LATEX
Plan for today

- Intro to LaTeX
- Learn LaTeX – rapid fire style
  ----- break -----  
- Edit a document using a simple template
  ----- lunch -----  
- Additional Resources and next step
Rule 1

Someone else had the same problem
Rule 2
Someone else had the same problem
Rule 3

Someone else had the same problem

and Google knows about it.
Discuss

• Your experience with \LaTeX
• Your expectations from this workshop
Hang on to your seats...

It is okay to forget everything
LATEX

Slides modified from
Document Organisation

Logical
• Sectioning
• Emphasis
• Document style
• References

Visual
• Font
• Local spacing
• Text size
Pronunciation Guide
Pronunciation Guide

**Latex**: pronounced *lay-tekS*
Pronunciation Guide

**Latex:** pronounced *lay-teks*

**LaTeX:** pronounced *lay-tech* (*tech* as in technical)

\documentclass{article}
\begin{document}
\emph{Long Live \LaTeX}
\end{document}

*Note the emphasis!*

*Long Live \LaTeX*

*Note the emphasis!*
Your favourite text editor

Text file with embedded instructions

`doc.tex`

`latex doc.tex`

Device independent document description

`doc.dvi`

`dvi2pdf doc.dvi`

PDF document description

`doc.pdf`

`yap`

Some other printer format (e.g., postscript)

`acrobat`

LaTeX
Some advantages of \LaTeX

- **Concentrate on content** before appearance
- **Mathematical formulae** easily described
  \[
  \int \int_0^\infty \frac{1}{x^2} \, dx \
  \sum_{i=0}^{10} \sin^{-1}(i) \sqrt{\frac{e^x}{x\sqrt{e}}} \, dx
  \]
- **Freely available** for all platforms and many tools
- Output comparable to that of **published books**
- **Text, tables, figures and references** look nicer
- **Sections** can be reused
- **Comments** and drafts hidden until needed
- **Reviewers** will be happier (aesthetics & functionality)
Some disadvantages of LaTeX:

- **Learning curve** much higher than Word
- Tools such as *Grammarly* are not integrated
- Journals & publishers may require Word
- Supervisors & collaborators may prefer Word (Track changes) / Google Docs (Live changes)

- Faster and simpler to produce Tables, Figures in Word, Excel, Powerpoint, Adobe Creative Suite
- **Skills may not be valuable** for industry / government (but knowledge is always useful right?)
Desktop software

- **MiKTeX** is a good Windows \LaTeX{} implementation;
- TeXMaker is a good editor for \LaTeX{} with a full IDE for document writing;
- So are TeXStudio, \texttt{vi} and many more ☺
- TeXPoint is perfect for including \LaTeX{} stuff in PowerPoint presentations but suggest NOT to use (Beamer is better). TeX to HTML, LyX etc. are available but are not great to use in the long term (try Hugo/R Markdown).
Guides

http://en.wikibooks.org/wiki/LaTeX

https://www.latex-tutorial.com

Online platforms

Overleaf

Authorea

and many others (who probably also want your money)
good for collaboration and ease of use but can be hard in the long term

Courses

https://github.com/jdleesmiller/latex-course

https://github.com/kks32/latex-course
There are more guides than you need, so don’t read about what you might need.

Get started now on something you need, and search the guides for what you need.
Let’s begin

Google “Overleaf”

Suggest using email (not Google) as it makes it easier to delete account later.
Templates

Tricks

https://truben.no/table/
https://www.tablesgenerator.com/
https://www.latex-tables.com/

http://app.uio.no/ifi/texcount/online.php
‘Coding’ Basics

- \texttt{\LaTeX} commands start with a backslash \textbackslash
- Parameters are given in curly brackets \{ \}
- Environments (blocks with a certain type of content) are of the form:

\begin{\texttt{environment\_type}}
  \texttt{environment content}
\end{\texttt{environment\_type}}
The Simplest Document

\documentclass{report}
\begin{document}
\end{document}
The Simplest Document

\documentclass{report}

\begin{document}

This specifies the type of the document: report, book, article, letter, etc.

\end{document}
The Simplest Document

\documentclass{report}
\begin{document}
\end{document}

The way the document is formatted is deduced through its class
The Simplest Document

\documentclass{report}
\begin{document}
\end{document}

Anything within the document environment is typeset as output
Hello World!

\documentclass{report}
\begin{document}
Hello
World!
Bye!
\end{document}
\documentclass{report}
\begin{document}
Hello
World!
Bye!
\end{document}
\documentclass{report}
\begin{document}
Hello
World!

