

Code 632

Certificate in DIGITAL MITRA

(Job Role: Digital Mitra)

NSQF LEVEL – 3

(Earlier – Data Entry Operations)



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How to use the Study Material

Congratulation! You have accepted the challenge to be a self-learner. NIOS is with you at every step and has developed the material in *Certificate in Digital Mitra* with the help of a team of experts, keeping you in mind. A format supporting independent learning has been followed. If you follow the instructions given, then you will be able to get the best out of this material. The relevant icons used in the material will guide you. These icons have been explained below for your convenience.

Title: will give a clear indication of the contents within. Do read it.

Introduction: This will introduce you to the lesson linking it to the previous one.



Objectives: These are statements that explain what you are expected to learn from the lesson. The objectives will also help you to check What have you learnt after you have gone through the lesson. Do read them.



Notes: Each page carries empty space in the side margins, for you to write important points or make notes.



Intext Questions: Very short answer self check questions are asked after every section, the answers to which are given at the end of the lesson. These will help you to check your progress. Do solve them. Successful completion will allow you to decide whether to proceed further or go back and learn again.



What have you learnt: This is the summary of the main points of the lesson. It will help in recapitulation and revision. You are welcome to add your own points to it also.



Terminal Exercise: These are long and short questions that provide an opportunity to practice for a clear understanding of the whole topic.



Answers to Intext Questions: These will help you to know how correctly you have answered the questions.

A Word With You

Dear Learner,

Congratulations for having chosen the course **Certificate in Digital Mitra**.

In today's interconnected world, having Computer knowledge is basic requirement not only to stay connected but to solve problems efficiently. Nowadays all the services are delivered at our doorsteps because of advancement of technologies and emergence of new digital platforms. As a learner, you should acquire and understand technologies to get the benefit of these services.

The course **Certificate in Digital Mitra** is specially designed keeping in view of the demand in IT industry. The curriculum has been mapped with the qualification pack of **Digital Mitra** at level 3. The Digital Mitra is a foundational role focused on developing proficiency in digital tools, office applications, and customer-centric digital services. This curriculum will give you a clear idea about the basic concepts in MS Office with AI assistance, managing digital records, troubleshooting, and ensuring cyber hygiene while delivering essential customer services.

We have ensured that the course contents are presented in a simple and straightforward manner. We are confident that you will enjoy learning this course through Open and Distance learning system. We have also prepared a practical manual which will help you to do more practice. We hope you will find this material interesting, informative and useful.

We wish you all the very best for a bright and successful future.

Course Team
National Institute of Open Schooling (NIOS)

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1

INTRODUCTION TO THE JOB ROLE OF DIGITAL MITRA

In today's scenario data is supreme and it is like fuel as oil runs machines, data runs businesses. Every company whether it is in marketing, sales, transport, banking, or customer service uses and produces huge amounts of data. This data can be in many forms: bills, receipts, forms, emails, reports, and even images.

But raw data is not useful unless it is properly collected, arranged, and entered into computer systems such as databases, Customer Relationship Management (CRM) software, or Enterprise Resource Planning (ERP) systems.

Earlier, this job was done by data entry operators. Their work was to type information carefully, check for mistakes, and update records. Although important, this work had many problems like time, repetitiveness, typing error etc.

Now, things are changing. Artificial Intelligence (AI) especially Machine Learning (ML), Natural Language Processing (NLP), and Computer Vision is making data entry faster, smarter, and more accurate. Instead of humans typing everything, AI software can now read, understand and save data automatically.



OBJECTIVES

After the completion of this lesson, you will be able to:

- understand what data entry means and why it is important;
- learn how Artificial Intelligence (AI) is used to make data entry automatic;
- identify different procedures, tools, and techniques used for entering data;
- explain the importance of accuracy and security in data handling;



Notes

- describe the role of data entry operators in modern businesses;
- discuss how the job of data entry operators is changing in the age of AI;
- imagine the future of data management and new career opportunities.

1.1 DATA ENTRY

Data entry is the process of putting information into a computer system so it can be stored, managed, and used later. It may involve typing, scanning, or using automated tools like OCR and AI. Accurate data entry helps businesses, schools, banks, and hospitals run smoothly. Without correct data entry, records and decisions can go wrong. Data entry is the process of putting information into a computer system so that it can be used later. The information may come from paper forms, receipts, invoices, images, emails, or even spoken words.

Example:

- When a student fills a form for an exam, someone types the details into the exam authority's database.
- When you order something online, your details (name, address, phone number) are stored in the seller's computer system.

So, data entry is like a bridge that connects raw information (on paper or spoken) with a digital system (computer or mobile).

1.1.1 Importance of Data Entry

Data entry may sound like a simple job, but it is the foundation of every organization. If data is entered incorrectly, the entire system can break down.

Here are some reasons why it is important:

- **Decision-making:** Companies need accurate data to make good decisions. For example, a company cannot decide how much product to produce unless it knows how many products were sold.
- **Accuracy in records:** Correct data ensures bills, certificates, or official documents are free from mistakes.
- **Legal compliance:** Many organizations (banks, hospitals, schools) are required by law to keep accurate records.
- **Customer service:** If a customer calls for help, the company can only solve the problem quickly if the correct data is available.



1.1.2 Types of Data Entry

There are mainly three types of data entry:

1. **Manual Data Entry:** Done by humans typing information into systems. Example: A clerk typing student marks into a computer.
2. **Automated Data Entry:** Done by machines using AI, scanners, or sensors. Example: A barcode scanner at a supermarket automatically adds product details to the billing system.
3. **Hybrid Data Entry:** A mix of both. Machines do most of the work, but humans check for mistakes. Example: AI reads handwritten forms, and a human operator checks whether the names are correctly spelled.

For example:

Think about your school library.

- Earlier, the librarian used to manually write which student borrowed which book. (Manual Data Entry)
- Now, many schools use barcodes or RFID cards. When you borrow a book, the scanner automatically records it. (Automated Data Entry)
- Sometimes, if the barcode is not clear, the librarian types it manually. (Hybrid Data Entry)



INTEXT QUESTIONS 1.1

1. **Fill in the blank:**

- (a) Data entry is the process of putting into a computer system so that it can be stored, managed, and used later.
- (b) Accurate data entry helps, schools, banks, and hospitals run smoothly.
- (c) When you order something online, your (name, address, phone number) are stored in the seller's computer system.
- (d) There are mainly three types of data entry: Data Entry, Automated Data Entry, and Hybrid Data Entry.
- (e) Using a barcode scanner at a supermarket to add product details to the billing system is an example of Data Entry.



Notes

2. State whether the following are True or False:

- (a) Data entry only means typing information into a computer system.
- (b) Incorrect data entry can affect decision-making in an organization.
- (c) A barcode scanner used in a supermarket is an example of automated data entry.
- (d) Hybrid data entry is when both machines and humans are involved in the process.
- (e) Data entry is not very important for customer service.

1.2 AUTOMATING DATA ENTRY USING AI

Earlier, most of this work was done manually by human operators. But today, a lot of data entry can be done automatically using Artificial Intelligence (AI).

Artificial Intelligence (AI) is a branch of computer science that makes machines think and act like humans. In data entry, AI is used to read, understand, and process information without needing much human effort.

Examples from daily life:

- When you deposit a cheque in the bank, the system automatically reads the details printed on the cheque.
- When you upload a photo of your Aadhaar card or PAN card online, the system automatically picks up your name, address, and date of birth.
- When you scan a product at a supermarket, the system instantly shows the product name and price.

All this happens because of AI tools like OCR (Optical Character Recognition), NLP (Natural Language Processing), RPA (Robotic Process Automation) and Machine Learning models.

1.2.1 AI Technologies Used in Data Entry

1. **Optical Character Recognition (OCR):** OCR is a technology that can read printed or scanned text from images and turn it into editable computer text.
 - o **Example:** Scanning a printed question paper into a Word document.
 - o **Use:** Useful for digitizing books, forms, receipts, and exam papers.



2. **Intelligent Character Recognition (ICR):** An advanced version of OCR that can also read **handwritten text**.
 - o Example: Reading a handwritten application form for school admission.
3. **Natural Language Processing (NLP):** This is a part of AI that helps computers understand human language.
 - o Example: Gmail automatically sorting emails into categories like Promotions, Social, or Primary.
 - o Example: A chatbot reading your query and finding the right answer.
4. **Robotic Process Automation (RPA):** RPA uses “software robots” to copy and move data between systems, just like a human would.
 - o Example: Copying marks from an Excel sheet to a school result portal automatically.
5. **Machine Learning (ML):** Machine learning systems can learn from past data and improve their accuracy over time.
 - o Example: A system predicting missing information in forms based on past entries.

1.2.2 Real-life Examples of AI in Data Entry

1. **Banking:** Cheques are scanned using OCR to read account numbers and amounts.
2. **Healthcare:** Patient forms are scanned, and AI enters the details into hospital systems.
3. **Retail (Shops/Online Stores):** Product barcodes and invoices are scanned automatically into billing systems.
4. **Government:** Old land records and census data are digitized using OCR and RPA.
5. **Education:** Exam OMR sheets are read automatically by machines and marks are entered into the system.



INTEXT QUESTIONS 1.2

1. **Fill in the blank:**
 - (a) is a technology that can read printed or scanned text from images and convert it into editable text.



Notes

- (b) is an advanced version of OCR that can also read handwritten text.
- (c) helps computers understand and process human language like English or Hindi.
- (d) In software robots are used to move data between systems automatically, just like a human.
- (e) When a system learns from past data and improves its accuracy, it is called

2. **Write short answer on following questions:**

- (a) What does OCR do in data entry?
- (b) Give one real-life example of NLP.
- (c) Which AI tool is used to read OMR sheets in exams?

1.3 DATA ENTRY PROCEDURES, TOOLS, AND TECHNIQUES

Before AI came, organizations followed systematic procedures and techniques to ensure accuracy. These steps are important because AI also depends on correct input and supervision.

1.3.1 Data Entry Procedures

A procedure means a series of steps we follow to complete a task. Data entry also has some important steps.

Steps of Data Entry Procedure:

1. Collection of Data

- o First, data is collected from sources like forms, surveys, invoices, receipts, or online submissions.
- o **Example:** A school collects admission forms from new students.

2. Verification of Data

- o The collected data is checked to see if it is complete and correct.
- o **Example:** Checking if all students have filled their date of birth and phone number correctly in the form.



3. Entry into the System

- o Information is entered manually (typing) or automatically (scanning/OCR).
- o Example: Clerk typing marks in an exam portal or scanning OMR sheets.

4. Validation

- o The entered data is checked by the system or by humans to ensure there are no errors.
- o Example: The system warns if a student's age is written as "5 years" for Class 12 admission.

5. Storage and Backup

- o Data is stored safely in computers, servers, or cloud storage. Backup copies are also made to prevent data loss.
- o Example: Banks store customer records in secure databases with daily backups.

6. Analysis and Reporting

- o The final step is using the data for reports, decision-making, and planning.
- o Example: A company analyzes sales data to decide which product is selling the most.

1.3.2 Tools for Data Entry

Data entry can be done using different tools as shown in table 1.1 depending on the type and size of data.

Common Tools Used in Data Entry:

1. Spreadsheets (MS Excel, Google Sheets):

- o Best for small-scale data like marks, attendance, or inventory.
- o Example: Teachers entering student marks in Excel sheets.

2. Databases (MS Access, MySQL, Oracle):

- o Used for large and structured data.
- o Example: Banks storing thousands of customer details.



Notes

3. OCR Software (Adobe Acrobat, ABBYY FineReader):

- o Used for scanning and converting printed forms into digital text.

4. RPA Platforms (UiPath, Automation Anywhere):

- o Automates repetitive data entry tasks.

5. Cloud-based Tools (Google Forms, Zoho, Airtable):

- o Used for online data entry and surveys.
- o Example: Schools collecting student feedback using Google Forms.

Tool Type Example**Table 1.1: Data Entry Tools**

Spread sheets	Excel, Google Sheets for Small data like marks, attendance
Data bases	MySQL, Oracle for Large structured data like bank, hospital
OCR Software	Adobe, ABBYY like Scanned forms, invoices
RPA Tools	UiPath like Automated repetitive entry tasks
Cloud Platforms	Google Forms for Online surveys, registrations

1.3.3 Data Entry Techniques

Even with good tools, data entry can go wrong if not done properly. To ensure accuracy, several techniques are used:

1. Batch Processing:

- o Data is collected first and then entered into the system in groups (batches).
- o **Example:** Entering exam marks of all students at once after evaluation.

2. Real-time Entry:

- o Data is entered immediately as the event happens.
- o **Example:** When billing items at a supermarket, data is entered instantly at the counter.

3. Double-entry System:

- o Two people enter the same data separately, and the system compares results.
- o **Example:** Used in banks to avoid mistakes in financial records.



4. Use of Drop-down Menus & Templates:

- o Predefined options reduce typing mistakes.
- o **Example:** Selecting “Delhi” from a drop-down list instead of typing it manually.

5. Error Detection and Correction:

- o Systems highlight errors like incorrect phone numbers or missing fields.



INTEXT QUESTIONS 1.3

1. State whether the following are True or False:

- (a) Data entry procedure starts directly with typing information into the system.
- (b) Verification of data means checking whether the collected data is complete and correct.
- (c) Spreadsheets like MS Excel are mostly used for small-scale data entry tasks.

2. Write short answer on following questions:

- (a) What is the purpose of the validation step in data entry?
- (b) Name one cloud-based tool used for online data entry and surveys.
- (c) Which tool is commonly used in banks for storing large amounts of customer data?

1.4 ROLE AND IMPORTANCE OF DATA ENTRY OPERATOR IN BUSINESS OPERATIONS

Even though AI and machines can do a lot of data entry work, human data entry operators are still very important. They are the ones who make sure the data is accurate, complete, and useful.

A data entry operator is a person whose main responsibility is to enter, update, check, and manage data in a computer system or database. They are like the guardians of business information.

1.4.1 Functions of a Data Entry Operator

Some of the major tasks performed by a data entry operator are:



Notes

1. Entering Data into Systems

- o Typing information into spreadsheets, CRMs (Customer Relationship Management), or ERP (Enterprise Resource Planning) systems.
- o Example: Entering attendance into school records.

2. Reviewing and Correcting Data

- o Checking for errors, spelling mistakes, or wrong entries.
- o Example: Correcting a phone number that was wrongly typed.

3. Validation of Data

- o Ensuring the entered data makes sense and is logical.
- o Example: Making sure a student's age is not shown as 50 years in school records.

4. Generating Reports

- o Preparing regular reports based on the data.
- o Example: Creating a monthly report of sales in a shop.

5. Maintaining Confidentiality

- o Handling sensitive information carefully.

1.4.2 Skills Required by Data Entry Operators

To do their job well, data entry operators need certain skills:

- 1. Typing Speed and Accuracy:** Fast and error-free typing saves time.
- 2. Knowledge of Software:** Operators must know spread sheets, databases, and office software.
- 3. Attention to Detail:** Even a small mistake (like typing 10,000 instead of 1,000) can create big problems.
- 4. Basic Database Knowledge:** Understanding how data is stored and retrieved.
- 5. Communication Skills:** Sometimes operators must ask questions to clarify missing details.
- 6. Ability to Work with AI Tools:** In modern times, operators must supervise AI tools and check their results.



1.4.3 Future Outlook of Data Entry Operators

With AI becoming more common, some people think data entry operators will lose their jobs. But in reality, their role is simply changing, not disappearing.

- **From Typing to Supervising:** Earlier, operators typed data manually. Now, they supervise AI systems.
- **From Clerical to Analytical Work:** Operators now help in checking, correcting, and analyzing data.
- **New Job Roles:** Data Quality Analyst, Process Supervisor, Data Validator.
- **Skill Upgrade:** Operators must learn new tools like RPA, OCR software, and cloud platforms.

So, the future of data entry is not about losing jobs but about gaining new responsibilities.



INTEXT QUESTIONS 1.4

1. **State whether the following are True or False:**
 - (a) Data entry operators are no longer needed because AI can handle all data entry tasks.
 - (b) Maintaining confidentiality is one of the important responsibilities of a data entry operator.
 - (c) Attention to detail is an important skill for data entry operators because even small mistakes can cause big problems.
2. **Fill in the blank:**
 - (a) A data entry operator is like the guardian of information.
 - (b) In modern times, data entry operators must supervise tools and check their results.
 - (c) The future of data entry is not about losing jobs but about gaining new



WHAT HAVE YOU LEARNT

- In today's digital world, data is the heart of every business, school, hospital, and organization. To manage this data properly, data entry plays a very important role. We learned how data can be entered through clear procedures such as collection, preparation, entry, verification, and storage.



Notes

Introduction to the Job Role of Digital Mitra

- We also explored the different tools and techniques like Excel, databases, OCR, OMR, and automation software that make the work faster and more accurate.
- We also understood the role of data entry operators, who act as the backbone of business operations by ensuring that the right data is available at the right time for decision-making.
- With the rise of Artificial Intelligence (AI), many tasks are becoming automated, but human supervision, accuracy, and responsibility are still necessary.



TERMINAL QUESTIONS

1. What is artificial intelligence and how it affects the work?
2. Identify the four areas where task is done by automation.
3. How AI tools are helpful for the society?



ANSWERS TO INTEXT QUESTIONS

1.1

1. (a) information (b) businesses (c) details
(d) Manual (e) Automated
2. (a) False (b) True (c) True
(d) True (e) False

1.2

1. (a) Optical Character Recognition (OCR)
(b) Intelligent Character Recognition (ICR)
(c) Natural Language Processing (NLP)
(d) Robotic Process Automation (RPA)
(e) Machine Learning (ML)



2. (a) OCR converts printed or scanned text into editable digital text
- (b) Gmail automatically sorting emails into categories like Promotions, Social, or Primary.
- (c) Machine Learning (ML) and OCR are used to process OMR sheets.

1.3

1. (a) False (b) True (c) True
2. (a) To check and correct errors in entered data.
- (b) Google Forms
- (c) Databases like MySQL or Oracle

1.4

1. (a) False (b) True (c) True
2. (a) Business (b) AI (c) Responsibilities

Key Learning Outcomes

By the end of the lesson, learners will be able to:

- explain the concept of AI in data entry.
- explain data entry Procedures, Tools and Techniques applicable.



WORD PROCESSING SOFTWARE

In the previous lesson, you were introduced to the job role of Digital Mitra, a data entry operator in supporting business operations and learnt all about data entry procedures, tools, and techniques. In this lesson, you will learn about presenting your data in an organised way in any word processing software like MS Word.

A word processing software is a type of application software that is used to create, modify and format text documents. It provides numerous tools to store the textual data in an organised and professional way in a digital file called a document. A few currently popular word processing software are MS-Word (part of MS-Office suite), Google Docs (Cloud-based word processing software), LibreOffice Writer (OpenSource Software) and Apple Pages (for macOS/iOS users), etc. Actually, the list is quite big.

We are living in the digital age, where information is shared faster and more widely than ever before. In this era, it's no longer enough to just have the right information – it must also be well-structured, clear, and visually presentable. Whether it's a report, a resume, a business proposal, or even a simple email, the way you present your content greatly affects how it is received and understood.

In this lesson, you will learn about using various objects like Images, SmartArt, Tables and Charts in the document to enhance the document's appeal, basic text/page formatting tools, the spelling and grammar tool to improve the accuracy of document the mail-merge feature to effectively manage sending of bulk mail in a professional way and basic troubleshooting through MS-Word.



OBJECTIVES

After reading this lesson, you will be able to:

- use images, smart arts, tables and charts to enhance the presentation of document;



- identify and apply the basic formatting tools of MS-Word;
- understand text structuring features of paragraphs like alignments, margins, bullets & numbering and implement Page Layout;
- ensure the language accuracy of the document and quality by using a spelling and grammar tool;
- understand and perform Mail Merge Operations;
- troubleshoot common MS-Word issues.

2.1 ENHANCING PRESENTATION OF DOCUMENT

A document can include both text and various objects such as images, SmartArt, tables, and charts to improve its visual presentation and engage the reader more effectively.

In fact, it's a proven fact in the medical and psychological fields that visual elements like images, charts, and tables significantly enhance comprehension and retention. They leave a more lasting impact on the reader compared to plain text alone.

So, let's explore these objects and the main steps to insert them into a document, making our content more engaging, visually appealing, and reader-friendly.

2.1.1 Using Image

Images are visual elements such as pictures, designs, or graphics used to represent information, enhance understanding, or improve the visual appeal of a document or presentation.

Steps to insert an image in the document are as follows:

Step 1: Place the cursor at the place where an image needs to be inserted

Step 2: Click on the Insert tab on the Menu bar

Step 3: In the Illustrations group, click the Pictures button.

It will give two options to insert pictures from (Fig. 2.1):

- **This Device** – to insert an image from your computer.
- **Online Pictures** – to search and insert images online from the world wide web.

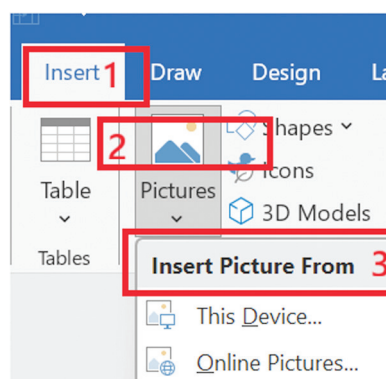


Fig. 2.1



Notes

Step 4: To choose the appropriate picture

- o If you select the “This Device” option, the “Insert Picture” dialog box will open.
- o Choose the picture as per the requirement.
- o Click on the **Insert button**.
- o The dialogue box will disappear, and the picture will be inserted in the document at the desired place.
- If you select the “Online Pictures” option:
 - o Bing search engine web page will open
 - o Select the desired image and click on the **Insert button**.
 - o The web page box will disappear, and the picture will be inserted in the document at the desired place.

Note: The Inserted Picture can be resized and formatted as per the requirement, which will be explained later in this lesson.

2.1.2 Smart Art

Smart Art = Smart + Art

The name “SmartArt” suggests “Smartly represented graphics” – visual elements that make information easier to understand, more engaging, and better organized.

It turns plain text or data into visually appealing diagrams – saving time and enhancing clarity.

The SmartArt feature allows users to graphically represent different types of information. It helps to visualise concepts, data, processes and relationships, making it easier to understand and communicate ideas effectively.

Steps to insert SmartArt are:

Step 1: Position the cursor in the document where SmartArt needs to be added and click on the Insert tab

Step 2: From the Illustrations group, select the SmartArt option (Fig. 2.2)

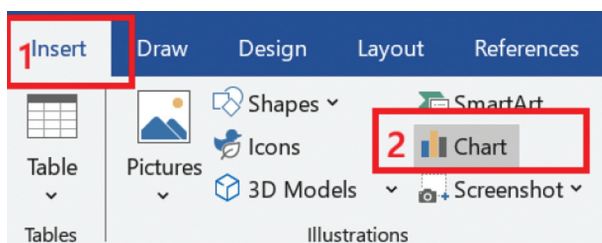


Fig. 2.2



A dialog box will open, having a variety of designs, organised under various categories like List, Process, Cycle, Hierarchy etc. (Fig. 2.3).

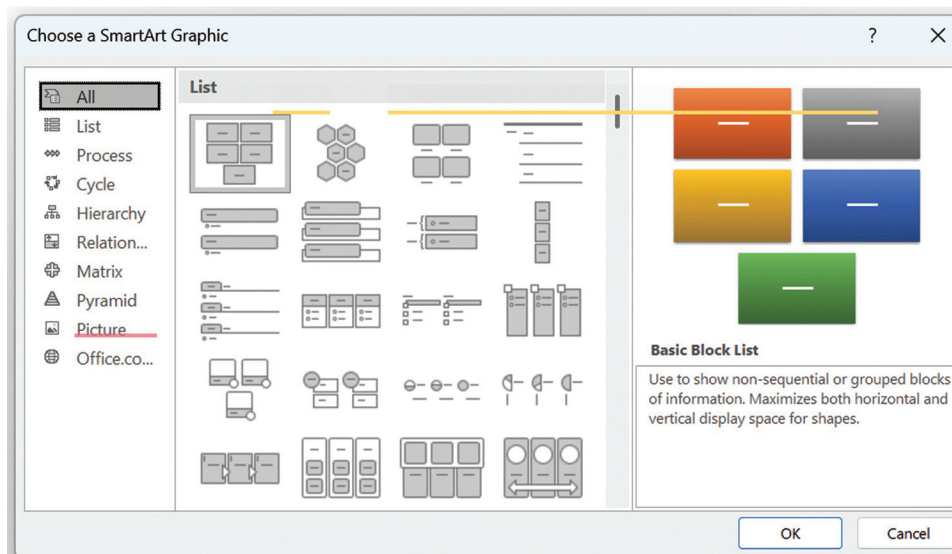


Fig. 2.3

Step 3: Choose the suitable category and design as per the requirement and click on the OK button.

Step 4: A blank layout of the Smart Art will be added into your document. Fill the text in the layout and click anywhere outside the SmartArt.

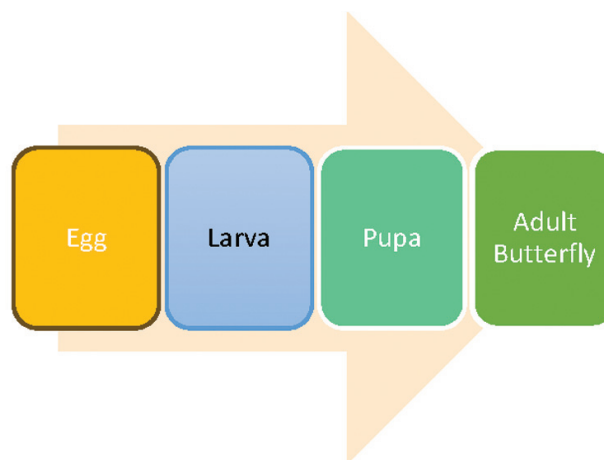


Fig. 2.4

Your SmartArt is ready. Interesting, isn't it. The life cycle of a butterfly, represented through SmartArt, is shown here for reference.



2.1.3 Tables

Sometimes, it's better to present textual data in a tabular format to enhance clarity and readability.

Tables are two-dimensional structures that organize data into rows and columns. Intersection of a row and columns is called a cell. It's basically a cell in a table in which data will be entered.

To understand the significance of tables in a better way, let's consider an example:

Mr Som, an export analyst, needs to present a report on India's medal count in the last four Olympics. He has done it in two ways:

Option-1:

He presented it through the following textual paragraph:

In the **2012 London Olympics**, India won a total of **six medals**, including **two silver** and **four bronze**. The **2016 Rio Olympics** saw a slight dip in performance, with India securing only **two medals** – **one silver** and **one bronze**. However, India bounced back strongly in the **2020 Tokyo Olympics**, achieving its **best-ever Olympic performance** with **seven medals**, comprising **one gold**, **two silver**, and **four bronze**. Most recently, at the **2024 Paris Olympics**, India secured **six medals**, including **one silver** and **five bronze**, continuing its trend of strong performances on the global stage.

Option-2:

He presented the same data through the following table:

Olympic Year	Gold	Silver	Bronze	Total Medals
2012	0	2	4	6
2016	0	1	1	2
2020	1	2	4	7
2024	0	1	5	6

I hope you will agree that option 2, i.e., presenting the statistical data in tabular format, is a better choice compared to option 1, as it's much easier to understand the information at a glance when presented in a tabular format instead of reading through an entire paragraph of statistical data. So without delay, let's understand how to add a table in a document.



In Microsoft Word 2019, there are several methods for inserting a table, depending on your needs and level of comfort. The main methods include:

1. Insert Table
2. Draw Table

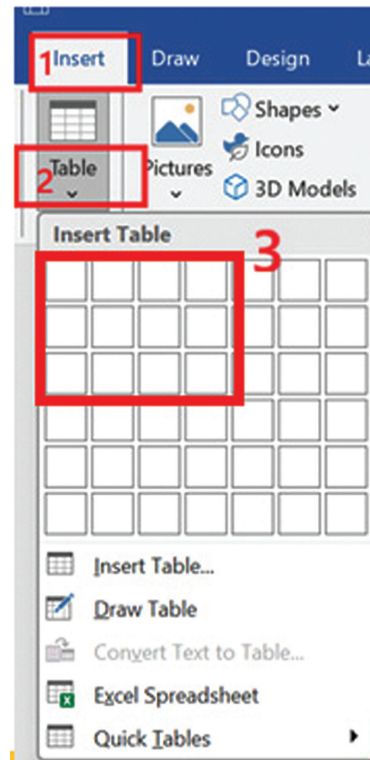
1. **Insert Table:** Follow the steps to insert a table in a document:

Step 1: Position the cursor in the document where the Table needs to be added and click on the Insert Tab

Step 2: Click on the Table option

Step 3: Roll over the mouse on the grid to specify the total number of rows and columns as per the requirement while holding the left mouse button.

As soon as you release the mouse button, a blank table containing a specified number of rows and columns will be inserted into the document as shown here.



You may enter the data in the blank table.

Note: The inserted table can be formatted as per the requirement, which will be explained later in this lesson.

2.1.4 Charts

Charts or graphs are the visual representation of the data. It's a very good data analysis tool as it helps the user to understand the patterns and trends of the data by making comparisons.

MS-Word-2019 allows you to create a variety of charts, clubbed under various categories, which are as follows:



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- Column
- Bar
- Map
- Radar
- Histogram
- Funnel
- Line
- Area
- Stock
- Treemap
- Box & Whisker
- Combo
- Pie
- XY (Scatter)
- Surface
- Sunburst
- Waterfall

Follow the steps to insert a chart in the document:

Step 1: Position the cursor in the document where Chart needs to be added and click on the Insert Tab

Step 2: Select the Chart option from the illustrations group

The Insert Chart dialog box will appear (Fig. 2.5)

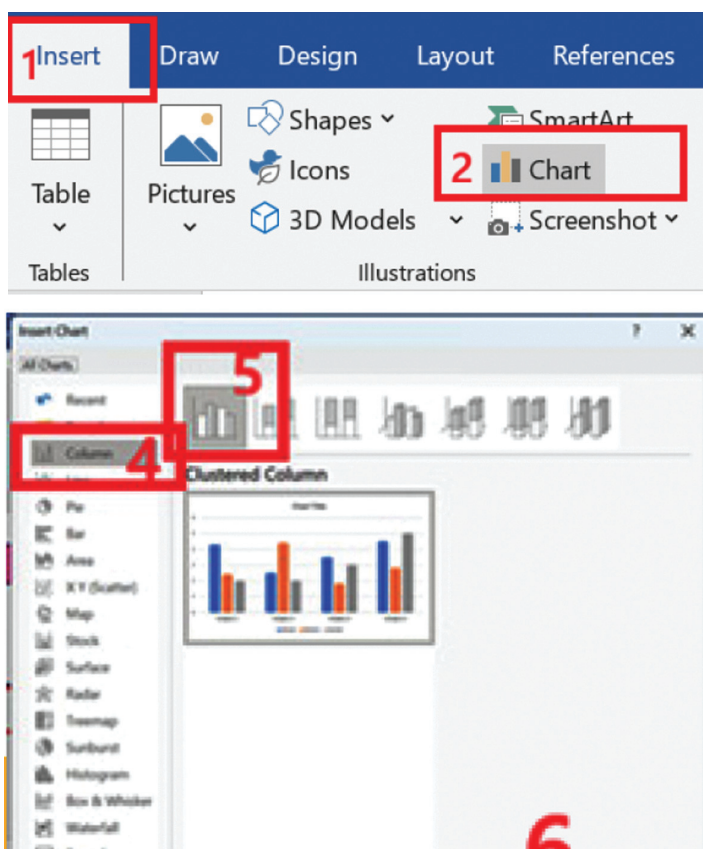


Fig. 2.5



Step 3: Select the desired category

Step 4: Select the desired style

Step 5: Click on the Ok button

Step 6: Insert Chart dialog box will disappear and a chart will be inserted in the document based on the dummy data (Fig. 2.6).

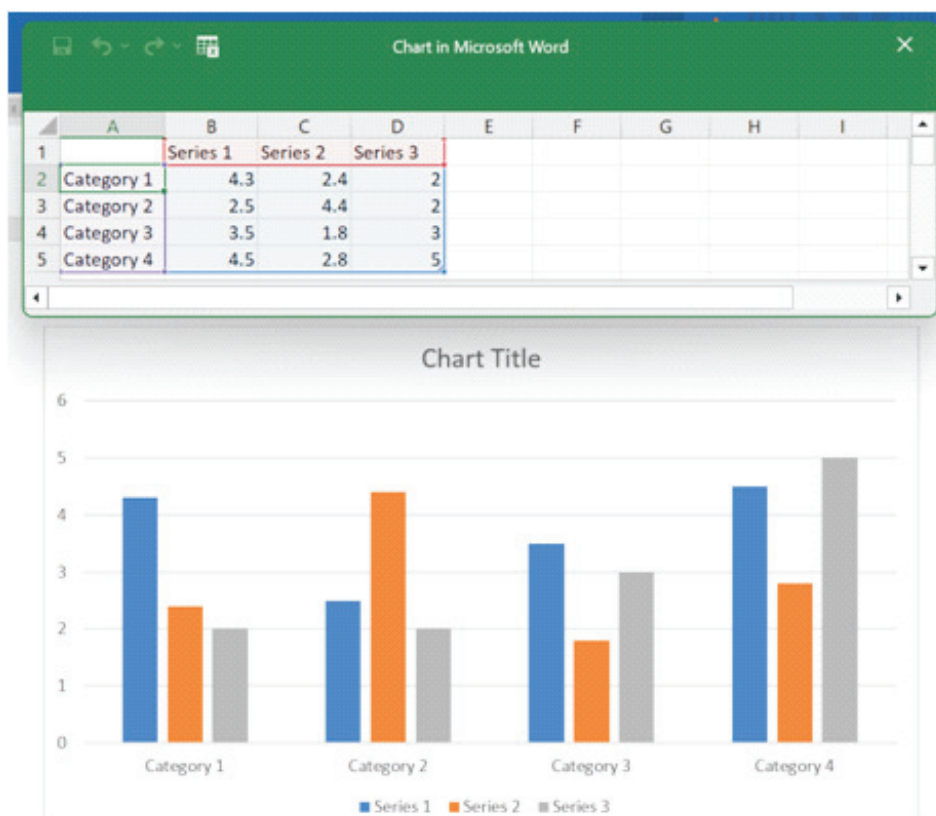


Fig. 2.6

Step 8: Remove the dummy data and add the real data.

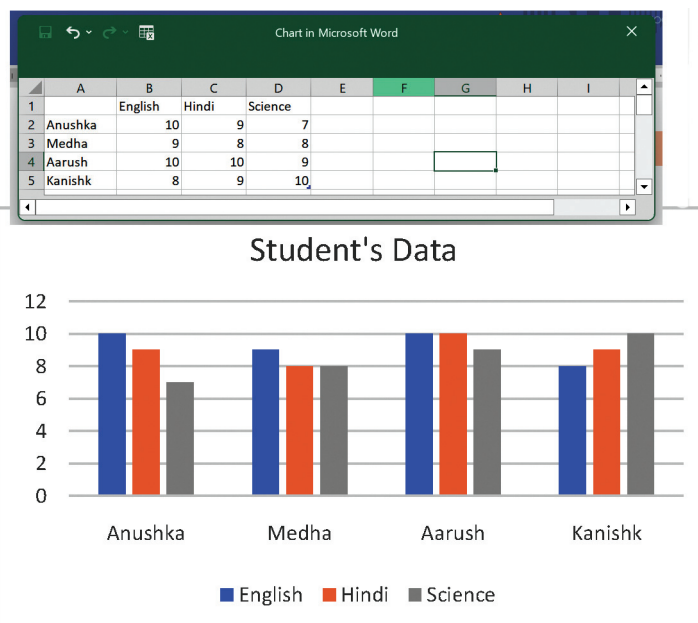
Notice the change in the chart.

Step 9: Click on the close (X) button of the Excel data sheet. Data will disappear, and the chart will remain in the document based on the real data.



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INTEXT QUESTIONS 2.1

1. Answer the following Multiple-Choice Questions:
 - (i) What type of software is a word processing program?
 - (a) System software
 - (b) Application software
 - (c) Utility software
 - (d) Firmware
 - (ii) What is the main purpose of a word processing software?
 - (a) To manage computer hardware
 - (b) To create and modify spreadsheets
 - (c) To create, modify, and format text documents
 - (d) To edit images and videos
 - (iii) The main purpose of using SmartArt is to:
 - (a) Insert pictures in a document
 - (b) Create animations in slides
 - (c) Make information easier to understand and more engaging
 - (d) Add special effects to text



- (iv) A table in MS Word is used to:
- (a) Insert pictures
 - b) Arrange data in rows and columns
 - c) Create charts
 - d) Format paragraphs
- (v) Each block in a table where a row and column intersect is called a:
- (a) Box
 - (b) Cell
 - (c) Frame
 - (d) Grid

2. Fill in the Blanks:

- (i) The digital file created in a word processor is called a
- (ii) A table is made up of rows and
- (iii) To insert a table in MS Word, click on the tab and then choose Table.
- (iv) A chart is a graphical representation of
- (v) In MS Word, charts can be inserted from the Insert → option.

2.2 FORMATTING TOOLS

Formatting is the process of arranging and styling the content of a document—such as text, images, and pages—to improve its appearance, organisation, readability and visual appeal. Formatting can be of the following types:

- Text Formatting
- Object Formatting
- Paragraph Formatting
- Page Formatting

Let us explore each one by one.

2.2.1 Text Formatting

Text formatting is the process of styling the text by enhancing its appearance to make it more readable, attractive, and effective in conveying the message. It



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involves changing elements such as font style, size, color, and applying effects like bold, italic, or underline to emphasize or organize content.

A font is a set of visual characteristics—such as size, weight, and style—that determine the appearance of text characters.

To apply text formatting, follow the steps given below:

1. Select the text to be formatted.
2. Click on the **Home** tab (usually the default tab when Word opens) (Fig. 2.7).

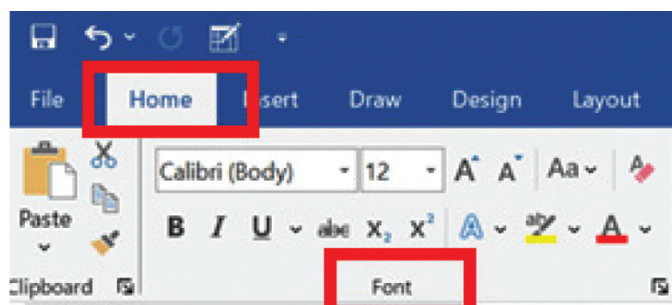


Fig. 2.7

3. In the “**Font**” group, you’ll find options like:
 - Font type (e.g., Calibri, Arial, Times New Roman etc.)
 - Font size (Though it depends on the context, the ideal font size of formal documents used to be 12pts)
 - Change Case
 - B for Bold, I for Italic and U for Underline, Strikethrough, Subscript, Superscript
 - Text effects, Text Highlight color and Font colors
4. Choose the desired text formatting style (s) to be applied directly on the selected text.

Note: Alternatively, the full Font dialog box (Fig. 2.8) can also be opened by clicking the small arrow icon (called a dialog box launcher) in the bottom-right corner of the Font group.

Choose the desired text formatting style (s) from the Font dialog box. Observe the preview in the Preview box and click on the OK button to apply the desired formatting to the selected text.

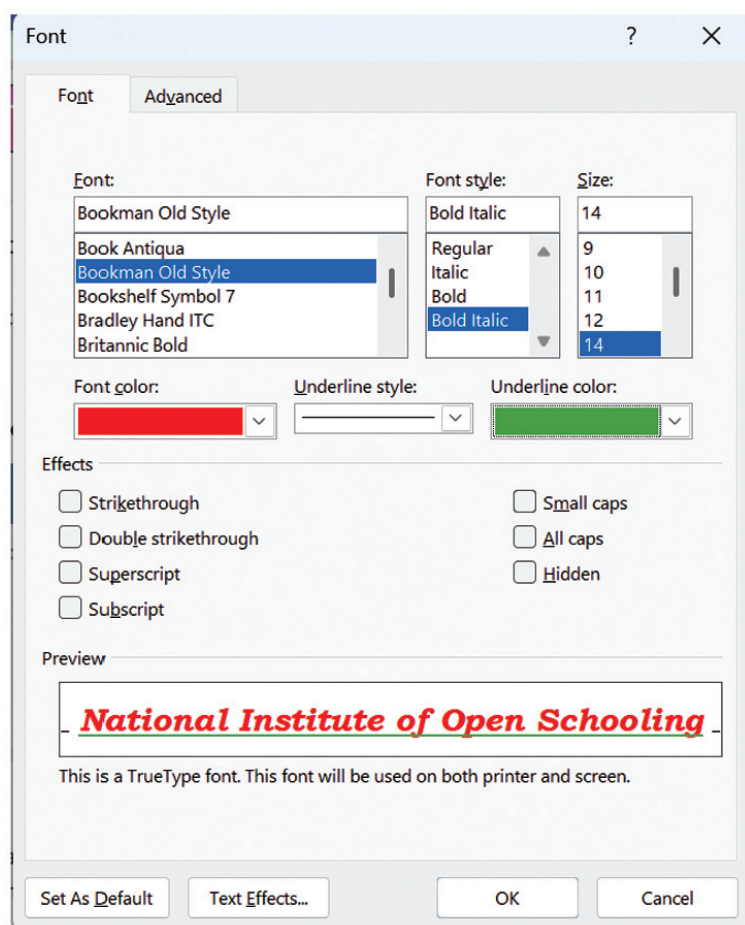


Fig. 2.8

2.2.2 Object Formatting

A document can include various non-text elements, referred to as objects, such as images, charts, shapes, text boxes, SmartArt, and tables. In the previous sections of this lesson, we have already seen how to insert a few of these, like images, charts, SmartArt and tables in the documents. Now this is the time to learn how to enhance the style of the objects, which can be done through Object formatting.

So, Object formatting is formatting non-text elements of the document.

Follow the given steps to format them:

Step 1: Select the object and notice the menu item added in the menu bar depending upon the type of the object, like for example if object is picture so a new tab named **Picture Format** will be added at the ribbon:

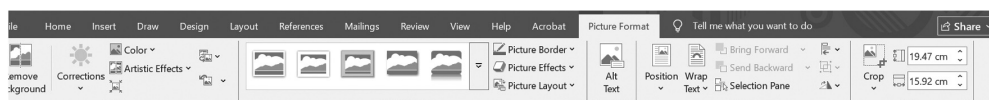


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Step 2: Click on the Picture Format tab, a ribbon will appear having a lot of picture formatting options like remove background, picture border, crop etc. Choose the required option (s), picture will be formatted as desired.

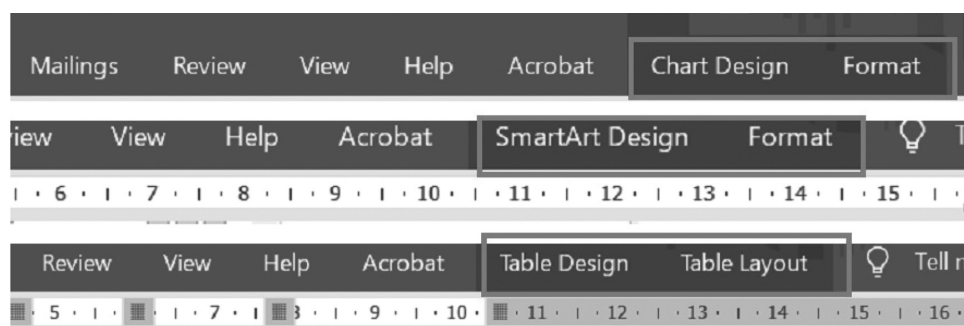


Similarly, after selecting other objects, the following tabs will appear:

Chart: Chart Design, Format

SmartArt: SmartArt Design, Format

Table: Table Design, Table Layout



Select the required tab and design/style, object will be formatted as desired.

2.2.3 Templates

Templates are documents having preset designs which can be used to create new documents. It is used to maintain a uniform style across the document and to give an expert look to the document without putting too much efforts.

Steps to use a predefined template:

Step 1: Click on File → New

New dialog box will appear having lot many options of built-in templates (Fig. 2.9).

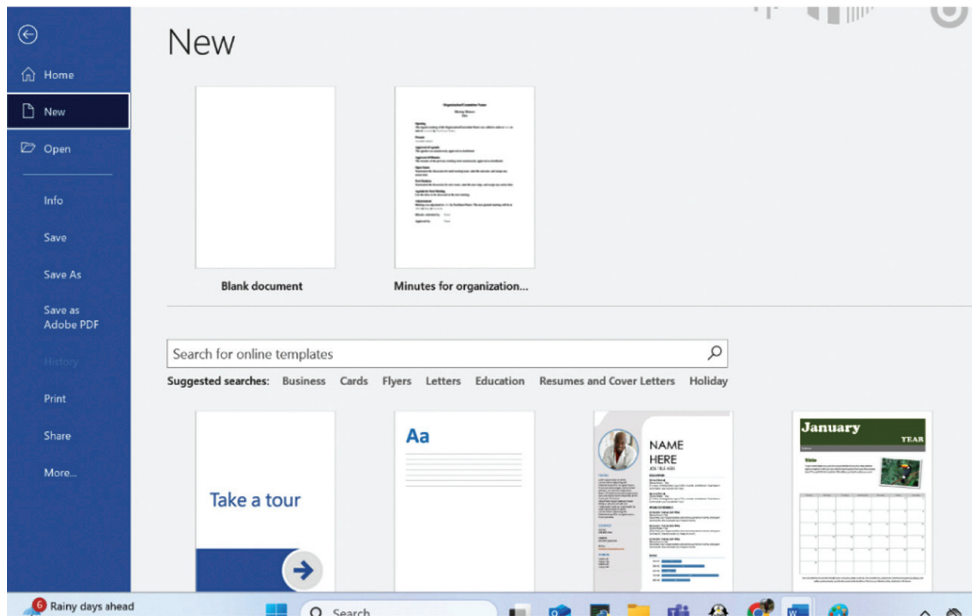


Fig. 2.9

Choose from **built-in templates** like resumes, letters, reports, or search online and click on **Create**.

Remove the dummy content and add your own content.

Your professional looking document will be ready with the help of predefined templates.

2.2.4 Styles

Styles are a collection of preset formatting options, such as font type, size, and colour, which can be applied to the text. Multiple styles can also be applied to the text by choosing a single style, which actually saves time and give a professional look to the document.

MS-Word 2019 provide following type of Styles to be applied on paragraph:

- (a) **Normal:** It is the default style for regular text.
- (b) **No Spacing:** It allows text without extra spacing between lines or paragraphs.
- (c) **Heading 1, Heading 2, Heading 3:** It can be used for creating headings and subheadings.
- (d) **Title:** It can be used for the main title of the document.



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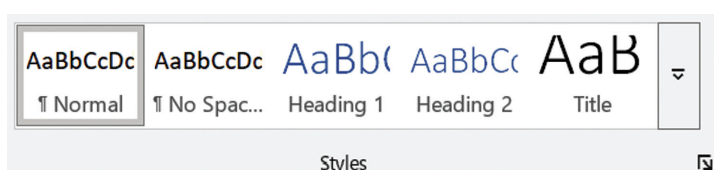
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- (e) **Subtitle:** It can be used for subtitles or secondary headings.
- (f) **Quote:** It can be used for inserting block quotes.
- (g) **Intense Quote:** It is a highlighted style for important quotes.
- (h) **List Paragraph:** It is used for paragraphs in a bulleted or numbered list.

Steps to apply styles are as follows:

Step 1: Place the cursor in the line, where Styles need to be applied and Click on the **Home** tab.

Step 2: In the **Styles** group, lot many styles will be displayed like Heading 1, Heading 2 etc.



Step 3: Select the desired style. The chosen style will be automatically implemented on the selected text.



INTEXT QUESTIONS 2.2

1. State if following statements are True or False:

- (i) Text formatting options are available on Home tab.
- (ii) Applying bold, italic, or underline are examples of paragraph formatting.
- (iii) A Style in MS Word is a predefined set of formatting features like font, color, and alignment.
- (iv) A Template is a blank document with no predefined formatting or layout.
- (v) Using styles helps in maintaining a consistent look throughout a document.

2. Fill in the Blanks

- (i) formatting is formatting non-text elements of the document.
- (ii) A is a set of visual characteristics – such as size, weight, and style – that determine the appearance of text characters.



- (iii) A is a predefined set of formatting options that can be applied to text or paragraphs.
- (iv) are pre-designed documents that help users create new documents with the same layout/formatting.
- (v) In MS Word, examples of built-in include **Normal**, **Heading 1**, and **Title**.

2.3 TEXT STRUCTURING FEATURES OF PARAGRAPH

It is very important to structure the text written in the document so that it will look more organised, nicely presented and easy to understand. In MS-Word-2019, the Paragraph group of the Home Tab contains a variety of tools to structure the text. Let's explore a few of them, one by one.

2.3.1 Text Alignment Tools

Text alignment refers to the horizontal positioning of text between the left and right margins of a page or text box.

MS Word provides four main types of text alignment:

- Align Left (Ctrl+L)
- Center (Ctrl+E)
- Align Right (Ctrl+R)
- Justify (Ctrl+J)



Align Left: As the name suggests, it will position the text towards the left margin of the page or text box. It is generally used to align the body of the document. Text given below is left-aligned in the text box.

The National Institute of Open Schooling (NIOS), is providing a number of Vocational, Life Enrichment and community-oriented courses.

Center: As the name suggests, it will position the text in the centre of the page or text box. It is generally applied to headings of the document. The text given below is centre-aligned in the text box.

The National Institute of Open Schooling (NIOS), is providing a number of Vocational, Life Enrichment and community-oriented courses.



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Align Right: As the name suggests, it will position the text towards the right margin of the page or text box. It is generally used to align the text of the header or footer. The text given below is right-aligned in the text box.

The National Institute of Open Schooling (NIOS), is providing a number of Vocational, Life Enrichment and community-oriented courses.

Justify: It will distribute the text evenly between both the left and right margins. It gives a more polished look to the text. The text given below is justified in the text box.

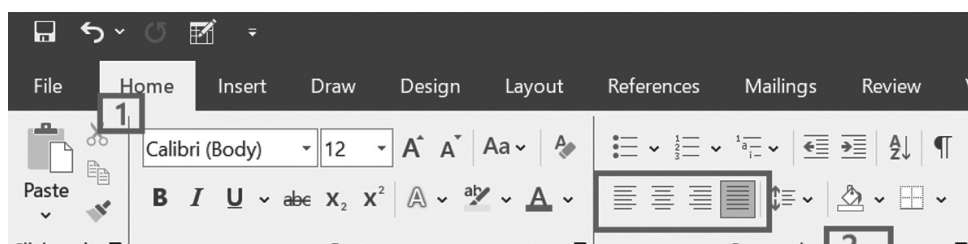
The National Institute of Open Schooling (NIOS), is providing a number of Vocational, Life Enrichment and community-oriented courses.

Steps to align the text

Select the text that needs to be aligned and follow the given steps to align the text:

Step 1: Click on the Home Tab

Step 2: In the Paragraph group, click on the suitable alignment type as per our choice/requirement



Alternatively, specified shortcut keys can also be used to align the text.

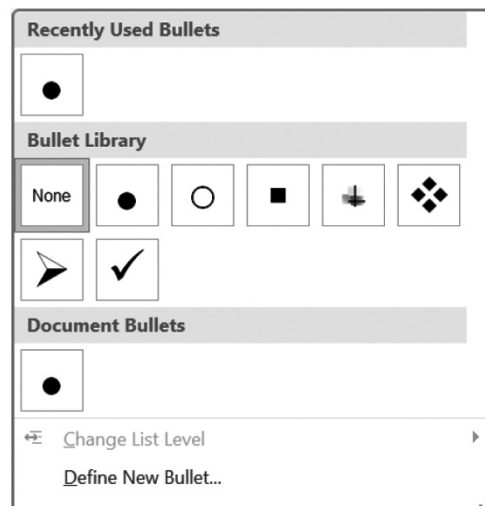
2.3.2 Bullets and Numbering

Sometimes, presenting text in the form of a list improves readability and comprehension. In such cases, the Bullets and Numbering feature of word processing software can be very helpful. MS Word 2019 provides three types of lists:

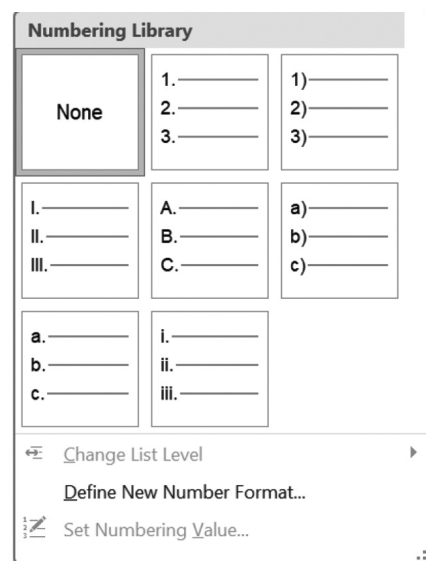
- Unordered List (Bulleted List)
- Ordered List (Numbered List)
- Multilevel List (Outline List)



Unordered List (Bulleted List): It is a list of items in which the order of items is not important. It is just used to mark or highlight each item of the list. In this, each list item will be preceded by a bullet. The following type of bullet symbols can be used:



Ordered List (Numbered List): It is a list of items in which the sequence of items is important. In this, each list item will be preceded by a number or letter that indicates its position in the list. The following type of numbering can be used:



Multilevel List (Outline List): It contains list items in multiple levels, i.e. one level of list items indented under another level of list item, representing a hierarchical structure. MS-Word-2019 provides the following type of multilevel list:



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Let's see, basic steps of how to convert a few country names into all three types of lists:

Step 1: Write the country names in separate lines in the document

Step 2: Select all the country names and choose the list type from the Paragraph group

Country names will be presented in the form of a chosen list.



