Preparing documents and presentations using LaTeX

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Indian Statistical Institute

Outline

Outline

Preamble

```
\documentclass{beamer}
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\usepackage{helvet}
\usefonttheme{professionalfonts}
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\usecolortheme[rgb={0.2,0.5,0.5}]{structure}
```

Preamble

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\documentclass{beamer}

\usepackage{helvet}
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\usecolortheme[rgb={0.2,0.5,0.5}]{structure}

\AtBeginSection[]{
  \begin{frame}{Outline}
    \tableofcontents[currentsection]
  \end{frame}
}
```

Preamble

```
\documentclass{beamer}

\usepackage{helvet}
\usefonttheme{professionalfonts}

\usecolortheme[rgb={0.2,0.5,0.5}]{structure}

\AtBeginSection[]{
  \begin{frame}{Outline}
    \tableofcontents[currentsection]
  \end{frame}
}

\title[\LaTeX\ and Beamer]{Preparing documents ...}
\author[M.\ Mitra]{Mandar Mitra}
\institute[ISI]{Indian Statistical Institute}
\date{}

\begin{document}
\maketitle
```

Useful environments

- **Frames**
  \begin{frame}(**[fragile,t]**){Preamble} ... \end{frame}

- **Code, etc.**
  \begin{verbatim} ... \end{verbatim}
  \begin{semiverbatim} ... \end{semiverbatim}

- **Blocks**
  \begin{block}{Example} ... \end{block}

Useful environments

- **Frames**
  \begin{frame}[fragile,t]{Preamble} ... \end{frame}

- **Code, etc.**
  \begin{verbatim} ... \end{verbatim}
  \begin{semiverbatim} ... \end{semiverbatim}

- **Blocks**
  \begin{block}{Example} ... \end{block}

Example

This is an example block.

Useful environments

- Columns

Column 1

Here
is
one
column.

Column 2

Alignment	Environment	Command
Left justified	flushleft	\raggedright
Right justified	flushright	\raggedleft
Center	center	\centering

Useful environments

- Columns

```
\begin{columns}[t]
  \column[T]{0.45\textwidth}
  \begin{block}{Column 1}
    Here

    is

    one

    column.
  \end{block}

  \column[T]{0.45\textwidth}
  \begin{block}{Column 2}
    \includegraphics[width=0.95\textwidth]{figs/alignment.png}
  \end{block}
\end{columns}
```

Useful commands

- `\alert{}`
- `\only, \uncover, \visible`
- `\onlyenv, \uncoverenv, \visibleenv`
- `\pause`
- `\section, \subsection, \subsubsection` (in between frames)
- `\verb`

References

- A Beamer Tutorial in Beamer
  http://www.uncg.edu/cmp/reu/presentations/Charles%20Batts%20-%20Beamer%20Tutorial.pdf

- A Beamer Quickstart http://www.math.umbc.edu/~rouben/beamer/

- Norm Matloff's Quick Tutorial
  http://heather.cs.ucdavis.edu/~matloff/beamer.html

- Beamer by Example
  http://www.tug.org/pracjourn/2005-4/mertz/mertz.pdf

- Beamer v3.0 Guide
  http://research.microsoft.com/en-us/um/people/saikat/ref/beamer_guide.pdf

- Beamer User Guide
  http://www.tug.org/tetex/tetex-texmfdist/doc/latex/beamer/beameruserguide.pdf

Outline

Where to get them

- Packages provided by your (GNU/Linux) distribution
  `texlive-generic-recommended`
  `texlive-latex-recommended`
  `texlive-latex-extra`
  etc.

- TeX Live installation from scratch
  - installation: `http://www.tug.org/texlive/quickinstall.html`

  - package manager: `tlmgr`
    `tlmgr install <pkgname>`

- MikTeX (Windows only?)

Where to get them

The Comprehensive TEX Archive Network http://ctan.org/

1. Download the package.
   http://www.ctan.org/tex-archive/support/ctantools

2. Extract the files: run LaTeX on the .ins file.

3. Create the documentation: run LaTeX on the .dtx file.

4. Install the files.

Private installation

- Put files in `~/latex` or `~/texmf`
- Setup paths for TeX and LaTeX
  `export MYLATEX="/home/mandar/latex"`

Private installation

- Put files in `~/latex` or `~/texmf`

- Setup paths for TeX and LaTeX

