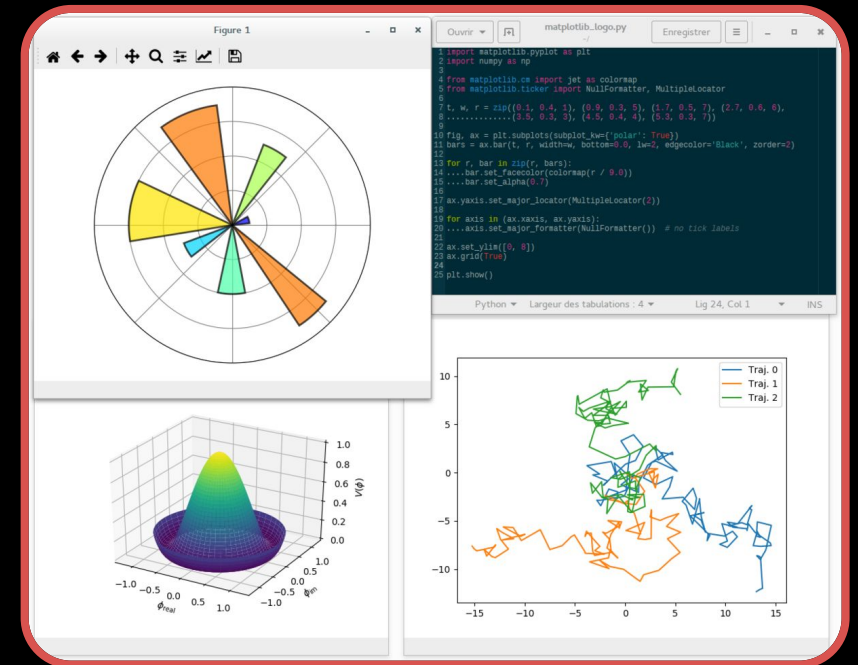
- > The figure environment provides the option to alter the float preference.
- > This is placed in square brackets after the `\begin{figure}`,
 - e.g. `\begin{figure}[h]`
- > They can be combined to give an order of preferences
 - e.g. `\begin{figure}[htb]` would be 'try here, then top, then bottom'
- > Can be overridden using packages such as `here` or `float` and using `[H]`

Parameter	Position
h	Place the float <i>here</i> , i.e., <i>approximately</i> at the same point it occurs in the source text (however, not <i>exactly</i> at the spot)
t	Position at the <i>top</i> of the page.
b	Position at the <i>bottom</i> of the page.
p	Put on a special <i>page</i> for floats only.
!	Override internal parameters LaTeX uses for determining "good" float positions.
H	Places the float at precisely the location in the \LaTeX code. Requires the <code>float</code> package. This is somewhat equivalent to <code>h!</code> .

Figures in Matplotlib

> When using figures generated in Matplotlib or R, make sure the figure generated has:

- Width of 6 inches
- Large font size in title, axes, and legend (marks are often deducted for lack of readability)
 - Check for high DPI when exporting. Low DPI + large width = blurry plot
- Clear and contrasting use of colour (check colour-blindness guidance)

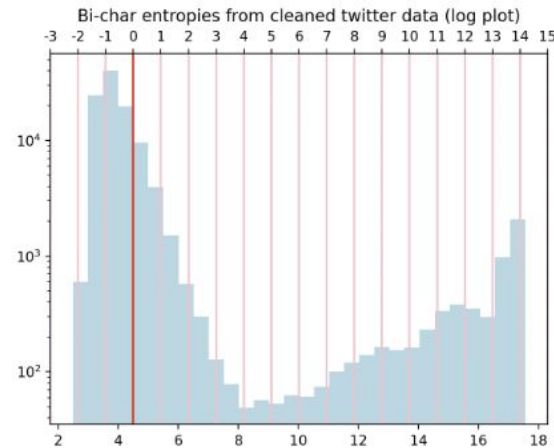


> Figure exercise - subfigures

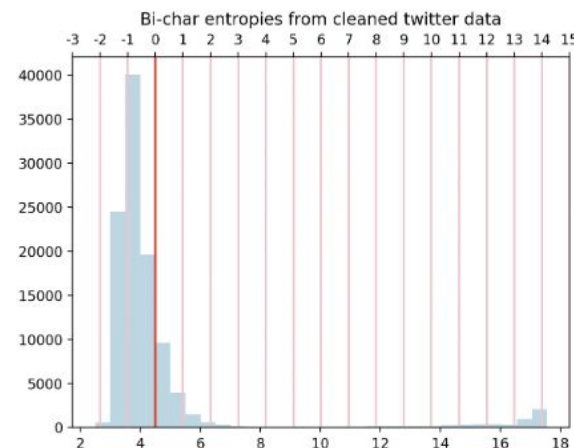
2 Methods

2.1 Stage 1

The first part of the methods.