Note: In case of a multilevel list, place the cursor on the list item that needs to be presented in the inner list and press the tab key once; it will be indented inside the outer list, and sub-level numbering will appear.

All three types of lists are shown here for reference:

- India
- Japan
- South Korea

Unordered List

1. India
2. Japan
3. South Korea

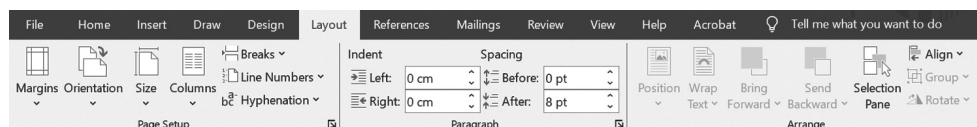
Ordered List

- 1) India
 - a) New Delhi
 - b) Mumbai
- 2) Japan
 - a) Tokyo
 - b) Osaka
- 3) South Korea
 - a) Seoul
 - b) Incheon

Multilevel List

2.3.3 Page Layout

Page layout refers to the final arrangement of the text, objects, margins, orientation etc, when viewed or printed.



MS-Word 2019 provides a Layout tab, which contains a variety of options to set the Page layout, a few of which are explained here:

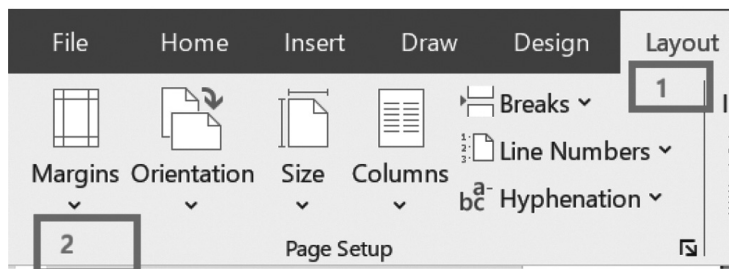
2.3.3.1 Margins

While writing on paper or in a digital document, it is considered a good practice to leave a fixed space between the edge of the page and the start of the text. This space is called the margin. Margins can be of four types:

- Left
- Right
- Top
- Bottom



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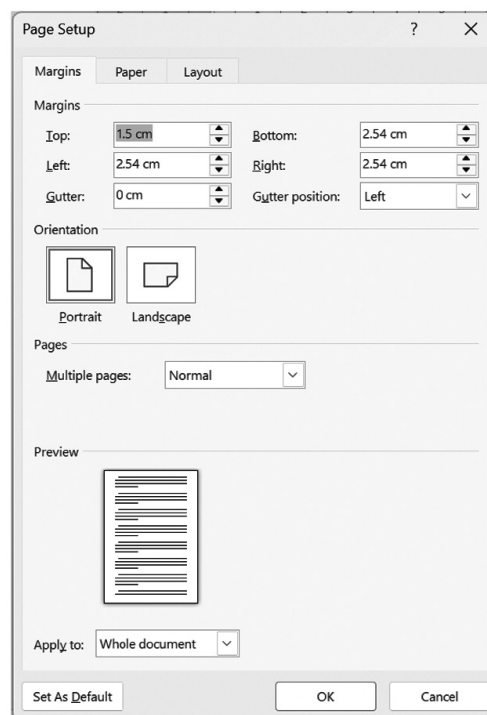
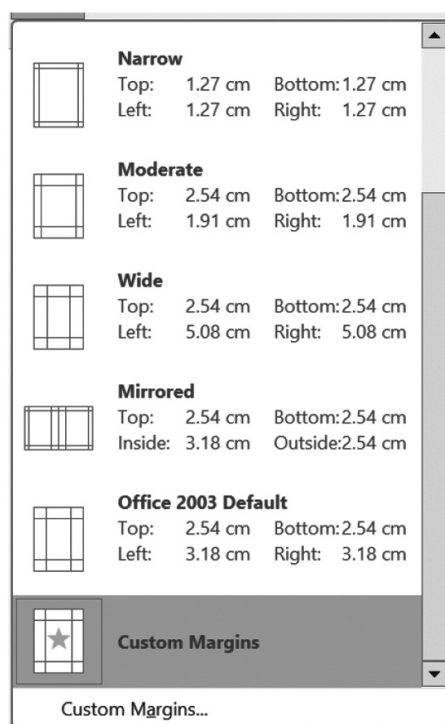


Steps to set a margin in the document:

Step 1: Click on Layout tab

Step 2: Click on Margins in the Page Setup group

A list of built-in Margin options will appear, having specifications of all four margins in each option.



Click on any of the options as per your requirement. Page margin will be set accordingly.

Apart from built-in options, you may also set margins on your own, through the Page Setup dialog box, which will appear after clicking on the Custom Margins.



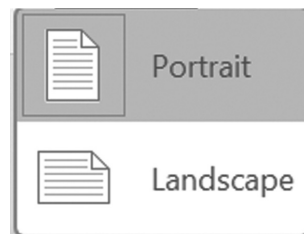
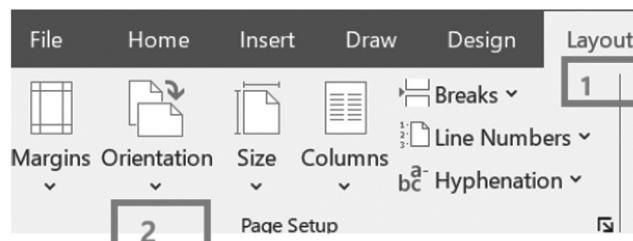
2.3.3.2 Orientations

The orientation feature of MS-Word 2019 provides us the flexibility to change the direction of the document in which it is displayed or printed. It provides two options:

- Portrait
- Landscape

Portrait: It is a vertical orientation in which the page is taller than wider. It is the default orientation of the document.

Landscape: It is a horizontal orientation in which the page is wider than taller.



Steps to set the orientation:

Step 1: Click on the Layout tab

Step 2: Click on the Orientation option

Choose the desired orientation from the drop-down option list.

Note: The Orientation option will be available

In Page Setup dialog box also.

2.4 SPELLING & GRAMMAR TOOL

After completing the document by inserting desired text, content appropriate objects like images, tables, charts etc., it's advisable to cross-check accuracy, spelling mistakes and language quality of the text before sending or submitting the



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document. MS-Word 2019 provides a very appropriate tool named the Spelling & Grammar tool to achieve this task.

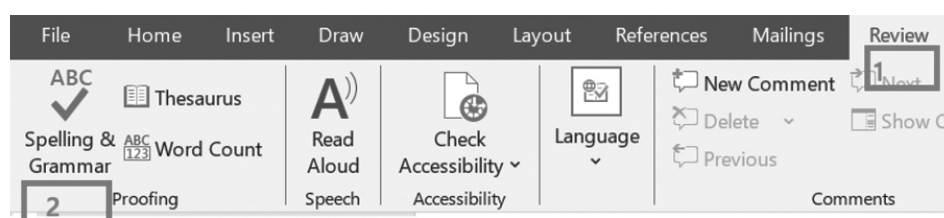
Steps to use the Spelling & Grammar tool:

Step 1: Open the document in MS-Word 2019 that needs proofreading and click on the Review tab

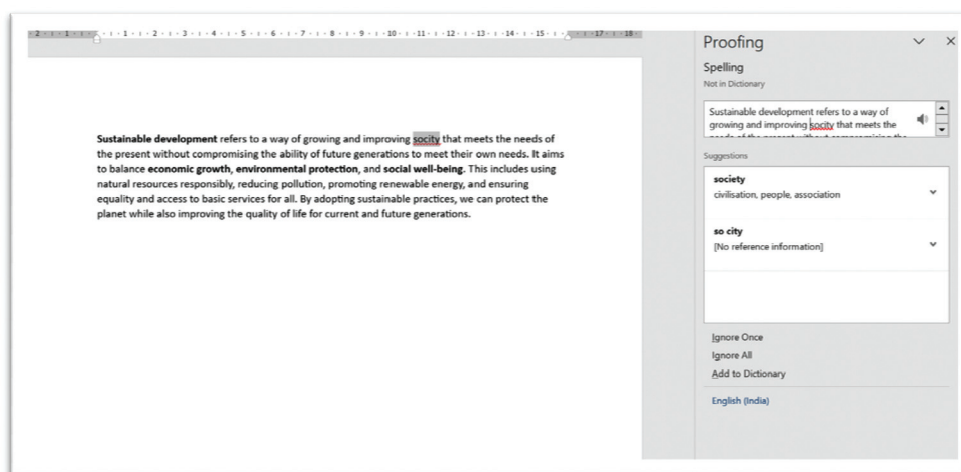
Step 2: From the Proofing group, choose the Spelling & Grammar option

OR

Press F7 key



The Proofing window will open on the right side of the document as shown here:



It's very interesting to observe that by default MS-Word 2019, visually indicates spelling and grammar issues through different styles and colours, which are as follows:

- **Spelling Mistake**-Red wavy underline
- **Grammar Mistake**-Blue double underline

In the Proofing window, all possible correction suggestions will be displayed in the Suggestion box.

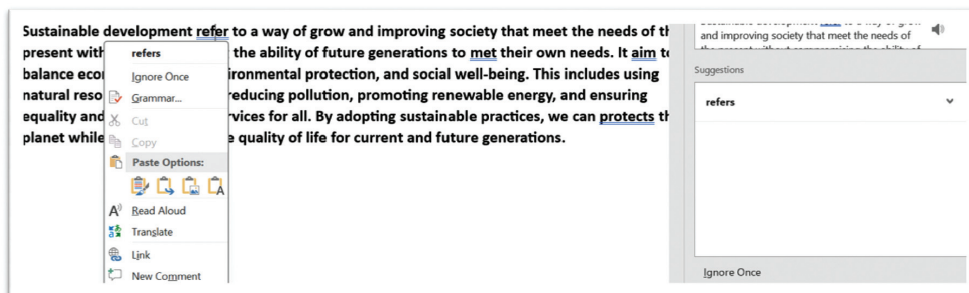


You have two ways to accept the suggestions:

Either click on any of the desired suggestions in the Proofing window, and it will be implemented automatically on the document.

OR

Right click directly on the erroneous word, select the suggested correct word by left clicking on that as shown in the screenshot.



2.5 MAIL MERGE

Sometimes, it is necessary to send the same document to multiple recipients, where only the recipient details differ while the main content remains the same. In such cases, instead of creating or editing the document repeatedly, MS Word 2019 offers a very useful and popular feature called Mail Merge to efficiently complete the task.

In other words, we can say that Mail Merge is a powerful feature in MS Word 2019 that allows you to create personalized documents – such as letters, emails, labels, or envelopes – for multiple recipients, without typing the same content repeatedly.

Common Uses of Mail Merge:

- Sending personalized letters or emails
- Generating invitations
- Creating certificates
- Printing address labels
- Making name badges

Before start learning the actual process, let's understand the basics of Mail merge first:



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Mail merge basically works on two documents:

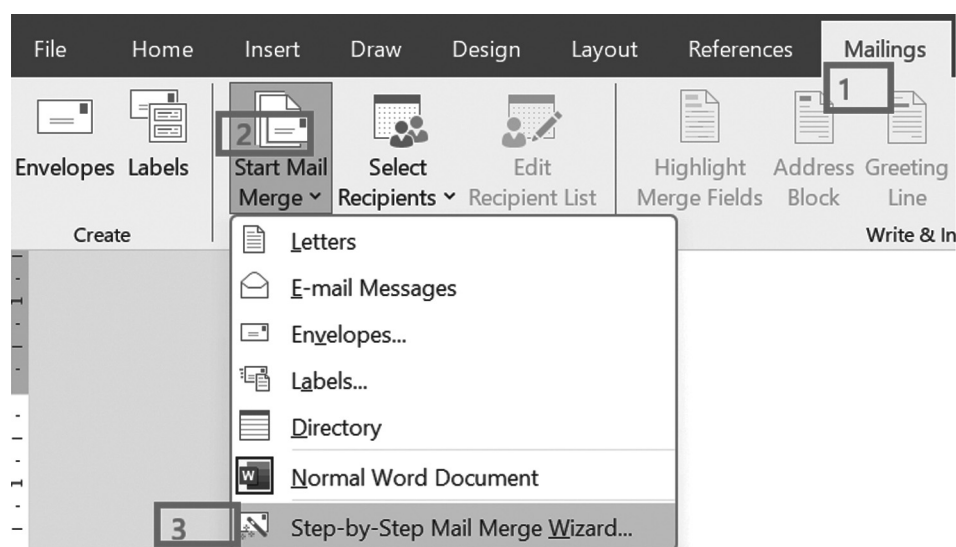
- Main Document
- Data Source

Main Document: As the name suggests, this is the document that contains the fixed main content of the document that will remain the same for each recipient. Additionally it also contains the placeholders to place the personalised data taken from the data source for each recipient.

Data Source: As the name suggests, this is the source of personalized data/information like recipient name, address, email id etc., which will be inserted in the main document during the mail merge process.

Mail Merge Process

MS-Word 2019 provides a Step-by-Step Mail Merge Wizard... tool that guides you step by step to perform the mail merge process easily and effectively.



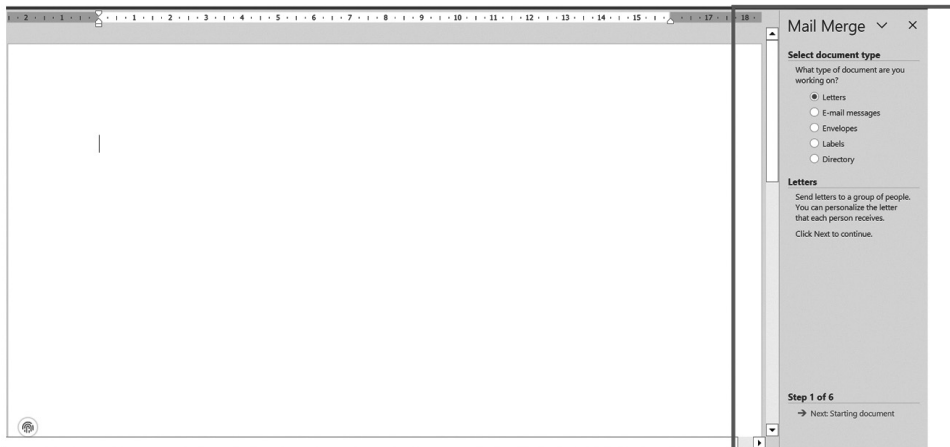
Follow the steps to open the Mail Merge Wizard:

Step 1: Open a blank document ->Click on the Mailing tab

Step 2: Click on the Start Mail Merge option

Step 3: Click on Step-by-Step Mail Merge Wizard

The Mail Merge panel will open on the right side of the document, as shown in the screenshot.



Steps to perform Mail Merge through the Mail Merge Wizard dialog box:

It has a total of 6 steps, as shown in the screenshot:

Step 1 of 6: Select the document type to specify the type of document you are working on.

It provides the following choices:

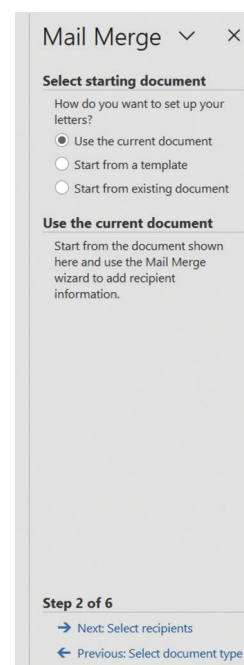
- Letters (default)
- E-mail messages
- Envelopes
- Labels
- Directory

After choosing the required type, click on Next at the bottom panel to proceed to the next step.

Step 2 of 6: In this step, you need to specify how you want to set up your letters...

It provides the following choices:

- Use the current document
- Start from a template
- Start from existing document

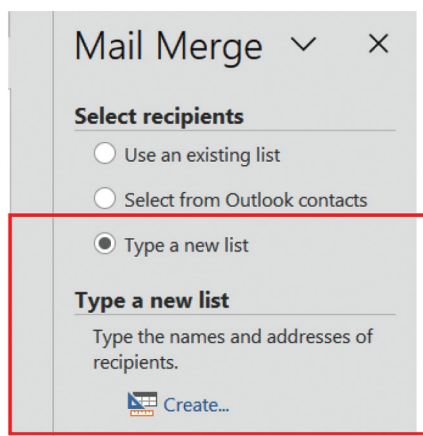


After specifying your choice by selecting any one of the radio buttons, click on Next at the bottom panel to proceed to the next step.



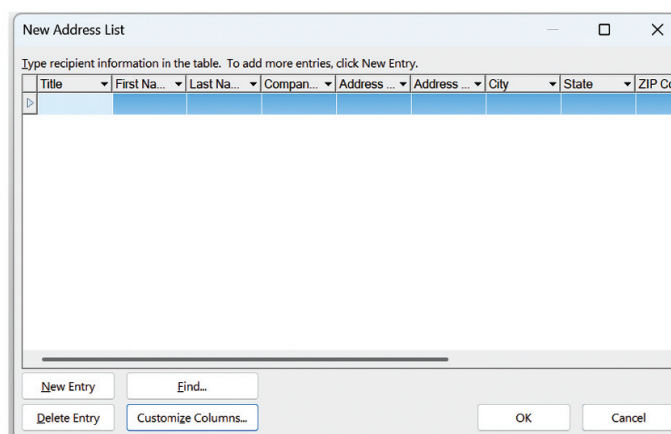
Notes

Step 3 of 6: In this step, you need to specify from where you will be taking recipients' data, by choosing one option out of 3, as shown in the screen shot:



If you don't have a recipients list, select the 3rd option, “**Type a new list**”, immediately an option Create will appear as shown in the screenshot.

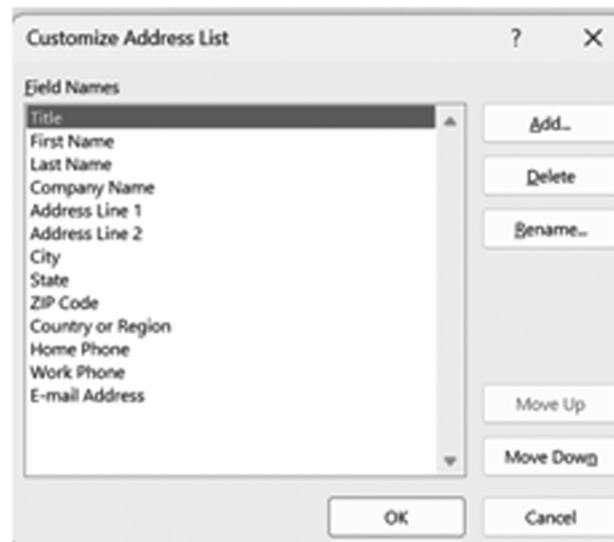
Click on the Create → New Address List box will open



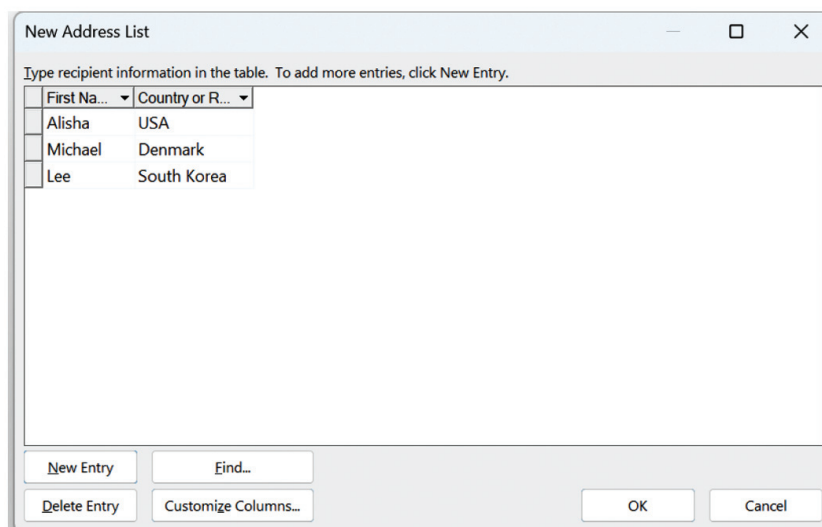
This box already has pre-set columns but if you want to customize columns, click on Customize Columns → button present at the bottom.

Customize Address List box will appear as shown here:

- Choose the column (s) which are not required → Press the Delete Button
- Similarly, columns can be renamed too, if required.
- If by chance required column is not in the Field Name list, so it can be added too by clicking on the Add button.



Once Field Names are all right so click on the OK button, Customize Address List box will be closed and New Address List box will be active to take all the entries as shown in the screenshot. You can use the “**New Entry**” and “**Delete Entry**” button as per the requirement. Once all the recipients’ entries are done, click on the “OK” button.



“Mail Merge Recipients” box will open to let you make any modification in the recipients list if by chance its required.

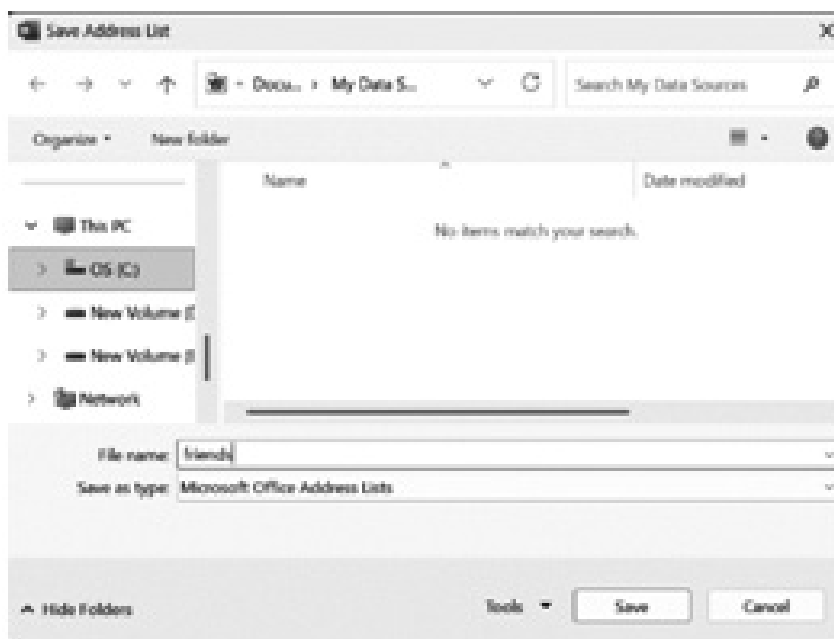
If finally everything is all right in the Mail Merge Recipients box, click on the OK button.

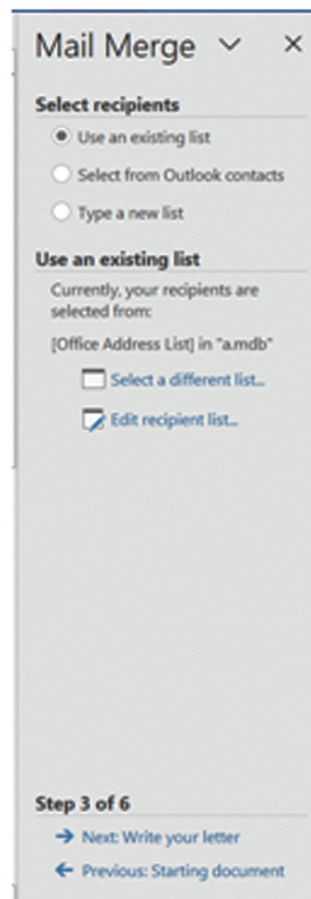


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The Save Address List box will open → Give a suitable name and click on the Save button.





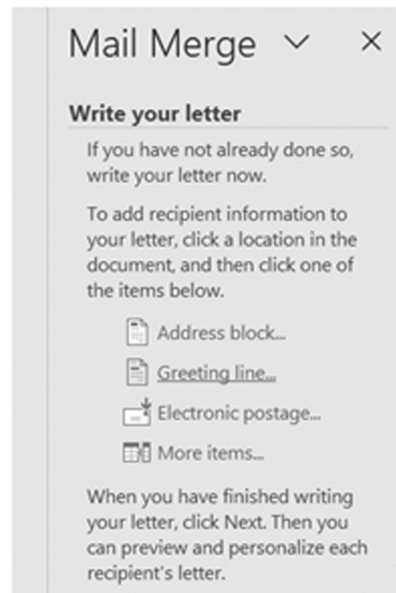
Click on the “**Next: Write your letter**” button to go to the next step.

Step 4 of 6: In this step, you need to write the letters





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Once letter writing is done, place the cursor where you want to add the recipient data and click on the More items link on the Mail Merge panel → Insert Merge Field box will open → Select Field Name → Click on the Insert Button.

Repeat the same process again for the other fields to be inserted in the main document.

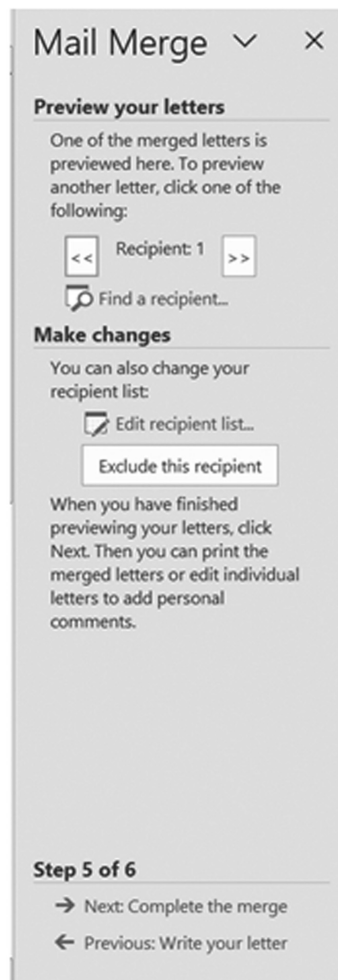
Once all the fields have been inserted, close the Insert Merge Field Box.



The main document will look like this, as shown in the screenshot



Notes





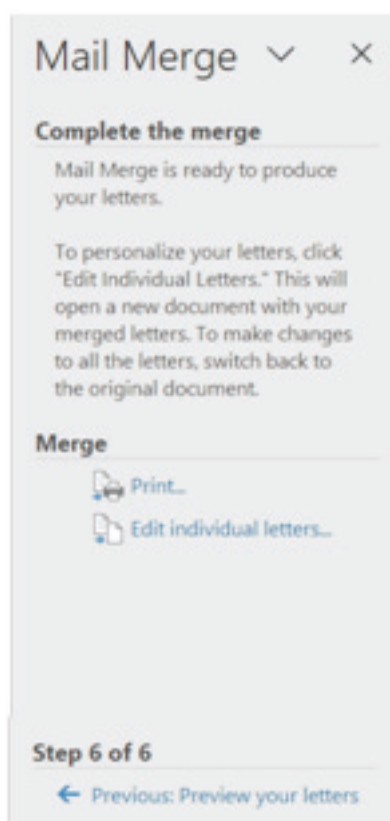
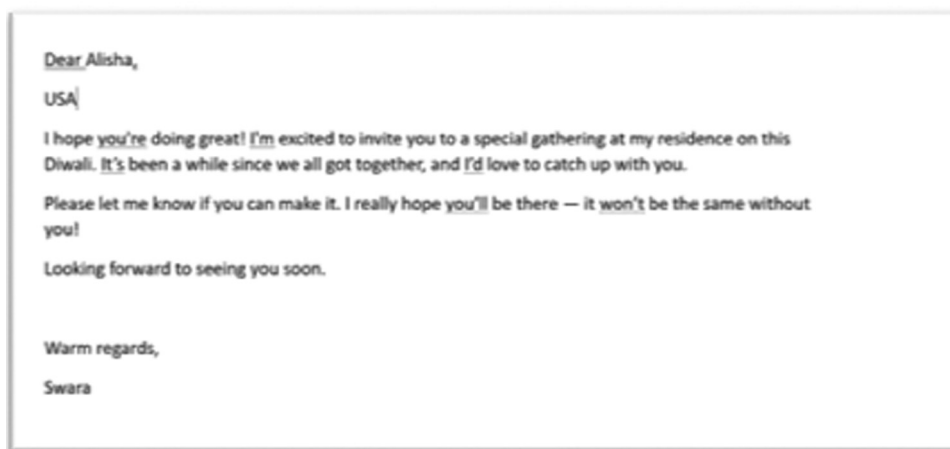
Notes

Word Processing Software

Click on the “Next: Preview your letters” button

Step 5 of 6: In this step, you can preview your letters if everything is all right....

Your document will be displayed as shown here





Click on the “**Next: Complete the merge**” button to complete the merge.

Step 6 of 6: In this step, you can take printout of the letters and if required so you can edit individual letters and save it on your disk as well.

So in this way, with the help of the Mail Merge Wizard, your letters are ready to be shared with recipients within minutes, in a professional way, with minimal effort.

2.6 TROUBLESHOOTING

Though MS Word-2019 is an excellent software but while working with the software, you may encounter a few basic troubles such as freezing, crashing, or any tool not working as expected. It’s always advisable to apply some basic troubleshooting tricks to fix common problems at our end before running to a professional.

So let’s explore about few general problems and how to overcome them....

Problem 1: MS Word-2019 window freezes or does not respond:

Solution: Follow the steps:

Step 1: Press Ctrl+Alt+Delete key

Step 2: Open Task Manager-> Choose MS Word task and click on End

Step 3: Restart the computer

Problem 2: Toolbar or Ribbon missing

Solution: Press Ctrl+F1 to toggle the toolbar

Problem 3: Ruler missing

Solution: Click on the View tab → Check the Ruler box to make it visible

Problem 4: File corrupted

Solution: Open MS Word 2019 → File → Open → Select the file and instead of open, choose the option “**Open and Repair**” from the dropdown arrow next to Open.

General Tips:

- Always keep MS Word, Office and other software updated.
- Keep saving your work frequently.
- Use **Auto Recover** and **Backup** features to prevent data loss.

**INTEXT QUESTIONS 2.3****1. Answer the following Multiple-Choice Questions:**

- (i) Which alignment option aligns text evenly along both the left and right margins?
 - (a) Left Align (b) Right Align
 - (c) Center Align (d) Justify
- (ii) What is the shortcut key for Center Align in MS Word 2019?
 - (a) Ctrl + L (b) Ctrl + R
 - (c) Ctrl + E (d) Ctrl + J
- (iii) Which of the following is used to create an unordered list in Word?
 - (a) Numbering (b) Bullets
 - (c) Multilevel list (d) Border
- (iv) Which option allows creating a hierarchical list (like 1, 1.1, 1.2, 2...) in Word 2019?
 - (a) Bullets (b) Numbering
 - (c) Multilevel list (d) Columns
- (v) What is the primary purpose of setting margins in a Word document?
 - (a) To change the font size
 - (b) To define space between the text and the edges of the page
 - (c) To add bullets and numbering
 - (d) To insert images

2. Identify if following statements is True or False:

- (i) Mail Merge in Word is used to create multiple personalized documents like letters or labels by combining a template with a data source.
- (ii) You can perform a Mail Merge without a data source in Word 2019.
- (iii) Word 2019 automatically checks spelling errors and highlights them with a red underline.

- (iv) Grammar checking in Word 2019 highlights errors with a green underline by default.
- (v) Portrait orientation is selected when you want the page to be wider than it is tall.

**Notes****WHAT HAVE YOU LEARNT**

- A word processing software is a type of application software that is used to create, modify and format text documents.
- Images are visual elements such as pictures, designs, or graphics used to represent information, enhance understanding, or improve the visual appeal of a document or presentation.
- The name “SmartArt” suggests “Smartly represented graphics” — visual elements that make information easier to understand, more engaging, and better organized.
- Tables are two-dimensional structures that organize data into rows and columns.
- Intersection of a row and columns is called a cell.
- Charts or graphs are the visual representation of the data.
- Text formatting is the process of styling the text by enhancing its appearance to make it more readable, attractive, and effective in conveying the message.
- Object formatting is formatting of non-text elements of the document.
- The Bullets and Numbering feature of word processing software represent a text in a list form.
- MS-Word 2019 allows list in three forms: Unordered List (Bulleted List), Ordered List (Numbered List), Multilevel List.
- Page layout refers to the final arrangement of the text, objects, margins, orientation etc, when viewed or printed.
- Styles are a collection of preset formatting options, such as font type, size, and colour, which can be applied to the text.
- Templates are documents having preset designs which can be used to create new documents.
- Text alignment refers to the horizontal positioning of text between the left and right margins of a page or text box.



Notes

Word Processing Software

- The orientation feature of MS-Word 2019 provides us the flexibility to change the direction of the document in which it is displayed or printed.
- Orientation can be of two types: Portrait and Landscape
- Mail Merge is a powerful feature in MS Word 2019 that allows you to create personalized documents – such as letters, emails, labels, or envelopes – for multiple recipients, without typing the same content repeatedly.



TERMINAL EXERCISE

1. Write a short note on Word Processing Software.
2. Name any two Word Processing Software.
3. What is SmartArt.
4. What is the purpose of Templates?
5. Briefly explain the following:
 - (a) Main Document
 - (b) Data Source
6. Write Main steps to perform Mail Merge operation in MS Word-2019.
7. Mention any two common errors encountered while working with MS Word-2019



ANSWER TO INTEXT QUESTIONS

2.1

1. Answer the following Multiple-Choice Questions:

- (i) (b) Application software
- (ii) (c) To create, modify, and format text documents
- (iii) (c) Make information easier to understand and more engaging
- (iv) (b) Arrange data in rows and columns
- (v) (b) Cell

2. Fill in the Blanks:

- (i) document (ii) columns (iii) Insert (iv) data (v) Chart



2.2

1. State if following statements are True or False:

- (i) True
- (ii) False (*They are examples of text formatting.*)
- (iii) True
- (iv) False (*Templates have predefined layouts and formatting.*)
- (v) True

2. Fill in the Blanks:

- (i) Object (ii) font (iii) Style
- (iv) Templates (v) Style

2.3

1. Answer the following Multiple-Choice Questions:

- (i) (d) Justify
- (ii) (c) Ctrl + E
- (iii) (b) Bullets
- (iv) (c) Multilevel list
- (v) (b) To define space between the text and the edges of the page

2. Identify if following statements is True or False:

- (i) True (ii) False (iii) True
- (iv) True (v) False

Key Learning Outcomes

By the end of the lesson, you will be able to:

- enhance document presentation and apply basic formatting tools
- structure text effectively and ensure language accuracy
- understand and perform mail merge operations to create multiple personalized letters, labels, or envelopes efficiently and troubleshoot common ms word problems



SPREADSHEET SOFTWARE

In the previous lesson, you were introduced to both the basic and advanced features of MS Word, one of the most popular word processing programs. After exploring many of powerful tools of MS Word, it's now time to take a step further and explore another fascinating category of software: spreadsheet software.

Spreadsheet software is a type of application software that organises data in the form of rows and columns. It is primarily used to present statistical data in a structured and easy-to-understand manner. In addition to organising data, spreadsheet software offers several powerful tools such as sorting and filtering, formulas, functions, and charts – all of which are essential for data analysis and generating a wide range of reports.

Some popular spreadsheet software includes MS Excel, LibreOffice Calc, OpenOffice Calc, Google Sheets, Zoho Sheets, and Lotus 1-2-3, among others. Out of these, Lotus 1-2-3 has been discontinued now. In this lesson, you will learn how to use tools of MS Excel for sorting, filtering, applying formulas and functions, and creating charts, which will help you a lot in analysing the data in a variety of ways in a professional manner.



OBJECTIVES

After completing this lesson, you will be able to:

- understand the importance of organising data using sort and filter tools in MS Excel;
- perform a variety of calculations by applying various predefined functions and formulas in MS Excel;
- visually represent data using different types of charts and graphs in MS Excel.



3.1 DATA MANAGEMENT TOOLS

In today's world, data has become a crucial asset, with nearly all business processes relying on it. Given the growing significance of data in the modern landscape, it's often referred to as the **“new gold”**. As a result, the need to efficiently manage and organise data has increased exponentially.

Microsoft Excel offers a variety of tools to efficiently manage and organize data. Among these, the **“Sort”** and **“Filter”** features are particularly popular and user-friendly. Let's dive into each of these tools one by one.

3.1.1 Sort

Typically, data is entered into the worksheets as it is received. However, there are times when it needs to be presented in a specific order. In such cases, the **Sort** tool in MS Excel 2019 proves to be extremely useful.

“Sort” means to arrange or order data in a specified sequence, whether numerically, alphabetically, or based on other attributes. Data can be sorted in two ways, either in ascending (increasing) order or in descending (decreasing) order.

For better clarity, two screenshots are provided below showing the data of five Indian states and their populations – one displaying the raw data as received, and the other one of sorted data, arranged in ascending order of population.

	A	B	C
1	Five Indian States & Population		
2	Sno	STATE	APPROX. POPULATION (In Millions)
3	1	Uttar Pradesh	236
4	2	Madhya Pradesh	87
5	3	Maharashtra	128
6	4	Bihar	127
7	5	West Bengal	100

Fig. 3.1(a): Unsorted Data

	A	B	C
1	Five Indian States & Population		
2	Sno	STATE	APPROX. POPULATION (In Millions)
3	2	Madhya Pradesh	87
4	5	West Bengal	100
5	4	Bihar	127
6	3	Maharashtra	128
7	1	Uttar Pradesh	236

Fig. 3.1(b): Sorted Data

Steps to Sort the Data

Step 1: Open MS Excel → Create a **new worksheet** → Enter the required data.

Step 2: Select the data to be sorted by holding down the **left mouse button** and dragging the pointer over the desired range.

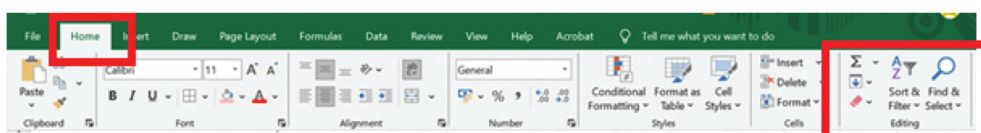


Notes

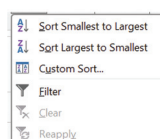
Step 3:

OPTION-1

Click the **Home** tab on the menu bar → In the **Editing** group, click the **Sort & Filter** drop-down button.



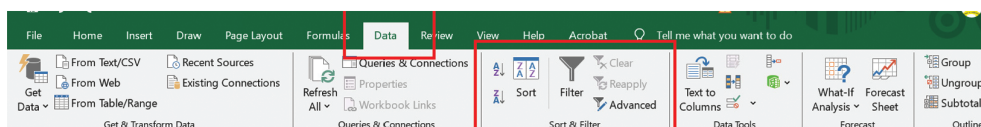
A drop-down menu will appear, as shown here:



OR

OPTION-2

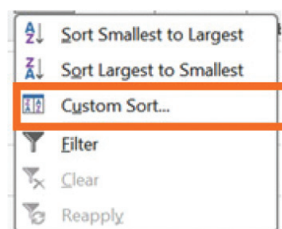
Click the **Data** tab on the menu bar → In the **Sort & Filter** group, click the **Sort** button.



Step 4: Click **A→Z** or **Z→A** to sort the data in **ascending** (smallest to largest) or **descending** (largest to smallest) order, as required.



By default, Excel sorts the data based on the values in the **first column**.



To sort the data based on another column, follow the steps:

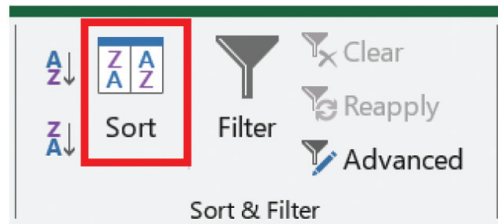


Step 1-3 will remain the same as discussed above...

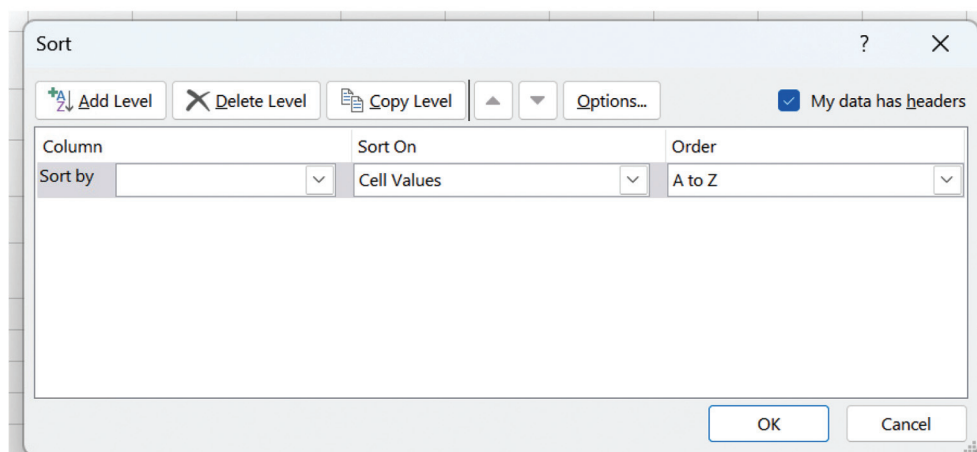
Step 4: Click **Custom Sort ...** in **OPTION-1**

OR

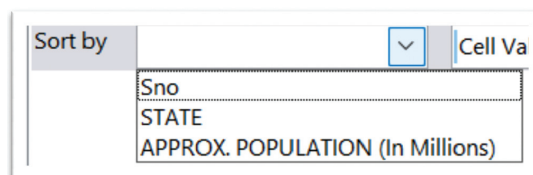
Click on **Sort** in the **Sort & Filter** group in **OPTION-2**:



The **Sort** dialog box will appear, as shown below:



Step 5: Click the **drop-down menu** next to the **Sort by** option. A list of **column headings** from the entered data will appear, as shown here:



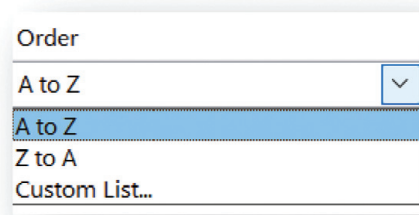
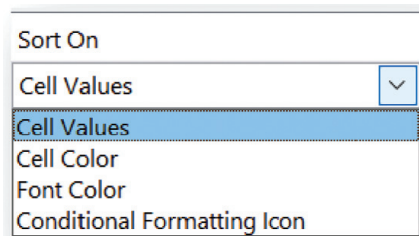
Step 6: Select the desired **column heading** based on which you want to sort the data → Click the **OK** button at the bottom of the dialog box.

The dialog box will close, and the data will be sorted as required.



Notes

Note: Additionally, you may try **Sort On** and **Order** options present in the Sort dialog box if required, which may have options as shown below:



3.1.2 Filter

While working with worksheets, there are times when we may need to separate data—meaning that we might want to hide certain information temporarily to focus on the most relevant data. In such cases, MS Excel 2019 provides a very useful data management tool called **Filter**.

As the word *filter* suggests, it is used to separate things. In MS Excel, the **Filter** tool allows you to display only the data that meets specific criteria, making it easier to concentrate on relevant information while temporarily hiding the rest.

This is especially useful when working with large datasets, as it helps focus on relevant information without permanently deleting any data.

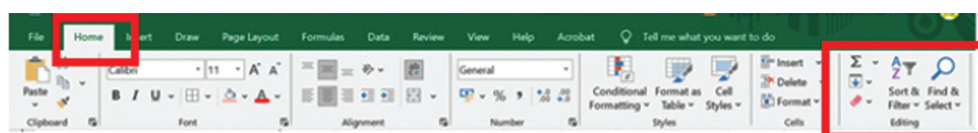
Steps to Filter the Data

Note: Although the initial steps for **Sort** and **Filter** are similar, all the steps are listed again below to avoid any confusion.

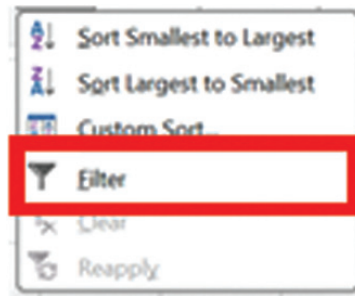
Step 1: Open **MS Excel** → Create a **new worksheet** → Enter the required data.

Step 2: Select the data to be filtered by holding down the **left mouse button** and dragging the pointer over the desired range.

Step 3: Click the **Home** tab on the menu bar → In the **Editing** group, click the **Sort & Filter** drop-down button.

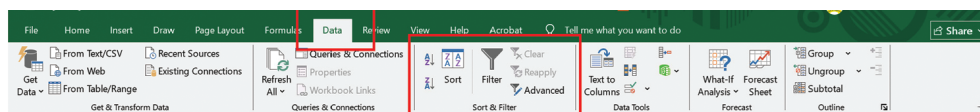


Choose the Filter option from the list of options.



OR

Click the **Data** tab on the menu bar → In the **Sort & Filter** group, click the **Filter** button.



OR

Press the shortcut keys: **CTRL+SHIFT+L**

Drop-down arrows will appear in the header row of each column.

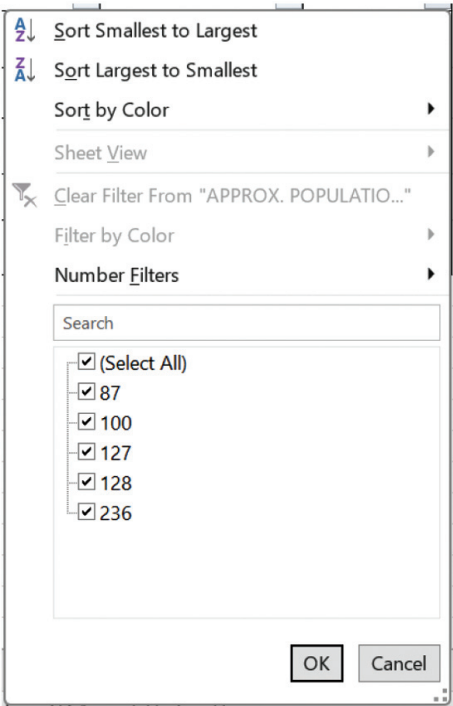
Five Indian States & Population		
Sno	STATE	APPROX. POPULATION (In Millions)
1	Uttar Pradesh	236
2	Madhya Pradesh	87
3	Maharashtra	128
4	Bihar	127
5	West Bengal	100

Step 4: Click the drop-down arrow in the column you want to filter and select the criteria.

A list of options will appear as shown here:



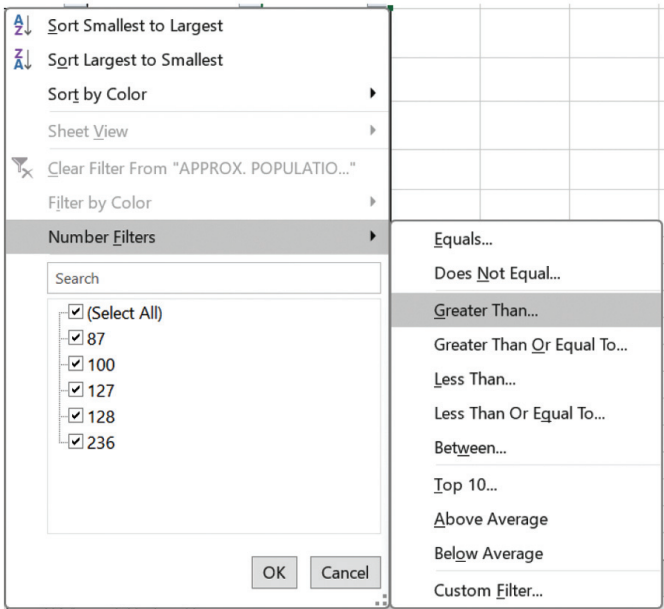
Notes



You may choose the required options from this list and click the Ok button.

Additionally, you may click on the **Number Filters** options to avail advanced filter options.

Select the desired options, like **Greater Than...** in this example.





Another **Custom Autofilter** dialog box will appear, enter the required values → Click Ok

The data will be filtered as desired, showing only the required ones, and hiding others temporarily, as shown here:

Sno	STATE	APPROX. POPULATION (In Millions)
1	Uttar Pradesh	236
3	Maharashtra	128
4	Bihar	127

Note: To get the original data back and to remove the **Filter** drop-down arrow from the column heading, repeat **Step 3**.



INTEXT QUESTIONS 3.1

1. Answer the following Multiple-Choice Questions:

- (i) The Sort feature in Excel is used to:
 - (a) Arrange data in a particular order
 - (b) Remove duplicate data
 - (c) Highlight specific cells
 - (d) Filter unwanted rows



Notes

- (ii) Which of the following can you *not* do with the Sort tool?
 - (a) Sort alphabetically
 - (b) Sort numerically
 - (c) Sort by color
 - (d) Sort by formulas
- (iii) The **Filter** tool in Excel is mainly used to:
 - (a) Rearrange all data
 - (b) Display only rows that meet certain criteria
 - (c) Delete unwanted rows
 - (d) Add new rows to a table
- (iv) To apply a filter in Excel, you can use the shortcut:
 - (a) Ctrl + F
 - (b) Alt + D + F + F
 - (c) Ctrl + Shift + L
 - (d) Alt + S + F
- (v) When you apply a filter in Excel, what happens to the hidden data?
 - (a) It gets deleted permanently
 - (b) It moves to another sheet
 - (c) It is temporarily hidden but not deleted
 - (d) It changes color

2. Fill in the Blanks:

- (i) The tool in Excel is used to arrange data in a particular order, either ascending or descending.
- (ii) The tool is used to temporarily hide rows that do not meet specific criteria.
- (iii) The **Sort & Filter** button is located in the group on the **Home** tab.
- (iv) In the **Sort** dialog box, you can choose the column name under the drop-down list.
- (v) To quickly remove a filter, you can use the keyboard shortcut



3.2 FORMULAS & FUNCTIONS CHARTS

As MS Excel is widely used for storing and processing statistical, numerical, and business data, it often becomes necessary to perform various calculations to derive meaningful conclusions. **MS Excel 2019** provides powerful **Formulas** and **Functions** tools that are essential for performing a variety of calculations, analysing data, and automating tasks efficiently.

3.2.1 Formulas

Note: Formula and functions always begin with an equal (=) sign in MS-Excel.

In mathematics, a **formula** is simply an expression that includes various constant and variable values.

Similarly, in **MS Excel 2019**, a formula is composed of the following elements:

- Values
- Cell references (addresses containing values)
- Mathematical operators

Steps to Add a Formula in a Cell

Step 1: Click the cell where you want to enter the formula.

Step 2: Type the **equal sign (=)** — all formulas in Excel begin with this symbol.

Step 3: Enter the formula as required. For example, to add three values, you can use either of the following:

- Using direct values: $= 2000 + 3000 + 4000$
- Using cell references: $= B2 + B3 + B4$

Here, **B2**, **B3**, and **B4** are the cell addresses containing the values to be added.

Once you have entered the formula, press the **Enter** key. You will notice that the formula disappears from the cell, and the **calculated result** is displayed instead.

Now, you can try applying any formula you've learned in **Mathematics** or **Physics**.

3.2.2 Functions

Not everyone using Excel can remember all types of formulas at all times. To overcome this limitation and simplify the calculation process, **MS Excel 2019** provides a set of **built-in formulas** known as **functions**.



Notes

Spreadsheet Software

A function is a predefined formula in Excel that simplifies complex calculations. Each function has a specific name and syntax and is used to perform common tasks like adding values, calculating averages, finding maximum or minimum values, counting cells containing specific values, and many more.

