Module : Writing skills and Office

TP 1 : Write Different Types of Documents with LATEX

LATEX is a powerful typesetting system commonly used for academic papers, technical reports, theses, and books, especially in fields like mathematics, computer science, and engineering.

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LATEX

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LaTeX Introduction

- LaTeX (pronounced either "Lah-tech" or "Lay-tech") is a software for typesetting documents.
- It's a document preparation system.
- It is not a word processor, but is used as a document markup language.
- It is a free, open source software.
- It was originally written by Leslie Lamport and is based on the TeX typesetting engine by Donald Knuth.

LaTeX Benefits

- It is well-suited for scientific and technical documents.
- Its superior for typesetting of mathematical formulas.
- It produces very high quality output, it is extremely stable, and handles complex documents easily no matter how large they are.
- Its cross-referencing capabilities, its automatic numbering and generation of lists of contents, figures and tables, indexes, glossaries, and bibliographies.

LaTeX Benefits

- It is multilingual with language-specific features.
- Produces the output in PostScript, PDF, DVI, and HTML format.
- It is incredibly flexible—there are templates for letters, presentations, bills, philosophy books, law texts, music scores, and even for chess game notations.
- It is available for Windows, Linux, Mac OS X, and others
- Its file format is plain text – readable and editable.
- It will produce the same output on all operating systems.

LaTeX Editors (Offline)

- MikTex
- TeXstudio
- TexLive
- TeXworks
- TexMaker
- TeXnicCenter
- Gummi
- Lyx

LaTeX Editors (Online)

- Overleaf
- ShareLatex
- Papeeria
- CoCalc
- LatexBase
- LatexLab
- Sciweavers
- Authorea

Creating First Document

Command

```
\documentclass[a4paper, 12pt]{article}
\title{Introduction to LaTeX}
\author{Prof. Prashant Jadav}
\begin{document}
\maketitle
This is my first LaTeX document
\end{document}
```

Preamble

Environment

Output in PDF Format

Introduction to LaTeX

Prof. Prashant M. Jadav

October 21, 2021

This is my first LaTex document

LaTeX Commands

- LaTeX commands begin with a backslash, followed by big or small letters.
- Commands may have **arguments**, given in curly braces or in square brackets.
- Calling a command looks like the following:

```
\command[optional argument]{argument}
```

- There could be several arguments, each of them in braces or brackets.
- Arguments in curly braces are mandatory.

Spaces, Line Breaks, Paragraphs

```
\begin{document}

\maketitle
\section{Introduction} This    is
the

first paragraph.


This is the second paragraph.

\end{document}
```

Spaces, Line Breaks, Paragraphs

Introductin to LaTeX

Prof. Prashant Jadav

October 21, 2021

1 Introduction

This is the first paragraph.

This is the second paragraph.

Spaces, Line Breaks, Paragraphs and Comments

- LaTeX treats multiple spaces just like a single space.
- A single line break has the same effect like a single space.
- It doesn't matter how you arrange your text in the editor using spaces or breaks, the output will stay the same.
- A blank line denotes a paragraph break.
- Multiple empty lines are treated as one.
- Everything following a percent sign (% symbol used as comment) until the end of the line will be ignored by LaTeX.

Writing Special Characters

```
\section{Writing Special
Characters} Statement \#1:

50\% of \$100 makes \$50.
\\
More special symbols are \&, \_, \{ and
\}.
\\
\textbackslash
```

Writing Special Characters

1 Writing Special Characters

Statement #1: 50% of $100 makes $50.
More special symbols are &, _, { and }.
\

Bolds, Italics and Underlining

```
Text can be \emph{emphasized}.\\

\textit{italic} words could be \textbf{bold}.\\

\textsl{slanted} or in \textsc{Small Caps}.\\

Commands can be \textit{\textbf{nested}}.\\

\emph{Here \emph{emphasizing} nested.}
```

Bolds, Italics and Underlining

Text can be *emphasized.*
italic words could be **bold.**
slanted or typeset in SMALL CAPS.
Commands can be ***nested.***
Here emphasizing *nested.*

Fonts Sizes

\tiny	Lorem ipsum
\scriptsize	Lorem ipsum
\footnotesize	Lorem ipsum
\small	Lorem ipsum
\normalsize	Lorem ipsum

