



Introduction to LaTeX

Learning Outcomes

- **Recognise** the advantages of LaTeX and its applications in the wider context of typesetting
- **Identify** the key features for reading and compiling an existing .tex document
- **Develop** new technical documents from simple templates
- **Create** simple equations, figures, tables, lists and references within LaTeX
- **Assess** and troubleshoot common compiler problems and use online aid tools

LaTeX

- What is LaTeX?
- How do I use it?
- Why would I use it?

Overleaf

- Online environment for creating and compiling LaTeX documents
- Pros
 - Cross-platform
 - Complete
 - Easy to use
 - Allows collaboration
 - Cloud syncing with Dropbox and Github
 - Integrated “review” system for feedback
- Cons
 - Editor online only
 - Data stored online – implications for patient data

Creating a document

Preamble

```
\documentclass[12pt,a4paper]{article}
\usepackage{graphicx}
\usepackage{amssymb, amsmath}
\usepackage[citecolor=black]{hyperref}
```

Main body

Comments

```
\begin{document}
% What you don't see
What you see %You also don't see this
\end{document}
```

Sections

```
\section{The Cat}
```

Some text

```
\subsection{Sat On}
```

More text

```
\subsubsection{The Mat}
```

Even More Text

1 The Cat

Some text

1.1 Sat On

More text

1.1.1 The Mat

Even More Text

Chapters and Paragraphs

```
\chapter{A Poem}  
\section{The Cat}  
\subsection{Sat On}  
\subsubsection{The Mat}  
\paragraph{Author}Chris
```

Chapter 1

A Poem

1.1 The Cat

1.1.1 Sat On

1.1.1.1 The Mat

Author Chris

Table of Contents

`\tableofcontents`

Contents

1	The Cat	1
1.1	Sat On.....	2
1.1.1	The Mat...	3

Modifying Text

The `\emph`{slanty cat}

The `\textbf`{fat cat}

The `\underline`{important cat}

The `{\huge` huge cat}

The `{\large` large cat}

The `{\small` small cat}

The *slanty cat*

The **fat cat**

The important cat

The huge cat

The large cat

The small cat

Lists

```
\begin{itemize}  
  \item A Cat  
  \item A Hat  
\end{itemize}
```

```
\begin{enumerate}  
  \item A Cat  
  \item A Hat  
\end{enumerate}
```

- A Cat

- A Hat

1. A Cat

2. A Hat

Equations

Of course,

```
\begin{equation}
x + y = 7 \alpha,
\end{equation}
```

should be obvious,
where α is
defined as

Of course,

$$x + y = 7\alpha, \quad (1)$$

should be obvious, where α is defined as

Mathmode Commands

`\frac`

`{`

`\Gamma` `}`

`{ \sqrt{\gamma} }$`

$$\frac{\Gamma}{\sqrt{\gamma}}$$

$$\int_0^{\pi} dx \sin x$$

`\int_{0}^{\pi} \text{textrm{d}x`

`\sin x$`

$$\lim_{x \rightarrow \infty} \log x$$

`\lim_{x \to \infty} \log x$`

$$\sum_{n=0}^N n^2$$

`\sum\limits_{n=0}^N`

Special Characters

`\$ \& \%`

`\textgreater`

`\textbackslash`

`\`{e} \'{a} \"{o}`

`\vec{v}`

`\widetilde{oo}`

`\widehat{abc}`

\$

&

%

>

\

è

á

ö

\vec{v}

\widetilde{oo}

\widehat{abc}

Figures

```
\begin{figure}[t]
```

```
\centering
```

```
\includegraphics[width  
=10cm]{Cat_Box}
```

```
\caption{Cats!}
```

```
\end{figure}
```

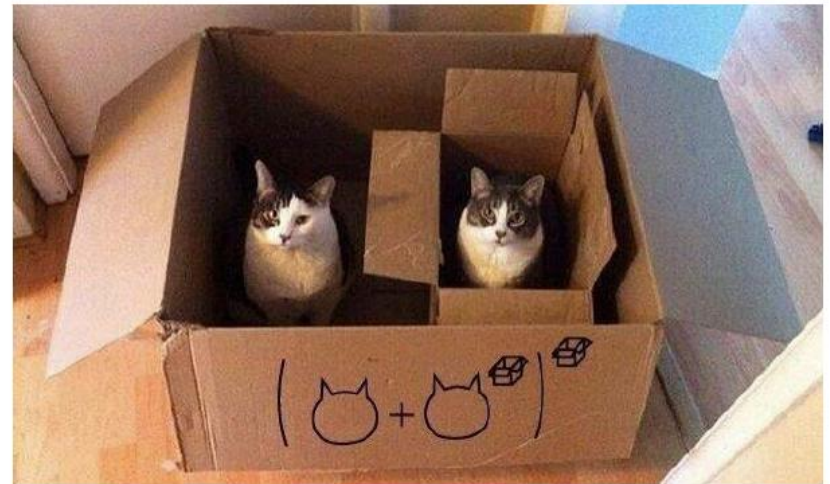


Figure 1: Cats!

