

ESSENTIAL EXCEL SKILLS FOR DATA ANALYSIS

Course Code: B24DS01PC
BSc Data Science and Analytics
Practical Core Course
Self Learning Material



SREENARAYANAGURU OPEN UNIVERSITY

The State University for Education, Training and Research in Blended Format, Kerala

SREENARAYANAGURU OPEN UNIVERSITY

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To increase access of potential learners of all categories to higher education, research and training, and ensure equity through delivery of high quality processes and outcomes fostering inclusive educational empowerment for social advancement.

Mission

To be benchmarked as a model for conservation and dissemination of knowledge and skill on blended and virtual mode in education, training and research for normal, continuing, and adult learners.

Pathway

Access and Quality define Equity.

Essential Excel Skills for Data Analysis

Course Code: B24DS01PC

Semester - I

Practical Core Course Undergraduate Programme BSc Data Science and Analytics Self Learning Material



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ESSENTIAL EXCEL SKILLS FOR DATA ANALYSIS

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BSc Data Science and Analytics

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MESSAGE FROM VICE CHANCELLOR

Dear learner,

I extend my heartfelt greetings and profound enthusiasm as I warmly welcome you to Sreenarayanaguru Open University. Established in September 2020 as a state-led endeavour to promote higher education through open and distance learning modes, our institution was shaped by the guiding principle that access and quality are the cornerstones of equity. We have firmly resolved to uphold the highest standards of education, setting the benchmark and charting the course.

The courses offered by the Sreenarayanaguru Open University aim to strike a quality balance, ensuring students are equipped for both personal growth and professional excellence. The University embraces the widely acclaimed "blended format," a practical framework that harmoniously integrates Self-Learning Materials, Classroom Counseling, and Virtual modes, fostering a dynamic and enriching experience for both learners and instructors.

The University is committed to providing an engaging and dynamic educational environment that encourages active learning. The Study and Learning Material (SLM) is specifically designed to offer you a comprehensive and integrated learning experience, fostering a strong interest in exploring advancements in information technology (IT). The curriculum has been carefully structured to ensure a logical progression of topics, allowing you to develop a clear understanding of the evolution of the discipline. It is thoughtfully curated to equip you with the knowledge and skills to navigate current trends in IT, while fostering critical thinking and analytical capabilities. The Self-Learning Material has been meticulously crafted, incorporating relevant examples to facilitate better comprehension.

Rest assured, the university's student support services will be at your disposal throughout your academic journey, readily available to address any concerns or grievances you may encounter. We encourage you to reach out to us freely regarding any matter about your academic programme. It is our sincere wish that you achieve the utmost success.

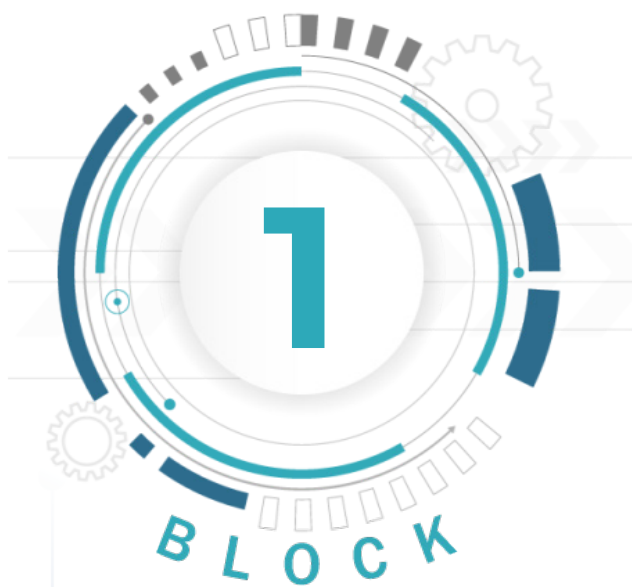


Regards,
Dr. Jagathy Raj V. P.

01-01-2025

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Basics of Data Handling in Excel



Experiment 1

Introduction to Excel

Discussion

1.1.1 Introduction to Microsoft Excel

Launched by Microsoft in 1985 for the Macintosh computer, Microsoft Excel is a powerful spreadsheet software designed for creating, editing, and analyzing data in various formats. During its development, it was code-named “Odyssey.” As one of the earliest spreadsheet programs, Excel distinguished itself by introducing pull-down menus and mouse functionality into a graphical interface. Excel secured its position as a market leader with the release of Excel 2.0 for Windows in 1987, which featured a visually rich interface and a host of innovative features. Over time, regular updates have enhanced its compatibility, security, and capabilities. Microsoft has released multiple versions of Excel, from Excel 95 to Excel 2021. Additionally, the Microsoft Office suite provides both mobile and web browser versions, making Excel accessible across different platforms.

Excel provides a robust set of tools for data analysis and visualization. Users can create a variety of charts, including pie charts, bar graphs, line graphs, scatter plots, and histograms, to effectively present data. Features like pivot tables and pivot charts enable users to summarize and filter large datasets based on specific criteria. Advanced analytical tools such as Solver, Goal Seek, Scenario Manager, and Data Table further enhance Excel’s functionality. Additionally, tools like Power Query and Forecast Sheet allow users to efficiently manage and analyze large volumes of data. Microsoft Excel is versatile and widely applicable across multiple industries and fields.

Excel plays a crucial role in data science and analytics by providing a versatile platform for data organization, manipulation, and analysis. It allows data scientists and analysts to efficiently clean and preprocess data, apply statistical functions, and perform calculations using built-in formulas and pivot tables. Excel’s powerful data visualization tools, such as charts, graphs, and conditional formatting, help to uncover patterns and insights from large datasets. Additionally, it supports data import and export from various sources, integrates with other Microsoft Office tools, and enables automation through macros and VBA (Visual Basic for Application), making it an essential tool for both beginners and professionals in the field of data science and analytics.

Here are the key features of Microsoft Excel:

1. User-Friendly Interface

Excel provides a simple and intuitive Ribbon Interface with tabs like Home, Insert, Formulas, and Data, combined with worksheets organized into numbered rows and lettered columns, making data organization seamless and user-friendly.

2. Data Entry and Management

Excel allows you to efficiently enter, store, and manipulate data in rows and columns, with features like Data Validation to ensure accuracy by setting rules for data entry and Find and Replace to simplify editing large datasets.

3. Functions and Formulas

Excel offers built-in mathematical, statistical, logical, and financial functions like SUM, AVERAGE, IF, and VLOOKUP, and allows users to create custom formulas for complex calculations, while also supporting dynamic formulas using relative, absolute, and mixed cell references.

4. Data Visualization

Excel enables the creation of visual representations of data using charts and graphs such as Pie, Line, Bar, and Histogram, while Conditional Formatting highlights trends with colours, icons, or bars, and Sparklines offer small, in-cell charts for quick insights.

5. Data Analysis Tools

Excel provides powerful tools like PivotTables to summarize and analyze large datasets effectively, What-If Analysis tools such as Goal Seek, Scenario Manager, and Data Tables for predictive analysis, and Sorting and Filtering options to organize and extract specific information from datasets.

6. Collaboration and Sharing

Excel offers powerful tools like PivotTables for summarizing and analyzing large datasets, What-If Analysis tools such as Goal Seek, Scenario Manager, and Data Tables for predictive analysis, and Sorting and Filtering options to organize and extract specific information. It also supports real-time collaboration via the cloud (e.g., OneDrive), allows you to protect sheets and workbooks with passwords or restricted editing permissions, and makes it easy to export to PDF or share spreadsheets via email.

7. Templates

Excel offers pre-designed templates for common tasks such as budgets, invoices, schedules, and reports, making it easier to get started with structured and professional documents.



8. Formatting Options

Excel provides rich formatting capabilities, including font styles, cell borders, shading, and number formats (such as currency, percentages, and dates), along with themes and styles for creating professional and consistent designs.

9. Data Import and Export

Excel allows you to import data from CSV (Comma-Separated Values) files, databases, or web queries and export files to various formats such as PDF, CSV, or XML.

Note: A CSV file is a text file that contains tabular data with each value is separated by a comma(,).

10. Macros and Automation

Excel allows you to use VBA (Visual Basic for Applications) to automate repetitive tasks and record macros for actions like formatting or data manipulation.

11. Multi-Sheet Workbooks

Excel allows you to perform calculations across multiple sheets and link data between them, as well as consolidate data from various sources into a single workbook.

12. Printing and Page Setup

Excel lets you set print areas, adjust margins, and preview layouts before printing, while also supporting page orientation, headers/footers, and scaling to fit data on a single page.

13. Add-Ins and Integration

Excel integrates seamlessly with other Microsoft Office apps like Word and PowerPoint and allows you to enhance its functionality using Excel Add-Ins, such as Solver and Analysis ToolPak.

14. Data Security

Excel allows you to protect sensitive data using encryption, password protection, and restricted access, while also enabling track changes to monitor edits made by collaborators.

15. Accessibility Features

Excel offers tools such as keyboard shortcuts, screen reader compatibility, and large font options to improve usability and accessibility.

16. Cloud Support

Excel seamlessly integrates with Microsoft 365 for cloud storage and backup, allowing you to access and edit files from multiple devices using OneDrive or SharePoint.

1.1.2 Overview of Excel Interface and Features

In Excel, understanding the concepts of workbook, worksheet, and cells is fundamental to effectively working with data. So let us start from the basics of Excel.

1.1.2.1 Starting Excel

To open Excel in computer, follow the steps given below:

- ◆ Click on “Start menu” 
- ◆ Then look for “All Programs”
- ◆ Double-click on the “Excel” icon to launch the application 

After launching Excel, the Excel Start Screen will appear as shown in Fig 1.1.1. In this screen, you can see options - to create a new workbook, choose an already existing template, and access the workbooks recently saved and edited by the user.

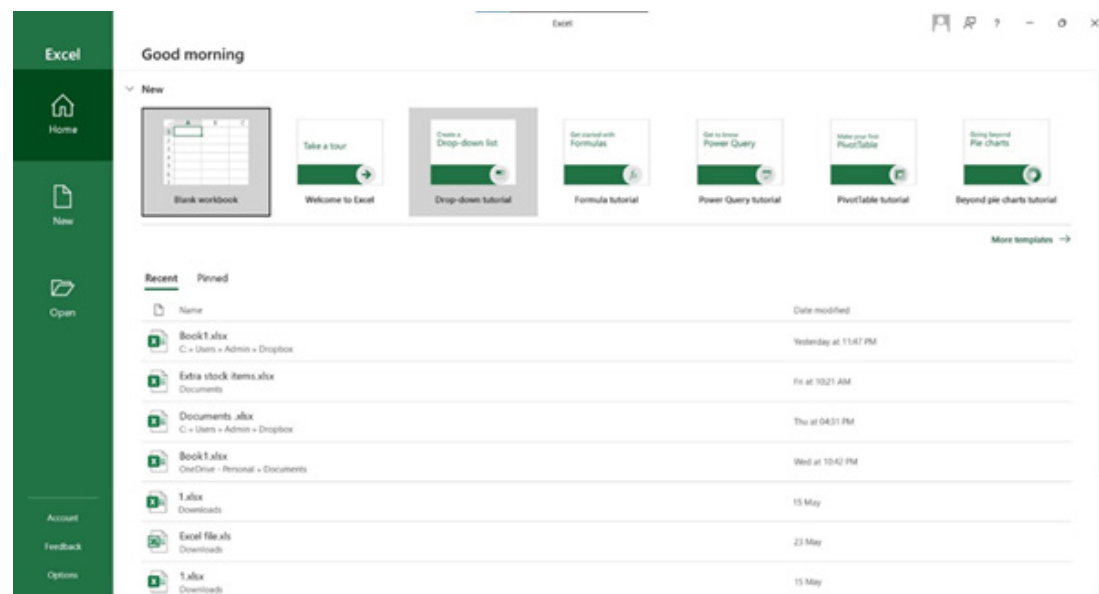


Fig 1.1.1 Excel Starter Screen

From the Start Screen, select “Blank workbook” to open the Excel interface and start working on a new Excel worksheet. This is shown in the Fig 1.1.2. The worksheet starter screen is the initial interface that appears when you open the Excel application.

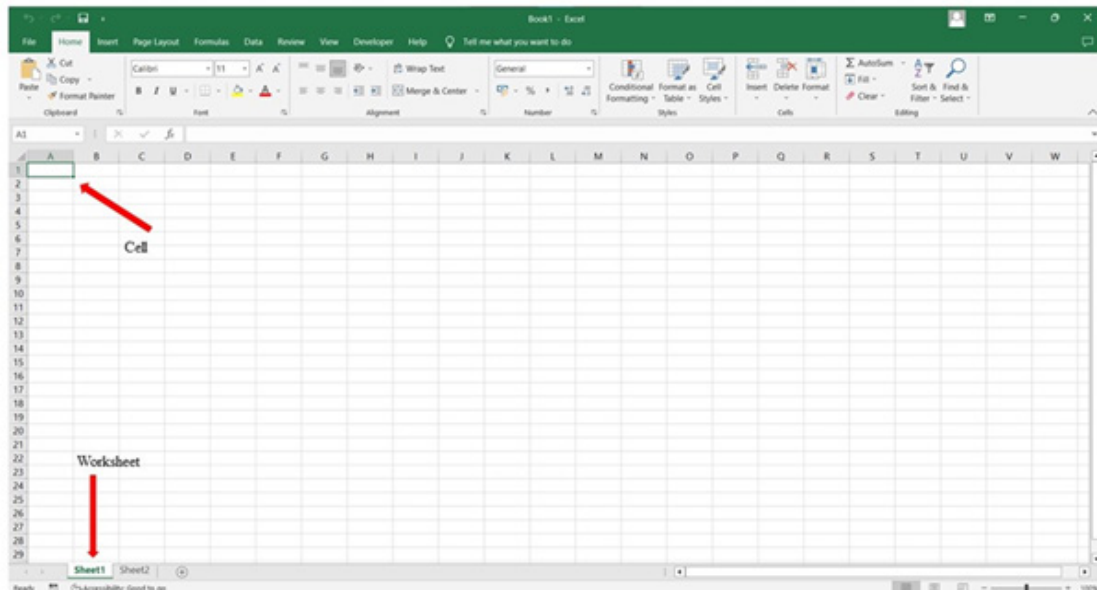


Fig 1.1.2 Workbook

A workbook is made up of multiple worksheets, each capable of storing data. Worksheets are grids composed of columns and rows, with cells where data is entered. Workbooks provide a way to organize related data, apply formatting, insert charts and images, and perform calculations using formulas and functions. They can be saved as files, shared with others, and offer a structured framework for managing and analyzing data in Excel. An example of a workbook is shown in Figure 1.1.2.

A worksheet is a collection of rows and columns within Excel. It offers various features and functions, such as performing complex calculations, creating charts and graphs, and applying formatting to cells. You can adjust the size of rows and columns to fit different types of data. Worksheets provide an organized structure for data analysis and reporting. You can easily switch between worksheets within a workbook to work with multiple datasets or organize information into different categories. By default, a new workbook starts with one worksheet, but additional worksheets can be added or removed as needed. Each worksheet is identified by a name, typically displayed at the bottom of the Excel window, such as Sheet1 or Sheet2, as shown in Figure 1.1.2. A cell is formed where a row and a column intersect.

Cells are the fundamental units where data is entered and stored in a worksheet. Each cell is identified by a unique combination of a column letter and row number. Cells can hold various types of information, including text, numbers, formulas, or functions. They act as the core components for organizing, manipulating, and analyzing data in Excel. Offering a wide range of functionalities and customization options, cells allow you to perform calculations using formulas or functions that reference other cells, enabling efficient data analysis. Cells can also be formatted to display data in different formats, such as dates or currency, and customized with various fonts, colours, and alignments. Additionally, they can be copied, moved, or formatted based on specific conditions or data values.

1.1.2.2 Excel interfaces

The Excel interface consists of various components that facilitate data management, analysis, and visualization. When you start the Excel application the basic window of Excel will be as shown in Figure 1.1.3.

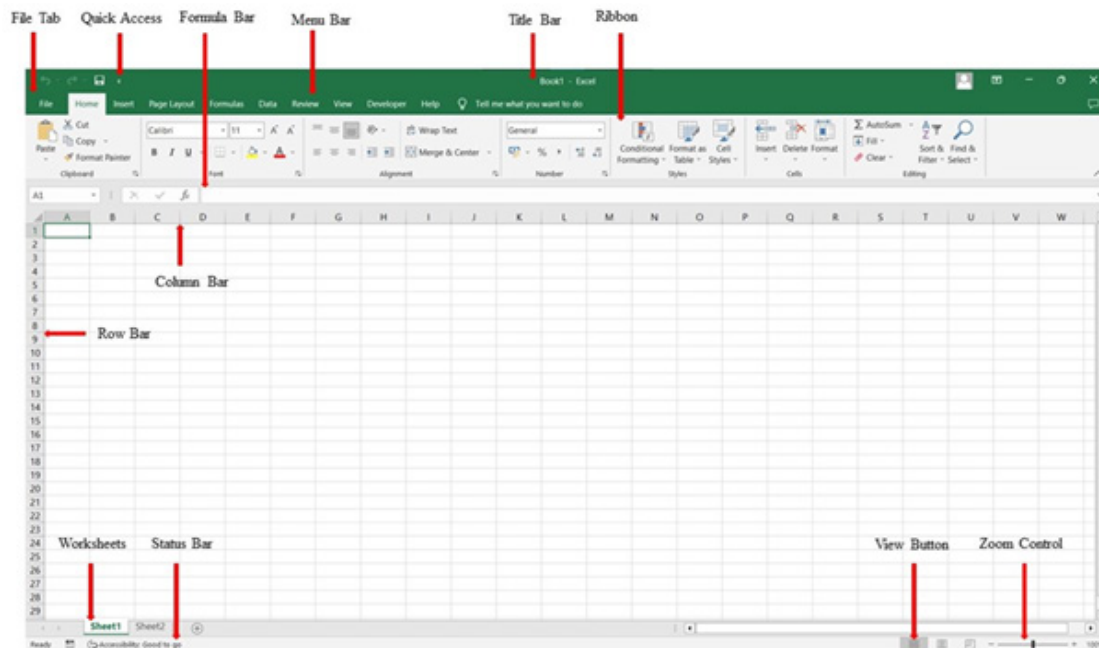


Fig 1.1.3 Components of Excel Sheet

File Tab: The Office button from Excel 2007 has been replaced with the File tab. You can click it to go to the Backstage view, where you can find options to open or save files, create new sheets, print a sheet, and do other file-related operations.

Quick Access Toolbar: The Quick Access Toolbar is available in the upper left corner. As the name suggests it includes functions that you want to use quickly and is simple to customize the options available in that.

Title bar: It is available at the top-middle part of the window. The title bar shows the titles of the program and the working sheet.

File tab: It is used to open or save files, create new sheets, print a sheet, and do all the file-related operations.

Ribbon: It contains all the main tabs and its subsequent features. Each tab is divided into sub-groups, for example, the Home tab contains Clipboard, Font, Alignment, Number and Styles, etc. Each group has also a triangular icon in the lower right corner and clicking on this will bring up additional options.

Formula bar: This is the area where you can enter the formula.

Row Bar: The numbering of Rows starts from 1 and keeps on increasing as you enter data. The maximum limit is 1,048,576 rows.

Column Bar: Columns are numbered from A and keep on increasing as you keep

entering data. After Z, it will start the series of AA, AB, and so on. The maximum limit is 16,384 columns.

Status Bar: This shows the status of the active cell in the worksheet. A cell can be in one of the four states (i) Ready mode, (ii) Edit mode, (iii) Enter mode, and (iv) Point mode.

Zoom Control: You may zoom in or out by moving the slider on the zoom control to the left or right. The + buttons can be clicked to increase the zoom factor.

View Buttons: You can switch between sheet views by pressing any of the three buttons that are situated to the left of the Zoom control, towards the bottom of the screen.

1.1.3 Creating a new workbook

Creating a new workbook in Excel involves starting a new file that serves as a container for multiple worksheets, allowing you to work with different sets of data and perform various tasks within a single file. There are many ways to start working with a workbook in Excel. You can either choose to create a new workbook or select an already existing template or open an already existing workbook. This is shown in Fig 1.1.4

Steps for creating a new workbook

Method 1: Using the File Menu

1. Open Microsoft Excel

Launch Excel from your desktop or Start menu.

2. Go to the File Menu

Click on the **File** tab in the top-left corner.

3. Select New

From the options on the left panel, click **New**.

4. Choose a Blank Workbook

Under the “New” section, select the option **Blank Workbook**.

5. Start Working

A new workbook will open, ready for you to enter data.

Method 2: Using a Shortcut

1. Open Excel.
2. Press **Ctrl + N** on your keyboard.
3. A new workbook will be created instantly.

Method 3: From an Existing Workbook

1. If you're working on an existing workbook:
 - ◆ Go to the **File** menu.
 - ◆ Select **New**.
2. Choose **Blank Workbook** or a template from the available options.

Method 4: From the Excel Icon

1. Right-click on your desktop (Windows).
2. Select **New > Microsoft Excel Worksheet**.
3. Rename the file as needed and double-click it to open.