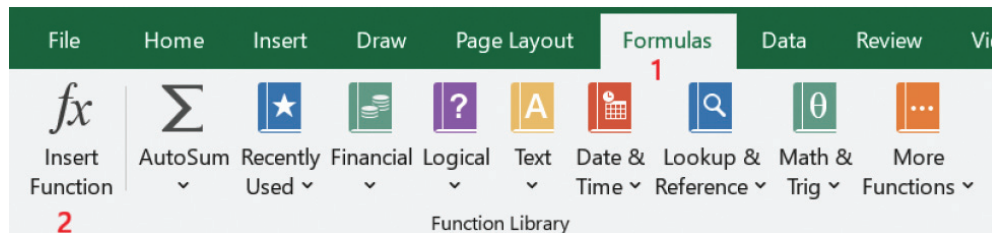
Since MS Excel supports a large number of built-in functions, they are organized into distinct categories. A few of these categories, along with some commonly used functions from each, are listed below for better accessibility, understanding, and quick reference:

S.No.	Category	Brief Description	Examples
1	Financial	These are used for financial and accounting purposes.	PMT(), FV()
2	Date & Time	These are used to handle date and time values.	TODAY(), NOW()
3	Math & Trig	These are used for Mathematical and Trigonometric calculations.	SUM(), POWER(), SIN(), ABS()
4	Statistical	These are used for statistical calculations.	AVERAGE(), MAX(), MIN(), COUNT()
5	Lookup & Reference	These are used to retrieve data from tables or other ranges.	VLOOKUP(), HLOOKUP()
6	Database	These are used to perform calculations on a database.	DSUM(), DAVG()
7	Text	These are used to manipulate string values.	LEN(), UPPER(), LOWER(), CONCATENATE()
8	Logical	These are used to evaluate logical conditions and return True or False.	IF(), AND(), OR(), NOT()
9	Information	These are used to obtain information about cells, data types or error values.	ISBLANK(), ISNUMBER()
10	Engineering	These are mainly used for engineering and technical calculations.	CONVERT(), BIN2DEC()

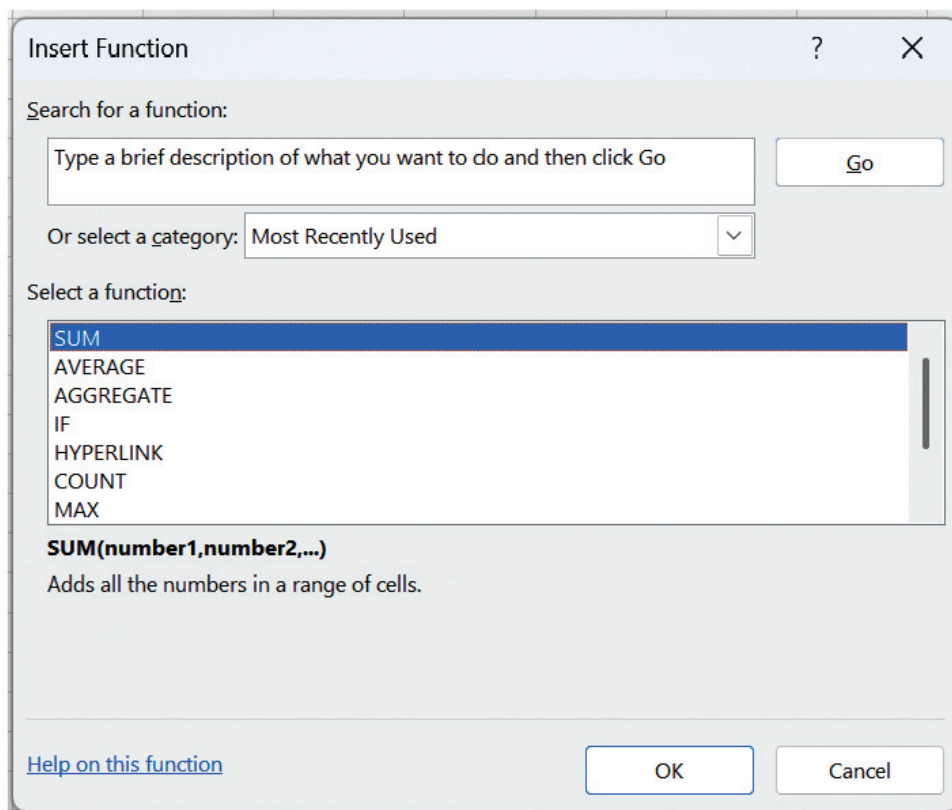
Steps to use functions in the worksheet

Step 1: Click the cell where you want to enter the function.

Step 2: Click on Formulas → Insert Function



The Insert Function dialog box will appear as shown here:



Step 3: Type a brief description in the Search box

OR

Select a Category from the drop-down list.

A list of related functions will then appear in the Function list box. Select the desired function and click the OK button.

The **Function Arguments** dialog box will appear, displaying the cell references of the values on which the selected function will operate.



Notes

Function Arguments

SUM

Number1: C3:G3 = {90,97,99,96,92}

Number2: = number

= 474

Adds all the numbers in a range of cells.

Number1: number1,number2,... are 1 to 255 numbers to sum. Logical values and text are ignored in cells, included if typed as arguments.

Formula result = 474

[Help on this function](#)

OK Cancel

By default, Excel automatically detects and displays a cell range, but if you wish to use a different range, you can manually select the required cells.

Step 4: Click the OK button.

The **Function Arguments** dialog box will close, and the result will be displayed in the selected cell.

	A	B	C	D	E	F	G	H
1	CLASS CONSOLIDATED MARKS SHEET							
2	ROLLNO	NAME	ENGLISH	HINDI	MATHS	SCIENCE	AI	TOTAL
3	1	Abhinav	90	97	99	96	92	474
4	2	Abraham	95	96	80	95	96	
5	3	Bhavishya	99	95	97	94	99	
6	4	Ivana	100	90	95	96	98	
7	5	Mani	80	89	90	90	95	
8	6	Roshni	85	93	91	86	96	
9	7	Sagar	89	98	95	97	97	
10	8	Samay	78	91	75	92	98	
11	9	Sneha	75	90	86	80	99	
12	10	Vikram	97	95	89	85	100	

Note: Alternatively, you can also directly select the desired **category** and **function** from the **Function Library** group on the **Formulas** tab.

To apply the same function to other cells, you can either repeat the same steps or use the **Fill Handle** (the small plus sign at the bottom-right corner of the selected cell). Click and drag the fill handle across the desired cells – you'll notice that all selected cells are automatically filled with the corresponding results.



	A	B	C	D	E	F	G	H
1	CLASS CONSOLIDATED MARKS SHEET							
2	ROLLNO	NAME	ENGILSH	HINDI	MATHS	SCIENCE	AI	TOTAL
3	1	Abhinav	90	97	99	96	92	474
4	2	Abraham	95	96	80	95	96	462
5	3	Bhavishya	99	95	97	94	99	484
6	4	Ivana	100	90	95	96	98	479
7	5	Mani	80	89	90	90	95	444
8	6	Roshni	85	93	91	86	96	451
9	7	Sagar	89	98	95	97	97	476
10	8	Samay	78	91	75	92	98	434
11	9	Sneha	75	90	86	80	99	430
12	10	Vikram	97	95	89	85	100	466

AutoSum() Function: Since addition is one of the most commonly performed calculations, **MS Excel** provides a special feature called **AutoSum()** to make this task faster and easier.

The **AutoSum** function in Excel is a **quick tool** that automatically adds up a range of numbers without requiring you to type the full formula manually.

Here's how it works:

Steps to use:

Step 1: Click the cell where you want the result.

Step 2: Go to the **Home** tab → **Editing** group → click **AutoSum (Σ)**.

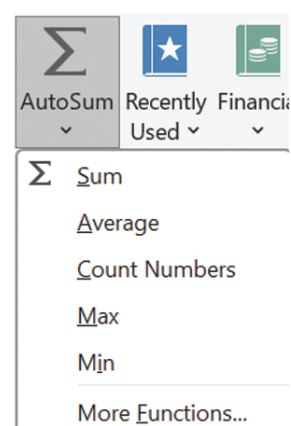
OR

Go to the **Formulas** tab → **Function Library** group → click **AutoSum (Σ)**.

Step 3: Excel automatically selects the nearby range of numbers.

Step 4: Press **Enter** to get the total.

Note: The **AutoSum** tool can also be used to apply other functions such as **AVERAGE**, **MAX**, **MIN**, and **COUNT** in addition to **SUM**.



**INTEXT QUESTIONS 3.2****1. Answer the following Multiple-Choice Questions:**

- (i) Every formula in Excel begins with which symbol?
(a) + (b) – (c) = (d) *
- (ii) Which of the following is a function in Excel?
(a) =A1+A2 (b) A1*A2
(c) A1+A2+A3 (d) =SUM(A1:A5)
- (iii) In the formula =AVERAGE(B1:B10), what does Excel calculate?
(a) The total of the values in B1 to B10
(b) The average of the values in B1 to B10
(c) The smallest value in B1 to B10
(d) The largest value in B1 to B10
- (iv) Which of the following functions returns the largest value in a range?
(a) MAX() (b) LARGE()
(c) COUNT() (d) SUM()
- (v) Which of the following categories in Excel contains the SUM, POWER, and SIN functions?
(a) Logical (b) Text
(c) Math & Trigonometry (d) Lookup & Reference

2. Match the following:

Column A	Column B
(i) Text functions	(a) DSUM()
(ii) AutoSum	(b) IF()
(iii) Logical functions	(c) VLOOKUP()
(iv) Database	(d) LEN()
(v) Lookup & Reference	(e) Σ



3.3 CHARTS

As you learned in the previous lesson, **charts** or **graphs** are used to represent data visually, making it easier to understand and compare information.

You may find the chart tool of MS Word and Excel similar at first because Word 2019 and Excel 2019 use the same charting engine, so the types of charts (like Column, Line, Pie, Bar, etc.) appear identical. The key differences are not in appearance, but in functionality and data handling. So, let's explore the basic differences between charts in MS Word 2019 and MS Excel 2019 before proceeding further:

Difference between Charts in MS Word 2019 and MS Excel 2019:

- **MS Word 2019:** Although Word allows you to create charts, it provides limited editing features. Charts in Word are mainly for presentation purposes. In Word, a chart opens a mini Excel sheet for data entry, but the data is not as dynamic as in Excel.
- **MS Excel 2019:** Excel offers a lot of customization options, and the ability to use formulas for calculations. Charts in Excel are directly linked to worksheet data, so if the data changes, the chart updates automatically.

Despite their basic similarities and minor differences, charts in **MS Word** and **MS Excel** are undoubtedly powerful data analysis tools, as they help users identify patterns and trends by enabling easy comparison of data.

MS Excel offers a variety of charts, organized into different categories (similar to MS Word), which are as follows:

- Column
- Line
- Pie
- Bar
- Area
- XY (Scatter)
- Map
- Stock
- Surface
- Radar
- Treemap
- Sunburst
- Histogram
- Box & Whisker
- Waterfall
- Funnel
- Combo

Steps to insert a chart in the worksheet:

Step 1: Select the **cells or cell range** on which the chart is to be created.

- If the cells are **continuous**, drag the mouse pointer over them to select.
- If the cells are **non-continuous**, hold down the **CTRL** key while selecting each desired cell or range.



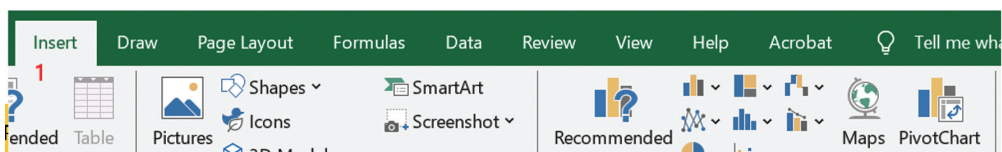
Notes

Spreadsheet Software

Once you release the mouse button, selected cells will be highlighted, as shown here:

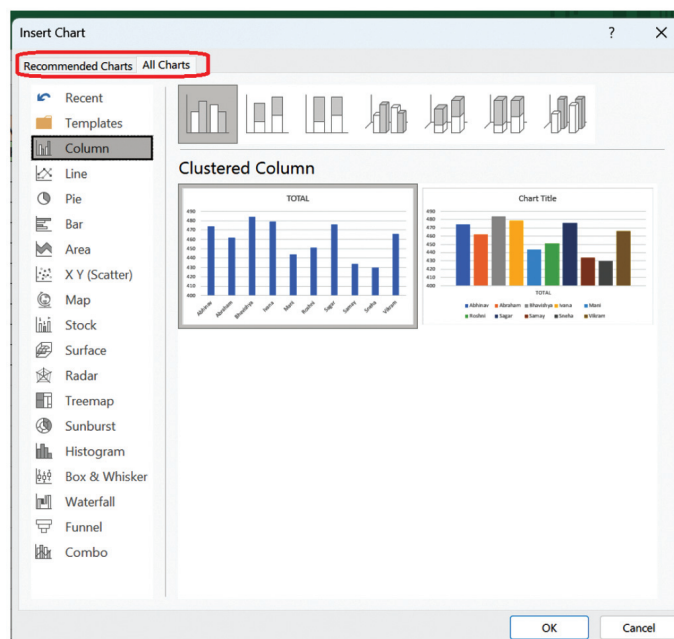
	A	B	C	D	E	F	G	H
1	CLASS CONSOLIDATED MARKS SHEET							
2	ROLLNO	NAME	ENGLISH	HINDI	MATHS	SCIENCE	AI	TOTAL
3	1	Abhinav	90	97	99	96	92	474
4	2	Abraham	95	96	80	95	96	462
5	3	Bhavishya	99	95	97	94	99	484
6	4	Ivana	100	90	95	96	98	479
7	5	Mani	80	89	90	90	95	444
8	6	Roshni	85	93	91	86	96	451
9	7	Sagar	89	98	95	97	97	476
10	8	Samay	78	91	75	92	98	434
11	9	Sneha	75	90	86	80	99	430
12	10	Vikram	97	95	89	85	100	466

Step 2: Click on Insert → Charts



You can either select a suitable **chart type** directly from the **Charts** group, or click the **Expand Arrow** at the bottom-right corner of the Chart group for more options.

The **Insert Chart** dialog box will then appear, as shown here:



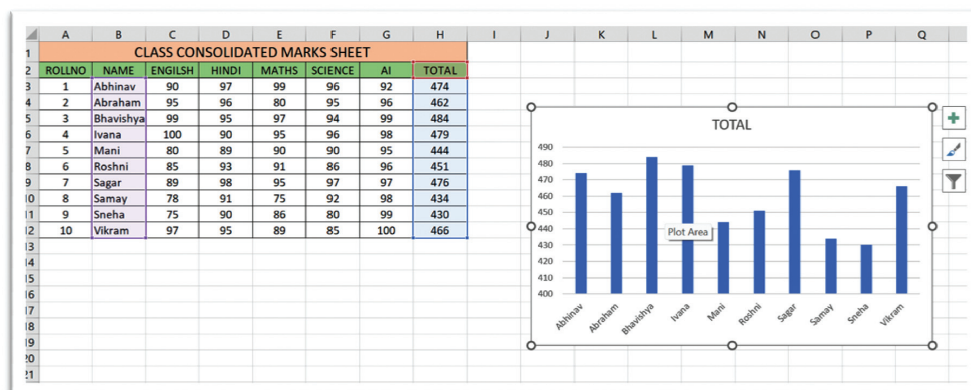


Step 3: Choose the desired tab from the Recommended Charts and All Charts tab.

Step 4: Choose the desired category and style from the options given.

Step 5: Click on the Ok button.

Insert Chart dialog box will disappear and a chart will be inserted in the worksheet based on the selected data as shown below:



You can format the chart by clicking the **Chart Design** tab and selecting the desired **chart style** and **formatting options**.



INTEXT QUESTIONS 3.3

1. **State if the following statements are True or False:**

- Charts in Excel are used to represent data visually.
- Excel 2019 allows only one type of chart — the Column chart.
- The “Insert” tab in Excel contains the Chart tools.
- You cannot move or resize a chart once it is created.
- Charts created in Excel cannot be copied to MS Word.

2. **Fill in the Blanks:**

- A in Excel is a graphical representation of data from a worksheet.
- The option to insert a chart is found under the tab on the Ribbon.



Notes

Spreadsheet Software

- (iii) The tab provides options to change the style and layout of a chart.
- (iv) While creating Charts, to select **non-continuous** cells, hold down the key while selecting each desired cell or range.
- (v) To insert Chart, click on tab → Chart option.



WHAT YOU HAVE LEANT

- Spreadsheet software is a type of application software that organises data in the form of rows and columns.
- Some popular spreadsheet software includes MS Excel, LibreOffice Calc, OpenOffice Calc, Google Sheets, Zoho Sheets, and Lotus 1-2-3, among others.
- The “Sort” tool arranges or orders data in a specified sequence, whether numerically, alphabetically, or based on other attributes.
- Data can be sorted in two ways, either in ascending (increasing) order or in descending (decreasing) order.
- The **Filter** tool allows to display only the data that meets specific criteria, making it easier to concentrate on relevant information while temporarily hiding the rest.
- Formulas and Functions tools are essential for performing a variety of calculations, analysing data, and automating tasks efficiently.
- Formula and functions always begin with an equal (=) sign in MS-Excel.
- A function is a predefined formula in Excel that simplifies complex calculations.
- The **AutoSum function** in Excel is a **quick tool** that automatically adds up a range of numbers without requiring you to type the full formula manually.
- **charts** or **graphs** are used to represent data visually, making it easier to understand and compare information.



TERMINAL EXERCISE

1. What is the purpose of the Sort Tool in Excel?
2. Briefly explain the Filter tool in Excel.



3. Differentiate between Formula and Functions in Excel.
4. Write a short note on Charts.
5. Name any four chart types available in MS-Excel 2019.
6. Name any two function categories and any two function names belonging to each category.
7. Write main steps to insert chart in a worksheet.



ANSWER TO INTEXT QUESTIONS

3.1

1. Answer the following Multiple-Choice Questions:

- (i) (a) Arrange data in a particular order
- (ii) (d) Sort by formulas
- (iii) (b) Display only rows that meet certain criteria
- (iv) (c) Ctrl + Shift + L
- (v) (c) It is temporarily hidden but not deleted

2. Fill in the Blanks:

- (i) Sort (ii) Filter (iii) Editing
- (iv) Sort By (v) CTRL+SHIFT+L

3.2

1. Answer the following Multiple-Choice Questions:

- (i) (c) =
- (ii) (d) =SUM(A1:A5)
- (iii) (b) The average of the values in B1 to B10
- (iv) (a) MAX()
- (v) (c) Math & Trigonometry

2. Match the following:

- (i) (d) LEN() (ii) (e) Σ (iii) (b) IF()
- (iv) (a) DSUM() (v) (c) VLOOKUP()



Notes

3.3

1. **State if the following statements are True or False:**

- | | | |
|------------|------------|------------|
| (i) True | (ii) False | (iii) True |
| (iv) False | (v) False | |

2. **Fill in the Blanks:**

- | | | |
|-----------|-------------|--------------------|
| (i) Chart | (ii) Insert | (iii) Chart Design |
| (iv) Ctrl | (v) Insert | |

Key Learning Outcomes

By the end of the lesson, you will be able to:

- efficiently organize and manage data in Excel using Sort and Filter tools
- perform basic and complex calculations using formulas and predefined functions
- create and customize charts and graphs to represent data visually
- analyze trends, patterns, and comparisons through different chart types like Column, Line, Pie, and Bar charts



4

PRESENTATION SOFTWARE

In the previous lesson, you were introduced to various powerful tools available in spreadsheet software for organizing statistical data systematically, conducting data analysis, and generating comprehensive reports.

Now is the time to learn how to present data professionally and aesthetically, because in today's era, the way data is presented is just as important as its accuracy. Several software programs, known as presentation software, allow you to organize content effectively, enhance visual appeal, and make your presentations more engaging. Some popular presentation software includes Microsoft PowerPoint, LibreOffice Impress, Google Slides, Zoho Show, and Apple Keynote.

In this lesson, you will learn how to use MS PowerPoint to construct an effective professional presentation by applying various tools to deliver impactful presentations.



OBJECTIVES

After completing this lesson, you will be able to:

- understand the basics of presentation software.
- present the data professionally and aesthetically in a presentation software
- construct professional PowerPoint presentations by adding and formatting text, and applying templates, themes, and formatting tools to enhance visual appeal.
- understand how to integrate images, animations, transitions and other multimedia elements into slides, and operate slideshow tools effectively to deliver engaging and seamless presentations using navigation and presenter features.



Notes

4.1 BASICS OF PRESENTATION SOFTWARE

While presenting content to an audience, it is always more effective to make it visually appealing and captivating rather than plain and static. Microsoft PowerPoint 2019, one of the most popular presentation software programs, helps you achieve this with its wide range of design and animation features.

Let's explore it, starting with the basics:

Presentation and Slides: As you know, in the digital world, data is stored in the form of files. Different types of software support different file formats. Files created using presentation software are called **presentations**, which consist of individual pages known as **slides**.

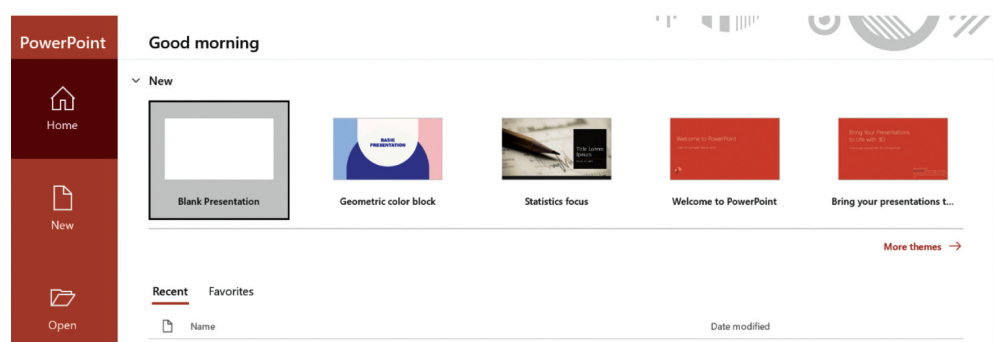
In other words, we can say that a slide is a single page within the presentation, which can contain **text, images, audio, or video** as per the requirement, while a presentation is made up of one or more slides.

Technically, there is no limit to the total number of slides in a presentation. The number of slides can vary depending on the requirements. In Microsoft PowerPoint 2019, presentations are saved with the .pptx file extension.

4.1.1 Create a Presentation in MS PowerPoint 2019 PowerPoint

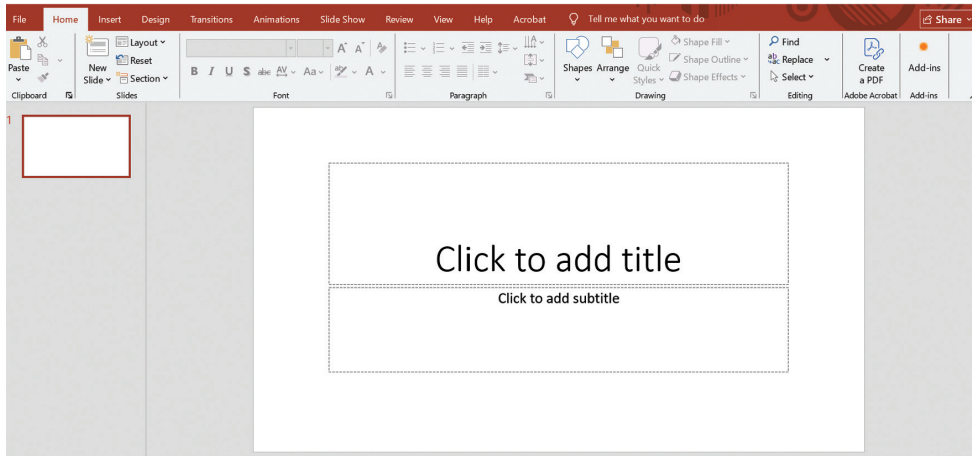
Follow the steps to create a simple presentation in MS PowerPoint 2019:

Step 1: Click the **Start** button → type **PowerPoint** → press **Enter** to open it.

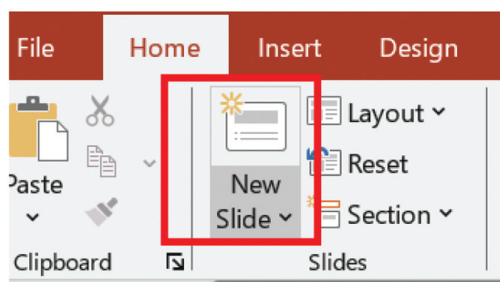


Step 2: From the **Start Screen**, select a **Blank Presentation**.

A blank presentation will open on the screen, containing a single slide by default, called the **Title Slide**. This slide uses the default layout, which includes a placeholder for adding a title and another placeholder for adding a subtitle, as shown below:

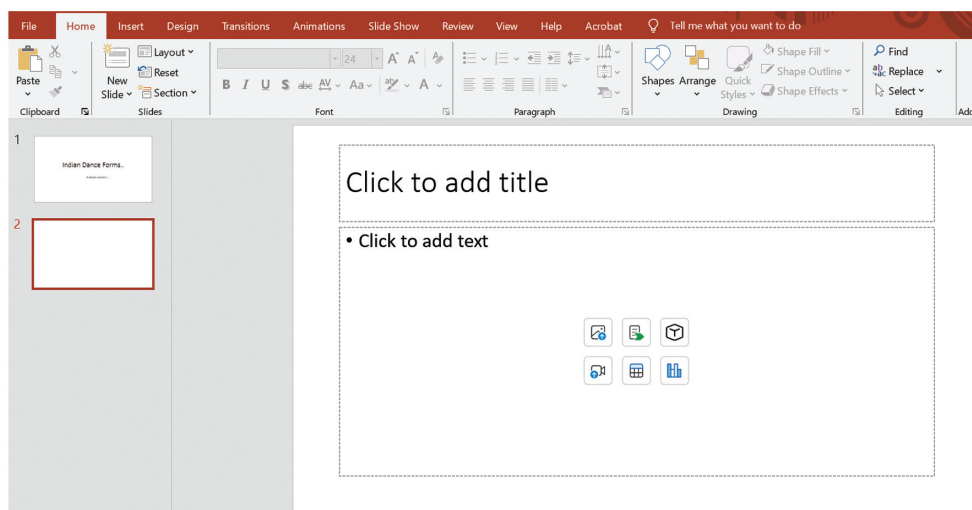


Step 3: Click inside the text boxes to enter your **presentation title** and **subtitle** (such as presenter's name, subject, or date).



Step 4: Insert a new slide by going to the Home Tab → Click on New Slide (CTRL+M)

A blank slide with default layout will be inserted as shown here:





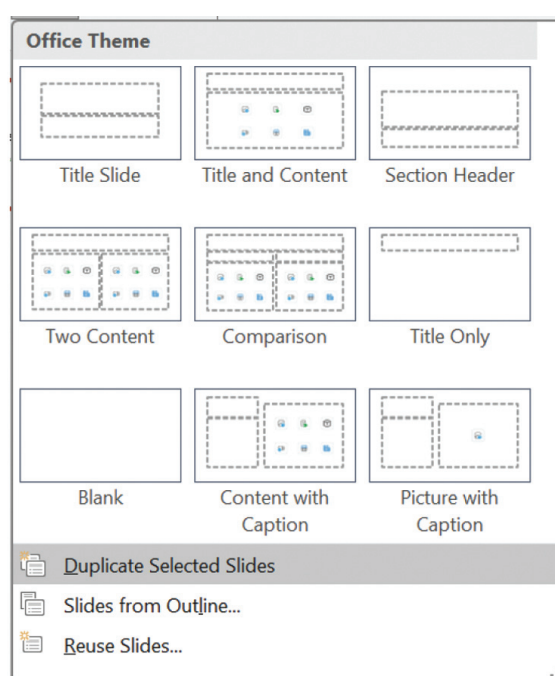
Notes

OR

Click on the drop-down arrow of New Slide



Different slide layouts will appear. Select the desired layout by clicking on it, and a new slide with that layout will be added to your presentation.



Enter the required content in the placeholders.

Repeat this step to add more slides as needed.

Do not forget to save your presentation before proceeding further to prevent any loss of data.

4.1.2 Save a Presentation

Follow the given steps to save the presentation:

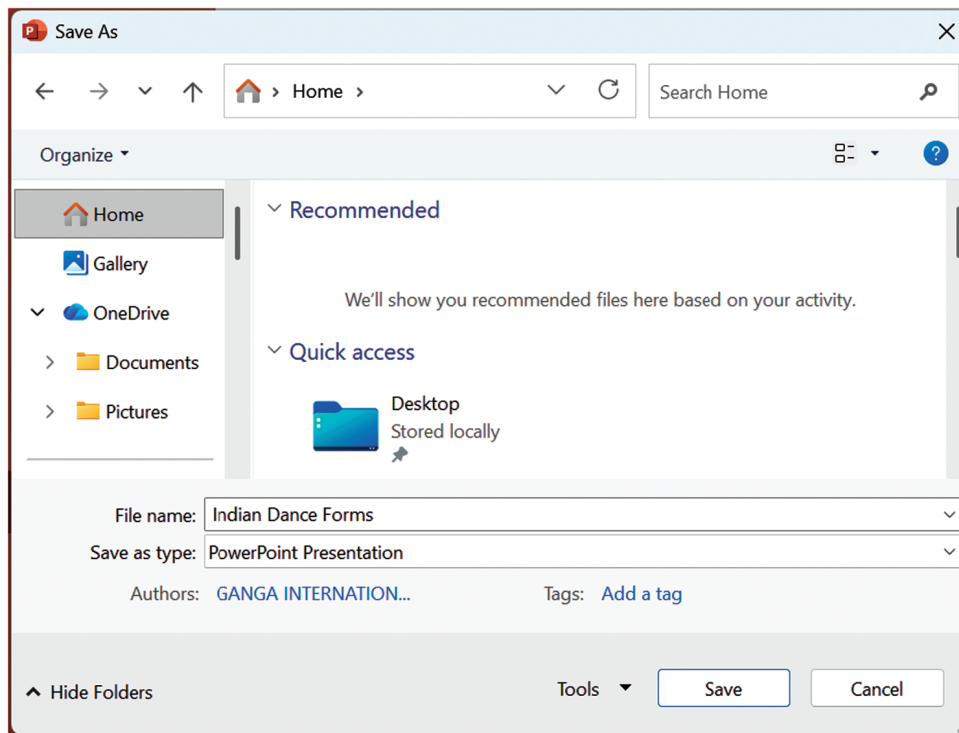
Step 1: Click on the File Tab at the top left corner of the screen → Click on the **Save** or **Save As** to save the presentation for the first time or to save it with a different name, location, or file format.



Step 2: Select the folder or drive where you want to save the file. You can save it on your **computer**, **OneDrive**, or any external storage.

Click on the **Save** option instead of the **Save As** option to save changes to a previously saved presentation or Press CTRL+S.

The Save As dialog box will appear as shown below:



Step 3: Type a suitable name for your presentation in the **File Name** field.

Step 4: Press the **Save** button to save your presentation.

Your presentation will be saved. It's advisable to regularly save your work while working.

Note: By default, PowerPoint saves presentations with **.pptx** extension, but you may save them in other formats like **.ppt** (older versions), **PDF**, or **PowerPoint Show (.ppsx)** if needed by selecting the required type from **Save as type** drop-down menu.

4.1.3 Open a Presentation

Follow these steps to open a previously created presentation:



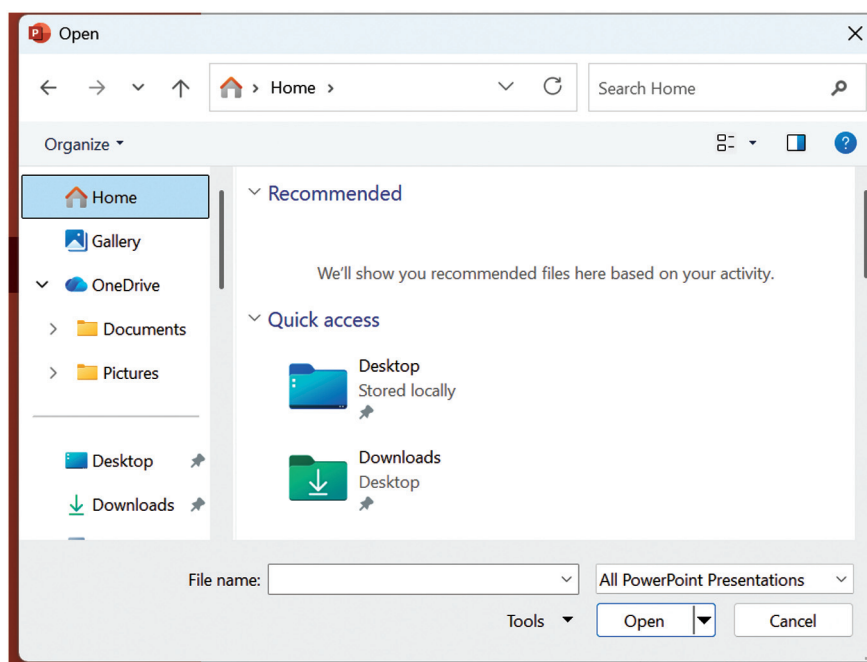
Notes

Step 1: Open MS PowerPoint by clicking on the **Start** button → type **PowerPoint** → press **Enter** to open the program.

Step 2: Click on the **File** Tab → Click on **Open** or press **CTRL+O**

Step 3: Choose the Location of the File where your file is saved – for example, **This PC**, **OneDrive**, or **Browse** to find it.

The Open Dialog box will appear as shown:



Step 4: Locate and select the Presentation file by clicking on the desired presentation → Click the **Open** button to open your selected presentation into PowerPoint.

Your presentation will open on the desktop.



INTEXT QUESTIONS 4.1

1. Answer the following Multiple-Choice Questions:

- (i) Which of the following is not a presentation software?
- | | |
|---------------|-------------------|
| (a) Keynot | (b) MS PowerPoint |
| (c) Zoho Show | (d) MS Excel |



- (ii) Which of the following is a default extension of a presentation in MS PowerPoint 2019?
 - (a) power
 - (b) .ppt
 - (c) .pptx
 - (d) .ppty
 - (iii) Which of the following is a Shortcut key to add a new slide in a presentation?
 - (a) SHIFT+M
 - (b) CTRL+M
 - (c) SHIFT+N
 - (d) CTRL+N
 - (iv) A presentation is made up of minimum slide.
 - (a) 0
 - (b) 1
 - (c) 2
 - (d) 3
 - (v) Which of the following is a Shortcut key to save a new presentation?
 - (a) SHIFT+S
 - (b) CTRL+SA
 - (c) ALT+S
 - (d) CTRL+S
2. Identify if the following statements are True or False:
- (a) PowerPoint 2019 is used to create slide-based presentations.
 - (b) Slides in a presentation can include text, images, charts, and videos.
 - (c) You cannot change the layout of a PowerPoint presentation once it is created.
 - (d) PowerPoint presentations can only be viewed on the same computer on which they are created
 - (e) The first slide that appears in a new presentation is usually a **Title Slide**.

4.2 FORMATTING THE PRESENTATION

In the previous section, you learned how to create a basic presentation containing one or more slides. Now, it's time to enhance its visual appeal by formatting the text, adding images, and applying templates and themes.

Formatting is the process of enhancing the appearance or style of text, objects, or slides to make a document or presentation more attractive and striking.

Although many formatting features and their application methods are similar across the Microsoft Office suite, let's take a quick look at them once again here, one by one.



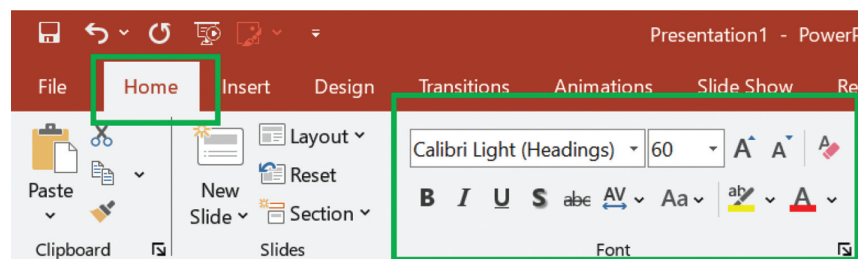
Notes

4.2.1 Formatting the Text

To format text – such as changing its color, size, and style to make it more visually appealing instead of plain black – select the text by clicking and dragging the mouse pointer over it, then follow the steps given below as needed:

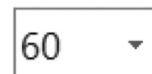
To change the font style:

Home tab → Font group → select the desired font style (like Calibri, Times New Roman) from the Font drop-down arrow.



To change the font size:

Home tab → Font group → select the desired font size from the Font size drop-down arrow.



OR

Use the Increase/Decrease Font Size buttons from the Font group.



To change the font color:



Home tab → Font group → Font Color drop-down arrow → select the desired font color from the color palette that appears after clicking on the Font color button





To change the text background (highlight) color:



Home tab → Font group → Text Highlight Color drop-down arrow → select the desired text highlight color from the color palette that appears after clicking on the text highlight color drop-down arrow.



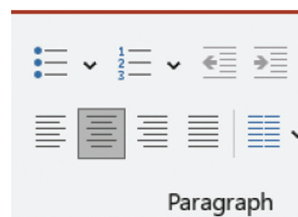
To make the text Bold/Italic/Underline/Text Shadow/Strikethrough/Character Spacing/Change Case:

Home tab → Font group → Choose the required style



To apply paragraph formatting like Alignments/Bullets/Numbering:

Home tab → Paragraph group → Choose the required style



To remove all the formatting

Home tab → Font group → click on the **Clear All Formatting** button



Alternatively, after selecting the text, instead of following multiple steps, you can use the following shortcut keys to save time and make formatting faster:



Notes

Presentation Software

Task	Shortcut Key	Description
Bold	Ctrl + B	Makes the selected text bold.
Italic	Ctrl + I	Makes the selected text Italic.
Underline	Ctrl + U	Underlines the selected text.
Increase Font Size	Ctrl + Shift + >	Increases the font size.
Decrease Font Size	Ctrl + Shift + <	Decreases the font size.
Change Font	Ctrl + Shift + F	Opens the Font dialog box to change font type.
Change Font Size (Dialog Box)	Ctrl + Shift + P	Opens the Font Size box to enter a specific size.
Change Case	Shift + F3	Toggles between UPPERCASE, lowercase, and Capitalize Each Word.
Align Left	Ctrl + L	Aligns the text to the left.
Center Align	Ctrl + E	Centers the text.
Align Right	Ctrl + R	Aligns the text to the right.
Justify Text	Ctrl + J	Aligns text evenly on both sides.

4.2.2 Themes

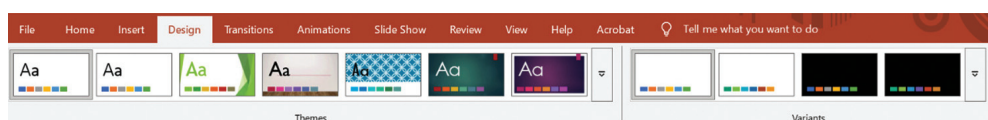
Rather than applying designs or styles to each element separately, you can use the **Theme** feature in PowerPoint to format the entire presentation at once for a consistent and professional look.

A theme in PowerPoint 2019 is a predefined set of design elements that determines the overall look and feel of a presentation. A theme includes colors, fonts, background styles, and effects that are applied consistently across all slides to give your presentation a professional and uniform appearance.

Follow the steps to apply a Theme:

Step 1: Open your presentation.

Step 2: Design Tab → Themes group





A list of various themes and their variants will appear on the screen, as shown below:

Step 3: Click the desired theme to apply it to your presentation.

Note: You may use the Variants group (next to Themes) to change color schemes, fonts, or effects of the selected theme.

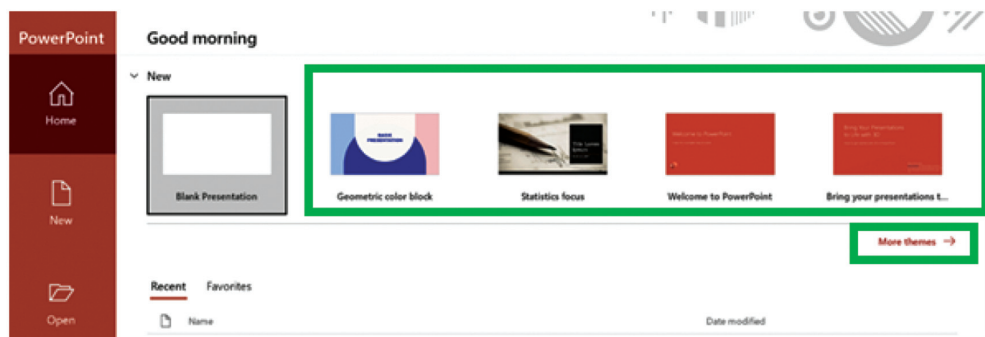
4.2.3 Templates

Microsoft PowerPoint 2019 offers a variety of readymade design structures, known as **templates**, that include a combination of predesigned coordinated color themes, slide layouts, effects and styles.

A template in MS PowerPoint 2019 is used to create a new professional-looking presentation with a ready-made design and structure instead of designing everything from scratch. Templates save a lot of time and help in creating high-quality presentations with minimal effort. It also helps in maintaining a consistent and professional look across all the slides.

Follow the steps to use a Template:

Step 1: Click the **Start** button → type **PowerPoint** → press **Enter** to open it.



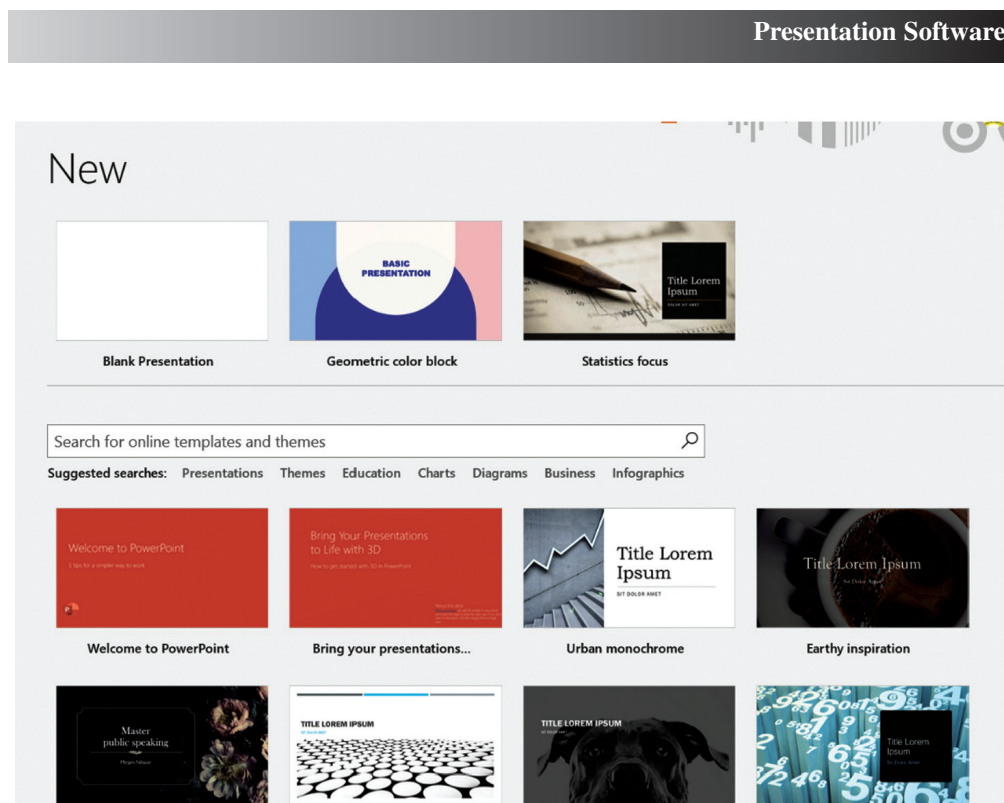
Step 2: From the **Start Screen**, select a desired template by clicking on it.

OR

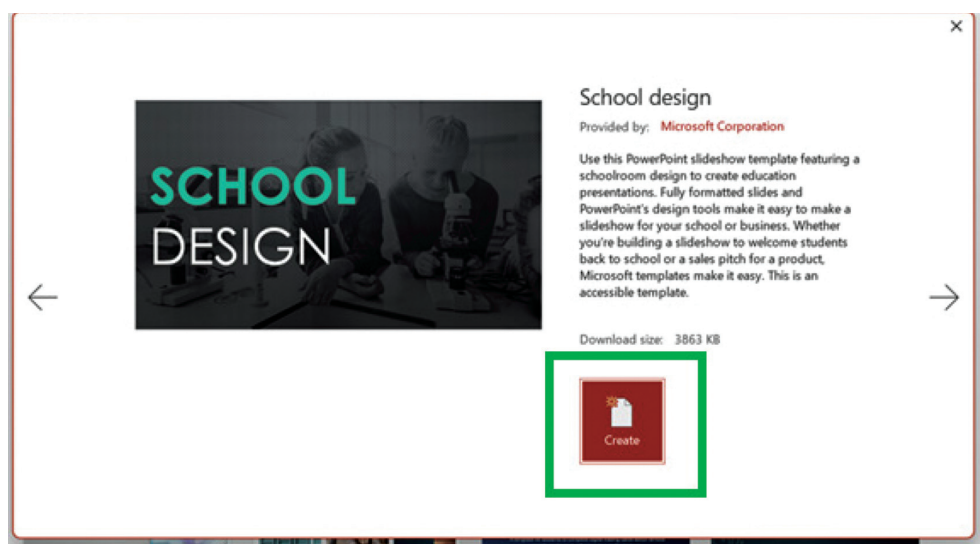
Click on **More Themes** to find more templates online → Click on the desired template to select it.



Notes



The desired template's preview window will appear on the screen as shown below:



Step 3: Click the **Create** button to open a new presentation based on the selected template as shown below:



Step 4: Add your content to the pre-formatted slides. Easy and instant, isn't it....

Don't forget to save your presentation to prevent data loss.



INTEXT QUESTIONS 4.2

1. Fill in the blanks:

- (i) is the process of enhancing the appearance or style of text, objects, or slides to make a document or presentation more attractive and striking.
- (ii) To apply Bold/Italic/Underline, use the required tool present on the group.
- (iii) To change the font style, go to Home tab → group → select the desired font style (like Calibri, Times New Roman) from the Font drop-down arrow.
- (iv) A in PowerPoint is a predefined set of design elements that determines the overall look and feel of a presentation.
- (v) A is used to create a new professional-looking presentation with a ready-made design and structure.

2. Match the following:

Column A

- (i) Clear All Formatting
- (ii) Font Color
- (iii) CTRL+E
- (iv) Text Highlight Color
- (v) CTRL+B

Column B

- (a) Center Align
- (b) BOLD
- (c) 
- (d) 
- (e) 



4.3 MULTIMEDIA ELEMENTS OF A SLIDE

The term Multimedia is made up of two words, Multi+Media, where **Multi** means many and **Media** means medium or ways to convey information like text, images, audio, video, and animations. So, the term **Multimedia** literally means “using many ways together to convey information.”

PowerPoint 2019 support following **multimedia elements** to be used on the slides to make the presentation more engaging and interactive:

- Text
- Images/Pictures
- Shapes and SmartArt
- Charts/Graphs
- Tables
- Audio/Sound
- Video/Movies
- Animations
- Transitions
- Hyperlinks and Action Buttons

Among these elements, you have already learned how to add and format **text** on a slide in the previous section. Next, we will explore the remaining components.

4.3.1 Inserting Multimedia (Pictures/Smart Art/3D Models/Video/Table/Chart) On a Slide

Follow the steps to add multimedia to the slide:

Step 1: Open the presentation in **Microsoft PowerPoint 2019**, and navigate to the **slide** where the multimedia content needs to be added.

Slide’s central content area may look like this, as shown here, having six icons to add the following:

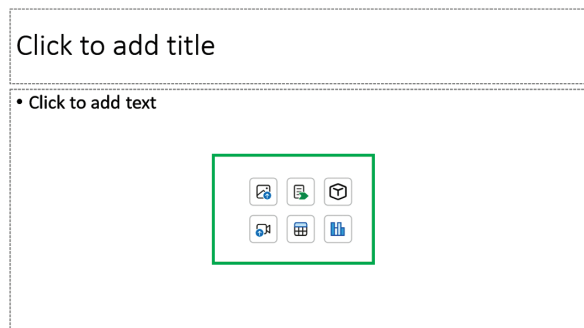
- Pictures
- SmartArt Graphic
- 3D Models

Presentation Software

- Video
- Table
- Chart



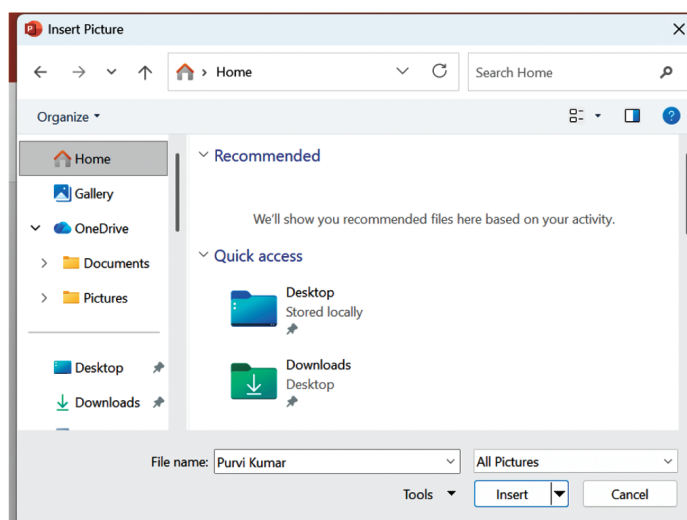
Notes



Step 2: Click on the required category.

Step 3:

- For adding pictures/Video, select the location of the media → Choose the required media → Click on the **Insert** button.
- For adding SmartArt/Chart, choose the required category of 3D Models → Select the desired 3D Model → Click on the **Insert** button.
- For adding SmartArt/Chart, choose the required style → Click on the **Ok** button.
- For inserting tables, specify the number of rows and columns → Click on the **Ok** button.



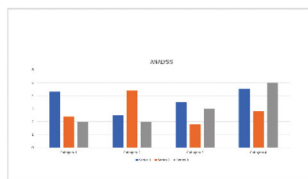


Notes

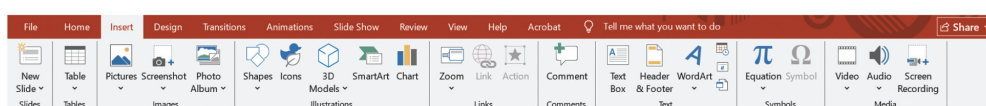
Presentation Software

The desired media will be added to the Slide.

HEART



Alternatively, you may click on the Insert tab on the ribbon and add the desired object as learnt in Lesson 2.



Note: You may format the object as discussed in Lesson 3.

4.3.2 Animations

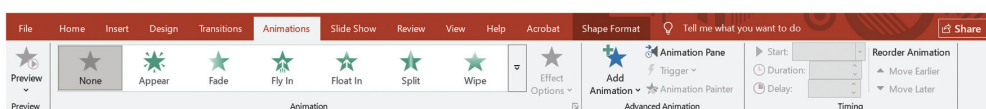
In general, the term animation refers to adding motion or visual effects to objects. The same concept applies in Microsoft PowerPoint, where animations are used to add motion effects to slide elements – such as text, images, shapes, or charts – to make presentations more dynamic, engaging, and visually appealing.

Follow the steps to add animations:

Step 1: Open your presentation in Microsoft PowerPoint 2019 and go to the slide that contains the object (text, image, shape, or chart) you want to animate.

Step 2: Select the object you want to apply the animation to.

Step 3: Click on the **Animations** tab on the Ribbon.



Step 4: From the **Animation** group, choose the desired animation effect from the gallery (e.g., Appear, Fade, Fly In, Float In).

Click on the **More** arrow  to see additional animation options.

Step 5: Select the desired animation effect by clicking on it.

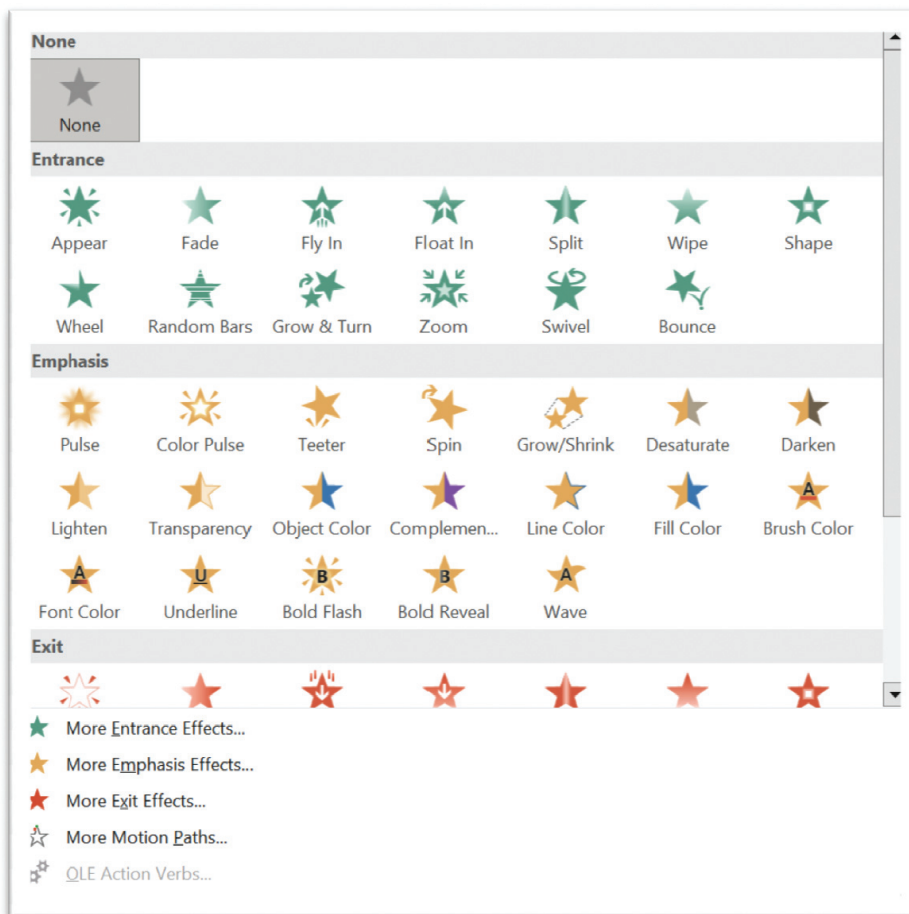
An instant preview will play.

OR

Click **Preview** (in the Animations tab) to see how the animation looks on your slide.



Notes



The effect will be applied immediately to the selected object.

Note:

- Use the **Effect Options** button (if available in the selected animation style) to change the direction, sequence, or style of the animation.
- To control when and how the animation plays, use the given options in the **Timing** group:
 - **Start:** Choose *On Click*, *With Previous*, or *After Previous*
 - **Duration:** Set how long the animation lasts
 - **Delay:** Add a delay before the animation starts



Notes

4.3.3 Transitions

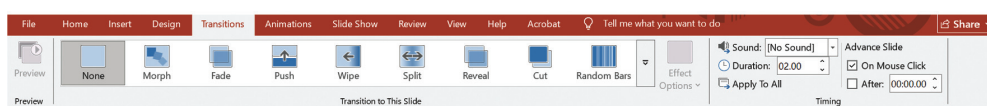
In general, the term transition refers to the process of moving or changing from one phase, state, or condition to another. Similarly, in Microsoft PowerPoint 2019, transition effects are special animation effects that occur when moving from one slide to the next during a presentation.