Tables

```
\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
& Column A & B \\
\hline
Row 1 & & C \\
2 & D & Big cell
\end{tabular}
\caption{An arbitrary table}
\end{table}
```

	Column A	B
Row 1		C
2	D	Big cell

Table 1: An arbitrary table

Referencing

```
\section{Referencing...}
```

```
\begin{equation}
```

```
x+y=7\alpha
```

```
\label{keyword1}
```

```
\end{equation}
```

... see Section `\ref{sections}`

```
\section{...Sections}\label{sections}
```

...see `\eqref{keyword1}`

1 Referencing...

$$x + y = 7\alpha \tag{1}$$

... see Section 2

2 ...Sections

...see (1)

Bibliography Management

- Many documents will have a large number of references
- There are many ways to include references and citations in LaTeX
- Many reference management programs allow the exporting of bibliographies in a .bib file

Bibliography Management

myrefs.bib

```
@article{thor_2011,  
author = "A.U. Thor",  
title = "{LaTeX} is Great",  
year = "2011",  
journal = "Typesetting Monthly",  
volume = "14",  
number = "3",  
pages = "342--351" }
```

```
@book{rowling_1997,  
author = "J.K. Rowling",  
title = "Philosopher's Stone",  
year = "1997",  
publisher = "Bloomsbury"}
```

Bibliography

J.K. Rowling. *Philosopher's Stone*. Bloomsbury, 1997.

A.U. Thor. LaTeX is great. *Typesetting Monthly*, 14(3):342-351, 2011.

Bibliography Management

main.tex

```
\usepackage{natbib}

\begin{document}

\citet{thor_2011} is much
better than its competitor
\citep{rowling_1997}

\bibliographystyle{plainnat}
\bibliography{myrefs}
```

Thor [2011] is much better than
its competitor [Rowling, 1997]

LaTeX Errors

The screenshot shows a LaTeX editor interface with a source code editor on the left and an errors panel on the right. The source code editor displays the following code:

```
1 \documentclass[12pt,a4paper]{article}
2 \usepackage{graphicx}
3 \usepackage{amssymb, amsmath}
4
5 \begin{document}
6
7 \begin{titlpage}
8
9 \begin{center}
10 {\hug A Document Free From Errors}
11
12 \vspace{5dm}
13
14 LaTeX Course
15
16 \vspace{2cm}
17
18 \today
19 \end{center}
20
21 \end{titlpage}
22
23 \tableofcontents
24
25 \section{The First Section}
26
27 This is a document which was once full of errors and is now free from errors \cite{fauxnews}.
28
29 Here is an equation:
30
31 \begin{equation}
32 \frac{\int_0^{\infty} \sqrt{x} e^{-x} \text{textrm{d}x}}{\Gamma} = \frac{\sqrt{\pi}}{2\Gamma}, \label{a_b
33 \end{equation}
34
35 where  $\Gamma$  is completely arbitrary and  $\pi$  is 3.14159....
36
37 \subsection{More Details}
38
```

The errors panel on the right displays the following error messages:

Compile Error. Sorry, your LaTeX code couldn't compile for some reason. Please check the errors below for details, or view the raw log.

Undefined control sequence. main.tex, line 10

The compiler is having trouble understanding a command you have used. Check that the command is spelled correctly. If the command is part of a package, make sure you have included the package in your preamble using `\usepackage{...}`.

[Learn more](#)

I.10 {\hug
A Document Free From Errors}
The control sequence at the end of the top line of your error message was never \def'ed. If you have misspelled it (e.g., \hobx'), type 'I' and the correct spelling (e.g., \Ihbox'). Otherwise just continue, and I'll forget about whatever was undefined.

! Illegal unit of measure (pt inserted).
<to be read again>
d
I.12 \vspace{5dm}

Undefined control sequence. main.tex, line 16

The compiler is having trouble understanding a command you have used. Check that the command is spelled correctly. If the command is part of a package, make sure you have included the package in your preamble using `\usepackage{...}`.

[Learn more](#)

Journal Submission

- Journal documentclasses
- Submit your source files
- Perfection not required



Introduction to LaTeX

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