Method 5: Using Excel Templates

Instead of a blank workbook, you can choose a pre-designed template:

1. Go to **File > New**.
2. Browse through the available templates.
3. Select one, customize it, and save it.

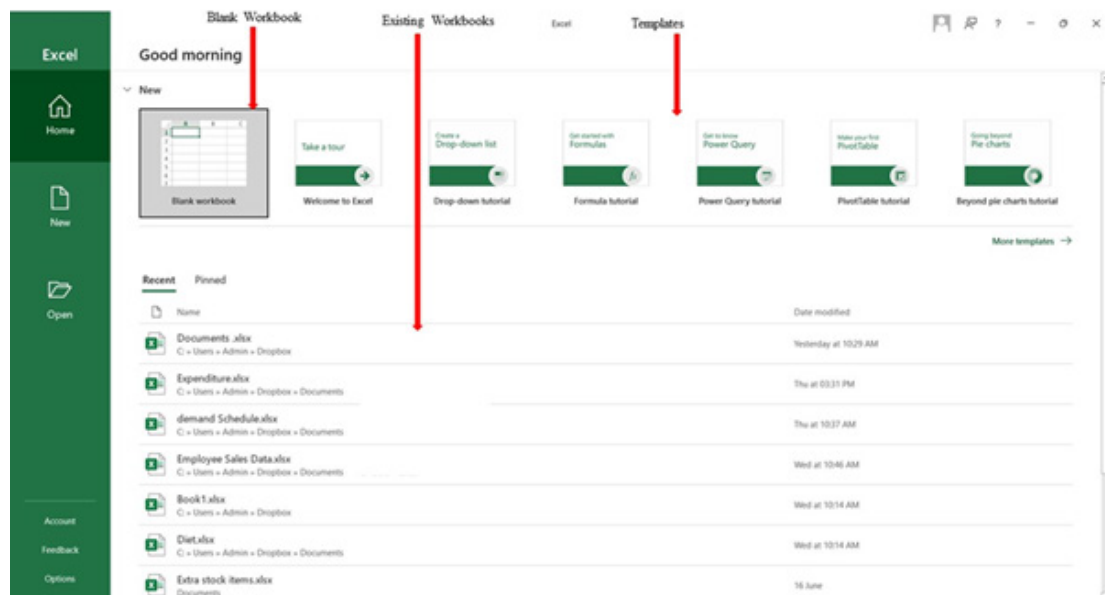


Fig 1.1.4 Creating a new workbook

When you open Excel for the first time, it will show a starter screen and you can either create a new workbook or select an already existing file, or choose from any existing template as shown in Fig 1.1.4. Once you select the “blank workbook” option a blank screen will open with all the options to start working. This is shown in Fig 1.1.5

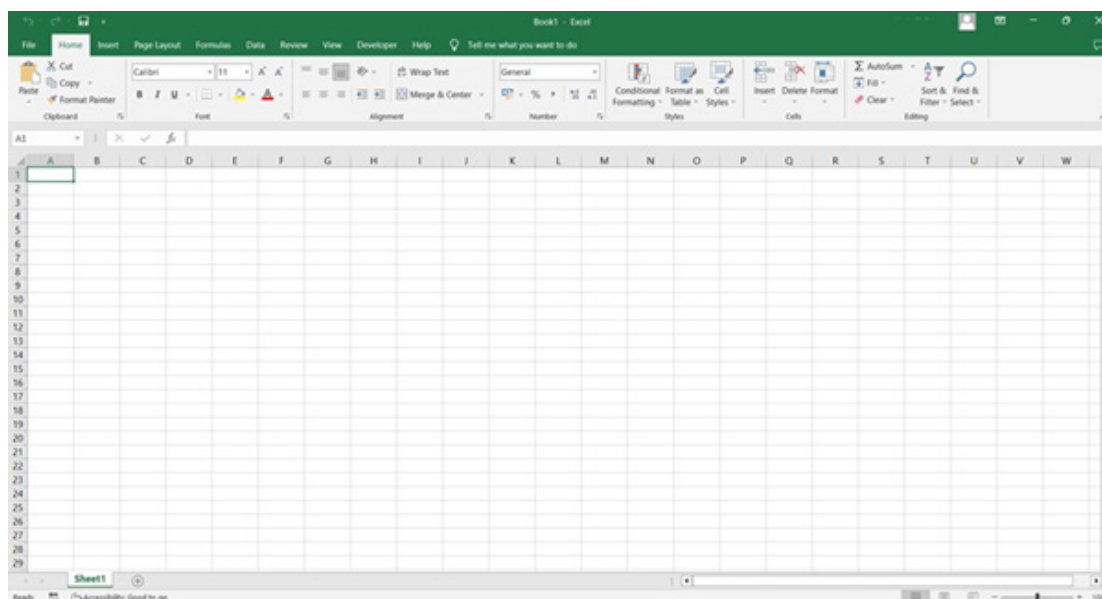


Fig 1.1.5 Blank Workbook

If you want to create a new workbook apart from the one you have already opened, click on the File tab, and then click on the ‘New’ in the left column, and then select ‘Blank workbook’ (Refer Fig 1.1.4).

Creating a new worksheet

A worksheet in Excel is a single page or tab within a workbook that contains cells organized in rows and columns. It is where you input, calculate, and analyze data. By default, a new Excel workbook contains one or more worksheets, and you can add, rename, or delete worksheets as needed.

Worksheets are often given default names like “Sheet1,” “Sheet2,” etc. There are 1,048,576 rows and 16,384 columns in a spreadsheet, which equals to 17,179,869,184 cells. If you already have an existing workbook open in Excel, you have a couple of options to create a new worksheet:

Steps to Create a New Worksheet in Excel

Method 1: Using the “+” Button

1. **Open the Workbook:** Open the Excel workbook where you want to add a worksheet.
2. **Locate the Worksheet Tabs:** At the bottom of the Excel window, find the tabs labelled “Sheet1,”.
3. **Click the “+” Button:** Click the small “+” button next to the last worksheet

tab. A new worksheet will be added, typically named “SheetX” (e.g., “Sheet2”).



Fig 1.1.6 Creating new worksheet

Method 2: Using the Ribbon Menu

1. **Open the Workbook:** Open your Excel workbook.
2. **Go to the Ribbon:** Click on the **Home** tab in the Ribbon.
3. **Find the Insert Option:** In the “Cells” group, click the **Insert** dropdown.
4. **Select Insert Sheet:** Choose **Insert Sheet** from the dropdown menu to create a new worksheet.

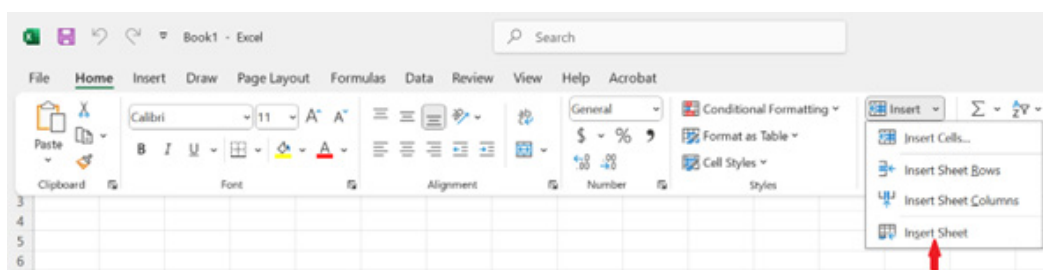


Fig 1.1.7 Inserting worksheet

Method 3: Keyboard Shortcut

1. **Open the Workbook:** Ensure the workbook is open.
2. **Use the Shortcut:** Press **Shift + F11** on your keyboard. A new worksheet will be added instantly.

Method 4: Right-click on an Existing Worksheet

1. **Open the Workbook:** Open the workbook where you want to add a worksheet.
2. **Right-click on a Tab:** Right-click on the tab of an existing worksheet.
3. **Select Insert:** Choose **Insert...** from the context menu.
4. **Choose Worksheet:** In the “Insert” dialog box, select **Worksheet** and click

OK.

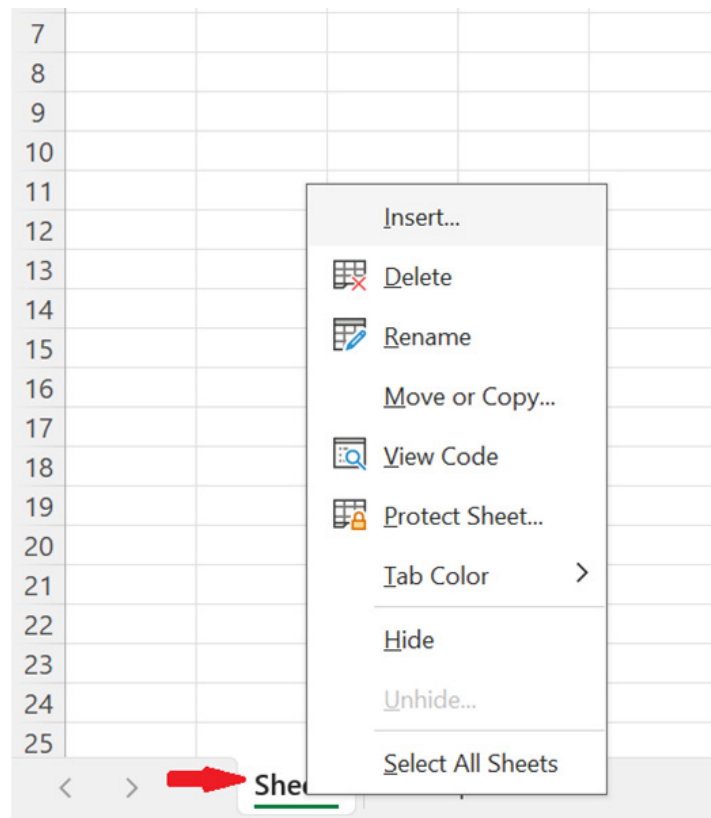


Fig 1.1.8 Inserting worksheet

Renaming the New Worksheet

After creating the worksheet, you can rename it:

1. Double-click on the worksheet tab.
2. Type the desired name.
3. Press **Enter** to save the new name.

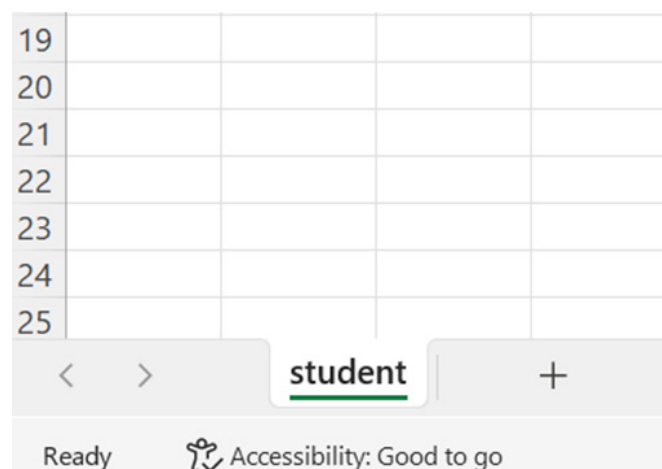


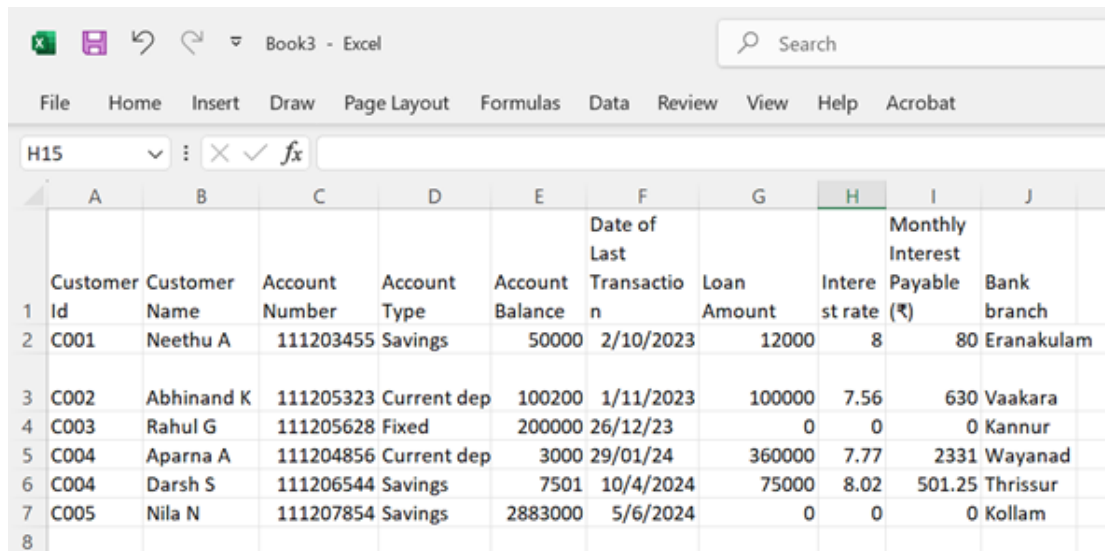
Fig 1.1.9 Renaming the worksheet

1.1.4 Entering data in Excel

The sheet area is where you type the desired text. The insertion point is the area where text will appear as you type and is represented by the flashing vertical bar. When you click on any cell in the sheet area then that cell will get highlighted. When you double-click the cell, the flashing vertical bar appears and then you can start entering your data.

There are various methods to enter data in Excel. They are as follows:

Directly typing data into the cells

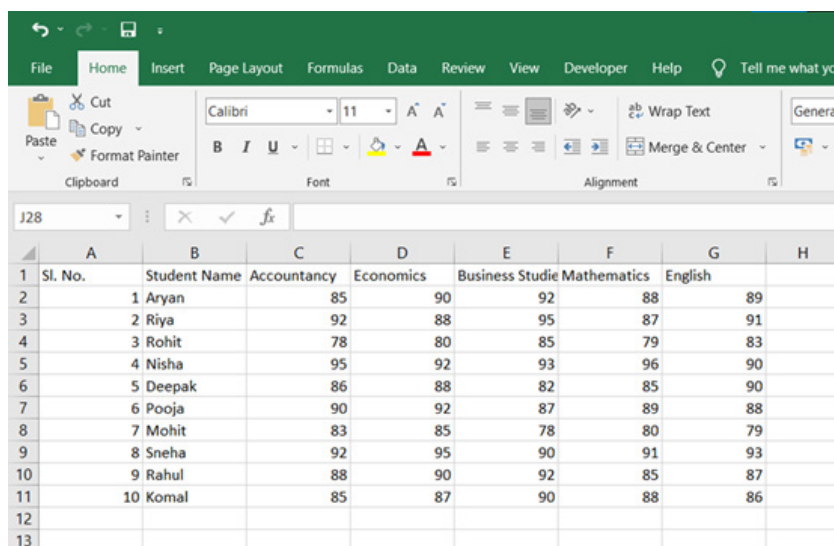


	A	B	C	D	E	F	G	H	I	J
	Customer Id	Customer Name	Account Number	Account Type	Account Balance	Date of Last Transaction	Loan Amount	Interest rate	Monthly Payable Interest	Bank branch
1	C001	Neethu A	111203455	Savings	50000	2/10/2023	12000	8	80	Ernakulam
3	C002	Abhinand K	111205323	Current dep	100200	1/11/2023	100000	7.56	630	Vaakara
4	C003	Rahul G	111205628	Fixed	200000	26/12/23	0	0	0	Kannur
5	C004	Aparna A	111204856	Current dep	3000	29/01/24	360000	7.77	2331	Wayanad
6	C004	Darsh S	111206544	Savings	7501	10/4/2024	75000	8.02	501.25	Thrissur
7	C005	Nila N	111207854	Savings	2883000	5/6/2024	0	0	0	Kollam

Fig 1.1.10 Typing data into Excel

The most straightforward method is to directly type the data into the desired cell. Click on the cell where you want to enter the data and start typing. Press the Tab button on the keyboard to move to the next cell. Here in Fig 1.1.10, we have typed in text, numbers, and a combination of both.

Copying and pasting from other sources



	A	B	C	D	E	F	G	H
	Sl. No.	Student Name	Accountancy	Economics	Business Studies	Mathematics	English	
2	1	Aryan	85	90	92	88	89	
3	2	Riya	92	88	95	87	91	
4	3	Rohit	78	80	85	79	83	
5	4	Nisha	95	92	93	96	90	
6	5	Deepak	86	88	82	85	90	
7	6	Pooja	90	92	87	89	88	
8	7	Mohit	83	85	78	80	79	
9	8	Sneha	92	95	90	91	93	
10	9	Rahul	88	90	92	85	87	
11	10	Komal	85	87	90	88	86	

Fig 1.1.11 Copy Pasting data into Excel

If you have data from another source, such as a website, document, or another Excel file, you can copy the data and paste it into Excel. Select the source data, right-click, choose “Copy,” then navigate to the Excel worksheet, click on the destination cell, right-click, and choose “Paste.” Here in Fig 1.1.11, we have pasted the data from another worksheet.

Importing data from external sources

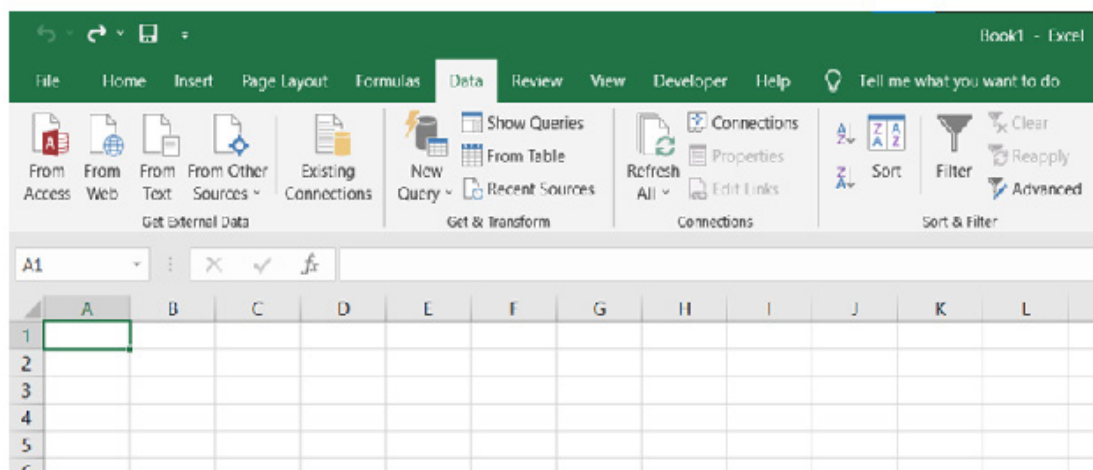


Fig 1.1.12 Data Ribbon for importing data

Excel provides various options to import data from external sources like text files, CSV files, databases, and other formats. You can use the import features, available under the “Data” tab in the Excel ribbon (as shown in Fig1.1.12), to import and populate your worksheet with data from external sources.

Entering various kinds of data in Excel involves using different techniques based on the type of data you are working with.

1.1.5 Saving a Workbook

Saving a workbook in Excel ensures that your data and changes are preserved for future use.

The different methods or ways by which an Excel file can be saved are as follows.

Steps for Saving Workbook for the First Time

1. **Open Your Workbook:** Make sure you’ve created or opened a workbook in Excel.
2. **Go to the File Menu:** Click the **File** tab in the top-left corner of the Excel window.

3. Click “Save As”:

- ◆ For Excel 2019/365: Choose a location, such as **This PC** or **OneDrive**, and click **Browse** to select a folder.
 - ◆ For earlier versions: Directly select the folder location to save the file.
4. **Enter a File Name:** In the “File name” field, type the name for your workbook.
5. **Choose a File Format:** In the “Save as type” dropdown, select the desired format, e.g.:
- ◆ **Excel Workbook (.xlsx):** For standard Excel files.
 - ◆ **Excel 97-2003 Workbook (.xls):** For backward compatibility.
 - ◆ **CSV (.csv):** For plain-text spreadsheet data.
6. **Click Save:** Your workbook is saved in the specified location.

Saving Changes to an Existing Workbook

1. **Make Changes:** Edit your workbook as needed.
2. **Click Save:** Press **Ctrl + S** on your keyboard, or click the save icon (a floppy disk) in the top-left corner of the Excel window.
3. **Done!** Your changes will be saved to the same file without creating a new one.

Saving a Copy of the Workbook

1. **Go to File Menu:** Click **File -> Save As**.
2. **Choose a Different Name or Location:** Change the file name or location to create a copy.
3. **Click Save.** This creates a new workbook with the changes while preserving the original.

Autosave option is available in Office 365/Excel Online, toggle the Autosave option in the top-left corner to automatically save your work periodically.

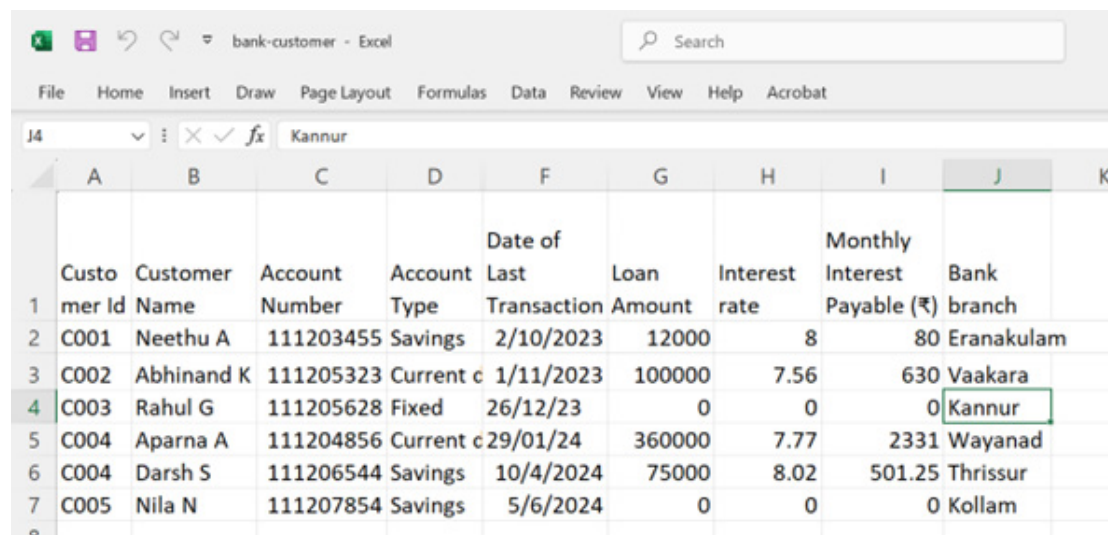
Saving a Workbook with a Password (Optional)

1. **Go to Save As:** Click **File -> Save As**.
2. **Open Tools Menu:** In the “Save As” dialog, click **Tools** (next to the Save button) and select **General Options**.

