My First LaTeX Document

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Chapter 1

Basic Text Formatting

This is my first LaTeX document. I want to learn LaTeX from today onwards.

1.1 How to Create Sections

This section explains how to create sections in LaTeX. Sections can be created using \section.

1.1.1 How to Create Subsections

This is my first subsection. I will create one more subsection.

1.1.2 This is My Second Subsection

I created one more subsection here. I'm happy that my sections are numbered automatically.

My First Subsubsection

This is how I created my first subsubsection.

Conclusions

This section is not having a section number by using *section*{}. Here, I conclude my document. I made my first section in Section 1.1. Also, my first

subsection is in Section 1.1.1.

1.2   Text Formatting

In this section I will learn some text formatting options.

1.2.1   Font Styles

This is a bold text.
This is an italic text.
<u>This is an underlined text.</u>
This is an emphasized text.
This is a slanted text.
This is a bold-italicized text
THIS IS A SMALL CAPITALIZED TEXT.
`This is text in teletype font.`
THIS TEXT IS IN UPPERCASE.

1.2.2   Font Sizes

This is the default font size.
This is the normal font size.

This is the tiny font size.

This is the scriptsize font.

This is a footnotesize font.

This is large font size.

This is Large font size.

This is LARGE font size.

This is huge font size.

This is Huge font size.

1.2.3   Font color

This text is in blue color.
This text is in red color.
This text's background is yellow.
This text is in a box

1.3   Footnotes

Here I am trying to add a footnote[1].

1.4   Hyperlinks

The LaTeX tutorial is available here. I need to include the `hyperref` package in my preamble.

1.5   Vertical and Horizontal Spacing

In this line,   I gave a horizontal spacing of 2 centimeters. After this line, I am giving a vertical space of 3 cm.

This is my text after vertical spacing.
I am printing at the   end of line.

This is the text after vertical fill.

---

[1]This is my footnote text

1.6   Centering Text

<div align="center">This text is at the center</div>

1.7   Single Quote and Double Quote

'This is a single quoted text.'
"This is a double quoted text."

1.8   Subscript and Superscript

Conscientia is from 2nd to 5th March, 2018.
The following is a word with subscript. HELLO$_{world}$. For subscript, I need to include the package `fixltx2e` in my preamble.

1.9   Dashes and Dots

Simple dash for hiphenation: hello-world
Double dash (called endash) for specifying range: Conscientia is on 2–5 March, 2018
Triple dashes (called emdash) for description: Conscientia — the technical festival of IIST — is on 2–5 March, 2018.

Conscientia include workshops, robotics, seminars, . . .

1.10   Comments in LaTeX

This section explaining commenting. Some text following this line won't be displayed in PDF.

1.11   Listing items

The following is an example of listing items as **bulleted points**.

- apple

- boy

- cat

The following will enumerate the items.

1. apple

2. boy

3. cat

The following is a description of items.

Letter A Apple

Letter B Boy

Letter C Cat

1.12 Special Characters

{ This is a text in braces. }

[this text is in square brackets]
Apples cost US $45
Apples cost ₹200. Oranges cost £200. For including the currency symbols, I need to include the package `tfrupee` in the preamble.
This is the way to put ampersand &
This is the way to write underscore hello_world
Writing hash

Chapter 2

Tables and Figures

2.1 Table

Table 2.1: Sample table

S.No.	Item	Cost
1	Apple	200
2	Orange	400
3	Grapes	100

For combining rows and columns in a table, we need to use the package `multirow` in the preamble.

Table 2.2: Combining rows and columns

Two collumns combined	
Two rows	a
combined	b
c	d

2.2   Including Images

This is the way to include figures in running text. For this I need to include the package `graphicx` in the preamble.

Next, I will study how to wrap text around the figure. For this, I need to include the package `wrapfig` in the preamble.

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non numquam eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem.

Next I will study how to include figures with Caption.

Figure 2.1: Picture of Apple

2.2.1 Subfigures

For using subfigures I need to include the package `subcaption` in my preamble.

(a) Orange   (b) Apple   (c) Grapes

Figure 2.2: Fruits

2.2.2 Things Side by Side using Minipage

This section explains how to place things side by side. Things include figures, tables, text, or combination of things. This kind of arrangement is done using **minipage** environment. The syntax of minipage is similar to subfigure, but there is a difference. Figures and tables are considered as floating objects in LaTeX. However, minipage is not a floating object. As per LaTeX rules, we cannot embed a floating object inside a non-floating object, i.e., we cannot include a \begin{figure}...\end{figure} or \begin{table}

}...\end{table} inside minipage. But, we can use \includegraphics command alone or \begin{tabular}...\end{tabular} environment within a minipage.

