LaTeX Basics

Professional Document Preparation System

Department of Mathematics and Computer Science, RMUTT

Lecture Outline

Paragraphs and new Lines

Starting a new paragraph
Paragraph alignments
Paragraph indentation

Bold, italics and underlining

Lists

The `itemize` environment for bulleted (unordered) lists
The `enumerate` environment for numbered (ordered) lists
Changing the label of individual entries
Nested Lists
Customizing lists

Font sizes and families

Starting a new paragraph

One way to start a new paragraph is by inserting **a blank line**.

```
This is text contained in the first paragraph.
This is text contained in the first paragraph.
This is text contained in the first paragraph.

This is text contained in the second paragraph.
This is text contained in the second paragraph.
```

But the following code snippet shows an alternative solution which uses the `\par` command:

```
This is text contained in the first paragraph.
This is text contained in the first paragraph.
This is text contained in the first paragraph.\par
This is text contained in the second paragraph.
This is text contained in the second paragraph.
```

Output

This is text contained in the first paragraph. This is text contained in the first paragraph. This is text contained in the first paragraph.

This is text contained in the second paragraph. This is text contained in the second paragraph.

Paragraph alignments

By default paragraphs in LaTeX are **fully justified**, i.e. flush with both the left and right margins. If you would like to typeset an unjustified paragraph you can use the following environments:

- `flushleft`
- `center`
- `flushright`

`flushleft` alignment

```latex
\begin{flushleft}
I sat on the porch, watching the world go by. The leaves rustled in the gentle breeze and birds sang in the trees. It was a peaceful moment, one that I treasured. I closed my eyes and let out a contented sigh, just enjoying the simple pleasures in life.
\end{flushleft}
```

Output

I sat on the porch, watching the world go by. The leaves rustled in the gentle breeze and birds sang in the trees. It was a peaceful moment, one that I treasured. I closed my eyes and let out a contented sigh, just enjoying the simple pleasures in life.

center alignment

```
\begin{center}
I sat on the porch, watching the world go by. The
 ↪  leaves rustled in the gentle breeze and birds
 ↪  sang in the trees. It was a peaceful moment, one
 ↪  that I treasured. I closed my eyes and let out a
 ↪  contented sigh, just enjoying the simple
 ↪  pleasures in life.
\end{center}
```

Output

I sat on the porch, watching the world go by. The leaves rustled in the gentle breeze and birds sang in the trees. It was a peaceful moment, one that I treasured. I closed my eyes and let out a contented sigh, just enjoying the simple pleasures in life.

flushright alignment

```
\begin{flushright}
I sat on the porch, watching the world go by. The leaves rustled in the gentle breeze and birds sang in the trees. It was a peaceful moment, one that I treasured. I closed my eyes and let out a contented sigh, just enjoying the simple pleasures in life.
\end{flushright}
```

Output

I sat on the porch, watching the world go by. The leaves rustled in the gentle breeze and birds sang in the trees. It was a peaceful moment, one that I treasured. I closed my eyes and let out a contented sigh, just enjoying the simple pleasures in life.

Paragraph indentation

By default new paragraphs are usually indented by an amount controlled by a parameter called `\parindent` whose value can be set using the command `\setlength`, e.g.,

```
\setlength{\parindent}{20pt}
```

- Avoid indentation by setting `\parindent` to `0pt` (or `0mm`, `0cm`, etc).
- Or use the command `\noindent` at the beginning of the paragraph.
- By default LaTeX does not indent the first paragraph contained in a document section.

```latex
\section*{Example}

\textbf{First paragraph} of a section which, as you can see, is not indented. This is more text in the paragraph. This is more text in the paragraph.

\textbf{In second paragraph}, as you can see, it is indented.
This is more text in the paragraph. This is more text in the paragraph.

\setlength{\parindent}{40pt}

\textbf{In the third paragraph}, it is indented with modified with extra space.
This is more text in the paragraph.
This is more text in the paragraph.
This is more text in the paragraph.

\noindent\textbf{In the forth paragraph}, it is not indented.
This is more text in the paragraph.

\textbf{In the last paragraph}, it is indented. This is more text in the paragraph.
```

Output

Example

First paragraph of a section which, as you can see, is not indented. This is more text in the paragraph. This is more text in the paragraph.