\large	Lorem ipsum
\Large	Lorem ipsum
\LARGE	Lorem ipsum
\huge	Lorem ipsum
\Huge	Lorem ipsum

Fonts Families

typeface = family	command	switch command	output
serif (roman)	`\textrm{Sample Text 0123}`	`\rmfamily`	Sample Text 0123
sans serif	`\textsf{Sample Text 0123}`	`\sffamily`	Sample Text 0123
typewriter (monospace)	`\texttt{Sample Text 0123}`	`\ttfamily`	Sample Text 0123

Fonts Styles

style	command	switch command	output
medium	`\textmd{Sample Text 0123}`	`\mdseries`	Sample Text 0123
bold	`\textbf{Sample Text 0123}`	`\bfseries`	**Sample Text 0123**
upright	`\textup{Sample Text 0123}`	`\upshape`	Sample Text 0123
italic	`\textit{Sample Text 0123}`	`\itshape`	*Sample Text 0123*
slanted	`\textsl{Sample Text 0123}`	`\slshape`	*Sample Text 0123*
small caps	`\textsc{Sample Text 0123}`	`\scshape`	Sample Text 0123

Text Alignments

```
\begin{flushleft}
This is left aligned.\
\
\end{flushleft}

\begin{flushright}
This is right aligned.
\\
\end{flushright}
```

```
\begin{center}
This is center aligned.
\\
\end{center}

\begin{centering}
This is a justified
Text.
\end{centering}
```

Text Alignments

1 Text Alignment

This is left aligned text.

This is right aligned text.

This is center aligned text.

This is a justified Text.

Custom Commands

```
\newcommand{\TUG}{TeX Users Group}
\begin{document}
\section{Creating Custom Commands}
The \TUG\ is an organization for people who
are interested in \TeX\ or \LaTeX.
\end{document}
```

Custom Commands

1 Creating Custom Commands

The TeX Users Group is an organization for people who are interested in TEX or LATEX.

Creating a Macro

```
\documentclass{article}
\newcommand{\keyword}[1]{\textbf{#1}}
\begin{document}
\section{Defining a Macro and using it}
\keyword{Grouping} by curly braces limits the
\keyword{scope} of \keyword{declarations}.
\end{document}
```

Creating a Macro

1 Defining a Macro and using it

Grouping by curly braces limits the scope of declarations.

\newcommand

`\newcommand{command}[arguments][optional]{definition}`

`command`	The name of the new command, starting with a backslash followed by lowercase and/or uppercase letters or a backslash followed by a single non-letter symbol. That name must not be already defined and is not allowed to begin with `\end`.
`arguments`	An integer from 1 to 9, the number of arguments of the new command. If omitted, the command will have no arguments.
`optional`	If this is present, then the first of the arguments would be optional with a default value given here. Otherwise all arguments are mandatory.
`definition`	Every occurrence of the `command` will be replaced by `definition` and every occurrence of the form `#n` will then be replaced by the nth argument.

Command with Optional Arguments

```
\documentclass{article}
\newcommand{\keyword}[2][\bfseries]{{#1#2}}
\begin{document}
\section{Macro with Optional Arguments}
\keyword{Grouping} by curly braces limits the
\keyword{scope} of
\keyword[\itshape]{declarations}.
\end{document}
```

Command with Optional Arguments

1 Macro with Optional Arguments

Grouping by curly braces limits the **scope** of *declarations*.

Two Columns

```
\documentclass[a4paper,12pt]
{article}

\usepackage[english]{babel}

\usepackage{blindtext}

\begin{document}

\twocolumn

\blindtext[5]

\end{document}
```

Two Columns (Output)

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words

Multiple Columns

```
\documentclass{article}
\usepackage{blindtext}
\usepackage{multicol}
\begin{document}
\begin{multicols}{3} [
\section{Multiple Columns Example} This is a
document with 3 columns.
]
\blindtext[2]
\end{multicols}
\end{document}
```

1 Multiple Columns Example

This is a document with 3 columns.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Table of Contents

```
\documentclass[a4paper,12pt]{book}
\usepackage[english]{babel}
\usepackage{blindtext}
\usepackage[a4paper, inner=1.5cm, outer=3cm, top=2cm,
bottom=3cm,
bindingoffset=1cm] {geometry}
\begin{document}
\tableofcontents
\chapter{Exploring the page layout}
In this chapter we will study the layout of pages.
\section{Some filler text}
\blindtext
\section{A lot more filler text}
More dummy text will follow.
\subsection{Plenty of filler text}
\blindtext[10]
\end{document}
```