In order to give caption for figures or tables within a minipage, we should include the package caption in the preamble. Further, we need to use the command \captionof{figure}{} and \captionof{table}{}, for figures and tables, respectively. In the following, I placed two figures and table side by side. Please note that minipage is entirely different from subfigure.

Figure 2.3: Orange

Table 2.3: Sample table

S.No.	Item	Cost
1	Apple	200
2	Orange	400
3	Grapes	100

Figure 2.4: Apple

2.2.3   Resizing Things

In LaTeX, anything can be resized using the construct \resizebox{width}{height}{Thing to be resized}. In the following I resized an equation.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Chapter 3

Writing Math

3.1 Math in Running Text

For including math in our document, we need to include two packages in the preamble, `mathtools` and `amssymb`.

The mass-energy equivalence relation is $E = mc^2$, where m is the mass of c is the velocity of light.

This is a fraction $c = \frac{a}{b}$.

The solution for quadratic equation $ax^2 + bx + c = 0$ is

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

3.1.1 Equation with Equation Numbers

$$e^x = \sum_{n \geq 0} \frac{1}{n!} x^n \tag{3.1}$$

3.1.2 Writing Multiple Equations

$$2x + 5y = 1 \tag{3.2}$$
$$5y = 1 - 2x \tag{3.3}$$
$$y = \frac{1 - 2x}{5} \tag{3.4}$$

3.1.3   Aligning Equations

$$
\begin{aligned}
2x + 5y &= 1 \\
5y &= 1 - 2x \\
y &= \frac{1 - 2x}{5}
\end{aligned}
\tag{3.5}
$$

3.1.4   Placing Dots

$$
\mathbb{N} = 1, 2, 3, \ldots, \infty
\tag{3.6}
$$
$$
A = a_1 + a_2 + \cdots + a_n
\tag{3.7}
$$

3.1.5   Use of Brackets

$$
e^x = \left[\sum_{n \geq 0} \left(\frac{1}{n!} \right)^3 (x^n)^5 \right]^2
\tag{3.8}
$$

3.1.6   Writing Matrices

Here I write a simple matrix.

$$
\begin{matrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{matrix}
\tag{3.9}
$$

Matrix with sharp corners.

$$
\begin{bmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{bmatrix}
\tag{3.10}
$$

Matrix with rounded corner.

$$
\begin{pmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{pmatrix}
\tag{3.11}
$$

3.1.7 Writing Cases

$$f(x) = \begin{cases} 0 & \text{if } x^2 \leq 4 \\ 1 & \text{if } x^2 > 4 \end{cases} \qquad (3.12)$$

3.1.8 Writing Theorems and Proofs

Theorem 3.1.1. *This is my first theorem. This theorem does nothing.*

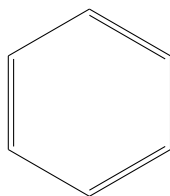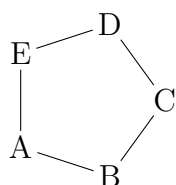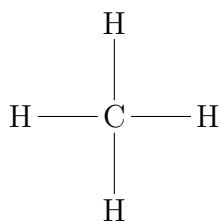*Proof.* The proof of this theorem is not existing [1]. □

3.2 Writing Chemistry

For writing chemistry, we need to include the package `chemfig` in the preamble.
Single Bond: C——H
Double Bond: C══H
Triple Bond: C≡══H

3.3   Writing Algorithms

For writing algorithms in LaTeX, we need to include the package `algorithm2e` in the preamble.

Algorithm 1: Sum of N numbers

   $S = 0$
for $i = 1 : N$ **do**
   ⌊ $S = S + i$
if $a < b$ **then**
   ⌊ $a = a + 1$
else
   ⌊ $b = b + 1$
Ouput S

3.4   Citation

The basic LaTeX documentation is discussed in [2].

Bibliography

[1] Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, and Chris Rowley. *The LATEX companion.* Addison-Wesley Professional, 2004.

[2] Leslie Lamport. *LaTeX: A Document Preparation System, 2/e.* Pearson Education India, 1994.