

Lecture 11 - COMPSCI1111/111G SS 2018

Today's lecture

- ▶ What is LaTeX?
- ▶ A brief history of LaTeX
- ▶ Basic LaTeX commands:
 - ▶ Document structure
 - ▶ Environments
 - ▶ Special characters; quotes, ellipsis, dashes

2

1 Introduction

What is LaTeX?

- ▶ LaTeX is a document preparation system for typesetting
- ▶ LaTeX encourages authors to focus on their document's content and leave the formatting for later
- ▶ LaTeX can be used for a range of documents:
 - ▶ Essays and theses
 - ▶ Journal articles
 - ▶ Technical documents
 - ▶ Presentations

3

1 Introduction

History of LaTeX

- ▶ Donald Knuth created TeX in 1978
 - ▶ Aim was to make it easy to create books and to ensure that documents looked the same on any computer
 - ▶ TeX files can be typeset into PDF files
- ▶ Leslie Lamport created LaTeX in 1985
 - ▶ LaTeX = Lamport TeX
 - ▶ Introduced a number of extensions to TeX which made it faster and easier to use
 - ▶ Soon, LaTeX became the standard way to use TeX

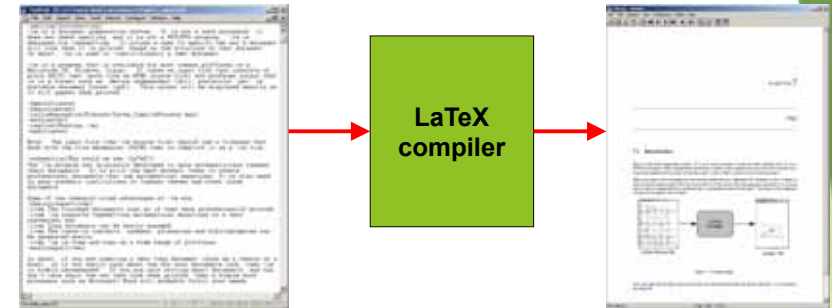


4

Why use LaTeX?

- ▶ Very efficient when working with large documents
- ▶ Versatile **mathematical** tools
- ▶ LaTeX can automatically generate:
 - ▶ Table of contents
 - ▶ List of figures
 - ▶ Index
 - ▶ Bibliographies
- ▶ LaTeX distributions are open source

Using LaTeX



LaTeX commands

- ▶ Use to provide the LaTeX compiler with instructions
- ▶ General structure of LaTeX commands:

```
\commandname[options]{argument}
```

- ▶ Example of a LaTeX command:

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

- ▶ Command name: documentclass
- ▶ Options: a4paper
- ▶ Argument: article
- ▶ Not all commands have options and/or arguments

Comments

- ▶ Used to annotate the document
- ▶ They are ignored by the LaTeX compiler

```
% Comments start with a percentage sign  
% All text is ignored until the end of the  
% line is reached
```

Whitespace characters

- ▶ Includes spaces, tabs and line breaks
- ▶ Two or more consecutive whitespace characters are reduced down to a single space character

A sentence

A sentence.

- ▶ One line break is treated as a space. However, two line breaks creates a new paragraph

This is
some text.

This is a sentence.

This is some text.
This is a sentence.

Whitespace

A B C
 D E F

A B C D E F

Special characters

- ▶ These characters have a special meaning in LaTeX
 - ▶ Need to type an escape character ('\') before you can type a special character
- ▶ There are 10 special characters in LaTeX

\ \$ % ^ & _ ~ # { }

- ▶ Example:

A pie costs `\$4.00`.

A pie costs \$4.00.

A URL contains a `\backslash` character.

A URL contains a \ character.

Creating a LaTeX document

```

\documentclass[a4paper]{article}
\begin{document}
\title{A test document}
\maketitle
This is an important document.
\end{document}

```

documentclass
Preamble
Document body

A test document

January 15, 2017

This is an important document.