  ```
  export MYLATEX="/home/mandar/latex"

  export BSTINPUTS=":$MYLATEX" # Bibliography style files
  export MFINPUTS=":$MYLATEX/fonts/source"
  export TEXINPUTS="$MYLATEX:$MYLATEX/tikz:$MYLATEX/images:"
  ```

Private installation

- Put files in `~/latex` or `~/texmf`

- Setup paths for TeX and LaTeX

  ```
  export MYLATEX="/home/mandar/latex"

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  export TEXINPUTS="$MYLATEX:$MYLATEX/tikz:$MYLATEX/images:"

  export PKFONTS=":$MYLATEX/fonts/pk"
  export TEXFONTS=":$MFINPUTS:$MYLATEX/fonts:$MYLATEX/fonts/pk"
  export TEXPKS=":$MYLATEX/fonts/pk"
  ```

- Can use a standard `macros.tex`

Outline

Basics

- `tabular` environment

```
\begin{tabular}{ l c r }
  1 & 2 & 3 \\
  14 & 25 & 36 \\
  147 & 258 & 369 \\
\end{tabular}
```

1	2	3
14	25	36
147	258	369

- Commands `\multicolumn`, `\cline`

Basics

■ Commands \multicolumn, \cline

```
\begin{tabular}{ l c r }
  \multicolumn{3}{c}{Heading} \\
  1 & 2 & 3 \\
  14 & 25 & 36 \\
  147 & 258 & 369 \\\cline{1-2}
\end{tabular}
```

	Heading	
1	2	3
14	25	36
147	258	369

"Professional" tables

> *Tables in LaTeX 2_ε: Packages and Methods*, Lapo Filippo Mori

- Good style: Avoid vertical lines, horizontal lines in body, double lines, etc.

- Requirements
    - lines and spacing
    - horizontal and vertical alignment

"Professional" tables

Tables in LaTeX 2ε: Packages and Methods, Lapo Filippo Mori

- Good style: Avoid vertical lines, horizontal lines in body, double lines, etc.

- Requirements
  - lines and spacing
  - horizontal and vertical alignment

- Packages
  - `tabularx`
  - `tabulary`
  - `ctable` (includes packages `array`, `tabularx` and `booktabs`)
  - `tabu`
  - `multirow`

Lines and spacing

- Use ctable or booktabs
- \toprule, \bottomrule, \midrule, \cmidrule

  \newcommand{\otoprule}{\midrule[\heavyrulewidth]}

Lines and spacing

- Use `ctable` or `booktabs`

- `\toprule, \bottomrule, \midrule, \cmidrule`

  `\newcommand{\otoprule}{\midrule[\heavyrulewidth]}`

```
\begin{tabular}{ l c r }\toprule
  1 & 2 & 3 \\\otoprule
  14 & 25 & 36 \\[1em]
  147 & 258 & 369 \\\bottomrule
\end{tabular}
```

Lines and spacing

- Use `ctable` or `booktabs`

- `\toprule`, `\bottomrule`, `\midrule`, `\cmidrule`

  `\newcommand{\otoprule}{\midrule[\heavyrulewidth]}`

```
\begin{tabular}{ l c r }\toprule
  1 & 2 & 3 \\\otoprule
  14 & 25 & 36 \\[1em] Don't use!
  147 & 258 & 369 \\\bottomrule
\end{tabular}
```

1	2	3
14	25	36
147	258	369

Packages

- `tabularx`

Force	Force is a vector quantity defined as the rate of change of the momentum of the body that would be induced by that force acting alone.
Moment of a force	Moment of a force with respect to an origin is defined as the cross product of the position vector (with respect to the same origin) and the force.

- `tabularx`

```
\begin{tabularx}{0.85\textwidth}{>{\bfseries}lX} \toprule
  Force &
  Force is a vector quantity defined as the rate of change of
  the momentum of the body that would be induced by that
  force acting alone.\\\midrule
  Moment of a force &
  Moment of a force with respect to an origin is
  defined as the cross product of the position vector (with
  respect to the same origin) and the force.\\\bottomrule
\end{tabularx}
```

tabularx

- Total width of table has to be specified and is fixed

- All X columns of equal width; relatively hard to change column widths

- C, L, R column types have to be defined