Bye!
\end{document}
<table>
<thead>
<tr>
<th>Symbol</th>
<th>\LaTeX</th>
<th>Unicode</th>
</tr>
</thead>
<tbody>
<tr>
<td>The name</td>
<td>\LaTeX</td>
<td>\LaTeX</td>
</tr>
<tr>
<td>Ellipsis</td>
<td>\ldots</td>
<td>\ldots</td>
</tr>
<tr>
<td>Single quotes</td>
<td>‘text’</td>
<td>‘text’</td>
</tr>
<tr>
<td>Double quotes</td>
<td>“text”</td>
<td>“text”</td>
</tr>
<tr>
<td>Dash (between words)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Number range</td>
<td>1--2</td>
<td>1--2</td>
</tr>
<tr>
<td>Endashed words</td>
<td>pre-order</td>
<td>pre-order</td>
</tr>
<tr>
<td>Accents</td>
<td>‘İçäöñû’</td>
<td>‘İçäöñû’</td>
</tr>
<tr>
<td></td>
<td>\‘{I}\c{c}</td>
<td>\‘{I}\c{c}</td>
</tr>
<tr>
<td></td>
<td>\‘{a}&quot;{o}</td>
<td>\‘{a}&quot;{o}</td>
</tr>
<tr>
<td></td>
<td>~{n}~{u}</td>
<td>~{n}~{u}</td>
</tr>
</tbody>
</table>
He said ``She said \textquote{H\'{e}ll\^{o}}, j\'adore \LaTeX!' '

She was French, you see \ldots
He said "She said 'Hélô, j'adore \LaTeX!' "

She was French, you see …
Useful Document Classes

• **Article**: Ideal for a short paper (divided into sections, subsections, etc). Typeset to be printed double-sided.

• **Book**: Class to be used to typeset a book (chapters, sections, etc). Typeset to be printed double-sided.

• **Report**: (Almost) identical to the book class but for single-sided printing.

• Other classes include **letter**, **slides**, etc.
Organising a Document

• A document is split into logical parts:
  – A title
  – An abstract
  – A number of parts
  – A number of chapters in each part
  – A number of sections in each chapter
  – A number of subsections in each section
  – A number of subsubsections in each subsection

• Availability of a logical part depends on the document class (eg no chapters in a paper).

• Typesetting of the sections may vary depending on document class.
The Title

\documentclass{article}
\begin{document}
\title{\LaTeX: Fun with Text}
\author{Cikku Flieles}
\date{31st February 2000}
\maketitle
\maketitle
\end{document}
\documentclass{article}
\begin{document}
\title{\LaTeX: Fun with Text}
\author{Cikku Flieles}
\date{31st February 2000}
\maketitle
\end{document}
The Abstract

- Available in article and report class.
- Used to give an overview of the content of the document.
- Is usually typeset with wider margins than the main text.
- Specified using the abstract environment:

  \begin{abstract}
  ...
  \end{abstract}
Logical Sections

• To start a named part, chapter, section, subsection or subsubsection use the command:

\section_type{section name}

where \texttt{section_type} is one of part, chapter, section, subsection and subsubsection.

• This will automatically create the title and numbering of the section.

• Any text after the command will appear inside the section named.

• Parts and chapters are only available in the report and book class.
Logical Sections

\documentclass{report}
\begin{document}
\chapter{Basics}

\section{First of all \ldots}
Initially, we think.

\subsection{Sit Down}
Find a chair and sit down.

\subsection{Think}
Think about the chair.

\end{document}
Chapter 1

Basics

1.1 First of all ...  
Initially, we think.

1.1.1 Sit Down  
Find a chair and sit down.

1.1.2 Think  
Think about the chair.
Figures and Tables

• The `figure` environment is used to include a *floating* figure in the text.
• Similarly the `table` environment can be used to insert a *floating* table.
• A caption can be added to both using the `\caption{}` command.
• The two environments are identical except for the caption title, and whether they appear in a list of figures, or the list of tables.
Figures and Tables

- The `figure` environment is used to include a floating figure in the text.
- Similarly, the `table` environment can be used to insert a floating table.
- A caption can be added to both using the `\caption{}` command.
- The two environments are identical except for the caption title, and whether they appear in a list of figures or tables.
- Floating objects do not have a fixed position in the body of the text, but may be moved around by LaTeX to improve the layout.
Figures and Tables

\begin{figure}
Here include whatever you want in the figure.

\caption{A demo figure}
\end{figure}

Any other text \ldots

\begin{table}
Here include whatever you want in the table.

\caption{A demo table}
\end{table}

Note that the figures and tables may move \ldots
Figures and Tables

\begin{figure}
Here include whatever you want in the figure.
\caption{A demo figure}
\end{figure}

Any other text \ldots

\begin{table}
Here include whatever you want in the table.
\caption{A demo table}
\end{table}

Note that the figures and tables may move \ldots

Here include whatever you want in the figure.

Figure 1: A demo figure

Here include whatever you want in the table.

Table 1: A demo table

Any other text \ldots
Figures and Tables

\texttt{LaTeX} keeps count of the figure and table numbering automatically.

Figure 1: A demo figure

Table 1: A demo table

Any other text …

Note that the figures and tables may move …
Figures and Tables

\begin{figure}
Here include whatever you want in the figure.
\caption{A demo figure}
\end{figure}

Any other text \ldots

\begin{table}
Here include whatever you want in the table.
\caption{A demo table}
\end{table}

Note that the figures and tables may move \ldots

If LaTeX puts the figures and tables in strange positions there are ways of giving it suggestions. Check a book on LaTeX for more details.

Figure 1: A demo figure

Table 1: A demo table
Tables of Contents

• To add a table of contents, with parts, chapters, sections, etc use the command \tableofcontents.

