LaTeX session
Basic Commands & Macros

January 25, 2017

Gowtham S. (SC13B020)

FOSS Group, IIST
Indian Institute of Space Science and Technology
Thiruvananthapuram

System/Program info

Operating system:	Xubuntu 16.0.1 LTS
LaTeX automator:	latexmk 4.41
Text Editor:	GNU Emacs 24.5.1
Beamer template:	Aalborg University Beamer

Outline

Comments

- **%** does the magic!
- To insert %, escape it with \
- Special characters needs escaping (# $ & ...)
- How to insert \?

Comments

- **%** does the magic!
- To insert %, escape it with \
- Special characters needs escaping (# $ & ...)
- How to insert \?

\\or \newline

- Single line break $\neq$ Single empty line
- Multiple empty lines $\simeq$ Single empty line
- Multiple spaces $\simeq$ Single space

itemize

`itemize` environment adds un-numbered [1] lists

```
\begin{itemize}
  \item Item no 2
  \item Item no 4
  \item Item no 1
  \item Item no 3
\end{itemize}
```

- Item no 2
- Item no 4
- Item no 1
- Item no 3

[1] Stuff put into unordered list

itemize

`itemize` environment adds un-numbered [1] lists

```
\begin{itemize}
  \item Item no 2
  \item Item no 4
  \item Item no 1
  \item Item no 3
\end{itemize}
```

- Item no 2
- Item no 4
- Item no 1
- Item no 3

`\footnote`

[1] Stuff put into unordered list

enumerate

`enumerate` adds numbered [2] lists

```
\begin{enumerate}
  \item Item no 1
  \item Item no 2
  \item Item no 3
  \item Item no 4
\end{enumerate}
```

1. Item no 1
2. Item no 2
3. Item no 3
4. Item no 4

[2] Stuff put into ordered list

Inserting Figures

Add the `graphicx` package

```
\includegraphics[scale = 0.1]{logo}
```

Optional arguments

- scale
- width, height
- angle

Positioning figures

Use `figure` environment to make as **floating** elements

```
\begin{figure}[h]
 \includegraphics[width=8cm]{logo}
\end{figure}
```

More control

- h Place the float here
- t Position at the top of the page
- b Position at the bottom of the page
- ! Override internal parameters
- H Place precisely here [3]

[3] required `float` package

Labels, references

```
\begin{figure}[h]
  \includegraphics[scale=0.1]{logo}
  \caption{FOSS Group, IIST Logo}
  \label{fig: foss_logo}
\end{figure}
```

Figure: FOSS Group, IIST Logo

```
Figure  \ref{fig: foss_logo}
```

produces output: **Figure 1**[4]

[4] invoke latex twice when using labels, refs

Tabulating stuff

```
\begin{tabular}{r|cl}
  1st column & 2nd column & 3rd column\\
  \hline
  a & b & c
\end{tabular}
```

Output:

1st column	2nd column	3rd column
a	b	c

Tabulating stuff

```
\begin{tabular}{r|cl}
  1st column & 2nd column & 3rd column\\
  \hline
  a & b & c
\end{tabular}
```

Output:

1st column	2nd column	3rd column
a	b	c

More control

Use `table` environment to get more control

Including codes

Add `listings`[5] package to the preamble

```
\lstinputlisting[language=C++]{hello.cpp}
```

Output:

```
#include <iostream>
using namespace std;

int main(int argc, char const *argv()){
        cout<<"Hello world!!";
        return 0;
}
```

[5] Comes with colors and code styles too!

Typesetting Math

- Most important reason to use LaTeX

Typesetting Math

- Most important reason to use LaTeX
- Use $ to enter math mode. $F=ma$ produces $F = ma$

Typesetting Math

- Most important reason to use LaTeX
- Use $ to enter math mode. $F=ma$ produces $F = ma$
- Use $$ for a math expression on its own line and centered

  `$$E = m c^2$$` produces

$$E = mc^2$$

Typesetting Math

- Most important reason to use LaTeX
- Use $ to enter math mode. $F=ma$ produces $F = ma$
- Use $$ for a math expression on its own line and centered

  `$$E = m c^2$$` produces

$$E = mc^2$$

- Look into `equation`, `align` environments[6]

[6] Load `amsmath` package

More Math :(

- Greek letters: `\alpha`, `\Alpha`
- Fractions: `\frac`, `\dfrac`
- Series: `\sum`, `\int`
- Matrix: `\bmatrix`, `\pmatrix`

More Math :(

- Greek letters: `\alpha`, `\Alpha`
- Fractions: `\frac`, `\dfrac`
- Series: `\sum`, `\int`
- Matrix: `\bmatrix`, `\pmatrix`

- Spacing in math environment
  - `\,` thinspace
  - `\:` mediumspace
  - `\;` thickspace

Math Exercises :P

$$e^{\pm i\theta} = \cos\theta \pm i\sin\theta$$

$$\frac{\partial \rho}{\partial t} + \vec{\nabla} \cdot (\rho \vec{u}) = 0$$

$$g^{\mu\nu} R_{\mu\nu} - \frac{1}{2} g^{\mu\nu} g_{\mu\nu} R = \frac{8\pi G}{c^4} g^{\mu\nu} T_{\mu\nu}$$

$$\oint_C E \cdot d\ell = -\frac{d}{dt} \int_S B_n dA$$

Math Exercises :P

$$e^{\pm i\theta} = \cos\theta \pm i\sin\theta$$

$$\frac{\partial \rho}{\partial t} + \vec{\nabla} \cdot (\rho \vec{u}) = 0$$

$$g^{\mu\nu} R_{\mu\nu} - \frac{1}{2} g^{\mu\nu} g_{\mu\nu} R = \frac{8\pi G}{c^4} g^{\mu\nu} T_{\mu\nu}$$

$$\oint_C E \cdot d\ell = -\frac{d}{dt} \int_S B_n dA$$

Saviour: Math equations in Wikipedia articles are written in LaTeX

Macros
Inbuilt commands

```
\centering
\author{}
\dots
\small{},\large{},\Large{},\huge{},\Huge{}
\tableofcontents
\listoffigures
\textbf{}
\hspace{}
\pagebreak
\fbox{}
\include{}
\setlength\itemsep{}
```

Macros

\newcommand

```
\newcommand{name}[num]{definition}
```

Macros
\newcommand

```
\newcommand{name}[num]{definition}
```

Examples :

```
\newcommand{\etal}{et al.}
```

\etal produces et al.

Macros
\newcommand

```
\newcommand{name}[num]{definition}
```

Examples :

```
\newcommand{\awesome}[1]{ #1 is Awesome stuff!!}
```

\awesome{\LaTeX} produces LaTeX is Awesome stuff!!
\awesome{Linux} produces Linux is Awesome stuff!!

Macros

\newenvironment

```
\newenvironment{name}[num]{before}{after}
```

Macros
\newenvironment

```
\newenvironment{name}[num]{before}{after}
```

Example [7] :

```
\newenvironment{king}
{ \rule{1ex}{1ex}\hspace{\stretch{1}} }
{ \hspace{\stretch{1}}\rule{1ex}{1ex} }

\begin{king}
My humble subjects \ldots
\end{king}
```

Output: ■ My humble subjects . . . ■

[7] Adopted from https://en.wikibooks.org/wiki/LaTeX/Macros

Thank You!