Follow the given steps to apply Slide Transitions in the presentation:

Step 1: Open your presentation in Microsoft PowerPoint 2019.

Step 2: Go to the slide to which you want to apply a transition effect.

Step 3: Click on the Transitions tab on the Ribbon.



Step 4: In the **Transition to This Slide** group, choose a transition effect from the gallery (e.g., Morph, Fade, Push, Wipe). Click the More arrow () to view additional transition options.

Step 5: Use the Effect Options button to modify the direction, style, or variation of the selected transition (for example, from left, right, top, or bottom).

Step 6: In the Timing group, you can adjust:

- **Duration:** Sets how long the transition lasts.
- **Sound:** Adds a sound effect to the transition.
- **Advance Slide:** Choose whether the slide advances *On Mouse Click* or *After a specified time*.

Step 7: Click Preview on the left side of the Ribbon to see how the transition looks.

Step 8 (Optional): To apply the same transition to all slides, click **Apply To All** in the **Timing** group.

4.3.4 Slide Show

Once your presentation, complete with all content and effects, is ready, it's time to display it in full-screen mode to review its flow or to present the content to the audience. This is done through a Slide Show.

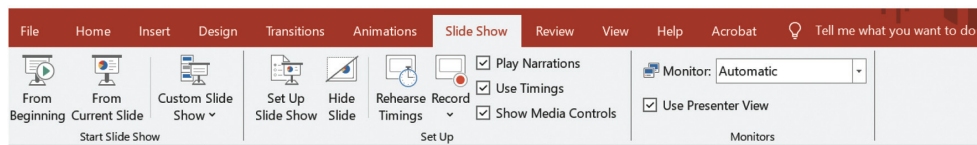


A Slide Show is a full-screen presentation of slides, used to present a PowerPoint presentation to an audience. It displays all slides, animations, transitions, and multimedia effects exactly as intended, allowing the presenter to observe the flow and deliver the content effectively.

Follow the steps to run a Slide Show in PowerPoint 2019:

Step 1: Open your PowerPoint presentation.

Step 2: Go to the **Slide Show** tab on the Ribbon.



Step 3: Choose one of the following options to start the presentation:

- **From Beginning:** To start the slide show from the first slide.
- **From Current Slide:** To start the slide show from the slide you are currently on.
- **Custom Slide Show:** To play only selected slides in a defined order.

Step 4: Use the keyboard or mouse to navigate through slides:

- **Next slide:** Click the mouse, press the Spacebar, Enter, Right Arrow, or Down Arrow
- **Previous slide:** Press Backspace, Left Arrow, or Up Arrow

Step 5 (Optional): Press **Esc** to exit the slide show at any time.

Alternatively, you may use the following shortcut keys to start a slide show:

- **F5** ® Starts the slide show from the beginning.
- **Shift + F5** ® Starts the slide show from the current slide.

4.3.5 Presenter View

Sometimes, while presenting to an audience, a presenter may want extra control over the presentation – for example, to view certain content without displaying it to the audience, next slide preview to anticipate the next slide, speaker's notes etc. This is possible using the Presenter View feature in Microsoft PowerPoint 2019.



Notes

Presentation Software

In PowerPoint 2019, the Presenter View (or presenter feature) is a special mode that helps the presenter deliver a presentation more effectively. It gives the presenter additional tools and information that the audience does not see.

To use Presenter View in PowerPoint 2019: Connect your computer to a secondary display or projector.

1. Go to the **Slide Show** tab.
2. Check the box “Use Presenter View.”

By default, it will be checked.

3. Start the slide show (**F5** or **Shift + F5**).
4. On your screen, you’ll see **Presenter View**, while the audience sees only the slides.



INTEXT QUESTIONS 4.3

1. State if the following statements are True or False:

- (i) The term multimedia means using only one type of object to convey the message.
- (ii) Data analytical charts can be used on the slide.
- (iii) To add multimedia content on a slide, click on Insert->Multimedia.
- (iv) We can apply transition effects which will occur while moving from one slide to another during presentation.
- (v) Short cut key to run the Slide Show is F6.

2. Fill in the Blanks:

- (i) The term refers to adding motion or visual effects to objects.
- (ii) A is a full-screen presentation of slides, used to present a PowerPoint presentation to an audience.
- (iii) To add animations, click on the tab on the Ribbon.
- (iv) + F5 is used to start the slide show from the current slide.
- (v) view gives the presenter additional tools and information that the audience does not see.



WHAT HAVE YOU LEARNT

- Presentation software, allow you to organize content effectively, enhance visual appeal, and make your presentations more engaging.
- Some popular presentation software includes Microsoft PowerPoint, LibreOffice Impress, Google Slides, Zoho Show, and Apple Keynote.
- Files created using presentation software are called **presentations**, which consist of individual pages known as **slides**.
- By default, PowerPoint saves presentations with **.pptx** extension.
- **Formatting** is the process of enhancing the appearance or style of text, objects, or slides to make a document or presentation more attractive and striking.
- To format the text, required options are available on the Font group on the ribbon.
- A theme in PowerPoint 2019 is a predefined set of design elements that determines the overall look and feel of a presentation.
- A template in MS PowerPoint 2019 is used to create a new professional-looking presentation with a ready-made design and structure instead of designing everything from scratch.
- PowerPoint 2019 support various multimedia elements like pictures, video, charts etc. to be used on the slides to make the presentation more engaging and interactive.
- Animations are used to add motion effects to slide elements – such as text, images, shapes, or charts – to make presentations more dynamic, engaging, and visually appealing.
- Transition effects are special animation effects that occur when moving from one slide to the next during a presentation.
- A Slide Show is a full-screen presentation of slides, used to present a PowerPoint presentation to an audience.
- The Presenter View (or presenter feature) is a special mode that helps the presenter deliver a presentation more effectively. It gives the presenter additional tools and information that the audience does not see.



Notes



Notes



TERMINAL EXERCISE

1. Briefly mention the significance of Presentation software.
2. Write any four popular presentation software names.
3. Differentiate between the following:
 - (a) Presentation and Slide
 - (b) Animation and Transition
4. Mention the main steps to create a new presentation.
5. Draw any four slide layout diagrams available in MS PowerPoint 2019.
6. What do you mean by the term multimedia? Mention any four multimedia object names that can be added in the presentation.
7. What is a template? How to use it while creating a presentation? Write the main steps.
8. Mention the steps to apply themes to a presentation.
9. What is the purpose of Presenter view? Briefly discuss.



ANSWER TO INTEXT QUESTIONS

4.1

1. Answer the following Multiple-Choice Questions:

- | | |
|------------------|----------------|
| (i) (d) MS Excel | (ii) (c) .pptx |
| (iii) (b) CTRL+M | (iv) (b) 1 |
| (v) (d) CTRL+S | |

2. Identify if the following statements are True or False:

- | | | |
|-----------|----------|-----------|
| (a) True | (b) True | (c) False |
| (d) False | (e) True | |

4.2

1. Fill in the blanks:

- | | | |
|----------------|----------------|------------|
| (i) Formatting | (ii) Paragraph | (iii) Font |
| (iv) Theme | (v) Template | |



2. **Match the following:**

- | | | |
|----------|--------------|------------------------|
| (i) (e) | (ii) (d) | (iii) (a) Center Align |
| (iv) (c) | (v) (b) Bold | |

4.3

1. **State if the following statements are True or False:**

- | | | |
|-----------|-----------|-------------|
| (i) False | (ii) True | (iii) False |
| (iv) True | (v) False | |

2. **Fill in the Blanks:**

- | | | |
|---------------|-----------------|-----------------|
| (i) Animation | (ii) Slide Show | (ii) Animations |
| (iv) Shift | (v) Presenter | |

Key Learning Outcomes

By the end of the lesson, you will be able to:

- explain the basics of presentation software
- Create professional PowerPoint presentations
- Incorporate multimedia elements such as images, animations, transitions, audio, and video to create engaging presentations.
- operate slideshow tools effectively



DIGITAL OPERATIONS

In today's digital age, technology has modified the way an organization functions and sustains competition. Digital technologies along-with data-driven systems are being employed to run business operations digitally. Some of the tools used by an organization for their digital operations are – automation software, cloud computing, analytics, etc.

One can say organizations are exploiting the power of digital technologies for effective and successful operations. Be it customer experience, digital marketing, research & innovation, operations, raising efficiency or making informed decisions, technology is everywhere.



OBJECTIVES

After completing the lesson, you will be able to:

- describe digital management and how technology is integrated with business;
- understand the role of digital tools in fast retrieval of data;
- apply digital technology to efficiently utilize storage space;
- apply proper file naming and organizational techniques;
- explain the need for digitizing physical records;
- identify appropriate technology to digitize physical document;
- understand different digital formats and their usage;
- provide file accessibility for working across different platforms



- explain the concept of data annotation;
- identify different types of data annotation;
- apply appropriate type of tag(s) / label(s) to data for the correct interpretation of data.

5.1 DATA ORGANIZATION FOR EFFICIENT DIGITAL MANAGEMENT

5.1.1 Digital Management

In this new scenario, the traditional business management approach is also changing, giving way to technology driven management known as Digital Management. Digital Management refers to the principles, strategies and practices used to lead and govern organizations in the digital age. It emphasizes agility, customer services, data-driven decision making and meaningful placement of technology.

Some of the features of digital management are

- Managing online presence – which include website(s), social media, online marketing, etc.
- Digital experience management – to create personalized and engaging experience(s) for customers on website(s), social media platform(s), mobile app(s) or any other platform.
- Digital Content management –creating, organizing and distributing digital content through various platforms to manage online presence of organization.
- Digital Asset Management – organizing, storing, distributing digital assets, such as videos, images, documents, etc., within and outside organization.
- Digital Data Management –creating and implementing policies and procedures to manage digital data of the organization.

For effective digital management in an organization Data Organization is a prerequisite. If data is not organized then:

- It can affect the company's data management strategies.
- Desired results might not be produced from most of the digital management processes, as unorganized data creates a state of "Data Chaos" thus making it difficult to find and convert data in usable form.



5.1.2 Data Organization

Organizing data is systematically arranging it in some logically related usable format. Simple steps which you may use to organize data are –categorization, structuring it in tables, database or arranging in some order. A simple example of organizing data is creating folders and sub folders to store logically related files, giving appropriate names to the files, you will learn more ways later in the chapter.

Activity

Given is the list of files available on the “Desktop” of a computer in your computer lab. The instructor wants to add the name of a student; who joined late. He doesn’t know the name of the file, as he is new to the school. Can you help in identifying the correct file? Record your observation(s).

presentation1.pptx, report.docx, presentation(23-7).pptx, document1.pdf, document.pdf, rep.docx, names.docx, image.jpg, image.png, names.pdf, data(1-12).csv, data1.csv, data.xls

5.1.3 Benefits of Organizing Data are

- (i) **Facilitating Analysis:** when data is logically arranged it is understandable and allows easy identification of patterns for comparison. Also application of analytical tools on such data results in accurate and reliable results.
- (ii) **Visibility:** The employees of the organization will be able to easily and quickly find the required data, which will enable them to work better.
- (iii) **Reliability:** Suppose while accessing data from the server of the organization; one finds multiple copies having different values for the same set of data. This will create confusion for the user. Organizing data will help in detecting multiple copies of the same data or any breakup of it while storing. Avoiding such issues ensures consistency and accuracy in getting results. Also such data will provide reliable and up to date information to the organization.
- (iv) **Security:** It is possible to apply data security rules on organized data. This lowers the chances of data loss and its theft. For example authentication of employees through password to control the access of data allowed to them.
- (v) Organized data can easily be backed up and can be used in case, the primary source of data is not accessible. For example if there is a virus attack on primary source, then original data can be retrieved using backup copy.
- (vi) **Scalability:** when data is logically organized and structured, accommodating more data volumes during day-to-day running of organization is very much possible. It can easily be divided or distributed and then stored on more than one data storage device.



5.1.4 Ways of Organizing files and folders

A well-planned filing structure in an organization saves time, avoids duplication of work and reduces stress. For effective organization of files hierarchical structure is used, *i.e.* group logically related subfolders within a folder. For example folder(s) may be created using any of the following criteria -

- Levels/Departments/Groups in the organization
- Project
- Category/Function
- Client
- Date

The subfolders within folders may be created for specific tasks or types of file. It is recommended to restrict the level of sub-folders to 3 – 4 so as to have clarity.

Design a naming convention having clear and descriptive names. Use it to name your files, subfolders and folders. This helps in understanding the content, without opening them. When creating and storing multiple files for similar purposes is essential, then add version number to the file to maintain clarity.

Files/Folders should be regularly reviewed to

- delete files no more required, so as to free the storage space. If you are not sure about their usage then it is recommended to move such files in a separate folder.
- Create an “Archive” folder for storing older files which are not frequently accessed, but can not be deleted as well.



INTEXT QUESTIONS 5.1

1. Suggest a folder structure to organize files listed in Activity.
2. Organizing files in some manner does not help in Data Analysis. True/False
3. One can apply data security rules on data.
4. Digital content management is same as Digital data management.
True/False
5. Use minimum five levels of sub-folders to organize data. True/False



5.2 CONVERTING PHYSICAL DOCUMENT TO DIGITAL FORM

5.2.1 Physical Document/Record

Digital management is the demand of today, but in the real world not every document is available on the computer, some are kept on paper, such as letters, invoices, contract documents, plans, reports, designs, etc. These **paper based documents are known as Physical Document** or Physical Record. In certain cases, it is required to maintain physical records such as for legal and compliance purpose. Managing these types of documents is quite challenging for an organization. Some of the problems faced during management of physical records are:

- they occupy physical space in the organization, as file cabinets or storage units are used to store them
- It's difficult and costly to share them. For every sharing the document is reproduced (photocopy) using paper, which contributes to environmental issues. To send it to some place it will need a postal service and time to reach there. The cost of sharing is also high.
- They are prone to damage and loss, etc. Over years the paper degrades and loses strength resulting in loss of information. Theft, misplacement, fire, etc. are some of the reasons for losing a physical document.

Exploiting technology to maintain digital records not only saves space and infrastructure but also provide various tools for maintaining them. Also for best utilization of the Digital management system, it is preferred to have E-Records. **Digital version of the physical record is also known as Electronic Record / E-Record.** Before moving onto converting physical records to Digital record let's find out the benefits of digitizing records.

5.2.2 Benefits of Digitizing

Some of the benefits of using digital records are:

- **Reduced storage need:** With huge and cheap secondary storage media a large amount of data can be stored compactly.
- **Reduced operational cost:** Cost associated with printing, duplication and managing physical records can be scaled down.
- **Enhanced accessibility:** Digital records can be easily shared through the network allowing on-the-go access to records and working remotely on them. Team members can share digital files to collaborate and improve team work.



- **Increased efficiency:** search option(s) available in software allows us to quickly access records. Also digitized information is less prone to errors.
- **Environmentally sustainable:** reducing usage of paper makes the process environment friendly.

5.2.3 Converting Physical Documents into Digital Format

The **process of converting physical record(s) to digital form is known as Digitization** and can be accomplished using the right kind of tools and technologies. The simplest way to convert a physical document to digital one is using a Scanner with appropriate app/software. Some other devices which can be used for conversion are Smartphone, Multifunction Printers, Overhead/Book scanner and Camera.

Identify the purpose of conversion before you start converting a physical record. If the purpose is just to conserve it, in its original form, then take its picture using a camera. This way a non-editable, read-only version of the physical document will be created, retaining its original form.

In other case, when an editable version i.e. allowing- modification, sharing, collaboration of physical document is desired, then use a combination of scanner and OCR (Optical Character Recognition) software.

A physical document passes through a procedure before it gets converted to digital form. This procedure is:

1. **Acquire Image:** The document is scanned, using scanner or any other device, i.e. an image of the document is captured and forwarded to OCR software.
2. **Preprocess:** Before converting the document, the software cleans the image and removes errors by (i) fixing alignment issues, if any during scanning (ii) soothing the edges of text images by removing spots, etc. (iii) cleaning up lines and boxes (iv) contrast enhancement and converting image to grey scale for accurate processing
3. **Recognize:** After preprocessing, next step is converting image(s) to text/ characters. Two most commonly used processes for this step are pattern matching and feature extraction. These days, for the recognition process, OCR systems use AI and machine learning. AI assisted OCR's can even recognize different handwriting styles, various - languages, fonts, etc.
4. **Output:** This is the final step in which identified characters are transformed into editable text.



5.2.4 Scanners and OCR's

Scanner and OCR lies at the heart of conversion process. Scanner makes a digital copy of a physical document and OCR software makes it editable. In addition to making it editable, the document is searchable and allows to copy or reuse the portion of scanned document. There are different types of scanners available in the market to choose from. They are designed for different purposes, media and quality requirements.

Types of Scanner

- **Flatbed scanner:** used for scanning books, photographs, documents, etc. they come in various sizes. Large ones are used to fit large size documents.



- **Sheet-fed scanner:** used for scanning single side of multiple pages, such as invoices. An automatic document feeder is attached with these scanners for fast scanning.





- **Film/Slide scanner:** used for scanning photographic slides or film negatives.
- **3D Scanner:** are used for scanning physical objects.
- **Drum scanner:** This type of scanners are used in the publishing industry for producing high quality images of scanned document.
- **Handheld scanner:** also known as portable scanner, used for scanning a small document, such as label, ID card, etc.



- **All-in-one device:** It is a combination of printer, scanner and copier into one device which is suitable for very small office or home users.



- Dedicated document scanner with preinstalled OCR software.



Notes

Some of the OCR apps are:

OCR App	Description
Adobe Acrobat	It is a web-based platform and can be used on desktop and laptop. It is a PDF editor with OCR and document management feature. Need license for usage.
Adobe Scan	Mobile apps supporting document scanning.
Microsoft Lens, Google Lens	Free to use
Fine Reader by ABBYY	Recognizes 198 languages. Can convert screenshots to text. Generates PDF file. Need license for usage
e-Aksharayan	Is a desktop solution created at TDIL in India. Creates editable text in Unicode supporting Indian languages. Its free to use and can be downloaded from tdil-dc.in
Chitrangan	It is a web-based solution developed at C-DAC. Supports Indian languages.
EasyOCR	It is an open source Python based, OCR library. Supports multiple language text recognition. Free to use.
Apple Notes	Scanning app for iphone users.
Simple OCR, Textract, Tesseract	Some of the popular available OCR's.

5.2.5 To Convert Physical Document into Digital Format

1. Scan the document using appropriate type of scanner to create a digital image file. Some of the file extensions in which you may store a scanned image are - PDF, JPEG, TIF, PNG, BMP, GIF. File extension in which one can store the scanned file is dependent on the scanner model and its software.
2. Open the scanned image document in the OCR application. Using appropriate conversion option from the app, initiate the process.
3. Review the converted document generated by the app.
4. Save the file in desired format such as Word document, PDF, Plain text, etc.



INTEXT QUESTIONS 5.2



Notes

1. Quality of digital document produced is only dependent on OCR software. True/False
2. Camera can be used to create editable digital document from a paper document. True/False
3. OCR stands for Optical Character
4. Scanner can be used to create duplicate copy of a document. True/False
5. is a type of portable scanner.

5.3 FILE FORMATS

It's clear that in today's digital management age, creating and maintaining electronic records plays a crucial role in an organization. But there are associated challenges as well. One of the challenges is managing and archiving records. The format in which digitized information is stored in the file is dependent on the software used for creation. For example creating a simple text file using

- (i) MS-Word results in "docx" extension
- (ii) Notepad in "txt" extension
- (iii) Adobe Acrobat results in "pdf" extension
- (iv) OpenOffice Writer in "odt" extension

File format, in a file defines the rules, structure and coding criteria of data. Choosing the correct format for data allows efficient storage and helps application software to correctly interpret and process data. There are different formats for different types of data. Some of the commonly used formats are text, image, audio, video, etc.

File format is the specific structure/layout and encoding of data in the file that dictates how information is – stored, organized and interpreted by software application.

Format of the file can be identified using extension (the suffix added at the end, after dot). Using this extension, we identify the file format and application software to be used for working on it. In the previous chapter you created files having - "docx", "xls" and "ppt" extensions using MS-Word, Ms Excel and MS-Powerpoint.



5.3.1 Different Types of File Format

Following is the list of common file extensions and software used for creating or editing them:

Format	Extension	Software
Text files	.doc/.docx	MS Word, Google Docs,
	.odt	Open Office Writer, LibreOffice Writer, Calligra word
	.txt	Notepad/Notepad++, gEdit, QuickEdit for Android
	.pdf	Adobe Acrobat Pro DC, PDF24 Creator, Nitro Pro, PDFgear
Image file	.jpg / .jpeg	MS Paint, GIMP, Adobe Photoshop,
	.bmp	MS Paint, GIMP
Audio file	.mp3, .wav, .aiff	Audacity, Adobe Audition, Pro Tools
Video file	.mp4	Adobe Express & Adobe Premiere Pro, Clipchamp, DaVinci Resolve
	.mov	Adobe Premiere Pro, Final Cut Pro, DaVinci Resolve
	.mkv	MKV Toolkit, Avidemux,
	.wmv	Clipchamp, VLC Media Player

5.3.2 Converting from One Format to Another

What If?

- The software used for creation / manipulation of file(s) is not available on the desired device?
- The particular type of platform does not support the file extension you have, usually happens when working on websites or archiving data?
- You need a small size file for transferring or uploading

Is it possible to change file format, in turn file extension, to deal with such situations? Yes file format can be changed using proper converting tools i.e. software. Many times the software used for creating the file itself, provides options to save the data file in another format. Otherwise special purpose software – online as well as offline are available for conversion.



Converting Excel (xls) to Word (docx): this can be done using the (i) normal Copy & Paste option or (ii) Online Convertors.

(i) **Copy and Paste**

- (a) Open Excel file and select the desired data, from excel file
- (b) Make a **copy** of data
- (c) Open Word file and move the cursor to the place where data is to be copied
- (d) **Paste** the data, while pasting (i) original formatting may be maintained (ii) using **Paste Link** create a live link between two files (iii) Selected data can also be inserted as image using the **Paste as Picture** option.

(ii) In case the complete excel file is to be converted then use **Online Convertors**.

- (a) **Choose** a convertor then visit their site
- (b) **Upload** your excel file and select the desired output format of the file.
- (c) Initiate the process of conversion and save the output file.

Converting PowerPoint (pptx) to Word (docx) – either use (i) **Export** component of PowerPoint or (ii) Online Convertor

(i) Using built-in Export feature of PowerPoint, create editable word file

Open PowerPoint file

- (a) Go to **File → Export → Create Handouts**
- (b) In **Send to Microsoft Word** window, select **Page Layout** option
- (c) Save this new document as .docx file.

(ii) Use any of the Online Convertors

- (a) **Choose** a convertor then visit their site
- (b) **Upload** your PowerPoint file and select the desired output format of the file.
- (c) Initiate the process of conversion and save the output file.

Converting image file to PDF – Choose an OCR software to convert image to text and opt for PDF format when saving the file.



Notes



INTEXT QUESTIONS 5.3

1. File format in file defines the rules structure and of data
2. Use To edit a text file on the Android phone.
3. Use MS Word for converting a xls file to docx format. True/False
4. or is used to convert a jpeg file to pdf format.
5. Which of the following is not an extension of the text file?
(a) .odt (b) .pdf (c) .txt (d) .bmp

5.4 DATA ANNOTATION AN INTRODUCTION

Guddu's mother asked him to get 2Kg of "Parmal" rice from the nearby shop. Guddu, a 13 years old kid, enters the shop and find many varieties of rice, stored in sacks. He is unable to identify the specific variety and needs help for making the correct purchase. The task of identifying the desired variety for Guddu would have been possible, if the shopkeeper had put some label (description of rice) attached with the sack. The same concept applies with data/documents management. Labelled data ensures correct interpretation of data for usage. Also labels can be used to identify/group data, helping its quick retrieval. In case, context and features of data are also attached and stored with data, then it is said to be annotated.

Data Annotation is the process of tagging (attaching context, features, etc.) data, which can be text, images, videos, audio or any other kind, for its correct interpretation. Annotations become very important when the data in reference is being used by the computer for digital management. Each data type has its own way of annotation, so there are different types of annotation methods. Some of the main types are Text annotation, Audio annotation, Image annotation, Video annotation.

5.4.1 Text Annotation

In this type of annotation, extra information is attached with text to clarify its meaning and purpose. Some of the ways of annotating text are adding notes at margins, assigning labels to a portion within text, classifying an element of text, highlighting or underlining a key passage, adding symbols to mark important points, etc.



Computer is an electronic device that take data as **input** from the user, store it and **process** the data under the control of set of instructions and gives **output**, this output can be **saved** for future reference.

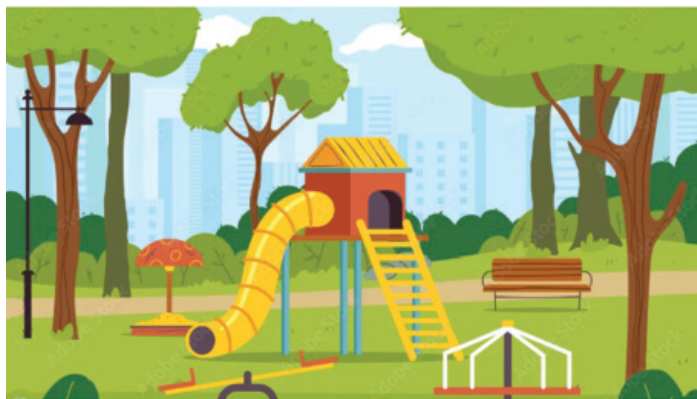
Definition

Computer can process both numerical and non-numerical data.

5.4.2 Image Annotation

Images are annotated to attach factual information while storing. It is done to assist in classifying and understanding the visual world. Not only the entire image, a portion/segment within the image may be annotated. This is done to pinpoint the individual item within it. Images can be annotated using keywords, captions, labels, identifiers, bounding boxes for highlighting a section, polygons for defining precise regions, etc. Some common types of image annotation are:

- Attaching a single label to the image for its classification, such as car, train.
- Adding rectangles /boxes around a specific object for its recognition, such as identifying all trees in a street scene.
- Adding labels to small segments of the image to identify precise component of image, such as a wheel of car.



5.4.3 Video Annotation

Annotations are attached to objects within video frames to recognize, detect and track their movement. Labels, polygons, bounding boxes, etc. are used to annotate frames or objects. Some of the uses of video annotations are

- Identifying objects, products, etc. in the frame, such as human beings, cars.



Notes

- Classifying actions, such as sitting, running, moving, etc.
- Tracking motion of an object.

5.4.4 Audio Annotation

It involves adding labels and tags to audio recordings for example identifying speech, environmental sound, music, etc. in the file. Some of the ways for annotating audio data are

- For annotating a transcription - each spoken segment can be labelled with corresponding text
- For sound event - labels can be created for specific sound present and its duration
- For speaker identification - labels can be created for identification of speaker(s) with segments in which they appear such as; gender, age-group, etc.



INTEXT QUESTIONS 5.4

1. Data Annotation is the process of data for its correct
2. Adding labels help quick of data.
3. Text can be annotated by changing its font. True/False
4. In audio file can be used to identify speaker.
5. Which of the following is not used for annotating image data?
(a) Text (b) bounding box (c) underlining (d) polygons



WHAT HAVE YOU LEARNT

- Significance of digital records and their importance in digitally managing data in an organization. Methods of arranging digital records in files and folders to avoid duplication of work.
- Technique of converting physical record(s) into digital document(s) for their long term retention. To create an editable digital document, from a physical record using Scanner and OCR.

- Different types of file formats available for storing data and their purpose. Simple technique to transform a file from one format to another.
- Ways of annotating text, image, audio or video data for its better interpretation.



TERMINAL EXERCISE

1. What do you understand by Digital Management?
2. List problems faced by an organization in digital management, if their data is not organized.
3. How organizing data helps in securing data?
4. There are many ways in which an organization can organize data in folders and sub-folders. List a way you find most suitable with justification.
5. Give any three real life situations when you would like to create a non-editable digital version of a physical document.
6. Explain the procedures through which a physical document passes when it gets converted to digital document.
7. Akansha comes to you with images of five pages, taken using a scanner. These documents contain text and an image. The text is in two Indian languages. Now she wants you to assist her in identifying an appropriate software to obtain digital documents which can be modified.
8. Distinguish between file formats and file extensions.
9. List software used to convert any image file to jpeg file.
10. Give examples of real life situation (minimum four), when it is required to convert the format of the file.
11. Outline the steps used for converting an image file to PDF form.
12. What do you understand by data annotation? How is annotating data different from labelling data?
13. Propose the ways of annotating following text:

“System software is the type of computer software which manages functions of hardware and provide a platform for application software to run. Key



Notes



Notes

Digital Operations

example of system software are – operating system, device drivers, utility software.”

Also implement the proposed annotations.

14. Mr Raja Librarian of the school, could find a copy of the speech given by Sh Bal Gangadhar Tilak “Swaraj is my Birthright”. The principal of the school decides to store it in schools server after annotating it. Describe ways to annotate this audio file.



ANSWER TO INTEXT QUESTIONS

5.1

1. Folder – Reports, Presentations, Pictures, Data and Documents.
2. False
3. Organized
4. False
5. False

5.2

1. False
2. False
3. Recognition
4. True
5. Hand-held

5.3

1. Coding criteria
2. Quick Edit
3. False
4. Adobe Express, Canava
5. (d)

5.4

1. Tagging, Interpretation
2. Identification
3. False
4. Labels/Tags
5. (c)

Key Learning Outcomes

By the end of the lesson, learners will be able to:

- explain the significance of proper data organization and document format conversions for efficient digital management.
- explain file formats.



6

FUNDAMENTALS OF MIS AND TROUBLESHOOTING

MIS – Management Information System is a computer based system used to process, evaluate and analyze data for generating useful information in the organization. A planned system ensures better coordination within and outside organization, it improves overall efficiency and facilitate informed decision making by delivering desired information at right time. MIS comprises of

People: such as staff, IT professional, managers

Hardware: Computers, servers, specific storage devices, telecommunication network, are some of the examples.

Software: Programs and applications to process data, manage databases and support reporting requirements.

Data: such as sales records, employee details, etc.

Procedures: guidelines and set of rules defining how data should be collected, processed and distributed through MIS.



OBJECTIVES

After completing this chapter you will be able to:

- identify components of MIS;
- describe how MIS supports decision making;
- integrate technology in some of the business processes, such as – decision-making;



Notes

- list different types of Information Systems;
- present large dataset in summarized understandable form;
- use MS-Excel built-in tools for data visualization;
- explain what escalation of technical issue means;
- describe why it is important to escalate these issues in maintaining smooth organizational operations;
- identify different levels of technical issues based on their impact on the organization;
- recognize when to escalate technical issues.

6.1 MIS REPORTS AND THEIR ROLE IN DECISION MAKING

6.1.1 MIS and Decision Making

Decision making requires assessing various available alternatives and choosing the best from it. MIS provides the necessary information to choose the best option. It supports at every stage of decision making, be it collecting data from various sources, converting data to information, comparing all possible alternative solutions, etc.

You can say that MIS acts as a backbone of decision making by providing reliable information and tools for analysis. This information, is presented in the form of reports in front of management, to help them in taking right decisions towards future growth of organization.

Example: A retail store named “Super Store” manages its sales using MIS by

- Tracking daily, weekly and monthly sales of the store.
- Identifying which product(s) sell the most and least
- Understanding sales trends.

Using the reports produced, management can plan (i) when and how much stock should be reordered (ii) promotion of less selling products, etc.

MIS is an information system that evaluates, analyzes and processes an organization’s data to produce meaningful and useful information, based on which the management can take right decisions to ensure growth of organization.



6.1.2 Benefits of using MIS

1. Informed and effective decision making – as the decision are made using reports based on data generated in the organization.
2. Improving communication and collaboration within and outside organization – the information is stored at common place and can be easily shared within the organization.
3. Monitoring progress of the organization across key indicators, like sales and profit growth, customer satisfaction, increased market share, employee satisfaction by aligning them with targets.
4. Better planning and forecasting – using data for projecting patterns help in creating long term strategies for expansion, budgeting and marketing, etc.
5. Faster problem identification – as performance can be tracked in real time. The reports generated can clearly emphasize gaps & inefficiencies of the organization.
6. Customer satisfaction – by tracking service satisfaction level, customer experience can be enhanced.
7. Allows organization to adapt to changing market conditions

6.1.3 Types of Management Information Systems

Some of the popularly used MIS are

- Knowledge Management Systems (KMS) – used for storing and sharing Knowledge, Documents and other expertise in the organization
- Decision Support Systems (DSS) – used for “What-If” kind of analysis in the organization.
- Transaction Processing Systems (TPS) – used for handling routine operations in the organization, such as billing, order processing, payroll, etc.
- Enterprise Resource Planning (ERP) – used to manage and automate basic business processes in real time for running day-to-day operations.
- Content Management System (CMS) – used to create, manage and publish digital content

6.1.4 MIS Reports

MIS reports are generated by collecting data from different sources of the organization, such as:



Notes

- Various departments of the organization - Sales, Finance, Operations, Services, Human Resource, etc.
- Trending data collected using surveys, news, social media, online trend tracking platforms, etc.
- Market research
- Customer feedback

There is no universally fixed formats for the reports generated in an organization. But organizations maintain consistency – w.r.t. time and format of the report. Some are generated daily some weekly and others once in a month.

Some common categories of MIS reports are listed below:

Category of Report	Example Report	Used for
Operational	Production reports, Inventory reports, Order Backlog Report, Supply chain reports	Monitoring various processes on daily / weekly / monthly basis.
Financial	Balance sheet, Revenue and Expenditure, Cash flow statement	Making budgets, Forecasting, Investment planning
HR	Payroll reports, Training and development reports, Employee productivity reports	Human resource management, HR policy improvement, tracking employee performance
Sales & Marketing	Sales performance, Return on Investment report, Customer demographics report	Identifying revenue generation patterns, getting information about customers action, design campaigns

Besides these reports, an organization may also require **Predictive Data Report(s)** for making data driven decisions. These reports use past data of organization and real-time data to forecast future events. For handling unique challenge(s) faced by organization, **Ad hoc**, i.e. one time reports are generated. These reports are very specific to address the challenge faced. Top level management will not be interested in detailed reports. They would be interested in **Summary Reports** giving a high level overview of data.

Sample Monthly sales report of a retail store.



 Retail Store – Monthly Sales MIS Report (August 2025)

Product Category	Units Sold	Total Sales (₹)	Avg. Selling Price (₹)	% of Total Sales	Stock Remaining	Remarks
Beverages	3,200	₹15,36,000	₹480	24%	500	High demand – reorder needed
Snacks	2,500	₹10,00,000	₹400	16%	800	Stable sales
Dairy Products	1,800	₹14,40,000	₹800	22%	300	Stock running low
Household Items	1,200	₹11,52,000	₹960	18%	600	Good margin
Frozen Foods	1,000	₹8,00,000	₹800	13%	700	Moderate demand
Fruits & Veg	1,500	₹4,80,000	₹320	7%	200	Seasonal shortage
TOTAL	11,200	₹64,08,000	₹572	100%	–	–



INTEXT QUESTIONS 6.1

1. The information generated in an organization is presented in the form of to management.
2. Using MIS in an organization means the information is not stored at a common place. True/False.
3. KMS stands for
4. Employees productivity report falls under category.
5. Which types of reports are used to handle unique challenges in the organization?

6.2 DATA ANALYSIS USING EXCEL

6.2.1 Data Visualization

Data visualization is depicting numerical information in graphical/pictorial form. Some of the elements used for graphical/pictorial representation are - Graphs, Charts, Diagrams, Pictures, etc. Using graphical representation makes complex information easier to understand and assist in smart decision making.

Excel has built-in tools such as – charts and graphs, for data visualization. Commonly used among them are – column chart, pie chart and scatter plot, line graph, bar graph, histogram and pivot chart. For visualization of huge dataset, pivot table are used. Using Pivot table data can be summarized before representing it in a graph/chart.



Notes

6.2.2 Charts/graphs in Excel

Before creating a chart/graph let's learn about commonly used practices for making an effective graph/chart.

- It's important to identify how much data should be displayed so that the user can find key values/trends easily.
- Reduce the number of data labels, tick marks, gridlines, etc. to allow users to quickly get to the data.
- Use concise labels/titles within the graph for quick reading.

As excel provide many chart types identifying the correct type for visualization of data becomes important. Following table provide a mapping of Chart Type to the purpose for which it can be used.

Purpose	Chart Type	Explanation
To compare data values	Column chart, Bar Graph, Stacked Bar	Best suited for displaying side-by-side category comparison. Stacked bar is used to show sub-groups while comparing categories.
To answer - What share does each part contribute?	Pie chart, Doughnut Chart, Stacked Bar chart	Best suited for visualization of proportions. It shows how much each component contributes to the total.
Find Trends or patterns over time in data	Line Chart	How does a category change over time? To find out growth, decline or stability in category.
To answer - How is data spread?	Histogram	To display frequency distribution or outliers in data.
To answer – is there a connection between two variables/categories?	Scatter Plot	To display correlation between categories.

6.2.3 Data Analysis on Sample Data Collected from Retail Chain Stores

A chain of stores, known as “Super Store” maintain following sales data:

Month, Region (North India, West India, South India and East India), Product Category (FMCG, Electronics, Apparel), Sales (in INR), Units sold.

Management wants to see the monthly sales trend of their stores. As line charts are best suited for displaying trends, let's make one.

Step 1: Prepare the data using following steps:



- Open excel file and enter data using file given in Annexure 1. Name this sheet as “Sales”
- Add another sheet (Name it Trends) for drawing graph. *It is not necessary to draw the graph on a separate sheet, we are doing it to retain clarity.*
- In column A of Trends sheet, write down months of the year. Label it as “Month”.
- Go to the first sheet (Sales) and calculate Total sales using the following way.
There are many ways to calculate and store total sales for each month. A simple way to do so is:

For calculations – Select any empty cell and write formula as “=Sum(cell1:cell2)”. In my sheet cell1 is D2 and cell 2 is D13. D2 is the first cell having sales data for “Jan” and D13 is the last cell for the month.

	A	B	C	D	E
1	Month	Region	Product Category	Sales (₹)	Units Sold
2	Jan	North India	FMCG	492586	14414
3	Jan	North India	Electronics	577177	2437
4	Jan	North India	Apparel	716221	11224
5	Jan	South India	FMCG	507728	4226
6	Jan	South India	Electronics	623831	11560
7	Jan	South India	Apparel	276241	9947
8	Jan	West India	FMCG	878921	9402
9	Jan	West India	Electronics	564508	10978
10	Jan	West India	Apparel	483339	8126
11	Jan	East India	FMCG	433212	3217
12	Jan	East India	Electronics	696220	10261
13	Jan	East India	Apparel	768331	6982
14	Feb	North India	FMCG	298377	11900
15	Feb	North India	Electronics	774853	3589

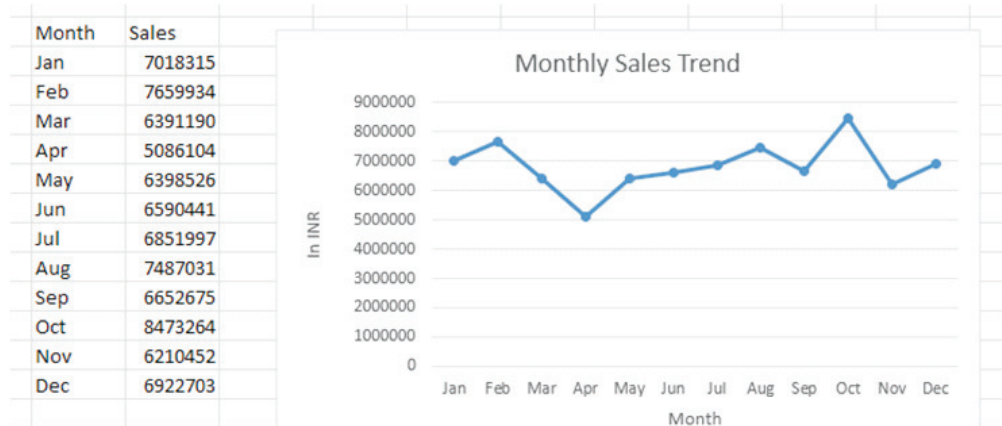
- Repeat the above step for the remaining months. Before writing the formula select the next empty cell and change the values of cell numbers in SUM().
- Once you get the total for all twelve months, copy this data and move to sheet 2(Trends). Paste this data (as values) in the column adjacent to months.
- Add header “Sales” to this new column.

Step 2: To make a graph, select data in both the columns – Months & Sales, include header in the selection.

Step 3: Click on the **Insert** tab in main menu. Select **Line chart** to get it inserted in your sheet.



Notes



Let's see region-wise sales, using a Pie chart.

Step 1: Prepare the data

- Add another sheet (Name it Pie) for drawing the graph.
- In column A of "Pie", write down regions. Label this column as "Region". Make an entry for four regions in this column.
- Go to the first sheet (Sales) and calculate Total sales for North India using the given method.

For calculations – Select any empty cell and write the formula as “=Sumif(range, criteria, sum range)”. In my sheet, the range is B2:B145, as this column contains details of category – Region. Criteria is “North India” and sum range is D2:D145.

	A	B	C	D	E
	Month	Region	Product Category	Sales (₹)	Units Sold
1					
2	Jan	North India	FMCG	492586	14414
3	Jan	North India	Electronics	577177	2437
4	Jan	North India	Apparel	716221	11224
5	Jan	South India	FMCG	507728	4226
6	Jan	South India	Electronics	623831	11560
7	Jan	South India	Apparel	276241	9947
8	Jan	West India	FMCG	878921	9402

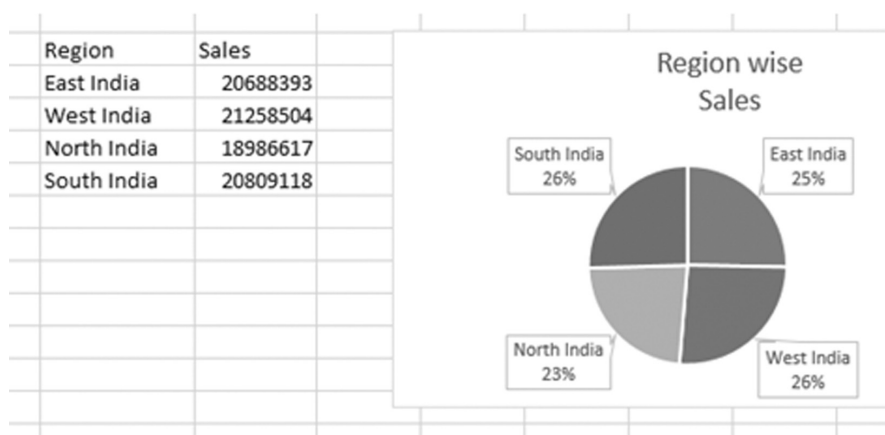
138	Dec	South India	Electronics	596136	7231
139	Dec	South India	Apparel	289719	3397
140	Dec	West India	FMCG	518687	6436
141	Dec	West India	Electronics	595880	6228
142	Dec	West India	Apparel	659398	5873
143	Dec	East India	FMCG	777105	6345
144	Dec	East India	Electronics	635856	13184
145	Dec	East India	Apparel	402848	8673



- (d) Repeat above step for remaining Regions. Before writing formula select next empty cell and change the value of Criteria to “West India”
- (e) Once you get total for all Regions, copy this data and move to sheet 3 i.e. “Pie” sheet. Paste this data (as values) in the column adjacent to the region.
- (f) Add header “Sales” to this new column.

Step 2: To make a graph, select data in both the columns, include header in the selection.

Step 3: Click on the Insert tab in main menu. Select Pie chart to get it inserted in your sheet.



6.2.4 Pivot Table

Pivot table is an interactive tool used for – summarizing, analyzing and exploring large set of data values. For summarizing large dataset, functions like Sum, Count, Average, Max, Min, standard deviation or variance, etc. can be used. Excel itself applies Sum/Count functions in case you don’t choose any.

Benefits of using Pivot tables

- As the data is summarized, it becomes manageable to focus on the key aspects and easy to make comparisons.
- Table being interactive in nature, allows to view data on different aspects. Change the values in any one element of table viz. **Filter, Rows, Columns**, etc. The information in pivot table gets rearranged without affecting the original data.
- It helps in clear visualization of patterns or trends in the data and assist in answering complex questions for taking decision in the organization.



Notes

6.2.5 Data Analysis on Sample Data of Flights.

DGC maintains data for various flights in a file, called “Flight Details”. This file contains following data about national flights :

Date, Airline, Flight No, Origin, Destination, Stops, Duration Mns (of Flight), Scheduled Departure, Scheduled Arrival, Actual Departure, Actual Arrival, Delay Mins, Cancelled, Price INR.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	Price INR
2	2022-02-20	AirAsia In	IS2386	BOM	DEL	0	159	2022-02-20 12:15	2022-02-20 14:54	2022-02-20 12:35	2022-02-20 15:13	20	No	4370
3	2022-02-16	AirAsia In	IS1635	BOM	JAI	0	60	2022-02-16 18:00	2022-02-16 19:00	2022-02-16 18:00	2022-02-16 19:01	0	No	3680
4	2022-02-27	Air India	AI6973	JAI	DEL	0	46	2022-02-27 11:50	2022-02-27 12:36	2022-02-27 11:50	2022-02-27 12:21	0	No	2480
5	2022-02-14	Air India	AI4652	AMD	HYD	0	121	2022-02-14 10:40	2022-02-14 12:41	2022-02-14 10:50	2022-02-14 12:42	10	No	3210
6	2022-02-16	Air India	AI5735	CCU	BOM	0	115	2022-02-16 17:05	2022-02-16 19:00	2022-02-16 17:25	2022-02-16 19:12	20	No	4770
7	2022-02-27	SpiceJet	SG1391	DEL	AMD	0	107	2022-02-27 08:40	2022-02-27 10:27	2022-02-27 08:45	2022-02-27 10:33	5	No	4000
8	2022-02-18	GoFirst	G83833	HYD	CCU	0	154	2022-02-18 07:00	2022-02-18 09:34	2022-02-18 07:00	2022-02-18 09:34	0	No	5110
9	2022-02-16	SpiceJet	SG7528	ROM	MAA	0	130	2022-02-16 17:20	2022-02-16 19:30	2022-02-16 18:01	2022-02-16 20:18	41	No	6330
467	2022-02-14	IndiGo	6E4378	DEL	MAA	0	181	2022-02-14 14:00	2022-02-14 17:01	2022-02-14 14:20	2022-02-14 17:26	20	No	3980
468	2022-02-15	IndiGo	6E2736	DEL	MAA	0	174	2022-02-15 15:15	2022-02-15 18:09	2022-02-15 15:25	2022-02-15 18:26	10	No	8520
469	2022-02-15	AirAsia In	IS9832	DEL	MAA	0	140	2022-02-15 22:00	2022-02-16 00:20	2022-02-15 23:00	2022-02-16 01:25	60	No	4610
470	2022-02-25	GoFirst	G87213	DEL	MAA	0	165	2022-02-25 05:45	2022-02-25 08:30	2022-02-25 06:05	2022-02-25 08:50	20	No	5940
471	2022-02-15	Air India	AI3212	DEL	MAA	0	129	2022-02-15 08:30	2022-02-15 10:39	2022-02-15 08:30	2022-02-15 10:40	0	No	6030
472	2022-02-27	Vistara	UK4972	DEL	MAA	0	182	2022-02-27 22:30	2022-02-28 01:32	2022-02-27 22:45	2022-02-28 01:51	15	No	6760
473	2022-02-16	Air India	AI2616	DEL	MAA	0	177	2022-02-16 06:45	2022-02-16 09:42	2022-02-16 06:45	2022-02-16 09:52	0	No	6720
474	2022-02-22	IndiGo	6E4925	DEL	MAA	0	120	2022-02-22 05:45	2022-02-22 07:45	2022-02-22 06:15	2022-02-22 08:12	30	No	5090
475	2022-02-25	AirAsia In	IS3490	DEL	MAA	0	150	2022-02-25 11:00	2022-02-25 13:30	2022-02-25 11:05	2022-02-25 13:30	5	No	5480

Note: Sample data file “flights.xls” used in the example is attached as Annexure 2.

DGC wants to know the number of flights per route.

As the file contains a large dataset, let’s summarize the data using Pivot table to answer the question.

Step 1: Click inside the data range to be summarized.

Step 2: Go to **Insert Option** in the main menu and select **Pivot Table** from the sub-menu.

Step 3: In the pop-up window – **Create Pivot Table**, range field is automatically detected, select **New Worksheet** to display the table.

Step 4: Click **OK**

Step 5: From “**Field List Panel**”

- Drag Origin in **Rows** section
- Drag Destination in **Column** section
- Drag Flight Number in **Values** section
- Summarize** on Count



This is what you get

Origin	Destination	TotalFlights	Origin	Destination	TotalFlights
BOM	BLR	26	AMD	HYD	7
DEL	BOM	20	HYD	AMD	7
MAA	BLR	19	HYD	JAI	6
DEL	BLR	18	GOI	HYD	6
DEL	MAA	16	GOI	MAA	6
HYD	DEL	13	JAI	AMD	6
AMD	JAI	11	MAA	JAI	6
BOM	DEL	11	JAI	BLR	6
GOI	BOM	9	CCU	GOI	6
MAA	HYD	9	AMD	DEL	6
JAI	CCU	8	AMD	GOI	6
AMD	BOM	8	BLR	AMD	6
BLR	GOI	8	MAA	DEL	6
BOM	JAI	8	CCU	BLR	6
JAI	DEL	7	BOM	MAA	6
JAI	HYD	7	BOM	CCU	5
JAI	MAA	7	GOI	AMD	5
HYD	MAA	7	DEL	JAI	5
DEL	CCU	7	BLR	HYD	5
HYD	BOM	7	GOI	DEL	5
CCU	MAA	7	BOM	GOI	5
MAA	BOM	7	MAA	GOI	5
GOI	CCU	7	HYD	CCU	5
BLR	BOM	7	MAA	AMD	5
GOI	JAI	7	MAA	CCU	4

DGC wants to know the average ticket price Airlines-wise.

Step 1: Click inside the data range to be summarized.

Step 2: Go to **Insert Option** in the main menu and select **Pivot Table** from the sub-menu.

Step 3: In the pop-up window – **Create Pivot Table**, range field is automatically detected, select **New Worksheet** to display the table.

Step 4: Click **OK**

Step 5: From **Field List Panel**

- Drag Airlines in **Row** section
- Drag Price INR in **Values** section
- Summarize** using Average function. To change the “Summarize” function use Right Click.



Notes

Airline	TotalFlights	AvgPrice
Air India	97	5177.835052
AirAsia India	88	5042.840909
GoFirst	77	5070.649351
IndiGo	63	5076.349206
SpiceJet	76	4931.710526
Vistara	74	5179.864865



INTEXT QUESTIONS 6.2

1. Pivot tables are used to huge dataset.
2. For creating a chart or graph always use complete dataset. True/False
3. Stacked bar chart can be used to compare data values and to find out
4. To display correlation between categories use
5. Max and Min can be used for In pivot table.

6.3 ESCALATING TECHNICAL ISSUES FOR SMOOTH DIGITAL OPERATIONS

Appropriate technology integration and using it efficiently, not only provide key benefits to an organization; but also helps in surviving fierce competition and cater to the evolving needs of consumer. Despite all the benefits offered by the use of technology, it also brings in set of challenges. Some of the technical challenges faced by an organization are:

- Network connectivity issues
- Data backup failure or data recovery failure
- Software compatibility issue
- Weak Cyber security
- Non-reliable communication system
- Adapting to new technology

6.3.1 Reporting Technical Issues

Just like providing reports in time is important for successfully running an organization, it is equally important to report technical issues. Reporting technical issue is becoming necessary to:



- Prevent/reduce financial losses to the organization
- Maintain operational continuity
- Improve overall efficiency
- Ensure data security and compliance
- Minimize confusion.

When technical issues arise, who you report to them depends on the organization's structure. Most of the organizations have well defined guidelines on how to move ahead an issue/request within the organization. These guidelines are known as **Escalation Matrix**. The matrix defines the roles and specific steps to be followed when the problem arises which can't be resolved at initial level.

6.3.2 When to Escalate Technical Issues?

- Solving an issue requires advanced knowledge, tools or diagnostic skills. It should be escalated to either the senior technician or specialized team. Usually there is IT Helpdesk or IT Support Team
- If the issue needs a decision to be made; may be at a higher level in the organization or require access to resources which are outside your access limit or may be cost is involved in solving it.
- For critical issues, which demand immediate attention from management people as it might affect multiple departments.
- When the technical problem affects multiple teams/departments, it should be escalated to get a comprehensive solution or process change.
- If the technical issue concerns a vendor/external partner it should be escalated to ensure effective coordination among all.

6.3.3 Example of Issues Need Escalation

- Organization's website or payment gateway goes offline.
- Email server or any other critical server goes down.
- Any security incident such as suspicious login or any kind of attack on the system. Data theft incident spotted from any desk.
- Failure of device even after repeated fixes.
- Failure of any kind of MIS in the organization should be immediately escalated.
- Malfunctioning device or software; Login & Access problem(s), Network connectivity issues, File/Document(s) issues.



