A Glimpse of

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Presentation plan

Presentation plan

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
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What is LaTeX?

- LaTeX is a programming-based simple and easy approach for producing a document directly in the `dvi` or `pdf` format
- LaTeX can be used for preparing letters, applications, articles, reports, publications, theses, books, or anything of that kind

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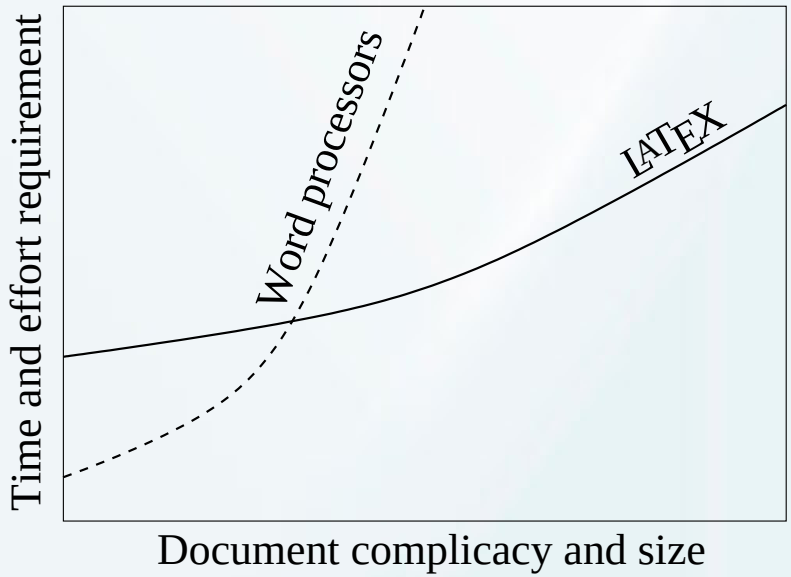
Why LaTeX?

- Formatting of a document can be automated in LaTeX
  - Hence, no possibility of committing any mistake in formatting, such as in numbering and referring items (sections, tables, figures, equations, or references), in choosing size and type of fonts for different sectional units, or in preparing bibliography
- Provision is also there for automatically generating various lists of contents, index, and glossary

Why LaTeX?



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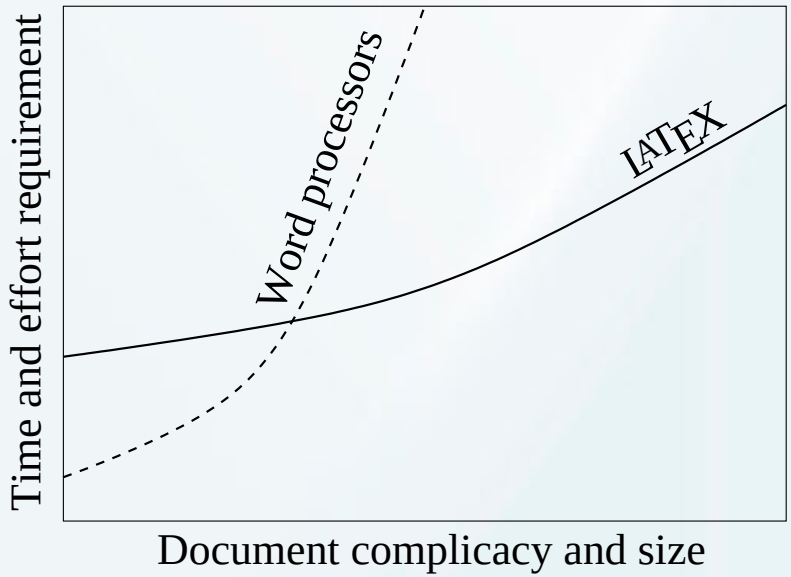

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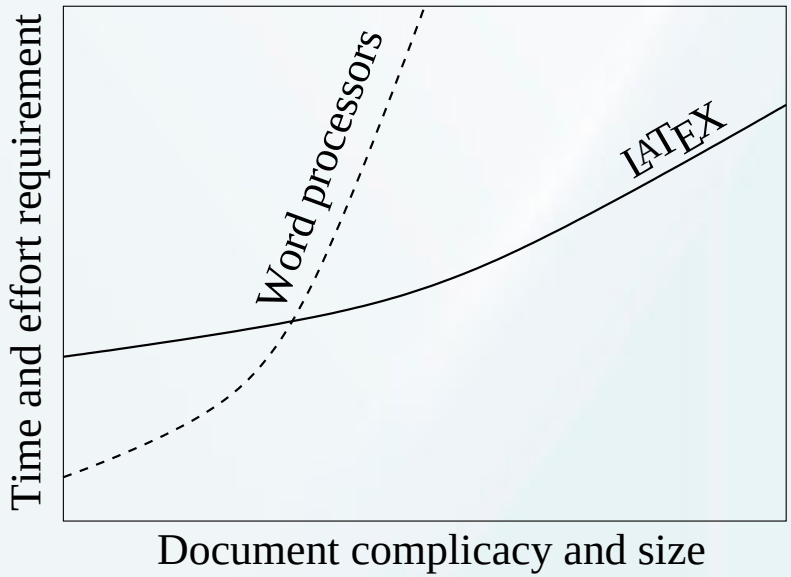

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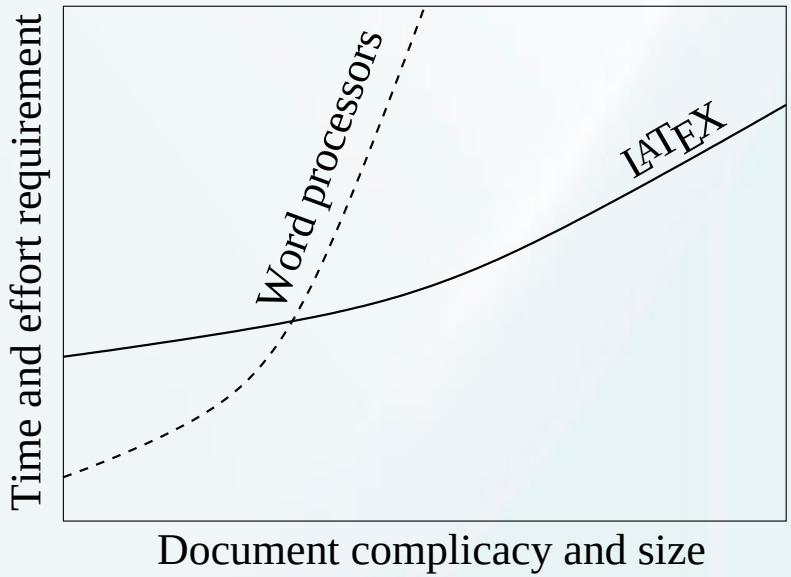

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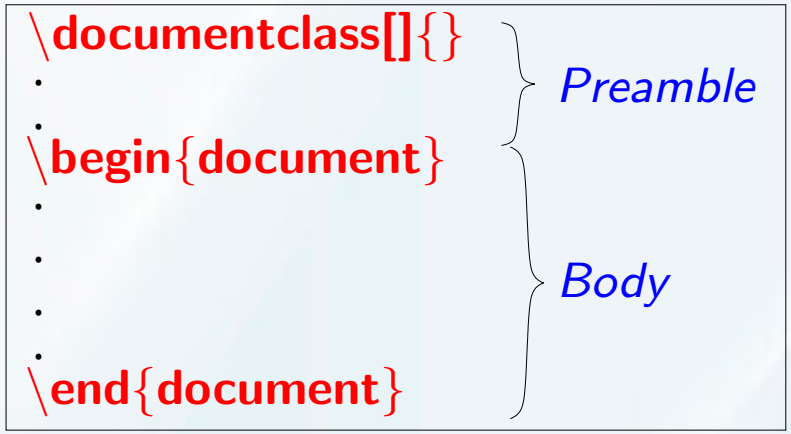
How to prepare a LaTeX input file?

- `\documentclass[fo1,fo2,...]{dtype}`
  - `dtype`: **letter**, **article**, **report**, or **book**
  - `fo1`, `fo2`, etc.: **a4paper**, **11pt**, etc.

How to prepare a LaTeX input file?