3. **Set a Password:** Enter a password to open or modify the workbook and click **OK**.

4. **Click Save.** The workbook is now password-protected.

Now let us save the list of customer details with the filename “bank-customer”.



	A	B	C	D	F	G	H	I	J	K
	Custo mer Id	Customer Name	Account Number	Account Type	Date of Last Transaction	Loan Amount	Interest rate	Monthly Interest Payable (₹)	Bank branch	
1	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Ernakulam	
2	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56	630	Vaakara	
3	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur	
4	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77	2331	Wayanad	
5	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur	
6	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam	

Fig 1.1.13 Saving Excel workbook

After we have saved the file, we can see that the name in the title bar has also changed. Saving files in Excel is a crucial step to ensure that your work is preserved and can be accessed later. Use keyboard shortcuts like Ctrl + S or F12 to save Excel files.

Method 2: Using File Explorer (Windows)

1. Locate the File:

- Open File Explorer and navigate to the folder where the Excel file is stored.

2. Double-click the File:

- Double-click the Excel file (e.g., [example.xlsx](#)). It will open directly in the Excel application.

Method 3: Using File Explorer (Windows)

1. Locate the File:

- Open File Explorer and navigate to the folder where the Excel file is stored.

2. Double-click the File:

- Double-click the Excel file (e.g., [example.xlsx](#)). It will open directly in the Excel application.

Exercise Questions

1. Create a workbook named “Schedule.xlsx.” Add worksheets for “Day1,” “Day2,” and “Day3.” Enter the current date and time in cell A1 of each worksheet. Save the file.
2. Open Excel and create a new workbook. Add your name as the title in cell A1. Save the workbook as “MyFirstWorkbook.xlsx” in your Documents folder.
3. Create a new workbook, add three worksheets, and rename them as “Sales Data,” “Employee Records,” and “Summary.” Save the file as “Company_Data.xlsx.”
4. Open a workbook and add a new worksheet named “SalesData.” Change its tab colour to blue. Save the workbook as “SalesReport.xlsx.”
5. Insert a new worksheet into an existing workbook and move it to the first position.
6. Copy a worksheet named “Report” and rename the copied worksheet as “Report_Backup.”

1.1.6 Navigating and Selecting Data in Excel

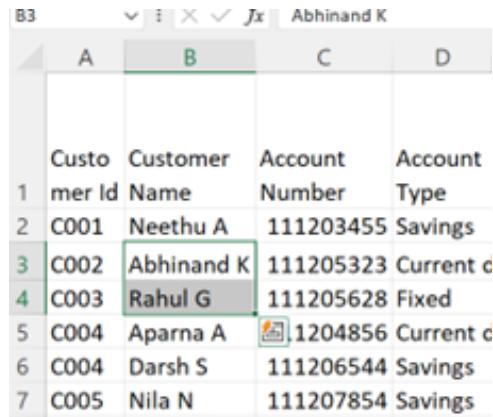
Navigating and selecting data in Excel refers to the process of moving through the worksheets and selecting specific cells, rows, or columns to work with. You can navigate within a worksheet by using the arrow keys on the keyboard, the scroll bars, or by clicking on the desired cell.

Moving within the Worksheet:

- ◆ To move between cells: You can use the arrow keys on your keyboard to navigate up, down, left, or right within the worksheet. Each press of an arrow key will move the selection to the adjacent cell in that direction. Press the Tab key to go to next the column and Press the Enter key to go to the next row
- ◆ To move to the beginning or end of a row or column: You can use the Home and End keys on your keyboard. Pressing the Home key will move the selection to the first cell of the row or column while pressing the End key will move it to the last cell.
- ◆ To move to the edge of the data range: You can hold down the Ctrl key on your keyboard and press an arrow key. For example, Ctrl+Down Arrow will take you to the last filled cell in the column, Ctrl+Up Arrow will take you to the topmost filled cell, Ctrl+Right Arrow will take you to the last filled cell in the row, and Ctrl+Left Arrow will take you to the leftmost filled cell. Press the right Alt + Enter to enter a new line in the same column. Navigate cells using arrow keys, Home/End keys, Ctrl key with arrow keys and right Alt + Enter keys.

Selecting Cells, Rows, and Columns:

- ◆ To select a single cell: Simply click on the desired cell with the mouse cursor, and it will be selected. The selected cell is indicated by a thick border.



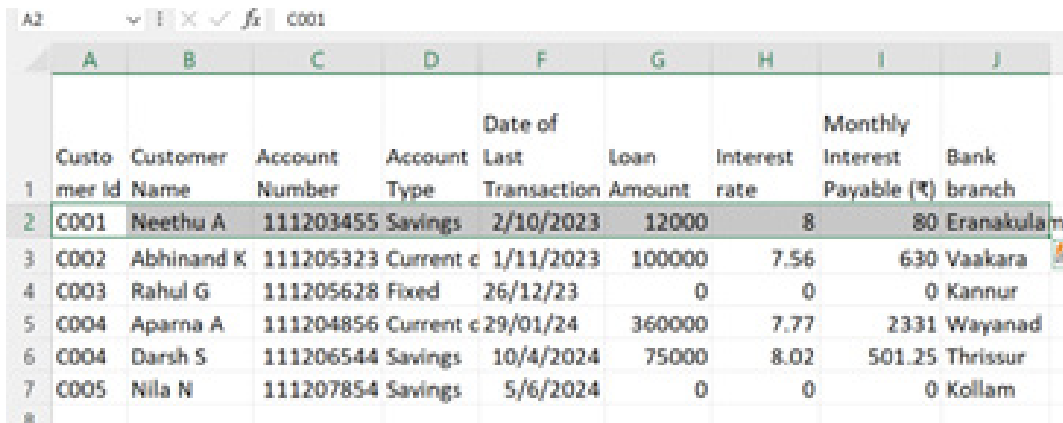
The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D
	Custo	Customer	Account	Account
1	mer Id	Name	Number	Type
2	C001	Neethu A	111203455	Savings
3	C002	Abhinand K	111205323	Current c
4	C003	Rahul G	111205628	Fixed
5	C004	Aparna A	11204856	Current c
6	C004	Darsh S	111206544	Savings
7	C005	Nila N	111207854	Savings

Cell B3 is selected, indicated by a thick border.

Fig 1.1.14 Selecting a single cell

- ◆ To select a range of cells: Click and hold the mouse button on the starting cell, then drag the cursor to the ending cell of the desired range. Release the mouse button, and all the cells within that range will be selected. The selected cells will be highlighted.



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J
					Date of				Monthly	
1	Custo	Customer	Account	Account	Last	Loan	Interest	Interest	Bank	
	mer Id	Name	Number	Type	Transaction	Amount	rate	Payable (₹)	branch	
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakulam	
3	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56	630	Vaakara	
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur	
5	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77	2331	Wayanad	
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur	
7	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam	

Cells A2 through J7 are selected, indicated by a thick border.

Fig 1.1.15 Selecting ranges of cells

- ◆ To select an entire row or column: Click on the row number or column letter to select the entire row or column. For example, clicking on the row number “3” will select the entire row 3, and clicking on the column letter “D” will select the entire column D.

	A	B	C	D	F	G	H	I	J
				Date of				Monthly	
1	Custo	Customer	Account	Account	Last	Loan	Interest	Interest	Bank
	mer Id	Name	Number	Type	Transaction	Amount	rate	Payable (₹)	branch
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Ernakulam
3	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56	630	Vaakara
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur
5	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77	2331	Wayanad
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur
7	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam

Fig 1.1.16 Selecting entire row

- ◆ To select multiple non-adjacent cells or ranges: Hold down the Ctrl key on your keyboard while selecting individual cells or ranges. Each selected cell or range will be added to the existing selection. To select cells, click on a single cell or drag the mouse to select a range.

	A	B	C	D	F	G	H	I	J	K
				Date of				Monthly		
1	Custo	Customer	Account	Account	Last	Loan	Interest	Interest	Bank	
	mer Id	Name	Number	Type	Transaction	Amount	rate	Payable (₹)	branch	
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Ernakulam	
3	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56	630	Vaakara	
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur	
5	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77	2331	Wayanad	
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur	
7	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam	

Fig 1.1.17. Selecting multiple cells or ranges

Selecting Data with Keyboard Shortcuts

- ◆ To select adjacent cells: Click on the starting cell, hold down the Shift key on your keyboard, and then click on the ending cell. All the cells between the starting and ending cells will be selected, and the entire range will be highlighted.
- ◆ To select entire rows or columns: Use the Shift key in combination with the arrow keys. For example, to select multiple rows, click on the first row you want to select, hold down the Shift key, and press the Down Arrow key to extend the selection to multiple rows.
- ◆ To select the entire worksheet: Press the Ctrl + A keys together. This

keyboard shortcut selects the entire worksheet, highlighting all cells, rows, and columns. Use Shift + click, Shift + arrow keys, and Ctrl + A to select data.

1.1.7 Opening an Excel File

Opening an Excel file means accessing a workbook (.xlsx, .xls, .csv, etc.) stored on your computer or in the cloud to view, edit, or analyze its content. Excel supports various file formats, including Excel workbooks, CSV files, and templates. The process involves navigating to the file's location and loading it into the Excel application.

Method 1: Using the Excel Application

1. Open the Microsoft Excel application from your desktop, Start menu, or taskbar.
2. Go to the File Menu in the top-left corner.
3. From the menu, click Open.
4. Choose the File Location Under the “Open” menu
 - ◆ This PC: For files saved locally on your computer.
 - ◆ OneDrive: For cloud-saved files.
 - ◆ Browse: To search for the file manually in your folders.
5. Navigate to the folder containing the Excel file.
6. Select the file you want to open and click Open.

Method 2: Using File Explorer (Windows)

1. Open File Explorer and navigate to the folder where the Excel file is stored.
2. Double-click the Excel file (e.g., **bank-customer.xlsx**). It will open directly in the Excel application.

Method 3: Drag and Drop

1. Open the Excel application.
2. Drag the Excel file from its folder and drop it onto the open Excel window.

Method 4: From Recent Files

1. Open the Excel application.
2. In the Home screen of Excel, you'll see a list of recently opened files. Click on the file name to open it.

Method 5: Keyboard Shortcut

1. Open Excel and press Ctrl + O to quickly access the Open menu.
2. Navigate to the file location and select the desired file.

Exercise Questions

1. Navigating and Selecting Data in Excel

Open a new Excel workbook.

- ◆ Use the Name Box to navigate to cell **H15**.
 - ◆ Select all the data in the range **A1:C10** using the mouse.
 - ◆ Highlight the entire worksheet using a shortcut key.
2. Moving Within the Worksheet
In a pre-filled worksheet:
 - ◆ Use the scroll bars to navigate to cell **Z50**.
 - ◆ Return to cell **A1** using a shortcut key.
 - ◆ Navigate to the last filled cell in the worksheet using the Ctrl + Arrow keys.

3. Selecting Cells, Rows, and Columns

Open an existing workbook and perform the following:

- ◆ Select the entire row for row 5.
- ◆ Highlight columns **B** to **D**.
- ◆ Select all cells in the range **E1:E20** using the Shift key and mouse.

4. Selecting Data with Keyboard Shortcuts

In a new worksheet, enter some random data in cells **A1:A20**.

- ◆ Use the Ctrl + Shift + Down Arrow shortcut to select all filled cells in column **A**.

- ◆ Extend the selection to include columns **B** and **C** using the Shift + Right Arrow shortcut.
 - ◆ Use Ctrl + A to select all data in the worksheet.
5. Opening an Excel File
Perform the following tasks:
- ◆ Open a pre-saved workbook named **Sample.xlsx** from your system.
 - ◆ Open a new workbook using the Ctrl + N shortcut.
 - ◆ Close the newly opened workbook without saving using a keyboard shortcut.

1.1.8 Data Types in Excel

Excel supports a variety of data types, enabling users to perform different types of calculations, manage information, and visualize data efficiently. This session focuses on identifying, using, and manipulating these data types.

Different data types in Excel are

1. Text (String)

Used for alphanumeric data, such as names, addresses, or any non-numeric information. Commonly used for Labels for rows and columns and storing non-numeric information like product names or categories.

- ◆ Characteristics:
 - Aligns to the left in a cell by default.
 - Can contain letters, numbers, and special characters.
 - Excel does not perform arithmetic operations on text.
- ◆ Examples:
 - Names: John Doe
 - IDs: INV12345
 - Messages: “Hello, World!”

Use the CONCATENATE () or TEXTJOIN () function to combine text values.

2. Numbers

Numeric data for arithmetic calculations or quantitative analysis. Commonly used for Mathematical computations (e.g., sums, averages) and Charts and data visualization.

- ◆ Characteristics:
 - Aligns to the right in a cell by default.
 - Includes whole numbers, decimals, and scientific notations.

- ◆ Examples:
 - Integer: 123
 - Decimal: 45.67
 - Scientific Notation: 1.23E+4 (represents 12300)

Use the ROUND (), INT (), and MOD () functions for specific numeric operations.

3. Date and Time

Represents calendar dates and clock times. Internally stored as numbers and commonly used for scheduling, timelines and analyzing data over specific periods.

- ◆ Characteristics:
 - Aligns to the right in a cell by default.
 - Dates and times can be formatted in various ways (e.g., DD/MM/YYYY, HH:MM AM/PM).
- ◆ Examples:
 - Date: 01/08/2025
 - Time: 14:30 (2:30 PM)
 - Combined Date and Time: 01/08/2025 14:30

Use date functions (=TODAY (), =DATE ()) and time functions (=NOW (), =TIME ()). Perform operations like adding days (=A1+7 for a week later).

4. Boolean (Logical)

Represents logical values, either TRUE or FALSE. Commonly used in conditional formatting and decision-making formulas.

- ◆ Characteristics:
 - Often used in logical operations and formulas.
 - Outputs depend on conditions.
- ◆ Examples:
 - Logical Test: =A1>100 → Returns TRUE if the value in A1 is greater than 100.
 - =AND(A1>50, B1<20) → Returns TRUE if both conditions are met.

Use logical functions like IF (), AND (), and OR () to create dynamic conditions.

5. Currency

Numbers formatted as monetary values, including symbols like \$, €, ₹. Commonly used in budgeting and financial planning and sales and revenue tracking.

- ◆ Characteristics:
 - Allows users to denote prices or financial figures.
 - Includes decimal places for cents/paisa.
- ◆ Examples:
 - \$123.45
 - ₹5000.00

Use Accounting format for better alignment and presentation.

6. Percentage

Represents numbers as fractions of 100. Commonly used in calculating growth rates or proportions and displaying survey results.

- ◆ Characteristics:
 - Automatically appends a % symbol.
 - Converts decimal values (e.g., 0.5 → 50%).
- ◆ Examples:
 - 25% (represents 0.25)
 - 100% (represents 1.00)

Use =B1/A1 to calculate percentages (e.g., percentage increase).

7. Logical test

Represents logical values, either TRUE or FALSE.

- ◆ Characteristics:
 - Often used in logical operations and formulas.
 - Outputs depend on conditions.
- ◆ Examples:
 - Logical Test: =A1>100 → Returns TRUE if the value in A1 is greater than 100.
 - =AND(A1>50, B1<20) → Returns TRUE if both conditions are met.

8. Custom

Custom Formats

User-defined formats for displaying data in a specific pattern. Commonly used in custom date or time formats.

Specialized formats for identifiers or structured data.

- ◆ Characteristics:
 - Does not alter the data itself, only its appearance.
- ◆ Examples:
 - Phone Numbers: (123) 456-7890
 - Product Codes: PROD-0001

Access custom formats via Home → Number → Custom.

9. Geography & Stocks

- ◆ Linked data types introduced in modern Excel.
- ◆ Provides real-time information from the internet.

Example:

- ◆ Country: India → Includes population, capital, etc.
- ◆ Stock: AAPL → Includes price, market cap, etc.

Exercise Questions

1. Activity 1: Identifying Data Types

- ◆ Open a new Excel workbook.
- ◆ Enter sample data for each data type in individual cells.
- ◆ Observe how Excel recognizes and aligns them automatically.

2. Activity 2: Formatting Data

- ◆ Select cells and apply different data formats (e.g., currency, percentage).
- ◆ Use Home → Number ribbon to explore formatting options.

3. Activity 3: Working with Dates and Times

- ◆ Enter today's date and current time in separate cells.
- ◆ Use date functions like =TODAY () and time functions like =NOW ().

4. Activity 4: Boolean Operations

- ◆ Create logical conditions using =IF (), =AND (), =OR () formulas.
- ◆ Example: =IF(A1>50, TRUE, FALSE)

5. Activity 5: Exploring Linked Data Types

- ◆ Insert Geography or Stock data types and explore associated information.
- ◆ Example: Use the “Data” tab to add these data types.



1.1.9 Editing Excel Files

Editing in Excel refers to the process of modifying the content or formatting of cells within a worksheet to ensure data accuracy, organization, and presentation. This may involve updating existing cell entries, correcting errors, or replacing outdated information. Additionally, editing encompasses changing the formatting of cells to enhance readability and visual appeal, such as adjusting font styles, sizes, colours, or applying borders and shading. It also includes inserting or deleting rows, columns, or individual cells to restructure the data layout. Excel provides various tools, such as the formula bar and right-click context menu, to facilitate efficient editing. Overall, editing is a crucial step in managing and analyzing data effectively in Excel.

1. Editing Cell Content

Editing cell content in Excel involves making changes to the data or information already entered into a cell. This can include correcting mistakes, updating values, or completely replacing the content. To edit a cell, you can simply select the cell and either start typing to overwrite the existing content or double-click on the cell to make changes within it. Alternatively, you can use the formula bar at the top of the worksheet to make adjustments.

Excel provides various options for editing, such as using the “Backspace” or “Delete” keys to remove unwanted characters or content. You can also copy, cut, and paste data from other cells or external sources to update the content efficiently. Additionally, you can use built-in features like Find and Replace to locate specific text or numbers and replace them across multiple cells. Editing cell content is a fundamental skill that helps ensure the accuracy and relevance of the data in your spreadsheet. Different editing methods are

- ◆ Double-Clicking:
 - Double-click on the cell to activate edit mode.
 - The cursor appears inside the cell, allowing you to modify the content.
- ◆ Using the Formula Bar:
 - Select the cell and edit the content directly in the formula bar above the worksheet.
- ◆ Keyboard Shortcut:
 - Press **F2** to activate edit mode for the selected cell.
- ◆ Replacing Entire Content:
 - Select the cell and type new content to replace the old one.

2. Bulk Editing

Bulk editing in Excel refers to making changes to multiple cells, rows, or columns simultaneously, saving time and effort when working with large datasets. This can involve applying formatting, modifying content, or implementing formulas across a

selected range of cells. For instance, users can quickly fill multiple cells with a specific value or formula using the fill handle, or apply formatting such as font styles, colours, or conditional formatting to a group of cells. Bulk editing also includes using tools like Find and Replace to modify content in multiple cells or applying filters and sorting options to reorganize data. Additionally, Excel's "Paste Special" feature allows users to paste specific attributes, such as values, formats, or formulas, across a range. By leveraging bulk editing capabilities, users can streamline their workflow and maintain consistency in large spreadsheets.

- ◆ Find and Replace:
 - Use Ctrl + H to open the Find and Replace dialog box.
 - Enter the value to find and its replacement value.
- ◆ Drag to Copy:
 - Click and drag the fill handle (bottom-right corner of the cell) to copy content to adjacent cells.
- ◆ Editing Formulas:
 - Double-click a cell with a formula to view and edit it.
 - Use Ctrl + [to trace formula precedents (cells referenced in the formula).

- ◆ AutoCorrect:
 - Enable AutoCorrect for common typos via File → Options → Proofing → AutoCorrect Options.
- ◆ Undo Changes:
 - Press Ctrl + Z to undo the last action.
- ◆ Redo Changes:
 - Press Ctrl + Y to redo an undone action.

Exercise questions

1. Open an Excel file and edit the content of a specific cell by changing the text, correcting a typo, or updating a numeric value. What happens to the original content?
2. Use the "Find and Replace" feature to locate all instances of a specific word or number in the worksheet and replace them with new values. How does this tool simplify bulk editing?
3. Clear the content of a cell and compare it with deleting the same cell. How do these actions affect the structure of the worksheet?
4. Modify the formatting of a cell by changing its font style, size, colour, and applying borders. How do these changes enhance the presentation of the data?

5. Edit a formula in a cell to include additional operations or references to other cells. How do the changes impact the calculated result and the dependent cells?