  ```
  \newcolumntype{C}{>{\centering\arraybackslash}X}
  \newcolumntype{L}{>{\raggedright\arraybackslash}X}
  \newcolumntype{R}{>{\raggedleft\arraybackslash}X}
  ```

- Relatively easy to change vertical alignment globally

  ```
  \renewcommand{\tabularxcolumn}[1]{>{\arraybackslash}t{#1}} % top
  \renewcommand{\tabularxcolumn}[1]{>{\arraybackslash}m{#1}} % middle
  \renewcommand{\tabularxcolumn}[1]{>{\arraybackslash}b{#1}} % bottom
  ```

- Total width of table is indicative and a maximum

- Relatively better column width allocation

- C, L, R column types pre-defined

- Vertical alignment has to be changed per cell
  `\parbox[position (t|m|b)][height][inner-pos]{width}{text}`

- To change horizontal alignment per cell
  `\makebox[width][lcr]{text}`

ctable

- Combines advantages of tabularx, tabulary

```
\ctable[caption = An example,pos = h]{rlcc}
{\tnote{1 degree${} = \pi/180$ radians.}}
{\FL
  &
  & $\fam0 H(Mu)+F_2$
  & $\fam0 H(Mu)+Cl_2$ \ML
  &$\beta$(H) & $80.9\circ$\tmark & $83.2\circ$
  \NN
  &$\beta$(Mu) & $86.7\circ$
  & $87.7\circ$
  \LL
}
```

- Combines advantages of tabularx, tabulary

	$H(Mu) + F_2$	$H(Mu) + Cl_2$
β(H)	80.9∘[a]	83.2∘
β(Mu)	86.7∘	87.7∘

[a] 1 degree $= \pi/180$ radians.

Table: An example

- Combines advantages of tabularx, tabulary

	$H(Mu) + F_2$	$H(Mu) + Cl_2$
$\beta(H)$	80.9○[a]	83.2○
$\beta(Mu)$	86.7○	87.7○

[a] 1 degree $= \pi/180$ radians.

Table: An example

- ```
\setupctable{%
  botcap, % topcap or sidecap
  captionskip=2pt, % space between caption and table
  mincapwidth=2in, % minimum width of caption
}
```

| **Name** | **Address** | **Legal status** |
|---|---|---|
| DAIICT Gandhinagar | Near Indroda Circle, Gandhinagar 382007. | University. |
| Indian Statistical Institute, Kolkata | 203 BT Road, Kolkata 700 108. | Autonomous institute. |
| National Law University, Odisha | Brajbiharipur, Near Naraj Bridge CDA, Cuttack  753015. | University. |

## tabu

```
\tabulinesep=8pt
\begin{tabu} to 1.0\linewidth {| X[l,1.8] | X[l,1.8] | X[1.2] |}\tabucline-
  \everyrow{\tabucline-}
  \rowfont[l]{\bfseries}
  Name & Address & Legal status \\

  DAIICT Gandhinagar &
  Near Indroda Circle, \linebreak Gandhinagar 382007. &
  University.\\

  Indian Statistical Institute, Kolkata &
  203 BT Road, Kolkata 700 108. &
  Autonomous institute.\\
  ...
\end{tabu}
```

- \tabucline[line style]{start-stop}

- \everyrow{code}

- \rowfont[alignment]{font spec}

Common problems

```
\begin{tabular}{ccc}
  \mc{3}{c}{Experimental results} \\
  x & x & x
\end{tabular}
```

Experimental results
x   x   x

```
\begin{tabular}{*{3}{>{\centering}p{1cm}}}
  \mc{3}{c}{Experimental results} \\
  x & x & x
\end{tabular}
```

Experimental results
 x   x   x

Outline

Unnumbered lists

```
\begin{itemize}
\item The first item
\item The second item
\item The third etc \ldots
\end{itemize}
```

Unnumbered lists