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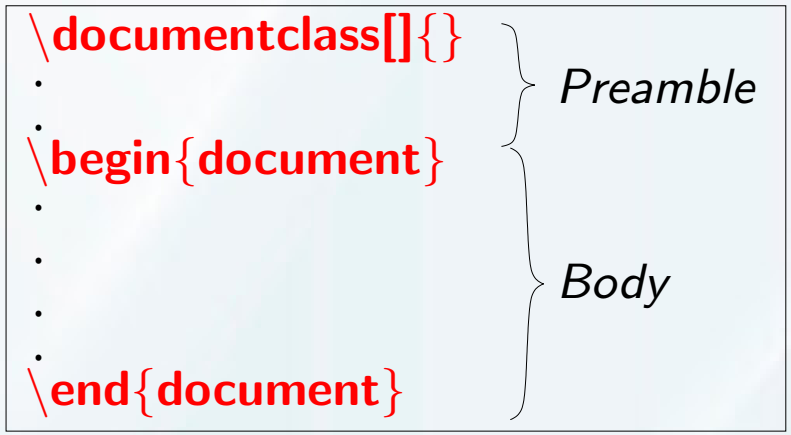

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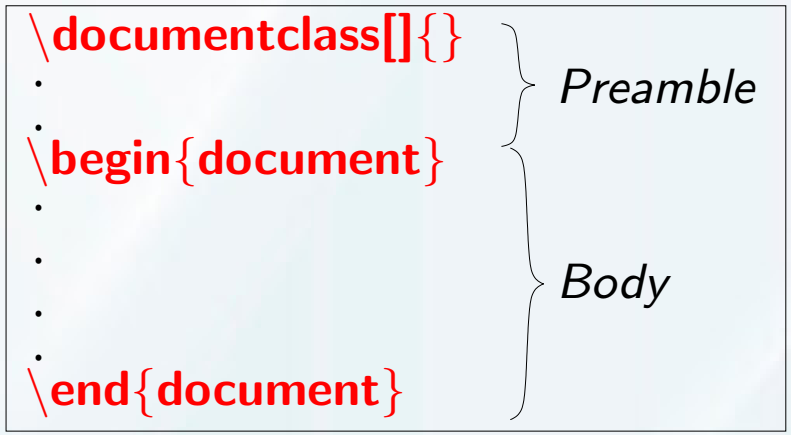

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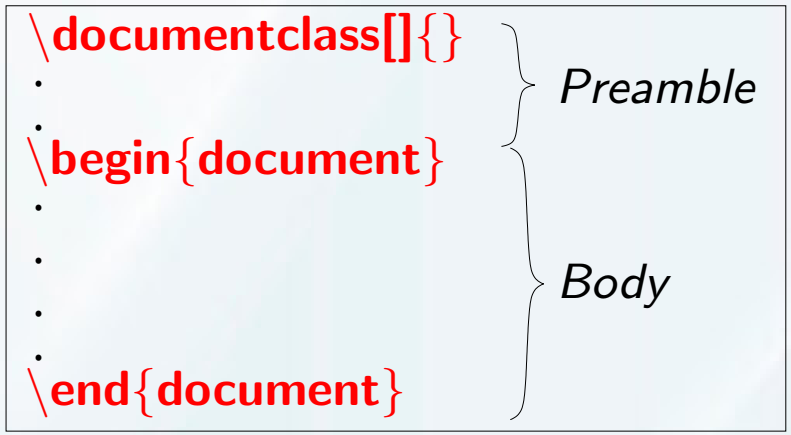

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How to prepare a LaTeX input file? (*Contd...*)

Table: A simple LaTeX input file and its output

LaTeX input	**Output**
\documentclass{article} \begin{document} **LaTeX** is a macro package for typesetting documents. It is a language-based approach, where LaTeX *instructions* are interspersed with the text file of a document, say `myfile.tex`, for obtaining the desired output as `myfile.dvi`. The `myfile.dvi` file can then be used to generate `myfile.pdf` file. \end{document}	LaTeX is a macro package for typesetting documents. It is a language-based approach, where LaTeX instructions are interspersed with the text file of a document, say myfile.tex, for obtaining the desired output as myfile.dvi. The myfile.dvi file can then be used to generate myfile.pdf file. 1

Open source software for LaTeX

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  - TeXnicCenter (www.texniccenter.org)
  - WinShell (www.winshell.de)
  - WinEdt (www.winedt.com), etc.

Open source software for LaTeX

- *For both Windows and Linux*:
  - BaKoMa TeX (`http://bakoma-tex.com`)
  - Emacs (`www.gnu.org/software/emacs/emacs.html`)
  - Kile (`http://kile.sourceforge.net`)
  - LyX (`www.lyx.org`)
  - TeXLive (`https://www.tug.org/texlive`)
  - Texmaker (`www.xm1math.net/texmaker`)
  - TeXstudio (`www.texstudio.org`)
  - TeXworks (`https://github.com/TeXworks/texworks`), etc.
- *For Linux only*:
  - LaTeXila (`https://wiki.gnome.org/Apps/LaTeXila`)
  - Gummy (`https://github.com/alexandervdm/gummi`), etc.
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- Compilation commands

  $ pdflatex myarticle.tex

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- Generated files:
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- **Command:** An instruction either for producing something new or to change the form of an existing item
  - \LaTeX produces LaTeX and \copyright produces ©
- **Environment:** A structure composed of two complementary commands, within which some particular job can be performed
  - \begin{equation} x^2+y^2=r^2 \end{equation} produces $x^2 + y^2 = r^2$
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Keyboard characters in LaTeX

Table: Keyboard characters that can be produced directly.

Type of character	Characters
Uppercase letters	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Lowercase letters	a b c d e f g h i j k l m n o p q r s t u v w x y z
Digits	0 1 2 3 4 5 6 7 8 9
Parentheses	( )
Brackets	[ ]
Quotations	` ' "
Punctuation	, ; : ! . ?
Math operators	+ - * / =
Other symbols	@

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Keyboard characters in LaTeX(*Contd...*)

Table: Keyboard characters to be produced through commands.

Character	Command	Function in LaTeX
$	\$	A pair of $ creates a math-mode within text-mode.
%	\%	Texts of a line preceded by % are commented.
{ }	\{ \}	Mandatory arguments of commands are written in { }.
_	_	Generates a subscript in math-modes.
^	\^\	Generates a superscript in math-modes.
&	\&	Separates the entries of two columns in a Table.
#	\#	Miscellaneous symbol.
\	$\backslash$	Most of the LaTeX commands start with \.
~	$\sim$	Binds two words to be printed in the same line.
|	$\|$	Generates a vertical (column) line in a Table.
<	$<$	—
>	$>$	—

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Text-mode fonts

Type	Variety	Command
Family	Serif (default)	\textrm{atext} or {\rm atext}
	Sans serif	\textsf{atext} or {\sf atext}
	Typewriter	\texttt{atext} or {\tt atext}
Series	Medium (default)	\textmd{atext}
	Boldface	\textbf{atext} or {\bf atext}
Shape	Upright (default)	\textup{atext}
	Italic	\textit{atext} or {\it atext}
	Slanted	\textsl{atext} or {\sl atext}
	CAPS & SMALL CAPS	\textsc{atext} or {\sc atext}
	Emphasized	\emph{atext} or {\em atext}

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Text-mode fonts (*Contd...*)

Type	Variety	Command
Size	Tiny	{\tiny atext}
	Script	{\scriptsize atext}
	Foot note	{\footnotesize atext}
	Small	{\small atext}
	Normal (default)	–
	Large	{\large atext}
	Larger	{\Large atext}
	Largest	{\LARGE atext}
	Huge	{\huge atext}
	Hugest	{\Huge atext}

Math-mode fonts

Font type	Command	Package required	Output
Serif	\mathrm{ABC abc}	—	ABCabc
Italic	\mathit{ABC abc}	—	*ABCabc*
Sans serif	\mathsf{ABC abc}	—	ABCabc
Typewriter	\mathtt{ABC abc}	—	ABCabc
Boldface	\mathbf{ABC abc}	—	**ABCabc**
	\boldmath{ABC abc}	amssymb	***ABCabc***
Normal	\mathnormal{ABC abc}	—	*ABCabc*
Calligraphic	\mathcal{A B C}	—	$\mathcal{ABC}$
Open	\Bbb{A B C}	amsfonts/ amssymb	$\mathbb{ABC}$
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Colored fonts

- Three types of color combinations exist – black and white (**gray**), additive primaries (**rgb**) and subtractive primaries (**cmyk**)

  `\definecolor{cname}{gray}{w}` ; $w \in [0, 1]$

  `\definecolor{cname}{rgb}{w,x,y}` ; $w, x, y \in [0, 1]$

  `\definecolor{cname}{cmyk}{w,x,y,z}` ; $w, x, y, z \in [0, 1]$

- Colored texts can be produced through the `\textcolor{cname}{atext}` command
  - `\textcolor{blue}{this is in blue}` will print 'this is in blue'
  - `\textcolor{urgb}{this is in rgb = \{0,0.7,0.3\}}` will print 'this is in rgb = {0,0.7,0.3}' (urgb is a new color defined as `\definecolor{urgb}{rgb}{0,0.7,0.3}`)

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Sectional units

- Commands for numbered sectional units – **\chapter**{}, **\section**{}, **\subsection**{}, **\subsubsection**{}, **\paragraph**{} and **\subparagraph**{}
- Sectional units work in order
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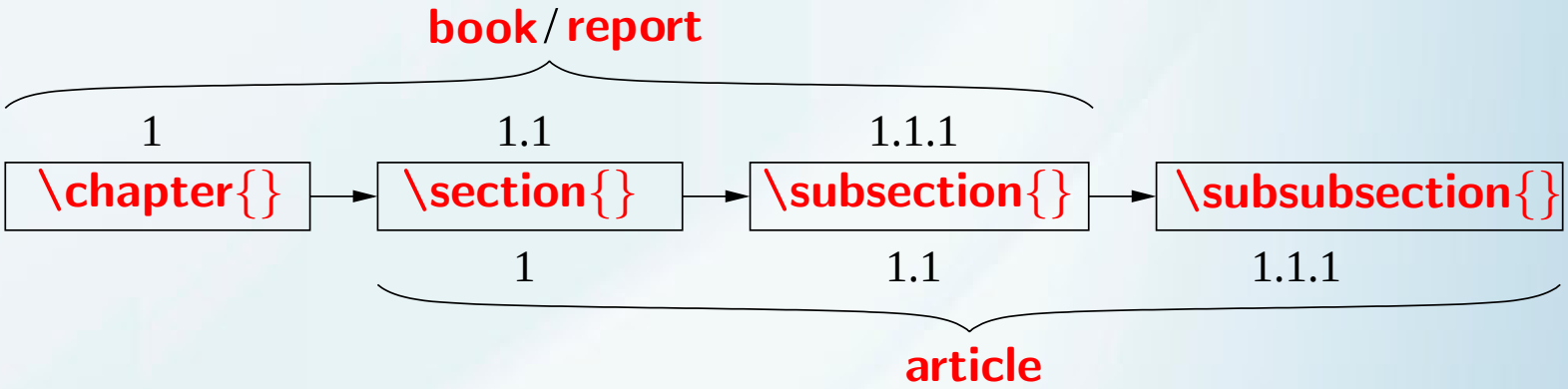

