Writing papers and thesis using LaTeX2e

Part I: Writing papers using LaTeX

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Sections

- To generate sections in LaTeX: `\section{name-here}`
- Subsection: `\subsection{name-here}`
- Subsubsection: `\subsubsection{name-here}`
- Subsections without numbering `\subsection*{name-here}`

Title and author name

Before you begin typing your document, i.e., `\begin{document}` you need to define the author name and title.

- Title of the document in LaTeX: `\title{name-here}`
- Author name: `\author{name-here}`
- Set a specific date: `\date{date-here}`
- How do you not print date: `\date{}`

This only defines what the title of the document, author name and date create. It does not print it. To print the meta-data, do `\maketitle` after begin document

\documentclass[**options**]{}

Options	What they do
Xpt	Sets the size of the main font in the document. Default: 10pt.
a4paper, letterpaper	Defines the paper size. Default: letter/A4.
fleqn	displays formulas left-aligned instead of centered.
leqno	Places the numbering of formulas on the left hand side instead of the right.
titlepage, notitlepage	Specifies whether a new page should be started after the document title or not. The article class does not start a new page by default, while report and book do.
onecolumn, twocolumn	Instructs LaTeX to typeset the document in one column or two columns.

\documentclass[**options**]{} cont . . .

Options	What they do
twoside, oneside	double or single sided output. Article and report are single sided and the book is double sided by default.
landscape	Changes the layout of the document to print in landscape mode.
openright, openany	Makes chapters begin either only on right hand pages or on the next page available. This does not work with the article class, as it does not know about chapters.
draft	Draft - no images.

Fonts

- \tiny
- \scriptsize
- \footnotesize
- \small
- \normalsize
- \large
- \Large
- \LARGE
- \huge
- \Huge

Exercise 4: Sections

- Add title, author and print date
- Set font size to 11 pt
- Create sections and subsections

Click to open this exercise in **writeLaTeX**

- Hint: Don't forget to do `\maketitle` and don't forget `begin{document}` and `end{document}` click here to see my solution.

Typesetting Maths

- Why are dollar signs `$` special? We use them to mark mathematics in text.

```
% not so good:
Let a and b be distinct positive
integers, and let c = a - b + 1.

% much better:
Let $a$ and $b$ be distinct positive
integers, and let $c = a - b + 1$.
```

Let a and b be distinct positive integers, and let c = a - b + 1.

Let a and b be distinct positive integers, and let $c = a - b + 1$.

- Always use dollar signs in pairs — one to begin the mathematics, and one to end it.
- LaTeX handles spacing automatically; it ignores your spaces.

```
Let $y=mx+b$ be \ldots

Let $y = m x + b$ be \ldots
```

Let $y=mx+b$ be \ldots

Let $y = m x + b$ be \ldots

Notation

- Use caret ^ for superscripts and underscore '_' for subscripts.

```
$y = c_2 x^2 + c_1 x + c_0$
```

$y = c_2 x^2 + c_1 x + c_0$

- Use curly braces { and } to group superscripts and subscripts.

```
$F_n = F_n-1 + F_n-2$      % oops!

$F_n = F_{n-1} + F_{n-2}$ % ok!
```

$F_n = F_n - 1 + F_n - 2$

$F_n = F_{n-1} + F_{n-2}$

- There are commands for Greek letters and common notation.

```
$\mu = A e^{Q/RT}$

$\Omega = \sum_{k=1}^{n} \omega_k$
```

$\mu = A e^{Q/RT}$

$\Omega = \sum_{k=1}^{n} \omega_k$

: Displayed Equations

- If it's big and scary, *display* it on its own line using \begin{equation⌘" and \end{equation⌘".

```
The roots of a quadratic equation
are given by
\begin{equation}
x = \frac{-b \pm \sqrt{b^2 - 4ac}}
         {2a}
\end{equation}
where $a$, $b$ and $c$ are \ldots
```

The roots of a quadratic equation are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad (1)$$

where a, b and c are ...

Caution: LaTeX mostly ignores your spaces in mathematics, but it can't handle blank lines in equations — don't put blank lines in your mathematics.

Ex 5: Maths

- Format these two equations:
- To format math you need to use additional packages

$$i\hbar\frac{\partial}{\partial t}\Psi(r,t) = \left[\frac{-\hbar^2}{2\mu}\nabla^2 + V(r,t)\right]\Psi(r,t)$$

$$E^2 = (pc)^2 + (m_0c^2)^2$$