• You may also include a list of figures and a list of tables using \listoffigures and \listoftables.
Tables of Contents

\title{A Quick \LaTeX\ Primer}
\author{Gordon J. Pace}
\date{}
\maketitle
\tableofcontents
# Tables of Contents

\title{A Quick $\LaTeX$ Primer}  
\author{Gordon J. Pace}  
\maketitle  
\tableofcontents

### Contents

1. Introduction  
   1.1 Motivation  
   1.2 What is $\LaTeX$?  
   1.3 Trivia  

2. Producing Output  

3. The first few steps  
   3.1 Starting a document  
   3.2 Paragraphs and line breaks  
   3.3 Titles  

4. Frills  
   4.1 Typefaces  
   4.2 Type Size  
   4.3 Verbatim Environment

---

This is a sample LaTeX document. The table of contents is generated automatically using the \tableofcontents command. The document includes sections and subsections, which are structured using \section and \subsection commands. The title, author, and date are set using the \title, \author, and \date commands, respectively. The document is formatted using LaTeX's default styles.
\title{A Quick \LaTeX\ Primer}
\author{Gordon J. Pace}
\maketitle
\tableofcontents

\begin{center}
A Quick \LaTeX\ Primer
\end{center}

Gordon J. Pace

\tableofcontents

\section{Introduction}
1.1 Motivation \hfill 3
1.2 What is \LaTeX\? \hfill 3
1.3 Trivia \hfill 3

\section{Producing Output}

\section{The first few steps}
3.1 Starting a document \hfill 4
3.2 Paragraphs and line breaks \hfill 4
3.3 Titles \hfill 5

\section{Frills}
4.1 Typefaces \hfill 5
4.2 Type Size \hfill 6
4.3 Verbatim Environment \hfill 6

\LaTeX\ creates an auxiliary file with all page numbers when run through a file. Run \LaTeX\ twice to ensure that they match.
Cross References

• Quite regularly, you will want to refer to section 4.2.1.4 from section 7.6.4.2.

• But when you add a section before section 4.2, you will have to revise the numbering…

• \textsc{LaTeX} provides a way of naming sections, chapters, figures and tables to allow references updated automatically.
Cross References

- **Use \label{label name}** to name a numbered object (figure, section, chapter, etc). It may appear within the \caption, \section, etc parameter or just after it.
- **Use \ref{label name}** to insert the number of the object named using \label command.
- **Use \pageref{label name}** to insert the page number where the named object appears.
- References may be forward or backward ones.
\section{Introduction}

... more details can be found in section \ref{s:proof} (in particular look at figure \ref{f:proof} on page \pageref{f:proof})...

\section{Proofs and Roofs}

...

\subsection{Proof \label{s:proof}}

\begin{figure}
...
\caption{Proof outline \label{f:proof}}
\end{figure}

...
Cross References

1 Introduction

...more details can be found in section 3.2 (in particular look at figure 8 on page 32).

3 Proofs and Roofs

3.2 Proof

... Figure 3: Proof outline

...
1 Introduction

...more details can be found in section 3.2 (in particular look at figure 8 on page 32).

3 Proofs and Roofs

3.2 Proof

...
\section{Introduction}

... more details can be found in section \ref{s:proof} (in particular look at figure \ref{f:proof} on page \pageref{f:proof})...

\section{Proofs and Roofs}

\subsection{Proof \label{s:proof}}

\begin{figure}
...
\caption{Proof outline \label{f:proof}}
\end{figure}

CAUTION

As with tables of contents, \LaTeX{} uses an auxiliary file with all references. Run \LaTeX{} twice to ensure that references match.
Take a 5 min break
Organising a Large Document

- Writing a large document can make access to different parts unwieldy.
- **\LaTeX** has two commands to import files from one another: \texttt{\input{file}}, \texttt{\include{file}}.
- Both include the text in the file given as parameter as-is into the main document.
- They are identical except that \texttt{\include} starts a new page automatically.
Organising a Large Document

• Writing a large document can make access to different parts unwieldy.

\textsc{LaTeX} has two commands to import files from one another: \texttt{\textbackslash input\{file\}}, \texttt{\textbackslash include\{file\}}.

• Both include the text in the file given as parameter as-is into the main document.

• They are identical except that \texttt{\textbackslash include} starts a new page automatically.

Note that the although the files are assumed to be \textsc{LaTeX} files, the .tex extension is left out.
main.tex

\documentstyle{report}
\begin{document}
\input{frontpage}

% short introduction
\input{introduction}

% The algorithm
\input{algorithm}

% Correctness proof
\input{proof}

% Conclusions
\input{conclusions}
\end{document}
Typical Document Organisation

main.tex

\% Document: FYP Chicken-Sort
\% Date:  1/9/2005
\% Author:  Cikku Flieles

\documentstyle{report}
\begin{document}
\input{frontpage}

% short introduction
\input{introduction}

% The algorithm
\input{algorithm}

% Correctness proof
\input{proof}  

% Conclusions
\input{conclusions}
\end{document}

proof.tex

\chapter{The Proof of Correctness}
\section{Proof Outline}

We prove the correctness of chicken sort using a technique based on the Socratic method of discourse.