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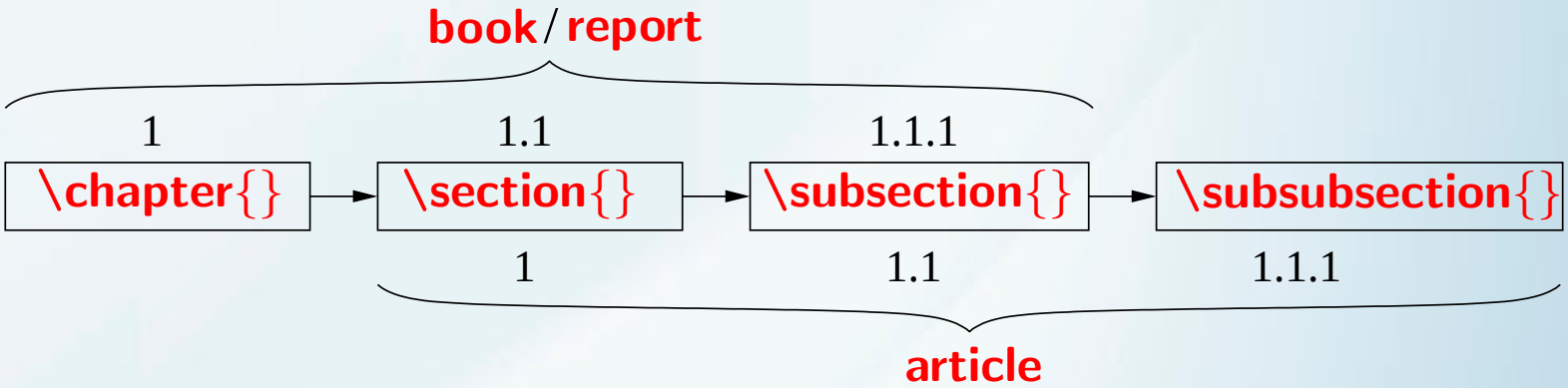

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Labeling and referring numbered items

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- Labeling and referring of an item are performed through `\label{rkey}` and `\ref{rkey}` respectively

LaTeX input	Output

`\section{Centre of gravity}\label{sec:cg}`
`A point though which the resultant of the gravitational forces ...`
`%`
`\section{Centre of mass}\label{sec-ex}`
`The definition of the centre of gravity is given in Section~\ref{sec:cg} ...`
	3.2 Centre of gravity
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New lines and paragraphs

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- LaTeX does not respond to a new line/paragraph set manually
- Unless specified commands are used, LaTeX considers everything in a single line/paragraph
- Command for creating a new line is **\newline**
  - A new line can also be created by using a line break command (**\linebreak**, \\, \\\\, or one or more blank lines) at the end of the previous line
- Command for creating a new paragraph is **\par**
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Creating and filling blank space

- Manually created excess blank spaces are just ignored in LaTeX, i.e., a sequence of blank spaces is treated as a single one only
- LaTeX provides its own commands for creating a blank space of a specified size, both in horizontal and vertical directions

Command	Package	Application	
\quad	—	x\quad␣y	x y
\qquad	—	x\qquad␣y	x y
\, or \thinspace	—	x\,y	x y
\: or \medspace	amsmath	x\:y	x y
\; or \thickspace	amsmath	x\;y	x y
\!	amsmath	x\!y	xy
\!\!	amsmath	x\!\!y	xy
\!\!\!	amsmath	x\!\!\!y	xy

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\; or \thickspace	amsmath	x\;y
\!	amsmath	x\!y
\!\!	amsmath	x\!\!y
\!\!\!	amsmath	x\!\!\!y

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\; or \thickspace	amsmath	x\;y
\!	amsmath	x\!y
\!\!	amsmath	x\!\!y
\!\!\!	amsmath	x\!\!\!y

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\; or \thickspace	amsmath	x\;y	x y
\!	amsmath	x\!y	xy
\!\!	amsmath	x\!\!y	xy
\!\!\!	amsmath	x\!\!\!y	xy

Creating and filling blank space (*Contd...*)

LaTeX input	Output
\begin{center} \LaTeX\ in 24 Hours\bigskip\\ A Practical Guide for Writing \end{center}	LaTeX in 24 Hours A Practical Guide for Writing
\begin{center} \LaTeX\ in 24 Hours \vskip 5mm A Practical Guide for Writing \end{center}	LaTeX in 24 Hours A Practical Guide for Writing
\begin{center} \LaTeX\ in 24 Hours \vspace{5mm}\\ A Practical Guide for Writing \end{center}	LaTeX in 24 Hours A Practical Guide for Writing
Language: \hspace{8mm} English	Language: English
Marks: 100 \hfill Time: 3 Hrs	Marks: 100 Time: 3 Hrs

Foot notes

- The \footnote{} command prints its argument as a foot note

LaTeX input	Output
`Both Rubi and Lila\footnote{They are sisters.} study in class I, while Ravi and Joy\footnote{They are friends.\label{fn:friends}} study in class II.`	Both Rubi and Lila[1] study in class I, while Ravi and Joy[2] study in class II. [1] They are sisters. [2] They are friends.

Foot notes

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LaTeX input	Output
Both Rubi and Lila\footnote{They are sisters.} study in class I, while Ravi and Joy\footnote{They are friends.\label{fn:friends}} study in class II.	Both Rubi and Lila[1] study in class I, while Ravi and Joy[2] study in class II. [1] They are sisters. [2] They are friends.

Foot notes

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LaTeX input	Output
`Both Rubi and Lila\footnote{They are sisters.} study in class I, while Ravi and Joy\footnote{They are friends.\label{fn:friends}} study in class II.`	Both Rubi and Lila[1] study in class I, while Ravi and Joy[2] study in class II. [1] They are sisters. [2] They are friends.

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
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- References

Numbered listing through **enumerate** environment

LaTeX input	Output
Some states of India: \begin{enumerate} \item Assam \item Punjab \item Rajasthan. \end{enumerate}	Some states of India: 1. Assam 2. Punjab 3. Rajasthan.

Numbered listing through **enumerate** environment

LaTeX input	Output
Some states of India: \begin{enumerate} \item Assam \item Punjab \item Rajasthan. \end{enumerate}	Some states of India: 1. Assam 2. Punjab 3. Rajasthan.

Nested listing through **enumerate** environment

LaTeX input

```
\begin{enumerate}
\item India\label{item:Ind}
    \begin{enumerate}
    \item Assam\label{item:Ass}
        \begin{enumerate}
        \item Nagaon\label{item:Nag}
        \item Kamrup
        \item Cachar
        \end{enumerate}
    \item Bihar
    \item Punjab
    \end{enumerate}
\item Sri Lanka
\end{enumerate}
District~\ref{item:Nag} belongs to
state~\ref{item:Ass} of
country~\ref{item:Ind}.
```

Output

1. India
   (a) Assam
      i. Nagaon
      ii. Kamrup
      iii. Cachar
   (b) Bihar
   (c) Punjab
2. Sri Lanka

District 1(a)i belongs to state 1a of country 1.

Nested listing through **enumerate** environment

LaTeX input

```
\begin{enumerate}
\item India\label{item:Ind}
    \begin{enumerate}
    \item Assam\label{item:Ass}
        \begin{enumerate}
        \item Nagaon\label{item:Nag}
        \item Kamrup
        \item Cachar
        \end{enumerate}
    \item Bihar
    \item Punjab
    \end{enumerate}
\item Sri Lanka
\end{enumerate}
District~\ref{item:Nag} belongs to
state~\ref{item:Ass} of
country~\ref{item:Ind}.
```

Output

1. India
   (a) Assam
      i. Nagaon
      ii. Kamrup
      iii. Cachar
   (b) Bihar
   (c) Punjab
2. Sri Lanka

District 1(a)i belongs to state 1a of country 1.

Unnumbered listing through **itemize** environment

LaTeX input	Output

`\begin{itemize}`
`\item India`
`\begin{itemize}`
`\item Assam`
`\begin{itemize}`
`\item Nagaon`
`\item Kamrup`
`\item Cachar`
`\end{itemize}`
`\item Bihar`
`\item Punjab`
`\end{itemize}`
`\item Sri Lanka`
`\end{itemize}`
	• India
	– Assam
	* Nagaon
	* Kamrup
	* Cachar
	– Bihar
	– Punjab
	• Sri Lanka

Unnumbered listing through **itemize** environment

LaTeX input	Output
\begin{itemize} \item India \begin{itemize} \item Assam \begin{itemize} \item Nagaon \item Kamrup \item Cachar \end{itemize} \item Bihar \item Punjab \end{itemize} \item Sri Lanka \end{itemize}	• India – Assam ∗ Nagaon ∗ Kamrup ∗ Cachar – Bihar – Punjab • Sri Lanka

Listing with user-defined labels through **description** env.