Table of Contents (First Page Output)

Contents

Lists in LaTeX

Various types of list in LaTeX:

- itemize environment for creating a bulleted (unordered) list
- enumerate environment for creating a numbered (ordered) list
- description environment for creating a list of descriptions

Unordered List

```
\section{Creating an Unordered List}

Lists are easy to create:

\begin{itemize}
  \item start with the \verb|\item| command.
  \item Entries start with bullets.
  \item The text may be of any length.
\end{itemize}
```

Unordered List (Output)

1 Creating an Unordered List

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.

Ordered List

```
\begin{enumerate}
  \item Items are numbered automatically.
  \item start at 1 with each
  \texttt{enumerate}.
  \item Another entry in the list
\end{enumerate}
```

Ordered List (Output)

1 Creating an Ordered List

Numbered (ordered) lists are easy to create:

1. Items are numbered automatically.
2. The numbers start at 1 with each use of the `enumerate` environment.
3. Another entry in the list

Description List

```
\begin{description}
   \item This is an entry \textit{without} a label.
   \item[Something short] A short one-line
   description.
   \item[Something long] A much longer description.
\blindtext[1]
\end{description}
```

Description List (Output)

1 Description List

This is an entry *without* a label.

Something short A short one-line description.

Something long A much longer description. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Inserting Images

```
\documentclass[a4paper, 12pt]{article}
\usepackage{graphicx}
\graphicspath{ {./images/} }
\begin{document}
\section{Inserting Images in a document}
The universe is immense and it seems to be homogeneous
in a large scale, everywhere we look at.

\includegraphics{galaxy}

There's a picture of a galaxy above
\end{document}
```

1 Inserting Images in a document

The universe is immense and it seems to be homogeneous, in a large scale, everywhere we look at.

There's a picture of a galaxy above

Changing the image size and rotation

```
\includegraphics[scale=0.5, angle=45]
{galaxy}
```

1 Changing the image size and rotating the picture

The universe is immense and it seems to be homogeneous, in a large scale, everywhere we look at.

There's a picture of a galaxy with half size and rotated at 45 degree above

Creating Tables

```
\begin{center}
\begin{tabular}{ c c c
 } cell1 & cell2      &
 cell3          \\ cell4
 & cell5        & cell6 \
 \ cell7 & cell8 &
 cell9
\end{tabular}
\end{center}
```

```
\begin{center}
\begin{tabular}{ |c|c|c| }
\hline
 cell1 & cell2 & cell3 \\
 cell4 & cell5 & cell6 \\
 cell7 & cell8 & cell9 \\
\hline
\end{tabular}
\end{center}
```

1 Creating a Table without border

cell1	cell2	cell3
cell4	cell5	cell6
cell7	cell8	cell9

2 Creating a Table with border

cell1	cell2	cell3
cell4	cell5	cell6
cell7	cell8	cell9

Combining Columns

```
\begin{center}
\begin{tabular}{ |c|c|c|c| }
\hline
\multicolumn{3}{|c|}{Combined Columns}\\
\hline
 col1   &   col2   &   col3   \\
 col4   &   col5   &   col6   \\
 col7   &   col8   &   col9   \\
\hline
\end{tabular}
\end{center}
```

Combining Rows

```
\usepackage{multirow}
\begin{tabular}{ |c|c|c|c| }
\hline
col1 & col2 & col3 \\
\hline
\multirow{3}{4em}{Multiple row} & cell2 &
cell3 \\ & cell5 & cell6 \\
& cell8 & cell9 \\
\hline
\end{tabular}
```