1.1.10 Deleting in Excel

Deleting in Excel involves removing unwanted data, cells, rows, or columns from a worksheet to maintain an organized and accurate dataset. Users can delete specific content within a cell while keeping the cell itself, or they can delete entire cells, which shifts the surrounding data to fill the gap. Deleting rows or columns completely removes them from the worksheet, affecting the structure of the data. This can be done using the “Delete” option from the context menu or by selecting the rows/columns and pressing the “Delete” key on the keyboard. Additionally, Excel allows users to clear only specific aspects, such as formats, contents, or comments, without removing the cell. Deleting is a crucial step in cleaning up data and ensuring the worksheet is free of unnecessary or redundant information.

1. Deleting Cell Content

Deleting cells in Excel involves removing specific cells and shifting the surrounding data to fill the gap. This can be done by selecting the cells, right-clicking, and choosing “Delete,” followed by specifying whether to shift the cells up or left. Unlike clearing content, deleting cells affects the structure of the worksheet by adjusting the layout. This feature is particularly useful for reorganizing data or eliminating unnecessary cells without deleting entire rows or columns.

- ◆ Clearing Contents:
 - Select the cell(s) and press Delete on your keyboard to remove the content without deleting the cell itself.
- ◆ Clearing Specific Elements:
 - Go to Home → Clear and choose:
 - Clear All: Removes everything (content, formatting, and comments).
 - Clear Contents: Removes only the content.
 - Clear Formats: Retains content but removes formatting.
 - Clear Comments and Notes: Deletes only the comments.

2. Deleting Rows and Columns

Deleting rows and columns in Excel allows users to remove entire sections of data from a worksheet to streamline its structure and organization. This can be done by selecting the row or column, right-clicking, and choosing the “Delete” option, or by using the “Delete” command in the ribbon. When a row or column is deleted, the surrounding data automatically shifts to fill the space, maintaining the continuity of the worksheet. Deleting rows and columns is particularly helpful for eliminating unnecessary or duplicate data, reorganizing the layout, or preparing the worksheet for analysis or presentation.

- ◆ Using the Right-Click Menu:
 - Right-click on a row/column header or selected cell(s) and choose Delete.
- ◆ Keyboard Shortcut:
 - Select the row(s) or column(s) and press **Ctrl + -** (minus key).
- ◆ Dialog Box Options (for cells):
 - After selecting cells, right-click and choose Delete:
 - Shift cells left: Moves cells on the right to the left.
 - Shift cells up: Moves cells below upward.
 - Entire row/column: Deletes the selected row or column.

3. Deleting Worksheets

Deleting sheets in Excel involves removing an entire worksheet from a workbook. Before deleting, Excel may prompt you to confirm the action, as it permanently removes all data and formatting in the sheet. This feature is useful for eliminating unnecessary or outdated sheets, and helping keep the workbook organized and focused.

- ◆ Single Sheet:
 - Right-click the sheet tab and select Delete.
- ◆ Multiple Sheets:
 - Hold Ctrl and select multiple sheets, then right-click and choose Delete.
- ◆ Warning: Deleting a sheet is permanent, and the action cannot be undone.
- ◆ Remove Blank Rows:
 - Use filters to locate blank rows, select them, and press Ctrl + -.
- ◆ Delete Without Losing Formatting:
 - Use Clear Contents instead of Delete to retain format

Exercise questions

1. Select a cell and delete its content using the “Delete” key. How does this action differ from clearing the formatting of the cell?
2. Select a range of cells and delete them by shifting the surrounding data either up or left. How does this impact the layout of the worksheet?
3. Delete an entire row from a dataset. How does the deletion affect the position of the remaining rows and any formulas referencing the deleted row?
4. Delete an entire column from a worksheet. Observe how the structure of the table changes and identify if formulas referencing the deleted column return errors.
5. Delete a worksheet from a workbook with multiple sheets. Does Excel prompt for confirmation? How does this action impact linked data or formulas in

other sheets?

1.1.11 Fill Handle

The fill handle in Excel is a powerful tool used to quickly copy and extend data or formulas to adjacent cells. It appears as a small square at the bottom-right corner of a selected cell or range. By clicking and dragging the fill handle across the desired range, users can replicate the content, continue patterns like numbers, dates, or text sequences or apply formulas to multiple cells. The fill handle is useful for saving time when working with repetitive data or performing calculations across rows or columns. It also supports custom lists, allowing users to define and autofill unique patterns or sequences.

Uses of the Fill Handle

1. Copying Data

- ◆ Select a cell containing data.
- ◆ Drag the Fill Handle across the desired range (down, up, left, or right) to copy the same value or formula.

	A	B	C	D	F	G	H	I	J	K
					Date of	Loan	Interest	Monthly	Bank	Bank
1	Custo	Customer	Account	Account	Last	Amount	rate	Interest	branch	name
	mer Id	Name	Number	Type	Transaction			Payable (₹)		
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakula	SBI
3	C002	Abhinand K	111205323	Current de	1/11/2023	100000	7.56	630	Vaakara	SBI
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur	SBI
5	C004	Aparna A	111204856	Current de	29/01/24	360000	7.77	2331	Wayanad	SBI
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur	SBI
7	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam	SBI
8										
9										

Fig 1.1.18 Copy the same value using fill handle

In the above example, the bank name for all customers is the same, so we can use the fill handle to copy the value 'SBI.' In Column K, Row 2, enter 'SBI,' select the cell, and drag the fill handle down to the last row.

2. Extending Data Series

- ◆ Numeric Patterns:
 - Enter two or more numbers in consecutive cells to define a pattern (e.g., 1, 2, 3).
 - Drag the Fill Handle to extend the sequence.
- ◆ Date Series:
 - Enter a starting date (e.g., 01/01/2025) and drag the Fill Handle to fill

consecutive dates.

◆ Custom Series:

- Define custom lists (e.g., “Monday, Tuesday, Wednesday”) via File → Options → Advanced → Edit Custom Lists.

A	B	C	D	F	G	H	I	J	K
Custo mer Id	Customer Name	Account Number	Account Type	Date of Last Transaction	Loan Amount	Interest rate	Monthly Interest Payable (₹)	Bank branch	Bank name
C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakular	SBI
C002	Abhinand K	111205323	Current dep	1/11/2023	100000	7.56	630	Vaakara	SBI
C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur	SBI
C004	Aparna A	111204856	Current dep	29/01/24	360000	7.77	2331	Wayanad	SBI
C005	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur	SBI
C006	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam	SBI

Fig 1.1.19 Enter consecutive numbers using fill handle

Filling Formulas:

- ◆ Enter a formula in one cell.
- ◆ Drag the Fill Handle to copy the formula to adjacent cells while automatically updating the cell references.

A	B	C	D	F	G	H	I	J	K
Custo mer Id	Customer Name	Account Number	Account Type	Date of Last Transaction	Loan Amount	Interest rate	Monthly Interest Payable (₹)	Bank branch	Bank name
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakular SBI
3	C002	Abhinand K	111205323	Current dep	1/11/2023	100000	7.56	630	Vaakara SBI
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur SBI
5	C004	Aparna A	111204856	Current dep	29/01/24	360000	7.77	2331	Wayanad SBI
6	C005	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur SBI
7	C006	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam SBI

Fig 1.1.20 Dragging formula

We can apply the formula to the first column and drag it down to apply it to the entire row.

3. AutoFill Options

- ◆ After using the Fill Handle, click the AutoFill Options button that appears.
- ◆ Choose from:
 - Copy Cells: Repeats the original value.
 - Fill Series: Extends a numeric or date series.

- Fill Formatting Only: Applies the format but not the content.
- Fill Without Formatting: Applies the content but not the format.

4. Flash Fill

- ◆ Recognizes patterns in adjacent columns and fills data accordingly.
- ◆ Example: If column A contains FirstName LastName and column B contains FirstName, Excel can auto-fill just the first names in column B.
- ◆ Shortcut: Use Ctrl + E to apply Flash Fill.

Exercise Questions

1. Activity 1: Copying Data
 - ◆ Enter Hello in cell A1.
 - ◆ Drag the Fill Handle down to row 10.
 - ◆ Observe that “Hello” is repeated in cells A1:A10.
2. Activity 2: Creating a Number Series
 - ◆ Enter 1 in A1 and 2 in A2.
 - ◆ Select both cells, then drag the Fill Handle down to row 10.
 - ◆ Observe the series generated: 1, 2, 3,
3. Activity 3: Working with Dates
 - ◆ Enter 01/01/2025 in B1.
 - ◆ Drag the Fill Handle down to fill the next 10 rows with consecutive dates.
4. Activity 4: Filling Formulas
 - ◆ Enter =A1*2 in cell C1 (assume column A contains numbers).
 - ◆ Drag the Fill Handle down to copy the formula to cells C2:C10.
 - ◆ Verify that Excel updates the references automatically (e.g., =A2*2, =A3*2).
5. Activity 5: Flash Fill
 - ◆ Enter John Smith in A1 and John in B1.
 - ◆ Type Jane in B2 (assuming Jane Doe is in A2).
 - ◆ Press Ctrl + E to auto-fill the first names in column B.

1.1.12 Templates in Excel

Templates in Excel are pre-designed spreadsheets that provide a structured framework for various tasks, saving time and effort. They come with predefined formatting, formulas, and layouts tailored to specific purposes, such as budgets, invoices, calendars, project plans, or data tracking. Excel templates are customizable, allowing users to adapt them to their unique needs while retaining the original structure. Built-in templates are readily available in Excel, and additional templates can be downloaded online or created from scratch. By using templates, users can streamline repetitive tasks, maintain consistency in their work, and ensure accuracy in data entry and calculations.

1. Types of Templates in Excel

- ◆ Built-in Templates:
 - Pre-installed with Excel.
 - Examples: Budget plans, invoices, calendars, expense reports.
- ◆ Custom Templates:
 - Created by users to suit specific needs.
 - Example: A unique project tracker for a team.
- ◆ Online Templates:
 - Downloadable from Microsoft Office or third-party sources.
 - Accessible via the File → New menu.

2. Accessing Templates in Excel

- ◆ Using Built-in Templates:
 - Open Excel and go to File → New.
 - Browse the list of available templates.
 - Click on a template to preview it.
 - Select Create to open the template as a new workbook.
- ◆ Using Online Templates:
 - Go to File → New.
 - Type keywords (e.g., “Invoice”) in the search bar.
 - Browse results and choose a template.
 - Select Create to use the template.
- ◆ Using Custom Templates:
 - Save a spreadsheet as a template:
 - Create your custom layout and design.
 - Go to File → Save As and select Excel Template (*.xltx) as the file type.

- Save it in the default template folder.
- Access your saved templates via File → New → Personal.

3. Uses of Templates in Excel

- ◆ Budgeting:
 - Track monthly expenses, income, and savings.
 - Use formulas for automatic calculations.
- ◆ Project Management:
 - Create Gantt charts, to-do lists, or milestone trackers.
- ◆ Invoices and Billing:
 - Generate invoices with automatic tax and total calculations.
- ◆ Attendance Sheets:
 - Track student or employee attendance with pre-set tables.
- ◆ Reports:
 - Format data and charts into professional-grade reports.

Exercise Questions

Activity 1: Using a Built-in Template

1. Open Excel and go to File → New.
2. Search for the “Personal Monthly Budget” template.
3. Fill in sample income and expense data.
4. Observe how the totals update automatically.

Activity 2: Downloading an Online Template

1. Go to File → New.
2. Search for “Invoice” in the search bar.
3. Select a template and click Create.
4. Enter sample customer details, items, and prices.
5. Save the file with the name Sample_Invoice.xlsx.

Activity 3: Creating a Custom Template

1. Create a student attendance tracker:
2. Add columns for Name, Roll Number, and days of the week.
3. Apply borders, shading, and a title.
4. Save the file as a template (.xltx).
5. Open the template to create a new workbook.

Experiment 2

Basic Functions and Formulas, Formatting and Printing

Discussion

1.2.1 Introduction

Mastering Excel's foundational functions and formatting tools is essential for efficient data analysis and presentation. Key functions like SUM, AutoSum, AVERAGE, MIN, and MAX enable users to perform fundamental calculations, such as totaling values, computing averages, and identifying minimum and maximum figures within datasets. Understanding cell references including relative, absolute, and mixed references - is crucial for creating dynamic formulas that adapt as data changes. Additionally, Excel's formatting features, such as borders, alignment tools, Format Painter, number formats, styles, and themes, enhance the visual appeal and readability of spreadsheets. Proficiency in these areas ensures that data is not only accurate but also presented in a clear and professional manner, facilitating better decision-making and communication.

1.2.2 Theory

1.2.2.1 Basic Functions in Excel

Excel provides a variety of basic functions that simplify calculations and data analysis. Common functions include SUM () for adding values, AVERAGE () for calculating the mean, COUNT () for counting cells with numbers, MAX () and MIN () for finding the highest and lowest values, and IF () for performing logical tests. These functions make it easy to process and analyze data efficiently, helping users perform everyday tasks like totaling expenses, calculating averages, or comparing values with ease. Detailed explanations are given below:

1. **SUM Function:** Adds all numbers in a specified range.

Syntax: =SUM(number1, [number2], ...)

Example: =SUM(A1:A10) //calculates the total of values from cell A1 to A10.

2. **AutoSum Feature:** A quick method to apply the SUM function. Select the cell below or to the right of the numbers to sum, then click the "AutoSum" button (Σ) on the toolbar. Excel automatically detects the range to sum and inserts the formula. It computes the arithmetic mean of a range.

Syntax: =AVERAGE(number1, [number2], ...)

Example: =AVERAGE(B1:B10) //calculates the average of values from cell B1 to B10.



3. **MIN Function:** Identifies the smallest number in a range.

Syntax: `=MIN(number1, [number2], ...)`

Example: `=MIN(C1:C10)` //returns the lowest value between cells C1 and C10.

4. **MAX Function:** Identifies the largest number in a range.

Syntax: `=MAX(number1, [number2], ...)`

Example: `=MAX(D1:D10)` //returns the highest value between cells D1 and D10.

The basic functions are again categorized into different groups based on their purpose. Here are some of the main categories of built-in functions in Excel:

1.2.2.2 Mathematical Functions

Excel provides a wide range of mathematical functions that allow users to perform various calculations, from basic arithmetic to more complex mathematical operations. These functions are essential for analyzing data, solving equations, and automating repetitive calculations. Below are some of the commonly used mathematical functions in Excel:

A. Basic Arithmetic Functions: In Microsoft Excel, several fundamental functions facilitate efficient data analysis and management:

- ♦ **SUM ():** Adds values in a range.

Example: `=SUM (A1:A5)` calculates the total of cells A1 through A5.

- ♦ **PRODUCT ():** Multiplies values in a range.

Example: `=PRODUCT (A1:A3)` multiplies the values in cells A1, A2, and A3.

- ♦ **SUBTRACTION:** No direct function, but you can subtract values using a formula like `=A1-A2`.

- ♦ **DIVISION:** No direct function, but you can divide values using a formula like `=A1/A2`.

B. Power and Root Functions

- ♦ **POWER ():** Calculates the power of a number.

Example: `=POWER (3, 2)` returns 9 (3²).

- ♦ **SQRT ():** Returns the square root of a number.

Example: `=SQRT (16)` returns 4.

- ◆ **EXP ()**: Calculates the exponential value of a number (e raised to the power of a number).

Example: =EXP (1) returns approximately 2.718.

C. Rounding Functions

- ◆ **ROUND ()**: Rounds a number to a specified number of digits.

Syntax: ROUND(number, num_digits)

In the above syntax, number is the number you want to round. num_digits specifies the number of decimal places to round to:

- A positive value rounds to the specified number of decimal places.
- Zero rounds to the nearest whole number.
- A negative value rounds to the nearest multiple of 10, 100, etc.

Example: =ROUND (3.14159, 2) returns 3.14.

- ◆ **ROUNDUP ()**: Rounds a number up, away from zero.

Syntax: ROUNDUP(number, num_digits)

In the above syntax, number is the numeric value to be rounded up. num_digits specifies the number of decimal places to round up to:

- A positive value rounds up to the specified number of decimal places.
- Zero rounds up to the nearest whole number.
- A negative value rounds up to the nearest multiple of 10, 100, etc.

Note: ROUNDUP() adjusts the number upward, that is it always moves the number up to the next possible value at the specified decimal place.

Example: =ROUNDUP (3.14, 1) returns 3.2.

- ◆ **ROUNDDOWN ()**: Rounds a number down, towards zero.

Syntax: ROUNDDOWN(number, num_digits)

In the above syntax, number is the numeric value to be rounded down. num_digits specifies the number of decimal places to round down to:

- A positive value rounds down to the specified number of decimal places.
- Zero rounds down to the nearest whole number.
- A negative value rounds down to the nearest multiple of 10, 100, etc.

Note: Rounding Rule: Always rounds down

Example1: =ROUNDDOWN (3.14, 1) returns 3.1.

Example2: =ROUNDDOWN (5.99, 1) returns 5.9.

- ♦ **INT ()**: Returns the integer portion of a number, truncating any decimals.

Syntax: INT(number)

where, number is the numeric value to be rounded down to the nearest integer.

Example: =INT (3.9) returns 3.

D. Trigonometric Functions

- ♦ **SIN (), COS (), TAN ()**: Calculate the sine, cosine, and tangent of an angle (in radians).

Example: =SIN (PI ()/2) returns 1.

- ♦ **ASIN (), ACOS (), ATAN ()**: Return the arcsine, arccosine, and arctangent of a number.

Example: =ASIN (1) returns $\pi/2$ (1.57 radians).

- ♦ **DEGREES ()**: Converts radians to degrees.

Example: =DEGREES (PI ()) returns 180.

- ♦ **RADIANS ()**: Converts degrees to radians.

Example: =RADIANS (180) returns π (3.14).

E. Logarithmic and Exponential Functions

- ♦ **LOG ()**: Returns the logarithm of a number with a specified base.

Example: =LOG (100, 10) returns 2 (log base 10 of 100).

- ♦ **LN ()**: Returns the natural logarithm (log base e) of a number.

Example: =LN (2.718) returns approximately 1.

- ♦ **EXP ()**: Calculates e raised to the power of a number.

Example: =EXP (2) returns 7.39.

F. Absolute Value and Sign Functions

- ♦ **ABS ()**: Returns the absolute value of a number.

Example: =ABS (-10) returns 10.

- ♦ **SIGN ()**: Returns 1 for positive numbers, -1 for negative numbers, and 0 for zero.

Example: =SIGN (-10) returns -1.

G. Sum-Based Functions

- ♦ **SUMIF ()**: Adds values based on a condition.

Example: =SUMIF (A1:A10, ">5") adds all values greater than 5 in the range A1 to A10.

- ◆ **SUMPRODUCT ():** Multiplies corresponding elements in arrays and returns the sum of those products.

Example: =SUMPRODUCT (A1:A3, B1:B3) multiplies each value in A1:A3 with the corresponding value in B1:B3 and sums the results.

H. Data Analysis Functions

- ◆ **AVERAGE():** The Average function calculates the arithmetic mean of sets of numbers. That is the sum of numbers divided by the count of numbers.

Syntax:

=AVERAGE(number1, [number2], ...)

Example:

=AVERAGE(12,23,11,5,8,10) //will give result as 11.5 as average is calculated as [(12+23+11+5+8+10)/6]

We can also calculate the average by including the range of cells in the equation as

=AVERAGE(A1:A6) if the data is ranging from cells A1 to A6

- ◆ **MEDIAN():** This function is used to calculate the median value. The median indicates the middle value in a given set of numbers after arranging them in ascending order. If the total numbers in the set are odd, the middle value is returned. If the number of values is even, the average of the two middle values is returned.

Syntax:

=MEDIAN(number1, [number2], ...)

Example1:

=MEDIAN(12,23,11,5,8,10) will return the result as 10.5

First arrange the numbers in ascending order: 5,8,**10,11**,12,23, find the average of two middle numbers.

Example 2:

=MEDIAN(12,23,8,5,11)will return the result as 11

First arrange the numbers in ascending order: 5,8,**11**,12,23 find the middle number

We can also write the range of cells instead of separating numbers by comma

=MEDIAN(A1:A6)

- ◆ **MODE():** Finds the most frequent number in the set of given numbers. If there are more than one value with the same highest frequency, it returns the first one found.

Syntax:

=MODE(number1, [number2], ...)

Example:

=MODE(11,12,11,12,12,10,12) will return the result as 12

=MODE(11,12,11,12,10,10,8) will return the result as 11 even though there are 11, 12, and 10 are appearing at the same frequency, but 11 is occurring first. Hence the result is 11.

We can also write the range of cells instead of separating numbers by comma

=MODE(A1:A6)

- ◆ **COUNT():** This function counts the number of numeric values in the given range of values. This function will not consider blank values, text values, and non-numeric data.

Syntax:

=COUNT(value1, [value2], ...)

Example:

=COUNT(12,23,11,5,8,10) will return the result as 6

=COUNT(12,23,11,"abc",8,"*") will return the result as 4. In this case, the function will ignore text value and non-numeric data.

We can also write the range of cells instead of separating numbers by comma

=COUNT(A1:A6)

- ◆ **COUNTA():** This function counts all the non-empty cells in the given range of cells. All numbers and text are included while counting. It is useful to count the total number of filled cells in the range of data or the dataset.

Syntax:

=COUNTA(value1, [value2], ...)

Example:

=COUNTA(12,23,11, "abc",8,"*") will return the result as 6 as it counts text and non-numeric values.