LaTeX input	Output
\begin{description} \item[(a)] Assam \item[(b)] Bihar \item[(c)] Punjab \item[(d)] Rajasthan. \end{description}	(a) Assam (b) Bihar (c) Punjab (d) Rajasthan.

Listing with user-defined labels through **description** env.

LaTeX input	Output
\begin{description} \item[(a)] Assam \item[(b)] Bihar \item[(c)] Punjab \item[(d)] Rajasthan. \end{description}	(a) Assam (b) Bihar (c) Punjab (d) Rajasthan.

Nesting different listing environments

LaTeX input

```
\begin{enumerate}
\item SI System
    \begin{enumerate}
    \item Metre
    \item Newton
    \item Second
    \end{enumerate}
\item MKS System
    \begin{itemize}
    \item Metre
    \item Kilogram
    \item Second
    \end{itemize}
\item FPS System
    \begin{description}
    \item [(i)] Foot
    \item [(ii)] Pound
    \item [(iii)] Second
    \end{description}
\end{enumerate}
```

Output

1. SI System
   (a) Metre
   (b) Newton
   (c) Second
2. MKS System
   - Metre
   - Kilogram
   - Second
3. FPS System
   (i) Foot
   (ii) Pound
   (iii) Second

Nesting different listing environments

LaTeX input

```
\begin{enumerate}
\item SI System
    \begin{enumerate}
    \item Metre
    \item Newton
    \item Second
    \end{enumerate}
\item MKS System
    \begin{itemize}
    \item Metre
    \item Kilogram
    \item Second
    \end{itemize}
\item FPS System
    \begin{description}
    \item [(i)] Foot
    \item [(ii)] Pound
    \item [(iii)] Second
    \end{description}
\end{enumerate}
```

Output

1. SI System
   (a) Metre
   (b) Newton
   (c) Second
2. MKS System
   - Metre
   - Kilogram
   - Second
3. FPS System
   (i) Foot
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- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
- Slide preparation
- References

Tabbing items

- Direct tabbing

LaTeX input	Output

`\begin{tabbing}`
`Potato \= 12.00\\`
`Rice \> 20.00\\`
`Oil \> 60.00\\`
`Sugar \> 23.00`
`\end{tabbing}`
	Potato 12.00
	Rice 20.00
	Oil 60.00
	Sugar 23.00

- Column width using the `\kill` command

LaTeX input	Output

`\begin{tabbing}`
`Base area (A) \= = bdh \= = 24\kill`
`Breadth (b) \> = 3\\`
`Depth (d) \> = 2\\`
`Height (h) \> = 4\\`
`Volume (V) \> = bdh \> = 24\\`
`Base Area (A) \> = bd \> = 6\\`
`\end{tabbing}`
	Breadth (b) = 3
	Depth (d) = 2
	Height (h) = 4
	Volume (V) = bdh = 24
	Base Area (A) = bd = 6

Tabbing items

- Direct tabbing

LaTeX input	Output
\begin{tabbing} Potato \= 12.00\\ Rice \> 20.00\\ Oil \> 60.00\\ Sugar \> 23.00 \end{tabbing}	Potato 12.00 Rice 20.00 Oil 60.00 Sugar 23.00

- Column width using the \kill command

LaTeX input	Output
\begin{tabbing} Base area (A) \= = bdh \= = 24\kill Breadth (b) \> = 3\\ Depth (d) \> = 2\\ Height (h) \> = 4\\ Volume (V) \> = bdh \> = 24\\ Base Area (A) \> = bd \> = 6\\ \end{tabbing}	Breadth (b) = 3 Depth (d) = 2 Height (h) = 4 Volume (V) = bdh = 24 Base Area (A) = bd = 6

Tabbing items

- Direct tabbing

LaTeX input	Output

`\begin{tabbing}`
`Potato \= 12.00\\`
`Rice \> 20.00\\`
`Oil \> 60.00\\`
`Sugar \> 23.00`
`\end{tabbing}`
	Potato 12.00
	Rice 20.00
	Oil 60.00
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`\begin{tabbing}`
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`Volume (V) \> = bdh \> = 24\\`
`Base Area (A) \> = bd \> = 6\\`
`\end{tabbing}`
	Breadth (b) = 3
	Depth (d) = 2
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- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
- Slide preparation
- References

Table preparation

- Table through the tabular environment

LaTeX input

```
\begin{table}[!hbt]
\centering
\caption{Obtained marks.}
\label{tab-marks}
\begin{tabular}{|l|c|c|c|}
\hline Name   & Math & Phy & Chem \\
\hline Robin  & 80   & 68  & 60   \\
\hline Julie  & 72   & 62  & 66   \\
\hline Robert & 75   & 70  & 71   \\
\hline
\end{tabular}
\end{table}
%
Table~\ref{tab-marks} shows the ...
```

Output

Table 1: Obtained marks.

Name	Math	Phy	Chem
Robin	80	68	60
Julie	72	62	66
Robert	75	70	71

Table 1 shows the marks obtained by three students in the final examination.

Table preparation

- Table through the **tabular** environment

LaTeX input

```
\begin{table}[!hbt]
\centering
\caption{Obtained marks.}
\label{tab-marks}
\begin{tabular}{|l|c|c|c|}
\hline Name   & Math & Phy & Chem \\
\hline Robin  & 80   & 68  & 60   \\
\hline Julie  & 72   & 62  & 66   \\
\hline Robert & 75   & 70  & 71   \\
\hline
\end{tabular}
\end{table}
%
Table~\ref{tab-marks} shows the ...
```

Output

Table 1: Obtained marks.

Name	Math	Phy	Chem
Robin	80	68	60
Julie	72	62	66
Robert	75	70	71

Table 1 shows the marks obtained by three students in the final examination.

Table preparation (*Contd...*)

- Table through the **tabularx** environment

LaTeX input

```
\begin{table}[!hbt]
\centering
\caption{Scored points.}
\begin{tabularx}{0.8\linewidth}
{|X|c|>{\raggedleft\arraybackslash}X|}
 \hline {\bf Name} & {\bf Sex} & {\bf Points}\\
 \hline Milan      &     M     &        1,500\\
        Julie      &     F     &        1,325\\
        Rubi       &     F     &           99\\
 \hline
\end{tabularx}
\end{table}
```

Output

Table 2: Scored points.

Name	Sex	Points
Milan	M	1,500
Julie	F	1,325
Rubi	F	99

Table preparation (*Contd...*)

- Merging two or more cells of a table into a single one

LaTeX input

```
\begin{tabular}{|l|*{5}{c|}}
\hline \multirow{2}{*}{Name}&
\multicolumn{4}{c|}{Subjects}&
\multirow{2}{*}{Total}\\
\cline{2-5}          & Math & Phy & Chem & English &   \\
\hline  Robin  & 80 & 68 & 60 &   57   & 265\\
\hline  Julie  & 72 & 62 & 66 &   63   & 263\\
\hline  Robert & 75 & 70 & 71 &   69   & 285\\
\hline
\end{tabular}
```

Output

Name	Subjects				Total
	Math	Phy	Chem	English	
Robin	80	68	60	57	265
Julie	72	62	66	63	263
Robert	75	70	71	69	285

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
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Figure insertion

- LaTeX compilation commands and supported figure formats

Compilation command	Supported figure format	
	Sort name	Full name
latex	eps	Encapsulated PostScript
	ps	PostScript
pdflatex	pdf	Portable Document Format
	jpeg	Joint Photographic Expert Group
	tiff	Tag Index File Format
	png	Portable Network Graphic

Figure insertion

- LaTeX compilation commands and supported figure formats

Compilation command	**Supported figure format**	
	Sort name	**Full name**
latex	`eps`	Encapsulated PostScript
	`ps`	PostScript
pdflatex	`pdf`	Portable Document Format
	`jpeg`	Joint Photographic Expert Group
	`tiff`	Tag Index File Format
	`png`	Portable Network Graphic

Figure insertion (*Contd...*)

- Figure insertion through the \epsfig{} command

LaTeX input	Output
\begin{figure}[!hbt] \centering \epsfig{file=girl.eps, width=2.0cm} \caption{A girl.} \label{girl1} \end{figure}	 Figure 1: A girl.
\begin{figure}[!hbt] \centering \epsfig{file=girl, width=2cm, angle=30} \caption{A girl.} \label{girl2} \end{figure}	 Figure 2: A girl.

Figure insertion (*Contd...*): Sub-numbering a group of figures

LaTeX input

```
\begin{figure}[!htb]
\centering
\subfigure[A girl.]
{   \includegraphics[width=2.0cm]{girl}
    \label{girl}
}\hfill
\subfigure[A flower.]
{   \includegraphics[width=2.0cm]{flower}
    \label{flower}
}\\
\subfigure[A finger work.]
{   \includegraphics[width=4.0cm]{finger}
    \label{finger-work}
}
\caption{Girl, flower and finger work.}
\label{girl_flower_finger}
\end{figure}
```

Output

(a) A girl.