1 Combining Columns

Combined Columns		
col1	col2	col3
col4	col5	col6
col7	col8	col9

2 Combining Rows

col1	col2	col3
Multiple row	cell2	cell3
	cell5	cell6
	cell8	cell9

Greek Letters

αA	\alpha A	νN	\nu N
βB	\beta B	$\xi \Xi$	\xi \Xi
$\gamma \Gamma$	\gamma \Gamma	oO	o O
$\delta \Delta$	\delta \Delta	$\pi \Pi$	\pi \Pi
$\epsilon \varepsilon E$	\epsilon \varepsilon E	$\rho \varrho P$	\rho \varrho P
ζZ	\zeta Z	$\sigma \Sigma$	\sigma \Sigma
ηH	\eta H	τT	\tau T
$\theta \vartheta \Theta$	\theta \vartheta \Theta	$\upsilon \Upsilon$	\upsilon \Upsilon
ιI	\iota I	$\phi \varphi \Phi$	\phi \varphi \Phi
κK	\kappa K	χX	\chi X
$\lambda \Lambda$	\lambda \Lambda	$\psi \Psi$	\psi \Psi
μM	\mu M	$\omega \Omega$	\omega \Omega

Arrows

$\leftarrow$	\leftarrow	$\Leftarrow$	\Leftarrow
$\rightarrow$	\rightarrow	$\Rightarrow$	\Rightarrow
$\leftrightarrow$	\leftrightarrow	$\rightleftharpoons$	\rightleftharpoons
$\uparrow$	\uparrow	$\downarrow$	\downarrow
$\Uparrow$	\Uparrow	$\Downarrow$	\Downarrow
$\Leftrightarrow$	\Leftrightarrow	$\Updownarrow$	\Updownarrow
$\mapsto$	\mapsto	$\longmapsto$	\longmapsto
$\nearrow$	\nearrow	$\searrow$	\searrow
$\swarrow$	\swarrow	$\nwarrow$	\nwarrow
$\leftharpoonup$	\leftharpoonup	$\rightharpoonup$	\rightharpoonup
$\leftharpoondown$	\leftharpoondown	$\rightharpoondown$	\rightharpoondown

Miscellaneous symbols

∞	\infty	$\forall$	\forall
$\Re$	\Re	$\Im$	\Im
∇	\nabla	$\exists$	\exists
∂	\partial	$\nexists$	\nexists
$\emptyset$	\emptyset	$\varnothing$	\varnothing
$\wp$	\wp	$\complement$	\complement
$\neg$	\neg	$\cdots$	\cdots
$\square$	\square	$\surd$	\surd
$\blacksquare$	\blacksquare	$\triangle$	\triangle

Binary Operation/ Relation Symbols

$\times$	\times	$\cdot$	\cdot
$\div$	\div	$\cap$	\cap
$\cup$	\cup	$\neq$	\neq
$\leq$	\leq	$\geq$	\geq
$\in$	\in	$\perp$	\perp
$\notin$	\notin	$\subset$	\subset
$\simeq$	\simeq	$\approx$	\approx
$\wedge$	\wedge	$\vee$	\vee
$\oplus$	\oplus	$\otimes$	\otimes
$\Box$	\Box	$\boxtimes$	\boxtimes
$\equiv$	\equiv	$\cong$	\cong

Mathematical Modes

LATEX allows two writing modes for mathematical expressions:

- *inline* math mode is used to write formulas that are part of a paragraph
- *display* math mode is used to write expressions that are not part of a paragraph, and are therefore put on separate lines

Inline Math Mode

You can use any of these "delimiters" to typeset your math in inline mode:

```
\(...\)
$...$
\begin{math}...\end{math}
```

Display Math Mode

Use one of these constructions:

```
\[...\]
```

```
\begin{displaymath}...
\end{displaymath}
```

```
\begin{equation}...\end{equation}
```

Mathematical Expressions

```
\begin{document}

The Pythagorean theorem \(x^2 + y^2 = z^2\)
was proved to be invalid for other
exponents.
Meaning the next equation has no
integer solutions:

\[ x^n + y^n = z^n \]

\end{document}
```

The well known Pythagorean theorem $x^2 + y^2 = z^2$ was proved to be invalid for other exponents. Meaning the next equation has no integer solutions:

$$x^n + y^n = z^n$$

Display Math Mode (with equation number)

```
The mass-energy equivalence is described by the
equation

\begin{equatio
n} E=mc^2
\end{equation}

discovered in 1905 by Albert Einstein.

\begin{equatio
n} E=m
\end{equation}
```

Display Math Mode (with equation number)