We can also write the range of cells instead of separating numbers by comma

=COUNTA(A1:A7)

1.2.2.3 Text Functions in Excel

Excel provides several powerful text functions that help manipulate, format, and clean text data. These functions are essential for managing textual data, such as names, addresses, and product descriptions, and are widely used in data cleaning and preparation. Below are some of the most commonly used text functions in Excel:

- i. **CONCAT () / CONCATENATE ():** Combines text from multiple cells into one. Useful for merging first and last names, addresses, or other fields.

Example: `=CONCAT (A1, " ", B1)` combines the values in cells A1 and B1 with a space in between.

- ii. **TEXT ():** Formats a value and converts it to text. Useful for customizing date, time, or number formats.

Example: `=TEXT (A1, "MM/DD/YYYY")` formats a date in cell A1 as "12/31/2025".

- iii. **LEFT():** Extracts a specific number of characters from the start of a text string. Useful for extracting prefixes or codes from strings.

Example: `=LEFT (A1, 5)` returns the first five characters of the text in cell A1.

- iv. **RIGHT():** Extracts a specific number of characters from the end of a text string. Useful for extracting suffixes or specific trailing information.

Example: `=RIGHT (A1, 3)` returns the last three characters of the text in cell A1.

- v. **LEN():** Counts the number of characters in a text string, including spaces. Useful for validating or analyzing text lengths.

Example: `=LEN(A1)` returns the length of the text in cell A1.

- vi. **TRIM():** Removes all extra spaces from a text string, leaving only single spaces between words. Useful for cleaning text data imported from other sources.

Example: `=TRIM(A1)` cleans up unnecessary spaces in cell A1.

- vii. **UPPER():** Converts all text to uppercase. Useful for standardizing text.

Example: `=UPPER(A1)` changes "hello" to "HELLO".

- viii. **LOWER():** Converts all text to lowercase. Useful for consistency in case-sensitive environments.

Example: `=LOWER(A1)` changes "HELLO" to "hello".

- ix. **FIND()**: Returns the position of a specific character or substring within a text string. Useful for locating specific text.

Example: `=FIND("e", A1)` returns the position of the first occurrence of "e" in cell A1.

- x. **SUBSTITUTE()**: Replaces occurrences of a specific text within a string with another text. Useful for updating or cleaning up text.

Example: `=SUBSTITUTE(A1, "old", "new")` replaces "old" with "new" in cell A1.

- xi. **REPLACE()**: Replaces part of a text string, starting at a specific position and length.

Example: `=REPLACE(A1, 3, 2, "xy")` replaces two characters starting from the third character in cell A1 with "xy".

1.2.2.4 Logical Functions in Excel:

Logical functions in Excel allow users to test conditions and return specific results based on whether the condition is TRUE or FALSE. These functions are essential for decision-making, automating tasks, and analyzing data. Here are the commonly used logical functions in Excel:

- i. **IF()**: The IF function returns one value if a condition is TRUE and another value if it is FALSE. Decision-making, such as determining pass/fail, eligibility, or categorization.

Syntax: `=IF(condition, value_if_true, value_if_false)`

Example: `=IF(A1>50, "Pass", "Fail")` returns "Pass" if the value in A1 is greater than 50; otherwise, it returns "Fail."

- ii. **AND()**: The AND function returns TRUE if all specified conditions are TRUE; otherwise, it returns FALSE. Evaluating multiple conditions simultaneously.

Syntax: `=AND(condition1, condition2, ...)`

Example: `=AND(A1>50, B1<100)` returns TRUE if A1 is greater than 50 and B1 is less than 100.

- iii. **OR()**: The OR function returns TRUE if at least one condition is TRUE; otherwise, it returns FALSE. Checking if any one of several conditions is met.

Syntax: `=OR(condition1, condition2, ...)`

Example: `=OR(A1>50, B1<100)` returns TRUE if either A1 is greater than 50 or B1 is less than 100.

- iv. **NOT()**: The NOT function reverses the result of a condition. If the condition is TRUE, it returns FALSE, and vice versa. Handling errors like division by zero or invalid references gracefully.

Syntax: =NOT(condition)

Example: =NOT(A1>50) returns TRUE if A1 is not greater than 50.

- v. **XOR()**: The XOR function (exclusive OR) returns TRUE if an odd number of conditions are TRUE; otherwise, it returns FALSE.

Syntax: =XOR(condition1, condition2, ...)

Example: =XOR(A1>50, B1<100) returns TRUE if only one of the conditions is TRUE.

1.2.2.5 Date and Time Functions

In Excel, date and time functions are widely used for calculations, formatting, and analyzing dates and times. Here are some commonly used date and time functions:

A. Date Functions in Excel

1. **TODAY()**: Returns the current date.

Example: If today is January 12, 2025, =TODAY() returns 12/01/2025.

2. **DATE(year, month, day)**: Creates a date value from the given year, month and day.

Example: date =DATE(2025, 1, 12) //returns 12/01/2025.

3. **YEAR(date)**: Extracts the year from a date.

Example: year =YEAR("12/01/2025") //returns 2025.

4. **MONTH(date)**: Extracts the month from a date.

Example: 4y=MONTH("12/01/2025") //returns 1.

5. **DAY(date)**: Extracts the day from a date.

Example: day =DAY("12/01/2025") //returns 12.

B. Time Functions in Excel

1. **NOW()**: Returns the current date and time.

Example:

If the current time is **1:30 PM on January 12, 2025**,

now =NOW() //returns 12/01/2025 13:30.



2. TIME(hour, minute, second): Creates a time value from the given hour, minute, and second.

Example:

time =TIME(13, 30, 0) //returns 1:30 PM.

3. HOUR(time): Extracts the hour from a time value.

Example:

hours =HOUR("13:30") //returns 13.

4. MINUTE(time): Extracts the minute from a time value.

Example:

minutes =MINUTE("13:30") //returns 30.

5. SECOND(time): Extracts the second from a time value.

Example:

seconds =SECOND("13:30:45") returns 45.

Exercise Questions

Question 1: Calculating Total Sales Using SUM

You have the following sales data for a week:

- ◆ Monday: \$100
- ◆ Tuesday: \$170
- ◆ Wednesday: \$180
- ◆ Thursday: \$220
- ◆ Friday: \$150

	A	B	C	D	E	F	G	H
1	DAYS	SALES						
2								
3	MONDAY	100						
4	TUESDAY	170						
5	WEDNESDAY	180						
6	THURSDAY	220						
7	FRIDAY	150						
8								
9	TOTAL	820						
10								
11								
12								

Fig 1.2.1: Total Sales Using SUM

Question 2: Using AutoSum to Find the Average Score

A student received the following scores in five subjects:

- ◆ Math: 85
- ◆ Science: 90
- ◆ English: 78
- ◆ History: 88

	A	B	C	D	E
1	SUBJECTS	MARKS			
2					
3	MATHEMATICS	85			
4	SCIENCE	90			
5	ENGLISH	78			
6	HISTORY	88			
7					
8					
9	TOTAL	341			
10					
11					
12					
13					
14					
15					

Fig 1.2.2: AutoSum to Find the Average Score

1.2.3 Theory: Formulas in Excel or Calculations across sheets

In Excel, formulas are expressions that perform calculations, manipulate data, and return results. They are used to automate calculations and perform various operations on the data in your Excel worksheets.

Formulas in Excel consist of a combination of values, cell references, functions, and operators. They are written in specific syntax, starting with an equal sign (=), followed by the elements that make up the formula.

Here is an overview of the components commonly used in Excel formulas:

- ◆ **Values:** These are specific numbers, text, or dates that you can directly include in a formula. For example, “=5+3” or “= “Hello World””
- ◆ **Cell References:** Excel allows you to refer to cells by their column and row reference within a formula. Cell references help dynamically include the values stored in those cells in your calculations. For example, “=A1+B1” adds the values in cells A1 and B1.
- ◆ **Functions:** There are several built-in functions in Excel that carry out particular operations or computations. Functions can be used to manipulate data, perform mathematical calculations, analyze data, and more. Examples of functions include SUM, AVERAGE, IF, COUNT, and many others. Functions

are typically written with the function name followed by parentheses that may contain additional arguments. For example, “=SUM(A1:A5)” calculates the sum of the values in the range A1 to A5.

- ◆ **Operators:** Operators are symbols or characters that perform specific operations on values or cell references. They include arithmetic operators (+, -, *, /), comparison operators (=, <, >, <=, >=), logical operators (AND, OR, NOT), concatenation operator (&), and more. Operators are used to define the type of operation you want to perform within a formula.

1.2.3.1 Operators in Excel

Excel formulas can be as simple as a single value or cell reference, or they can be complex, involving multiple values, cell references, functions, and operators. Formulas can be entered directly into cells, or they can be used in various functions and features throughout Excel to perform calculations, data analysis, conditional formatting, and more.

Using formulas in Excel involves the following steps:

- ◆ Select the cell where you want the formula result to display.
- ◆ Start the formula by typing an equal sign (=). This tells Excel that you are entering a formula.
- ◆ Enter all the elements of the formula, which can include cell references, values, functions, and operators. You can type them directly or use the mouse to select cells or functions from the toolbar.
- ◆ As you enter the formula, Excel provides suggestions and auto-complete options to help you with syntax and function names. You can also refer to the Formula Bar at the top of the Excel window to see and edit the formula.
- ◆ Press Enter key once you have completed the formula. Excel will calculate the formula and display the result in the selected cell.

By using formulas in Excel, you can perform calculations, analyze data, automate tasks, and manipulate data efficiently. Operators allow you to perform mathematical calculations, comparisons, concatenations, and logical operations. Here are the main types of operators in Excel:

A. Arithmetic Operators:

- ◆ **Addition (+):** Adds values together. For example, “=A1 + B1” adds the values in cells A1 and B1.
- ◆ **Subtraction (-):** Subtracts one value from another. For example, “=A1 - B1” subtracts the value in cell B1 from the value in cell A1.
- ◆ **Multiplication (*):** Multiplies values together. For example, “=A1 * B1” multiplies the values in cells A1 and B1.

- ◆ **Division (/):** Divides one value by another. For example, “=A1 / B1” divides the value in cell A1 by the value in cell B1.
- ◆ **Exponentiation (^):** Raises a value to the power of another value. For example, “=A1 ^ B1” raises the value in cell A1 to the power of the value in cell B1.

B. Comparison Operators:

- ◆ **Equal to (=):** Checks if two values are equal. For example, “=A1 = B1” returns TRUE if the values in cells A1 and B1 are equal.
- ◆ **Not equal to (<>):** Checks if two values are not equal. For example, “=A1 <> B1” returns TRUE if the values in cells A1 and B1 are not equal.
- ◆ **Greater than (>):** Checks if one value is greater than another value. For example, “=A1 > B1” returns TRUE if the value in cell A1 is greater than the value in cell B1.
- ◆ **Less than (<):** Checks if one value is less than another value. For example, “=A1 < B1” returns TRUE if the value in cell A1 is less than the value in cell B1.
- ◆ **Greater than or equal to (>=):** Checks if one value is greater than or equal to another value.
- ◆ **Less than or equal to (<=):** Checks if one value is less than or equal to another value.

C. Concatenation Operator:

- ◆ **Ampersand (&):** Joins two or more text strings together. For example, “=A1 & “ “ & B1” concatenates the values in cells A1 and B1 with a space in between.

D. Logical Operators:

- ◆ **AND:** Checks if all specified conditions are TRUE.
- ◆ **OR:** Checks if at least one of the specified conditions is TRUE.
- ◆ **NOT:** Negates the logical value of a condition.

These operators, when combined with values, cell references, and functions, allow you to create formulas that perform calculations, comparisons, text manipulations, and logical operations in Excel.

1.2.3.2 Entering formulas in Excel

To enter a formula in Excel, follow these steps:

- ◆ Select the cell where you want to enter the formula.
- ◆ Begin the formula by typing the equal sign (=). This means that you are entering a formula.

- ◆ Enter the formula using cell references, operators, and functions. For example, to add the values in cells A1 and B1, you can enter “=A1+B1”.
- ◆ Use parentheses or round brackets () to control the order of calculations if needed. For example, “(A1+B1)*C1” will add the values in cells A1 and B1, and then multiply the result by the value in cell C1.
- ◆ Press Enter to complete the formula. Excel will calculate the result based on the formula you entered and display it in the selected cell.

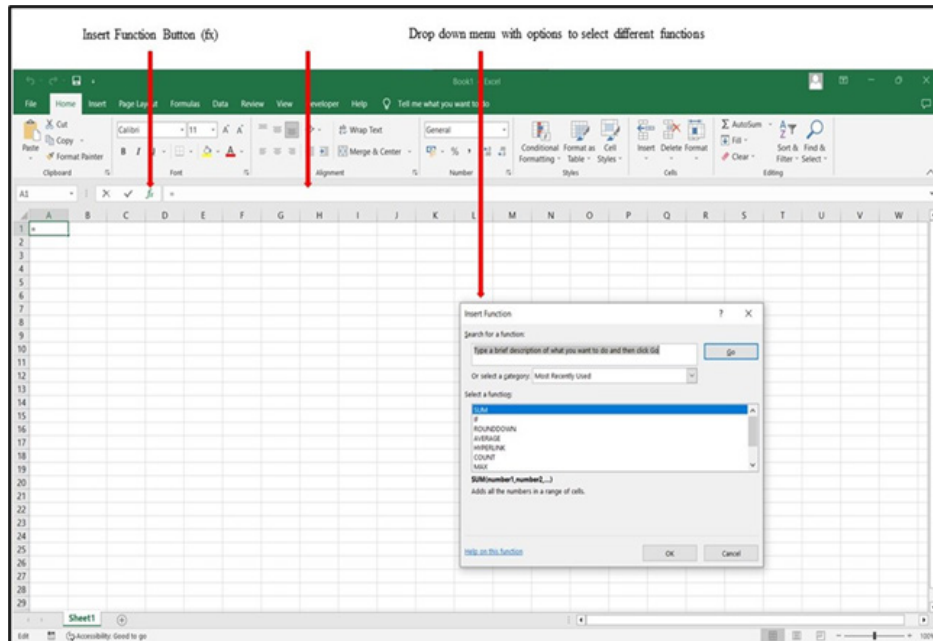


Fig 1.2.3: Entering formula in Excel

You can also use the Insert Function button (fx) on the formula bar to access a list of built-in functions and easily insert them into your formula (Refer to Fig 1.2.1). Simply click on the Insert Function button, select the function you want to use, and follow the prompts to enter the necessary arguments. The detailed explanation and usage of different functions are given in subsequent chapters.

From our above example figure 1.2.1 bank details of a customer, we can calculate **monthly interest payable** for customers who have taken a loan.

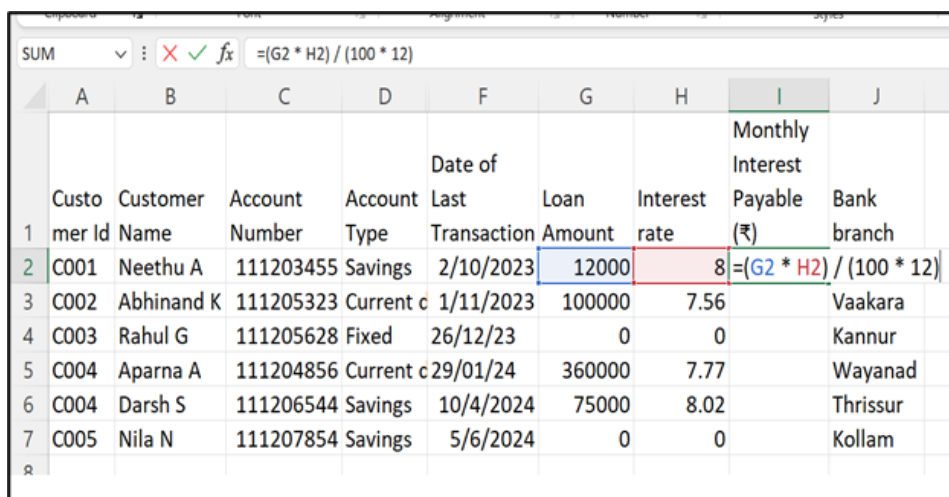
The formula to calculate the monthly interest is:

$$\text{Monthly Interest Payable} = \frac{\text{Loan Amount} \times \text{Interest Rate (\%)}}{100 \times 12}$$

A. Steps to Implement in Excel

1. **Add a New Column:** Add a column titled “**Monthly Interest Payable (₹)**” next to the **Interest Rate** column.
2. **Enter the Formula:** For example, if the loan amount is in column G and the interest rate is in column H. In the first row of the new column I (say row 2), enter:

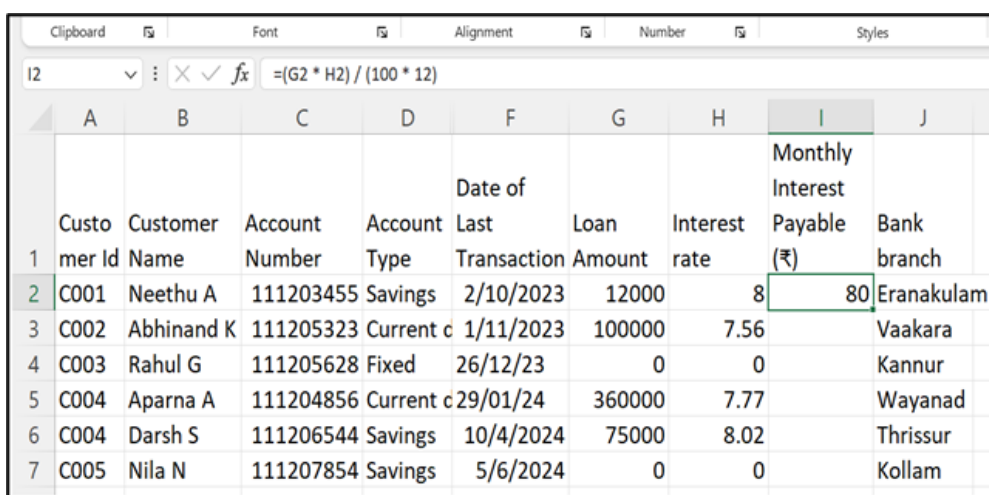
$$=(G2 * H2) / (100 * 12)$$



	A	B	C	D	F	G	H	I	J
					Date of			Monthly	
	Custo	Customer	Account	Account	Last	Loan	Interest	Interest	Bank
1	mer Id	Name	Number	Type	Transaction	Amount	rate	Payable	branch
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	$=(G2 * H2) / (100 * 12)$	
3	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56		Vaakara
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0		Kannur
5	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77		Wayanad
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02		Thrissur
7	C005	Nila N	111207854	Savings	5/6/2024	0	0		Kollam

Fig 1.2.4: Entering formula

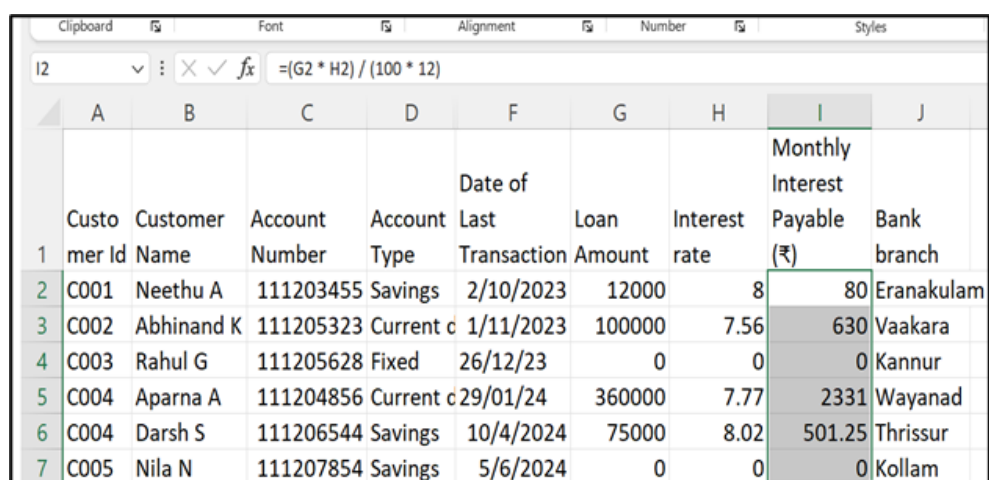
3. Press enter



	A	B	C	D	F	G	H	I	J
					Date of			Monthly	
	Custo	Customer	Account	Account	Last	Loan	Interest	Interest	Bank
1	mer Id	Name	Number	Type	Transaction	Amount	rate	Payable	branch
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakulam
3	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56		Vaakara
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0		Kannur
5	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77		Wayanad
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02		Thrissur
7	C005	Nila N	111207854	Savings	5/6/2024	0	0		Kollam

Fig 1.2.5: Press enter

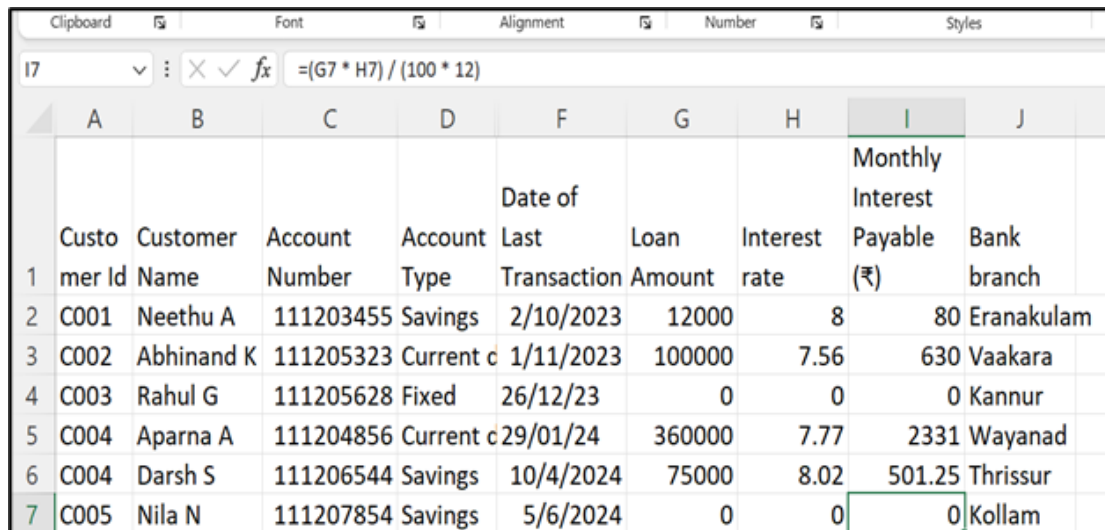
4. Drag the Formula Down: Copy the formula to all rows in the column.