```
\begin{itemize}
\item The first item
\item The second item
\item The third etc \ldots
\end{itemize}
```

- The first item

- The second item

- The third etc …

Unnumbered lists

```
\begin{itemize}
  \item The first item
  \item The second item
  \item The third etc \ldots
\end{itemize}
```

- The first item
- The second item
- The third etc . . .

Unnumbered lists

Changing labels

- Manually for each entry, e.g., \item[$\star$]

- Label commands
  \labelitemi, \labelitemii, \labelitemiii, \labelitemiv

- Globally via \renewcommand
  \renewcommand{\labelitemi}{\textgreater}
  \renewcommand{\labelitemii}{$\star$}

Numbered lists

```
\begin{enumerate}
\item The first item
\item The second item
\item The third etc \ldots
\end{enumerate}
```

Numbered lists

```
\begin{enumerate}
\item The first item
\item The second item
\item The third etc \ldots
\end{enumerate}
```

1 The first item

2 The second item

3 The third etc …

Numbered lists

```latex
\begin{enumerate}
  \item The first item
  \item The second item
  \item The third etc \ldots
\end{enumerate}
```

1. The first item
2. The second item
3. The third etc . . .

Numbered lists

Changing labels

- Label commands
  \labelenumi, \labelenumii, \labelenumiii, \labelenumiv

- Via \renewcommand

  ```
  % changes cross-references
  \renewcommand{\theenumi}{\Roman{enumi}}

  % changes appearance
  \renewcommand{\labelenumi}{(\theenumi)}

  \renewcommand{\theenumii}{\alph{enumii}}
  \renewcommand{\labelenumii}{\theenumi.~\theenumii}
  ```

- Styles: alph, Alph, arabic, roman, Roman

Numbered lists

Changing labels - I

- \usepackage{enumerate}

- \begin{enumerate}[style] ... \end{enumerate}

- Style options: A, a, I, i and 1

- To use any of the style options without the special meaning, use {} e.g. \begin{enumerate}[{A}1] ... \end{enumerate}

- May cause problems with Beamer

Changing labels - II

- \usepackage[newenum,olditem]{paralist}

- Also provides
  \begin{inparaenum}[(1)] ... \end{inparaenum}

Numbered lists

Changing labels - III

- `\usepackage[inline,shortlabels]{enumitem}`

- Useful parameters: `topsep`, `itemsep`

Numbered lists

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- `\usepackage[inline,shortlabels]{enumitem}`

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- Example: `\begin{enumerate}[i), itemsep=1mm]`

Numbered lists

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- More examples (Truman Collins: `truman@tkcs-collins.com`):

Numbered lists

Changing labels - III

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- Example: `\begin{enumerate}[i), itemsep=1mm]`

- More examples (Truman Collins: `truman@tkcs-collins.com`):

    Standard enumeration

    `\begin{enumerate}`

1. topsep is 1 mm
2. leftmargin is 9 mm, which is the distance to the text for the item.
3. labelsep is 2 mm
4. labelwidth is 7 mm

Numbered lists

Changing labels - III

- `\usepackage[inline,shortlabels]{enumitem}`

- Useful parameters: `topsep`, `itemsep`

- Example: `\begin{enumerate}[i), itemsep=1mm]`

- More examples (Truman Collins: `truman@tkcs-collins.com`):

  Customised enumeration 1

  `\begin{enumerate}[topsep=0mm,label=\emph{\alph*})]`

a) leftmargin is 9 mm, which is the distance to the text for the item.

b) labelindent is 0 mm

c) labelsep is 2 mm

d) labelwidth is 7 mm

Changing labels - III

- \usepackage[inline,shortlabels]{enumitem}

- Useful parameters: topsep, itemsep

- Example: \begin{enumerate}[i), itemsep=1mm]

- More examples (Truman Collins: truman@tkcs-collins.com):

  Customised enumeration 2

  \begin{enumerate}[topsep=0mm, leftmargin=15mm]

1. leftmargin is 15 mm, which is the
   distance to the text for the item.

2. labelindent is 0 mm

3. labelsep is 2 mm

4. labelwidth is 7 mm

Changing labels - III

- \usepackage[inline,shortlabels]{enumitem}

- Useful parameters: topsep, itemsep

- Example: \begin{enumerate}[i), itemsep=1mm]

- More examples (Truman Collins: truman@tkcs-collins.com):

   Standard itemize

   \begin{itemize}

- topsep is 1 mm
- leftmargin is 9 mm, which is the distance to the text for the item.
- labelindent is 0 mm
- labelsep is 2 mm
- labelwidth is 7 mm
- itemindent is 0 mm

Changing labels - III

- `\usepackage[inline,shortlabels]{enumitem}`

- Useful parameters: `topsep`, `itemsep`

- Example: `\begin{enumerate}[i), itemsep=1mm]`

- More examples (Truman Collins: `truman@tkcs-collins.com`):

  Customised itemize

  `\begin{itemize}[topsep=0mm, label=$\boxempty$]`

□ topsep is 0 mm
□ leftmargin is 9 mm, which is the distance to the text for the item.
□ labelindent is 0 mm
□ labelsep is 2 mm
□ labelwidth is 7 mm
□ itemindent is 0 mm

Numbered lists

Changing numbering

- Counters (incremented by \item before use):
  enumi, enumii, enumiii, enumiv

- To change value, use \setcounter{enumi}{4}

Description