(b) A flower.

(c) A finger work

Figure 3: Girl, flower and finger work.

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
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- Bibliography with BibTeX
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- Thesis preparation
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- References

Equation writing

- Frequently used mathematical notations (math-mode)

Function	Command with application	Output
Prime	`p'`	p'
Dots	`\dot{x}, \ddot{x}`	$\dot{x}$, $\ddot{x}$
	`\dddot{x}, \ddddot{x}`	$\dddot{x}$, $\ddddot{x}$
Sub/super-script	`x_i, x^2`	x_i, x^2
	`x_{ij}, x^{2k}`	x_{ij}, x^{2k}
	`x^{2k}_{ij}` or `x_{ij}^{2k}`	x_{ij}^{2k}
Summation	`\sum, \sum\limits_{i=1}^{20}`	$\sum$, $\sum\limits_{i=1}^{20}$
Product	`\prod, \prod_{i=1}^{i=20}`	$\prod$, $\prod\limits_{i=1}^{20}$
Integration	`\int x^2\,dx, \int_a^b xy\,dx`	$\int x^2\,dx$, $\int_a^b xy\,dx$
Fraction	`\frac{x}{y}`	$\frac{x}{y}$
Derivative	`\nabla{f}, \frac{dx}{dy}`	∇f, $\frac{dx}{dy}$
Partial derivative	`\frac{\partial{y}}{\partial{x}}`	$\frac{\partial y}{\partial x}$
Root	`\sqrt{x}, \sqrt[5]{xyz}`	$\sqrt{x}$, $\sqrt[5]{xyz}$
Limit	`\lim_{x\to 0}`	$\lim_{x\to 0}$
Binomial expression	`\binom{n}{k}`	$\binom{n}{k}$

Equation writing

- Frequently used mathematical notations (math-mode)

Function	Command with application	Output
Prime	`p'`	p'
Dots	`\dot{x}`, `\ddot{x}`	$\dot{x}$, $\ddot{x}$
	`\dddot{x}`, `\ddddot{x}`	$\dddot{x}$, $\ddddot{x}$
Sub/super-script	`x_i`, `x^2`	x_i, x^2
	`x_{ij}`, `x^{2k}`	x_{ij}, x^{2k}
	`x^{2k}_{ij}` or `x_{ij}^{2k}`	x_{ij}^{2k}
Summation	`\sum`, `\sum\limits_{i=1}^{20}`	$\sum$, $\sum\limits_{i=1}^{20}$
Product	`\prod`, `\prod_{i=1}^{i=20}`	$\prod$, $\prod\limits_{i=1}^{20}$
Integration	`\int x^2\,dx`, `\int_a^b xy\,dx`	$\int x^2\,dx$, $\int_a^b xy\,dx$
Fraction	`\frac{x}{y}`	$\frac{x}{y}$
Derivative	`\nabla{f}`, `\frac{dx}{dy}`	∇f, $\frac{dx}{dy}$
Partial derivative	`\frac{\partial{y}}{\partial{x}}`	$\frac{\partial y}{\partial x}$
Root	`\sqrt{x}`, `\sqrt[5]{xyz}`	$\sqrt{x}$, $\sqrt[5]{xyz}$
Limit	`\lim_{x\to 0}`	$\lim_{x\to 0}$
Binomial expression	`\binom{n}{k}`	$\binom{n}{k}$

Equation writing (*Contd...*)

- Greek letters (math-mode)

Sym. command	Sym. command	Sym. command	Sym. command
Lowercase	κ \kappa	υ \upsilon	Ξ \Xi
α \alpha	λ \lambda	ϕ \phi	Π \Pi
β \beta	μ \mu	φ \varphi	Σ \Sigma
γ \gamma	ν \nu	χ \chi	Υ \Upsilon
δ \delta	ξ \xi	ψ \psi	Φ \Phi
ϵ \epsilon	π \pi	ω \omega	Ψ \Psi
ε \varepsilon	ϖ \varpi	**Uppercase**	Ω \Omega
ζ \zeta	ρ \rho	Γ \Gamma	AMS **Greek**
η \eta	ϱ \varrho	Δ \Delta	$\digamma$ \digamma
θ \theta	σ \sigma	Θ \Theta	$\varkappa$ \varkappa
ϑ \vartheta	ς \varsigma	Λ \Lambda	
ι \iota	τ \tau		

Equation writing (*Contd...*)

- Basic delimiters (math-mode)

Del.	Command	Del.	Command
$\left(\frac{x}{y}\right)$	\left(\frac{x}{y} \right)	$\bigl(\frac{x}{y}\bigr)$	\bigl(\frac{x}{y} \bigr)
$\left(\frac{x}{y}\right.$	\left(\frac{x}{y} \right.	$\Bigl(\frac{x}{y}$	\Bigl(\frac{x}{y}
$\left.\frac{x}{y}\right)$	\left. \frac{x}{y} \right)	$\frac{x}{y}\biggr)$	\frac{x}{y} \biggr)
$\left\{\frac{x}{y}\right\}$	\left\{ \frac{x}{y} \right\}		
$\left\{\frac{x}{y}\right.$	\left\{ \frac{x}{y} \right.	$\biggl\{\frac{x}{y}\biggr\}$	\biggl\{ \frac{x}{y} \biggr\}
$\left.\frac{x}{y}\right\}$	\left. \frac{x}{y} \right\}		
$\left[\frac{x}{y}\right]$	\left[\frac{x}{y} \right]	$\Biggl(\frac{x}{y}\Biggr)$	\Biggl(\frac{x}{y} \Biggr)
$\left[\frac{x}{y}\right.$	\left[\frac{x}{y} \right.		
$\left.\frac{x}{y}\right]$	\left. \frac{x}{y} \right]	$\frac{x}{y}\Biggr\}$	\frac{x}{y} \Biggr\}
$\left\lvert\frac{x}{y}\right\rvert$	\left\lvert \frac{x}{y} \right\rvert		
$\left\lvert\frac{x}{y}\right.$	\left\lvert \frac{x}{y} \right.	$\frac{x}{y}\Biggr\rvert$	\frac{x}{y} \Biggr\rvert
$\left.\frac{x}{y}\right\rvert$	\left. \frac{x}{y} \right\rvert		

Equation writing (*Contd...*)

- Basic binary operators

Symbol	Command	Symbol	Command	Symbol	Command
$\pm$	\pm	$\diamond$	\diamond	$\wr$	\wr
$\mp$	\mp	$\Diamond$	\Diamond	$\setminus$	\setminus
$\div$	\div	$\triangle$	\triangle	$\amalg$	\amalg
$\times$	\times	$\triangle$	\bigtriangleup	$\dagger$	\dagger
$*$	\ast	$\bigtriangledown$	\bigtriangledown	$\ddagger$	\ddagger
$\star$	\star	$\triangleleft$	\triangleleft	$\bigcirc$	\bigcirc
$\cdot$	\cdot	$\triangleright$	\triangleright	$\bigcap$	\bigcap
$\circ$	\circ	$\lhd$	\lhd	$\bigcup$	\bigcup
$\bullet$	\bullet	$\rhd$	\rhd	$\bigsqcup$	\bigsqcup
$\cap$	\cap	$\unlhd$	\unlhd	$\biguplus$	\biguplus
$\cup$	\cup	$\unrhd$	\unrhd	$\bigvee$	\bigvee
$\sqcap$	\sqcap	$\odot$	\odot	$\bigwedge$	\bigwedge
$\sqcup$	\sqcup	$\oplus$	\oplus	$\bigodot$	\bigodot
$\uplus$	\uplus	$\ominus$	\ominus	$\bigoplus$	\bigoplus
$\vee$	\vee	$\otimes$	\otimes	$\bigotimes$	\bigotimes
$\wedge$	\wedge	$\oslash$	\oslash		

Equation writing (*Contd...*)

- Basic relation operators

Symbol	Command	Symbol	Command	Symbol	Command
$\leq$	\leq	$\in$	\in	$\neq$	\not=
$\ll$	\ll	$\notin$	\not\in	$\doteq$	\doteq
$\geq$	\geq	$\ni$	\ni	$\propto$	\propto
$\gg$	\gg	$\vdash$	\vdash	$\mid$	|
$\gtreqqless$	\gtreqqless	$\dashv$	\dashv	$\models$	\models
$\prec$	\prec	$\equiv$	\equiv	$\perp$	\perp
$\preceq$	\preceq	$\not\equiv$	\not\equiv	$\mid$	\mid
$\succ$	\succ	$\sim$	\sim	$\parallel$	\parallel
$\succeq$	\succeq	$\not\sim$	\not\sim	$\not\parallel$	\not\parallel
$\subset$	\subset	$\simeq$	\simeq	$\bowtie$	\bowtie
$\subseteq$	\subseteq	$\asymp$	\asymp	$\Join$	\Join
$\sqsubseteq$	\sqsubseteq	$\approx$	\approx	$\smile$	\smile
$\supset$	\supset	$\not\approx$	\not\approx	$\frown$	\frown
$\supseteq$	\supseteq	$\cong$	\cong	$\not<$	\not<
$\sqsupseteq$	\sqsupseteq	$\neq$	\neq	$\not>$	\not>

Equation writing (*Contd...*)

- Mathematics in text-mode
  - Mathematical expressions in text-mode can be produced as `$amath$`, `\(amath\)` or `\begin{math}amath\end{math}`
    - A single notation is usually inserted in `$ $`, while an expression is inserted in `\( \)` or in the **math** environment (however, all three are applicable in either case)
    - An example
      'The equation of an origin-centered circle is `\(x^2+y^2=r^2\)`, where `$x$` and `$y$` are the coordinates of a point on the circumference of the circle, and `$r$` is its radius.' will produce the following:

      The equation of an origin-centered circle is $x^2 + y^2$ where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.