	A	B	C	D	F	G	H	I	J
					Date of			Monthly	
	Custo	Customer	Account	Account	Last	Loan	Interest	Interest	Bank
1	mer Id	Name	Number	Type	Transaction	Amount	rate	Payable	branch
2	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakulam
3	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56	630	Vaakara
4	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur
5	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77	2331	Wayanad
6	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur
7	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam

Fig 1.2.6: Calculating values in all columns after dragging

5. Result: Excel will calculate the monthly interest payable for each customer.



	A	B	C	D	F	G	H	I	J
	Custo mer Id	Customer Name	Account Number	Account Type	Date of Last Transaction	Loan Amount	Interest rate	Monthly Interest Payable (₹)	Bank branch
1	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Eranakulam
2	C002	Abhinand K	111205323	Current c	1/11/2023	100000	7.56	630	Vaakara
3	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur
4	C004	Aparna A	111204856	Current c	29/01/24	360000	7.77	2331	Wayanad
5	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur
6	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam

Fig 1.2.7: Result of entering formula

The same can be done using the fx option and using formula ribbon in Excel without directly typing the formula into the cell.

Steps to Calculate Monthly Interest Payable Using the fx Option

1. Select the Cell for Calculation:

- ◆ Click on the cell where you want to display the **Monthly Interest Payable I**.

2. Click on the fx Button:

- ◆ Look for the **fx** button (Function Wizard) next to the formula bar. Click on it.

3. Choose a Function:

- ◆ In the **Insert Function** dialog box:
 - Select **Math & Trig** or **All** in the “Or select a category” dropdown.
 - Choose the function **PRODUCT** or **MULTIPLY** (to calculate the product of numbers).

4. Enter the Arguments for the Formula:

- ◆ The formula for monthly interest payable is: $(\text{Loan Amount} \times \text{Interest Rate}) \div 100 \div 12$
- ◆ Input the arguments:
 - For **Loan Amount**, select the respective cell **G**
 - For **Interest Rate**, select the respective cell **I**. Remember, if the percentage format isn't applied, divide it by 100 here.
 - Use **/** (divide) for dividing the product by 12×100 in subsequent steps.

5. Apply the Formula:

- ◆ Click **OK**, and the calculated monthly interest will appear in the selected cell.

B. Using the Formula Ribbon: You can also use the Formula Ribbon to create the same calculation interactively:

1. **Go to the Formula Ribbon:**

- ◆ Click on the **Formulas** tab in the Excel ribbon.

2. **Insert Function:**

- ◆ Click on **Insert Function** on the left-hand side.

3. **Choose the PRODUCT Function:**

- ◆ From the dialog box, select **PRODUCT** to multiply the loan amount and interest rate.

4. **Complete the Formula:**

- ◆ After calculating the product, divide it using **/** by **100 × 12** directly in the formula bar.

5. **Drag Down the Formula:**

- ◆ Use the fill handle to copy the formula down for all rows.

Exercise Questions

Question 1: Round a set of numerical values to the nearest integer.

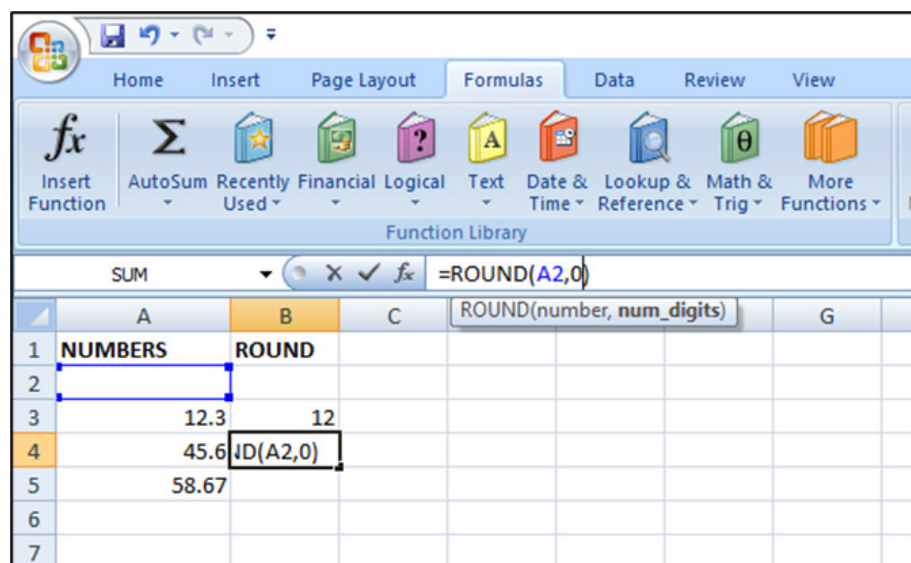


Fig 1.2.8: Round a set of numerical values

Question 2: Combine text from multiple cells into one (Concatenating Text Strings).

1.2.4 Formatting in Excel

Formatting cells, rows, and columns in Excel is a crucial aspect of data presentation and customization. By applying formatting options, you can enhance the visual appearance of your data, emphasize important information, and make it more readable and professional. Excel Cell can hold different types of data like Numbers, Currency, Dates, etc. The various cell formats are as follows;

	A	B	C	D	E	F	G	H	I	J	K
1	General	Number	Currency	Accounting	Date	Long date	Time	Percentage	Fraction	Scientific	Text
2	abcd1234	1234567890.00	₹ 1,23,45,67,890.00	₹ 1,23,45,67,890.00	24-06-2023	24 June 2023	12:00:00 AM	123456789000.00%	1/2	1.23E+09	Abcd
3											

Fig 1.2.9: Examples of cell formats

- ◆ **General:** The default cell format that displays the cell content as it is.
- ◆ **Number:** Formats the cell content as a number with appropriate separators.
- ◆ **Currency:** Formats the cell content as currency, including the currency sign.
- ◆ **Accounting:** Similar to the currency format, used specifically for accounting purposes.
- ◆ **Date:** Formats the cell content as a date, with various date formats available.
- ◆ **Time:** Formats the cell content as a time, with different time formats to choose from.
- ◆ **Percentage:** Formats the cell content as a percentage with decimal places.
- ◆ **Fraction:** Formats the cell content as a fraction, such as 1/4 or 1/2.
- ◆ **Scientific:** Formats the cell content in scientific notation, such as 5.6E+01.
- ◆ **Text:** Treats the cell content as normal text without applying any formatting.
- ◆ **Special:** Provides special formats for specific data types, such as zip codes or phone numbers.
- ◆ **Custom:** Allows you to create a custom format for the cell content based on your specific requirements.

To access the formatting options for cells, rows, and columns in Excel, follow these steps:

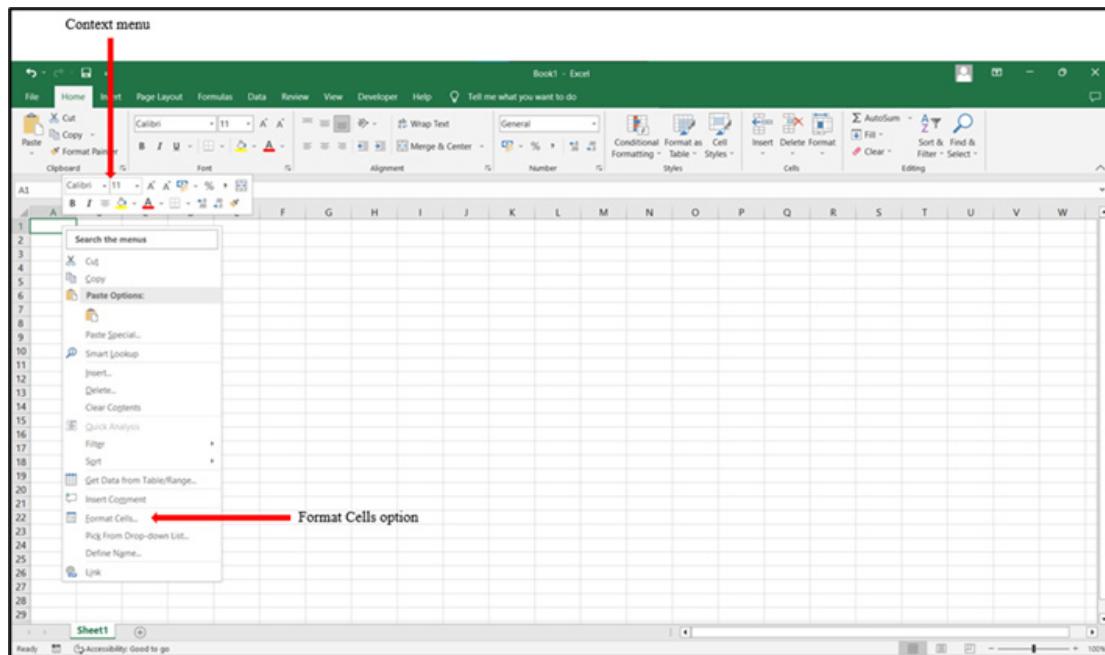


Fig 1.2.10: Formatting cells

- ◆ Select the cell(s), row(s), or column(s) that you want to format. You can do this by clicking and dragging the mouse cursor over the desired cells, rows, or columns, or by clicking on a cell and then holding down the Shift key while selecting additional cells, rows, or columns.
- ◆ Once the desired cells, rows, or columns are selected, you can access the formatting options through various methods:
 - **Format Cells Dialog Box:** Right-click on the selected cells, rows, or columns and choose “Format Cells” from the context menu (Refer to Fig 1.1.16). Alternatively, you can go to the Home tab in the Excel ribbon, click on the “Format” drop-down arrow in the Cells group, and select “Format Cells.” (Refer Fig 1.2.7)
 - **Ribbon Options:** In the Home tab of the Excel ribbon, you will find different formatting options in the Cells group. These options include Font, Alignment, Number Format, Cell Styles, and more. Click on the appropriate button for the formatting option you want to apply. (Refer to Fig 1.2.7)
 - **Shortcut Menus:** Right-click on the selected cells, rows, or columns to open a shortcut menu. The options in the menu will depend on the type of selection, but you can find formatting options such as Format Cells, Insert, Delete, and more. (Refer to Fig 1.2.6)
 - **Keyboard Shortcuts:** Excel also provides keyboard shortcuts for formatting. For example, pressing Ctrl+1 opens the Format Cells dialog box, Ctrl+B applies bold formatting, Ctrl+I apply italic formatting, and Ctrl+U underlines the text.

Once you have accessed the formatting options, you can modify various aspects of the selected cells, rows, or columns, such as font style, font size, font colour, cell borders,

cell background colour, number formatting, alignment, and more. Make the desired changes in the formatting options dialog box or ribbon, and then click OK or apply the formatting button to confirm the changes.

By using these methods, you can easily access and apply formatting options to cells, rows, and columns in Excel, allowing you to customize the appearance and style of your data. Excel provides a range of formatting tools that allow you to customize the appearance of your data. These formatting options help you improve readability, emphasize important information, and create a visually organized worksheet. Here are some of the key formatting tools available in Excel:

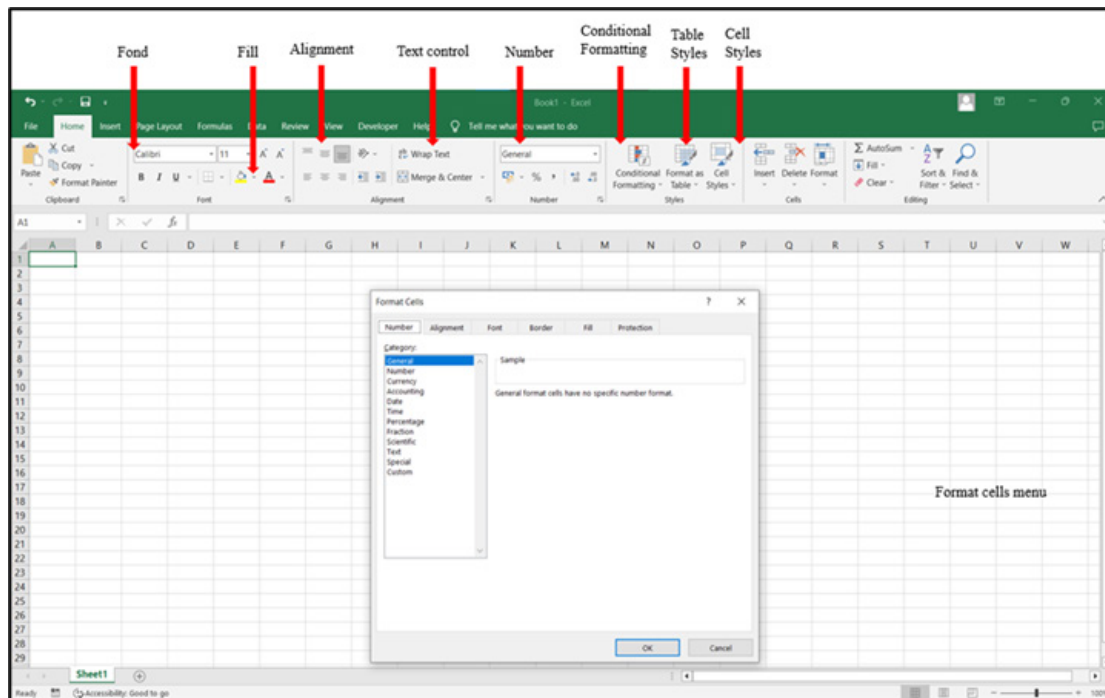


Fig 1.2.11: Options in formatting of cells

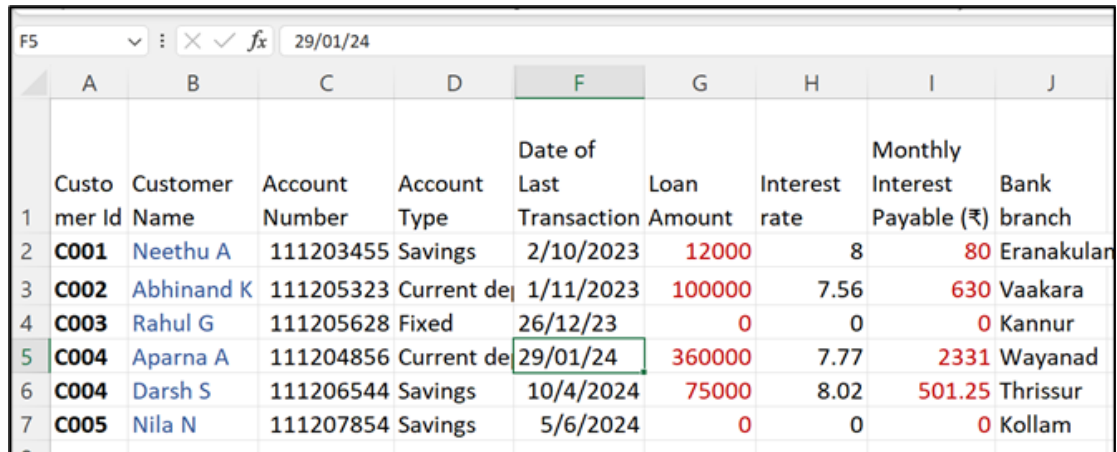
Here's an overview of the main formatting options available in Excel:

1.2.4.1 Types of Formatting

1. Font Formatting

- ◆ **Font Style:** You can change the font type (e.g., Arial, Times New Roman) to improve the readability and design of the worksheet.
- ◆ **Font Size:** Adjusting the font size allows you to make important information more prominent or fit more data into a cell.
- ◆ **Font Color:** Use different colors for text to make certain data stand out or categorize information visually.
- ◆ **Bold, Italic, Underline:** Apply bold for emphasis, italics for special data, or underline for headings or labels.

- ◆ **Changing Font or Style:** Use the **Home** tab to adjust font type, size, color, and cell alignment.



	A	B	C	D	F	G	H	I	J
	Custo mer Id	Customer Name	Account Number	Account Type	Date of Last Transaction	Loan Amount	Interest rate	Monthly Interest Payable (₹)	Bank branch
1	C001	Neethu A	111203455	Savings	2/10/2023	12000	8	80	Ernakulan
2	C002	Abhinand K	111205323	Current de	1/11/2023	100000	7.56	630	Vaakara
3	C003	Rahul G	111205628	Fixed	26/12/23	0	0	0	Kannur
4	C004	Aparna A	111204856	Current de	29/01/24	360000	7.77	2331	Wayanad
5	C004	Darsh S	111206544	Savings	10/4/2024	75000	8.02	501.25	Thrissur
6	C005	Nila N	111207854	Savings	5/6/2024	0	0	0	Kollam

Fig 1.2.12 font formatting

2. Number Formatting

- ◆ **Currency:** Use currency formatting to display numbers with a currency symbol (e.g., \$1,000.00).
- ◆ **Percentage:** Convert decimal numbers into percentages (e.g., 0.25 becomes 25%).
- ◆ **Date and Time:** Format cells to display dates (e.g., DD/MM/YYYY) or time (e.g., 2:30 PM), with various styles available.
- ◆ **Decimal Places:** Adjust the number of decimal places shown for numerical data for greater precision or simpler display.

Format cells as currency, percentages, or dates using the **Number** group in the **Home** tab.

3. Alignment

- ◆ **Horizontal and Vertical Alignment:** Control the alignment of text or numbers within a cell, such as left, center, or right alignment, and top, middle, or bottom alignment.
- ◆ **Text Wrap:** If the text is too long for a cell, the “wrap text” feature ensures the text continues on multiple lines within the same cell.
- ◆ **Merge Cells:** Combine multiple adjacent cells into one larger cell, often used for headers or titles that span across several columns or rows.

4. Borders and Shading

- ◆ **Borders:** Apply borders around cells or ranges to define and separate data. You can customize border styles (e.g., thick, dotted, or dashed) and apply them to individual sides of a cell.

- ◆ **Cell Shading (Fill Color):** Add background colors to cells to highlight or group data. This can help make certain sections stand out, like totals or headers. Use Home → Borders to apply or remove borders around cells.

5. Conditional Formatting

- ◆ **Highlight Cells Based on Criteria:** Conditional formatting allows you to automatically apply specific formatting (e.g., color or font change) to cells based on their values. For example, you can highlight cells with values greater than 100, or apply a color scale to indicate higher or lower values.
- ◆ **Data Bars and Color Scales:** Visual indicators like data bars (colored bars within cells) or color scales (gradient colors based on values) provide a quick way to analyze trends and data patterns. Highlight cells based on specific criteria (e.g., values greater than 100). Go to Home → Conditional Formatting.

6. Text Control and Orientation

- ◆ **Text Orientation:** Rotate text in a cell to any desired angle, useful for fitting text into narrow columns or for creating unique header layouts.
- ◆ **Shrink to Fit:** This option automatically reduces the font size to fit all the content within a cell without overflowing.

7. Cell Styles

- ◆ **Predefined Styles:** Excel provides built-in cell styles that combine various formatting elements (font, color, borders) to quickly apply consistent formatting across your spreadsheet. You can use these styles for headings, titles, or emphasized data.

8. Custom Formatting

- ◆ Excel also allows you to create custom number formats that adjust how data appears in a cell. For example, you can format a number to display with leading zeros, or even show text before or after numeric values.

9. Printing in Excel

Printing in Excel is a crucial aspect of sharing and presenting data, providing an easily shareable format for your spreadsheet. Whether you need a hard copy or a digital representation in the form of a PDF, understanding the printing process is essential for ensuring that your data is effectively communicated. Excel provides a range of features and settings that allow you to customize the printout, controlling everything from layout and orientation to the inclusion of specific elements like headers, footers, and gridlines.

Printing in Excel involves configuring various settings to ensure that the data is presented on paper or as a PDF in a way that is both visually appealing and functionally effective. Let us now learn how to print sheet in Excel:

- i. **Page Layout:** Before printing, it is essential to consider the page layout. Decide whether you want to print in portrait (vertical) or landscape (horizontal) orientation. You can set this in the “Page Layout” tab.
- ii. **Size and Margins:** Adjust the page size and margins using the “Size” and “Margins” options in the “Page Layout” tab. This step ensures that your content fits well on the printed page.
- iii. **Print Titles:** If specific rows or columns need to repeat on each printed page, such as headers, use the “Print Titles” command. Go to the “Page Layout” tab, click on “Print Titles,” and set the rows or columns to repeat.
- iv. **Print Area:** Define a specific print area to include only the selected range in your worksheet. Select the range you want to print, go to the “Page Layout” tab, and click on “Print Area,” then select “Set Print Area.”
- v. **Print Preview:** Before printing, use the “Print Preview” option to see how your document will look. Click on “File” and then select “Print.” The right panel will show a preview of your document, allowing you to make adjustments if needed.
- vi. **Page Breaks:** Adjust page breaks to control where Excel starts a new page. Go to the “View” tab and select “Page Break Preview.” Drag the page break lines to adjust as necessary.
- vii. **Headers and Footers:** Customize headers and footers to add information such as page numbers, file name, and date. Go to the “Insert” tab and select “Header & Footer.” Add elements as needed for your document.
- viii. **Scaling Options:** Adjust the size of the printout using scaling options. In the “Print” menu, go to “Settings” and choose options like “Fit Sheet on One Page” to optimize the document for printing.
- ix. **Print Settings:** Configure additional print settings for quality and speed. In the “Print” menu, go to “Settings” and select the desired options, such as print quality and paper type. Figure 1.2.10 depicted as Printing in Excel.