The mass-energy equivalence is described by the famous equation

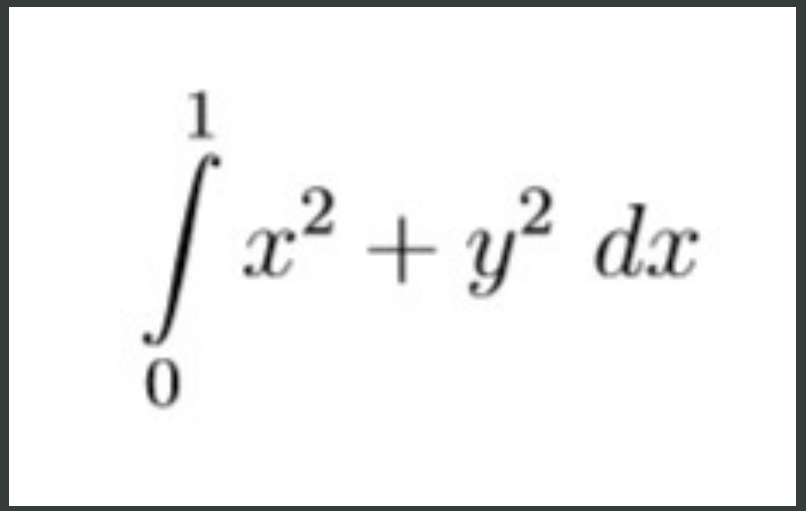
$$E = mc^2 \tag{1}$$

discovered in 1905 by Albert Einstein. In natural units ($c = 1$), the formula expresses the identity

$$E = m \tag{2}$$

Subscript and Superscript

```
\[ \int\limits_0^1 x^2 + y^2 \ dx
\]
```



Operators using subscripts and superscripts

```
\[ \sum_{i=1}^{\infty} \frac{1}
{n^s}
= \prod_p \frac{1}{1 - p^{-s}} \]
```

$$\sum_{i=1}^{\infty} \frac{1}{n^s} = \prod_{p} \frac{1}{1 - p^{-s}}$$

Brackets and Parentheses

Type	LaTeX markup	Renders as
Parentheses; round brackets	`(x+y)`	$(x+y)$
Brackets; square brackets	`[x+y]`	$[x+y]$
Braces; curly brackets	`\{ x+y \}`	$\{x+y\}$
Angle brackets	`\langle x+y \rangle`	$\langle x+y \rangle$
Pipes; vertical bars	`|x+y|`	$\|x+y\|$
Double pipes	`\\|x+y\\|`	$\|\|x+y\|\|$

Brackets and Parentheses

```
\[
F = G \left( \frac{m_1 m_2}{r^2}
\right)
\]
```

$$F = G \left(\frac{m_1 m_2}{r^2} \right)$$

Aligning Equations with amsmath package

```
\begin{align*}
x&=y          & w  &=z              &   a&=b+c \\
2x&=-y        &   3w&=\frac{1}{2}z  &   a&=b\\
-4 + 5x&=2+y  &   w+2&=-1+w         &   ab&=cb
\end{align*}
```

$$
\begin{aligned}
x &= y & w &= z & a &= b+c \\
2x &= -y & 3w &= \frac{1}{2}z & a &= b \\
-4+5x &= 2+y & w+2 &= -1+w & ab &= cb
\end{aligned}
$$

Spacing Commands (use amsmath package)

LaTeX code	Description
`\quad`	space equal to the current font size (= 18 mu)
`\,`	3/18 of `\quad` (= 3 mu)
`\:`	4/18 of `\quad` (= 4 mu)
`\;`	5/18 of `\quad` (= 5 mu)
`\!`	-3/18 of `\quad` (= -3 mu)
`\ ` (space after backslash!)	equivalent of space in normal text
`\qquad`	twice of `\quad` (= 36 mu)

Spacing Commands (Example)

```
\begin{align*}
  f(x)    &=   x^2\! +3x\! +2 \\
  f(x)    &=   x^2+3x+2 \\
  f(x)    &=   x^2\, +3x\, +2 \\
  f(x)    &=   x^2\: +3x\: +2 \\
  f(x)    &=   x^2\; +3x\; +2 \\
  f(x)    &=   x^2\ +3x\ +2 \\
  f(x)    &=   x^2\quad +3x\quad +2                  \\
  f(x)    &=   x^2\qquad +3x\qquad                   +2
\end{align*}
```