Equation writing (*Contd...*)

- Mathematics in text-mode
  - Mathematical expressions in text-mode can be produced as **$**amath**$**, **\(**amath**\)** or **\begin{math}**amath**\end{math}**
    - A single notation is usually inserted in **$ $**, while an expression is inserted in **\(\)** or in the **math** environment (however, all three are applicable in either case)
    - An example

```
'The equation of an origin-centered circle is
\(x^2+y^2=r^2\), where $x$ and $y$ are the
coordinates of a point on the circumference of
the circle, and $r$ is its radius.' will produce
the following:
```

'The equation of an origin-centered circle is $x^2+y^2=r^2$, where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.' will produce the following:

The equation of an origin-centered circle is $x^2 + y^2$ where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.

Equation writing (*Contd...*)

- Mathematics in text-mode
  - Mathematical expressions in text-mode can be produced as **$**amath**$**, **\(**amath**\)** or **\begin{math}**amath**\end{math}**
    - A single notation is usually inserted in **$ $**, while an expression is inserted in **\(\)** or in the **math** environment (however, all three are applicable in either case)
  - An example

```
'The equation of an origin-centered circle is
\(x^2+y^2=r^2\), where $x$ and $y$ are the
coordinates of a point on the circumference of
the circle, and $r$ is its radius.' will produce
the following:
```

'The equation of an origin-centered circle is $x^2+y^2=r^2$, where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.' will produce the following:

The equation of an origin-centered circle is $x^2 + y^2$ where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.

Equation writing (*Contd...*)

- Mathematics in text-mode
  - Mathematical expressions in text-mode can be produced as **$**amath**$**, **\(**amath**\)** or **\begin{math}**amath**\end{math}**
    - A single notation is usually inserted in **$ $**, while an expression is inserted in **\(\)** or in the **math** environment (however, all three are applicable in either case)
    - An example
      'The equation of an origin-centered circle is **\(**x^2+y^2=r^2**\)**, where **$**x**$** and **$**y**$** are the coordinates of a point on the circumference of the circle, and **$**r**$** is its radius.' will produce the following:

The equation of an origin-centered circle is $x^2 + y^2$ where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.

Equation writing (*Contd...*)

- Mathematics in text-mode
  - Mathematical expressions in text-mode can be produced as **$**amath**$**, **\(**amath**\)** or **\begin{math}**amath**\end{math}**
    - A single notation is usually inserted in **$ $**, while an expression is inserted in **\(\)** or in the **math** environment (however, all three are applicable in either case)
    - An example
      'The equation of an origin-centered circle is **\(**x^2+y^2=r^2**\)**, where **$**x**$** and **$**y**$** are the coordinates of a point on the circumference of the circle, and **$**r**$** is its radius.' will produce the following:

The equation of an origin-centered circle is $x^2 + y^2$ where x and y are the coordinates of a point on the circumference of the circle, and r is its radius.

Equation writing (*Contd...*)

- Simple numbered and unnumbered equations

LaTeX input	Output
\begin{equation} x^2 + y^2 = r^2 \label{eq:circ} \end{equation}	$x^2 + y^2 = r^2 \quad (1)$
\begin{equation*} x^2 + y^2 = r^2 \end{equation*}	$x^2 + y^2 = r^2$
\begin{equation} x^2 + y^2 = r^2 \nonumber \end{equation}	$x^2 + y^2 = r^2$

Equation writing (*Contd...*): Arrays of equations

LaTeX input

```
\begin{gather}
  5x+   2y      =   x+     2z+  3\\
130x+       4z  =       y+      2\\
      43y+ 57z  = 20x+          99
\end{gather}
```

Output

$$5x + 2y = x + 2z + 3 \quad (2)$$
$$130x + 4z = y + 2 \quad (3)$$
$$43y + 57z = 20x + 99 \quad (4)$$

LaTeX input

```
\begin{eqnarray}
5x+2y   &=& x+2z+3  \label{eqn1}\\
130x+4z &=& y+2     \nonumber \\
43y+57z &=& 20x+99  \label{eqn3}
\end{eqnarray}
```

Output

$$\begin{aligned} 5x + 2y &= x + 2z + 3 && (5)\\ 130x + 4z &= y + 2 \\ 43y + 57z &= 20x + 99 && (6) \end{aligned}$$

LaTeX input

```
\begin{align}
5x+2y   &= x+2z+3  \nonumber \\
130x+4z &= y+2     \label{align2}\\
43y+57z &= 20x+99  \notag
\end{align}
```

Output

$$\begin{aligned} 5x + 2y &= x + 2z + 3\\ 130x + 4z &= y + 2 && (7)\\ 43y + 57z &= 20x + 99 \end{aligned}$$

Equation writing (*Contd...*): Arrays of equations (*Contd...*)

```
\begin{alignat*}{7}
  5x&+&  2y&&    &=&  x&+&  &&2z&+&3\\
130x&+&    &&  4z&=&   &&  y&+&  &&2\\
    &&43y&+&57z&=&20x&+&  &&  &&99
\end{alignat*}
```

$$\begin{alignat*}{7}
5x&+&\ 2y&&\ &=&\ x&+&\ &&2z&+&3\\
130x&+&\ &&\ 4z&=&\ &&\ y&+&\ &&2\\
\ &&43y&+&57z&=&20x&+&\ &&\ &&99
\end{alignat*}$$

```
\begin{equation}
\left.\begin{array}{rrrrrrrrrrrr}
  5x&+&  2y&&    &=&  x&+&  &&2z&+&3\\
130x&+&    &&  4z&=&   &&  y&+&  &&2\\
    &&43y&+&57z&=&20x&+&  &&  &&99
\end{array}\right\}
\end{equation}
```

$$\left.\begin{array}{rrrrrrrrrrrr}
5x&+&\ 2y&&\ &=&\ x&+&\ &&2z&+&3\\
130x&+&\ &&\ 4z&=&\ &&\ y&+&\ &&2\\
\ &&43y&+&57z&=&20x&+&\ &&\ &&99
\end{array}\right\} \tag{8}$$

- Introduction to LaTeX
- Fonts selection
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- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
- Slide preparation
- References

Bibliography with BibTeX

- Types and fields of references under BibTeX

	article	book	booklet	inbook	incollection	inproceedings, conference	manual	masterthesis, phdthesis	misc	proceedings	techreport	unpublished
address	×	O	O	O	O	O	O	O	×	O	O	×
author	M	M_1	O	M_1	M	M	O	M	O	×	M	M
booktitle	×	×	×	×	M	M	×	×	×	×	×	×
chapter	×	×	×	M_2	O	×	×	×	×	×	×	×
edition	×	O	×	O	O	×	O	×	×	×	×	×
editor	×	M_1	×	M_1	O	O	×	×	×	O	×	×
howpublished	×	×	O	×	×	×	×	×	O	×	×	×
institution	×	×	×	×	×	×	×	×	×	×	M	×
journal	M	×	×	×	×	×	×	×	×	×	×	×
month	O	O	O	O	O	O	O	O	O	O	O	O
note	O	O	O	O	O	O	O	O	O	O	O	M

Bibliography with BibTeX

- Types and fields of references under BibTeX

	article	book	booklet	inbook	incollection	inproceedings, conference	manual	mastersthesis, phdthesis	misc	proceedings	techreport	unpublished
address	×	O	O	O	O	O	O	O	×	O	O	×
author	M	M_1	O	M_1	M	M	O	M	O	×	M	M
booktitle	×	×	×	×	M	M	×	×	×	×	×	×
chapter	×	×	×	M_2	O	×	×	×	×	×	×	×
edition	×	O	×	O	O	×	O	×	×	×	×	×
editor	×	M_1	×	M_1	O	O	×	×	×	O	×	×
howpublished	×	×	O	×	×	×	×	×	O	×	×	×
institution	×	×	×	×	×	×	×	×	×	×	M	×
journal	M	×	×	×	×	×	×	×	×	×	×	×
month	O	O	O	O	O	O	O	O	O	O	O	O
note	O	O	O	O	O	O	O	O	O	O	O	M

Bibliography with BibTeX (*Contd...*)

- Types and fields of references under BibTeX (*Contd...*)

	article	book	booklet	inbook	incollection	inproceedings, conference	manual	mastersthesis, phdthesis	misc	proceedings	techreport	unpublished
number	O	O_1	×	O_1	O_1	O_1	×	×	×	O_1	O	×
organization	×	×	×	×	×	O	O	×	×	O	×	×
pages	O	×	×	M_2	O	O	×	×	×	×	×	×
publisher	×	M	×	M	M	O	×	×	×	O	×	×
school	×	×	×	×	×	×	×	M	×	×	×	×
series	×	O	×	O	O	O	×	×	×	O	×	×
title	M	M	M	M	M	M	M	M	O	M	M	M
type	×	×	×	O	O	×	×	O	×	×	O	×
volume	O	O_1	×	O_1	O_1	O_1	×	×	×	O_1	×	×
year	M	M	O	M	M	M	O	M	O	M	M	O

