



G. T. N. ARTS COLLEGE, (AUTONOMOUS)

A Telugu Linguistic Minority Institution | Affiliated to Madurai Kamaraj University

Re-accredited with 'A++' Grade by NAAC in the 2nd Cycle with CGPA 3.56

Recognized under DBT STAR COLLEGE SCHEME | Supported by DST - FIST Program

Listed in NIRF- 2024 Ranking

Old Karur Road, Dindigul - 624 005.



DEPARTMENT OF MATHEMATICS

DBT STAR COLLEGE SCHEME

LATEX - 24CMAT6P

LABORATORY MANUAL (2023 - 2024)

Supported by



Department of
BioTechnology,
Government
of India

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Introduction to LaTeX

LaTeX is a document preparation system for high-quality typesetting. ([Tex 2023](#)) It is part of a mature and established toolchain that has been around since 1980's. ([Knuth 1984](#)) Originally written by [Leslie Lamport](#), a computer scientist now working at Microsoft Research, its development has long been taken over by the open-source LaTeX community around the world. LaTeX is free software and is distributed under the LaTeX Project Public License (LPPL).

LaTeX is typically used for technical documents but it can be used for almost any form of publishing, including writing CVs, letters, books, posters, presentations and much more. Whatever you create with LaTeX, one of its key strengths is making documents look professional in portable document format (pdf) using industrial-strength typesetting.

What is LATEX?

LaTeX is a professional typesetting software system. It can produce documents with a much higher standard of typography than your average Word processor is capable of. It also has some useful features to help you write scientific and technical documentation, as we will see.

This document is an article.

- Its title is Cartesian closed categories and the price of eggs.
- Its author is Jane Doe.
- It was written in September 1994.
- The document consists of a title followed by the text Hello world!

LaTeX Features

A large number of functionalities is included in LaTeX such as

- Typesetting journal articles, technical reports, books, and slide presentations.
- Control over large documents containing sectioning, cross-references, tables and figures.
- Typesetting of complex mathematical formulas.
- Advanced typesetting of mathematics with AMS-LaTeX.
- Automatic generation of bibliographies and indexes.
- Multi-lingual typesetting.
- Inclusion of artwork, and process or spot colour.
- Using PostScript or Metafont fonts.

Released on Oct 2020

[System requirements](#) | [Change log](#)

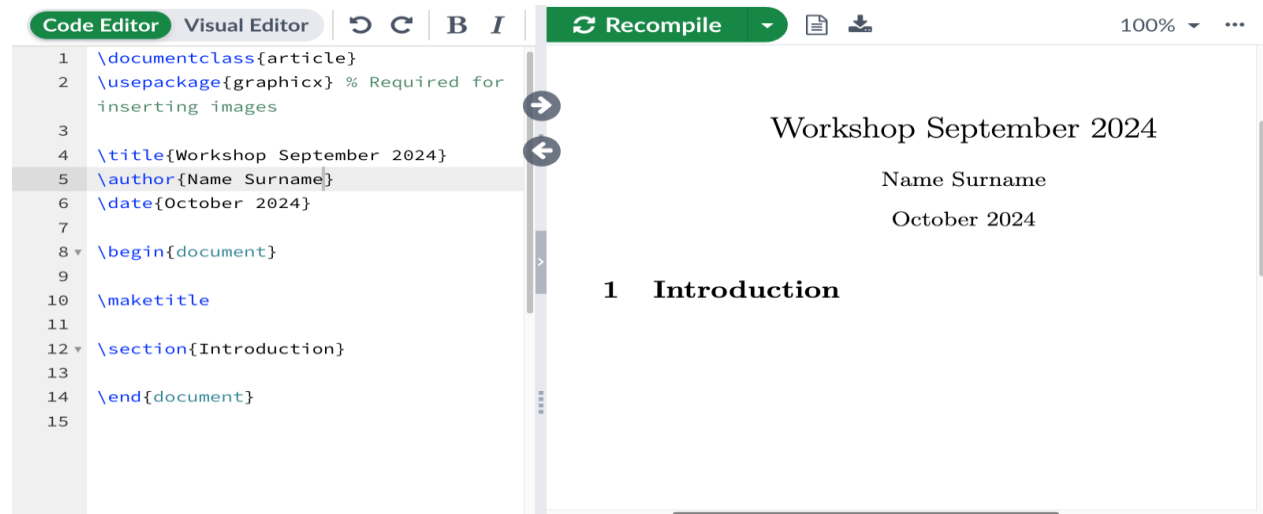
LaTeX is typically distributed along with plain [TeX](#) under a [free software licence](#): the [LaTeX Project Public License](#) (LPP). The LPPL is [Debian Free Software Guidelines](#) (DFSG) compliant as of version 1.3

Windows 8, 10, 11

LaTeX2e is the current version of LaTeX, since it replaced LaTeX 2.09 in 1994

Getting started with LaTeX:

Installation of the software is easy like any other software. The software gets ready after its installation into a computer system. Just like any other software, Latex can be opened by Double clicking on the Latex icon in desktop or by clicking on the icon appearing after the entering the name Latex in the Windows search bar.