Let us start by assuming that Plato knew about this proof...
Images

• Images can be added anywhere in a document (not just as a figure)
• To include an image, use the command \includegraphics{filename}
• Various formats are allowed, including gif, jpg, pdf (when using pdftex), etc.
Resizing Images

• Images can be resized using the

\resizebox{width}{height} {object to resize}

• Width and height can be set in various units: cm, mm, in, textwidth (the size of the page less the margins).

• Use ! as the width or height to scale it according to the other given size.
Il-Ahwa x’Figure!

\begin{figure}
\resizebox{0.8\textwidth}{!}{\includegraphics{girlinlatex.gif}}
\caption{Il-Ahwa x’Figure}
\end{figure}
Il-Ahwa x’Figure!

\begin{figure}
\resizebox{0.8\textwidth}{!}{
\includegraphics{girlinlatex.gif}}
\caption{Il-Ahwa x’Figure}
\end{figure}

Figure 1: Il-Ahwa x’Figure
Tables

- To draw up tabular data, use the `tabular` environment.
- An extra parameter gives the information about the column layout.
- Separate lines using `\` and columns using the ampersand (`&`) symbol.
- `\hline` draws a horizontal line.
Tables

- To draw up tabular data, use the `tabular` environment.

- An extra parameter gives the information about the column layout.

- Separate lines using the backslash (`\`) symbol.

- Separate columns using the ampersand (`&`) symbol.

- \hline draws a horizontal line.

  eg \{ l | c | r \} results in two vertical lines, a left aligned column, another vertical line, a centred column, and a right aligned column, and a vertical line.
# Eurovision Singers

\begin{tabular}{||l|cr||}
\hline
Name & Pos & Pnts \\
\hline
Cikku & 3rd & 5  \\
Pippo & 2nd & 10  \\
Salvu & 1st & 15  \\
\hline
\end{tabular}
Eurovision Singers

\begin{tabular}{||l|c|c||}
\hline
Name  & Pos & Pnts \\
\hline
Cikku & 3rd & 5 \\
Pippo & 2nd & 10 \\
Salvu & 1st & 15 \\
\hline
\end{tabular}
\begin{tabular}{||l|c|r||}
\hline
Name & Pos & Pnts \\
\hline
Cikku & 3rd & 5 \\
Pippo & 2nd & 10 \\
Salvu & 1st & 15 \\
\hline
\end{tabular}
Footnotes

• To add a footnote, use the:

\footnote{footnote text}

• A footnote mark (such as \footnote{footnote text}) appears where the command is given, and the footnote at the bottom of the page.

• \LaTeX{} takes care of the rest.
Unordered Lists

• The \texttt{itemize} environment creates an unordered list (like this one).
• Items are started using the \texttt{\textbackslash item} command.
• You can have nested lists.
Ordered Lists

1. The *enumerate* environment creates an unordered list (like this one).
2. Items are also started using the \texttt{item} command.
3. Nested ordered lists can be used.
Description Lists

The environment: The `description` environment creates a description list (like this one).

Items: Items are started using the `\item` command, with the title given as an optional parameter (in square brackets) just after the command.
Pre-Formatted Text

• Anything given within the `verbatim` environment is typeset exactly as given in a monospaced font, with no command interpretation.

• To include a non-interpreted string within your text, use `\verb+the text+` command. You may use !, | or a number of other characters to start and end the text (the same symbol must be used to start and end the text).
Centre Alignment

- Anything appearing within a `center` environment is centred on the page.
- If you have just one line, such as an image, you can use:
  \[\text{\texttt{centerline\{centred\ line\}}:\}\]
\begin{enumerate}
\item The first\footnote{not second} item
\begin{centerline}\text{lambda.pdf}\end{centerline}
\item The second\footnote{not first} item
\begin{verbatim}
\begin{verbatim}
let f n = n `mod` 17
in  map (\x -> x * f x) [ 1..10 ]
\end{verbatim}
\end{verbatim}
\end{enumerate}
The first\textsuperscript{1} item

\begin{verbatim}
let f n = n `mod` 17
in map (\x -> x * f x) [ 1..10 ]
\end{verbatim}

\texttt{lambda.pdf}

The second\textsuperscript{2} item

\footnotesize

\textsuperscript{1} not second

\textsuperscript{2} not first
Elephants and Giraffes

\begin{description}
\item[Elephants:] Elephants can be typeset using the \verb+\elephant+ command.
\item[Giraffes:] Two points should be kept in mind:
\begin{itemize}
\item \LaTeX\ offers no support for giraffes.
\item Neither does Word.
\end{itemize}
\end{itemize}
\end{description}
Elephants and Giraffes

\begin{description}
\item[Elephants:] Elephants can be typeset using the \verb+\elephant+ command.
\item[Giraffes:] Two points should be kept in mind:
  \begin{itemize}
  \item \LaTeX{} offers no support for giraffes.
  \item Neither does Word.
  \end{itemize}
\end{description}
Emphasis and Boldface

- *Emphasised* text is produced using the `\textemph{text}` command.
- **Boldface** is obtained through the use of `\textbf{text}`.
- Rarely used are sans-serif `\texttt{text}`, small caps `\textsc{text}` and typewritten `\texttttt{text}`.
**Definition:** An *elephant* can be defined to be a giraffe who should go on a diet.