In second paragraph, as you can see, it is indented. This is more text in the paragraph. This is more text in the paragraph.

In the third paragraph, it is indented with modified with extra space. This is more text in the paragraph. This is more text in the paragraph. This is more text in the paragraph.

In the forth paragraph, it is not indented. This is more text in the paragraph.

In the last paragraph, it is indented. This is more text in the paragraph.

Notes on indentation

Paragraph indentation is controlled or influenced by three commands:

1. `\parindent`: a parameter which stores the current size of the paragraph indent
2. `\indent`: the effect of this command depends where it is used:
   - in a horizontal mode or math mode, it inserts a space of width `\parindent`.
   - in a vertical mode, it triggers the start a new indented paragraph.
3. `\noindent`: the effect of this command also depends where it is used:
   - in a vertical mode, it also triggers a new non-indented paragraph.
   - in a horizontal mode, or math mode it has no effect: it is ignored.

Bold, italics and underlining

Simple text formatting helps to highlight important concepts within a document and make it more readable. Using italics, bold or underlined words can change the perception of the reader.

```
Some of the \textbf{greatest} discoveries in
 ↪  \underline{science} were made by
 ↪  \textbf{\textit{accident}}.
```

Output

Some of the **greatest** discoveries in science were made by ***accident***.

Lists

This lesson provides an introduction to typesetting, and customizing, various types of list in LaTeX:

1. the `itemize` environment for creating a bulleted (unordered) list;
2. the `enumerate` environment for creating a numbered (ordered) list;

Typesetting lists is a large topic because LaTeX lists are **extremely configurable**, enabling creation of an enormous variety of list types and structures.

The itemize environment for bulleted (unordered) lists

Bulleted lists are produced by the itemize environment, where each list entry starts by using the \item command, which also generates the bullet symbol.

```
Lists are easy to create:
\begin{itemize}
    \item List entries start with the item command.
    \item Individual entries are indicated with a
    ↪   black dot, a so-called bullet.
    \item The text in the entries may be of any
    ↪   length.
\end{itemize}
```

Output

Lists are easy to create:

- List entries start with the item command.
- Individual entries are indicated with a black dot, a so-called bullet.
- The text in the entries may be of any length.

The enumerate environment for numbered (ordered) lists

Numbered lists have the same syntax but use the enumerate environment. These numbers start at 1 with every use of the enumerate environment.

```
Lists are easy to create:
\begin{enumerate}
    \item List entries start with the item command.
    \item Individual entries are indicated with a
     ↪  black dot, a so-called bullet.
    \item The text in the entries may be of any
     ↪  length.
\end{enumerate}
```

LaTeX list numbering behaviour can be changed/controlled via the `enumitem` package.

Output

Lists are easy to create:

1. List entries start with the item command.
2. Individual entries are indicated with a black dot, a so-called bullet.
3. The text in the entries may be of any length.

Changing the label of individual entries

The `\item` command takes an optional parameter, in square brackets. We can use this feature within `itemize` and `enumerate` environments to change the default label of individual entries in your list:

```
\item[label text] Text of your entry goes here...
```

Examples

```
Change the labels in an \texttt{itemize} environment
\begin{itemize}
  \item This is my first point
  \item Another point I want to make
  \item[!] A point to exclaim something!
  \item[$\blacksquare$] Make the point fair and square.
  \item[NOTE] This entry has no bullet
  \item[] A blank label?
\end{itemize}
```

```
Change the labels in an \texttt{enumerate} environment
\begin{enumerate}
  \item This is my first point
  \item Another point I want to make
  \item[!] A point to exclaim something!
  \item[$\blacksquare$] Make the point fair and square.
  \item[NOTE] This entry has no bullet
  \item[] A blank label?
\end{enumerate}
```

Output: `itemize`

Change the labels in an `itemize` environment

- This is my first point
- Another point I want to make

! A point to exclaim something!

■ Make the point fair and square.

NOTE This entry has no bullet

A blank label?

Output: `enumerate`

Change the labels in an `enumerate` environment

1. This is my first point

2. Another point I want to make

! A point to exclaim something!