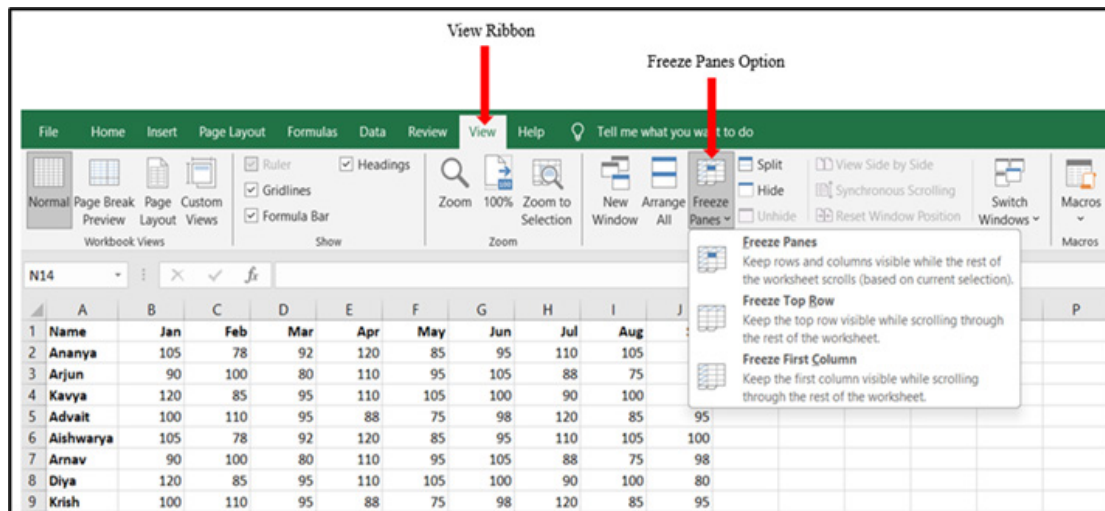


Fig 1.2.14: Freeze Panes

The “Freeze Panes” feature in Excel allows you to lock specific rows or columns, making them always visible while scrolling through large datasets. There are three main options under “Freeze Panes,” each serving a different purpose as shown in the figure above. They are:

1. **Freeze Panes:** The “Freeze Panes” option in Excel is a powerful feature that allows you to lock both rows and columns based on the cell you have selected. This means that the rows above and the columns to the left of the chosen cell will remain visible while scrolling through a large dataset. It is particularly useful when you want to keep both row and column headers in view for constant reference.
2. **Freeze Top Row:** “Freeze Top Row” is a specific option under “Freeze Panes” that focuses on locking only the top row of a worksheet. By selecting any cell in the row below the one you want to freeze and choosing this option, you ensure that the top row stays fixed at the top of the worksheet. This is beneficial when dealing with datasets where the header row provides essential information that needs to be visible at all times.
3. **Freeze First Column:** The “Freeze First Column” option in Excel is designed to lock only the first column of a worksheet. By selecting any cell in the column to the right of the one you want to freeze and choosing this option, you ensure that the first column remains visible on the left side of the worksheet. This is particularly helpful when dealing with datasets where the first column contains labels or identifiers crucial for understanding the data.

These three options, collectively known as “Freeze Panes,” enhance the user experience when working with extensive datasets by providing a way to keep specific rows or columns visible while navigating through the data.

The steps to use the freeze pane option is as follows:

1. Select the Cell Below and to the Right:

- ◆ Click on the cell below the row(s) you want to freeze.
- ◆ Click on the cell to the right of the column(s) you want to freeze.

2. Access the “Freeze Panes” Option:

- ◆ Go to the “View” tab on the ribbon.

3. Freeze Panes Options:

- ◆ In the “Window” group, find and click on “Freeze Panes.”
- ◆ You have three options:
 - **Freeze Panes:** Freezes both rows and columns based on the cell you selected.
 - **Freeze Top Row:** Only the top row remains visible while scrolling.
 - **Freeze First Column:** Only the first column remains visible while scrolling.

4. Unfreeze Panes:

- ◆ If you want to remove the frozen panes, go back to the “Freeze Panes” option and choose “Unfreeze Panes.”

Exercise Questions

Question 1: Given a dataset, apply borders around each cell and shade the header row with a light gray color.

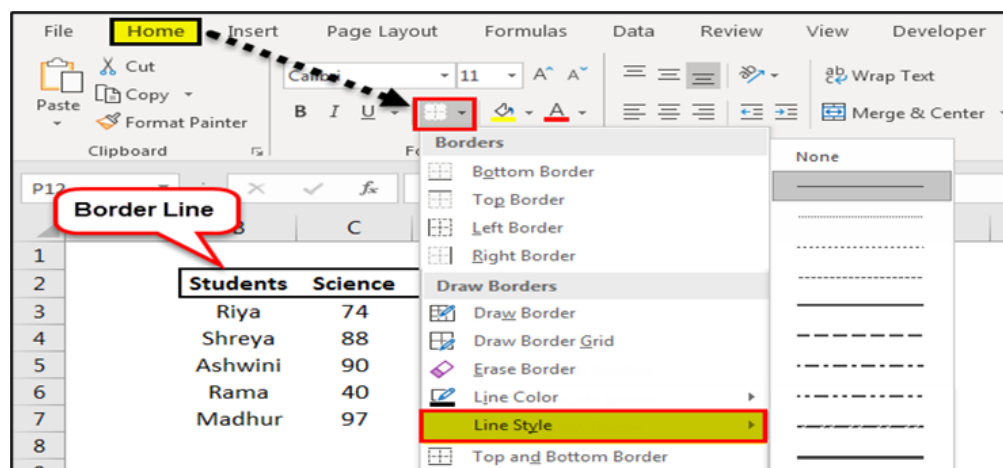


Fig 1.2.15: Apply borders around each cell and shade the header row

Question 2: Format a column of sales to display as currency with two decimal places.

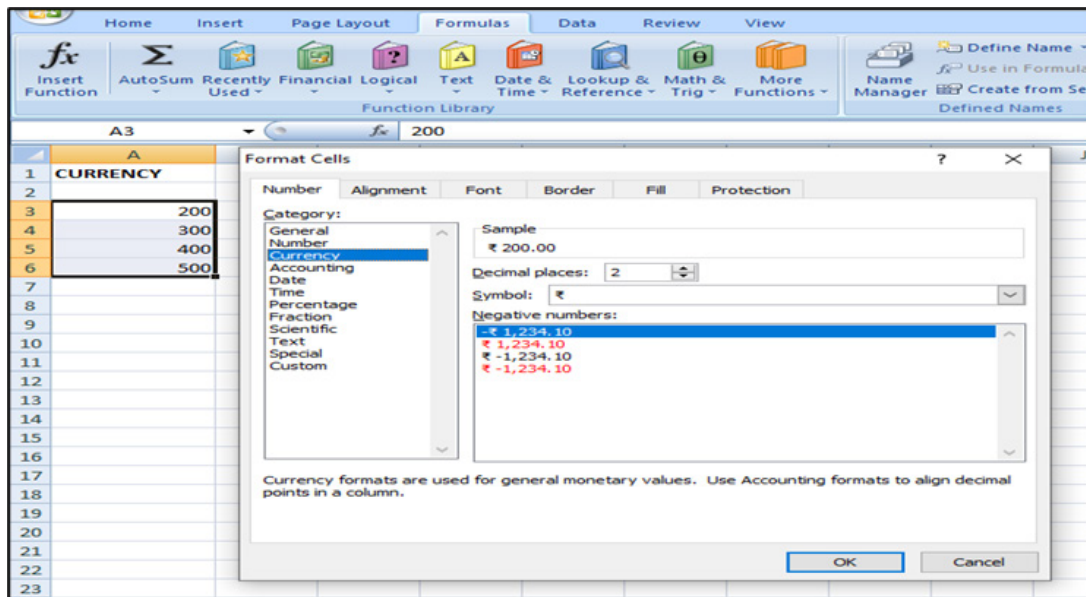


Fig 1.2.16: Format a column of sales to display as currency

1.2.5 Cell Reference in Excel

A cell reference is a way to identify and refer to a specific cell or range of cells within a worksheet. It is used in formulas, functions, and other operations to perform calculations, manipulate data, and retrieve values from cells. The cell reference is a combination of column letter and the row number; the two components uniquely identify a cell within the worksheet. For example, the cell reference “A1” refers to the cell in column A and row 1. There are three types of cell references in Excel:

1. Relative Cell Reference

A relative cell reference adjusts when copied or filled to other cells. For example, if you have a formula “=A1+B1” in cell C1 and copy it to cell C2, the formula in C2 will automatically adjust to “=A2+B2”. The references A1 and B1 change relative to the new position of the formula.

2. Absolute Cell Reference

An absolute cell reference remains fixed when copied or filled to other cells. To create an absolute reference, you add a dollar sign (\$) before the column letter and/or row number. For example, the formula “=A\$1+B\$1” will always refer to cell A1 and B1, regardless of the new position of the formula.

3. Mixed Cell Reference

A mixed cell reference combines aspects of both absolute and relative references. You can fix either the column or the row while allowing the other part to adjust when copied. For example, the formula “=A\$1+B2” will always refer to cell A1, but the row reference adjusts to B2 when copied to other cells.

Cell references can be used in various ways in Excel. They are primarily used in formulas and functions to perform calculations based on the values in different cells. By referencing cells, you can create dynamic and flexible formulas that update automatically when the referenced cells change. This allows you to perform complex calculations, analyze data, and create dynamic reports and dashboards within your Excel worksheets.

Cell references are an essential aspect of Excel because they provide flexibility, automation, and dynamic capabilities in various spreadsheet tasks. Here are some key reasons why we use cell references in Excel:

- ◆ **Perform Calculations:** Cell references allow us to perform calculations and mathematical operations in Excel. By referencing cells containing values or formulas, we can create complex formulas that dynamically update based on the values in the referenced cells. This enables us to automate calculations and perform calculations across multiple cells or ranges.
- ◆ **Dynamic Data Analysis:** Cell references are crucial for data analysis in Excel. By referencing cells or ranges of data, we can perform various analysis operations such as sorting, filtering, conditional formatting, and creating charts. Cell references enable us to analyze and manipulate data dynamically, making it easier to derive insights and make informed decisions.
- ◆ **Report Generation:** Cell references are widely used in creating reports in Excel. By referencing cells containing data, we can generate dynamic reports that update automatically as the underlying data changes. Cell references allow us to pull data from different cells or ranges, perform calculations, and present the information in a summarised or organised format. This makes it easier to generate accurate and up-to-date reports.
- ◆ **Data Validation:** Cell references play a vital role in data validation in Excel. By referencing cells, we can define rules and conditions that restrict the type of data or values that can be entered. Cell references enable us to validate and verify data entered by users, ensuring data accuracy, consistency, and adherence to predefined rules.
- ◆ **Conditional Formatting:** Cell references are used extensively in conditional formatting in Excel. By referencing cells, we can define formatting rules that dynamically change the appearance of cells based on specified conditions. Cell references allow us to highlight data, apply color schemes, icon sets, or data bars based on the values or conditions in the referenced cells. This helps in visualising data, identifying patterns, and drawing attention to important information.
- ◆ **Data Integration:** Cell references are used when integrating Excel with other applications or data sources. By referencing cells in formulas, we can retrieve or link data from external sources, such as databases, web services, or other Excel workbooks. Cell references enable us to establish connections and pull data from external sources into our Excel worksheets, allowing for data consolidation and analysis.

Overall, cell references in Excel provide the ability to create dynamic and automated spreadsheets, perform calculations, analyze data, generate reports, and

integrate with external sources. They enhance the efficiency, accuracy, and flexibility of our Excel tasks and allow for efficient data manipulation and analysis.

To create a **relative cell reference** in Excel, you simply enter the cell reference without any dollar signs (\$). Here is how you can do it:

- Select the cell where you want to enter the formula or value that contains the relative cell reference.
- Begin typing the formula or value in the cell, starting with an equal sign (=) to indicate that you are entering a formula.
- To create a relative cell reference, enter the column letter followed by the row number of the cell. For example, to reference cell A1, you would enter “A1”.
- After entering the relative cell reference, you can continue entering the rest of the formula or value.
- Press Enter to confirm the formula or value, and Excel will use the relative cell reference.

When you copy or fill a formula or value that contains a relative cell reference to other cells, the referenced column(s) and row(s) will adjust automatically relative to the new position of the formula. For example, if you copy a formula with a relative cell reference from cell A1 to cell B1, the reference will adjust to B1. Similarly, if you copy the formula to cell A2, the reference will adjust to A2.

Relative cell references are useful when you want the formula or value to adapt to different locations in the worksheet. They allow you to perform calculations based on the relative position of cells, making it easier to apply the same logic to multiple cells or ranges. To explain relative cell reference let us use a data sheet as given in Fig 1.2.17.

	A	B	C	D	E	F
1	Salesman	Quarter 1 (₹)	Quarter 2 (₹)	Quarter 3 (₹)	Quarter 4 (₹)	Total Sales (₹)
2	Ravi	₹ 15,000	₹ 18,000	₹ 20,000	₹ 22,000	
3	Asha	₹ 12,000	₹ 16,000	₹ 14,000	₹ 18,000	
4	Rajesh	₹ 18,000	₹ 22,000	₹ 19,000	₹ 21,000	
5	Meena	₹ 14,000	₹ 16,000	₹ 17,000	₹ 19,000	
6	Mohan	₹ 16,000	₹ 18,000	₹ 15,000	₹ 20,000	
7						

Fig 1.2.17: Quarterwise_Sales Dataset

So in order to find the total sales we can use multiple options like either using “= sign” or “using fx insert option” or “ Alt+ = sign and then enter option”. Then the result will be as shown in Fig 1.2.18.

	A	B	C	D	E	F
1	Salesman	Quarter 1 (₹)	Quarter 2 (₹)	Quarter 3 (₹)	Quarter 4 (₹)	Total Sales (₹)
2	Ravi	₹ 15,000	₹ 18,000	₹ 20,000	₹ 22,000	₹ 75,000
3	Asha	₹ 12,000	₹ 16,000	₹ 14,000	₹ 18,000	
4	Rajesh	₹ 18,000	₹ 22,000	₹ 19,000	₹ 21,000	
5	Meena	₹ 14,000	₹ 16,000	₹ 17,000	₹ 19,000	
6	Mohan	₹ 16,000	₹ 18,000	₹ 15,000	₹ 20,000	
7						

Fig 1.2.18: Finding total sales in one row

Here we found total sales for one person, so to find the total sales for rest of the salesmen we can use the drag and drop option or auto fill option.

When we do this the sum of all the quarters will be added to the total sales column and shown as in Fig 1.2.18

	A	B	C	D	E	F
1	Salesman	Quarter 1 (₹)	Quarter 2 (₹)	Quarter 3 (₹)	Quarter 4 (₹)	Total Sales (₹)
2	Ravi	₹ 15,000	₹ 18,000	₹ 20,000	₹ 22,000	₹ 75,000
3	Asha	₹ 12,000	₹ 16,000	₹ 14,000	₹ 18,000	₹ 60,000
4	Rajesh	₹ 18,000	₹ 22,000	₹ 19,000	₹ 21,000	₹ 80,000
5	Meena	₹ 14,000	₹ 16,000	₹ 17,000	₹ 19,000	₹ 66,000
6	Mohan	₹ 16,000	₹ 18,000	₹ 15,000	₹ 20,000	₹ 69,000

Fig 1.2.19: Total sales of all salesmen

This is relative cell reference. By default, all cell references are relative cell references.

To create an **absolute cell reference** in Excel, you need to add a dollar sign (\$) before the column letter and/or row number of the cell reference. Here is how you can do it:

- ◆ Select the cell where you want to enter the formula or value that contains the absolute cell reference.
- ◆ Begin typing the formula or value in the cell, starting with an equal sign (=) to indicate that you are entering a formula.
- ◆ To create an absolute cell reference, you need to add a dollar sign (\$) before the column letter and/or row number of the cell reference. Here are the different ways to use absolute cell references:
- ◆ To make both the column and row absolute, place a dollar sign before both the column letter and row number. For example, to create an absolute reference to cell A1, you would enter “\$A\$1”.

- ◆ To make only the column absolute, place a dollar sign before the column letter but not before the row number. For example, to create an absolute reference to column A but allow the row number to adjust, you would enter “\$A1”.
- ◆ To make only the row absolute, place a dollar sign before the row number but not before the column letter. For example, to create an absolute reference to row 1 but allow the column letter to adjust, you would enter “A\$1”.
- ◆ After adding the dollar sign(s) to the appropriate location(s), you can continue entering the rest of the formula or value.
- ◆ Press Enter to confirm the formula or value, and Excel will use the absolute cell reference.

When you copy or fill a formula or value that contains an absolute cell reference to other cells, the referenced column(s) and/or row(s) will remain fixed, and they will not adjust relative to the new position of the formula. This allows you to refer to specific cells or ranges consistently in your formulas, even when copied to different locations in the worksheet.

Let us work on the same Quarterwise_Sales Dataset for understanding absolute cell reference. For that we have taken the total sales in that year and added one more column titled Total Sales %. It is as shown in Fig 1.2.14

	A	B	C	D	E	F	G
1	Salesman	Quarter 1 (₹)	Quarter 2 (₹)	Quarter 3 (₹)	Quarter 4 (₹)	Total Sales (₹)	Total sales %
2	Ravi	₹ 15,000	₹ 18,000	₹ 20,000	₹ 22,000	₹ 75,000	
3	Asha	₹ 12,000	₹ 16,000	₹ 14,000	₹ 18,000	₹ 60,000	
4	Rajesh	₹ 18,000	₹ 22,000	₹ 19,000	₹ 21,000	₹ 80,000	
5	Meena	₹ 14,000	₹ 16,000	₹ 17,000	₹ 19,000	₹ 66,000	
6	Mohan	₹ 16,000	₹ 18,000	₹ 15,000	₹ 20,000	₹ 69,000	
7					Grand Total	₹ 3,50,000	
8							

Fig 1.2.20 : Quarterwise_Sales Dataset with Total Sales %

To find the total sales % of Ravi we will use the formula Total sales of Ravi divided by Grand total. And then choose percentage from the Number ribbon. The result will be as shown in Fig 1.2.15.

Experiment Questions

1. Apply different font styles, sizes, and colors to a range of cells containing text data. How does altering the font and color improve the readability and presentation of the data?
2. Format a cell containing a numeric value to display it as currency, percentage, and date. What happens to the value in the cell, and how does it affect the overall appearance of the data?
3. Set up conditional formatting to highlight cells that meet specific criteria, such as values greater than 100. How does this formatting help in identifying trends or outliers in the dataset?
4. Align the text within a cell to the left, right, and center. Then, merge multiple cells to create a title header. How does alignment and merging affect the layout and appearance of the worksheet?
5. Use the SUM and AVERAGE functions to compute the total and average of a dataset. Also find the lowest and highest values in datasets.

Experiment 3

Dating Sorting

Discussion

1.3.1 Introduction

Sorting is a key aspect of data organization that helps structure information in a meaningful way. It makes it easier to interpret and analyze. It involves arranging data in a particular sequence, such as ascending or descending order, based on text, numbers, or dates. Excel provides robust sorting options that allow you to sort by one or more columns, making it a powerful tool for handling extensive datasets. Whether you're prioritizing sales numbers, categorizing client information, or evaluating survey responses, sorting helps present your data in a clear and structured format, laying the foundation for insightful analysis.

1.3.2 Theory

1.3.2.1 Types of Data Sorting

1. Sorting Data in a Single Column

Sorting data in a single column is one of the simplest and most common tasks in Excel. This allows you to organize the values within a single column either in ascending order (A to Z or smallest to largest) or descending order (Z to A or largest to smallest). Sorting a single column is particularly useful for tasks like arranging names alphabetically, ranking sales figures, or organizing dates chronologically.