**Definition:** A *giraffe* is nothing but an anorexic elephant.

**Occam** implements elephants very efficiently. Note that **Occam** is not written **Occam** or **Occam**!
**Definition:** An *elephant* can be defined to be a giraffe who should go on a diet.

**Definition:** A *giraffe* is nothing but an anorexic elephant.

Occam implements elephants very efficiently. Note that **Occam** is not written OCCAM or Occam!
Some Symbols

• To illustrate the rest of this part, we will introduce some mathematical symbols. More can be found on the last few slides.

• All mathematics must appear in maths mode – but more about this in a moment…

• The following symbols can be produced using the commands: \leq, \times, \pi, \infty.

\[\leq, \times, \pi, \infty\]
More Symbols

Some symbols are used to combine other mathematical expressions:

- **Powers:**
  \[ e^{i\pi} = -1 \]

- **Subscripts:**
  \[ a_{n+1} = 2 \times a_n \]

- **Fractions:**
  \[ \frac{x^{\pi}}{a_{25}} \]

- **Summation:**
  \[ \sum_{i=0}^{\infty} a^i \]
Inline Mathematics

• If a mathematical expression appears in a line of normal text, use a dollar symbol $ to start and to end the mathematics.

• This ensures that the lines are kept as narrow as possible to avoid \text{\LaTeX} having to change line spacing drastically.
Inline Mathematics

• If a mathematical expression appears in a line of normal text, use a dollar symbol $ to start and to end the mathematics.

• This ensures that the lines are kept as low as possible to avoid \LaTeX having to change line spacing.

It has already been shown that $a_{n+1} = 2 \times a_n$. We can thus conclude that $\frac{a_n}{a_0} = 2^n$. 
Inline Mathematics

• If a mathematical expression appears in a line of normal text, use a dollar symbol $ to start and to end the mathematics.

• This ensures that the lines are kept as low as possible to avoid \LaTeX\ having to change line spacing.

It has already been shown that $a_{n+1} = 2 \times a_n$. We can thus conclude that $\frac{a_n}{a_0} = 2^n$. 

It has already been shown that $a_{n+1} = 2 \times a_n$. We can thus conclude that $\frac{a_n}{a_0} = 2^n$. 
Large Formulae

• If the mathematical formulae are to appear on a separate line, start the mathematics using \[, and end it with \] .

It has already been shown that $a_{n+1} = 2 \times a_n$. We can thus conclude that:

$$\frac{a_n}{a_0} = 2^n$$

Note the difference from inline mode: $\frac{a_n}{a_0} = 2^n$. 
It has already been shown that $a_{n+1} = 2 \times a_n$. We can thus conclude that:

$$\frac{a_n}{a_0} = 2^n$$

Note the difference from inline mode: $\frac{a_n}{a_0} = 2^n$. 
Equations

• Quite regularly, one needs equations with aligned equality signs. The environment `eqnarray` is used for this.

• Separate lines using `\\`, and the left hand side, equality, and right hand side of the equations using `&`. 
Equations

• Quite regularly, one needs equations with aligned equality signs. The environment `eqnarray` is used for this.

• Separate lines using `\\`, and the left hand side, equality, and right hand side of the equations using `&`.

\begin{eqnarray}
a_0 &=& 1 \\
a_{n+1} &=& 2 \times a_n
\end{eqnarray}
Equations

• Quite regularly, one needs equations with aligned equality signs. The environment `eqnarray` is used for this.

• Separate lines using `\`, and the left hand side, equality, and right hand side of the equations using `&`.

\[
\begin{eqnarray}
a_0 &=& 1 \\
a_{n+1} &=& 2 \times a_n
\end{eqnarray}
\]

\[
\begin{align*}
a_0 &= 1 & (1) \\
a_{n+1} &= 2 \times a_n & (2)
\end{align*}
\]
Equations

• Quite regularly, one needs equations with aligned equality signs. The environment `eqnarray` is used for this.

• Separate lines using `\\`, and the left hand side, equality, and right hand side of the equations using `&`.

\[
\begin{eqnarray}
  a_0 &=& 1 \\
  a_{n+1} &=& 2 \times a_n
\end{eqnarray}
\]

Note that the equations are numbered. If you don’t want this feature, use the `eqnarray*` environment instead.

\[
\begin{align}
  a_0 &= 1 & (1) \\
  a_{n+1} &= 2 \times a_n & (2)
\end{align}
\]
Some Notes …

• Spacing is ignored in math mode – $x\ y$ gives the same result as $xy$.