Documentclass command

- ▶ This command defines the type of document that is being typeset
- ▶ [option] used to define paper size
 - ▶ a4paper
 - ▶ a5paper
 - ▶ letterpaper
- ▶ {argument} used to define the type of document
 - ▶ Book
 - ▶ Report
 - ▶ Article
 - ▶ Letter

Adding a title

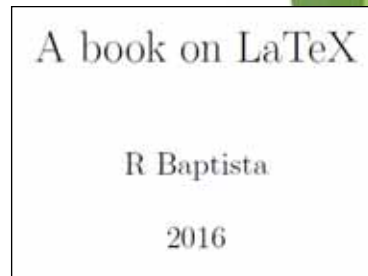
- ▶ There are four commands that can be used to create the document's title
- ▶ \title{document title}
- ▶ \author{author's name}
- ▶ \date{date here}
 - ▶ By default, LaTeX will insert today's date
- ▶ \maketitle
 - ▶ This command inserts the title in the document and comes after the commands above

Adding a title

```
\documentclass[a4paper]{book}

\begin{document}
\title{A book on LaTeX}
\author{R Baptista}
\date{2016}
\maketitle

LaTeX typesets documents.
\end{document}
```

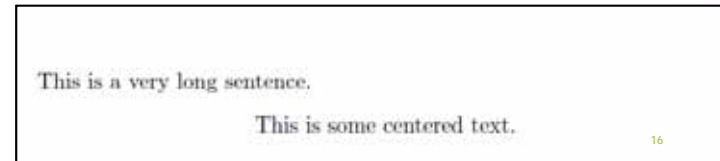


Environments

- ▶ Environments apply a specified change to the text within the environment
 - ▶ An environment will also start a new paragraph

```
\begin{environment name}
...
\end{environment name}
```

```
\begin{document}
This is a very long sentence.
\begin{center}
This is some centered text.
\end{center}
\end{document}
```



Environments

- ▶ document
 - ▶ Used to define the body of the document
- ▶ center
 - ▶ Aligns the content within the environment on the centre of the page
- ▶ displaymath, equation
 - ▶ Environments for displaying math equations
- ▶ itemize, enumerate, description
 - ▶ Three kinds of lists

Exercise 1

- ▶ In this exercise, you will prepare your first LaTeX file. You may either work on some text of your own, or work with the text given below.

```
\documentclass[a4paper]{article}
\  
  
Words are separated by one or more spaces.  
  
\  
  

```

Words are separated by one or more spaces.
Paragraphs are separated by one or more blank lines.

Paragraphs and line breaks

- ▶ Earlier, we saw leaving a blank line between two pieces of text creates a new paragraph
- ▶ You can create a new line by using `\\`

```
\begin{document}
A gap between two lines.

Creates a new paragraph. Two backslashes creates \\
a new line.
\end{document}
```

A gap between two lines.
Creates a new paragraph. Two backslashes creates a new line.

Footnotes

- ▶ Use `\footnote{}` within the text to insert a footnote

```
\begin{document}
Pythagoras was born in Greece\footnote{Wikipedia}
around 2,500 years ago.
\end{document}
```

Pythagoras was born in Greece¹ around 2,500 years ago.

¹Wikipedia

Quote marks

- ▶ LaTeX uses directional quotes (eg. “ ”) rather than unidirectional quotes (eg. " ")