This window is the default layout of the latex desktop. It is a set of tools for managing files, variables, and applications associated with latex.

- Latex stbtax consists of commands and environments, which are kinds of instruction interspersed with the texts of a document for performing some specific jobs. Such instructions are defined in different packages.
- A command usually starts with a \ (backlash), followed by one or more alphabets without any gap.
- A Latex environment is a structure composed of two complementary commands, within which some particular job can be performed, e.g. writing an equation or inserting a figure.

Advantages of Latex

- LaTeX can quickly create pdf files
- LaTeX uses professional typesetting
- LaTeX can create pdf files that look better than those created with conventional word processing software packages

Syntax

1. Different alignment (Left, Right, Centre and Justify)

`\begin{abstract}`

Type your abstract and align Left, Right, Center, Justify

`\end{abstract}`

2. Letter for applying job

`\begin{letter}{**** | | *** | | ****}`

`\opening{Respected Sir or Madam}`

`\closing{*****}`

`\end{letter}`

3. Draw a table

`\begin{tabular}{|1|1|1|1|}`

`\hline`

`*** & *** & **** \\ \hline`

`\hline`

`\end{tabular}`

4. Type a Mathematical expression

`\usepackage{amsmath,amssymb}`

`\title{Mathematics in \LaTeX}`

5. Type an expression using inequalities

`\usepackage{amsmath,amssymb}`

`\title{all inequalities in \LaTeX}`

`\end{document}`

6. Draw any picture

`\begin{document}`

`\setlength{\unitlength}{1mm}`

`\begin{picture}(**,**)`

`\end{document}`

7. Insert picture

```
\usepackage{graphicx}
\graphicspath{{/image1/}}
\title{Image}
\begin{document}
The inserted image is shown above
\begin{figure}
\includegraphics[scale=0.3]{image1}
\centering
\end{figure}
```

8. Type Bio data

```
\begin{document}
\title{My Bio Data}
\author{Your Name}
\end{document}
```

9. Type a Question paper

```
\usepackage{amsmath,amssymb,amsfonts}

\usepackage{graphicx}

\hrule

\begin{enumerate}

\item \textbf{Question 1} (10 points)\

*****. Write your answer in the space provided.

\vspace{1cm}

\end{document}
```

Program No.: 01

Type a document in different alignment (Left, Right, Centre, Justify)

(Left, Right, Centre, Justify) by using Latex.

graph theory

February 23, 2025

Abstract

Type your abstract and align Left, Right, Center and Justify

d Justify

graph theory

February 23, 2025

Abstract

Type your abstract and align Left, Right, Center and Justify

Program No.: 02

Type a Letter for applying a job by using Latex.

Aim:

To type a Letter for applying a job by using Latex.

Code:

```
\documentclass{letter}
\signature{Name}
\address{51,**** | |**** | |****}
\begin{document}
\begin{letter}{The Director | |** | |****}
\opening{Respected Sir or Madam}
```

This is with reference to the job posting on Linked In for the position of computer designer in your esteemed organization and I am interested in working with you. I am an B.sc., Mathematics graduate and I have completed multiple computer courses. Thank you for your consideration and your time.

```
\closing{Yours faithfully}
\end{letter}
\end{document}
```

Output:

51,****

February 23, 2025

The Director

Respected Sir or Madam

This is with reference to the Linked In job posting for the position of computer designer in your esteemed organization, and I am interested in working with you. I am **** a B.Sc., Mathematics graduate and have completed multiple computer courses. Thank you for your consideration and your time.

Yours faithfully,
NAME

Program No.: 03

Draw a Table structure by using Latex

Aim:

To draw a Table structure by using Latex.