```latex
\begin{description}
  \item[First] The first item
  \item[Second] The second item
  \item[Third] The third etc \ldots
\end{description}
```

First The first item

Second The second item

Third The third etc ...

Outline

Page layout

Use the `geometry` package

- `\usepackage[options]{geometry}`

- `\usepackage[text={7in,10in},centering]{geometry}`

- `\usepackage[margin=1.5in]{geometry}`

- `\usepackage[top=,bottom=,left=,right=]{geometry}`

Line spacing

- Use `\linespread{factor}\selectfont`
    - `\linespread{1.3}` = "one and a half" line spacing
    - `\linespread{1.6}` = "double" line spacing

Line spacing

- Use \linespread{factor}\selectfont
  - \linespread{1.3} = "one and a half" line spacing
  - \linespread{1.6} = "double" line spacing

- To change fontsize and spacing, use:
  \fontsize{size}{skip}\selectfont
  (Thumb rule: skip should be 1.2 times the font size)

Line spacing

- Use `\linespread{factor}\selectfont`
    - `\linespread{1.3}` = "one and a half" line spacing
    - `\linespread{1.6}` = "double" line spacing

- To change fontsize and spacing, use:
  `\fontsize{size}{skip}\selectfont`
  (Thumb rule: skip should be 1.2 times the font size)

- Use package `setspace`
    - handles footnotes, captions, etc. correctly
    - environments: `doublespace`, `onehalfspace`, `singlespace`, `spacing{ factor }`

Lengths
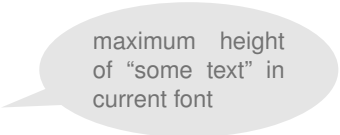
- Change default lengths
  \setlength{parameter}{length}
  \addtolength{parameter}{length}
  \settowidth{parameter}{some text}
  \settoheight{parameter}{some text}
  \settodepth{parameter}{some text}
  Also, \newlength{parameter}
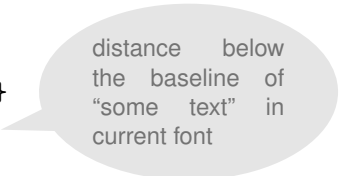
- Change default lengths
  `\setlength{parameter}{length}`
  `\addtolength{parameter}{length}`
  `\settowidth{parameter}{some text}`
  `\settoheight{parameter}{some text}`
  `\settodepth{parameter}{some text}`
  Also, `\newlength{parameter}`