Notes

6.3.4 Low-level versus High Level Issues

Aspect	Low-Level issue	High-Level issue
Example	Forgot Password/Login issue Printer or any other peripheral device not working Network problem File not accessible/missing	Data breach/Security issue Failure of a device at more than one location Network/Server down
Impact	Have limited effect on day to day operations	Can upset critical operations of the organization
Escalation	Escalation required if the issue is recurring	Always escalated to Management

6.3.5 Benefits of Effective Escalation

- Once the problem is guided to the qualified department/person, it can be solved quickly and effectively.
- Minor issues when attended in time will not result into major problems.
- Escalation make sure that issues are handled properly, resulting in quality service and better customer satisfaction.
- Support staff get an opportunity to enhance their skill set and allow them to handle such situations in future.

6.3.6 Basic Report Template - to Escalate a Technical Issue

Technical issue escalation report should have the (i) details of the person escalating issue with an ID allocated to the issue (ii) summary of problem faced (iii) Previous trouble shooting steps details, if applicable (iv) Reason for escalation and kind of support required (v) relevant details (vi) Escalation details, if applicable

Name of the Report

Details of the person escalating issue, such as

Date: of escalation

Reported by: Name, Department and Designation of the person

Email id

Issue ID



Technical Issue Summary

Issue: brief description of technical problem.

Product/feature: name of product affected.

Impact: of issue on the department/business.

Troubleshooting steps

When issue started: date and time when the issue was first reported.

Action taken so far Trouble shooting steps already taken for the issue

Why escalation is required and Action requested

Reason for escalation:

Escalated to Name of person/Department

Support required

Relevant details

Error Message (if any):

Screen Shots (if any):

Report prepared/forwarded by

Sign, Name and Date:



INTEXT QUESTIONS 6.3

1. The guidelines used to move an issue forward in the organization is known as
2. A very critical technical issue can be reported to the IT Desk. True/False
3. During payroll processing activity, data server housing employee's data goes down. Identify the level of issue.
4. Reporting a problem to qualified dept./person gets it solved and



Notes

**WHAT HAVE YOU LEARNT**

- MIS is computer based system to process, evaluate and analyze data. Information and Reports generated using MIS, help management to take effective decisions.
- Using graphical representation of the data facilitate smart decision making in the organization. Built-in tools of MS-Excel are simple to use for graphical representation of data.
- Identifying correct type of chart/graph in MS-Excel to produce desired report for management people.
- Just like, providing reports in time is important for running an organization successfully, reporting technical issues in time is also very important. Organizations have well defined method of handling these issues.

**TERMINAL EXERCISE**

1. Define MIS and why is it so important for an organization?
2. Prepare a list of Management Information System, which can be used in an educational organization.
3. Write the names of MIS reports which can be used to identify revenue generation patterns in an organization.
4. List the points to be considered for creating an effective graph?
5. Management of Super Store wants to create following visual reports using file “Sales.xls”:
 - (a) Product Category wise monthly sales made
 - (b) Month-wise sales details of Product Category – “Apparel”
 - (c) Yearly sales for each Product category.

Suggest best suitable chart type to plot the data and also write the steps used to draw them.
6. Describe the benefits of using pivot table in data visualization.
7. Using “flights.xls” create
 - (a) Pivot table to find average delay by Airline
 - (b) Pivot table to find cancelled vs non-cancelled flights.
8. Why is it important to escalate a technical issue in the organization?



9. Determine a situation, apart from what is given in chapter, which you consider as an issue for escalation.
10. An HR staff member of the organization forgot the password to access Payroll component of the software. What can be the possible solution? Do you think it should be escalated to management? Justify your answer.
11. A login attempt made in MIS from an unknown IP address. What is the level of issue and to whom it should get escalated?



ANSWER TO IN-TEXT QUESTIONS

6.1

1. Reports
2. False
3. Knowledge Management System
4. H.R.
5. Ad-hoc Reports

6.2

1. Summarize
2. False
3. What share does each point contribute
4. Scatter Plot
5. Summarizing

6.3

1. Escalation Matrix
2. False
3. High Level Issue
4. Quickly, Efficiently

Key Learning Outcomes

By the end of the lesson, learners will be able to:

- explain MIS reports and their role in decision making.
- create and analyze pivot tables to sort, filter and visualize business data.
- escalate technical issues for smooth digital operations



DIGITAL SECURITY

We live in a digital era where technology has become deeply embedded in every aspect of our lives. The digital devices and gadgets have transformed the manner in which we communicate, work, learn, and entertain ourselves. On one side, it has helped to improve communication, introduced cashless transactions, allowed us to learn virtually, enhanced governance, and has given us many more such conveniences. However, on the other side, it has also made us vulnerable to a wide range of cybercrimes. From identity theft and data breaches to phishing scams, terrorism, and ransomware attacks, the digital world presents significant risks to both individuals and organizations. Therefore, it is very important for us to be aware of these threats and take proactive steps to protect ourselves from loss of financial or personal data. Similarly, the companies that provide online services must take proactive measures and adhere to safety regulations to safeguard the personal and financial data of all its customers. In this lesson, we will understand what digital security is, why it is important, and how we can protect ourselves from potential cybercrimes.



OBJECTIVES

After the completion of this lesson, the learner will be able to:

- evaluate the importance of cyber hygiene practices and how they contribute to a secure digital workspace;
- identify potential cyber threats and describe necessary precautions to mitigate risks;
- identify and practice basic security measures for protecting digital devices and systems;
- describe the significance of strong and unique passwords for data security.



- explain the need for software updates and security patches to prevent digital vulnerabilities.
- describe the principles of secure data transmission, including access control and encryption in online communications.

7.1 DIGITAL SECURITY

Digital Security refers to the protection of digital devices and personal and financial data from unauthorized access, theft, or damage. It is the combination of technologies, tools, practices, and policies to safeguard sensitive information from potential cyber threats. Every user should feel safe when he/she is online, may it be for learning, entertainment, shopping, mailing or simply browsing for any information. The importance of digital security can be understood from the following points:

- It protects personal information from any type of fraud due to hacking or identity theft.
- It ensures safe business practices for all organizations, avoiding breaches that may lead to any form of financial loss or damage of reputation.
- It safeguards national security from any type of malware, ransomware or cyberterrorism attack, especially in these days, when all critical infrastructure relies on secure digital systems.
- It builds trust for online transactions and interactions among all users as it ensures safer digital environments for communication, shopping, banking, etc.

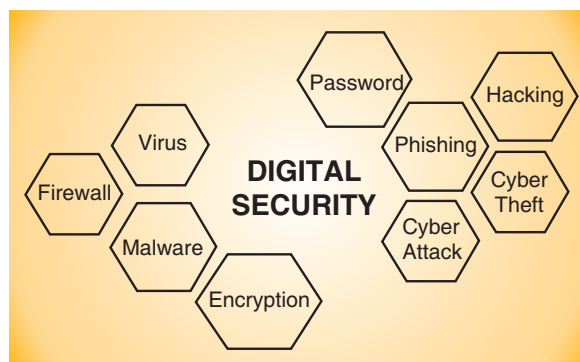


Fig 7.1: Digital Security

Therefore, digital security is the need of the hour today. It is important for each one of us to be aware about potential cyber threats and what measures and security practices should be adopted to protect ourselves from any form of cyber-attack.



7.2 COMMON CYBER THREATS

A cyber threat or a cyber attack is an intentional effort to steal, modify, damage, or destroy data or any other resource on the network. With the advancement of technology, the cyber criminals are becoming increasingly creative with their attacks. As a netizen, one should be aware of all prevalent cyber attacks. The knowledge of these threats and attacks is the best means to protect ourselves. Some of the common forms of cyber-threats are discussed below:

7.2.1 Hacking

Hacking is one of the most common forms of cybercrime. The persons who commit the crime of hacking are known as hackers. They gain access to systems or networks without necessary permissions and authentications with the intent to cause data theft, system disruptions, and even injection of malware. This is done for monetary benefits or to settle business or political rivalries. The Swachh City platform, an initiative associated with Swachh Bharat Mission was hacked in September 2022, putting data of its 16 million users on risk. The database was then put on sale on the dark web. In the year 2018, hackers infiltrated the server of Cosmos Bank in Pune and conducted fraudulent transactions via cloned debit cards across 28 countries.

7.2.2 Malware Attacks

A malware attack is a software-based attack where any form of malware – viruses, worms, trojans, ransomware, adware, spyware, or fileless malware can be used to harm a digital device or a network. Such attacks can be localised to a particular area, region, or organization, or can be on a global scale affecting millions of computers. In the year 2024, the state of Telangana faced about 17000 malware attacks every day. In 2019, WhatsApp revealed that a malware by the name of Pegasus Spyware has targeted Indian journalists, activists, and high-ranking officials.

7.2.3 Denial-of-Service (DoS) Attacks

In this type of cyber attack, the attacker blocks the access to data and/or resources for its intended users. It is done by overloading the system with fake requests, causing it to crash or become unresponsive. The huge network traffic leads to complete exhaustion of bandwidth such that the service becomes inoperable. To bring back normalcy, the cyber attackers may demand money, usually in bitcoins. Sometimes, such types of attacks may also be used as a distraction to commit some other crimes. IoT (Internet of Things) devices are used to carry out such attacks. According to a report, 16 lakhs DoS attacks were attempted on the G20 website in the year 2023.



7.2.4 Phishing, Vishing, and Smishing

These are the types of attacks in which the user is coerced to give its own personal and confidential information such as bank account details, ATM PINs, credit/debit card details, etc. to the attacker. Phishing is a type of cyber attack in which fraudulent emails and websites that appear to be legitimate are used to trick individuals into revealing personal information. The phishing emails may contain infectious attachments or links to malicious websites, or they may directly ask to reveal confidential information.

The screenshot of an email given in figure is an example of a phishing mail. This is because

- The sender's address is suspicious. It is not coming from any domain of a bank
- It does not address the customer with his/her real name
- gives a sense of urgency and pressures the user to act promptly.
- If you will keep the mouse pointer over the hyperlink, you will notice that it does not go to the bank's real website.
- The mail exhibits poor language skills.

On receiving such mails, one should always verify from the bank and never click on any link.

Subject: Important: Verify Your Bank Account Immediately

From: admin@bank-support.co.in

Message:

Dear Customer,

There is an unusual activity noticed in your bank account. Therefore, the access to your bank account will be blocked.

To restore full access, please verify your information immediately by clicking the link below:

Verify My Account

Failure to verify within 24 hours will result in permanent account suspension.

Thank you for your prompt attention,

YourBank Security Team

Fig. 7.2: A Sample Phishing Mail



A study by Kaspersky found that from January 2024 to June 2024 India saw around **135,173 phishing attacks** that targeted banking, payments, e-commerce, etc. This is a whopping 175 % increase as compared to the previous year.

Spear Phishing is a type of phishing in which the employees of an organization are targeted through emails that seem to come from a trusted source, such as the CEO or IT Manager of the organization.

Vishing is an attempt by cyber criminals to seek personal information through phone calls. They entice the person by luring them into a good deal, a lottery, or some prize money and then winning their confidence. If the users divulge their personal information, the data disclosed by them is then used by attackers for malicious purposes.

Smishing is a type of cyber attack that tricks people by sending text messages. These messages may contain a fraudulent number for the victim to respond back, a link that may lead to a fraudulent website or may insist to download a malicious software via phone or web. Fig below shows a sample smishing attack.

Sender: WhatsApp
Your WhatsApp account will be deactivated in
30 minutes.
To continue using it, verify now:
<http://whatsapp-verify-login.com>

Fig. 7.3: Smishing Attack

7.2.5 Identity-Based Attacks

Identity Based attacks are those attacks in which the personal identification details of a person are stolen and used for malicious purposes. The details may be financial, medical, personal or any other such confidential information. The data stolen may be used to commit crimes in victim's name or may lead to unauthorized purchases, loans, and many more fraudulent activities.

Some of the common types of identity theft are:

- **Financial Identity Theft:** In this type of identity theft, the personal or financial details are stolen for monetary benefits of the attacker.
- **Account Takeover Theft:** In this case the attacker uses the stolen details to get access to the victim's existing account and steal money.



- **True to Name Theft:** In this type of identity theft, the criminal steals personal details of the victim and then creates a new account on that very name. For example, a fraudster may open a bank account in the victim's name after stealing his/her personal details. Thereafter that bank account may be used for performing some illegal transactions.
- **Medical Identity Theft:** In this type of identity theft, the medical records, health claims, or insurance records of the victim are stolen to make some false financial claims on behalf of the victim.
- **Synthetic Identity Theft:** In this type of identity theft, the criminal steals personal information of multiple people. Portions of information from these multiple sources are then combined to create a new identity which is then used to get a debit/credit card, sim card, etc.
- **Child Identity theft:** This happens when personal details of a child such as his/her Aadhar card number are stolen and then used for malicious purposes. Generally, such details are not used instantly and so are difficult to catch.
- **Criminal Identity Theft:** When the attacker gives a stolen identity as his own identity in the police station and then commits crimes using that very stolen identity, it is criminal identity theft. As a result, the police approach the victim instead of the actual offender.

According to a survey, about 39% of Indian adults have experienced Identity Theft at some point.

7.2.6 Juice Jacking

This is a type of cyberattack where an infected USB charging port is used to compromise a digital device. A mobile device can be charged using the same USB cable that is used to transfer data. If the phone is charged through a USB port, that is compromised, the hackers either copy data or inject malware into the charging device in such a manner that it is not even noticed. Hence, one should never charge their phones at public places such as railway stations, cafes, metro stations, and airports. Although most of the juice jacking attacks have occurred on mobile phones, but all digital devices that are charged using USB ports are prone to this type of attack as shown in the Fig. 7.4.

To prevent Juice jacking attack, avoid public USB charging stations. Instead, use a power cable or carry your power bank. Still, if there is absolute necessity to charge using a USB port, then:

- disable automatic transfer of data option



Notes



Fig. 7.4

- lock the device once it connects with the charging station, so that it is prevented from synching or transferring data.
- If a prompt appears to “Trust this computer”, deny the permission. This is a clear signal that the charging port is compromised.

7.2.7 Man-in-the-middle (MITM) Attacks

A Man-In-The-Middle or MITM attack is a type of cyberattack where the attacker positions himself/herself between the two communicating entities (user and application) in a communication channel. This may be done to eavesdrop or to impersonate one of the parties, making it appear as if a normal exchange of data is happening. None of the entities whether they are logging in, sending emails, texting, or chatting on a video call, are aware that an attacker is present in their conversation and is stealing their data. The attackers collect personal credentials and login information.

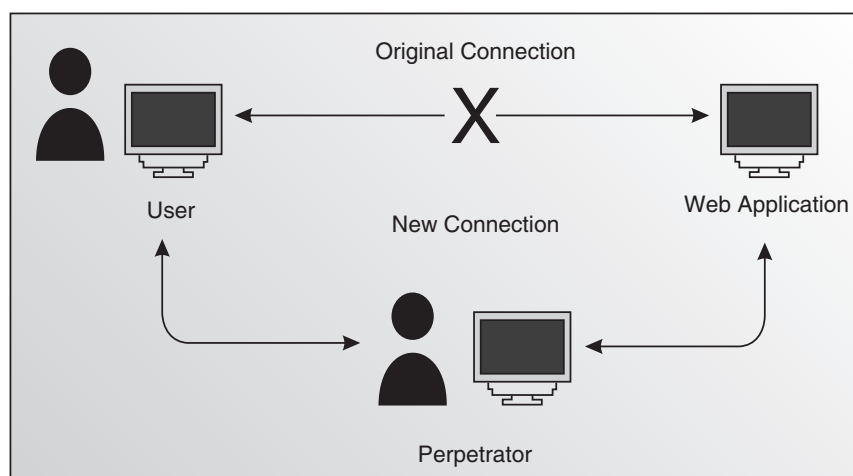


Fig. 7.5



Consider a courier delivery service, where the courier delivery person opens the confidential packet, copies the personal details, seals the packet back and then delivers it. MITM attack works in the same manner where the attacker is the courier delivery person who steals confidential data.

The aim of the attack is to steal personal data such as credit card numbers, passwords, login ids, etc. For example, if a user is logging in to an e-commerce site, the attacker positions himself/herself in between the e-commerce platform, to steal the user id and password is visible to the attacker. Information so obtained is used for identity theft, unapproved fund transfers, or illicit password change. One of the warning signs of an MITM attack is unexpected and frequent disconnections from service and getting links of strange URLs in the browser window.

To avoid MITM attacks one must follow the following cyber security practices:

- Update and secure home Wi-Fi routers with strong passwords.
- Use virtual private network (VPN) while connecting to Internet.
- Use an updated antivirus software
- Avoid using public Wi-Fi, especially while performing financial transactions
- Do not visit unsecured websites

7.2.8 Password Attacks

A password attack is one when the attacker attempts to steal the password for any application. It is increasingly becoming common these days. The username and password are one of the most used authentication techniques. The attackers target the weak passwords, especially if that is the only authentication method used for logging in the network. The weak passwords are easily guessed as they are too generic or are already compromised. However, passwords may be stolen by installing a keylogger on the victim's device or through an MITM attack.

To avoid being the victim of password attacks:

- Use strong passwords and change them regularly.
- Wherever possible, use multi-factor authentication
- If possible, enable a biometric authentication
- Always use an updated antivirus software.



Notes

7.2.9 Cyber Bullying and Cyber Stalking

Cyber bullying and cyber stalking is becoming a growing concern among young internet users. In case of cyber bullying, digital devices along with Internet are used to threaten, intimidate, or harass a person to such an extent, that it becomes a trauma and distress for the victims.

Although many incidents of cyber bullying go unreported but a survey has found out that 1 in every four adolescents, i.e. children in the age group of 15-19 years have experienced cyber bullying. Most of the cyber bullying incidents happen on social media platforms such as Facebook and Instagram. The victims are bullied by spreading rumours, posting insulting comments, sharing private photos or videos without consent, exclusion from groups, etc. The victims suffer emotional distress and show symptoms such as depression, anxiety, low self esteem and feeling of being incompetent and unworthy.

Cyberstalking is an act of following a person online or making repeated attempts to contact the victim through text, audio, or video messages on a social media platform. This is done despite a clear indication of disinterest by the victim. The stalker sends lewd comments and attempts to seek personal attention. In Delhi, a 21 year old man was arrested for cyber stalking a college student. He created multiple fake Instagram accounts and used the victims photos to generate objectionable content.

7.2.10 Cyber Grooming

With the increase in Internet usage by children, and that too without proper parental supervision, the children are becoming easy victims to cybercrimes. Cyber grooming is an act when a person, usually an adult, befriends a child through social media platforms. He/she subsequently gains trust of the child generally, with an intention of sexual abuse or any other such activity. The child may be forced to meet the attacker in person without the knowledge of parents or guardians. Such



Fig. 7.6

Source: <https://www.childsafenet.org/cyber-grooming>



children may be abused or forced to perform illegal tasks. A minor girl in Ahmedabad befriended a 24 year old man via Instagram. He groomed her into sharing obscene pictures and videos which he then shared on social media. The offender was arrested.

7.2.11 SIM Swap

A SIM (Subscriber Identification Module) card is the only identity of a particular mobile phone. It identifies the phone to a specific mobile network and allows the user to use its features. SIM Swap is a type of cyberattack in which the criminal fraudulently manages to get a new SIM card issued from the mobile service provider against an already existing registered mobile number. Once the new SIM card is issued, all notifications, alerts, OTPs, that are required for making financial transactions through the victim's bank account are received to the criminal instead of the victim.

Following few missed calls, the mobile phone of a textile merchant in Mumbai stopped working overnight. About 1.85 cores were stolen from his bank account and transferred to 24 other bank accounts across the country.

7.2.12 IoT – Based Attacks

The Internet of Things (IoT) is a network formed by connecting multiple devices over the Internet. The devices that can be connected to the IoT are known as IoT devices. These include smart locks, vehicles, lighting systems, cameras, fitness trackers, home appliances such as air conditioners, washing machines and many other types of gadgets. Huge amount of data is collected through these multiple devices, which makes the IoT devices very vulnerable to cyber attacks such as data theft, phishing attacks, spoofing, or Denial of Service (DoS) attacks.

Although there are quite a few advantages of IoT but the security aspects of IoT devices need due attention. The built-in sensors attached in the IoT devices pass on sensitive information through the Internet. Any security breach can cause theft of sensitive data.

Some of the reasons for IoT based attacks are as follows:

- **Outdated hardware and software:** The gadgets and digital devices, one installed are not updated on time. This gives an opportunity to the cyber criminals to gain access to these devices and their data. The network ports that are used to connect these devices are also insecure as they do not use proper security protocols.



- **Use of default passwords:** Most gadgets, especially security cameras, home locks, routers, light control systems, etc. are installed with default password that are not changed by the user. This makes it easy for cyber criminals to compromise such gadgets.
- **Unsafe communication:** The messages sent over the Internet through IoT devices are not encrypted, hence, they can be easily comprehended by hackers.
- **Personal Information Leaks:** If the cyber criminals get hold of the IP address of the IoT devices, they can easily reveal the user's precise location, residential or permanent address.
- **Automation:** With the increase in the use of artificial intelligence and automation in the program codes, our lives have become convenient but at the same time, we have become increasingly dependent on technology. If cyber criminals get access to these codes, they can get control of the automation and do anything they want to. In one of the examples of Milwaukee Couple case, the hackers compromised their smart home and took control of security cameras, played vulgar music, and pushed the room temperature to 90 degrees.

Another famous IoT based attack is the Mirai Bot attack. In 2016, an IoT botnet was used to execute a massive DoS attack that brought several websites, such as CNN, Twitter, and Netflix, offline. The default user names and passwords were used to log in to various gadgets in the IoT network and spread the malware.

IoT users should be aware of cyber security practices. One should always get services from a reliable IoT vendor and ensure that all their products use proper security measures in their product design. The smartphone controlling the IoT devices should also be well protected with firewall or a dedicated monitoring tool. The notifications sent to on the smartphone by the IoT devices should be read carefully.

7.2.13 Intellectual Property Theft

With increase in Internet usage, all kinds of creative work such as paintings, music, poems, blogs, research papers, software codes, etc. is made available to all around the world. But that does not mean that anybody can download and use any intellectual property without the consent of the creator. If anyone does the same, he/she is committing a criminal offence of intellectual property theft. The following acts are included in intellectual property theft:



- **Software Piracy:** This is an act of copying a software and using or distributing it without the consent of the original creator.
- **Plagiarism:** This is an act when the offender copies someone else's work and presents it as his/her own work.
- **Copyright infringement:** A copyright is the right of an intellectual work given to its original creator. The right to use, distribute, reproduce, or display lies with the copyright holder. Any act by the offender that is done without seeking permission from the copyright holder is copyright infringement.
- **Trademark Infringement:** A trademark is a unique symbol or text that identifies the company and its products. If anyone tries to use a similar symbol or logo such that there are chances of deception by the consumers, then such an act is termed as trademark infringement. The figure shows two most popular trademark infringements.



Fig. 7.7

Source: <http://www.colormatters.com/images/brand-tm/mcdonald-3-rights.png>



Fig. 7.8

Source: <https://legalupanishad.com/wp-content/uploads/2021/11/Registration-of-shape-of-goods-astrademarks-5.png>



INTEXT QUESTIONS 7.1

A. State whether the following statements are true or false:

1. Anyone who is online is vulnerable to malware attacks.
2. Cyber Bullying and Cyber Stalking refer to same type of cyber crime.



Notes

3. Digital security only protects the user's personal data.
4. Cyber grooming means to enhance the personality of the child through online sessions.
5. Plagiarism is an act when the offender copies someone else's work and presents it as his/her own work.

B. Fill in the blanks:

1. The persons who commit the crime of hacking are known as
2. is an attempt by cyber criminals to seek personal information through phone calls.
3. The is a network formed by connecting multiple devices over the Internet.
4. A is a unique symbol or text that identifies the company and its products.

C. Identify the type of cybercrime for the following:

1. A USB charging port is used to inject malware into a device.
2. Downloading a piece of music from Internet and using it in your own composition.
3. Posting lewd comments on social media for anyone.
4. The attacker can view the communication between the user and the application.
5. A new SIM card is issued against an already existing registered mobile number without the knowledge of the original user.

- D. Talk to your parents, friends, or relatives. Ask them if they have experienced any type of cybercrime. Make a report on it and present in your class.

7.3 BASIC SECURITY MEASURES

While working online we do not know about the malicious intentions of other Internet users. Therefore, it is always advised to follow certain security measures while working online. Some of these measures are discussed below:

- **Keep strong passwords.** The passwords should be lengthy and should include alphabets, digits, and special characters. Also, one should avoid



passwords such as names of relatives, friends, or pets, house number, date of birth, etc. as these can be easily guessed by others. One should also change the passwords frequently and not use the same passwords for multiple login ids.

- **Never click on suspicious links** whose authenticity is not known. These may come through emails or any social media app.
- **Never share your personal information** such as financial details, passwords, OTP, or personal contact numbers with anyone.
- **Browse securely.** The browser that you are using should be updated and secure. Always make sure that web addresses use **HTTPS (Hyper Text Transfer Protocol Secure)**. This secure protocol ensures encrypted communication between the client and the server. This is because these websites use a **Secure Socket Layer (SSL)** digital certificate. Such websites have a padlock on the left side of the address bar. One should always download software from these secure sites only.
- **Mark all unsolicited emails** as spam.
- **Exercise discretion while accepting friend requests** on social media.
- **Do not allow the browser to save passwords**, especially when you are working on devices that are being used by multiple users.
- **Use original and updated software** such as operating system, antivirus, firewall, or any other application software.
- **Be careful with the spelling** of a website. A website with a minor change in spelling might be fraudulent.
- **Do not accept cookies from any unknown website.** Also, delete cookies periodically. This is because a cookie contains user information such as domain names, registration ids, etc. The server sends this cookie along with the response requested by the client. The browser at the client machine stores this cookie received from the server in a directory called cookie directory. Hackers may access this directory and gain access to these websites.

A cookie is a small piece of information about the browser's activity.

- In case of any suspicious or malicious activity, it must be reported at the **National Cyber Crime Reporting portal** (www.cybercrime.gov.in) or the nearest Cyber Police Station or Cyber Crime Cell in your city.



Notes

7.4 NETWORK SECURITY MEASURES

Now that we know about various online threats, everyone, who uses the Internet for communication and resource-sharing purposes must be aware of these threats and take precautionary measures to avoid being the victim of cybercrime. Other than the basic security measures that we discussed in the previous section, the organizations providing online services through the Internet are also responsible for safeguarding the data of its customers. It is indeed a big challenge to protect our confidential and sensitive data from unauthorized access and fraud. Various hardware and software tools that help to keep our data secure on the network are discussed below:

- **Security Layer**

TCP/IP (Transmission Control Protocol / Internet Protocol) may be secured with cryptographic methods and security tools such as Secure Socket Layer(SSL). It encrypts the data that is transferred between the web browser and the server and hence makes sure that data remains private and does not tamper when in transit. A website that implements SSL has HTTPS in its URL instead of HTTP.

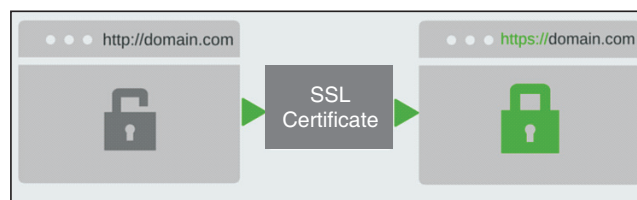


Fig. 7.9

- **Antivirus**

An antivirus is a utility software that aims to protect the computing device against malicious programs. It aims to prevent, detect and eliminate viruses along with other malware such as worms and trojan horses. An antivirus usually runs in the background. If a virus is found, the antivirus sends a notification to the user about the infected program and kills the virus. It also maintains a database of malware definitions to identify the virus or any other malware. One should regularly update the antivirus so that the malware database is up to date.

- **Firewall**

A firewall is a security tool that prevents unauthorized access to the internal network of an individual or an organization. It can be hardware, software, or a combination of both.



The data to be transmitted is first verified that it is coming and going from a user-specified trusted source. After this, the data is allowed to pass through the network. Therefore, it acts as a barrier between internal private networks and external sources. One common example of a hardware firewall is a router, that is placed between the internal computer network and the Internet. It prevents any malicious data or program from entering any private network. Similarly, software firewalls are installed on computing devices to prevent malware access on these devices.

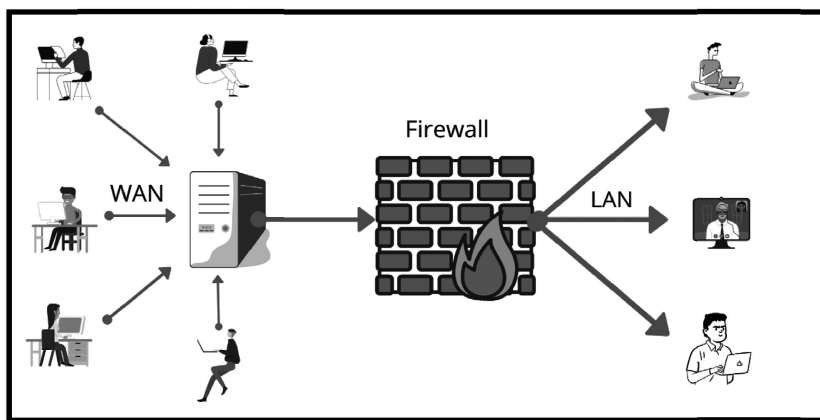


Fig. 7.10

Source: <https://ministryofsecurity.co/wp-content/uploads/2024/02/image-1.png>

Cloud-based firewalls, also referred to as Firewall as a service (FaaS) are accessed over the Internet.

- **Password Manager**

The network users should create strong passwords that consist of alphanumeric and special characters. The login ids and passwords should not be shared with anyone. Multiple applications should not have the same password to log in. Nowadays, software applications such as Password Managers help to create strong passwords using password generators, and store them in encrypted format. The user only needs to remember only one master password while unique and strong passwords for all other applications are generated and stored by the password manager. Hence, the users may not remember passwords for all applications. Some examples of password managers are Google Password Manager, 1Password, Bitwarden, LastPass, etc.

- **Software Updates and Security patches**

Software updates and security patches are of utmost importance for security of any network or device. The updates frequently include bug fixes, improved



memory handling mechanisms and performance optimizers. Hence updates help to maintain compatibility between hardware and software. The security patches seal the loose ends in any software, which may be exploited by cyber criminals. Unmatched systems may expose sensitive data and may also lead to system crashes and memory leaks.

- **Regular Backups**

Backup your data on regular basis to protect your data from ransomware and hardware failures.

- **Educate about security measures**

Conduct user education programs that educate people about cyber hygiene and best practices to keep oneself and the organization safe during online activities.

7.4.1 Access Control

In a computing environment with multiple users, it is very important to control the access of users who can view, edit, or share the available resources. Access Control is a process that determines who is permitted to do so. It ensures that only authorized individuals can access systems, files, or data. It limits the damage caused in case of security breach, and also ensures accountability of users in case of such breaches.

The various types of access controls are authentication, authorization, and account management.

Authentication refers to verifying the identity of the user before giving access to him/her to a network or a network application. There are multiple methods to authenticate a user, such as:

- Passwords or PIN numbers
- OTPs and security questions for two-factor authentication(2FA) or multi-factor authentication (MFA)
- Biometric scans such as fingerprints and facial recognition
- Smart cards

Authorization is a type of Access Control that determines what an authorized user is allowed to do. For example, whether a user, who is authorized to access a resource, can only view it or is also allowed to edit and delete it. A user may be granted access to certain files on the network based on his/her role in the organization. For example, an employee in Sales department may not be allowed



to access the files related to production department. Such type of access is known as **Role-Based Access**.

Account Management is a type of Access Control that involves management of a user's account. It is done by monitoring the activities of authorized users, disabling accounts that are no longer in use, ensuring 2FA, regular updation of passwords, and other such measures.

7.4.2 Encryption

Encryption is a process of converting plain or original data into a coded format. The original readable data is known as **plaintext** while the encrypted version of a plaintext message is known as **cyphertext**. It can only be read by intended receivers. Cyphertext looks like a string of random characters. Even if hackers manage to breach the security layers and get access to data, they won't be able to understand the encrypted data. This adds another layer of protection to the data.

The process of encryption (shown in figure) involves scrambling the original message and making it non-readable, using a secret **encryption key**. This encrypted data is known as **cyphertext**, can now be securely transmitted and/or stored. In the reverse process, the decryption algorithms use a secret key (known as **decryption key**), to transform the encrypted data back to its original form. The encryption or decryption key is known as a **cipher**.

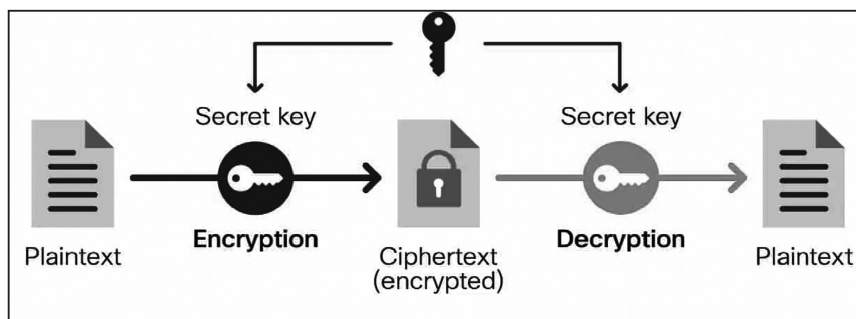


Fig. 7.11: Process of Encryption

Source: <https://www.cisco.com/content/dam/cisco-cdc/site/images/legacy/assets/swa/img/1100/symmetric-encryption-1256x706.png>

A cypher can be individual characters, pairs, or triplets of characters, or any other combination. These cyphers replace a specific sequence and a pattern of conversion is maintained throughout the conversion process. The reverse process may be done with the same or with a different cipher. This process of encryption helps to protect confidentiality during data transmission and storage. However, it cannot protect data from modification or deletion from someone who has an access to the decryption key. Encryption is often used by e-commerce, banking applications,



Notes

defence and diplomatic establishments, and other platforms that use confidential data. Some of the common applications of encryption are:

- HTTPS protocol that uses Secure Socket Layer(SSL) protocols to encrypt web pages
- Virtual private Networks(VPNs) encrypt traffic between your device and the Internet.
- Hard Drives are encrypted using encryption techniques such as BitLocker
- Email communications are made secure using encryption mechanisms.



INTEXT QUESTIONS 7.2

A. State whether the following statements are true or false:

1. You must accept any friend request that you receive on social media.
2. Never allow the browser to save passwords.
3. A firewall is a software application meant to protect from unauthorized access.
4. The encrypted text can only be read by intended receivers.
5. A cypher can only contain uppercase and lowercase alphabets.

B. Fill in the blanks

1. A website that implements SSL has in its URL instead of HTTP.
2. The tool help to store and manage passwords for various applications that we use.
3. refers to verifying the identity of the user before giving access to him/her to a network or a network application.
4. In the process of encryption, the original readable data is known as plaintext while the encrypted version of a plaintext message is known as

C. Give names for the following:

1. National Cyber Crime Reporting portal



2. The security measure that needs an OTP in addition to user id and password.
3. Term used to refer encryption or decryption key.
4. Type of Access control that allows to a user allowed as per his/her designated work in an organization.

D. Which of the following is a strong password?

- (a) Your date of birth
- (b) Debby – your pet name
- (c) T3*YP8@
- (d) Your address

E. Check your Gmail Account. Tick mark the measures that you have taken to secure your account.

- Enabled 2FA
- The browser cache is cleared
- Used a strong password
- Shared your password with your best friend
- Your device has original and updated antivirus



WHAT HAVE YOU LEARNT

- Digital Security refers to the protection of digital devices and personal & financial data from unauthorized access, theft, or damage.
- The various types of potential cyber threats are hacking, identity theft, IoT based attacks, DoS attacks, cyber bullying, cyber stalking, cyber grooming, password attacks, MITM attacks, etc.
- Precautions should be taken to mitigate risks. Some of these best practices include using strong passwords, enabling 2FA, using updated antivirus and other software, etc.
- Network security measures that should be taken while accessing any network. Two important practices are Access Control and encryption.



Notes



TERMINAL EXERCISE

1. Define the following:
 - (a) Digital Security
 - (b) Juice Jacking
 - (c) Cyber Grooming
 - (d) Software Piracy
2. Why is digital security important?
3. Name any three authentication and any three authorization techniques.
4. Name any three types of Identity theft attacks.
5. What are IoT based attacks. Why are such attacks caused?
6. Explain briefly MITM attacks.
7. Differentiate between:
 - (a) Authentication and Authorization
 - (b) Phishing and Smishing
 - (c) Cyber Bullying and Cyber Stalking
 - (d) Plagiarism and Copyright Infringement
 - (e) Antivirus and Firewall
8. Why should one delete cookies from their device?
9. Expand the following:
KYC, HTTPS, TCP/IP, SSL
10. Define encryption. Write any two applications of encryption.



ANSWERS TO INTEXT QUESTIONS

7.1

- A. 1. True 2. False 3. False
4. False 5. True



- B.** 1. hackers 2. Vishing 3. IoT
4. Trademark
- C.** 1. Juice Jacking 2. Plagiarism 3. Cyber Bullying
4. MITM Attack 5. SIM Swap

7.2

- A.** 1. False 2. True 3. False
4. True 5. False
- B.** 1. HTTPS 2. Password Manager 3. Authentication
4. Cyphertext
- C.** 1. www.cybercrime.gov.in
2. 2FA
3. cipher
4. Role based Access

Key Learning Outcomes

By the end of the lesson, learners will be able to:

- identify potential cyber threats and describe necessary precautions to mitigate risks.
- identify and practice basic security measures for protecting digital devices and systems.
- update your software regularly to prevent digital vulnerabilities.



8

DATA PRIVACY AND CUSTOMER-CENTRIC SERVICES

We often see data being collected by different organizations in online and offline modes. Is it legally correct to collect data from individuals? Further, is it safe to divulge your personal, professional, or financial information? Many times, we cannot install an application on our device without giving the required details such as mobile number and Email ids. Therefore, the organizations collecting this data have the ethical, moral, and legal responsibility to safeguard the data so collected. The organizations must comply with data security standards to avoid its misuse by cyber criminals.



OBJECTIVES

After the completion of this lesson, you will be able to:

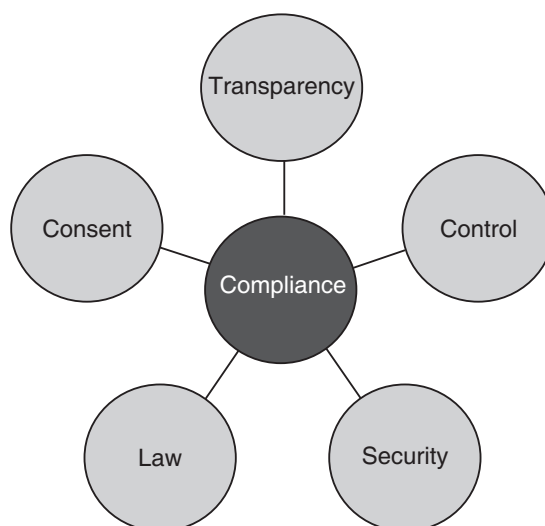
- define data privacy and its compliance requirements in various industries.
- identify industry-specific data handling practices in sectors such as banking, healthcare, logistics, and education.
- list and describe emerging trends in digital tools and platforms that can improve online service delivery.
- troubleshoot common digital platform issues, such as login failures and transaction errors.
- explain the legal and regulatory compliance requirements for digital payments and online transactions.



8.1 DATA PRIVACY

Data Privacy refers to protection of an individual's personal information and upholding of fundamental human right to privacy. Every individual has the right to determine when, how, and to what extent data will be collected, stored, used, and shared, thereby protecting it from unauthorized access and misuse. It helps prevent individuals from suffering harm from the misuse of personal data. The key aspects of data privacy are:

- (i) **Transparency and Consent:** Any individual whose data is being collected should know why the data is being collected and how it will be used. With complete knowledge, the individual should agree and give consent to the terms of collection and usage of data.
- (ii) **Control:** Every user has the right to access, edit, or delete his/her data. That means each user should have full control over his/her data.
- (iii) **Security:** The data should be protected from all forms of breaches and unauthorized access. This relies on data security measures such as access controls, enforcement of policies and regulations to protect data from unauthorized use.
- (iv) **Compliance with Law:** Data privacy requires adherence to local and international laws for any kind of data transfer.



Under Privacy laws, all companies are under a legal obligation to protect personal data of their customers. Further, demonstrating good data privacy builds trust with its customers. The best practices for compliance include:

- Implement role-based authentication and authorization



Notes

Data Privacy and Customer-Centric Services

- Only collect data that is necessary
- Create clear and accessible policies for users
- The data should be properly mapped. It should be known what data is being collected, where it is stored, and who all have access to that data.
- Educate staff on duties and responsibilities towards data privacy.
- Prepare a well-defined Incident Response Plan that can be activated in case of data breaches

The compliance requirements of some of the prominent industries are given in Table 8.1

Table 8.1: Compliance Requirements for various industries

Industry	Focus	Compliance Requirements
Healthcare	Protect health related information of all patients	● Patient consent for sharing of his/her data ● Mandatory notifications for data breach ● Strictly enforced access controls ● Regular and strict audit trials
Finance	Securing financial data	● Strong encryption mechanisms ● Strong authentication processes ● Vendor and third party risk management ● Regular risk assessments ● Regular and strict audit trials
E-Commerce	Protecting payment and personal information of consumers	● Secure payment processing ● Transparent data collection practices ● Regular risk assessments ● Disclosures for use of data collected ● Maintaining record of all online transactions with date, time, and location.
Education	Protecting student records	● Consent from students/parents for collection of data ● Security of student's data ● Record retention for permitted period ● Setting limits for disclosure of data to authenticated users.
Technology	Handling large volumes of user's data across multiple jurisdictions	● Strict cross border data transfer rules and mechanisms ● Transparent privacy policies ● Full protection of user's data by default



8.2 INDUSTRY SPECIFIC DATA HANDLING PRACTICES

Practices of various industries depend upon the type of data collected and maintained, regulatory obligations, and the risks involved in handling of data. Let us discuss some of the data handling practices for Banking, Healthcare, Logistics, and Education sectors.

8.2.1 Banking Sector

A. Key Data Collected and Maintained

- Financial records such as account numbers, balance amount, transaction records of all its customers
- Authentication data such as user ids and passwords
- Personal records such as name, address, contact details of all its customers
- Transaction histories including that of credit and debit

B. Risks Involved

- Prevention of fraudulent transactions
- Detection of money laundering
- Identity Theft

C. Data Handling Practices

- End-to-end encryption of data at all times
- Mandatory two-factor authentication (2FA) for all net banking and customer portals
- Automated systems to detect malicious transactions and money laundering
- Must retain data for set periods (generally 5-7 years) as per compliance
- Give role-based access to sensitive data
- Conduct regular audits

8.2.2 Healthcare Sector

A. Key Data Collected and Maintained

- Generic and biometric data
- Electronic and protected health records of patients such as type of disease, treatments. etc.
- Insurance and Billing data



Notes

B. Risks Involved

- Exposure of protected health records of patients
- Legal liability of protection of all records
- Ransomware
- Loss of patient's trust

C. Data Handling Practices

- Explicit consent of patient should be taken for sharing of data
- Access to only that data that is necessary for treatment
- Encryption while sharing of patient's data with any one
- Remove identifiers when data is used for research and analysis purposes
- Give role-based access to sensitive data
- Conduct regular audits
- Ensure secure data recovery plans

8.2.3 Logistics and Supply Chain Sector

A. Key Data Collected and Maintained

- Shipment and delivery data
- Customer contact and location data
- Inventory and Warehouse data
- Vendor information
- Contract information
- GPS and route optimization data

B. Risks Involved

- Disruption of Supply Chains in a particular area or at global level
- Intelligence leaks by competitors
- Regulatory penalties for cross-border data mishandling



C. Data Handling Practices

- Establishment of centralized platforms for monitoring and synching data across suppliers, distributors, and customers
- Use of IoT and GPS to monitor shipments and transport vehicles
- Encryption while exchange of data between partners, vendors, producers, and consumers.
- Give access to data based on operational roles
- Evaluate data handling practices of third parties
- Conduct regular audits

8.2.4 Education Industry

A. Key Data Collected and Maintained

- Personally identifiable records of students and parents/guardians such as names, birthdates, contact numbers, etc.
- Academic records of students such as grades, transcripts, and attendance
- Health and special education records
- Payment or financial aid records
- Disciplinary records
- User Ids and passwords for learning management systems(LMSs) or virtual classes of the educational institutions

B. Risks Involved

- Unauthorized access to student portals, LMSs, or virtual learning platforms.
- Loss or theft of physical records or unencrypted storage devices
- Phishing attacks targeting students, parents, and staff
- Data sharing with third party ed-tech apps without proper vetting

C. Data Handling Practices

- Only collect and retain data necessary for educational purposes
- Consent must be obtained for data collection and sharing, especially for minors



Notes

Data Privacy and Customer-Centric Services

- Encryption of data at all times
- Give access to data based on operational roles of teachers, administrative staff, students, and parents.
- Track misuse of data or any unauthorized activity
- Regular training of staff on data privacy policies and practices
- Ensure that LMSs, online classrooms, and learning apps comply with security and privacy standards
- Conduct regular audits
- Establish a plan for identifying, reporting, and reducing data breaches



INTEXT QUESTIONS 8.1

A. State True/False

- It is not necessary for the individual to know why his/her data is being collected.
- Data privacy requires adherence to local and international laws for any kind of data transfer.
- Before collecting data of minor students, consent should be taken from their parents.
- Every user has the right to access his/her data but cannot delete it.

B. Name the industry/sector that collects the following type of data:

- Financial records such as account numbers, and transaction details such as date, time, type of transaction
- Electronic and protected health records of patients
- Inventory and Warehouse data
- Vendor information
- Academic records of students such as grades, transcripts, and attendance

C. You are principal of a reputed school in your city. A coaching centre approaches you to conduct a career counselling session for the students of your school. While taking the sessions, they distribute forms to collect personal data of students and their parents. Should you allow this? Why/Why Not? Have a discussion with your classmates in the presence of a teacher.



8.3 TROUBLESHOOTING COMMON DIGITAL PLATFORM ISSUES

The netizens, especially the senior citizens face multiple issues while they are accessing digital platforms. Some of these issues can be solved by gaining little bit knowledge about platforms and their usage. Two most common issues that are encountered while accessing digital platforms are Login Failures and errors while making online transactions.

8.3.1 Login Failures

We know that authentication is one of the most used security practices by digital platform. To avail the services on any digital platform, especially for financial transactions, one has to login using the correct user id and password. In addition to this, many of the platforms use 2FA or MFA for secure access. The table 8.2 given below outlines the common causes for login failures and the steps to troubleshoot the same.

Table 8.2: Troubleshooting Login Failures to a Digital Platform

Cause	Troubleshooting Steps
Incorrect Username or Password	• Re-enter username and password carefully. • Use the Show Password option if available. • Try resetting the password via Forgot Password option.
Account Locked or Suspended	• If the account is locked due to too many failed attempts, wait a while before trying again. • Check if you have received any email or SMS about suspension or lockout. • Contact support if the issue remains unsolved
Issues with Two-Factor authentication (2FA)	• Ensure your phone, Email, or authenticator app is synced together. • Check your mobile network. Sometimes OTP is delayed due to unavailability of network/mobile data.
Browser or Cache problems	• Update your browser/app • For browsers, clear cache/history. Alternatively try Incognito/Private mode. • For apps, go to phone settings → App → Clear cache/data.



Notes

Data Privacy and Customer-Centric Services

Server Issues	• Look on status pages or social media for any widespread outages • Try a different device or network as sometimes firewalls block logins • Contact support if issue not resolved
---------------	---

8.3.2 Online Transaction Errors

As we know that online transactions have become a norm these days. But sometimes, users are unable to complete the transaction due to some reason. Table 4.3 outlines the some of the causes for failed transactions and the steps that may be taken for troubleshooting.

Table 8.3: Troubleshooting Online Transaction Errors

Cause	Troubleshooting Steps
Payment Declined	• Ensure your card/account has sufficient funds. • Check for expiration date or incorrect CVV on the credit/debit card • Double check for typo errors while authenticating the transactions • Contact your bank for support if issue is not resolved
Transaction Times Out	• Use a different card, payment method, or device • Try using Wi-Fi instead of mobile data or vice versa • Look for failed payments – some of these payments are reversed within few days
Wrong Billing/Shipping Details	• Double check for typos or incorrect postal codes • Check your order before finalising for payments
Items not showing after purchase	• Check for confirmation email or SMS after you finalize the order. • Check your order history or account activity • Contact support with transaction id, payment method, date and time of transaction, and screenshot of error message



8.4 EMERGING TRENDS

With advancement of technology, multiple new tools and applications are being developed that enhance and improve online transactions, service, and delivery. These emerging digital trends use advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML), automation, and immersive experiences. Let us discuss some of the emerging trends that have boosted the E-Commerce industry.

8.4.1 Artificial Intelligence(AI) and Machine Learning(ML) Driven Tools

AI and ML driven tools streamline repetitive tasks and helps the customers to find response and solutions on their own. Some of the common AI tools that improve online service and delivery are:

- **The advanced AI Powered Intelligent Chatbots and Virtual Assistants** understand the context, intentions, emotions, etc of the customer, and hence can handle routine queries without human intervention. Features such as interactive FAQs, knowledge bases, and customer portals allow users to find information independently, reducing the load on customer support teams. Automating business processes like approvals and notifications has helped to streamline internal operations.
- By using historical real time data, the **AI models can analyse and forecast** demand, user behaviour, and potential issues that may arise in future. This forecast helps in better resource allocation for earning maximum profits.
- The **On-Device AI** Tool involves processing data nearer to the user's device such as in case of IoT and telecom applications. It reduces latency, improves responsiveness, and privacy.
- AI analyses large amounts of data, including browsing and purchase history of customers. This helps to **deliver tailored product recommendations**, content, and dynamic offers in real time to boost engagement of customers and hence increase the sales.

8.4.2 Cloud Services

Cloud computing and storage is the foundation for scalable, flexible, and cost-effective online services and delivery. This has revolutionised the way we store, access, and share data. Some of the emerging trends in this aspect are:

- The services are delivered over cloud with subscription or usage-based payments has increased exponentially. It ensures scalability and flexibility of the service being provided. It also optimizes cost and performance.



- The cloud allows the companies to **test new projects quickly and cost-effectively**, thereby enabling them to meet customer demands faster.

8.4.3 Seamless Multi-Device/Multi Channel Experiences

- The users can switch between devices and channels (phone, web application, mobile apps and social media) without losing the context. This ensures consistency in the usage of an application as a user can access the application from a smartphone or a laptop or any other device, ensuring continuity of service.
- In case of E-Commerce, multi-channel engagement integrates data, inventory, and customer profiles in real time to personalize service, reduce errors, and enable greater speed of delivery and flexibility.

8.4.4 Immersive Technologies

- Using Augmented Reality (AR), Virtual Reality (VR), mixed reality, remote support, virtual showrooms, remote field operations, etc. helps to cut down on errors and enhances engagement of customers. It also improves accessibility for people with disabilities or those living in remote areas.
- Customers can use **AR to virtually try on products** such as clothing before buying. This increases the customer's satisfaction and reduces return rates. Further, features such as live stream shopping allow the brands to showcase their products via live videos and real time interaction with influencers builds a trusted client community.
- **Integration of shopping features directly into social media platforms** has further contributed to more visibility of products. The users can shop without leaving the social media app.

8.4.5 Data Privacy and Security

- With increased use of digital devices, companies are investing in **AI driven security** with enhanced encryption.
- With the help of **blockchain technology**, the record of all transactions is maintained in a transparent manner. This helps to address concerns about fraud and data integrity. The blockchain technology is a type of digital ledger that records the transactions across a network of computers in a secure and tamper-resistant manner. Every computer in the network has a copy of the transaction. Also, once data is recorded in a blockchain, it cannot be altered or tampered.



8.5 LEGAL AND REGULATORY COMPLIANCE FOR ONLINE TRANSACTIONS

The governing bodies of each country ensure legal and regulatory compliance for online transactions and digital payments. It is essential to secure customer protection, safeguard financial security, and maintain data privacy. This prevents financial frauds and other malpractices including terrorism financing. Some of the important laws and regulations that are to be adhered and/or implemented are:

- General Data Protection Regulation(GDPR)
- Anti-Money Laundering(AML)
- Know Your Customer(KYC)
- Payment Card Industry Data Security Standard (PCI DSS), etc.

By following these regulations, the companies earn the trust of customers globally and avoid legal penalties. In addition to this, it also improves operational efficiency and risk management.

The key aspects of legal and regulatory compliance for all online transactions are:

- (i) All digital platforms enabling online transactions must follow Consumer Protection Regulations to protect the consumers performing online transactions.
- (ii) All companies should comply with Data Privacy and Protection Laws to safeguard sensitive personal and financial data of its customers.
- (iii) Digital payment providers must implement systems such as AML and Counter Terrorism Financing (CTM) to detect and report suspicious transactions. One example for this is implementing KYC.
- (iv) Licensing and Registration of Payment Service Providers (PSPs) has to be mandatorily completed by all financial platforms. The government or central banks authorize such licenses and registrations after the organization meets capital adequacy requirements and comply with their auditing regulations.
- (v) All digital transactions must comply with applicable accounting standards and tax laws such as GST, VAT, sales tax, etc. Proper invoices for each sale/purchase must be generated and all transaction records must be maintained for audit purposes.
- (vi) Security frameworks such as 2FA or MFA, encryption mechanisms, are strongly recommended for all platforms enabling digital payments.