Code: Example-1

```
\documentclass{article}
\begin{document}
\begin{center}
\begin{tabular}{|1|1|1|}
\hline
Day & Min temp & Max Temp\\\hline
Monday&11c&22c\\\hline
Tuesday&9c&19c\\\hline
Wednesday&10c&21c\\\hline
\hline
\end{tabular}
\end{center}
\end{document}
```

Example-2

```
\documentclass{article}
\begin{document}
\begin{tabular}{|1|1|}
\hline
\multicolumn{2}{|c|}{Team Sheet}\\\hline
\end{tabular}
```

```

Cricket & Robin\\ Football & Lucas\\ Volleyball & Ramu\\ Tennis & Domi
\\ Hockey& Ranjitha\\ Kabadi& Smith\\ Badminton & Kavin\\ Golf & Shiva\\
Basketball & Smitha\\
\\hline
\\end{tabular}
\\end{document}

```

Output:

Example: 1

Day	Min temp	Max Temp
Monday	11c	22c
Tuesday	9c	19c
Wednesday	10c	21c

Example: 2

Team Sheet	
Cricket	Robin
Football	Lucas
Volleyball	Ramu
Tennis	Domini
Hockey	Ranjitha
Kabadi	Smith
Badminton	Kavin
Golf	Shiva
Basketball	Smitha

Program No.: 04

Type a given Mathematical expression using Differentiation, Integration and Trigonometry

Aim:

To type a Mathematical expression by using Latex.

Code:

Example:1

```
\documentclass{article}
\begin{document}
\begin{equation}
{ax^{2}+bx+c=0}
\end{equation}
\end{document}
```

Example:2

```
\documentclass[12pt]{article}
\usepackage{amsmath,amssymb}
\title{Mathematics in \ Latex}
\author{***}
\begin{document}
\maketitle
\section{Integration}

$$\int \int \int$$


$$\int_0^2 (x^2+4x+5)(dx)$$

\section{Differentiation}

$$\frac{dy}{dx} \frac{dy}{dx}$$


$$\frac{\partial y}{\partial x}$$

```

```
\section{Trigonometry}
```

```
$\sin(x)\ \ \sin(x)+x^3+10\ \$
```

```
$\tan(x)\ \ \tan(x)+y^2-17\ \$
```

```
$\sec(x)\ \ \sec(x)+z^5-1\ \$
```

```
\end{document}
```

Output:

$$ax^2 + bx + c = 0 \qquad (1)$$

Mathematics in Latex

February 23, 2025

1 Integration

$$\int \int \int \int \int_0^2 (x^2 + 4x + 5)(dx)$$

2 Differentiation

$$\frac{dy}{dx} \frac{dy}{dx} \frac{\partial y}{\partial x}$$

3 Trigonometry

$$\begin{aligned} &\sin(x) \\ &\sin(x) + x^3 + 10 \\ &\tan(x) \\ &\tan(x) + y^2 - 17 \\ &\sec(x) \\ &\sec(x) + z^5 - 1 \end{aligned}$$

Program No.: 05

Type a given expression using all inequalities

Aim:

To type a expression using Inequalities by using Latex.

Code:

```
\documentclass[12pt]{article}
\usepackage{amsmath,amssymb}
\title{all inequalities in \LaTeX}
\author{****}
\begin{document}
\section{Relational Operator}
$ a \leq b + c $ \\
$ a \geq 2b - c^2 $ \\
$ a \equiv b $ \\
$ a \approx b $ \\
$ a \neq b $ \\
$ a \subset b $ \\
$ a \supset b $ \\
$ a \in b $ \\
$ a \parallel b $ \\
$ a \perp b $ \\
\end{document}
```

Output:

1 Relational Operator

$$\begin{aligned} a + c \\ a \geq 2b - c^2 \\ a \equiv b \\ a \approx b \\ a \neq b \\ a \subset b \\ a \supset b \\ a \in b \\ a \parallel b \\ a \perp b \end{aligned}$$

Program No.: 06

Draw any picture using Latex

Aim:

To draw any picture using Latex

Code:

```
\documentclass{article}

\begin{document}

\setlength{\unitlength}{1mm}

\begin{picture}(60,40)

\put(20,30){\circle{1}}

\put(20,30){\circle{2}}

\put(20,30){\circle{4}}

\put(20,30){\circle{8}}

\put(20,30){\circle{16}}

\put(20,30){\circle{32}}


\put(15,10){\circle*{1}}

\put(20,10){\circle*{2}}

\put(25,10){\circle*{3}}

\put(30,10){\circle*{4}}

\put(35,10){\circle*{5}}


\put(40,30){\circle{1}}

\put(40,30){\circle{2}}

\put(40,30){\circle{3}}

\put(40,30){\circle{4}}
```