• If you need to escape from math mode to include normal text (eg for the name of a function) use the command \mbox{text} (eg $e^n+\mbox{fibonacci}(n+1)$)

• Never use math mode to emphasise text – because $\text{different}$ gives different, not different!
### Some Mathematical Symbols

<table>
<thead>
<tr>
<th>Unicode</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\aleph)</td>
<td>(\prime)</td>
<td>(\forall) for all</td>
</tr>
<tr>
<td>(\hbar)</td>
<td>(\emptyset)</td>
<td>(\exists) exists</td>
</tr>
<tr>
<td>(\imath)</td>
<td>(\nabla)</td>
<td>(\neg) neg</td>
</tr>
<tr>
<td>(\jmath)</td>
<td>(\sqrt{})</td>
<td>(\flat) flat</td>
</tr>
<tr>
<td>(\ell)</td>
<td>(\top)</td>
<td>(\natural) natural</td>
</tr>
<tr>
<td>(\wp)</td>
<td>(\bot)</td>
<td>(#) sharp</td>
</tr>
<tr>
<td>(\Re)</td>
<td>(|)</td>
<td>(\clubsuit) clubsuit</td>
</tr>
<tr>
<td>(\Im)</td>
<td>(\angle)</td>
<td>(\diamondsuit) diamondsuit</td>
</tr>
<tr>
<td>(\partial)</td>
<td>(\triangle)</td>
<td>(\heartsuit) heartsuit</td>
</tr>
<tr>
<td>(\infty)</td>
<td>(\backslash)</td>
<td>(\spadesuit) spadesuit</td>
</tr>
</tbody>
</table>
## Binary Operators

<table>
<thead>
<tr>
<th>Symbol</th>
<th>LaTeX</th>
<th>Symbol</th>
<th>LaTeX</th>
</tr>
</thead>
<tbody>
<tr>
<td>±</td>
<td>\pm</td>
<td>∩</td>
<td>\cap</td>
</tr>
<tr>
<td>⊕</td>
<td>\mp</td>
<td>∪</td>
<td>\cup</td>
</tr>
<tr>
<td>\setminus</td>
<td>\uplus</td>
<td>⊔</td>
<td>\sqcap</td>
</tr>
<tr>
<td>\cdot</td>
<td>\cdot</td>
<td>⊓</td>
<td>\sqcup</td>
</tr>
<tr>
<td>\times</td>
<td>\times</td>
<td>⊔</td>
<td>\otimes</td>
</tr>
<tr>
<td>\ast</td>
<td>\ast</td>
<td>\triangleleft</td>
<td>\triangleright</td>
</tr>
<tr>
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<td>\star</td>
<td>⊓</td>
<td>\oslash</td>
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<td>\diamond</td>
<td>\wr</td>
<td>\odot</td>
</tr>
<tr>
<td>\circ</td>
<td>\circ</td>
<td>\bigcirc</td>
<td>\bigtriangleright</td>
</tr>
<tr>
<td>•</td>
<td>\bullet</td>
<td>\bigtriangleup</td>
<td>\bigtriangledown</td>
</tr>
<tr>
<td>÷</td>
<td>\div</td>
<td>\bigtriangledown</td>
<td>\amalg</td>
</tr>
</tbody>
</table>
Relational Operators

\leq \quad \geq
\prec \quad \succ
\preceq \quad \succeq
\ll \quad \gg
\subset \quad \supset
\subseteq \quad \supseteq
\sqsubset \quad \sqsupset
\in \quad \ni
\vdash \quad \dashv
\smile \quad \mid
\frown \quad \parallel
\equiv \quad \sim \quad \simeq \quad \asymp
\approx \quad \cong
\bowtie \quad \models
\doteq \quad \perp
### Some Arrows

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\leftarrow$</td>
<td>$\rightarrow$</td>
</tr>
<tr>
<td>$\longleftrightarrow$</td>
<td>$\longleftarrow$</td>
</tr>
<tr>
<td>$\leftarrow$</td>
<td>$\rightarrow$</td>
</tr>
<tr>
<td>$\Leftarrow$</td>
<td>$\Rightarrow$</td>
</tr>
<tr>
<td>$\Longleftarrow$</td>
<td>$\Longrightarrow$</td>
</tr>
<tr>
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<td>$\leftrightarrow$</td>
</tr>
<tr>
<td>$\hookleftarrow$</td>
<td>$\hookrightarrow$</td>
</tr>
<tr>
<td>$\leftarrow$</td>
<td>$\rightarrow$</td>
</tr>
<tr>
<td>$\leftharpoonup$</td>
<td>$\rightharpoonup$</td>
</tr>
<tr>
<td>$\leftharpoondown$</td>
<td>$\rightharpoondown$</td>
</tr>
<tr>
<td>$\uparrow$</td>
<td>$\downarrow$</td>
</tr>
<tr>
<td>$\Uparrow$</td>
<td>$\Downarrow$</td>
</tr>
<tr>
<td>$\updownarrow$</td>
<td>$\Updownarrow$</td>
</tr>
<tr>
<td>$\nearrow$</td>
<td>$\nwarrow$</td>
</tr>
<tr>
<td>$\searrow$</td>
<td>$\swarrow$</td>
</tr>
<tr>
<td>$\mapsto$</td>
<td>$\longmapsto$</td>
</tr>
<tr>
<td>$\rightleftharpoons$</td>
<td>$\longleftrightarrow$</td>
</tr>
</tbody>
</table>
Big Symbols

\[ \sum \quad \prod \quad \coprod \quad \int \quad \oint \]

\[ \text{\textbackslash sum} \quad \text{\textbackslash prod} \quad \text{\textbackslash coprod} \quad \text{\textbackslash int} \quad \text{\textbackslash oint} \]

\[ \text{\textbackslash bigcap} \quad \text{\textbackslash bigcup} \quad \text{\textbackslash bigsqcup} \quad \text{\textbackslash bigvee} \quad \text{\textbackslash bigwedge} \]

\[ \text{\textbackslash bigodot} \quad \text{\textbackslash bigotimes} \quad \text{\textbackslash bigoplus} \quad \text{\textbackslash biguplus} \]
Greek Letters