Notes

- (vii) All digital platforms enabling online transactions must have regular audits to check for any irregularities or suspicious transactions.
- (viii) When the platforms are operating across the countries, they must ensure compliance with foreign exchange regulations and international data transfer laws
- (ix) In case of data breach, or any fraud, the companies must inform the customers about how the breach occurred, what data is compromised and what measures will be taken to minimize their loss.



INTEXT QUESTIONS 8.2

A. Fill in the blanks:

- (a) The option can be used to reset the password.
- (b) One of the reasons for failure may be insufficient balance in the bank account.
- (c) The tool involves processing data nearer to the user's device such as in case of telecom applications
- (d) In case of, multi-channel engagement integrates data, inventory, and customer profiles in real time
- (e) With the help of, the record of all transactions is maintained in a transparent manner.

B. Multiple Choice Questions:

1. Which of the following can be one of the troubleshooting steps that should be taken if the user's account is locked after multiple login failures?
 - (a) Use Show Password option
 - (b) Shut down your device
 - (c) Try after some time
 - (d) Format your device
2. Which of the following payment method is used to avail cloud services?
 - (a) Subscription Based (b) Usage Based
 - (c) Colour based (d) Both (A) and (B)



3. Rocky wants to try the clothing virtually before buying it online. Which new age technology can be used by E-Commerce platforms?
 - (a) Augmented Reality
 - (b) Photoshop
 - (c) Image Mixer
 - (d) Copy and Paste feature of MS Paint
- C. Have you experienced any issue while trying to login to your Gmail account? If yes, then state the issue and the steps taken to resolve the issue. Discuss the same with your friend.



WHAT HAVE YOU LEARNT

In this lesson you have learnt about:

- Data privacy and its compliance requirements for various industries.
- Industry-specific data handling practices for banking, healthcare, logistics, and education sectors.
- New AI and ML driven tools that help to enhance online service and delivery.
- Cloud computing, immersive technologies and multi-channel experiences, that have proved to be very efficient for online services.
- Basic trouble shooting steps that one should take in case of login failures and transaction errors.
- Legal and regulatory compliance requirements for digital payments.



TERMINAL EXERCISE

1. What are the key aspects of data privacy?
2. Give any two compliance requirements of the following industries:
 - (i) Healthcare
 - (ii) Education
 - (iii) E-Commerce
3. Write the troubleshooting steps that you will take if the following issues are encountered while working online:
 - (a) The server is not responding
 - (b) Transaction is timed out
4. Expand the following:
KYC, GDPR, AML



Notes

Data Privacy and Customer-Centric Services

5. AI and ML driven tools streamline repetitive tasks and helps the customers to find response and solutions on their own. Explain any two such tools.
6. How cloud computing has enhanced online services?
7. Give any one application of immersive technology that has boosted customer engagement on an E-Commerce platform.
8. Explain the key aspects of legal and regulatory compliance for online transactions.



ANSWER TO INTEXT QUESTIONS

8.1

- A. (a) False (b) True (c) True (d) False
- B. (a) Banking (b) Healthcare (c) Supply Chain
(d) Supply Chain (e) Education

8.2

- A. (a) Forgot Password (b) transaction
(c) On-Device AI (d) E-Commerce
(e) blockchain technology
- B. 1. (c) 2. (d) 3. (a)

Key Learning Outcomes

By the end of the lesson, you will be able to:

- ensure data privacy of yourself and others while working online.
- follow industry-specific data handling practices in the sector that you are employed.
- to use latest digital tools and platforms that can improve online service delivery & troubleshoot common digital platform issues, such as login failures and transaction errors.
- to ensure that digital payments follow the legal and regulatory compliance requirements.



9

AI-DRIVEN DIGITAL DATA MANAGEMENT AND PROCESS OPTIMIZATION

In today's world, we are surrounded by digital data – from using social media to sending emails or preparing spreadsheets. For students entering workplaces, it is important to understand how this data is managed, organized, and used effectively. A basic knowledge of computers, internet use, and applications like MS Word and MS Excel will help you connect with this lesson easily.

This chapter introduces you to how **Artificial Intelligence (AI)** is changing the way organizations work with information. Instead of long hours of manual effort, AI can summarize documents, detect errors, filter emails, classify data, and even handle customer service queries. At the same time, we must use AI responsibly – by respecting privacy, ensuring fairness, and keeping transparency.

The theme of this lesson is simple: **“AI makes digital work faster, smarter, and more accurate – but it always needs human supervision and ethical use.”** By the end of this lesson, you will know both the skills to use AI tools effectively and the values to use them responsibly in real-life situations.



OBJECTIVES

By the end of this lesson, you will be able to:

- differentiate between structured, semi-structured, and unstructured data, and explain why accuracy in data analysis is important;
- describe the principles of ethical AI use, with emphasis on data privacy, fairness, and transparency;



Notes

- write clear prompts for AI tools and refine outputs to make them accurate and professional.
- demonstrate how AI features in MS Word and MS Excel improve efficiency and reduce errors.
- explain how AI-driven automation optimizes processes such as summarization and content extraction.
- apply AI tools for sorting, filtering, and drafting professional emails.
- identify the role of chatbots and explain why human supervision is necessary for complex tasks.
- understand data annotation and troubleshooting

9.1 FOUNDATIONS OF AI IN DIGITAL DATA MANAGEMENT

9.1.1 Introduction to AI-Driven Data Handling

Artificial Intelligence (AI) has become a powerful force in reshaping how organizations handle and use their data. Every workplace today generates vast amounts of information coming from emails, reports, transactions, customer interactions, and social media. Manually processing this volume of data is slow and error-prone. AI tools make data handling faster, smarter, and more accurate by automating tasks such as organizing, analyzing, and presenting information. For example, instead of reading a 20-page policy document, an AI summarizer can give the highlights in two paragraphs, saving both time and effort.

To apply AI effectively, it's important to first recognize the different types of digital data.

Structured data

Structured data is highly organized and stored in fixed rows and columns, like databases and spreadsheets, making it easy for both humans and machines to analyze. An example would be a customer list with columns for "Name," "Email," and "Phone Number."

Unstructured data

Unstructured data, on the other hand, includes free-form content such as documents, images, audio, and videos—data without a fixed format. A customer's email asking for support or a video of a product review are examples of unstructured data.



Semi-structured data

Then there is **semi-structured data**, which sits in between, containing some organization but not as rigid as structured data. Formats like XML and JSON files, often used for data exchange between computer systems, are examples of semi-structured data. AI technologies are particularly useful in working across all three types, especially unstructured data, which is otherwise difficult to analyze manually. It is shown in Fig. 9.1.



Fig. 9.1: Types of Digital Data (Structured, Semi-Structured, Unstructured)

9.1.2 Why Data Accuracy Matters

Data accuracy is the foundation of every good decision. When data contains mistakes, the insights drawn from it can mislead managers and workers, leading to poor actions, wasted resources, and even financial losses. For example, imagine a company using pivot tables in Excel to track monthly sales. If the pivot is created with wrong fields or duplicate entries, the totals will not match reality. A manager relying on this faulty analysis may either overstock items that are not really selling or under-order items that are actually in demand. This one error can cause both losses and unhappy customers.

AI helps prevent such situations by detecting errors and offering corrective suggestions. Many modern productivity tools now include AI-based assistants that check calculations, highlight anomalies, and recommend adjustments. For instance, if a pivot table shows inconsistent totals, AI can alert the user and suggest corrections, such as removing duplicates or adjusting filters. It can also detect missing information and propose how to fill it appropriately. By reducing human error and supporting users with real-time recommendations, AI strengthens confidence in the data-driven decisions that organizations rely upon every day.



Notes

Accurate data is critical for decision-making. Errors in data can cause poor outcomes. For instance, mistakes in Excel pivot tables can produce misleading trends. AI can detect such issues and recommend corrections. Fig. 9.2 shows that it corrects inaccurate data and correct this.



Fig. 9.2: Role of AI in Correcting Data Errors and Improving Workflow.



INTEXT QUESTIONS 9.1

1. Choose the correct answer

(a) Which of the following is an example of semi-structured data?

- | | |
|-----------------------|----------------|
| (i) Excel Spreadsheet | (ii) JSON File |
| (iii) MP4 Video | (iv) PDF Scan |

(b) Pivot tables are mainly used in:

- | | |
|------------------------|------------------|
| (i) MS Word | (ii) MS Excel |
| (iii) Email Automation | (iv) AI Chatbots |

2. Fill in the blank

- (i) Data accuracy is important because incorrect data leads to decisions and wasted resources.



9.2 ETHICAL AND SECURE USE OF AI TOOLS

9.2.1 Principles of Ethical AI Use

As workplaces rely more on AI, it is vital to use it responsibly. Ethical usage ensures that AI is a helpful tool rather than a source of problems. At its core, ethical AI usage means respecting **data privacy**, applying rules fairly, and being transparent about AI involvement. For example, when using an AI service to summarize company emails, employees must avoid sharing confidential details that could compromise security. Responsible users should treat AI like they would treat a trusted colleague – giving it only the information it needs and keeping sensitive data safe.

Ethical AI also requires us to think about **responsibility and fairness**. AI systems learn from data, and if that data is biased, the results may be unfair. An AI-based recruitment bot trained with biased datasets may unintentionally favor one group of applicants over another. Therefore, users should always question outputs and make final decisions carefully, ensuring human values guide the way.

9.2.2 Avoiding Bias and Ensuring Transparency

Bias in AI often arises from the data it is trained on. If the original data is unbalanced – for example, containing more reviews from one type of customer than another – AI predictions might not be fair to everyone. Transparency helps by keeping users aware of these limitations. For instance, customer-service bots should not make decisions about refunds without human review, as AI's output may need context or correction.

In customer service, transparency means letting customers know when they are interacting with AI tools. Many companies add a disclosure such as, “You are chatting with our virtual assistant.” This builds trust by being honest about the technology in use. Ethical AI is about combining efficiency with responsibility: while AI saves time, human supervision ensures fairness and removes errors that machines might miss.



INTEXT QUESTIONS 9.2

1. Choose the correct answer

- (a) Ethical use of AI in workplaces primarily ensures:
 - (i) More profit for business



- (ii) Data privacy, fairness, and responsible outputs
- (iii) Quick automation with no supervision
- (iv) Faster internet speed

2. Fill in the blank

- (i) Customers should always be informed when they are speaking with a

9.3 DESIGNING AND REFINING AI PROMPTS

9.3.1 Introduction to Prompts

AI systems, especially Large Language Models (LLMs), respond to **prompts**—the instructions we type in. Think of a prompt as the way you “talk” to AI, guiding it to act like a helpful assistant. The quality of the prompt directly affects the quality of the output. For example, if you type “Write email,” the AI will give a vague and general result. But if you type, “Write a professional email to a customer apologizing for a 2-day delivery delay and offering a 10% discount coupon,” the AI produces a clear, polished, customer-friendly response.

Good prompts are **specific, structured, and contextual**. They give the AI enough background information and tell it the desired format. Students should practice framing prompts with details such as audience (customer or manager), style (formal, friendly, short, or detailed), and purpose (inform, apologize, persuade). This simple habit makes AI far more useful for real-world applications.

Fig. 9.3 shows that the Prompts guide AI responses. Good prompts are clear, specific, and contextual.

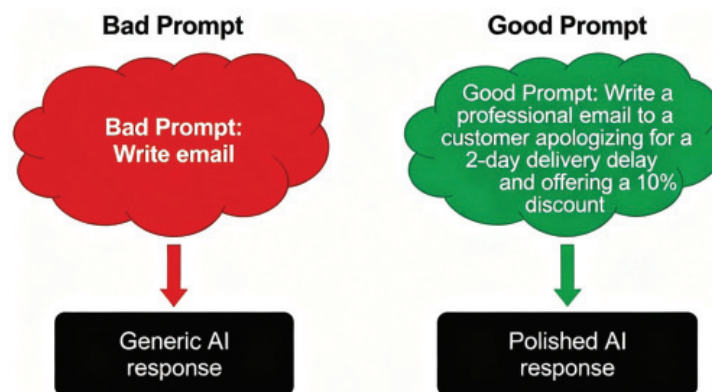


Fig. 9.3: Comparison of Bad Prompt vs Good Prompt.



9.3.2 Refining AI Responses

AI outputs are not always perfect. Sometimes they contain small errors, irrelevant details, or sound too generic. That's why refining responses is a key skill. Users should carefully review results and edit them for professionalism, accuracy, and relevance. For instance, an AI might draft a customer query response that is polite but very wordy. Refining means shortening it while keeping the key message intact.

Refinement is also about correcting **factual mistakes**. AI can sometimes confuse dates, figures, or terms, so double-checking with reliable sources is essential. For example, if an AI summarizes a news article and gets a date wrong, you must correct it. By learning how to refine AI's work, students develop a healthy balance: they benefit from the **speed of AI** while ensuring the **final quality reflects human judgement**.



INTEXT QUESTIONS 9.3

1. Choose the correct answer

- (a) A good prompt should be:
 - (i) Short and vague
 - (ii) Clear, specific, and contextual
 - (iii) Written in programming language only
 - (iv) Avoiding details

2. Fill in the blank

- (i) Refining AI outputs involves checking for, relevance, and professionalism.

9.4 AI FEATURES IN PRODUCTIVITY TOOLS

9.4.1 MS Word AI Features

Modern tools like Microsoft Word have built-in AI features that help users write more efficiently. Features such as **text prediction** suggest words or phrases as you type, reducing effort and correcting grammar in real time. For example, if you type "I am looking forward to," Word might suggest "meeting you" or "your response." **Grammar correction** not only fixes spelling mistakes but also ensures the tone is more professional. It can highlight awkward phrasing or suggest more formal



Notes

alternatives. **Automated formatting** tools improve presentation by suggesting headings, bullet lists, and styles. With these features, students can prepare assignments, reports, or letters that look crisp and professional without spending hours editing.

These tools are especially useful for students entering professional settings where polished documents are expected. For instance, if a student has to prepare a business letter for an internship, Word's AI features can guide grammar corrections, helping them sound confident and clear.

9.4.2 MS Excel AI Features

Excel is one of the most useful tools for data management, and AI has made it even more powerful. In Excel, AI can generate pivot tables and recommend the correct fields to analyze trends. For example, if you have sales data, AI can suggest a pivot table to show “Total Sales by Region” or “Sales by Product Category.” It can detect anomalies (like a sales value suddenly dropping to zero) and highlight them for review. AI chart recommendations also help visualize data better – instead of spending time guessing which graph works, Excel suggests the best form based on your dataset.

For students, these features make data analysis approachable. Imagine a dataset with students' marks in different subjects. Excel can recommend a bar chart to show subject-wise performance or a pie chart to display the share of high scorers. This builds understanding of both data and visualization. Figure 9.4 summarizes AI features in the MS-Word and MS Excel.

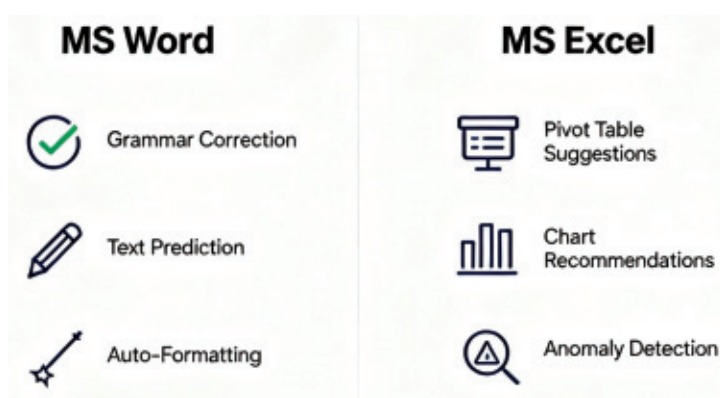


Fig. 9.4: AI Features in MS Word and Excel

**INTEXT QUESTIONS 9.4**

Notes

1. Choose the correct answer:
 - (a) Which of the following is **not** a feature of MS Word AI?
 - (i) Grammar correction
 - (ii) Text prediction
 - (iii) Auto-formatting
 - (iv) Pivot tables
2. Fill in the blank
 - (i) In MS Excel, chart recommendations help display data trends effectively.

9.5 AI IN WORKFLOW AUTOMATION

9.5.1 Content Automation

AI can automate the management of text and content flows within organizations. Examples include **summarization** (condensing long documents into key points), **content recommendations** (suggesting what article or video to see next), and **data extraction** (pulling addresses from hundreds of forms). These functions save time and reduce manual effort.

Applications are everywhere: an HR department can summarize job applications; a teacher can use AI to extract attendance trends; and businesses can automate contract reviews. By letting AI handle repetitive reading and sorting work, human employees gain time for creative and decision-making tasks.

9.5.2 Workflow Optimization

Workflows are sequences of tasks in a process – like approving leave in an organization. Normally, these processes involve multiple steps, but AI can optimize them. For example, AI can automatically flag leave applications exceeding certain days for extra approval, while routine ones are auto-approved. In email workflows, AI can sort messages into categories, highlight urgent ones, and suggest quick replies.

This reduces human workload and prevents things from being missed. For students, it means learning to trust AI for routine tasks while keeping important decisions for human judgment.



Notes



Fig. 9.5: Workflow Optimization through AI

1. **Before AI (Left Side):** The diagram shows a cluttered, manual process with a person overwhelmed by physical papers and slow typing, representing the inefficiency and potential for errors in traditional workflows.
2. **AI Intervention (Middle):** A central AI brain/robot icon with gears signifies the application of artificial intelligence to analyze and process the workflow, acting as the catalyst for transformation.
3. **After AI (Right Side):** The streamlined digital flow of documents between screens and servers illustrates the outcome of AI optimization—a fast, organized, and efficient automated process, highlighting reduced manual effort and improved speed.



INTEXT QUESTIONS 9.5

1. **Choose the correct answer:**
 - (a) Which of the following is an example of content automation?
 - (i) Summarizing a long article
 - (ii) Handwriting class notes
 - (iii) Attending a meeting
 - (iv) Saving a file manually
2. **Fill in the blank**
 - (i) Workflow optimization helps by automating repetitive



9.6 AI IN DIGITAL COMMUNICATION & EMAIL MANAGEMENT

9.6.1 Role of AI in Emails

Emails remain one of the most widely used forms of workplace communication. AI enhances email usage by **sorting and filtering messages** into categories such as priority, promotions, or spam. This helps users focus on important messages first. AI-driven auto-responses also speed up communication, offering pre-written replies like “Thank you for your email. I will get back to you shortly.”

These features may look simple but are powerful in professional communication. They ensure timely responses, reduce clutter, and maintain professionalism.

9.6.2 AI in Professional Communication

AI also helps in drafting professional and polite communication. It can automatically suggest better phrasing, adjust tone (formal or friendly), and structure email templates. For businesses, AI can translate emails into multiple languages, making global communication smoother. However, the key rule remains: final approval should always come from a human.

For instance, AI may draft a polite apology to a customer, but the human employee decides if compensation offers (like discounts) are suitable. This combination maintains both efficiency and empathy in communication.

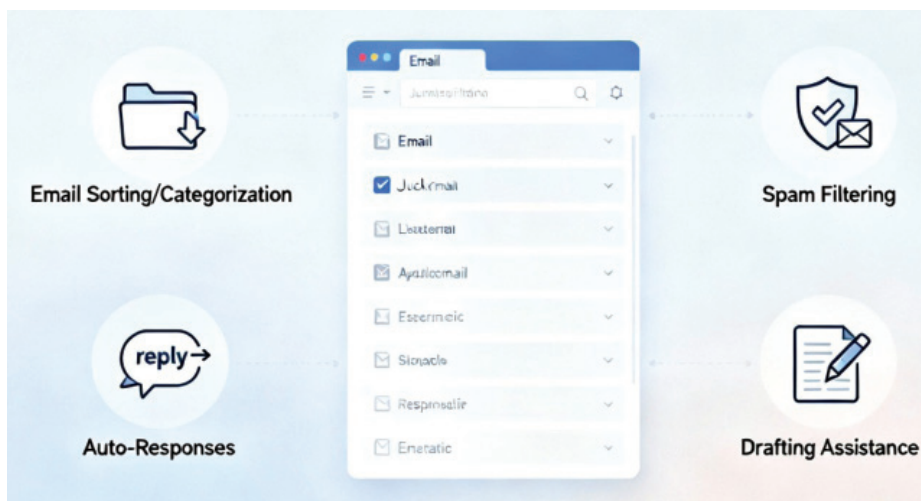


Fig. 9.6: AI in Email Management.

**INTEXT QUESTIONS 9.6****1. Choose the correct answer:**

- (a) AI in email management can
 - (i) Paint a picture
 - (ii) Sort & filter messages
 - (iii) Upload videos
 - (iv) Edit photos

2. Fill in the blank:

- (i) Email features can auto-filter messages such as promotions, spam, and urgent tasks.

9.7 AI IN CUSTOMER SERVICE**9.7.1 AI Chatbots and Agents**

Customer service has been transformed by AI chatbots and virtual assistants. These bots answer FAQs, track orders, and even process simple requests 24/7. This means customers don't have to wait for human agents for common issues – reducing frustration and making businesses more efficient.

Chatbots handle FAQs and repetitive questions. Human agents are needed for complex issues. A hybrid model works best.

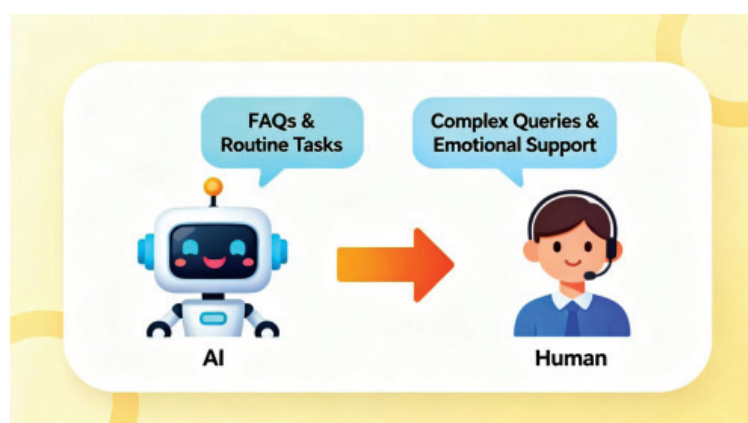


Fig. 9.7: Hybrid Model of AI Chatbot + Human Agent.



However, chatbots also have limitations. They cannot always understand complex queries or emotions. That's why businesses use a **hybrid model**: AI handles routine tasks, and humans take over for complex or sensitive situations.

9.7.2 Ethical Guidelines in Customer Interaction

AI must be used responsibly in customer service. Customers should always know whether they are interacting with a bot or a human. AI systems should avoid giving biased or misleading information. For example, if an AI system only recommends a premium product when a customer asks for "cheapest option," it breaks the principle of fairness.

Ethical guidelines ensure that customer trust is maintained. Secure handling of data (like phone numbers and payment records) and transparent communication are critical for long-term success.



INTEXT QUESTIONS 9.7

1. Choose the correct answer
 - (a) A hybrid customer service model involves:
 - (i) Only human support
 - (ii) Only AI bots
 - (iii) AI + humans complementing each other
 - (iv) No communication at all
2. Fill in the blank
 - (i) AI chatbots are best suited for handling queries.

9.8 VISUALIZING & PRESENTING DATA WITH AI

9.8.1 Data Visualization Basics

Presenting data visually makes it easier to understand and analyze. Charts, graphs, and infographics help identify patterns that are not obvious in raw numbers. For example, looking at 100 rows of sales data might be confusing, but a graph can instantly show which month had the highest sales.

AI simplifies this by recommending the **best visualization formats** automatically. When given a dataset, AI can suggest a bar graph for comparisons, a line chart for trends, or a pie chart for proportions.



Notes

9.8.2 AI Recommendations for Visualization

Students learning to use Word and Excel will find that inserting tables and charts with AI recommendations not only saves time but also improves presentation. If an assignment requires presenting survey data, AI can instantly highlight meaningful visualizations. Figure 9.8 demonstrate this.

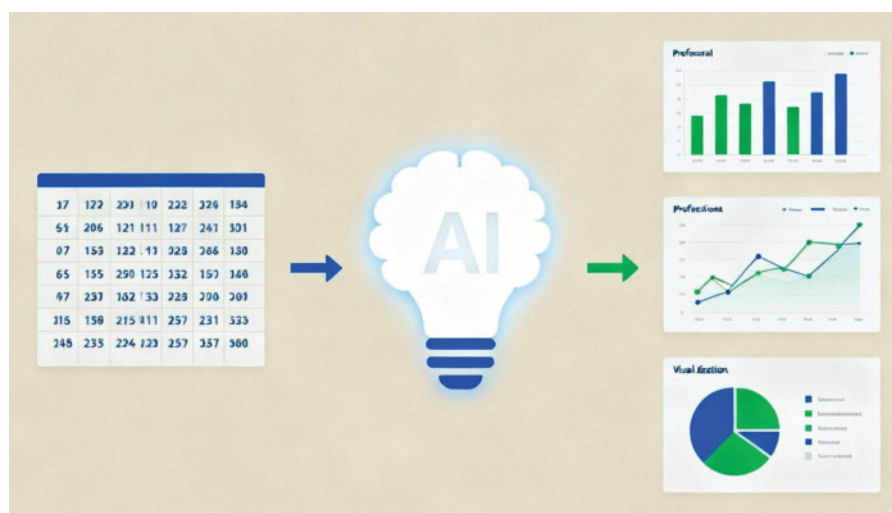


Fig. 9.8: AI-suggested Data Visualizations.

With AI support, even beginners can create professional-quality reports with visuals that make sense to the audience. The goal is not just to collect data, but to **communicate insights clearly** – and AI makes this process much easier.



INTEXT QUESTIONS 9.8

1. Choose the correct answer:

- (a) Which chart is best for showing proportions?
 - (i) Line chart
 - (ii) Pie chart
 - (iii) Bar chart
 - (iv) Scatter plot

2. Fill in the blank:

- (i) Data visualization helps by making patterns and trends to understand.



9.9 DATA ANNOTATION

9.9.1 What is Data Annotation

Data annotation is the process of adding labels or tags to raw data so AI models can learn patterns and make correct predictions. Without clear labels, models don't know what to look for.

- Simple definition: Annotators turn “raw” data into “annotated” data by marking what's in it (what objects, what meaning, what sounds, what actions).
- Why it matters: Better annotations → better model accuracy, fairness, and safety.
- Good annotation = clear guidelines + consistent labels + quality checks → reliable training data for AI.

9.9.2 Types and Techniques by Modality

Images, text, audio, and video data annotations techniques are following:

A. Images

- Bounding Boxes: Draw rectangular boxes around objects.
 - Example: In a CCTV image, draw boxes around “person,” “motorcycle,” and “helmet” to train a model to detect helmet compliance.
- Polygons: Trace the exact outline of an object for more precision than boxes.
 - Example: For self-driving cars, outline the exact shape of the road, sidewalks, and cars to help the model understand drivable areas.
- Key points: Mark specific points on an object (like joints).
 - Example: For a fitness app, place key points on shoulders, elbows, knees, and ankles to analyze a user's squats or push-ups.
- Segmentation (Pixel-wise labeling): Assign each pixel a class.
 - Example: In medical scans, color every pixel belonging to a tumor vs. healthy tissue to help diagnosis.
- Image-level Tags: Add general labels to the whole image.
 - Example: Tag a social media photo with “beach,” “sunset,” “friends” for search and recommendations.



Notes

AI-Driven Digital Data Management and Process Optimization

Why it matters: Image annotation teaches models to recognize objects, shapes, and scenes. More precise techniques (polygons/segmentation) are used when accuracy is critical (e.g., medical, autonomous driving).

B. Text

- Named Entity Recognition (NER)/Entity Labeling: Highlight names of people, places, products, dates, etc.
 - Example: In the sentence “Order #4589 shipped to Riya in Pune on 12 Sept,” label Riya (PERSON), Pune (LOCATION), 12 Sept (DATE), Order #4589 (ORDER_ID).
- Intent Classification: Identify the purpose of a message.
 - Example: In customer support, tag a message as “Complaint,” “Request Refund,” or “Product Inquiry.”
- Sentiment Labeling: Mark text as positive, neutral, or negative.
 - Example: “The phone battery dies too fast” ! Negative sentiment.
- Topic Tagging: Assign a topic category.
 - Example: A news headline tagged as “Sports,” “Politics,” or “Technology.”
- Span Selection: Highlight relevant phrases that answer a question.
 - Example: Question: “What is the refund window?” Text: “Customers can return items within 30 days.” Span: “within 30 days.”

Why it matters: Text annotations help chatbots, search systems, and content filters understand meaning, tone, and key information.

C. Audio

- Transcription: Convert speech to text.
 - Example: Turn a customer helpline call into text for analysis.
- Speaker Diarization: Mark who spoke when in a conversation.
 - Example: In a call with an agent and a customer, label segments as “Agent” or “Customer” to analyze agent performance.
- Sound Event Labeling: Identify non-speech sounds.
 - Example: Tag “sirens,” “dog barking,” “doorbell,” or “applause” in a city sound recording.



- Emotion/Intent Tagging: Label the tone or intent in speech.
 - Example: A support call might be tagged as “frustrated” if the speaker sounds upset, helping route calls faster.

Why it matters: Audio annotations power voice assistants, call center analytics, and safety monitoring systems.

D. Video

- Frame-level Tags: Assign tags to frames (or short segments).
 - Example: In a sports video, tag frames where the ball is in play vs. out of play.
- Object Tracking: Track the same object across frames over time.
 - Example: Follow a specific player or a delivery vehicle across the video to analyze movement.
- Action/Activity Labeling: Label actions happening over time.
 - Example: “Pouring water,” “Cutting vegetables,” “Crossing the road” in instructional or surveillance videos.
- Temporal Segmentation: Mark the start and end of events.
 - Example: In a classroom video, segment “Lecture,” “Q&A,” and “Break” by time ranges.

9.9.3 Common Problems and Troubleshooting in Data Annotation

1. Software Errors

- Problem: Annotation tool crashes or doesn’t save work.
- Example: After labeling 20 images, the browser refresh wipes recent labels.
- Fix:
 - Enable autosave/versioning; save/export in small batches (e.g., every 10 items).
 - Update browser/tool; close heavy tabs to free memory.
 - Report reproducible steps to support (helps fix the bug).



Notes

2. Data Inconsistencies

- **Problem:** Different annotators apply different labels to similar cases.
- **Example:** Some label “refund request” as Complaint; others as Request.
- **Fix:**
 - Tighten guidelines with decision rules: “If the customer asks for money back → Refund; if only unhappy → Complaint.”
 - Add examples and counter-examples.
 - Run spot audits; re-label a small sample after calibration.

3. Class Confusion/Overlapping Categories

- **Problem:** Two classes mean nearly the same thing.
- **Example:** “Mobile phone” vs “Smartphone” used interchangeably.
- **Fix:**
 - Merge classes or clearly define boundaries: “Use Smartphone for all modern mobile devices; reserve Mobile phone for feature phones only.”
 - Provide a quick decision tree.

4. Low Inter-Annotator Agreement (IAA)

- **Problem:** Annotators frequently disagree.
- **Example:** NER task where “order #1234” is sometimes tagged as ORDER_ID, other times ignored.
- **Fix:**
 - Hold a calibration round: review 20 items together, align on rules.
 - Update guidelines; re-run a small pilot; measure IAA again.
 - Keep a gold set (expert-labeled examples) to benchmark.

5. Off-by-One and Temporal Errors (Text/Audio/Video)

- **Problem:** Start/end boundaries are slightly wrong.
- **Example:** In video, “person stands up” tagged from 00:05–00:08 by one annotator, 00:06–00:09 by another.



Notes

- Fix:
 - Define strict boundary rules (e.g., “start when knees leave chair”).
 - Use tooling that snaps to frames/timecodes; review at slower speed.

6. Imbalanced Data

- Problem: Too few examples of certain classes ! model performs poorly on them.
- Example: Only 2% of reviews are “Refund Request.”
- Fix:
 - Targeted sampling to add more minority-class examples.
 - Data augmentation where appropriate; collect edge cases intentionally.

7. Data Drift/New Patterns

- Problem: New phrases or objects appear not covered by labels.
- Example: New product line “UltraPhone” not in the entity list.
- Fix:
 - Update label schemas and guidelines; add examples.
 - Periodically review and evolve classes (“living” guideline document).

8. Ambiguous or Poor Instructions

- Problem: Annotators guess when rules are unclear.
- Example: “Mark sensitive info” without defining what counts as sensitive.
- Fix:
 - Define scope: “Sensitive = phone numbers, email, address, bank details; Not sensitive = product name.”
 - Add screenshots and “do/don’t” examples.



Notes



WHAT HAVE YOU LEARNT

- **Types of Data:** Digital data exists in structured, semistructured, and unstructured forms, and each requires different handling approaches.
- **Data Accuracy:** Accurate data is essential for sound decisions; AI helps detect errors in tools like Excel pivot tables and suggests corrections.
- **Ethical AI Usage:** Responsible use of AI involves privacy protection, fairness, transparency, and minimization of bias.
- **Prompt Writing:** Good prompts are clear, specific, and contextual, and refining AI outputs ensures accuracy, relevance, and professionalism.
- **AI in Productivity Tools:** MS Word uses AI for grammar correction, text prediction, and formatting; Excel applies AI for pivot tables, chart recommendations, and anomaly detection.
- **Workflow Automation:** AI automates repetitive processes like summarization, content extraction, and approvals, optimizing efficiency.
- **Digital Communication & Emails:** AI categorizes emails, filters spam, generates autoresponses, and drafts professional communication.
- **Customer Service:** AI chatbots handle routine queries while human agents address complex issues, making a hybrid model effective and ethical.
- **Data Annotation:** Understood various annotation techniques, and identified common problems along with their troubleshooting methods to ensure high-quality, reliable datasets.



TERMINAL EXERCISE

1. Explain the difference between structured, semi-structured, and unstructured data with examples.
2. Why is accuracy important in pivot tables? How does AI help?
3. Discuss ethical concerns in AI-enabled customer service.
4. Create three good AI prompts and explain why they are effective.



ANSWERS TO INTEXT QUESTIONS



Notes

9.1

1. (a) (ii) JSON File
(b) (ii) MS Excel
2. (i) misleading

9.2

1. (a) (ii) Data privacy, fairness, and responsible outputs
2. (i) Chatbot/Virtual Assistant

9.3

1. (a) (ii) Clear, specific, and contextual
2. (i) Accuracy

9.4

1. (a) (iv) Pivot tables
2. (i) AI

9.5

1. (a) (i) Summarizing a long article
2. (i) Tasks

9.6

1. (a) (ii) Sort & filter messages
2. (i) Categorization

9.7

1. (a) (iii) AI + humans complementing each other
2. (i) Routine

9.8

1. (a) (ii) Pie chart
2. (i) Easier



Notes

Key Learning Outcomes

By the end of the lesson, you will be able to:

- identify different types of digital data (structured, semistructured, unstructured) and understand the need for accuracy in analysis.
- follow ethical and secure practices in AI usage, ensuring fairness, transparency, and data privacy.
- frame clear prompts for AI tools and refine outputs to make them accurate, relevant, and professional.
- use AI features in productivity tools such as MS Word, Excel, and Email to save time, reduce errors, and increase efficiency.
- apply AI for workflow automation, customer service support, and effective data visualization through charts and graphs.



10

EMPLOYABILITY SKILLS

In this chapter we will study- how to get good employable skill so that we can work with industries? Employability refers to a person's ability to get and keep a job. It includes the abilities, knowledge, attitudes, and personal characteristics that make people appealing to employers and boost their chances of getting and keeping a job. Employability is critical in today's competitive job market for both job seekers and those who are currently employed, as it determines career progression, job security, and overall professional success.

Employability is not exclusively determined by academic credentials or technological expertise. It also includes a variety of transferrable talents, known as "soft skills," such as communication, teamwork, problem-solving, flexibility and leadership. Employers place a high value on these abilities because they contribute to an individual's capacity to collaborate successfully with others, deal with obstacles, and continually learn and grow in a quickly changing work environment.

Furthermore, a person's motivation to learn and acquire new abilities, as well as their ability to effectively promote themselves to employers, impact employability. This includes creating an eye-catching resume, emphasizing relevant experiences, and presenting oneself confidently during interviews. Having a professional network, participating in continuous learning opportunities and remaining alert with industry developments are all important for increasing employability.

Employability has evolved in recent years to include a focus on entrepreneurial skills and a desire to take initiative. Employers are increasingly looking for people who can think creatively, spot possibilities and bring unique ideas to their organizations. This entrepreneurial mentality exhibits a proactive attitude towards work as well as the capacity to adapt to new difficulties and possibilities.



Notes



OBJECTIVES

After reading this lesson you will be able to:

- talk about consumers' and business people's legal rights;
- describe how communication works in a business setting;
- enumerate the critical processes involved in creating goals;
- acquire the knowledge and abilities needed to properly manage their money.

10.1 CONSTITUTIONAL VALUES-CITIZENSHIP

Citizenship principles are established in the Indian Constitution (Fig. 10.1), notably in Part II (Citizenship) and Part III (Fundamental Rights). These ideals emphasize equality, liberty, justice and dignity for all citizens. Here are some major constitutional ideals of Indian citizenship:

- **Equality:** The Constitution ensures equality for all people, regardless of caste, religion, gender or place of birth. The equality principle assures that every citizen is treated equally and given equal legal opportunities and protections.
- **Liberty:** Indian citizens have the right to personal freedoms and liberties. Individual liberties such as freedom of speech and expression, freedom of religion, freedom of movement, and the right to life and personal liberty are all protected by the Constitution.
- **Justice:** The values of social, economic, and political justice are promoted by the Indian Constitution. It assures citizens access to a fair and impartial legal system, as well as their protection against discrimination, exploitation and arbitrary acts.
- **Dignity:** The Constitution recognises every citizen's inherent dignity and value. It outlaws all forms of inhuman or humiliating treatment and guarantees that citizens are treated with dignity and respect.
- **Sovereignty and Patriotism:** The Indian Constitution supports the country's sovereignty and expects citizens to be loyal to the country. It emphasises the value of patriotism and citizens' responsibility to contribute to the country's well-being and prosperity. India is a secular country, and the Constitution encourages religious tolerance and respect for all religions. It protects citizens' right to practice and promote their faith while ensuring communal peace and an inclusive atmosphere.



- **Social Justice:** The Constitution emphasises the importance of social justice and supports the values of equality, non-discrimination, and affirmative action in order to help underprivileged and marginalised members of society. It seeks to bridge social and economic gaps and foster a fairer society.



Fig 10.1: Constitution of India

Source: <https://www.jatinverma.org/>

These constitutional concepts of citizenship serve as the foundation for Indian citizens' rights, obligations, and responsibilities. They embody the democratic and inclusive values upon which the Indian country is established, and they influence the operation of the government as well as people's relationships with the state.

10.2 BECOME A PROFESSIONAL IN 21ST CENTURY

To flourish in a fast-changing environment, becoming a professional in the twenty-first century necessitates a mix of knowledge, skills and flexibility. Here are some suggestions to help you become a professional in the twenty-first century (Fig. 10.2):

- **Determine Your Passions and Goals:** Consider your hobbies, values, and long-term work goals. Determine your areas of interest and make specific goals for your career growth.
- **Continuous Learning:** Adopt a philosophy of lifelong learning. Maintain your curiosity and aggressively seek opportunities to gain new information and abilities. Keep up to speed on industry developments and breakthroughs, and consider formal education, online courses, workshops, and conferences as learning opportunities.
- **Develop Transferable talents:** Focus on establishing transferable talents that are highly appreciated across sectors in addition to specialised knowledge.



Notes

Employability Skills

Communication, critical thinking, problem solving, flexibility, teamwork, leadership, and technology literacy are among them. These abilities will boost your employability and assist you negotiate a variety of job contexts.



Fig. 10.2: Professional in 21st century

Source: <https://www.ict360.com/>

- **Embrace Technology:** Technology is important in the contemporary workplace. Keep up with technological advances, improve your digital literacy, and learn how to use technology to boost your productivity, communication, and problem-solving skills.
- **Develop a Professional Network:** Make significant connections with professionals in your field of interest. Attend industry events, join professional organisations, and participate in online and offline networking opportunities. Mentorship, direction, and future job possibilities may all be obtained through a strong professional network.
- **Gain Practical Experience:** Look for internships, part-time employment or volunteer opportunities in the sector you want to work in. Practical experience not only improves your abilities but also gives essential insights into the workplace and aids in the development of a professional track record.
- **Create a Professional Brand:** Establish a professional internet presence using platforms such as LinkedIn. Display your abilities, expertise and



accomplishments. Create a captivating CV and cover letter that showcase your unique value proposition for each opportunity.

- **Adaptability and resilience:** The workplace of the twenty-first century is marked by fast change and instability. Increase your adaptability, flexibility, and resilience. To stay ahead in your area, be open to new challenges, embrace change, and always learn and improve.
- **Recognise the value of Diversity and Inclusion in the Workplace:** Recognise the value of diversity and develop cultural knowledge, promote inclusion, and learn to collaborate with individuals from all backgrounds.
- **Professional Ethics:** Maintain high ethical standards in your professional interactions. In your relationships with coworkers, clients, and stakeholders, demonstrate integrity, honesty, and responsibility.

10.3 BASIC ENGLISH SKILLS

For various reasons, basic English abilities are critical to employability. Here are some significant points emphasising the significance of English abilities in the workplace:

- **Communication:** English is often considered as the global business and communication language. English proficiency allows for successful communication with colleagues, clients and stakeholders from various backgrounds. It promotes clear and succinct articulation of ideas, instructions and information in the workplace, creating improved cooperation, collaboration and comprehension.
- **Job Applications and Interviews:** Fluency in desired language is required for job applications and interviews, particularly in international corporations or sectors with a global presence. A well-written resume and cover letter show professionalism and attention to detail. The ability to explain concepts and reply convincingly in during interviews increases your chances of impressing potential employers.

Effective communication becomes increasingly vital as people advance in their jobs. It is frequently required for managerial or leadership positions where workers are expected to successfully communicate with teams, clients and senior management. Strong communication abilities can lead to more senior roles and professional prospects.

- **Global Workforce:** Many businesses operate in worldwide marketplaces and have varied teams made up of people from various language backgrounds. Within such organisations, English is used as a common language for



Notes

Employability Skills

communication. Employees who are fluent in English can navigate and contribute successfully in a global workforce.

English is the major language used in a large number of professional materials, such as books, journals, research papers, and online learning platforms. Individuals with strong English abilities may access and exploit these resources for ongoing learning, professional growth, and staying current on industry trends.

- **Customer Service and Client Relations:** Interacting with English-speaking consumers or clients is widespread in areas such as hospitality, tourism, and customer service. Employees with strong English abilities may provide outstanding customer service, answer enquiries, and create relationships with clients, increasing customer satisfaction and the company's reputation.
- **International Assignments & Travel:** English proficiency is especially important for people who work on international assignments, travel for business, or work in expatriate jobs. It promotes successful partnerships and corporate interactions by enabling efficient communication and adaption in foreign contexts.

It is vital to highlight that basic English abilities serve as a foundation, while advanced English proficiency can improve employability and career prospects even more. Employers frequently favour individuals with high English communication skills because they are perceived as more adaptive, globally competent, and capable of contributing successfully in a varied and interconnected environment.



INTEXT QUESTIONS 10.1

1. The Constitution ensures equality for all people, regardless of caste, religion, gender, or place of birth. (T/F)
2. The Constitution emphasises the importance of social justice and supports the values of equality, non-discrimination, and affirmative action in order to help underprivileged and marginalised members of society. (T/F)
3. Technology is important in the contemporary workplace. (T/F)
4. English is used as a common language for communication at Global Workforce. (T/F)
5. Self-Assessment begin with consider your hobbies, values, strengths, and limitations. (T/F)



10.4 COMMUNICATION SKILLS

Improving communication skills is critical for employability since good communication is important in many facets of the job. Here are some things you can do to improve your communication skills (Fig.10.3):

Develop active listening skills by paying close attention to the speaker, keeping eye contact, and avoiding distractions. To display your interest, concentrate on understanding the material being delivered, asking clarifying questions and providing relevant comments.

- **Improve Your Verbal Communication:** Take note of your public speaking abilities. Practice utilizing proper tone and loudness, as well as clarity and articulation. When interacting with diverse audiences, use succinct and organised language, avoiding jargon or complicated terminology. To enhance your delivery, practice speaking in front of a mirror or with a trusted buddy on a regular basis. Non-verbal signals, such as body language, facial emotions, and gestures, have a substantial influence on communication. Keep an open and positive body posture, keep eye contact, and utilise suitable hand motions to reinforce your message.
- **Improve Your Written Communication:** In professional contexts, written communication is vital. Practice grammar, sentence structure, and vocabulary to improve your writing abilities. Examine your written communication for clarity, conciseness, and organisation, whether it's in emails, reports, or other written materials.
- **Develop Your Presentation Skills:** Giving presentations is a typical responsibility in many organisations. Develop your presenting abilities by rationally arranging your topic, effectively employing visual aids, and engaging the audience via your delivery. To find areas for development, practice in front of a small group or video recording yourself.
- **Develop Empathy and Emotional Intelligence:** Understanding and empathising with the viewpoints and feelings of others is essential for effective communication. Actively listening, observing non-verbal signs, and responding empathetically to people will help you develop your emotional intelligence. This promotes greater professional ties and understanding.
- **Seek Feedback:** Actively seek feedback on your communication abilities from coworkers, bosses or mentors. Request specific areas for improvement and actively implement their ideas.



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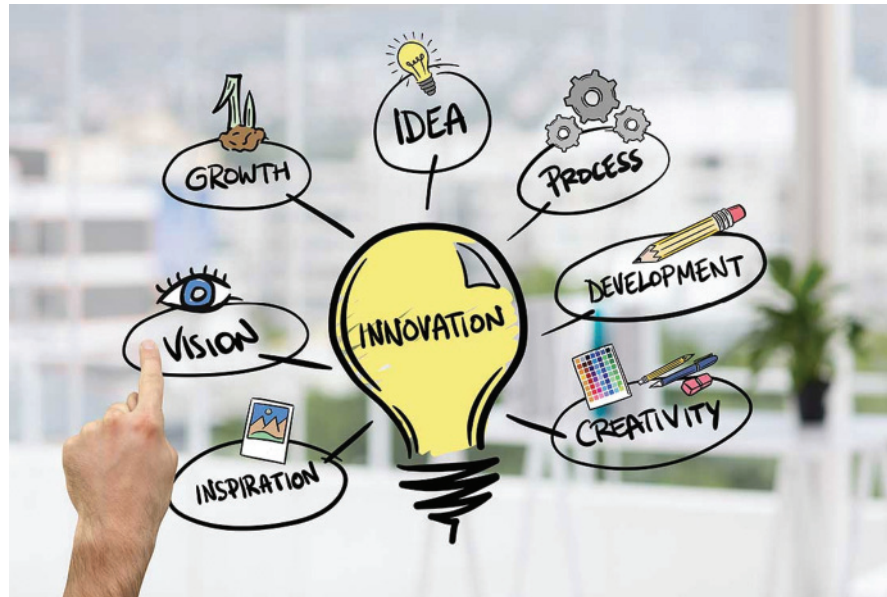


Fig. 10.3: Creative or Innovative

Source: <https://blog.webit.org/>

- **Continuous Learning:** Stay update on communication trends and approaches by reading books, articles, or using internet resources. Attend courses or training sessions aimed at improving communication skills. Maintain your curiosity and look for opportunities to learn and improve your communication skills.
- **Participate in Group Activities:** Participate in group activities or team initiatives that need teamwork and efficient communication. This allows you to practice working with varied people, actively providing ideas, and constructively resolving problems.
- **Develop Confidence:** Confidence is essential for good communication. Before significant talks or presentations, practice and prepare thoroughly. Make use of positive self-talk and visualization strategies, and look for opportunities to practice your communication abilities in a variety of circumstances.

Keep in mind that strengthening communication skills requires time and practice. Be patient with yourself and commit to continuous improvement. You improve your employability and become a more successful and impactful professional by always honing your communication skills.



10.5 DIVERSITY AND INCLUSION

Diversity and inclusion contribute significantly to employability by establishing a more inclusive and equitable work environment. Here are a few examples of how diversity and inclusion affect employability:

- **Access to a broader talent pool:** Organisations may tap into a bigger talent pool by embracing diversity and inclusion practices. Employers boost their chances of discovering highly talented employees with unique experiences and ideas by aggressively pursuing applicants from varied backgrounds, including those of different races, genders, ages, abilities, and cultural viewpoints.
- **Innovation and creativity:** A varied and inclusive workforce bring together people from various backgrounds, viewpoints, and ways of thinking. This variety of view promotes organisational innovation and creativity. When people from different backgrounds work together, they bring a broad set of ideas, problem-solving methodologies, and insights to the table, resulting in more inventive solutions and a competitive edge in the market.
- **Improved decision-making:** Diverse opinions and viewpoints are encouraged to be heard in inclusive work settings. When employees from varied backgrounds are given a place at the table and their ideas are appreciated, better decisions are made. Diverse views aid in the identification of blind spots, the testing of assumptions, and the consideration of a larger variety of considerations, resulting in better informed and successful decision-making.
- **Enhanced problem-solving and adaptability:** Employees in inclusive work settings are more likely to collaborate and work together. When various people work together to solve challenges, they bring a variety of talents, expertise, and experiences to the table. This collective diversity of abilities and viewpoints helps organisations to more successfully manage difficult issues and adapt to changing market conditions.
- **Increased employee engagement and retention:** Employee engagement and work satisfaction increase when they feel included, appreciated, and valued for their unique contributions. Inclusive environments foster a sense of belonging and psychological safety, allowing employees to be their true selves at work. This good work atmosphere increases employee retention, decreases turnover, and attracts top talent looking for inclusive environments.
- **Expanded market reach and customer satisfaction:** Organisations that are diverse and inclusive are better able to comprehend and serve a wide range



of customers. Companies may produce goods, services, and marketing tactics that appeal to a wider spectrum of customers by reflecting the diversity of their customers. As a result, consumer happiness and loyalty rise.

- **Reputation and employer branding:** Organisations that prioritise diversity and inclusion are more likely to have a favourable reputation and effective employer branding. They are viewed as progressive, socially responsible and appealing to job searchers who appreciate diversity and inclusive workplaces. This reputation can assist the organization to acquire top people and boost its overall competitiveness.

10.6 FINANCIAL AND LEGAL LITERACY

10.6.1 Financial Literacy

Financial literacy is important for employment because it provides individuals with the information and skills needed to handle their finances successfully. Here are some of the most important ways that financial literacy affects employability (Fig.10.4):

- **Budgeting and money management:** Financial literacy teaches people the significance of budgeting and how to manage their income and spending. Individuals may better manage their personal finances by learning how to develop a budget, analyse costs, and make educated financial decisions. This includes living within their means, saving money, and avoiding debt. These abilities are required for individuals to exhibit financial responsibility and stability, which employers strongly respect.

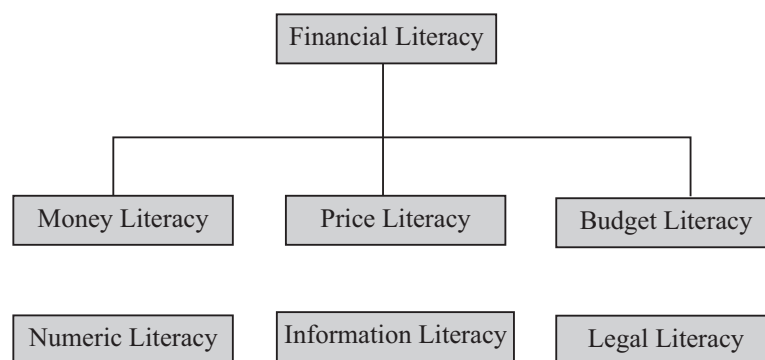


Fig. 10.4: Flow Chart of Financial Literacy

- **Salary negotiation and benefit optimization:** Financial literacy enables people to properly negotiate their salary and grasp the worth of employee perks. Individuals who understand industry norms, the cost of living and the



effect of perks such as health insurance, retirement plans and stock options may make educated judgements during job interviews and maximise their remuneration packages. Individuals with this understanding may fight for fair and competitive remuneration, which is critical for financial stability and overall job satisfaction.

- **Debt management and creditworthiness:** Financial literacy teaches people how to handle debt responsibly and keep excellent credit. Understanding topics like interest rates, credit ratings, and debt repayment plans enables people to make educated decisions about borrowing money, using credit cards, and repaying loans. Individuals improve their financial stability and raise their chances of being perceived as trustworthy and responsible by future employers by efficiently managing their debt and keeping good credit.
- **Entrepreneurship and financial decision-making:** Financial literacy is especially crucial for people who want to be entrepreneurs or establish their own firms. It teaches the information and skills required to manage firm finances, such as budgeting, cash flow management, financial forecasting, and capital access. Financial literacy enables entrepreneurs to make solid financial decisions, reduce risks, and handle the financial hurdles of beginning and sustaining a firm.
- **Job mobility and professional development:** Financial literacy may help with job mobility and career progression. Individuals may have the confidence to explore new employment prospects, negotiate higher compensation, or engage in professional growth when they understand their financial condition and make educated judgements. Individuals with financial literacy are better able to make smart job choices and take advantage of opportunities that correspond with their financial goals.