M → mandatory field M_1 → one of them is mandatory
M_2 → either one or both are mandatory
O → optional field O_1 → one of them (optional) × → not required

Bibliography with BibTeX (*Contd...*)

- BibTeX compatible bibliographic database

```
% mybib2.bib
@article{Datta-Figueira-2013,
  author = {Dilip Datta and Jos\'e Rui Figueira},
  title = {{A real-integer-discrete-coded differential evolution}},
  journal = {Applied Soft Computing},
  volume = {13},
  number = {9},
  pages = {3884--3893},
  year = {2013}
}

@book{Deb-2001,
  author = {Kalyanmoy Deb},
  title = {{Multi-Objective Optimization using Evolutionary
Algorithms}},
  publisher = {John Wiley \& Sons Ltd.},
  address = {Chichester, England},
  year = {2001}
}
```

Bibliography with BibTeX (*Contd...*)

- BibTeX compatible bibliographic database (*Contd...*)

```
@inproceedings{Burke-etal-1996,
  author = {E. Burke and D. Elliman and P. F. R. Weare},
  title = {{Examination Timetabling in British Universities ...}},
  booktitle = {Proceedings of Practice and Theory of ...},
  publisher = {Springer},
  series = {Lecture Notes in Computer Science (LNCS)},
  editor = {Edmund K. Burke and Peter Ross},
  year = {1996},
  volume = {1153},
  pages = {76--90}
}

@mastersthesis{Datta-1998,
  author = {Dilip Datta},
  title = {{Optimal Shape Design System for Plates under ...}},
  school = {Indian Institute of Technology, Delhi},
  month = {December},
  year = {1998},
  note = {Master thesis}
}
```

Bibliography with BibTeX (*Contd...*)

- Standard bibliographic styles of LaTeX

LaTeX style	Function
plain	References are listed in alphabetic order of the surnames of authors, and labeled by Arabic numerals in [] [1] Dilip Datta and José Rui Figueira. A real-integer-discrete-coded differential evolution. *Applied Soft Computing*, 13(9):3884–3893, 2013. [2] Kalyanmoy Deb. *Multi-Objective Optimization using Evolutionary Algorithms*. John Wiley & Sons Ltd., Chichester, England, 2001.
unsrt	Same with **plain**, except that the references are listed in order of their citations in the document
alpha	References are listed in alphabetic order of their identifiers [Deb01] Kalyanmoy Deb. *Multi-Objective Optimization using Evolutionary Algorithms*. John Wiley & Sons Ltd., Chichester, England, 2001. [DF13] Dilip Datta and José Rui Figueira. A real-integer-discrete-coded differential evolution. *Applied Soft Computing*, 13(9):3884–3893, 2013.

Bibliography with BibTeX (*Contd...*)

- Standard bibliographic styles of LaTeX (*Contd...*)

LaTeX style	Function
abbrv	Same with **plain**, except that a reference is made compact by abbreviating the given (or first and middle) names of authors [1] D. Datta and J. R. Figueira. A real-integer-discrete-coded differential evolution. *Applied Soft Computing*, 13(9):3884–3893, 2013. [2] K. Deb. *Multi-Objective Optimization using Evolutionary Algorithms*. John Wiley & Sons Ltd., Chichester, England, 2001.
acm	Same with **plain**, but the surname of an author is printed first in small capital letters, followed by the abbreviated given name [1] Datta, D., and Figueira, J. R. A real-integer-discrete-coded differential evolution. *Applied Soft Computing 13*, 9 (2013), 3884–3893. [2] Deb, K. *Multi-Objective Optimization using Evolutionary Algorithms*. John Wiley & Sons Ltd., Chichester, England, 2001.

Bibliography with BibTeX (*Contd...*)

- Standard bibliographic styles of LaTeX (*Contd...*)

LaTeX style	Function
apalike	The surname of an author is printed first, followed by the abbreviated given name, and a reference is labeled by an identifier generated from the surnames of authors and the year of publication [Datta and Figueira, 2013] Datta, D. and Figueira, J. R. (2013). A real-integer-discrete-coded differential evolution. *Applied Soft Computing*, 13(9):3884–3893. [Deb, 2001] Deb, K. (2001). *Multi-Objective Optimization using Evolutionary Algorithms*. John Wiley & Sons Ltd., Chichester, England.

Bibliography with BibTeX (*Contd...*)

- Bibliographic reference data file is included as follows:

  \bibliographystyle{bib_style}

  \bibliography{bib_file}

- A reference is cited through the **\cite**{ckey} command, where ckey is the citation key of the reference
- Multiple references can be cited as **\cite**{ckey1,ckey2,...}
- Only those references, cited in the document, are printed in the bibliographic reference list
  - A non-cited reference can be included in the bibliographic list by issuing **\nocite**{ckey} somewhere within the document
  - **\nocite**{*} may also be issued for including all the non-cited references in the bibliographic list

Bibliography with BibTeX (*Contd...*)

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  \bibliographystyle{bib_style}

  \bibliography{bib_file}

- A reference is cited through the \cite{ckey} command, where ckey is the citation key of the reference
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- Only those references, cited in the document, are printed in the bibliographic reference list
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Bibliography with BibTeX (*Contd...*)

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  \bibliographystyle{bib_style}

  \bibliography{bib_file}

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- Multiple references can be cited as \cite{ckey1,ckey2,...}
- Only those references, cited in the document, are printed in the bibliographic reference list
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  - \nocite{*} may also be issued for including all the non-cited references in the bibliographic list

Bibliography with BibTeX (*Contd...*)

- Bibliographic reference data file is included as follows:

  \bibliographystyle{bib_style}

  \bibliography{bib_file}

- A reference is cited through the \cite{ckey} command, where ckey is the citation key of the reference
- Multiple references can be cited as \cite{ckey1,ckey2,...}
- Only those references, cited in the document, are printed in the bibliographic reference list
  - A non-cited reference can be included in the bibliographic list by issuing \nocite{ckey} somewhere within the document
  - \nocite{*} may also be issued for including all the non-cited references in the bibliographic list

Bibliography with BibTeX (*Contd...*)

- Compilation of BibTeX based LaTeX input file:

```
$ latex myarticle
$ bibtex myarticle
$ latex myarticle
$ latex myarticle
```

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
- Slide preparation
- References

Article in the document-class article

LaTeX input

```
% myarticle.tex (in 'article')
\documentclass[12pt]{article}
\date{}
\title{My First Article in \LaTeX}
\author{Author's Name and Address}
\begin{document}
\maketitle
%
\begin{abstract}
The article explains ...
\end{abstract}
%
\section{First Section}
First level of numbered section.
\subsection{First subsection}
Second level of numbered section.
\subsubsection{First sub-subsection}
Third and last level of ...
\section{Second Section}
Texts of the second section ...
\end{document}
```

Output

My First Article in LaTeX

Author's Name and Address

Abstract

The article explains ...

1 First Section

First level of numbered section.

1.1 First subsection

Second level of numbered section.

1.1.1 First sub-subsection

Third and last level of numbered section.

2 Second Section

Texts of the second section ...

Article in the document-class **article**

LaTeX input	Output
% myarticle.tex (in 'article') \documentclass[12pt]{article} \date{} \title{My First Article in \LaTeX} \author{Author's Name and Address} \begin{document} \maketitle % \begin{abstract} The article explains ... \end{abstract} % \section{First Section} First level of numbered section. \subsection{First subsection} Second level of numbered section. \subsubsection{First sub-subsection} Third and last level of ... \section{Second Section} Texts of the second section ... \end{document}	My First Article in LaTeX Author's Name and Address **Abstract** The article explains ... **1 First Section** First level of numbered section. **1.1 First subsection** Second level of numbered section. **1.1.1 First sub-subsection** Third and last level of numbered section. **2 Second Section** Texts of the second section ...