maximum height of "some text" in current font

Lengths

- Change default lengths
  `\setlength{parameter}{length}`
  `\addtolength{parameter}{length}`
  `\settowidth{parameter}{some text}`
  `\settoheight{parameter}{some text}`
  `\settodepth{parameter}{some text}`
  Also, `\newlength{parameter}`

  distance below the baseline of "some text" in current font

Lengths

- Change default lengths
  ```
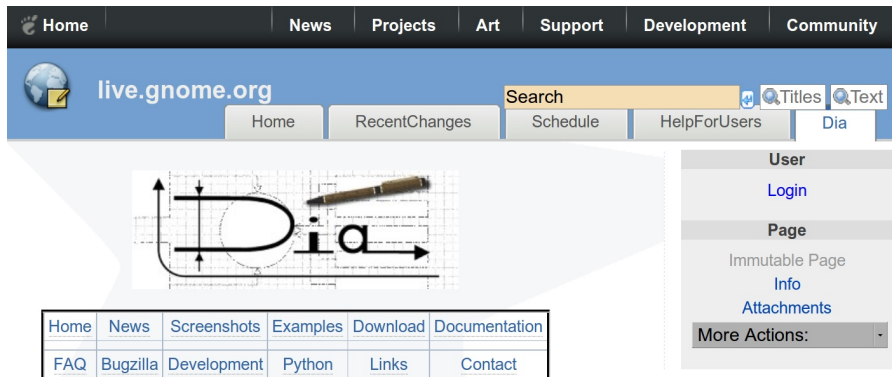  \setlength{parameter}{length}
  \addtolength{parameter}{length}
  \settowidth{parameter}{some text}
  \settoheight{parameter}{some text}
  \settodepth{parameter}{some text}
  ```
  Also, `\newlength{parameter}`

- Paragraph indentation and spacing
  ```
  \setlength{\parindent}{0pt}
  \setlength{\parskip}{6pt}
  indent, noindent
  ```

Outline

Dia

Welcome to Dia's new homepage. Dia is a GTK+ based diagram creation program

Tgif

`http://bourbon.usc.edu:8001/tgif/index.html`
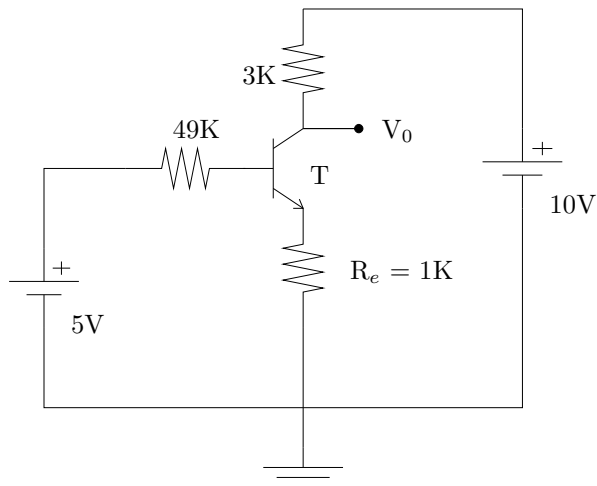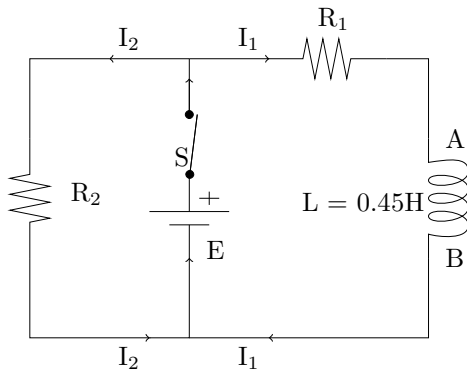
- Shapes: lines, arcs, rectangles / squares, polygons, ellipses / circles, etc.

- Move, rotate, flip objects

- Text

- Filling regions with patterns

- Formatting of elements
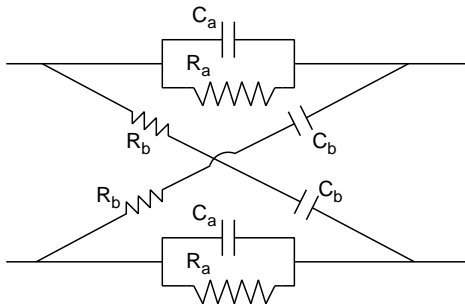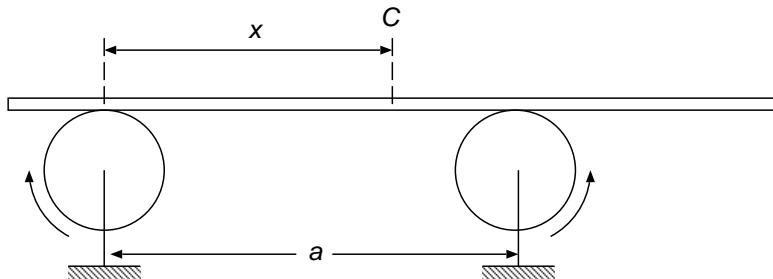
Ipe

http://ipe7.sourceforge.net/

Outline

Questions

- Can we open terminal from latex presentation?

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  Click here

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  `\href{http://www.isical.ac.in/~mandar/script.sh}{Click here}`

Questions

- Can we open terminal from latex presentation?

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  `\href{http://www.isical.ac.in/~mandar/script.sh}{Click here}`

- How to embed animations or video files in a a) Beamer slide presentation b) pdf file generated by Latex (If at all possible)?

Questions

- Can we open terminal from latex presentation?

  Click here