Spacing Commands (Output)

$$f(x) = x^2 + 3x + 2$$

$$f(x) = x^2 + 3x + 2$$

$$f(x) = x^2 \ + 3x \ + 2$$

$$f(x) = x^2 \ + 3x \ + 2$$

$$f(x) = x^2 \ + 3x \ + 2$$

$$f(x) = x^2 \ + 3x \ + 2$$

$$f(x) = x^2 \quad + 3x \quad + 2$$

$$f(x) = x^2 \qquad + 3x \qquad + 2$$

Invisible Brackets (\left. and \right.)

$$y = 1+\left(\frac{1}{x}+\frac{1}{x^2}+\frac{1}{x^3}+\cdots + \frac{1}{x^{n-1}}+\frac{1}{x^n}\right)$$

```
\usepackage{amsmath}

\begin{align*}

y  = 1 + & \left( \frac{1}{x} + \frac{1}{x^2} + \frac{1}
{x^3} +
\ldots \right. \\
  &\left. \quad + \frac{1}{x^{n-1}} + \frac{1}{x^n} \right)

\end{align*}
```

1) Use of align* environment for not numbering the equations.
2) Use of '&' symbol for aligning the multiple equations.

amsmath matrix environments

Type	LaTeX markup	Renders as

Plain	`\begin{matrix}`
	`1 & 2 & 3\\`
	`a & b & c`
	`\end{matrix}`
		$\begin{matrix} 1 & 2 & 3 \\ a & b & c \end{matrix}$

Parentheses; round brackets	`\begin{pmatrix}`
	`1 & 2 & 3\\`
	`a & b & c`
	`\end{pmatrix}`
		$\begin{pmatrix} 1 & 2 & 3 \\ a & b & c \end{pmatrix}$

Brackets; square brackets	`\begin{bmatrix}`
	`1 & 2 & 3\\`
	`a & b & c`
	`\end{bmatrix}`
		$\begin{bmatrix} 1 & 2 & 3 \\ a & b & c \end{bmatrix}$

amsmath matrix environments

Type	LaTeX markup	Renders as

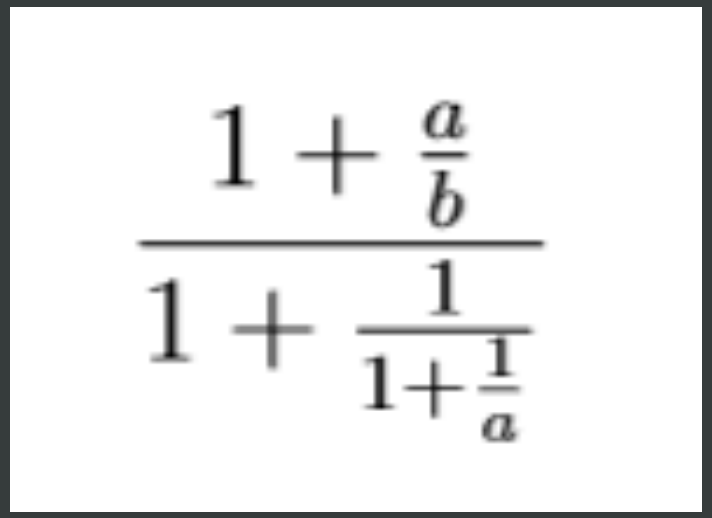
Braces; curly brackets	`\begin{Bmatrix}`
	`1 & 2 & 3\\`
	`a & b & c`
	`\end{Bmatrix}`
		$\begin{Bmatrix} 1 & 2 & 3 \\ a & b & c \end{Bmatrix}$

Pipes	`\begin{vmatrix}`
	`1 & 2 & 3\\`
	`a & b & c`
	`\end{vmatrix}`
		$\begin{vmatrix} 1 & 2 & 3 \\ a & b & c \end{vmatrix}$

Double pipes	`\begin{Vmatrix}`
	`1 & 2 & 3\\`
	`a & b & c`
	`\end{Vmatrix}`
		$\begin{Vmatrix} 1 & 2 & 3 \\ a & b & c \end{Vmatrix}$

Continued Fractions

```
\[
\frac{1+\frac{a}{b}}{1+\frac{1}{1+\frac{1}{a}}}
\]
```



References

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