\alpha  \alpha  \iota  \iota  \rho  \rho
\beta   \beta   \kappa \kappa  \sigma \sigma
\gamma \gamma \lambda \lambda  \tau \tau
\delta \delta \mu \mu  \upsilon \upsilon
\epsilon \epsilon \nu \nu \phi \phi
\zeta \zeta \xi \xi  \chi \chi
\eta \eta \omicron \omicron \psi \psi
\theta \theta \pi \pi  \omega \omega

\varepsilon \varepsilon
\vartheta \vartheta
\varpi \varpi
\varrho \varrho
\varsigma \varsigma
\varphi \varphi
Standard Functions

\cos \quad \arccos \quad \sin \quad \arcsin \quad \tan \quad \arctan

\exp \quad \ln \quad \log \quad \gcd \quad \min \quad \max
Simple Bibliographies

- To create the bibliography, use the `thebibliography` environment.
- Items in the bibliography are added using the `\bibitem{label}` command. The label is used to refer to the entry.
- Citing a bibliography item in the main text can be done using the `\cite{label}` or `\cite{label1, label2,...}` command to obtain citations such as [2] or [7,4].
\cite{alur:94,asarin:01} talk about timed-automata, even if \cite{asarin:01} treats a particular case of the general case appearing in \cite{alur:94}.

\begin{thebibliography}{99}

\end{thebibliography}
Citing Papers the Easy Way

\cite{alur:94,asarin:01} talk about timed-automata, even if \cite{asarin:01} treats a particular case of the general case appearing in \cite{alur:94}.

\begin{thebibliography}{99}
\end{thebibliography}

[1, 2] talk about timed-automata, even if [2] treats a particular case of the general case appearing in [1].

References


\cite{alur:94,asarin:01} talk about timed-automata, even if \cite{asarin:01} treats a particular case of the general case appearing in \cite{alur:94}.

\begin{thebibliography}{99}
\end{thebibliography}

The number here is used to tell \LaTeX that no more than 99 entries will appear in the bibliography.
Citing Papers the Easy Way

\cite{alur:94} and \cite{asarin:01} talk about timed-automata, even if \cite{asarin:01} treats a particular case of the general case appearing in \cite{alur:94}.

\begin{thebibliography}{99}
\end{thebibliography}

\textbf{CAUTION}\n\LaTeX \textbf{creates} an bibliography file with all reference information when run through a file. Run \LaTeX twice to ensure that references and citations match.
The Problems with This…

• It is your responsibility to ensure that the references appear in a standard way (e.g., all journal papers start with the author name, have an emphasised title, etc).

• Reuse of bibliographies can be cumbersome.
Using **BibTeX**

**BibTeX** is an additional tool, which takes a list of references (generated by **LaTeX**), a (.bib) file with all the bibliographic entries, and generates a file with all the reference entries to be used by **LaTeX**.
Using \texttt{Bib\TeX}.

1. Run \texttt{LaTeX} to generate the list of citations.

2. Run \texttt{Bib\TeX} to obtain the reference details.

3. Run \texttt{LaTeX} to use the reference details.

4. Run \texttt{LaTeX} again to get references right.
Using Bib\TeX.

1. Run $\LaTeX$ to generate the list of citations.
2. Run Bib\TeX to obtain the reference details.
3. Run $\LaTeX$ to use the reference details.
4. Run $\LaTeX$ again to get references right.

Luckily, new software does this at the click of one button!
Using \texttt{BibTEX}.

- Citations in the \texttt{LATEX} file appear as before using the \texttt{\cite} command.
- At the point where you want the references to appear, use the \texttt{\bibliography{file}} command, where \texttt{filename.bib} is the name of the file with the \texttt{BibTEX} entries.
@article{alur:94,
    author="R. Alur and D.L. Dill",
    title="A theory of timed automata",
    journal="Theoretical Computer Science",
    year=1994,
    volume=126,
    pages="183--235"
}

@Book{bird:88,
    author = "R. Bird and P. Wadler",
    title = "Introduction to Functional Programming",
    year = 1988
}
Your BibTeX Will Look Like This …

@article{alur:94,
    author="R. Alur and D.L. Dill",
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    journal="Theoretical Computer Science",
    year=1994,
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    year = 1988
}

You can either download these entries, type them in yourself, or use a bibliography database tool (eg Mendeley) to manage them.
Your **BibTeX** Will Look Like This …

```latex
@article{alur:94,
    author="R. Alur and D.L. Dill",
    title="A theory of timed automata",
    journal="Theoretical Computer Science",
    year=1994,
    volume=126,
    pages="183--235"
}

@Book{bird:88,
    author = "R. Bird and P. Wadler",
    title = "Introduction to Functional Programming",
    year = 1988
}
```

**BibTeX** uses the entry type (article, book, etc) to ensure a standard formatting. You don’t need to worry any longer whether it’s book or article titles that should appear in italics.
Using \textbf{BibTEX}.