Article: List of authors

- Authors one below another

LaTeX input	Output

`\author`
`{`
`  {\bf 1st author's name}\\`
`  Affiliation\\`
`  Address\\[2mm]`
`  %`
`  {\bf 2nd author's name}\\`
`  Affiliation\\`
`  Address`
`}`
	1st author's name
	Affiliation
	Address
	
	2nd author's name
	Affiliation
	Address

Article: List of authors

- Authors one below another

LaTeX input	Output

\author
{
{\bf 1st author's name}\\
Affiliation\\
Address\\[2mm]
%
{\bf 2nd author's name}\\
Affiliation\\
Address
}
	1st author's name
	Affiliation
	Address
	
	2nd author's name
	Affiliation
	Address

Article: List of authors (*Contd...*)

- Authors side-by-side through the **tabular** environment

LaTeX input

```
\author
{
    \begin{tabular}[t]{c@{\extracolsep{30mm}}c}
     {\it Author-1}   &   {\it Author-2}\\
     Affiliation      &   Affiliation\\
     Address          &   Address\\
     e-mail           &   e-mail\\
    \end{tabular}
}
```

Output

Author-1
Affiliation
Address
e-mail

Author-2
Affiliation
Address
email

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
- Slide preparation
- References

Template of a thesis

```
\input{preamble}
\begin{document}
    % Cover page, title, abstract, certificate, acknowledge, and dedication
    \thispagestyle{empty}
        \include{coverpage} \clearpage
    \pagenumbering{roman}   % Page numbering in Roman numerals
        \addcontentsline{toc}{chapter}{Title}
            \thispagestyle{empty} \include{title} \clearpage
        \addcontentsline{toc}{chapter}{Abstract}
            \thispagestyle{empty} \include{abstract} \clearpage
        \addcontentsline{toc}{chapter}{Certificate}
            \thispagestyle{empty} \include{certif} \clearpage
        \addcontentsline{toc}{chapter}{Acknowledgement}
            \thispagestyle{empty} \include{acknowl} \clearpage
        \addcontentsline{toc}{chapter}{Dedication}
            \thispagestyle{empty} \include{dedicate} \clearpage
    % Contents, List of Tables and List of Figures
        \addcontentsline{toc}{chapter}{Contents}
            \thispagestyle{empty} \tableofcontents \clearpage
        \addcontentsline{toc}{chapter}{List of Tables}
            \thispagestyle{empty} \listoftables \clearpage
```

Template of a thesis

```
\input{preamble}
\begin{document}
    % Cover page, title, abstract, certificate, acknowledge, and dedication
    \thispagestyle{empty}
        \include{coverpage} \clearpage
    \pagenumbering{roman}    % Page numbering in Roman numerals
        \addcontentsline{toc}{chapter}{Title}
            \thispagestyle{empty} \include{title} \clearpage
        \addcontentsline{toc}{chapter}{Abstract}
            \thispagestyle{empty} \include{abstract} \clearpage
        \addcontentsline{toc}{chapter}{Certificate}
            \thispagestyle{empty} \include{certif} \clearpage
        \addcontentsline{toc}{chapter}{Acknowledgement}
            \thispagestyle{empty} \include{acknowl} \clearpage
        \addcontentsline{toc}{chapter}{Dedication}
            \thispagestyle{empty} \include{dedicate} \clearpage
        % Contents, List of Tables and List of Figures
        \addcontentsline{toc}{chapter}{Contents}
            \thispagestyle{empty} \tableofcontents \clearpage
        \addcontentsline{toc}{chapter}{List of Tables}
            \thispagestyle{empty} \listoftables \clearpage
```

Template of a thesis (*Contd...*)

```
        \addcontentsline{toc}{chapter}{List of Figures}
            \thispagestyle{empty} \listoffigures \clearpage
    % Main matters
    \pagenumbering{arabic}    % Page numbering in Arabic numerals
        % Chapters
        \include{chap_introduction}
        \include{chap_literature}
        \include{chap_problem}
        \include{chap_formulation}
        \include{chap_result}
        \include{chap_conclusion}
        % Appendix
        \appendix
        \include{app_derivation}
        \include{app_proof}
        % Bibliography
        \addcontentsline{toc}{chapter}{Bibliography}
            \bibliographystyle{plain}
            \bibliography{mybib}
\end{document}
```

- Introduction to LaTeX
- Fonts selection
- Texts formatting
- Listing items
- Tabbing items
- Table preparation
- Figure insertion
- Equation writing
- Bibliography with BibTeX
- Article preparation
- Thesis preparation
- Slide preparation
- References

Slide preparation with **beamer**

- In LaTeX, slides are widely prepared through the **beamer** document-class
- In the document-class **beamer**, a presentation consists of a number of frames (or slides)
  - A frame is created either by the **frame**[]{} command or the **frame** environment as **begin**{**frame**}[]...**end**{**frame**}
  - A frame generally consists of some or all of the eight components of *Headline and footline*, *Sidebars*, *Navigation bars*, *Navigation symbols*, *Logo*, *Frame title*, *Background*, and *Frame contents*
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Slide preparation with **beamer**: Sructure

```
\documentclass{beamer}
\usetheme{JuanLesPins}
% Components of the title page
\title[\LaTeX\ in 24H]{\LaTeX\ in Twenty Four Hours}
\subtitle{A Practical Guide for Scientific Writing}
\author[D. Datta]{Dilip Datta}
\institute[\LaTeX-LT]{\LaTeX\ Learners Team}
\date[L24H :: 21-06-2016]{June 21, 2016}
\titlegraphic{\includegraphics[width=20mm]{logo_LA}}
%
\begin{document}
% Frame 1
\frame[plain]{\titlepage}
% Frame 2
\section*{Outline}
\frame[t]{ \frametitle{Presentation outline} \tableofcontents }
```

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Slide preparation with **beamer**: Sructure (*Contd...*)

```
% Frames 3 and 4
\section[Introduction]{Introduction to \LaTeX}
\subsection[Definition]{Definition of \LaTeX}
\frame[t]
{    \frametitle{Introduction to \LaTeX}
     \framesubtitle{What is \LaTeX?}
     \begin{itemize}
     \item \LaTeX\ is a macro-package for ...
     \item \LaTeX\ instructions are interspersed ...
     \item \LaTeX\ input files have .tex extension.
     \item \LaTeX\ output can be obtained in ...
     \end{itemize}
}
\subsection[Resources]{Resources on \LaTeX}
\begin{frame}[t]
  \frametitle{Introduction to \LaTeX}
  \framesubtitle{Some popular books on \LaTeX}
  \begin{enumerate}
  \item The \LaTeX\ Companion by \citet{Goossens-etal-1994}
  \item A Guide to \LaTeX2$_\varepsilon$ by \citet{KopDal-97}
  \item \LaTeX: User's Guide and Reference Manual by ...
```

Slide preparation with **beamer**: Sructure (*Contd...*)

```
% Frame 5
\section*{}
\begin{frame}[t]
  \frametitle{References}
  \bibliographystyle{apalike} \bibliography{lswbib}
\end{frame}
% Frame 6
\section*{}
\begin{frame}
  \begin{center}
  \Large{\bf\textcolor{blue}{Thanks a lot}}\\[5mm] ... \end{center}
\end{frame}
\end{document}
```

Slides under the **JuanLesPins** presentation theme

LaTeX in Twenty Four Hours
A Practical Guide for Scientific Writing

Dilip Datta

LaTeX Learners Team

June 21, 2016

LaTeX in 24H
Introduction
Resources

Introduction to LaTeX
Some popular books on LaTeX

- The LaTeX Companion by Goossens et al. (1994)
- A Guide to LaTeX2ε by Kopka and Daly (1995)
- LaTeX: Users Guide and Reference Manual by Lamport (1994)

LaTeX in 24H
Outline

Presentation outline

LaTeX in 24H

References

Goossens, M., Mittelbach, F., and Samarin, A. (1994). *The LaTeX Companion*. Addison-Wesley Publishing company, Reading, Massachusetts.

Kopka, H. and Daly, P. W. (1995). *A Guide to LaTeX2ε*. Addison-Wesley, Harlow, England.

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LaTeX in 24H
Introduction
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Introduction to LaTeX
What is LaTeX?

- LaTeX is a macro-package for typesetting documents.
- LaTeX instructions are interspersed with the input file of a document.
- LaTeX input files have .tex extension.
- LaTeX output can be obtained in .dvi or .pdf format.

LaTeX in 24H

Thanks a lot

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The Boring Presentation!!

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LaTeX in 24H
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1. Introduction to LaTeX
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LaTeX in 24H

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LaTeX in 24H

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The Boring Presentation!!

Appearance of a presentation (BEAMER themes)

- The appearance of a presentation in the **beamer** document-class can be controlled by five types of themes, which are presentation theme, color theme, font theme, inner theme, and outer theme.
- The above five themes are loaded in the preamble as `\usetheme{tname}`, `\usecolortheme{tname}`, `\usefonttheme{tname}`, `\useinnertheme{tname}`, and `\useoutertheme{tname}`, where `tname` is the name of the chosen presentation/color/font/inner/outer theme.

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Appearance of a presentation (BEAMER themes) (*Contd...*)

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References

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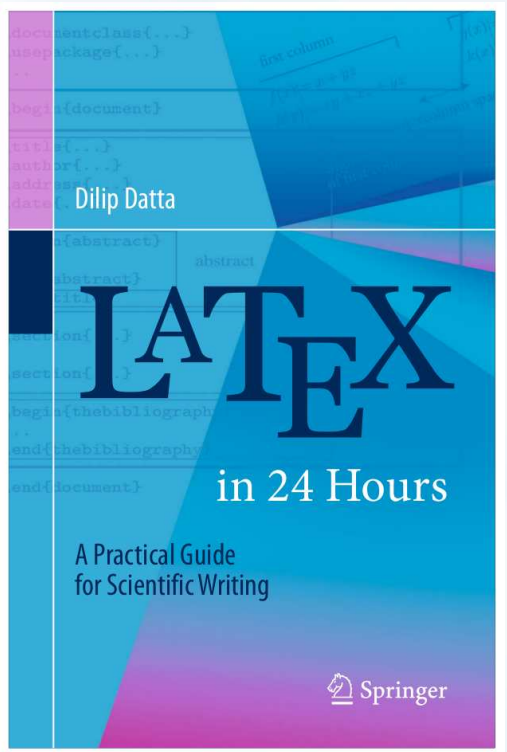
ISBN: 978-3-319-47831-9
URL: http://www.springer.com/gp/book/9783319478302



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