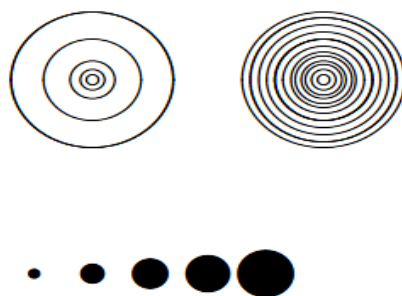
```

\put(40,30){\circle{5}}
\put(40,30){\circle{6}}
\put(40,30){\circle{7}}
\put(40,30){\circle{8}}
\put(40,30){\circle{8}}
\put(40,30){\circle{9}}
\put(40,30){\circle{10}}
\put(40,30){\circle{11}}
\put(40,30){\circle{12}}
\put(40,30){\circle{13}}
\put(40,30){\circle{14}}

\end{picture}
\end{document}

```

Output:



Program No.: 07

Insert any picture in Latex file

Aim:

To insert any picture in Latex file

Code:

```
\documentclass{article}  
\usepackage{graphicx}  
\graphicspath{{/image1/}}  
\title{Image}
```

```
\begin{document}
```

The inserted image is shown above

```
\begin{figure}  
\includegraphics[scale=0.3]{image1}  
\centering  
\end{figure}  
\end{document}
```

Output:



The inserted image is shown above.

Program No.: 08

Type your own Bio-Data

Aim:

To type your own Bio-Data

Code:

```
\documentclass{article}
```

```
\begin{document}
```

```
\title{My Bio Data}
```

```
\author{Your Name}
```

```
\Date{\Today}
```

```
\maketitle
```

```
\section{Personal Information}
```

```
\begin{tabular}{l l}
```

```
Full Name: & Your Full Name\\
```

```
Date of Birth: & DD/MM/YYYY\\
```

```
Nationality: & Your Nationality
```

```
Gender: & Your Gender\\
```

```
Marital Status: & Your Marital Status \\
```

```
Phone: & Your Phone Number\\
```

```
Email: & Your Email Address\\
```

```
Address: & Your Full Address \\
```

```
\end{tabular}
```

```
\section{Education}
```

```
\begin{tabular}{l l l l}
```

```
Degree & Institution Name & Year of Passing & Percentage\\
```

```
\hline
```

```
**** & ***** & **** & *** \\
```

```
\end{tabular}
```

```
\section{Skills}
```

```
\begin{itemize}
```

```
\item Skill 1
```

```
\item Skill 2
```

```
\item Skill 3
```

```

\item Skill 4
\end{itemize}
\section{Experience}

\begin{itemize}

\item Job Title, Company Name, Duration, Location

\begin{itemize}

\item Description of job responsibilities and achievements

\end{itemize}

\end{itemize}

\section{References} Available on request.
\end{document}

```

Output:

My Bio Data

Your Name

February 23, 2025

1 Personal Information

Full Name:	Your Full Name
Date of Birth:	DD/MM/YYYY
Nationality:	Your Nationality
Gender:	Your Gender
Marital Status:	Your Marital Status
Phone:	Your Phone Number
Email:	Your Email Address
Address:	Your Full Address

2 Education

Degree	Institution Name	Year of Passing	Percentage
****	*****	*****	***

3 Skills

- Skill 1
- Skill 2
- Skill 3
- Skill 4

4 Experience

- Job Title, Company Name, Duration, Location
 - Description of job responsibilities and achievements

5 References

Available on request.

Program No.: 09

Type a question paper

Aim:

To Type a question paper

Code:

```
\document class{article}

\usepackage{amsmath,amssymb,amsfonts}

\usepackage{graphicx}

\begin{document}

\begin{center}

\textbf{\large Title of Exam}\\
```

Date of

Exam\\

Time of Exam

```
\end{center}
```

```
\hrule
```

```
\begin{enumerate}
```

```
\item \textbf{Question 1} (10 points)\\
```

Explain connected graph with example. Write your answer in the space provided.

```
\vspace{1cm}
```

```
\item \textbf{Question 2} (20 points)\\
```

Define path and trial. Write your answer in the space provided.

```
\vspace{1cm}
```

```
\item \textbf{Question 3} (30 points)\\
```

Define complete graph with example. Write your answer in the space provided.

`\vspace{1cm}`

`\end{enumerate}`

`\hrule`

`\end{document}`

Output:

Title of Exam

Date of Exam

Time of Exam

1. Question 1 (10 points)

Explain connected graph with example. Write your answer in the space provided.

2. Question 2 (20 points)

Define path and trial. Write your answer in the space provided.

3. Question 3 (30 points)

Define complete graph with example. Write your answer in the space provided.