10.6.2 Legal Literacy

Legal literacy, or an individual's grasp of legal rights, obligations, and processes, is important for employment. Here are some of the most important ways that legal knowledge affects employability (Fig. 10.5):

- **Employment rights and protections:** Legal literacy enables individuals to understand their employment rights and protections. Individuals can exercise their rights and fight for fair treatment in the workplace if they are aware of labour laws, employment contracts, minimum wage requirements, working hour limitations, and anti-discrimination legislation. This awareness aids individuals in navigating job relationships, effectively resolving disagreements and protecting themselves from potential workplace breaches.



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Fig. 10.5: Legal Literacy an Effective Tool to Control Violence

Source: <https://twocircles.net/>

- **Compliance and ethical behaviour:** Legal literacy fosters a corporate culture of compliance and ethical behaviour. Individuals who are knowledgeable of the rules and regulations that govern their sector are more likely to adhere to ethical standards, avoid unlawful acts, and make judgements that are in accordance with legal requirements. Employers appreciate individuals who display a strong dedication to legal and ethical behaviour since it adds to a healthy work environment and the organization's reputation.
- **Contract negotiation and comprehension:** Legal literacy helps people to understand employment contracts and other legal agreements connected to their jobs. Individuals may negotiate favourable terms and ensure their rights are protected by understanding the terms, conditions and duties specified in contracts. This expertise is especially useful for those in management or executive roles who may be engaged in contract negotiations or have control of contractual agreements.
- **Intellectual property protection:** Legal literacy is essential for those who work in areas that include intellectual property, such as technology, media, or creative industries. Individuals who understand copyright, trademarks, patents, and trade secrets are better able to preserve their intellectual property rights. This awareness enables employees to respect and protect intellectual property rights, adding to the organization's overall competitiveness and success.



- **Workplace health and safety rules:** Legal literacy involves understanding workplace health and safety standards. Understanding safety regulations, danger identification, and reporting processes aids in maintaining a safe workplace and preventing workplace accidents or injuries. Employers appreciate workers that to prioritize workplace safety and contribute to a positive culture.
- **Dispute resolution and legal recourse:** Legal literacy provides persons with understanding of legal procedures and dispute resolution possibilities. When workplace problems emerge, employees who understand their legal choices, such as mediation, arbitration, or litigation, may make educated judgements about seeking legal redress if necessary. This awareness enables individuals to safeguard their rights and seek legal solutions.
- **Compliance with regulatory requirements:** Legal literacy is especially crucial in regulated businesses where specific rules and regulations must be followed. Finance, healthcare, and environmental services are examples of such industries. Individuals who are familiar with industry-specific legislation can help to ensure compliance, mitigate risks, and prevent legal ramifications for themselves and their organisations.



INTEXT QUESTIONS 10.2

Fill in the blank:

1. Develop skills by paying close attention to the speaker, keeping eye contact and avoiding distractions.
2. Budgeting, money management, salary negotiation and benefit optimisation are come under
3. Employment rights, protections, compliance and ethical behaviour are come under
4. Social media helpful for community development,, and
5. Legal literacy is essential for those who work in areas of,, or



10.7 ESSENTIAL DIGITAL SKILLS

Nowadays, people in a wide range of fields and professions find it increasingly necessary to have specific digital abilities. The following are some fundamental digital abilities that are helpful in many situations:

- **Basic computer literacy:** Basic computer literacy refers to the ability to use computers, navigate an operating system, use a web browser, organise files and directories and perform simple troubleshooting.
- **Internet navigation and search:** Internet navigation and search are essential for discovering pertinent information and making the most of online resources. These skills include how to conduct efficient online searches, assess the reliability of sources, and move around websites and web pages.
- **Email communication:** Email communication is still the main way that people communicate both personally and professionally. Effective communication requires a variety of abilities, including the ability to write and send emails, manage email accounts, organise folders, and comprehend email etiquette.
- **Digital Security and Privacy:** securing digital identities and preserving privacy online requires an understanding of the fundamentals of online security, such as password management, spotting phishing scams, and securing personal information.
- **Online collaboration and communication tools:** Effective teamwork and distant collaboration need the use of digital collaboration tools, including as video conferencing platforms, project management software, shared document editing tools, and instant messaging programmes.
- **Digital research and information evaluation:** It is crucial for academic endeavours, professional research, and decision-making to be able to quickly obtain information from digital sources, critically assess its veracity and credibility and synthesise pertinent data.
- **Digital creativity and content creation:** This skill can improve one's capacity to articulate ideas, captivate audiences, and effectively communicate in the digital sphere. These skills include graphic design, photo and video editing, audio production, and basic coding.
- **Data literacy and analysis:** As data become more accessible, it is becoming increasingly important to be able to comprehend, examine, and evaluate data sets. Making educated decisions and spotting patterns and trends can be aided

by knowledge of data visualisation, data analysis software and fundamental statistical ideas.

- **Social Media Management:** It's helpful for community development, marketing, and personal branding to be familiar with the various social media platforms, understand social media strategies, and effectively engage and interact with audiences.
- **Adaptability and Continuous Learning:** It's critical to have the capacity to adjust to new technologies, platforms, and tools in the quick-changing digital environment. Growing personally and professionally requires adopting an attitude of lifelong learning, remaining current on trends and being open to learning new digital skills.

10.8 ENTREPRENEURSHIP:

The process of locating, developing, and pursuing possibilities to launch a new company or endeavour is referred to as entrepreneurship. It involves people—known as entrepreneurs—who take risks and invest money to create novel concepts, goods or services in an effort to create economic value.

Entrepreneurship encompasses several key elements:

- **Innovation and Creativity:** Entrepreneurs frequently identify and launch new concepts, goods or services to fill gaps in the market or address issues already in existence. They use their ingenuity to build original solutions and advertise them.
- **Risk-taking:** Taking measured risks is a key component of entrepreneurship. Even though they are aware that success is not guaranteed, entrepreneurs are eager to put their time, effort, and money into new endeavours. They welcome ambiguity and are equipped to deal with difficulties and setbacks.
- **Opportunity Recognition:** Entrepreneurs have a strong eye for spotting business possibilities. They notice patterns, gaps, and new demands, and they think of methods to take advantage of those possibilities by adding value to their offerings.
- **Business Planning and Execution:** Entrepreneurs frequently identify and launch new concepts, goods, or services to fill gaps in the market or address issues already in existence. They use their ingenuity to build original solutions and advertise them.



Notes



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- **Resource Management:** Successful businesspeople effectively manage resources including money, people and time. They effectively allocate resources, seek funding or investment as necessary and take well-informed decisions to maximise their business operations.
- **Building Networks and Relationships:** Successful businesspeople recognise the value of developing networks and relationships. To obtain knowledge, access resources, and form cooperative relationships, they interact with mentors, business experts, possible partners and clients.
- **Adaptability and Resilience:** Entrepreneurship necessitates the capacity to adjust to shifting market conditions, technical developments, and consumer expectations. To remain competitive, entrepreneurs must be resilient in the face of difficulties, learn from mistakes, and adapt their plans as necessary.
- **Scaling and growth:** Over time, entrepreneurs want to see their businesses expand. They create plans for growing their business, gaining more clients, and breaking into new markets. To promote growth, this may entail bringing on new personnel, looking for additional funds or putting new technology into place.

10.9 CUSTOMER SERVICE:

Customer service refers to the support and assistance provided to customers before, during, and after their interaction with a product, service or organization. It involves addressing customer inquiries, resolving issues or complaints, and ensuring customer satisfaction.

Effective customer service is crucial for building and maintaining strong relationships with customers. It encompasses various elements:

- (i) Communication
- (ii) Knowledge and expertise
- (iii) Problem solving
- (iv) Empathy and understanding
- (v) Timeliness
- (vi) Personalization
- (vii) Continuous improvement
- (viii) Positive attitude



10.10 GETTING READY FOR APPRENTICESHIP & JOBS

Preparing for apprenticeships and jobs involves several important steps to increase your chances of success. Here are some key considerations:

- (i) Identify your interests and goals
- (ii) Research apprenticeships and job opportunities
- (iii) Build relevant skills and knowledge
- (iv) Create a professional resume
- (v) Prepare a compelling cover letter
- (vi) Enhance your interview skills
- (vii) Network and seek guidance
- (viii) Stay updated and persistent



WHAT HAVE YOU LEARNT

Let us recapitulate and enlist the salient points that you have learnt in this lesson.

- Citizenship principles are established in the Indian Constitution, notably in Part II (Citizenship) and Part III (Fundamental Rights).
- Equality, Liberty, Justice, Dignity, Sovereignty and Patriotism, Social Justice are some major constitutional ideals of Indian citizenship
- Continuous learning, determine your passions and goals, develop transferable talents, embrace technology, develop a professional network, gain practical experience, create a professional brand, adaptability and resilience and professional ethics are required become a professional in 21st century.
- English is often considered as the global business and communication language.
- English fluency is frequently required for job applications and interviews, particularly in international corporations or sectors with a global presence.
- SMART goals mean Specific, Measurable, Achievable, Relevant, and Time-bound goals.
- Global businesses operate in worldwide marketplaces and have varied teams made up of people from various language backgrounds.



Notes

Employability Skills

- Self-Assessment begin, consider your hobbies, values, strengths, and limitations. Consider your interests, talents, and what inspires you.
- Financial literacy is important for employment because it provides individuals with the information and skills needed to handle their finances successfully.
- Financial literacy teaches people the significance of budgeting and how to manage their income and spending.
- Legal literacy enables individuals to understand their employment rights and protections.



TERMINAL EXERCISE

1. What are Constitutional Values-citizenship? Explain major constitutional ideals of Indian citizenship.
2. What suggestions are required to become a professional in 21st century?
3. What is role of English to become a global professional?
4. How you can decide your career and goal?
5. How to improve communication skill to become a good professional?
6. What is financial and legal literacy? Explain it.
7. Role of digital education in professionalism?
8. What is entrepreneurship and its elements?



ANSWER TO INTEXT QUESTIONS

10.1

1. T 2. T 3. T 4. T 5. T

10.2

1. Active listening
2. Financial literacy
3. Legal literacy
4. Marketing, and personal branding.
5. Technology, media, or creative industries.



Notes

KEY LEARNING OUTCOMES

By the end of the lesson, you will be able to:

- explain employability Skills in meeting the job requirements & constitutional values to be followed to become a responsible citizen.
- demonstrate professional skills required in 21st century, Practice basic English speaking & basic communication skills and procedure of operating digital devices & associated applications safely.
- describe gender sensitization, ways of managing expenses, income, and savings.
- describe opportunities as an entrepreneur , ways of maintaining customer & ways of preparing for apprenticeship & Jobs appropriately.

ANNEXURE 1

Month	Region	Product Category	Sales (₹)	Units Sold
Jan	North India	FMCG	492586	14414
Jan	North India	Electronics	577177	2437
Jan	North India	Apparel	716221	11224
Jan	South India	FMCG	507728	4226
Jan	South India	Electronics	623831	11560
Jan	South India	Apparel	276241	9947
Jan	West India	FMCG	878921	9402
Jan	West India	Electronics	564508	10978
Jan	West India	Apparel	483339	8126
Jan	East India	FMCG	433212	3217
Jan	East India	Electronics	696220	10261
Jan	East India	Apparel	768331	6982
Feb	North India	FMCG	298377	11900
Feb	North India	Electronics	774853	3589
Feb	North India	Apparel	503286	3034
Feb	South India	FMCG	657412	7085
Feb	South India	Electronics	749884	14849
Feb	South India	Apparel	733652	8954
Feb	West India	FMCG	370840	8542
Feb	West India	Electronics	784878	1614
Feb	West India	Apparel	582917	10146
Feb	East India	FMCG	679584	10947
Feb	East India	Electronics	777473	9330
Feb	East India	Apparel	746778	10191
Mar	North India	FMCG	253081	1128
Mar	North India	Electronics	731588	12140
Mar	North India	Apparel	338467	14441
Mar	South India	FMCG	552439	803
Mar	South India	Electronics	712282	12115
Mar	South India	Apparel	298852	6785
Mar	West India	FMCG	847194	1927
Mar	West India	Electronics	492911	9801
Mar	West India	Apparel	383196	8544

Month	Region	Product Category	Sales ()	Units Sold
Mar	East India	FMCG	592499	9060
Mar	East India	Electronics	893343	1277
Mar	East India	Apparel	295338	3400
Apr	North India	FMCG	498695	14432
Apr	North India	Electronics	582206	10786
Apr	North India	Apparel	492540	11721
Apr	South India	FMCG	438631	12435
Apr	South India	Electronics	335922	6519
Apr	South India	Apparel	411549	2036
Apr	West India	FMCG	385102	6020
Apr	West India	Electronics	256415	5573
Apr	West India	Apparel	315932	8362
Apr	East India	FMCG	271662	12419
Apr	East India	Electronics	686515	4219
Apr	East India	Apparel	410935	10894
May	North India	FMCG	350591	2769
May	North India	Electronics	350186	5308
May	North India	Apparel	503386	3912
May	South India	FMCG	889353	8462
May	South India	Electronics	347338	6176
May	South India	Apparel	483976	13356
May	West India	FMCG	638689	12306
May	West India	Electronics	875534	13991
May	West India	Apparel	406494	12042
May	East India	FMCG	608375	4118
May	East India	Electronics	590911	3898
May	East India	Apparel	353693	1741
Jun	North India	FMCG	388602	12606
Jun	North India	Electronics	290544	9936
Jun	North India	Apparel	447141	7036
Jun	South India	FMCG	297503	6066
Jun	South India	Electronics	733834	2123
Jun	South India	Apparel	421578	3285
Jun	West India	FMCG	897833	1232
Jun	West India	Electronics	795886	4779
Jun	West India	Apparel	336949	14051
Jun	East India	FMCG	466549	7187
Jun	East India	Electronics	654339	11421
Jun	East India	Apparel	859683	7972

(ii)

Month	Region	Product Category	Sales ()	Units Sold
Jul	North India	FMCG	644720	5281
Jul	North India	Electronics	476012	11115
Jul	North India	Apparel	574761	2822
Jul	South India	FMCG	543928	4343
Jul	South India	Electronics	475677	3910
Jul	South India	Apparel	760569	2570
Jul	West India	FMCG	780876	4801
Jul	West India	Electronics	562984	2310
Jul	West India	Apparel	737216	4875
Jul	East India	FMCG	332348	14160
Jul	East India	Electronics	254506	8894
Jul	East India	Apparel	708400	8865
Aug	North India	FMCG	777549	1457
Aug	North India	Electronics	895822	3559
Aug	North India	Apparel	815517	6474
Aug	South India	FMCG	569334	6164
Aug	South India	Electronics	889162	9446
Aug	South India	Apparel	763611	4107
Aug	West India	FMCG	470009	3260
Aug	West India	Electronics	512008	11616
Aug	West India	Apparel	517751	4652
Aug	East India	FMCG	409454	12995
Aug	East India	Electronics	404402	14077
Aug	East India	Apparel	462412	3144
Sep	North India	FMCG	370022	7052
Sep	North India	Electronics	695558	14166
Sep	North India	Apparel	398748	5492
Sep	South India	FMCG	762981	8818
Sep	South India	Electronics	273828	7240
Sep	South India	Apparel	536400	11787
Sep	West India	FMCG	754985	8126
Sep	West India	Electronics	841099	833
Sep	West India	Apparel	292107	9482
Sep	East India	FMCG	608979	9600
Sep	East India	Electronics	503730	2388
Sep	East India	Apparel	614238	3458
Oct	North India	FMCG	484940	13073
Oct	North India	Electronics	785724	5682
Oct	North India	Apparel	617779	3781

Month	Region	Product Category	Sales ()	Units Sold
Oct	South India	FMCG	785528	14936
Oct	South India	Electronics	722442	7855
Oct	South India	Apparel	751636	12240
Oct	West India	FMCG	825809	11834
Oct	West India	Electronics	842234	3451
Oct	West India	Apparel	584663	10828
Oct	East India	FMCG	718043	9186
Oct	East India	Electronics	468632	6550
Oct	East India	Apparel	885834	13937
Nov	North India	FMCG	255422	13192
Nov	North India	Electronics	442358	6674
Nov	North India	Apparel	307328	1416
Nov	South India	FMCG	506217	2067
Nov	South India	Electronics	831844	5906
Nov	South India	Apparel	685857	985
Nov	West India	FMCG	722350	12218
Nov	West India	Electronics	449654	9858
Nov	West India	Apparel	293256	8582
Nov	East India	FMCG	828277	1918
Nov	East India	Electronics	457424	13365
Nov	East India	Apparel	430465	8470
Dec	North India	FMCG	626725	2321
Dec	North India	Electronics	892330	7984
Dec	North India	Apparel	335775	6402
Dec	South India	FMCG	592244	12609
Dec	South India	Electronics	596136	7231
Dec	South India	Apparel	289719	3397
Dec	West India	FMCG	518687	6436
Dec	West India	Electronics	595880	6228
Dec	West India	Apparel	659398	5873
Dec	East India	FMCG	777105	6345
Dec	East India	Electronics	635856	13184
Dec	East India	Apparel	402848	8673

ANNEXURE 2

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/20/2022	AirAsia India	I52386	BOM	DEL	0	159	2/20/2022 12:15	2/20/2022 14:54	2/20/2022 12:35	2/20/2022 15:13	20	No	4370
2/16/2022	AirAsia India	I51635	BOM	JAI	0	60	2/16/2022 18:00	2/16/2022 19:00	2/16/2022 18:00	2/16/2022 19:01	0	No	3680
2/27/2022	Air India	AI6973	JAI	DEL	0	46	2/27/2022 11:50	2/27/2022 12:36	2/27/2022 11:50	2/27/2022 12:21	0	No	2480
2/14/2022	Air India	AI4652	AMD	HYD	0	121	2/14/2022 10:40	2/14/2022 12:41	2/14/2022 10:50	2/14/2022 12:42	10	No	3210
2/16/2022	Air India	AI5735	CCU	BOM	0	115	2/16/2022 17:05	2/16/2022 19:00	2/16/2022 17:25	2/16/2022 19:12	20	No	4770
2/27/2022	SpiceJet	SG1391	DEL	AMD	0	107	2/27/2022 8:40	2/27/2022 10:27	2/27/2022 8:45	2/27/2022 10:33	5	No	4000
2/18/2022	GoFirst	G83833	HYD	CCU	0	154	2/18/2022 7:00	2/18/2022 9:34	2/18/2022 7:00	2/18/2022 9:34	0	No	5110
2/16/2022	SpiceJet	SG7528	BOM	MAA	0	130	2/16/2022 17:20	2/16/2022 19:30	2/16/2022 18:01	2/16/2022 20:18	41	No	6330
2/22/2022	AirAsia India	I54474	CCU	BLR	0	155	2/22/2022 16:15	2/22/2022 18:50	2/22/2022 16:45	2/22/2022 19:19	30	No	6020
2/26/2022	AirAsia India	I57673	BOM	BLR	0	102	2/26/2022 12:10	2/26/2022 13:52	2/26/2022 12:20	2/26/2022 13:55	10	No	6150
2/19/2022	Vistara	UK625	HYD	JAI	0	85	2/19/2022 15:00	2/19/2022 16:25	2/19/2022 15:25	2/19/2022 16:50	25	No	7820
2/15/2022	SpiceJet	SG8279	GOI	HYD	1	76	2/15/2022 11:30	2/15/2022 12:46	2/15/2022 11:55	2/15/2022 13:08	25	No	5090
2/20/2022	AirAsia India	I59297	AMD	BLR	1	149	2/20/2022 9:15	2/20/2022 11:44	2/20/2022 9:46	2/20/2022 12:22	31	No	5790
2/19/2022	SpiceJet	SG1589	GOI	CCU	0	104	2/19/2022 9:50	2/19/2022 11:34	2/19/2022 9:50	2/19/2022 11:36	0	No	5620
2/17/2022	IndiGo	6E6404	BOM	BLR	0	89	2/17/2022 18:05	2/17/2022 19:34	2/17/2022 18:05	2/17/2022 19:29	0	No	3070
2/20/2022	Vistara	UK1976	AMD	JAI	1	148	2/20/2022 22:00	2/21/2022 0:28	2/20/2022 22:25	2/21/2022 1:12	25	No	5110
2/16/2022	GoFirst	G87533	HYD	CCU	0	94	2/16/2022 14:40	2/16/2022 16:14	2/16/2022 14:45	2/16/2022 16:18	5	No	3450
2/18/2022	AirAsia India	I54989	HYD	JAI	0	200	2/18/2022 21:05	2/19/2022 0:25	2/18/2022 22:31	2/19/2022 1:51	86	No	5300
2/14/2022	IndiGo	6E5138	CCU	AMD	0	185	2/14/2022 8:30	2/14/2022 11:35	2/14/2022 9:10	2/14/2022 12:16	40	No	3680
2/16/2022	IndiGo	6E8827	MAA	BOM	0	123	2/16/2022 20:05	2/16/2022 22:08	2/16/2022 20:05	2/16/2022 22:18	0	No	5300
2/27/2022	Air India	AI7032	BLR	AMD	0	130	2/27/2022 10:20	2/27/2022 12:30				Yes	4620
2/23/2022	GoFirst	G88579	MAA	HYD	2	130	2/23/2022 16:45	2/23/2022 18:55	2/23/2022 17:49	2/23/2022 20:07	64	No	5120
2/19/2022	Vistara	UK444	BOM	MAA	0	92	2/19/2022 7:30	2/19/2022 9:02	2/19/2022 7:40	2/19/2022 9:18	10	No	4430
2/19/2022	GoFirst	G81064	JAI	MAA	0	167	2/19/2022 5:05	2/19/2022 7:52	2/19/2022 5:05	2/19/2022 7:42	0	No	4130
2/15/2022	IndiGo	6E4662	DEL	CCU	0	176	2/15/2022 21:15	2/16/2022 0:11				Yes	9510
2/27/2022	AirAsia India	I57849	AMD	MAA	0	76	2/27/2022 9:45	2/27/2022 11:01	2/27/2022 9:50	2/27/2022 11:06	5	No	6690
2/16/2022	Vistara	UK7039	MAA	BOM	2	115	2/16/2022 18:30	2/16/2022 20:25	2/16/2022 20:18	2/16/2022 22:13	108	No	4170
2/16/2022	Vistara	UK5659	AMD	DEL	0	75	2/16/2022 6:40	2/16/2022 7:55	2/16/2022 7:00	2/16/2022 8:06	20	No	3460
2/24/2022	IndiGo	6E4663	MAA	JAI	0	87	2/24/2022 9:40	2/24/2022 11:07	2/24/2022 11:18	2/24/2022 12:49	98	No	5730
2/27/2022	Air India	AI8956	BOM	AMD	0	116	2/27/2022 8:00	2/27/2022 9:56	2/27/2022 8:00	2/27/2022 10:12	0	No	5270
2/18/2022	IndiGo	6E7986	BOM	MAA	1	121	2/18/2022 18:45	2/18/2022 20:46	2/18/2022 19:05	2/18/2022 20:59	20	No	4880

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/17/2022	Air India	AI6496	GOI	DEL	1	139	2/17/2022 17:00	2/17/2022 19:19	2/17/2022 17:05	2/17/2022 19:28	5	No	5290
2/24/2022	SpiceJet	SG3211	AMD	HYD	1	81	2/24/2022 22:45	2/25/2022 0:06	2/24/2022 22:45	2/25/2022 0:00	0	No	4660
2/15/2022	Air India	AI921	DEL	JAI	0	43	2/15/2022 15:00	2/15/2022 15:43	2/15/2022 15:15	2/15/2022 15:56	15	No	3810
2/26/2022	GoFirst	G81412	AMD	JAI	1	154	2/26/2022 10:00	2/26/2022 12:34	2/26/2022 10:05	2/26/2022 12:30	5	No	7360
2/23/2022	Air India	AI9585	BOM	MAA	0	107	2/23/2022 8:15	2/23/2022 10:02	2/23/2022 8:43	2/23/2022 10:46	28	No	5250
2/24/2022	GoFirst	G84372	DEL	BOM	0	185	2/24/2022 21:30	2/25/2022 0:35	2/24/2022 21:50	2/25/2022 0:58	20	No	5510
2/20/2022	Air India	AI5015	CCU	MAA	0	157	2/20/2022 17:10	2/20/2022 19:47	2/20/2022 17:10	2/20/2022 20:04	0	No	4470
2/25/2022	SpiceJet	SG8908	BOM	DEL	1	141	2/25/2022 8:05	2/25/2022 10:26	2/25/2022 8:05	2/25/2022 10:27	0	No	5610
2/17/2022	Air India	AI4102	JAI	HYD	0	171	2/17/2022 16:05	2/17/2022 18:56	2/17/2022 16:31	2/17/2022 19:29	26	No	4470
2/27/2022	SpiceJet	SG9186	BLR	AMD	1	65	2/27/2022 14:50	2/27/2022 15:55	2/27/2022 15:10	2/27/2022 16:23	20	No	4940
2/20/2022	AirAsia India	I59164	BOM	BLR	1	104	2/20/2022 8:05	2/20/2022 9:49	2/20/2022 10:07	2/20/2022 12:01	122	No	3830
2/22/2022	Air India	AI8380	HYD	MAA	0	119	2/22/2022 11:20	2/22/2022 13:19	2/22/2022 13:29	2/22/2022 15:28	129	No	3700
2/16/2022	Vistara	UK822	HYD	DEL	0	166	2/16/2022 18:20	2/16/2022 21:06				Yes	5990
2/20/2022	IndiGo	6E7107	CCU	BLR	0	130	2/20/2022 10:45	2/20/2022 12:55	2/20/2022 11:39	2/20/2022 14:03	54	No	6500
2/27/2022	IndiGo	6E9643	BOM	BLR	0	96	2/27/2022 6:30	2/27/2022 8:06	2/27/2022 7:01	2/27/2022 8:41	31	No	3550
2/17/2022	GoFirst	G8753	BLR	GOI	0	119	2/17/2022 6:20	2/17/2022 8:19	2/17/2022 7:12	2/17/2022 9:06	52	No	6850
2/22/2022	SpiceJet	SG2632	MAA	BOM	1	109	2/22/2022 22:40	2/23/2022 0:29	2/22/2022 22:40	2/23/2022 0:20	0	No	6420
2/14/2022	Air India	AI6845	BLR	GOI	0	170	2/14/2022 10:30	2/14/2022 13:20	2/14/2022 11:11	2/14/2022 14:04	41	No	6320
2/17/2022	AirAsia India	I5734	MAA	HYD	0	140	2/17/2022 8:40	2/17/2022 11:00	2/17/2022 10:43	2/17/2022 12:55	123	No	6000
2/22/2022	Vistara	UK487	MAA	AMD	0	108	2/22/2022 14:15	2/22/2022 16:03	2/22/2022 14:40	2/22/2022 16:30	25	No	6830
2/20/2022	Air India	AI8446	GOI	CCU	0	94	2/20/2022 7:20	2/20/2022 8:54	2/20/2022 7:25	2/20/2022 8:55	5	No	3450
2/14/2022	AirAsia India	I59612	JAI	CCU	0	66	2/14/2022 8:20	2/14/2022 9:26	2/14/2022 8:20	2/14/2022 9:39	0	No	4110
2/22/2022	IndiGo	6E8479	BOM	GOI	0	55	2/22/2022 15:40	2/22/2022 16:35	2/22/2022 17:16	2/22/2022 18:11	96	No	3350
2/20/2022	IndiGo	6.00E+127	GOI	MAA	2	76	2/20/2022 6:40	2/20/2022 7:56	2/20/2022 7:42	2/20/2022 9:00	62	No	4740
2/22/2022	GoFirst	G85509	JAI	MAA	0	151	2/22/2022 18:05	2/22/2022 20:36	2/22/2022 18:55	2/22/2022 21:23	50	No	4670
2/26/2022	SpiceJet	SG5444	BOM	HYD	0	85	2/26/2022 14:40	2/26/2022 16:05	2/26/2022 15:04	2/26/2022 16:23	24	No	1980
2/17/2022	Vistara	UK6311	HYD	JAI	1	136	2/17/2022 11:40	2/17/2022 13:56	2/17/2022 11:50	2/17/2022 14:13	10	No	6840
2/23/2022	AirAsia India	I55078	BLR	HYD	0	87	2/23/2022 22:00	2/23/2022 23:27	2/23/2022 22:51	2/24/2022 0:18	51	No	4660
2/21/2022	SpiceJet	SG7344	MAA	GOI	0	64	2/21/2022 19:45	2/21/2022 20:49	2/21/2022 19:45	2/21/2022 20:46	0	No	4770
2/25/2022	AirAsia India	I58545	MAA	JAI	0	110	2/25/2022 10:05	2/25/2022 11:55	2/25/2022 10:30	2/25/2022 12:19	25	No	6720
2/19/2022	AirAsia India	I53362	CCU	BOM	0	135	2/19/2022 14:15	2/19/2022 16:30	2/19/2022 14:15	2/19/2022 16:48	0	No	3460
2/25/2022	IndiGo	6E6890	DEL	MAA	0	150	2/25/2022 7:45	2/25/2022 10:15	2/25/2022 7:58	2/25/2022 10:28	13	No	5050
2/25/2022	AirAsia India	I52517	MAA	GOI	0	54	2/25/2022 17:15	2/25/2022 18:09	2/25/2022 17:15	2/25/2022 18:08	0	No	4140
2/24/2022	AirAsia India	I58586	DEL	BOM	0	146	2/24/2022 12:10	2/24/2022 14:36	2/24/2022 12:51	2/24/2022 15:16	41	No	5150
2/20/2022	Vistara	UK2284	DEL	JAI	0	47	2/20/2022 8:45	2/20/2022 9:32	2/20/2022 8:45	2/20/2022 9:33	0	No	3320
2/24/2022	Vistara	UK9076	JAI	CCU	0	167	2/24/2022 21:40	2/25/2022 0:27	2/24/2022 21:40	2/25/2022 0:34	0	No	4790

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/20/2022	Air India	AI4019	AMD	HYD	0	103	2/20/2022 13:50	2/20/2022 15:33	2/20/2022 13:50	2/20/2022 15:21	0	No	6120
2/19/2022	Vistara	UK5338	BOM	HYD	1	95	2/19/2022 13:30	2/19/2022 15:05				Yes	6270
2/17/2022	GoFirst	G82603	BOM	BLR	0	83	2/17/2022 12:40	2/17/2022 14:03	2/17/2022 12:45	2/17/2022 14:07	5	No	3250
2/24/2022	AirAsia India	I58990	MAA	BOM	0	120	2/24/2022 18:30	2/24/2022 20:30	2/24/2022 18:40	2/24/2022 20:37	10	No	5430
2/19/2022	Vistara	UK9669	GOI	DEL	0	170	2/19/2022 18:40	2/19/2022 21:30	2/19/2022 20:07	2/19/2022 23:13	87	No	6110
2/25/2022	AirAsia India	I54992	DEL	GOI	0	151	2/25/2022 5:30	2/25/2022 8:01	2/25/2022 5:30	2/25/2022 7:55	0	No	4290
2/27/2022	Vistara	UK4571	GOI	JAI	0	75	2/27/2022 12:45	2/27/2022 14:00	2/27/2022 12:45	2/27/2022 14:16	0	No	4160
2/22/2022	Vistara	UK7757	DEL	GOI	0	159	2/22/2022 17:10	2/22/2022 19:49	2/22/2022 17:25	2/22/2022 20:10	15	No	5810
2/23/2022	Air India	AI7122	JAI	DEL	0	42	2/23/2022 5:05	2/23/2022 5:47	2/23/2022 5:05	2/23/2022 5:47	0	No	3610
2/15/2022	Air India	AI3567	AMD	BLR	0	107	2/15/2022 13:40	2/15/2022 15:27	2/15/2022 14:39	2/15/2022 16:09	59	No	5680
2/20/2022	SpiceJet	SG1441	CCU	GOI	0	125	2/20/2022 18:20	2/20/2022 20:25	2/20/2022 18:20	2/20/2022 20:17	0	No	3720
2/22/2022	IndiGo	6E759	JAI	DEL	0	36	2/22/2022 12:05	2/22/2022 12:41	2/22/2022 12:30	2/22/2022 13:07	25	No	3190
2/17/2022	IndiGo	6E7858	MAA	DEL	0	143	2/17/2022 12:10	2/17/2022 14:33	2/17/2022 12:31	2/17/2022 14:57	21	No	5640
2/25/2022	AirAsia India	I52849	BOM	MAA	0	132	2/25/2022 13:30	2/25/2022 15:42	2/25/2022 13:30	2/25/2022 15:36	0	No	6320
2/21/2022	GoFirst	G85211	BOM	BLR	1	90	2/21/2022 8:00	2/21/2022 9:30	2/21/2022 8:05	2/21/2022 9:42	5	No	6900
2/15/2022	GoFirst	G85041	GOI	MAA	0	71	2/15/2022 12:05	2/15/2022 13:16	2/15/2022 12:05	2/15/2022 13:28	0	No	3040
2/22/2022	AirAsia India	I56171	BOM	DEL	0	123	2/22/2022 22:40	2/23/2022 0:43	2/22/2022 22:55	2/23/2022 0:56	15	No	4930
2/14/2022	IndiGo	6E7202	JAI	CCU	0	68	2/14/2022 18:45	2/14/2022 19:53	2/14/2022 18:55	2/14/2022 20:13	10	No	4260
2/24/2022	AirAsia India	I54525	AMD	BLR	0	162	2/24/2022 10:50	2/24/2022 13:32	2/24/2022 11:10	2/24/2022 13:51	20	No	6540
2/20/2022	GoFirst	G81519	AMD	GOI	0	162	2/20/2022 15:15	2/20/2022 17:57	2/20/2022 16:07	2/20/2022 18:39	52	No	4470
2/27/2022	Vistara	UK8198	MAA	AMD	0	67	2/27/2022 17:30	2/27/2022 18:37	2/27/2022 17:55	2/27/2022 18:50	25	No	4280
2/19/2022	SpiceJet	SG4681	BLR	AMD	0	109	2/19/2022 16:20	2/19/2022 18:09	2/19/2022 16:25	2/19/2022 18:08	5	No	5050
2/14/2022	GoFirst	G84054	HYD	JAI	0	63	2/14/2022 21:15	2/14/2022 22:18	2/14/2022 21:15	2/14/2022 22:06	0	No	5070
2/19/2022	Vistara	UK382	AMD	JAI	0	109	2/19/2022 20:45	2/19/2022 22:34	2/19/2022 20:45	2/19/2022 22:32	0	No	4200
2/19/2022	SpiceJet	SG7853	MAA	GOI	0	77	2/19/2022 14:30	2/19/2022 15:47	2/19/2022 14:40	2/19/2022 15:57	10	No	4260
2/24/2022	GoFirst	G87534	JAI	CCU	1	88	2/24/2022 22:30	2/24/2022 23:58				Yes	3970
2/16/2022	SpiceJet	SG2058	HYD	MAA	0	130	2/16/2022 11:30	2/16/2022 13:40	2/16/2022 12:01	2/16/2022 14:10	31	No	6540
2/18/2022	AirAsia India	I59759	JAI	BLR	0	102	2/18/2022 11:45	2/18/2022 13:27	2/18/2022 12:19	2/18/2022 14:10	34	No	4520
2/18/2022	GoFirst	G86012	HYD	BOM	0	92	2/18/2022 14:15	2/18/2022 15:47	2/18/2022 14:35	2/18/2022 16:09	20	No	3390
2/26/2022	Air India	AI845	HYD	DEL	0	168	2/26/2022 9:20	2/26/2022 12:08	2/26/2022 9:20	2/26/2022 12:03	0	No	6290
2/17/2022	IndiGo	6.00E+300	JAI	HYD	1	160	2/17/2022 20:05	2/17/2022 22:45	2/17/2022 20:05	2/17/2022 22:48	0	No	7860
2/18/2022	SpiceJet	SG7927	AMD	CCU	0	195	2/18/2022 6:20	2/18/2022 9:35	2/18/2022 6:20	2/18/2022 9:27	0	No	3160
2/15/2022	IndiGo	6E9321	GOI	AMD	0	81	2/15/2022 6:10	2/15/2022 7:31	2/15/2022 6:20	2/15/2022 7:34	10	No	4410
2/27/2022	IndiGo	6E8661	MAA	BOM	0	107	2/27/2022 18:15	2/27/2022 20:02	2/27/2022 18:20	2/27/2022 20:07	5	No	6230
2/24/2022	Vistara	UK1725	AMD	HYD	0	144	2/24/2022 14:00	2/24/2022 16:24	2/24/2022 14:15	2/24/2022 16:21	15	No	4940
2/15/2022	Air India	AI2947	MAA	HYD	2	104	2/15/2022 10:15	2/15/2022 11:59	2/15/2022 10:20	2/15/2022 11:57	5	No	5770
2/14/2022	GoFirst	G89829	BOM	BLR	0	75	2/14/2022 18:45	2/14/2022 20:00	2/14/2022 18:50	2/14/2022 20:05	5	No	5710

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/19/2022	Vistara	UK7538	HYD	DEL	0	133	2/19/2022 14:20	2/19/2022 16:33	2/19/2022 14:20	2/19/2022 16:46	0	No	4630
2/18/2022	IndiGo	6E9022	MAA	HYD	0	120	2/18/2022 18:05	2/18/2022 20:05	2/18/2022 19:08	2/18/2022 20:58	63	No	6510
2/17/2022	Air India	AI2818	BLR	HYD	0	83	2/17/2022 7:00	2/17/2022 8:23	2/17/2022 7:00	2/17/2022 8:33	0	No	4220
2/17/2022	SpiceJet	SG6694	HYD	AMD	0	126	2/17/2022 19:20	2/17/2022 21:26	2/17/2022 19:30	2/17/2022 21:30	10	No	7900
2/24/2022	SpiceJet	SG7178	JAI	AMD	0	163	2/24/2022 7:00	2/24/2022 9:43	2/24/2022 7:47	2/24/2022 10:24	47	No	6930
2/16/2022	SpiceJet	SG4515	HYD	DEL	0	140	2/16/2022 12:00	2/16/2022 14:20	2/16/2022 12:49	2/16/2022 15:18	49	No	6900
2/25/2022	GoFirst	G84657	DEL	BLR	0	167	2/25/2022 21:45	2/26/2022 0:32	2/25/2022 23:57	2/26/2022 2:44	132	No	6400
2/16/2022	Air India	AI5560	GOI	AMD	0	133	2/16/2022 20:30	2/16/2022 22:43				Yes	3760
2/22/2022	AirAsia India	I54822	BOM	BLR	0	84	2/22/2022 18:45	2/22/2022 20:09	2/22/2022 19:10	2/22/2022 20:26	25	No	3440
2/14/2022	AirAsia India	I54235	GOI	JAI	0	110	2/14/2022 19:05	2/14/2022 20:55	2/14/2022 20:44	2/14/2022 22:41	99	No	4490
2/14/2022	IndiGo	6E988	GOI	JAI	0	119	2/14/2022 22:45	2/15/2022 0:44	2/14/2022 22:45	2/15/2022 0:40	0	No	4470
2/24/2022	GoFirst	G89098	CCU	AMD	0	80	2/24/2022 6:15	2/24/2022 7:35	2/24/2022 8:07	2/24/2022 9:38	112	No	4630
2/14/2022	SpiceJet	SG9124	AMD	BOM	0	72	2/14/2022 12:10	2/14/2022 13:22	2/14/2022 12:10	2/14/2022 13:15	0	No	3120
2/19/2022	GoFirst	G82024	GOI	BOM	0	56	2/19/2022 8:45	2/19/2022 9:41	2/19/2022 8:45	2/19/2022 9:41	0	No	4010
2/21/2022	AirAsia India	I58005	BLR	AMD	0	138	2/21/2022 21:20	2/21/2022 23:38	2/21/2022 21:30	2/21/2022 23:54	10	No	5890
2/17/2022	Air India	AI9920	AMD	JAI	0	186	2/17/2022 17:15	2/17/2022 20:21	2/17/2022 17:25	2/17/2022 20:35	10	No	5270
2/20/2022	AirAsia India	I58418	BLR	BOM	0	97	2/20/2022 18:30	2/20/2022 20:07	2/20/2022 18:56	2/20/2022 20:32	26	No	4190
2/21/2022	SpiceJet	SG7416	DEL	HYD	1	152	2/21/2022 20:10	2/21/2022 22:42	2/21/2022 20:10	2/21/2022 22:45	0	No	4430
2/22/2022	GoFirst	G87560	AMD	CCU	0	110	2/22/2022 22:50	2/23/2022 0:40				Yes	5600
2/19/2022	SpiceJet	SG5313	MAA	GOI	0	62	2/19/2022 18:00	2/19/2022 19:02				Yes	3480
2/23/2022	AirAsia India	I52168	AMD	GOI	0	69	2/23/2022 9:45	2/23/2022 10:54	2/23/2022 10:36	2/23/2022 11:37	51	No	5950
2/24/2022	GoFirst	G87586	CCU	BOM	0	216	2/24/2022 8:50	2/24/2022 12:26				Yes	3500
2/17/2022	AirAsia India	I54442	BLR	GOI	0	196	2/17/2022 7:45	2/17/2022 11:01	2/17/2022 7:50	2/17/2022 10:55	5	No	4720
2/21/2022	GoFirst	G85288	GOI	BOM	0	55	2/21/2022 22:40	2/21/2022 23:35	2/21/2022 23:10	2/22/2022 0:04	30	No	2060
2/14/2022	AirAsia India	I54808	AMD	JAI	0	160	2/14/2022 7:15	2/14/2022 9:55	2/14/2022 7:40	2/14/2022 10:13	25	No	7120
2/16/2022	AirAsia India	I52825	BOM	GOI	0	40	2/16/2022 8:45	2/16/2022 9:25	2/16/2022 8:45	2/16/2022 9:38	0	No	2550
2/15/2022	AirAsia India	I54906	HYD	DEL	0	167	2/15/2022 15:00	2/15/2022 17:47	2/15/2022 15:20	2/15/2022 18:10	20	No	4470
2/17/2022	SpiceJet	SG9372	CCU	GOI	0	116	2/17/2022 12:50	2/17/2022 14:46	2/17/2022 13:05	2/17/2022 15:08	15	No	3540
2/23/2022	Air India	AI9654	BLR	BOM	0	90	2/23/2022 12:45	2/23/2022 14:15				Yes	3670
2/20/2022	Air India	AI253	MAA	AMD	0	151	2/20/2022 19:20	2/20/2022 21:51	2/20/2022 20:19	2/20/2022 22:48	59	No	8660
2/17/2022	Vistara	UK5761	HYD	JAI	0	175	2/17/2022 7:45	2/17/2022 10:40				Yes	6260
2/25/2022	SpiceJet	SG8016	GOI	HYD	0	91	2/25/2022 14:15	2/25/2022 15:46	2/25/2022 14:30	2/25/2022 15:53	15	No	3580
2/27/2022	Air India	AI6584	GOI	CCU	0	56	2/27/2022 14:20	2/27/2022 15:16	2/27/2022 15:49	2/27/2022 16:57	89	No	5360
2/20/2022	IndiGo	6E3688	DEL	AMD	0	102	2/20/2022 12:30	2/20/2022 14:12	2/20/2022 12:50	2/20/2022 14:42	20	No	4020
2/17/2022	AirAsia India	I55161	MAA	HYD	0	122	2/17/2022 8:00	2/17/2022 10:02	2/17/2022 8:20	2/17/2022 10:13	20	No	4690
2/17/2022	Vistara	UK5452	DEL	CCU	1	193	2/17/2022 7:20	2/17/2022 10:33	2/17/2022 7:35	2/17/2022 10:41	15	No	8400
2/18/2022	AirAsia India	I56094	GOI	BLR	0	168	2/18/2022 9:50	2/18/2022 12:38	2/18/2022 10:10	2/18/2022 12:52	20	No	3980

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/20/2022	GoFirst	G85649	HYD	BLR	0	81	2/20/2022 20:20	2/20/2022 21:41	2/20/2022 21:31	2/20/2022 22:58	71	No	4520
2/17/2022	IndiGo	6E9231	AMD	BOM	0	204	2/17/2022 12:40	2/17/2022 16:04	2/17/2022 12:45	2/17/2022 15:56	5	No	6360
2/20/2022	IndiGo	6E7551	GOI	DEL	1	129	2/20/2022 22:05	2/21/2022 0:14	2/20/2022 22:20	2/21/2022 0:32	15	No	4110
2/23/2022	SpiceJet	SG510	HYD	GOI	0	125	2/23/2022 8:15	2/23/2022 10:20	2/23/2022 8:30	2/23/2022 10:34	15	No	3490
2/15/2022	GoFirst	G86789	CCU	MAA	0	123	2/15/2022 19:20	2/15/2022 21:23	2/15/2022 21:02	2/15/2022 23:11	102	No	3450
2/25/2022	Air India	AI3946	DEL	HYD	0	144	2/25/2022 8:05	2/25/2022 10:29	2/25/2022 8:44	2/25/2022 11:04	39	No	5250
2/25/2022	GoFirst	G89722	BLR	GOI	0	122	2/25/2022 16:50	2/25/2022 18:52	2/25/2022 17:05	2/25/2022 18:56	15	No	5240
2/16/2022	AirAsia India	I54683	BLR	GOI	0	133	2/16/2022 20:40	2/16/2022 22:53	2/16/2022 21:55	2/17/2022 0:09	75	No	3360
2/24/2022	AirAsia India	I56042	CCU	MAA	0	159	2/24/2022 19:15	2/24/2022 21:54	2/24/2022 19:25	2/24/2022 22:17	10	No	4700
2/22/2022	AirAsia India	I53209	CCU	JAI	0	106	2/22/2022 6:40	2/22/2022 8:26	2/22/2022 6:55	2/22/2022 8:18	15	No	4260
2/14/2022	Vistara	UK4090	BOM	MAA	0	108	2/14/2022 6:30	2/14/2022 8:18	2/14/2022 6:40	2/14/2022 8:28	10	No	5930
2/27/2022	Air India	AI3917	MAA	BOM	0	114	2/27/2022 11:15	2/27/2022 13:09	2/27/2022 12:02	2/27/2022 14:00	47	No	5410
2/20/2022	SpiceJet	SG8950	BLR	DEL	0	171	2/20/2022 9:10	2/20/2022 12:01	2/20/2022 9:10	2/20/2022 11:55	0	No	6630
2/14/2022	SpiceJet	SG5969	BLR	BOM	0	111	2/14/2022 9:00	2/14/2022 10:51	2/14/2022 9:53	2/14/2022 11:35	53	No	3560
2/18/2022	Air India	AI2176	CCU	DEL	0	152	2/18/2022 13:00	2/18/2022 15:32	2/18/2022 13:20	2/18/2022 16:02	20	No	7240
2/16/2022	AirAsia India	I56031	GOI	JAI	0	95	2/16/2022 7:45	2/16/2022 9:20	2/16/2022 7:45	2/16/2022 9:18	0	No	6070
2/26/2022	GoFirst	G88643	BOM	AMD	1	194	2/26/2022 12:00	2/26/2022 15:14	2/26/2022 12:25	2/26/2022 15:20	25	No	3450
2/23/2022	Vistara	UK8132	DEL	AMD	0	111	2/23/2022 18:05	2/23/2022 19:56	2/23/2022 18:05	2/23/2022 19:42	0	No	5180
2/15/2022	AirAsia India	I52167	AMD	BOM	0	83	2/15/2022 15:10	2/15/2022 16:33	2/15/2022 15:30	2/15/2022 16:54	20	No	3820
2/23/2022	GoFirst	G88382	JAI	CCU	0	94	2/23/2022 21:20	2/23/2022 22:54	2/23/2022 22:02	2/23/2022 23:55	42	No	6160
2/19/2022	Vistara	UK3843	BOM	JAI	0	151	2/19/2022 18:45	2/19/2022 21:16	2/19/2022 19:16	2/19/2022 21:54	31	No	5480
2/24/2022	SpiceJet	SG5220	AMD	GOI	1	106	2/24/2022 8:30	2/24/2022 10:16	2/24/2022 10:02	2/24/2022 11:57	92	No	7300
2/25/2022	SpiceJet	SG1498	CCU	BLR	0	145	2/25/2022 7:05	2/25/2022 9:30	2/25/2022 8:54	2/25/2022 11:10	109	No	3740
2/17/2022	Vistara	UK9301	BOM	CCU	0	142	2/17/2022 22:00	2/18/2022 0:22	2/17/2022 22:05	2/18/2022 0:34	5	No	5310
2/22/2022	SpiceJet	SG4812	BOM	GOI	0	46	2/22/2022 18:00	2/22/2022 18:46				Yes	3170
2/16/2022	GoFirst	G88000	HYD	CCU	0	78	2/16/2022 21:15	2/16/2022 22:33	2/16/2022 21:15	2/16/2022 22:29	0	No	4020
2/22/2022	IndiGo	6E3805	CCU	JAI	0	140	2/22/2022 8:20	2/22/2022 10:40	2/22/2022 8:30	2/22/2022 10:44	10	No	4860
2/20/2022	Vistara	UK4577	JAI	DEL	0	51	2/20/2022 5:10	2/20/2022 6:01	2/20/2022 5:25	2/20/2022 6:22	15	No	2360
2/22/2022	AirAsia India	I52447	HYD	CCU	0	158	2/22/2022 5:10	2/22/2022 7:48	2/22/2022 5:15	2/22/2022 7:44	5	No	4400
2/17/2022	AirAsia India	I58791	GOI	BOM	0	55	2/17/2022 5:05	2/17/2022 6:00	2/17/2022 5:14	2/17/2022 6:00	9	No	2260
2/22/2022	Air India	AI5414	GOI	AMD	0	92	2/22/2022 10:30	2/22/2022 12:02	2/22/2022 10:35	2/22/2022 12:07	5	No	5230
2/17/2022	GoFirst	G81436	BOM	DEL	0	148	2/17/2022 10:00	2/17/2022 12:28	2/17/2022 10:25	2/17/2022 12:46	25	No	5410
2/25/2022	SpiceJet	SG3631	AMD	GOI	0	91	2/25/2022 19:40	2/25/2022 21:11	2/25/2022 20:48	2/25/2022 22:10	68	No	5360
2/24/2022	GoFirst	G89817	BOM	CCU	0	152	2/24/2022 8:20	2/24/2022 10:52	2/24/2022 8:25	2/24/2022 10:49	5	No	3110
2/19/2022	GoFirst	G8225	HYD	DEL	0	146	2/19/2022 17:00	2/19/2022 19:26	2/19/2022 17:20	2/19/2022 19:34	20	No	7950
2/17/2022	Air India	AI5475	HYD	MAA	0	138	2/17/2022 13:20	2/17/2022 15:38	2/17/2022 13:25	2/17/2022 15:43	5	No	6670
2/24/2022	IndiGo	6E6329	DEL	AMD	0	87	2/24/2022 10:10	2/24/2022 11:37	2/24/2022 10:10	2/24/2022 11:40	0	No	3330