(a) Image 1



(b) Image 2

Figure 1: Here is two images

Use any two images, for extra practice, use Matplotlib plots if you have any.

> Figure exercise - solution

```
\begin{figure}[htbp]
\centering
\begin{subfigure}{.5\textwidth}
\centering
\includegraphics[width=1\linewidth]{Media/FNLPGraph.png}
\caption{Image 1}
\label{fig:piano}
\end{subfigure}%
\begin{subfigure}{0.5\textwidth}
\centering
\includegraphics[width=1\linewidth]{Media/FNLPGraph2.png}
\caption{Image 2}
\label{fig:fnlpgraph}
\end{subfigure}
\caption{Here is two images}
\label{fig:images}
\end{figure}
```

Bibliography

- > By now, you might be used to including citations in your academic papers, using a standardised format to credit the author at the end
- > LaTeX uses a separate bibliography file to input all data about every source that is used
- > This file is then quoted at the start of the main document and the bibliography style can be customised to the user's choice by quoting a specific package in the dependencies file

Bibliography data file

```
@misc{1,
  title = {How Long Does It Take to Learn Piano? We Asked 1000+ Pianists},
  author = {{The Note}},
  year = {2023},
  note = {Aug. 27},
  url = {https://www.pianote.com/blog/how-long-does-it-take-to-learn-piano-survey/}
}

@misc{2,
  title = {21 Dyslexia Statistics \& Facts: How Common Is It?},
  author = {M. Elias},
  year = {2023},
  note = {Oct. 31},
  url = {https://www.discoveryaba.com/statistics/dyslexia}
}

@misc{3,
  title = {Music and dyslexia},
  author = {{B. D. Association}},
  note = {British Dyslexia Association},
  url = {https://www.bdadyslexia.org.uk/advice/adults/music-and-dyslexia-1}
}
```

- > As mentioned, LaTeX requires a separate bibliography file (e.g. **my_refs.bib**) that includes all the required data of your citation style (seen here)
 - > Each citation has a reference ID (in this case, 1,2 3, etc.) that is used to refer to it in the document exactly where the source is quoted
- \cite{2}**
- > This in-text citation produces a small description of the source (depending on chosen citation style) that then links to the bibliography at the end of the document that shows all the included data

Citation Styles

- > When using a provided template by the University of Edinburgh, the document will automatically use a very specific format:

`\bibliographystyle{icml2017}`

- > This quotes the author and year in-text when the citation appears and then provides more information at the end of the document in the bibliography.
- > IEEE is also often accepted, but check with your course organiser/dissertation supervisor, as each lab has a preferred style.

References

Explore the yamaha music europe hub.
URL <https://hub.europe.yamaha.com/article/10-benefits-from-learning-to-play-keyboard>. Yamaha Music Europe Hub.

The shape and future of adult music learning | making music. URL <https://www.makingmusic.org.uk/campaigns-and-advocacy/adult-music-education>. www.makingmusic.org.uk, 2020.

B. D. Association. Music and dyslexia. URL <https://www.bdadyslexia.org.uk/advice/adults/music-and-dyslexia-1>. British Dyslexia Association.

Chasse, B. Taking a crack at gamification. URL <https://blog.duolingo.com/gamification-design/>. Duolingo Blog, Jul. 27, 2021.

> Bibliography exercise - cite this

Title: Ada Lovelace: In search of “a calculus of the nervous system”

Author: Georgina Ferry

Journal: The Lancet

Volume: 386

Pages: 1731

Year: 2015

Georgina Ferry. “Ada Lovelace: In search of “a calculus of the nervous system””. In: *The Lancet* 386 (2015), p. 1731.

Result should look like this

> Bibliography exercise - solution

```
@article{Ferry2015,  
  Author = {Georgina Ferry},  
  Title = {Ada Lovelace: In search of ``a calculus of the  
nervous system''},  
  Journal = {The Lancet},  
  Volume = {386},  
  Pages = {1731},  
  Year = {2015}  
}
```

Any questions?

Feel free to ask the leaders!

<InfPALS/>

Thank you!