- Using \textbf{BibTEX} will only show the items in the bibliography referred to in the text. Use the \texttt{\nocite{*}} command in the \texttt{\LaTeX} file to show all the items in the bibliography.

- If you prefer citations of the form [Alu94] instead of [1], add the command \texttt{\bibliographystyle{alpha}} before the bibliography in the \texttt{\LaTeX} file.
Quick and Dirty Bibliographies, or \texttt{BibTEX}?

- If you’re writing a quick document, with references you will use only once, don’t bother with \texttt{BibTEX}. Google Scholar / ADS are good alternatives.

- However, in that case, make sure that your bibliographic entries appear in a standard way, and contain all the necessary information.

- For a bigger project, that last more than a month, I would start building a \texttt{BibTEX} database early on to reduce work later on (particularly if you anticipate submitting to different publishers)
Need help?

LaTeX blah blah blah
Go forth and \textsc{LATEXify}
ANU Guidelines

- This document describes the thesis submission and examination procedures for the Higher Degree by Research (HDR) programs Master of Philosophy, Professional Doctorate, or Doctor of Philosophy.
Extras

• Mendeley (Reference Management)
• Adobe CC for ANU
• Adobe Acrobat + Word (PDF to Word)
• Adobe Illustrator (Vector figures)
• Dropbox / OneDrive / Google Drive (Backup)
• Offline Editor
• Template(s) for thesis & papers
Tips

• Download & Install MiKTeX “Net Installer – 64bit” in default 64bit directory for all users and select “install missing packages on the fly”.

• Install TeXMaker

• **Restart computer** to avoid errors after install
### Quick Build Command

- **PdfLaTeX + Bib(la)tex + PdfLaTeX (x2) + View Pdf**
- **LaTeX + dvips + View PDF**
- **LaTeX + dvips + ps2pdf + View PDF**
- **LaTeX + Bib(la)tex + LaTeX (x2) + dvips + ps2pdf + View Pdf**
- **LaTeX + Asymptote + LaTeX + dvips + View PS**
- **PdfLaTeX + Asymptote + PdfLaTeX + View Pdf**
- **LatexMk + View PDF**
- **XeLaTeX + View PDF**
- **LuaLaTeX + View PDF**

**User**: (% : filename without extension)

```
nstopmode %.tex|bibtex %.aux|latex -interaction=nostopmode %.tex|latex -interaction=nostopmode %.tex|xdvi %.dvi
```

(the commands must be separated by '|')

For .asy files mptote/asy.exe -f pdf -noView %.asy""C:/Program Files/Adobe/Reader 11.0/Reader/AcroRd32.exe" %.pdf

- **Don't launch a new instance of the viewer if the dvi/ps/pdf file is already opened**
Settings

General

Package installation

Packages are installed from: a random package repository on the Internet

You can choose whether missing packages are to be installed on-the-fly:

- Always install missing packages on-the-fly
- Ask me
- Never install missing packages on-the-fly

Paper

Select your default paper format: A4

Changing the paper format triggers a rebuild of the format files.

Bin directory

Links to the executables have been installed in:

C:\Program Files\MiKTeX 2.9\miktex\bin\x64
Package ClassicThesis - CTAN
https://ctan.org/pkg/classicthesis
ClassicThesis – A "classically styled" thesis package. This package provides an elegant layout designed in homage to Brighurst's "The Elements of ..."!

CTAN: /tex-archive/macros/latex/contrib/classicthesis
https://www.ctan.org/tex-archive/macros/latex/contrib/classicthesis
My address can be found in the file ClassicThesis.pdf. A collection of the postcards I received so far is available online at http://postcards.miede.de License: This ...!

amiede / classicthesis / wiki / Home — Bitbucket
https://bitbucket.org/amiede/classicthesis
Jan 1, 2019 - classicthesis. A Classic Thesis Style -- An Homage to The Elements of Typographic Style. You can find the latest release for LaTeX and LyX ...!

André Miede
https://www.miede.de
classicthesis. This section is devoted to the system LaTeX. The first version of the text ...

[PDF] A Classic Thesis Style
mirrors.ibiblio.org → CTAN → macros → latex → contrib → classicthesis

Classic Thesis

This is an easy to use LaTeX template for a PhD or masters thesis, and it is also well suited to a report or book. It provides a classic, professional-quality typographic style that is influenced by Brighurst’s The Elements of Typographic Style.

You can find the latest release for LaTeX and LyX here. Furthermore, this is a playground to experiment with alpha- and beta-versions. Download the current stable LyX and LaTeX versions here. The "official" and latest release for LyX can also be found on CTAN.

You can find help regarding typical problems in the wiki overview of the available wiki pages. Or you might have a look at the reported (and closed/fixesd) issues.

#Showcase

A CLASSIC THESIS STYLE

Latex source code, compiled PDF and preview images.