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/27/2022	GoFirst	G8793	MAA	JAI	0	127	2/27/2022 16:05	2/27/2022 18:12	2/27/2022 16:05	2/27/2022 18:11	0	No	4540
2/21/2022	IndiGo	6E6943	AMD	BOM	0	141	2/21/2022 18:40	2/21/2022 21:01				Yes	5660
2/21/2022	IndiGo	6E6028	GOI	DEL	0	139	2/21/2022 10:45	2/21/2022 13:04	2/21/2022 10:50	2/21/2022 13:01	5	No	4520
2/19/2022	IndiGo	6E8684	GOI	BOM	0	46	2/19/2022 18:40	2/19/2022 19:26	2/19/2022 19:10	2/19/2022 19:55	30	No	4010
2/22/2022	IndiGo	6E2854	GOI	HYD	0	153	2/22/2022 12:30	2/22/2022 15:03	2/22/2022 12:30	2/22/2022 14:59	0	No	4910
2/26/2022	GoFirst	G82519	BOM	JAI	0	88	2/26/2022 11:30	2/26/2022 12:58	2/26/2022 11:35	2/26/2022 13:08	5	No	3790
2/18/2022	IndiGo	6E1334	BLR	HYD	0	84	2/18/2022 10:10	2/18/2022 11:34				Yes	4600
2/21/2022	Air India	AI7782	AMD	CCU	0	59	2/21/2022 9:45	2/21/2022 10:44	2/21/2022 9:45	2/21/2022 10:43	0	No	6250
2/22/2022	AirAsia India	I55185	HYD	DEL	0	153	2/22/2022 21:05	2/22/2022 23:38	2/22/2022 21:05	2/22/2022 23:29	0	No	5720
2/15/2022	Vistara	UK1357	AMD	DEL	0	80	2/15/2022 16:20	2/15/2022 17:40	2/15/2022 16:26	2/15/2022 17:46	6	No	3910
2/23/2022	AirAsia India	I5772	BOM	JAI	0	184	2/23/2022 19:50	2/23/2022 22:54	2/23/2022 20:00	2/23/2022 23:06	10	No	5180
2/25/2022	GoFirst	G87481	MAA	CCU	0	72	2/25/2022 21:10	2/25/2022 22:22	2/25/2022 21:35	2/25/2022 22:44	25	No	4050
2/18/2022	SpiceJet	SG7272	BOM	JAI	0	111	2/18/2022 6:15	2/18/2022 8:06	2/18/2022 6:20	2/18/2022 8:19	5	No	5920
2/22/2022	GoFirst	G86797	JAI	BLR	0	106	2/22/2022 16:20	2/22/2022 18:06	2/22/2022 16:51	2/22/2022 18:27	31	No	5700
2/15/2022	SpiceJet	SG9241	DEL	CCU	0	195	2/15/2022 15:05	2/15/2022 18:20				Yes	5350
2/20/2022	AirAsia India	I59647	GOI	HYD	0	58	2/20/2022 9:30	2/20/2022 10:28	2/20/2022 9:35	2/20/2022 10:45	5	No	6460
2/23/2022	Air India	AI9257	CCU	HYD	0	99	2/23/2022 9:05	2/23/2022 10:44	2/23/2022 9:36	2/23/2022 11:17	31	No	4620
2/26/2022	AirAsia India	I56028	CCU	BLR	0	130	2/26/2022 7:40	2/26/2022 9:50	2/26/2022 8:05	2/26/2022 10:09	25	No	2710
2/19/2022	SpiceJet	SG3245	HYD	BLR	0	70	2/19/2022 15:45	2/19/2022 16:55	2/19/2022 16:10	2/19/2022 17:14	25	No	4880
2/21/2022	Air India	AI8943	BLR	BOM	0	88	2/21/2022 8:50	2/21/2022 10:18	2/21/2022 10:00	2/21/2022 11:22	70	No	4060
2/22/2022	AirAsia India	I52627	JAI	DEL	0	43	2/22/2022 9:40	2/22/2022 10:23	2/22/2022 11:06	2/22/2022 11:49	86	No	2600
2/15/2022	Air India	AI3991	BLR	AMD	0	115	2/15/2022 18:30	2/15/2022 20:25	2/15/2022 18:55	2/15/2022 20:44	25	No	5780
2/19/2022	GoFirst	G87784	HYD	AMD	0	114	2/19/2022 22:15	2/20/2022 0:09	2/19/2022 22:40	2/20/2022 0:39	25	No	6750
2/25/2022	Air India	AI8741	CCU	AMD	0	118	2/25/2022 14:40	2/25/2022 16:38	2/25/2022 15:05	2/25/2022 17:06	25	No	5700
2/20/2022	Air India	AI6181	MAA	BLR	0	128	2/20/2022 6:45	2/20/2022 8:53	2/20/2022 7:30	2/20/2022 9:44	45	No	4780
2/17/2022	GoFirst	G82726	BOM	JAI	0	142	2/17/2022 14:05	2/17/2022 16:27	2/17/2022 14:05	2/17/2022 16:30	0	No	3630
2/24/2022	Vistara	UK7491	JAI	BLR	0	153	2/24/2022 7:15	2/24/2022 9:48	2/24/2022 8:36	2/24/2022 11:14	81	No	7160
2/15/2022	SpiceJet	SG6226	DEL	GOI	0	153	2/15/2022 17:50	2/15/2022 20:23	2/15/2022 17:50	2/15/2022 20:19	0	No	6760
2/23/2022	Air India	AI5321	GOI	BOM	0	58	2/23/2022 12:00	2/23/2022 12:58	2/23/2022 12:20	2/23/2022 13:11	20	No	3010
2/17/2022	IndiGo	6E7840	CCU	BLR	0	181	2/17/2022 6:20	2/17/2022 9:21	2/17/2022 6:25	2/17/2022 9:30	5	No	4590
2/15/2022	Air India	AI3633	AMD	DEL	0	107	2/15/2022 5:20	2/15/2022 7:07	2/15/2022 7:02	2/15/2022 8:38	102	No	3370
2/16/2022	Air India	AI2096	JAI	GOI	0	96	2/16/2022 14:15	2/16/2022 15:51	2/16/2022 14:31	2/16/2022 15:50	16	No	3770
2/15/2022	Air India	AI8882	GOI	AMD	0	135	2/15/2022 8:45	2/15/2022 11:00	2/15/2022 9:05	2/15/2022 10:58	20	No	3130
2/17/2022	AirAsia India	I55880	JAI	MAA	0	65	2/17/2022 14:40	2/17/2022 15:45	2/17/2022 16:03	2/17/2022 17:01	83	No	4150
2/16/2022	GoFirst	G88718	GOI	BLR	1	67	2/16/2022 21:30	2/16/2022 22:37				Yes	4890
2/23/2022	GoFirst	G86438	JAI	DEL	0	46	2/23/2022 20:00	2/23/2022 20:46	2/23/2022 20:07	2/23/2022 20:59	7	No	3210
2/22/2022	SpiceJet	SG4050	HYD	DEL	0	118	2/22/2022 7:30	2/22/2022 9:28	2/22/2022 7:40	2/22/2022 9:34	10	No	4860

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/17/2022	AirAsia India	I55646	BOM	CCU	1	113	2/17/2022 6:30	2/17/2022 8:23	2/17/2022 7:27	2/17/2022 9:19	57	No	8900
2/25/2022	AirAsia India	I57598	BLR	AMD	0	69	2/25/2022 10:10	2/25/2022 11:19	2/25/2022 10:10	2/25/2022 11:19	0	No	2800
2/18/2022	SpiceJet	SG5180	MAA	DEL	0	138	2/18/2022 6:30	2/18/2022 8:48	2/18/2022 6:55	2/18/2022 9:18	25	No	8260
2/25/2022	GoFirst	G83231	GOI	JAI	0	142	2/25/2022 13:00	2/25/2022 15:22	2/25/2022 13:00	2/25/2022 15:17	0	No	5330
2/20/2022	SpiceJet	SG7259	DEL	CCU	0	177	2/20/2022 8:30	2/20/2022 11:27	2/20/2022 8:40	2/20/2022 11:31	10	No	6470
2/22/2022	Vistara	UK8251	AMD	GOI	0	205	2/22/2022 10:45	2/22/2022 14:10	2/22/2022 11:05	2/22/2022 14:27	20	No	3890
2/24/2022	GoFirst	G89970	HYD	BOM	0	109	2/24/2022 7:40	2/24/2022 9:29	2/24/2022 7:40	2/24/2022 9:24	0	No	3550
2/21/2022	Air India	AI4943	JAI	HYD	0	104	2/21/2022 8:05	2/21/2022 9:49	2/21/2022 8:39	2/21/2022 10:20	34	No	4960
2/24/2022	Vistara	UK5876	GOI	BLR	0	56	2/24/2022 16:45	2/24/2022 17:41	2/24/2022 17:40	2/24/2022 18:45	55	No	6270
2/15/2022	Vistara	UK8506	HYD	DEL	0	170	2/15/2022 17:30	2/15/2022 20:20	2/15/2022 19:15	2/15/2022 21:59	105	No	5970
2/17/2022	AirAsia India	I52168	BLR	DEL	0	177	2/17/2022 19:00	2/17/2022 21:57	2/17/2022 19:15	2/17/2022 22:26	15	No	5690
2/22/2022	IndiGo	6E2613	MAA	CCU	0	149	2/22/2022 17:00	2/22/2022 19:29	2/22/2022 17:00	2/22/2022 19:25	0	No	6920
2/15/2022	Vistara	UK6621	CCU	AMD	0	111	2/15/2022 9:50	2/15/2022 11:41	2/15/2022 9:50	2/15/2022 11:50	0	No	4600
2/16/2022	AirAsia India	I58276	HYD	MAA	0	129	2/16/2022 5:10	2/16/2022 7:19				Yes	4370
2/16/2022	GoFirst	G87411	GOI	JAI	0	139	2/16/2022 13:20	2/16/2022 15:39	2/16/2022 13:35	2/16/2022 15:50	15	No	4000
2/18/2022	GoFirst	G81313	HYD	AMD	0	184	2/18/2022 8:10	2/18/2022 11:14	2/18/2022 9:15	2/18/2022 12:16	65	No	5190
2/21/2022	Air India	AI8982	AMD	BOM	0	96	2/21/2022 16:05	2/21/2022 17:41	2/21/2022 16:51	2/21/2022 18:27	46	No	4390
2/26/2022	SpiceJet	SG2375	BLR	CCU	0	81	2/26/2022 12:05	2/26/2022 13:26	2/26/2022 13:12	2/26/2022 14:41	67	No	6170
2/27/2022	Vistara	UK9138	DEL	CCU	1	165	2/27/2022 16:45	2/27/2022 19:30	2/27/2022 16:50	2/27/2022 19:33	5	No	5280
2/23/2022	Air India	AI6830	BOM	HYD	0	97	2/23/2022 20:50	2/23/2022 22:27	2/23/2022 22:02	2/23/2022 23:40	72	No	4470
2/21/2022	Vistara	UK7732	BOM	BLR	0	76	2/21/2022 7:45	2/21/2022 9:01	2/21/2022 9:17	2/21/2022 10:42	92	No	4460
2/17/2022	AirAsia India	I52214	JAI	CCU	1	156	2/17/2022 22:10	2/18/2022 0:46	2/18/2022 0:19	2/18/2022 2:59	129	No	4820
2/26/2022	GoFirst	G82797	DEL	BOM	0	166	2/26/2022 9:20	2/26/2022 12:06	2/26/2022 9:20	2/26/2022 12:04	0	No	8010
2/22/2022	Air India	AI1392	CCU	MAA	0	148	2/22/2022 21:20	2/22/2022 23:48	2/22/2022 21:25	2/22/2022 23:59	5	No	3620
2/17/2022	Air India	AI8334	JAI	HYD	0	71	2/17/2022 14:50	2/17/2022 16:01	2/17/2022 15:05	2/17/2022 16:16	15	No	4580
2/27/2022	Air India	AI844	BLR	CCU	0	58	2/27/2022 6:00	2/27/2022 6:58	2/27/2022 6:05	2/27/2022 7:03	5	No	8340
2/27/2022	GoFirst	G88259	HYD	MAA	1	129	2/27/2022 18:00	2/27/2022 20:09				Yes	3110
2/21/2022	AirAsia India	I56753	JAI	HYD	0	137	2/21/2022 20:15	2/21/2022 22:32	2/21/2022 21:13	2/21/2022 23:29	58	No	5510
2/17/2022	Vistara	UK8033	BOM	DEL	0	168	2/17/2022 19:40	2/17/2022 22:28	2/17/2022 19:40	2/17/2022 22:28	0	No	4470
2/17/2022	Vistara	UK5758	MAA	CCU	1	164	2/17/2022 15:30	2/17/2022 18:14	2/17/2022 16:25	2/17/2022 19:16	55	No	4330
2/27/2022	Air India	AI7742	CCU	JAI	0	107	2/27/2022 8:30	2/27/2022 10:17	2/27/2022 9:41	2/27/2022 11:23	71	No	4520
2/17/2022	SpiceJet	SG6393	AMD	MAA	0	78	2/17/2022 8:00	2/17/2022 9:18	2/17/2022 8:54	2/17/2022 10:21	54	No	7850
2/17/2022	GoFirst	G83210	GOI	MAA	0	56	2/17/2022 15:30	2/17/2022 16:26	2/17/2022 15:35	2/17/2022 16:31	5	No	3180
2/25/2022	Air India	AI479	AMD	JAI	0	125	2/25/2022 20:20	2/25/2022 22:25	2/25/2022 20:39	2/25/2022 22:44	19	No	4090
2/19/2022	Vistara	UK928	JAI	AMD	0	76	2/19/2022 11:30	2/19/2022 12:46	2/19/2022 11:30	2/19/2022 13:00	0	No	4410
2/27/2022	Vistara	UK2294	AMD	HYD	0	134	2/27/2022 5:05	2/27/2022 7:19	2/27/2022 5:10	2/27/2022 7:22	5	No	6120
2/22/2022	SpiceJet	SG9443	CCU	GOI	0	65	2/22/2022 6:40	2/22/2022 7:45	2/22/2022 6:40	2/22/2022 7:43	0	No	4920

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/21/2022	Air India	AI7478	CCU	JAI	1	89	2/21/2022 7:40	2/21/2022 9:09	2/21/2022 8:00	2/21/2022 9:31	20	No	5020
2/17/2022	GoFirst	G86214	HYD	BOM	0	113	2/17/2022 8:40	2/17/2022 10:33	2/17/2022 8:56	2/17/2022 10:50	16	No	4510
2/17/2022	SpiceJet	SG8293	JAI	CCU	0	111	2/17/2022 11:50	2/17/2022 13:41	2/17/2022 12:05	2/17/2022 13:56	15	No	2470
2/22/2022	IndiGo	6E7587	DEL	BLR	0	163	2/22/2022 20:50	2/22/2022 23:33	2/22/2022 20:50	2/22/2022 23:34	0	No	5250
2/21/2022	Air India	AI5002	JAI	BLR	1	95	2/21/2022 15:10	2/21/2022 16:45	2/21/2022 18:25	2/21/2022 19:46	195	No	5890
2/27/2022	SpiceJet	SG372	JAI	AMD	0	155	2/27/2022 14:45	2/27/2022 17:20	2/27/2022 14:55	2/27/2022 17:20	10	No	5190
2/21/2022	SpiceJet	SG4450	BOM	GOI	0	52	2/21/2022 5:45	2/21/2022 6:37				Yes	3810
2/25/2022	AirAsia India	I56329	MAA	DEL	0	166	2/25/2022 10:50	2/25/2022 13:36	2/25/2022 11:00	2/25/2022 13:53	10	No	6340
2/27/2022	Air India	AI410	MAA	DEL	0	165	2/27/2022 8:15	2/27/2022 11:00	2/27/2022 8:15	2/27/2022 11:02	0	No	6200
2/17/2022	Vistara	UK8321	CCU	GOI	0	107	2/17/2022 18:15	2/17/2022 20:02	2/17/2022 21:03	2/17/2022 22:50	168	No	7320
2/17/2022	GoFirst	G89289	AMD	DEL	0	78	2/17/2022 21:15	2/17/2022 22:33	2/17/2022 21:35	2/17/2022 22:47	20	No	5460
2/23/2022	SpiceJet	SG8834	AMD	JAI	0	106	2/23/2022 15:10	2/23/2022 16:56	2/23/2022 17:27	2/23/2022 19:11	137	No	4810
2/25/2022	GoFirst	G89243	CCU	HYD	0	86	2/25/2022 11:15	2/25/2022 12:41	2/25/2022 12:31	2/25/2022 13:58	76	No	5300
2/25/2022	Air India	AI5814	HYD	MAA	0	141	2/25/2022 15:45	2/25/2022 18:06	2/25/2022 16:10	2/25/2022 18:27	25	No	6660
2/27/2022	GoFirst	G86564	HYD	BOM	0	103	2/27/2022 22:40	2/28/2022 0:23	2/27/2022 22:50	2/28/2022 0:37	10	No	5750
2/15/2022	SpiceJet	SG5774	BLR	HYD	0	79	2/15/2022 14:05	2/15/2022 15:24	2/15/2022 14:25	2/15/2022 15:38	20	No	3420
2/19/2022	Vistara	UK9308	HYD	AMD	0	85	2/19/2022 11:50	2/19/2022 13:15	2/19/2022 12:15	2/19/2022 13:38	25	No	6490
2/19/2022	SpiceJet	SG8800	BLR	BOM	0	77	2/19/2022 12:00	2/19/2022 13:17	2/19/2022 12:10	2/19/2022 13:19	10	No	4750
2/16/2022	Air India	AI7839	MAA	DEL	0	157	2/16/2022 18:30	2/16/2022 21:07	2/16/2022 18:50	2/16/2022 21:32	20	No	6820
2/27/2022	IndiGo	6E7893	BLR	DEL	0	138	2/27/2022 10:40	2/27/2022 12:58	2/27/2022 10:40	2/27/2022 13:03	0	No	9220
2/21/2022	Vistara	UK1565	MAA	HYD	0	128	2/21/2022 14:00	2/21/2022 16:08	2/21/2022 14:15	2/21/2022 16:20	15	No	5410
2/14/2022	AirAsia India	I52980	MAA	JAI	0	173	2/14/2022 10:40	2/14/2022 13:33	2/14/2022 11:21	2/14/2022 14:20	41	No	6190
2/18/2022	IndiGo	6E4988	GOI	AMD	0	56	2/18/2022 14:00	2/18/2022 14:56	2/18/2022 14:15	2/18/2022 15:12	15	No	5580
2/20/2022	GoFirst	G88192	BOM	CCU	0	123	2/20/2022 19:50	2/20/2022 21:53	2/20/2022 19:50	2/20/2022 21:47	0	No	6820
2/20/2022	Air India	AI2762	JAI	AMD	1	110	2/20/2022 11:05	2/20/2022 12:55	2/20/2022 11:10	2/20/2022 12:55	5	No	3710
2/14/2022	Vistara	UK9402	HYD	BLR	0	88	2/14/2022 15:20	2/14/2022 16:48	2/14/2022 15:30	2/14/2022 17:05	10	No	3620
2/23/2022	AirAsia India	I55472	MAA	BLR	0	124	2/23/2022 18:50	2/23/2022 20:54	2/23/2022 19:24	2/23/2022 21:26	34	No	4240
2/18/2022	IndiGo	6E5401	GOI	BOM	0	57	2/18/2022 9:45	2/18/2022 10:42	2/18/2022 9:45	2/18/2022 10:38	0	No	3670
2/23/2022	Air India	AI4474	DEL	HYD	1	138	2/23/2022 12:45	2/23/2022 15:03	2/23/2022 13:44	2/23/2022 16:11	59	No	4940
2/20/2022	SpiceJet	SG1117	HYD	DEL	0	152	2/20/2022 16:15	2/20/2022 18:47	2/20/2022 16:32	2/20/2022 19:05	17	No	5530
2/21/2022	AirAsia India	I58333	BOM	AMD	0	132	2/21/2022 10:40	2/21/2022 12:52	2/21/2022 10:42	2/21/2022 12:47	2	No	5520
2/21/2022	AirAsia India	I53690	HYD	BOM	0	66	2/21/2022 16:15	2/21/2022 17:21	2/21/2022 17:37	2/21/2022 18:50	82	No	4380
2/25/2022	Air India	AI9098	AMD	BLR	1	128	2/25/2022 16:40	2/25/2022 18:48	2/25/2022 16:40	2/25/2022 18:56	0	No	7200
2/20/2022	Vistara	UK8753	JAI	MAA	0	107	2/20/2022 7:50	2/20/2022 9:37	2/20/2022 7:50	2/20/2022 9:44	0	No	5920
2/27/2022	SpiceJet	SG9483	BOM	DEL	0	173	2/27/2022 21:15	2/28/2022 0:08	2/27/2022 21:48	2/28/2022 0:29	33	No	5720
2/26/2022	GoFirst	G83465	BLR	CCU	0	136	2/26/2022 19:05	2/26/2022 21:21	2/26/2022 21:02	2/26/2022 23:35	117	No	4480
2/26/2022	GoFirst	G82261	AMD	BOM	1	113	2/26/2022 19:00	2/26/2022 20:53	2/26/2022 19:23	2/26/2022 21:23	23	No	4670

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/27/2022	Vistara	UK456	AMD	DEL	0	102	2/27/2022 19:20	2/27/2022 21:02	2/27/2022 19:57	2/27/2022 21:40	37	No	4660
2/19/2022	Vistara	UK7041	HYD	DEL	0	117	2/19/2022 7:00	2/19/2022 8:57	2/19/2022 8:37	2/19/2022 10:34	97	No	6560
2/15/2022	SpiceJet	SG4803	BOM	JAI	0	47	2/15/2022 7:45	2/15/2022 8:32				Yes	4390
2/23/2022	Air India	AI6284	BLR	GOI	0	180	2/23/2022 17:45	2/23/2022 20:45	2/23/2022 18:22	2/23/2022 21:22	37	No	4370
2/22/2022	IndiGo	6E6539	JAI	BLR	0	159	2/22/2022 8:10	2/22/2022 10:49	2/22/2022 8:10	2/22/2022 10:39	0	No	5210
2/14/2022	Air India	AI9020	MAA	DEL	0	190	2/14/2022 14:45	2/14/2022 17:55	2/14/2022 15:49	2/14/2022 19:02	64	No	6340
2/19/2022	Vistara	UK2641	JAI	GOI	0	85	2/19/2022 12:45	2/19/2022 14:10	2/19/2022 13:10	2/19/2022 14:39	25	No	4780
2/24/2022	Air India	AI3476	BOM	DEL	0	161	2/24/2022 5:15	2/24/2022 7:56	2/24/2022 5:19	2/24/2022 8:11	4	No	5340
2/24/2022	IndiGo	6E824	BOM	DEL	1	188	2/24/2022 6:15	2/24/2022 9:23	2/24/2022 7:35	2/24/2022 10:43	80	No	6290
2/27/2022	Vistara	UK8355	AMD	MAA	1	90	2/27/2022 11:00	2/27/2022 12:30	2/27/2022 11:20	2/27/2022 12:46	20	No	2830
2/21/2022	Air India	AI6875	CCU	MAA	0	105	2/21/2022 9:50	2/21/2022 11:35	2/21/2022 9:50	2/21/2022 11:29	0	No	4710
2/18/2022	SpiceJet	SG8220	DEL	JAI	0	37	2/18/2022 18:50	2/18/2022 19:27	2/18/2022 18:55	2/18/2022 19:47	5	No	3510
2/26/2022	IndiGo	6E2544	CCU	GOI	0	110	2/26/2022 15:40	2/26/2022 17:30	2/26/2022 16:07	2/26/2022 18:09	27	No	3720
2/25/2022	Vistara	UK2465	BLR	JAI	2	86	2/25/2022 12:15	2/25/2022 13:41	2/25/2022 12:15	2/25/2022 13:30	0	No	3500
2/24/2022	Vistara	UK8783	DEL	JAI	0	47	2/24/2022 18:50	2/24/2022 19:37	2/24/2022 19:47	2/24/2022 20:42	57	No	3490
2/20/2022	Air India	AI1395	GOI	MAA	0	61	2/20/2022 11:30	2/20/2022 12:31	2/20/2022 11:40	2/20/2022 12:28	10	No	4520
2/27/2022	Vistara	UK6279	CCU	BOM	0	88	2/27/2022 11:00	2/27/2022 12:28	2/27/2022 12:00	2/27/2022 13:20	60	No	6700
2/18/2022	GoFirst	G87954	DEL	BOM	0	134	2/18/2022 22:15	2/19/2022 0:29	2/18/2022 22:15	2/19/2022 0:24	0	No	5640
2/14/2022	Air India	AI2022	CCU	HYD	0	147	2/14/2022 11:15	2/14/2022 13:42	2/14/2022 11:42	2/14/2022 14:20	27	No	5670
2/19/2022	Vistara	UK4737	MAA	GOI	1	61	2/19/2022 22:30	2/19/2022 23:31	2/19/2022 22:50	2/19/2022 23:38	20	No	3040
2/22/2022	Vistara	UK8501	AMD	JAI	0	118	2/22/2022 14:20	2/22/2022 16:18	2/22/2022 15:06	2/22/2022 17:04	46	No	8480
2/25/2022	Vistara	UK5226	AMD	BOM	0	117	2/25/2022 15:15	2/25/2022 17:12	2/25/2022 15:25	2/25/2022 17:22	10	No	4290
2/14/2022	IndiGo	6E9668	MAA	BLR	0	113	2/14/2022 13:50	2/14/2022 15:43	2/14/2022 14:26	2/14/2022 16:16	36	No	3890
2/17/2022	GoFirst	G86323	GOI	HYD	0	68	2/17/2022 11:30	2/17/2022 12:38				Yes	5590
2/22/2022	Air India	AI8137	AMD	JAI	0	146	2/22/2022 13:45	2/22/2022 16:11	2/22/2022 14:14	2/22/2022 16:38	29	No	7170
2/17/2022	Air India	AI8982	CCU	BLR	0	102	2/17/2022 22:45	2/18/2022 0:27	2/17/2022 23:10	2/18/2022 0:51	25	No	5810
2/15/2022	IndiGo	6E6856	JAI	DEL	0	48	2/15/2022 6:00	2/15/2022 6:48	2/15/2022 6:25	2/15/2022 7:21	25	No	3860
2/17/2022	Air India	AI8385	MAA	BOM	0	100	2/17/2022 5:15	2/17/2022 6:55	2/17/2022 5:19	2/17/2022 7:04	4	No	3990
2/25/2022	Vistara	UK208	CCU	DEL	0	148	2/25/2022 20:00	2/25/2022 22:28	2/25/2022 20:15	2/25/2022 22:52	15	No	4870
2/14/2022	GoFirst	G84601	JAI	GOI	0	140	2/14/2022 5:50	2/14/2022 8:10	2/14/2022 6:15	2/14/2022 8:31	25	No	6480
2/24/2022	SpiceJet	SG1678	DEL	JAI	0	39	2/24/2022 10:05	2/24/2022 10:44	2/24/2022 11:05	2/24/2022 11:44	60	No	2650
2/18/2022	GoFirst	G85907	BLR	MAA	0	144	2/18/2022 21:20	2/18/2022 23:44	2/18/2022 21:20	2/18/2022 23:52	0	No	5730
2/23/2022	SpiceJet	SG9356	GOI	BOM	0	51	2/23/2022 17:45	2/23/2022 18:36	2/23/2022 17:45	2/23/2022 18:30	0	No	3350
2/15/2022	Air India	AI6740	MAA	HYD	0	128	2/15/2022 6:05	2/15/2022 8:13	2/15/2022 6:05	2/15/2022 8:07	0	No	7240
2/25/2022	Vistara	UK2907	GOI	JAI	0	113	2/25/2022 6:00	2/25/2022 7:53	2/25/2022 6:11	2/25/2022 7:57	11	No	4610
2/27/2022	Vistara	UK797	GOI	CCU	0	192	2/27/2022 8:50	2/27/2022 12:02	2/27/2022 8:50	2/27/2022 12:02	0	No	4610
2/15/2022	Air India	AI8997	AMD	HYD	0	190	2/15/2022 7:20	2/15/2022 10:30	2/15/2022 7:45	2/15/2022 10:48	25	No	5300

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/21/2022	AirAsia India	I59717	DEL	BLR	0	158	2/21/2022 5:15	2/21/2022 7:53	2/21/2022 5:35	2/21/2022 8:13	20	No	6730
2/21/2022	Air India	AI9384	GOI	BOM	1	59	2/21/2022 10:15	2/21/2022 11:14	2/21/2022 11:10	2/21/2022 12:17	55	No	2200
2/23/2022	Vistara	UK5766	JAI	CCU	0	131	2/23/2022 9:05	2/23/2022 11:16	2/23/2022 9:30	2/23/2022 11:31	25	No	3180
2/15/2022	IndiGo	6E5447	GOI	MAA	0	65	2/15/2022 15:40	2/15/2022 16:45	2/15/2022 15:55	2/15/2022 17:06	15	No	3410
2/25/2022	IndiGo	6E6250	HYD	AMD	0	132	2/25/2022 12:30	2/25/2022 14:42	2/25/2022 12:35	2/25/2022 14:53	5	No	5660
2/21/2022	Air India	AI1444	GOI	BOM	0	53	2/21/2022 12:05	2/21/2022 12:58	2/21/2022 12:10	2/21/2022 13:06	5	No	3210
2/17/2022	SpiceJet	SG1845	BLR	GOI	0	101	2/17/2022 17:30	2/17/2022 19:11	2/17/2022 17:50	2/17/2022 19:31	20	No	3350
2/22/2022	IndiGo	6E1530	HYD	AMD	0	68	2/22/2022 13:05	2/22/2022 14:13	2/22/2022 13:05	2/22/2022 14:18	0	No	3800
2/27/2022	Vistara	UK530	AMD	JAI	0	74	2/27/2022 21:40	2/27/2022 22:54	2/27/2022 21:45	2/27/2022 23:00	5	No	3230
2/21/2022	SpiceJet	SG6879	JAI	BOM	0	87	2/21/2022 17:00	2/21/2022 18:27	2/21/2022 18:03	2/21/2022 19:26	63	No	3750
2/27/2022	IndiGo	6E6337	JAI	MAA	0	147	2/27/2022 21:10	2/27/2022 23:37				Yes	5280
2/17/2022	Air India	AI4621	HYD	AMD	1	116	2/17/2022 7:10	2/17/2022 9:06	2/17/2022 7:43	2/17/2022 9:51	33	No	4050
2/22/2022	SpiceJet	SG8223	AMD	BOM	0	140	2/22/2022 13:15	2/22/2022 15:35	2/22/2022 13:35	2/22/2022 15:55	20	No	4480
2/16/2022	GoFirst	G86583	MAA	AMD	0	71	2/16/2022 9:20	2/16/2022 10:31	2/16/2022 9:40	2/16/2022 10:47	20	No	3780
2/24/2022	GoFirst	G89838	GOI	CCU	0	154	2/24/2022 15:40	2/24/2022 18:14	2/24/2022 15:40	2/24/2022 18:23	0	No	5400
2/25/2022	SpiceJet	SG5328	CCU	MAA	2	89	2/25/2022 15:10	2/25/2022 16:39	2/25/2022 15:10	2/25/2022 16:33	0	No	5160
2/21/2022	AirAsia India	I56537	AMD	MAA	1	175	2/21/2022 17:20	2/21/2022 20:15	2/21/2022 18:34	2/21/2022 21:29	74	No	4460
2/18/2022	IndiGo	6E7663	MAA	JAI	0	169	2/18/2022 22:00	2/19/2022 0:49	2/18/2022 22:37	2/19/2022 1:30	37	No	6510
2/21/2022	AirAsia India	I58280	MAA	AMD	0	182	2/21/2022 7:40	2/21/2022 10:42	2/21/2022 8:53	2/21/2022 12:02	73	No	4600
2/20/2022	AirAsia India	I56276	HYD	MAA	0	124	2/20/2022 9:40	2/20/2022 11:44	2/20/2022 10:00	2/20/2022 12:13	20	No	5370
2/26/2022	IndiGo	6E702	AMD	GOI	0	90	2/26/2022 21:40	2/26/2022 23:10	2/26/2022 21:55	2/26/2022 23:18	15	No	6070
2/16/2022	SpiceJet	SG825	JAI	BOM	0	86	2/16/2022 12:30	2/16/2022 13:56	2/16/2022 12:30	2/16/2022 13:56	0	No	2860
2/24/2022	AirAsia India	I54339	GOI	CCU	0	71	2/24/2022 8:00	2/24/2022 9:11	2/24/2022 8:00	2/24/2022 9:04	0	No	5980
2/24/2022	GoFirst	G89743	JAI	MAA	2	128	2/24/2022 16:40	2/24/2022 18:48	2/24/2022 17:00	2/24/2022 18:59	20	No	8330
2/14/2022	GoFirst	G86915	BLR	CCU	0	102	2/14/2022 20:05	2/14/2022 21:47	2/14/2022 20:30	2/14/2022 22:03	25	No	8450
2/22/2022	IndiGo	6E7560	BOM	BLR	0	90	2/22/2022 14:30	2/22/2022 16:00	2/22/2022 14:30	2/22/2022 15:57	0	No	4160
2/22/2022	Air India	AI7512	JAI	AMD	0	111	2/22/2022 20:05	2/22/2022 21:56	2/22/2022 21:07	2/22/2022 22:53	62	No	3310
2/16/2022	IndiGo	6E1891	HYD	DEL	1	133	2/16/2022 5:30	2/16/2022 7:43				Yes	5680
2/26/2022	AirAsia India	I52723	BLR	MAA	0	154	2/26/2022 10:50	2/26/2022 13:24	2/26/2022 11:05	2/26/2022 13:34	15	No	7870
2/25/2022	SpiceJet	SG3122	JAI	GOI	0	126	2/25/2022 12:40	2/25/2022 14:46				Yes	4790
2/18/2022	AirAsia India	I56470	GOI	DEL	0	155	2/18/2022 19:40	2/18/2022 22:15	2/18/2022 20:00	2/18/2022 22:25	20	No	5730
2/15/2022	IndiGo	6E3163	MAA	HYD	0	134	2/15/2022 8:50	2/15/2022 11:04	2/15/2022 9:22	2/15/2022 11:32	32	No	5010
2/25/2022	SpiceJet	SG8119	CCU	MAA	0	146	2/25/2022 8:20	2/25/2022 10:46	2/25/2022 8:51	2/25/2022 11:06	31	No	5400
2/23/2022	AirAsia India	I57601	CCU	GOI	0	100	2/23/2022 8:30	2/23/2022 10:10				Yes	4650
2/17/2022	Air India	AI4008	HYD	BOM	0	82	2/17/2022 15:05	2/17/2022 16:27	2/17/2022 15:05	2/17/2022 16:25	0	No	4600
2/23/2022	SpiceJet	SG6464	BOM	BLR	2	102	2/23/2022 9:50	2/23/2022 11:32				Yes	6840
2/24/2022	Vistara	UK8904	BLR	GOI	0	157	2/24/2022 10:45	2/24/2022 13:22	2/24/2022 10:50	2/24/2022 13:29	5	No	6340

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/18/2022	AirAsia India	I53165	BLR	JAI	2	81	2/18/2022 20:20	2/18/2022 21:41	2/18/2022 20:20	2/18/2022 21:39	0	No	3760
2/14/2022	Vistara	UK3296	DEL	CCU	0	183	2/14/2022 20:10	2/14/2022 23:13	2/14/2022 20:35	2/14/2022 23:45	25	No	7140
2/23/2022	Vistara	UK7372	JAI	AMD	0	162	2/23/2022 20:40	2/23/2022 23:22	2/23/2022 20:45	2/23/2022 23:33	5	No	4870
2/19/2022	Air India	AI4603	BOM	DEL	0	143	2/19/2022 14:00	2/19/2022 16:23	2/19/2022 14:20	2/19/2022 16:48	20	No	7780
2/18/2022	Air India	AI8469	JAI	HYD	0	136	2/18/2022 19:45	2/18/2022 22:01				Yes	4590
2/27/2022	GoFirst	G8781	BOM	HYD	0	82	2/27/2022 16:50	2/27/2022 18:12	2/27/2022 17:25	2/27/2022 18:48	35	No	5830
2/19/2022	AirAsia India	I54155	AMD	JAI	0	158	2/19/2022 18:05	2/19/2022 20:43	2/19/2022 19:12	2/19/2022 21:53	67	No	4300
2/22/2022	IndiGo	6E2023	AMD	HYD	0	188	2/22/2022 7:45	2/22/2022 10:53	2/22/2022 7:55	2/22/2022 10:58	10	No	7070
2/24/2022	Air India	AI3485	MAA	CCU	0	158	2/24/2022 10:10	2/24/2022 12:48				Yes	4830
2/26/2022	Air India	AI2858	DEL	CCU	0	149	2/26/2022 13:50	2/26/2022 16:19	2/26/2022 15:11	2/26/2022 17:35	81	No	4950
2/16/2022	SpiceJet	SG1071	HYD	JAI	0	176	2/16/2022 9:40	2/16/2022 12:36	2/16/2022 9:45	2/16/2022 12:50	5	No	2550
2/17/2022	AirAsia India	I56534	BLR	MAA	0	120	2/17/2022 15:15	2/17/2022 17:15	2/17/2022 15:40	2/17/2022 17:48	25	No	4940
2/24/2022	Vistara	UK1337	BLR	HYD	0	66	2/24/2022 17:45	2/24/2022 18:51	2/24/2022 18:00	2/24/2022 19:07	15	No	3530
2/26/2022	AirAsia India	I57549	BOM	GOI	0	53	2/26/2022 13:30	2/26/2022 14:23				Yes	2680
2/16/2022	Vistara	UK1137	CCU	DEL	0	146	2/16/2022 19:30	2/16/2022 21:56				Yes	4840
2/24/2022	GoFirst	G84499	GOI	MAA	0	64	2/24/2022 11:45	2/24/2022 12:49				Yes	3290
2/27/2022	SpiceJet	SG5731	HYD	CCU	0	138	2/27/2022 9:45	2/27/2022 12:03	2/27/2022 9:45	2/27/2022 11:59	0	No	7280
2/25/2022	AirAsia India	I52688	DEL	BOM	1	115	2/25/2022 5:05	2/25/2022 7:00	2/25/2022 5:30	2/25/2022 7:23	25	No	4680
2/24/2022	Vistara	UK5045	AMD	DEL	0	104	2/24/2022 11:10	2/24/2022 12:54	2/24/2022 12:19	2/24/2022 14:01	69	No	5010
2/22/2022	Air India	AI6192	HYD	BOM	0	106	2/22/2022 13:05	2/22/2022 14:51	2/22/2022 13:50	2/22/2022 15:36	45	No	4280
2/23/2022	AirAsia India	I57132	BLR	DEL	0	123	2/23/2022 14:15	2/23/2022 16:18	2/23/2022 14:35	2/23/2022 16:44	20	No	6200
2/19/2022	AirAsia India	I52274	BOM	DEL	0	171	2/19/2022 20:05	2/19/2022 22:56				Yes	5790
2/24/2022	GoFirst	G85729	MAA	JAI	1	157	2/24/2022 5:00	2/24/2022 7:37	2/24/2022 5:54	2/24/2022 8:24	54	No	5440
2/25/2022	IndiGo	6E1563	GOI	BLR	0	118	2/25/2022 7:15	2/25/2022 9:13	2/25/2022 7:50	2/25/2022 9:51	35	No	4950
2/22/2022	IndiGo	6E2281	BOM	CCU	0	86	2/22/2022 14:10	2/22/2022 15:36	2/22/2022 14:10	2/22/2022 15:37	0	No	5910
2/26/2022	AirAsia India	I57310	BLR	BOM	0	69	2/26/2022 5:10	2/26/2022 6:19	2/26/2022 5:10	2/26/2022 6:19	0	No	5420
2/23/2022	SpiceJet	SG1520	MAA	BLR	0	121	2/23/2022 19:15	2/23/2022 21:16	2/23/2022 19:35	2/23/2022 21:28	20	No	5890
2/23/2022	IndiGo	6E5252	BLR	BOM	0	85	2/23/2022 16:40	2/23/2022 18:05	2/23/2022 16:45	2/23/2022 18:15	5	No	4360
2/16/2022	Air India	AI9946	MAA	HYD	1	102	2/16/2022 12:50	2/16/2022 14:32	2/16/2022 13:57	2/16/2022 15:54	67	No	5240
2/21/2022	GoFirst	G88448	HYD	DEL	0	158	2/21/2022 11:50	2/21/2022 14:28	2/21/2022 12:05	2/21/2022 14:43	15	No	6490
2/15/2022	Air India	AI1947	GOI	HYD	0	103	2/15/2022 12:45	2/15/2022 14:28	2/15/2022 12:55	2/15/2022 14:38	10	No	6140
2/14/2022	Vistara	UK6437	BOM	JAI	1	66	2/14/2022 16:30	2/14/2022 17:36	2/14/2022 17:31	2/14/2022 18:39	61	No	6750
2/27/2022	GoFirst	G81295	GOI	CCU	0	195	2/27/2022 10:45	2/27/2022 14:00	2/27/2022 11:15	2/27/2022 14:26	30	No	2600
2/20/2022	GoFirst	G81090	BOM	DEL	0	142	2/20/2022 11:00	2/20/2022 13:22	2/20/2022 11:00	2/20/2022 13:13	0	No	4640
2/26/2022	Vistara	UK6690	JAI	HYD	0	126	2/26/2022 18:40	2/26/2022 20:46	2/26/2022 19:17	2/26/2022 21:29	37	No	4980
2/20/2022	AirAsia India	I58477	JAI	BLR	1	68	2/20/2022 7:20	2/20/2022 8:28	2/20/2022 7:37	2/20/2022 8:43	17	No	7370
2/17/2022	Air India	AI9708	DEL	BOM	0	155	2/17/2022 22:30	2/18/2022 1:05	2/17/2022 22:45	2/18/2022 1:27	15	No	7310

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/15/2022	AirAsia India	I51048	DEL	BOM	0	117	2/15/2022 14:45	2/15/2022 16:42	2/15/2022 15:45	2/15/2022 17:44	60	No	6870
2/16/2022	Air India	AI1001	DEL	BOM	0	135	2/16/2022 18:00	2/16/2022 20:15	2/16/2022 18:00	2/16/2022 20:24	0	No	7560
2/18/2022	SpiceJet	SG285	DEL	BOM	0	113	2/18/2022 8:00	2/18/2022 9:53	2/18/2022 8:00	2/18/2022 9:52	0	No	5300
2/26/2022	Air India	AI6192	DEL	BOM	0	153	2/26/2022 16:30	2/26/2022 19:03	2/26/2022 17:00	2/26/2022 19:33	30	No	4620
2/20/2022	Air India	AI7134	DEL	BOM	0	158	2/20/2022 8:00	2/20/2022 10:38	2/20/2022 8:00	2/20/2022 10:43	0	No	6710
2/26/2022	SpiceJet	SG8228	DEL	BOM	0	160	2/26/2022 7:30	2/26/2022 10:10	2/26/2022 7:50	2/26/2022 10:27	20	No	5750
2/26/2022	Vistara	UK9387	DEL	BOM	0	142	2/26/2022 16:00	2/26/2022 18:22	2/26/2022 16:10	2/26/2022 18:42	10	No	4880
2/22/2022	Air India	AI9502	DEL	BOM	0	154	2/22/2022 10:30	2/22/2022 13:04	2/22/2022 10:45	2/22/2022 13:17	15	No	5800
2/16/2022	AirAsia India	I5301	DEL	BOM	0	153	2/16/2022 12:00	2/16/2022 14:33	2/16/2022 12:00	2/16/2022 14:29	0	No	4740
2/15/2022	Air India	AI2558	DEL	BOM	0	135	2/15/2022 20:30	2/15/2022 22:45	2/15/2022 20:50	2/15/2022 23:12	20	No	5470
2/14/2022	Air India	AI5372	DEL	BOM	0	131	2/14/2022 22:45	2/15/2022 0:56	2/14/2022 22:45	2/15/2022 0:58	0	No	4760
2/24/2022	Air India	AI9464	DEL	BOM	0	136	2/24/2022 15:30	2/24/2022 17:46	2/24/2022 15:45	2/24/2022 17:58	15	No	5030
2/16/2022	SpiceJet	SG3756	DEL	BOM	0	178	2/16/2022 21:00	2/16/2022 23:58	2/16/2022 21:00	2/16/2022 23:58	0	No	5390
2/15/2022	GoFirst	G84725	DEL	BOM	0	151	2/15/2022 17:00	2/15/2022 19:31	2/15/2022 17:00	2/15/2022 19:40	0	No	5900
2/21/2022	SpiceJet	SG6144	DEL	BLR	0	168	2/21/2022 7:45	2/21/2022 10:33	2/21/2022 8:25	2/21/2022 11:08	40	No	4710
2/21/2022	Air India	AI6133	DEL	BLR	0	158	2/21/2022 14:15	2/21/2022 16:53	2/21/2022 14:30	2/21/2022 17:17	15	No	5260
2/25/2022	GoFirst	G8204	DEL	BLR	0	158	2/25/2022 11:15	2/25/2022 13:53	2/25/2022 11:25	2/25/2022 14:02	10	No	5340
2/14/2022	Vistara	UK5588	DEL	BLR	0	185	2/14/2022 12:30	2/14/2022 15:35	2/14/2022 13:10	2/14/2022 16:10	40	No	6050
2/23/2022	IndiGo	6E8780	DEL	BLR	0	152	2/23/2022 14:00	2/23/2022 16:32	2/23/2022 14:05	2/23/2022 16:38	5	No	4950
2/24/2022	Air India	AI4684	DEL	BLR	0	123	2/24/2022 20:00	2/24/2022 22:03	2/24/2022 20:30	2/24/2022 22:32	30	No	7220
2/15/2022	IndiGo	6E7611	DEL	BLR	0	188	2/15/2022 12:45	2/15/2022 15:53	2/15/2022 13:15	2/15/2022 16:29	30	No	4850
2/16/2022	AirAsia India	I51326	DEL	BLR	0	133	2/16/2022 8:15	2/16/2022 10:28	2/16/2022 8:30	2/16/2022 10:50	15	No	6300
2/27/2022	GoFirst	G83979	DEL	BLR	0	185	2/27/2022 6:45	2/27/2022 9:50	2/27/2022 6:45	2/27/2022 9:49	0	No	6210
2/20/2022	SpiceJet	SG5311	DEL	BLR	0	152	2/20/2022 15:45	2/20/2022 18:17	2/20/2022 16:05	2/20/2022 18:42	20	No	6970
2/20/2022	Vistara	UK2330	DEL	BLR	0	146	2/20/2022 12:00	2/20/2022 14:26	2/20/2022 12:05	2/20/2022 14:32	5	No	3640
2/16/2022	GoFirst	G87465	DEL	BLR	0	153	2/16/2022 9:00	2/16/2022 11:33	2/16/2022 9:05	2/16/2022 11:38	5	No	7340
2/21/2022	Vistara	UK3501	DEL	BLR	0	165	2/21/2022 18:00	2/21/2022 20:45	2/21/2022 18:00	2/21/2022 20:51	0	No	5040
2/21/2022	Vistara	UK1581	DEL	BLR	0	170	2/21/2022 19:30	2/21/2022 22:20	2/21/2022 20:00	2/21/2022 22:48	30	No	5030
2/21/2022	Air India	AI2530	DEL	BLR	0	164	2/21/2022 6:15	2/21/2022 8:59	2/21/2022 6:30	2/21/2022 9:19	15	No	5860
2/20/2022	IndiGo	6E4996	BOM	BLR	0	84	2/20/2022 16:45	2/20/2022 18:09	2/20/2022 17:45	2/20/2022 19:05	60	No	4150
2/18/2022	SpiceJet	SG9208	BOM	BLR	0	89	2/18/2022 5:45	2/18/2022 7:14	2/18/2022 5:50	2/18/2022 7:28	5	No	4090
2/27/2022	AirAsia India	I51769	BOM	BLR	0	95	2/27/2022 12:00	2/27/2022 13:35	2/27/2022 12:10	2/27/2022 13:54	10	No	5010
2/16/2022	Air India	AI2241	BOM	BLR	0	83	2/16/2022 5:00	2/16/2022 6:23	2/16/2022 5:30	2/16/2022 6:55	30	No	3310
2/23/2022	Air India	AI1328	BOM	BLR	0	91	2/23/2022 16:00	2/23/2022 17:31	2/23/2022 16:00	2/23/2022 17:34	0	No	3500
2/15/2022	IndiGo	6E1606	BOM	BLR	0	88	2/15/2022 11:45	2/15/2022 13:13	2/15/2022 12:00	2/15/2022 13:27	15	No	3070
2/16/2022	SpiceJet	SG2852	BOM	BLR	0	76	2/16/2022 6:45	2/16/2022 8:01	2/16/2022 6:55	2/16/2022 8:07	10	No	3820
2/24/2022	GoFirst	G86370	BOM	BLR	0	103	2/24/2022 17:45	2/24/2022 19:28	2/24/2022 17:55	2/24/2022 19:33	10	No	4520

Date	Airline	Flight Number	Origin	Destination	Stops	Duration Mins	Scheduled Departure	Scheduled Arrival	Actual Departure	Actual Arrival	Delay Mins	Cancelled	PriceINR
2/24/2022	AirAsia India	I53166	BOM	BLR	0	92	2/24/2022 10:30	2/24/2022 12:02	2/24/2022 10:45	2/24/2022 12:18	15	No	5730
2/20/2022	SpiceJet	SG4126	BOM	BLR	0	88	2/20/2022 19:15	2/20/2022 20:43	2/20/2022 19:35	2/20/2022 20:59	20	No	4190
2/21/2022	AirAsia India	I51099	BOM	BLR	0	102	2/21/2022 20:45	2/21/2022 22:27	2/21/2022 21:05	2/21/2022 22:57	20	No	3950
2/20/2022	IndiGo	6E3367	BOM	BLR	0	106	2/20/2022 17:15	2/20/2022 19:01	2/20/2022 17:15	2/20/2022 19:09	0	No	3600
2/26/2022	AirAsia India	I55983	BOM	BLR	0	110	2/26/2022 12:00	2/26/2022 13:50	2/26/2022 12:10	2/26/2022 14:07	10	No	4340
2/27/2022	Vistara	UK6463	BOM	BLR	0	108	2/27/2022 20:30	2/27/2022 22:18	2/27/2022 20:45	2/27/2022 22:38	15	No	5550
2/18/2022	SpiceJet	SG580	BOM	BLR	0	88	2/18/2022 5:30	2/18/2022 6:58	2/18/2022 5:30	2/18/2022 7:00	0	No	6620
2/15/2022	SpiceJet	SG2715	MAA	BLR	0	130	2/15/2022 20:30	2/15/2022 22:40	2/15/2022 20:45	2/15/2022 22:57	15	No	4410
2/20/2022	IndiGo	6E3694	MAA	BLR	0	168	2/20/2022 12:30	2/20/2022 15:18	2/20/2022 12:30	2/20/2022 15:14	0	No	4100
2/23/2022	GoFirst	G83975	MAA	BLR	0	143	2/23/2022 16:15	2/23/2022 18:38	2/23/2022 16:25	2/23/2022 18:48	10	No	6160
2/21/2022	GoFirst	G89400	MAA	BLR	0	156	2/21/2022 16:00	2/21/2022 18:36	2/21/2022 16:00	2/21/2022 18:42	0	No	6070
2/17/2022	GoFirst	G82976	MAA	BLR	0	122	2/17/2022 11:45	2/17/2022 13:47	2/17/2022 12:25	2/17/2022 14:31	40	No	4140
2/14/2022	Vistara	UK9957	MAA	BLR	0	142	2/14/2022 7:00	2/14/2022 9:22	2/14/2022 7:20	2/14/2022 9:44	20	No	4970
2/14/2022	Air India	AI5535	MAA	BLR	0	111	2/14/2022 21:45	2/14/2022 23:36	2/14/2022 22:25	2/15/2022 0:11	40	No	6100
2/18/2022	GoFirst	G85401	MAA	BLR	0	149	2/18/2022 9:30	2/18/2022 11:59	2/18/2022 9:30	2/18/2022 11:59	0	No	7700
2/14/2022	IndiGo	6E8722	MAA	BLR	0	128	2/14/2022 9:15	2/14/2022 11:23	2/14/2022 9:15	2/14/2022 11:21	0	No	7120
2/15/2022	SpiceJet	SG5614	MAA	BLR	0	130	2/15/2022 16:45	2/15/2022 18:55	2/15/2022 17:00	2/15/2022 19:08	15	No	5250
2/21/2022	SpiceJet	SG8082	MAA	BLR	0	142	2/21/2022 9:15	2/21/2022 11:37	2/21/2022 9:25	2/21/2022 11:55	10	No	5380
2/21/2022	AirAsia India	I59749	MAA	BLR	0	147	2/21/2022 10:30	2/21/2022 12:57	2/21/2022 10:35	2/21/2022 13:04	5	No	4570
2/23/2022	Air India	AI3011	MAA	BLR	0	124	2/23/2022 14:30	2/23/2022 16:34	2/23/2022 14:50	2/23/2022 16:53	20	No	5820
2/14/2022	AirAsia India	I59969	MAA	BLR	0	126	2/14/2022 17:00	2/14/2022 19:06	2/14/2022 18:00	2/14/2022 20:06	60	No	2860
2/19/2022	SpiceJet	SG5525	MAA	BLR	0	125	2/19/2022 8:45	2/19/2022 10:50	2/19/2022 9:25	2/19/2022 11:29	40	No	4260
2/15/2022	AirAsia India	I52850	DEL	MAA	0	123	2/15/2022 12:30	2/15/2022 14:33	2/15/2022 13:00	2/15/2022 15:08	30	No	7720
2/16/2022	AirAsia India	I54445	DEL	MAA	0	139	2/16/2022 15:45	2/16/2022 18:04	2/16/2022 16:45	2/16/2022 18:59	60	No	3460
2/20/2022	Air India	AI1870	DEL	MAA	0	156	2/20/2022 7:30	2/20/2022 10:06	2/20/2022 7:35	2/20/2022 10:14	5	No	6670
2/14/2022	AirAsia India	I56975	DEL	MAA	0	122	2/14/2022 6:45	2/14/2022 8:47	2/14/2022 6:45	2/14/2022 8:56	0	No	7370
2/24/2022	Air India	AI9046	DEL	MAA	0	175	2/24/2022 20:45	2/24/2022 23:40	2/24/2022 20:50	2/24/2022 23:51	5	No	7660
2/16/2022	Vistara	UK7493	DEL	MAA	0	141	2/16/2022 20:15	2/16/2022 22:36	2/16/2022 21:15	2/16/2022 23:36	60	No	7390
2/14/2022	IndiGo	6E4378	DEL	MAA	0	181	2/14/2022 14:00	2/14/2022 17:01	2/14/2022 14:20	2/14/2022 17:26	20	No	3980
2/15/2022	IndiGo	6E2736	DEL	MAA	0	174	2/15/2022 15:15	2/15/2022 18:09	2/15/2022 15:25	2/15/2022 18:26	10	No	8520
2/15/2022	AirAsia India	I59832	DEL	MAA	0	140	2/15/2022 22:00	2/16/2022 0:20	2/15/2022 23:00	2/16/2022 1:25	60	No	4610
2/25/2022	GoFirst	G87213	DEL	MAA	0	165	2/25/2022 5:45	2/25/2022 8:30	2/25/2022 6:05	2/25/2022 8:50	20	No	5940
2/15/2022	Air India	AI3212	DEL	MAA	0	129	2/15/2022 8:30	2/15/2022 10:39	2/15/2022 8:30	2/15/2022 10:40	0	No	6030
2/27/2022	Vistara	UK4972	DEL	MAA	0	182	2/27/2022 22:30	2/28/2022 1:32	2/27/2022 22:45	2/28/2022 1:51	15	No	6760
2/16/2022	Air India	AI2616	DEL	MAA	0	177	2/16/2022 6:45	2/16/2022 9:42	2/16/2022 6:45	2/16/2022 9:52	0	No	6720
2/22/2022	IndiGo	6E4925	DEL	MAA	0	120	2/22/2022 5:45	2/22/2022 7:45	2/22/2022 6:15	2/22/2022 8:12	30	No	5090
2/25/2022	AirAsia India	I53490	DEL	MAA	0	150	2/25/2022 11:00	2/25/2022 13:30	2/25/2022 11:05	2/25/2022 13:30	5	No	5480