- ▶ Single quotes

- ▶ Open using ` character and close using ' character

``Hello'` `'Hello'`

- ▶ Double quotes

- ▶ Open using `` characters and close using "" character

```Hello''`     `“Hello”`

21

## Dashes

- ▶ Hyphen (-)

- ▶ Short dash to join different words together

`merry-go-round`     merry-go-round

- ▶ En dash (--)

- ▶ Longer dash used to indicate a range of values

`pages 45--50`     pages 45–50

- ▶ Em dash (---)

- ▶ Very long dash between words or phrases

`the start --- the finish`     the start — the finish

22

## Ellipsis

- ▶ A character made of up three dots used to indicate missing text

- ▶ Must insert an ellipsis using the `\ldots` command, not three full stops, so that you get the correct spacing between the dots

`There is \ldots missing`

There is ... missing

23

## Avoiding line breaks

- ▶ There can be times when we don't want LaTeX to automatically insert a new line break

The Lord of the Rings is an epic high-fantasy novel series written by J. R. R. Tolkien, who was an English author.

The Lord of the Rings is an epic high-fantasy novel series written by J. R. R. Tolkien, who was an English author.

24

## Avoiding line breaks

- ▶ To avoid this, we use the tilde character (~) in place of the spaces

The Lord of the Rings is an epic high-fantasy novel series written by J.~R.~R.~Tolkien, who was an English author.

The Lord of the Rings is an epic high-fantasy novel series written by J. R. R. Tolkien, who was an English author.

## Basic formatting

- ▶ \emph command emphasises the enclosed text

This was a \emph{long} lecture

This was a *long* lecture

- ▶ \textbf command makes the enclosed text bold

This was a \textbf{cool} lecture

This was a **cool** class

## Exercise 2

- ▶ In this exercise, you will prepare a LaTeX file. You may either work on some text of your own, or work with the text given below.

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

In March 2006, Congress raised that ceiling an additional \$0.79 trillion to \$8.97 trillion, which is approximately 68% of GDP. As of October 4, 2008, the Emergency Economic Stabilization Act of 2008 raised the current debt ceiling to 11.3 trillion.

```
\
```

In March 2006, Congress raised that ceiling an additional \$0.79 trillion to \$8.97 trillion, which is approximately 68% of GDP. As of October 4, 2008, the "Emergency Economic Stabilization Act of 2008" raised the current debt ceiling to \$11.3 trillion.

## Exercise 3

- ▶ What is the LaTeX code that would generate the following document?

Pythagoras

A. Professor

2017

Around 530 BC, Pythagoras moved to **Croton** — a Greek colony in southern Italy — and set up a religious sect.

This is where Pythagoras earned his reputation as a mystic.

Pythagoras was also a skilled mathematician . . .

# Structuring a document

- ▶ `\part{ part name goes here }`
- ▶ `\chapter{ chapter name goes here }`
- ▶ `\section{ section name goes here }`
- ▶ `\subsection{ subsection name goes here }`
- ▶ `\subsubsection{ subsubsection name goes here }`

# Example

```

\documentclass{article}
\begin{document}

\section{Introduction}
The problem of \ldots

\section{Method}
We investigate \ldots

\subsection{Sample Preparation}
\subsection{Data Collection}

\section{Results}

\section{Conclusion}

\end{document}

```

**1 Introduction**  
The problem of ...

**2 Method**  
We investigate ...

**2.1 Sample Preparation**

**2.2 Data Collection**

**3 Results**

**4 Conclusion**

# Table of contents

- ▶ `\tableofcontents` uses the location of the structuring commands (eg. `\page`, `\chapter`, `\section` etc) to build a table of contents
- ▶ Insert the `\tableofcontents` command after the `\maketitle` command
  - ▶ May need to compile your document twice in order to see the complete table of contents

## Contents

|                                                 |          |
|-------------------------------------------------|----------|
| <b>1 Who was Pythagoras?</b>                    | <b>1</b> |
| <b>2 What is the Pythagorean theorem?</b>       | <b>1</b> |
| <b>3 How is the Pythagorean theorem useful?</b> | <b>2</b> |

# Summary

- ▶ History of LaTeX
- ▶ Basics of LaTeX: comments, special characters, whitespace
- ▶ Creating a LaTeX document
  - ▶ `\documentclass`
  - ▶ Environments
  - ▶ Structuring documents
  - ▶ Quotes, dashes, basic formatting