■ Make the point fair and square.

NOTE This entry has no bullet

A blank label?

Nested enumerate lists: number format

```latex
\begin{enumerate}
   \item First level item
   \item First level item
   \begin{enumerate}
     \item Second level item
     \item Second level item
     \begin{enumerate}
       \item Third level item
       \item Third level item
       \begin{enumerate}
         \item Fourth level item
         \item Fourth level item
       \end{enumerate}
     \end{enumerate}
   \end{enumerate}
 \end{enumerate}
```

1. First level item
2. First level item
   - (a) Second level item
   - (b) Second level item
     - i. Third level item
     - ii. Third level item
       - A. Fourth level item
       - B. Fourth level item

Nested itemize lists: bullet style

```
\begin{itemize}
   \item First level item
   \item First level item
   \begin{itemize}
     \item Second level item
     \item Second level item
     \begin{itemize}
       \item Third level item
       \item Third level item
       \begin{itemize}
         \item Fourth level item
         \item Fourth level item
       \end{itemize}
     \end{itemize}
   \end{itemize}
 \end{itemize}
```

• First level item

• First level item

– Second level item

– Second level item

∗ Third level item

∗ Third level item

· Fourth level item

· Fourth level item

Customizing lists

LaTeX lists are highly configurable, providing plenty of scope for the creation of many different types of customized list. You can either make direct modifications to LaTeX standard list types or, preferably, use the highly versatile `enumitem` package to do it for you.

CTAN hosts a number of list-related packages which may be worth investigating if you have particular customization requirements. In addition, `tex.stackexchange.com` provides a wealth of list-related questions with answers that provide useful insights and great examples!

Font sizes and families

In some cases, you may want to set fonts and sizes by hand. The following example shows how to use the smallest available font size in LaTeX (`\tiny`) and the small caps (`\textsc{...}`) font style:

```
This is a simple example, {\tiny this will show
↪  different font sizes} and also \textsc{different
↪  font styles}.
```

Output

This is a simple example, this will show different font sizes and also DIFFERENT FONT STYLES.

Font sizes

Font sizes are identified by special names, the actual size is not absolute but relative to the font size declared in the `\documentclass` statement.

In this example, `{\huge huge font size}` declares that the text inside the braces must be formatted in a huge font size.

```
In this example the {\huge huge font size} is set
↪  and the {\footnotesize Foot note size also}.
↪  There's a fairly large set of font sizes.
```

Output

In this example the huge font size is set and the Foot note size also. There’s a fairly large set of font sizes.

Font sizes

Command	Output
`\tiny`	Text Here
`\scriptsize`	Text Here
`\footnotesize`	Text Here
`\small`	Text Here
`\normalsize`	Text Here
`\large`	Text Here
`\Large`	Text Here
`\LARGE`	Text Here
`\huge`	Text Here
`\Huge`	Text Here

Font families

In standard LaTeX classes the default style for text is usually a Roman serif font. To use other styles (families), we need some specific LaTeX commands:

```
In this example, a command and a switch are used.
\texttt{A command is used to change the style
of a sentence}.

\sffamily
A switch changes the style from this point to
the end of the document unless another switch is used.
```

Output

In this example, a command and a switch are used. `A command is used to change the style of a sentence`.

A switch changes the style from this point to the end of the document unless another switch is used.

Font families

Family	Command	Switch	Output
serif (roman)	`\textrm{Sample 123}`	`\rmfamily`	Sample 123
san serif	`\textsf{Sample 123}`	`\sffamily`	Sample 123
typewriter (monospace)	`\texttt{Sample 123}`	`\ttfamily`	Sample 123

Font styles

Family	Command	Switch	Output
bold	`\textbf{Sample 123}`	`\bfseries`	**Sample 123**
medium weight	`\textmd{Sample 123}`	`\mdseries`	Sample 123
italic	`\textit{Sample 123}`	`\itshape`	*Sample 123*
slant	`\textsl{Sample 123}`	`\slshape`	*Sample 123*
upshape	`\textup{Sample 123}`	`\upshape`	Sample 123
small caps.	`\textsc{Sample 123}`	`\scshape`	Sample 123