  ```
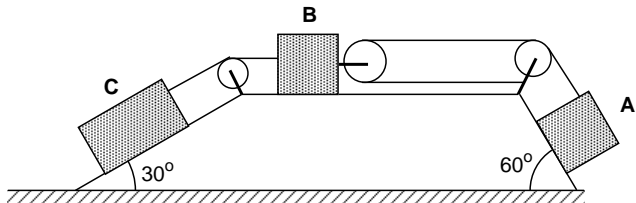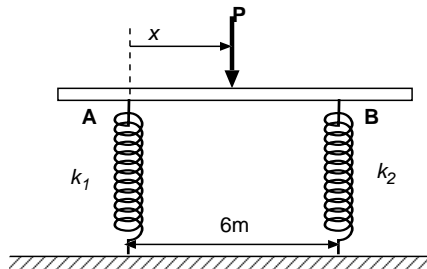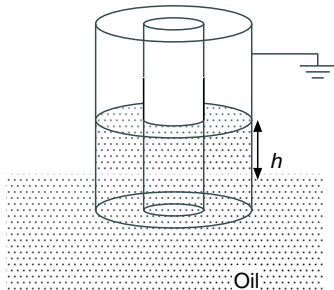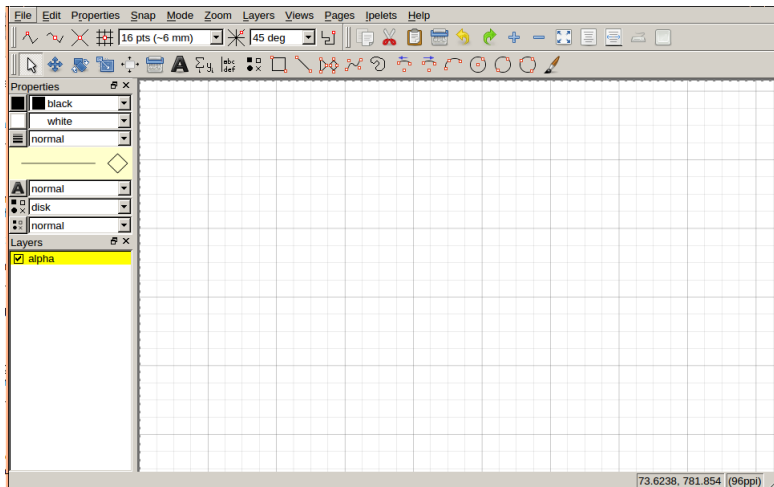  \href{http://www.isical.ac.in/~mandar/script.sh}{Click here}
  ```

- How to embed animations or video files in a a) Beamer slide presentation b) pdf file generated by Latex (If at all possible)?

  ```
  \movie[externalviewer]{\includegraphics{figs/figure.jpg}}{movie.mp4}
  ```

- Can we open terminal from latex presentation?

  Click here

  ```
  \href{http://www.isical.ac.in/~mandar/script.sh}{Click here}
  ```

- How to embed animations or video files in a a) Beamer slide presentation b) pdf file generated by Latex (If at all possible)?

  ```
  \movie[externalviewer]{\includegraphics{figs/figure.jpg}}{movie.mp4}
  ```

  A movie

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- How to design customized and personalized Latex themes?