Steps to Sort a Single Column in Excel:

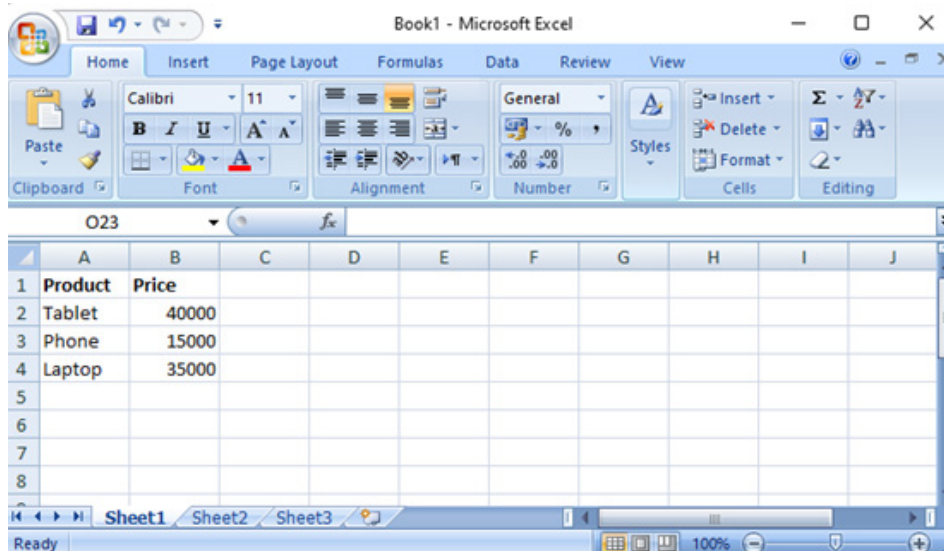
1. **Select the Column to Be Sorted:** Highlight the column you want to sort by clicking on the column header (e.g., "A").
2. **Access the Sorting Option:**
 - ◆ Navigate to the Data tab in the toolbar.
 - ◆ Click on Sort A to Z for ascending order or Sort Z to A for descending order.
3. **Confirm Sorting:**

If Excel detects adjacent data, it will prompt you to either:

- ◆ Expand the selection to sort all related data (e.g., rows linked to the column).
 - ◆ Continue with the current selection to sort only the highlighted column.
4. View the Results: The data in the column will be rearranged based on the selected sorting order.

Example: Sorting Product Prices

Original data

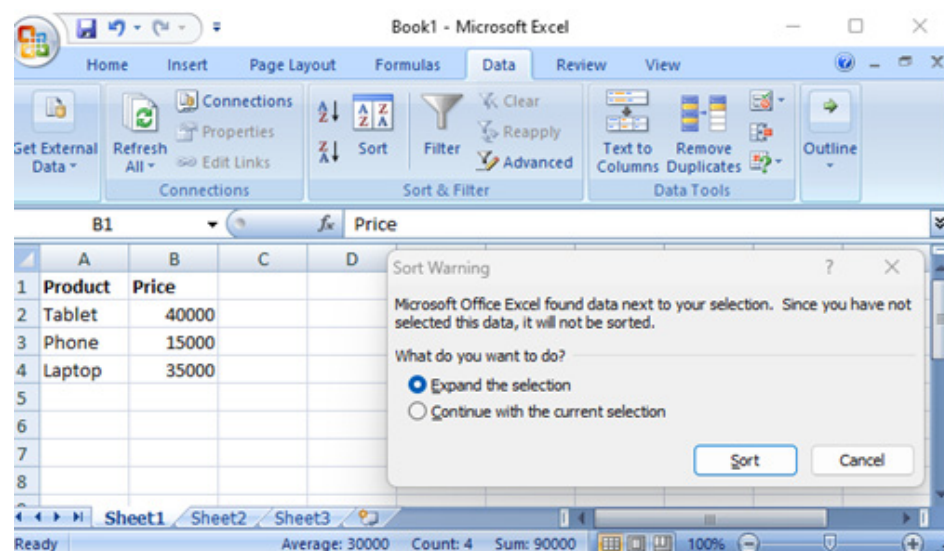


The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The worksheet contains the following data:

	A	B	C	D	E	F	G	H	I	J
1	Product	Price								
2	Tablet	40000								
3	Phone	15000								
4	Laptop	35000								
5										
6										
7										
8										

Fig.1.3.1. Original data before sorting

Ascending Sort (Smallest to Largest)



The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The 'Sort' button in the 'Sort & Filter' group is active. A 'Sort Warning' dialog box is displayed, asking for confirmation to sort the data. The dialog box contains the following text:

Sort Warning

Microsoft Office Excel found data next to your selection. Since you have not selected this data, it will not be sorted.

What do you want to do?

☒ Expand the selection

☐ Continue with the current selection

Buttons: Sort, Cancel

Fig.1.3.2. Confirm Sorting

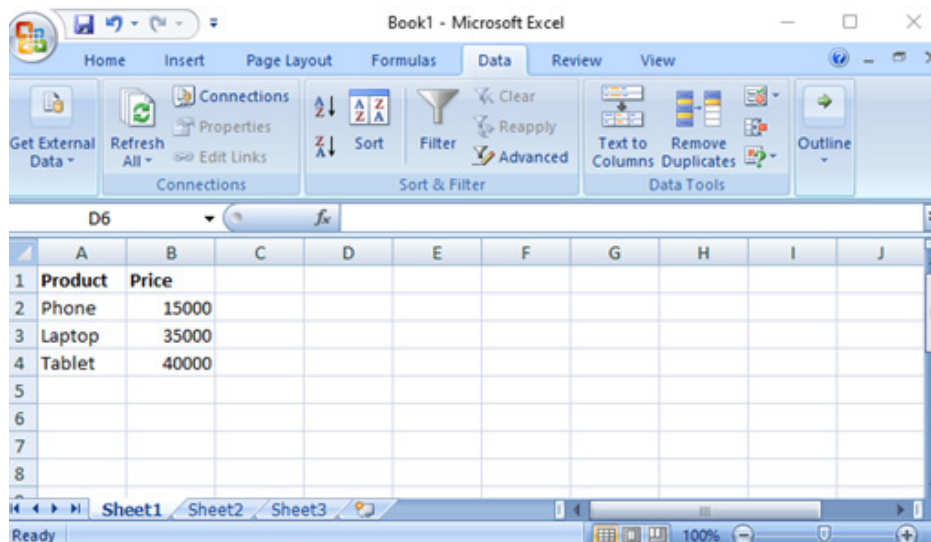


Fig.1.3.3 Data sorted in Ascending order

When sorting a single column, Excel checks for data in adjacent columns and offers two options:

1. **Expand the Selection:** Sorts the entire dataset, ensuring rows remain intact and relationships between columns are preserved.
2. **Continue with the Current Selection:** Sorts only the selected column, which may misalign data in adjacent columns, leading to potential errors. Use this option with care.

2. Sorting Data by Multiple Columns

Sorting data is a fundamental skill in data analysis, allowing you to organize information for better understanding and decision-making. In Excel, sorting by multiple columns helps you arrange your data based on more than one criterion, such as sorting by region and then by sales within each region. This ensures data is structured logically, making insights easier to derive.

Steps to Sort Data by Multiple Columns

- ◆ Open your Excel file containing the dataset. For example, consider the following dataset of Sales representatives:

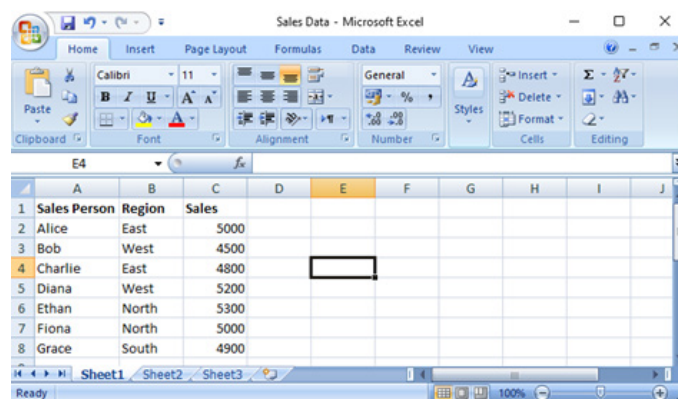


Fig.1.3.4 Sales Representatives dataset

- ◆ Click anywhere within the data range, or select the entire table (including headers).
- ◆ Make sure all rows and columns you want to sort are included.
- ◆ Go to the **Data** tab in Excel.
- ◆ Click on **Sort** in the “Sort & Filter” group.
- ◆ In the **Sort** dialog box, perform the following:
 - First Level:
 - Under “Column,” select **Region**.
 - Under “Sort On,” choose **Cell Values**.
 - Under “Order,” select **A to Z**.
 - Second Level:
 - Click **Add Level**.
 - Under “Column,” select **Sales**.
 - Under “Order,” select **Largest to Smallest**.

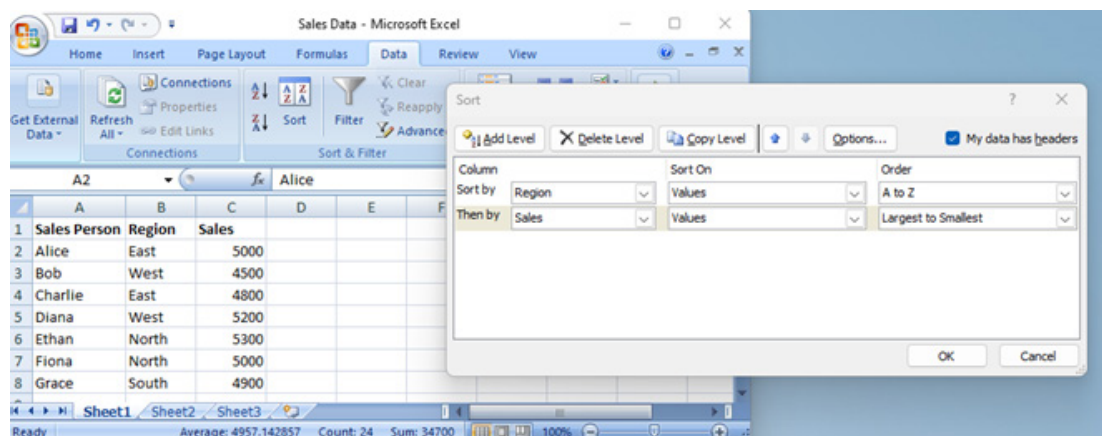


Fig.1.3.5 Adding levels in Sort dialog box

- ◆ Click **OK**. Excel will sort the data as follows:

Sales Person	Region	Sales
Alice	East	5000
Charlie	East	4800
Ethan	North	5300
Fiona	North	5000
Grace	South	4900
Diana	West	5200
Bob	West	4500

Fig.1.3.6 Sales representatives data after sorting

3. Case-Sensitive Sorting

Excel provides the option to differentiate between uppercase and lowercase letters during sorting, which is particularly useful in specialized data formats.

How to Use:

Go to **Sort Options** in the **Sort** dialog box.

Check the box for **Case Sensitive**.

Apply the desired sorting order.

4. Sorting by Cell or Font Color

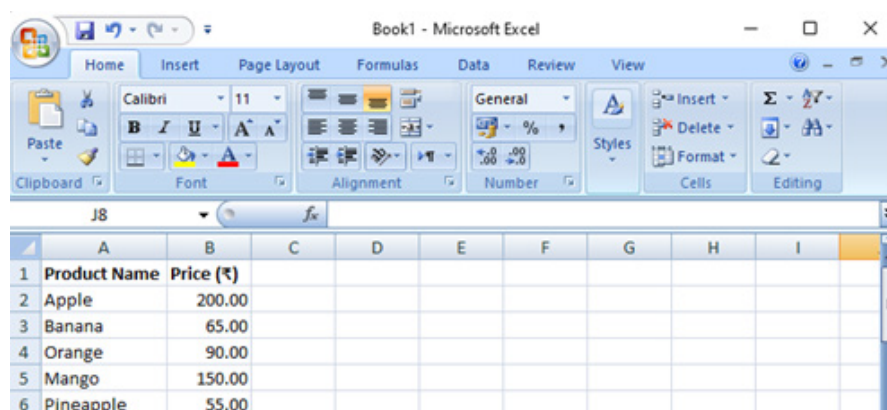
Excel allows you to sort data by cell color or font color, a handy feature for datasets that rely on visual cues.

How to Use:

1. Select your data range and open the **Sort** dialog box.
2. Choose the column to sort by and select **Cell Color** or **Font Color** in the **Sort On** dropdown.
3. Specify the color and sorting preference (on top or bottom).

Lab Exercise 1

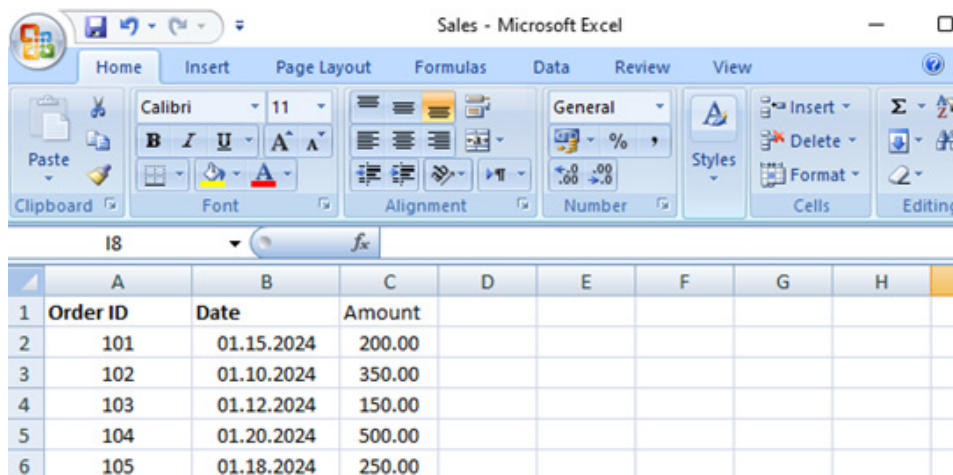
1. Sort a dataset of product names and prices in descending order of price. Make sure to preserve the relationship between product names and their corresponding prices.



	A	B	C	D	E	F	G	H	I
1	Product Name	Price (₹)							
2	Apple	200.00							
3	Banana	65.00							
4	Orange	90.00							
5	Mango	150.00							
6	Pineapple	55.00							

Lab Exercise 2

2. You have a list of sales orders with dates and amounts. Sort the data by date in ascending order (oldest to newest), and then by order amount in descending order (largest to smallest).



Sales - Microsoft Excel

	A	B	C	D	E	F	G	H
1	Order ID	Date	Amount					
2	101	01.15.2024	200.00					
3	102	01.10.2024	350.00					
4	103	01.12.2024	150.00					
5	104	01.20.2024	500.00					
6	105	01.18.2024	250.00					

1.3.2 Data Filtering

Data Filtering is an essential step in data analysis, especially when working with large datasets. Filters allow you to narrow down a dataset by displaying only rows that meet certain criteria. The rest of the data remains hidden but is not deleted. You can filter data based on:

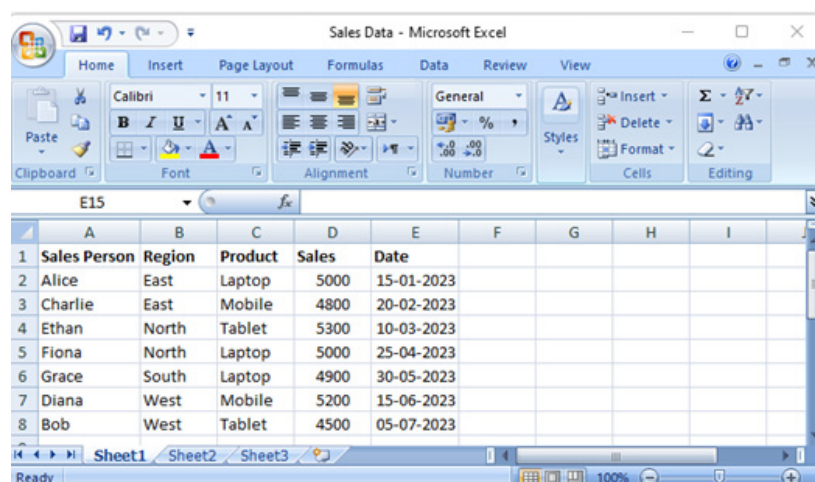
1. Specific values
2. Conditions (e.g., greater than, less than)
3. Text, numbers, or dates

1.3.2.1 Types of Data Filtering

1. Filtering based on Specific Values

You can filter data to show only rows that match a particular value in a column. This is especially useful when you want to isolate specific entries, like a certain region, product, or category.

Example Dataset: Sales record



Sales Data - Microsoft Excel

	A	B	C	D	E	F	G	H	I
1	Sales Person	Region	Product	Sales	Date				
2	Alice	East	Laptop	5000	15-01-2023				
3	Charlie	East	Mobile	4800	20-02-2023				
4	Ethan	North	Tablet	5300	10-03-2023				
5	Fiona	North	Laptop	5000	25-04-2023				
6	Grace	South	Laptop	4900	30-05-2023				
7	Diana	West	Mobile	5200	15-06-2023				
8	Bob	West	Tablet	4500	05-07-2023				

Fig.1.3.7 Sales Record

Objective: Filter Data to Display Relevant Information

You might want to:

1. Show only sales from the **East** region.
2. Display records where **Sales** exceed \$3000.
3. List sales of **Laptops** only.

Step-by-Step Guide to Applying Filters

1. Enable Filters

- Select the dataset, including headers.
- Go to the **Data** tab in the Excel ribbon.
- Click on the **Filter** button. Small drop-down arrows will appear in each header cell.

2. Apply a Filter for a Single Column

Filter by Region:

- Click the drop-down arrow in the **Region** column.
- Uncheck **Select All**, then check **East**.
- Click **OK**.

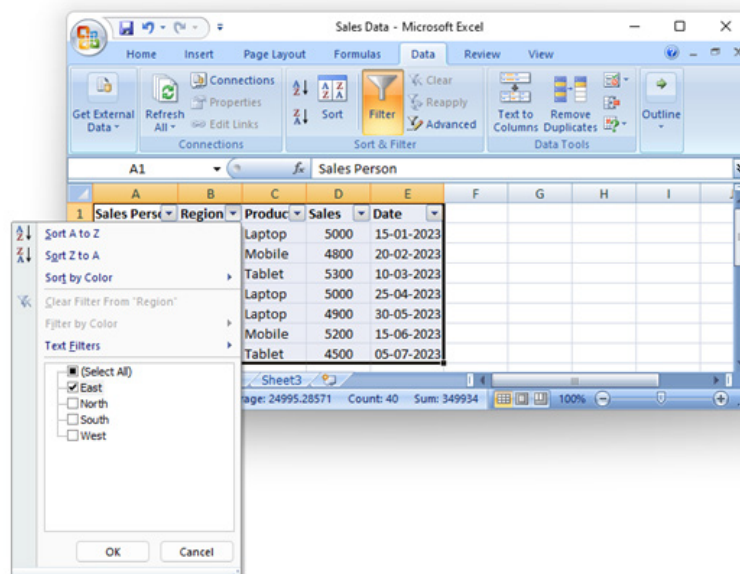


Fig.1.3.8 Filter by Region

	A	B	C	D	E	F	G	H	I
1	Sales Person	Region	Product	Sales	Date				
2	Alice	East	Laptop	5000	15-01-2023				
3	Charlie	East	Mobile	4800	20-02-2023				
9									
10									
11									
12									
13									

Fig.1.3.9. Data after filtering

Result: Only rows where the Region is “East” are displayed.

3. Apply Multiple Filters

Filter by Region and Sales Amount:

- ◆ First, filter **Region** to display only “East” (as above).
- ◆ Then, click the drop-down arrow in the **Sales** column.
- ◆ Select **Number Filters > Greater Than**.
- ◆ Enter **3000** in the dialog box and click **OK**.
- ◆ Click the drop-down arrow in the **Product** column
- ◆ Select **Text Filters > Laptop**

	A	B	C	D	E	F	G	H	I
1	Sales Person	Region	Product	Sales	Date				
2	Alice	East	Laptop	5000	15-01-2023				
9									
10									
11									
12									
13									
14									

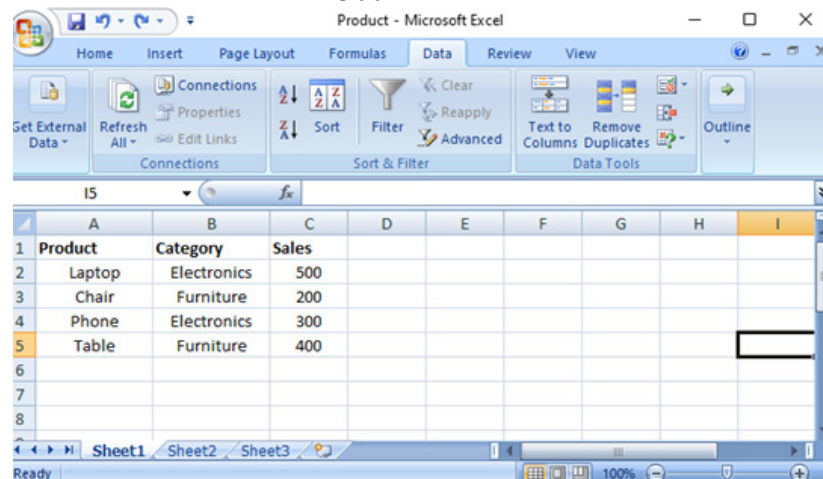
Fig.1.3.10 Data after multiple filters

Result: Only rows with sales greater than 3000 in the “East” region are displayed.

2. Filtering Based on Conditions

Excel allows you to filter data based on specific conditions, such as values greater than, less than, or equal to a particular number. This is useful for numeric or date-based filtering.

Example : Filter Sales Greater Than 300



	A	B	C	D	E	F	G	H	I
1	Product	Category	Sales						
2	Laptop	Electronics	500						
3	Chair	Furniture	200						
4	Phone	Electronics	300						
5	Table	Furniture	400						
6									
7									
8									

Fig. 1.3.11 Sales table

To filter sales greater than 300:

- ◆ Click the filter dropdown in the **Sales** column header.
- ◆ Choose **Number Filters > Greater Than**.
- ◆ Enter **300** in the field and click **OK**.

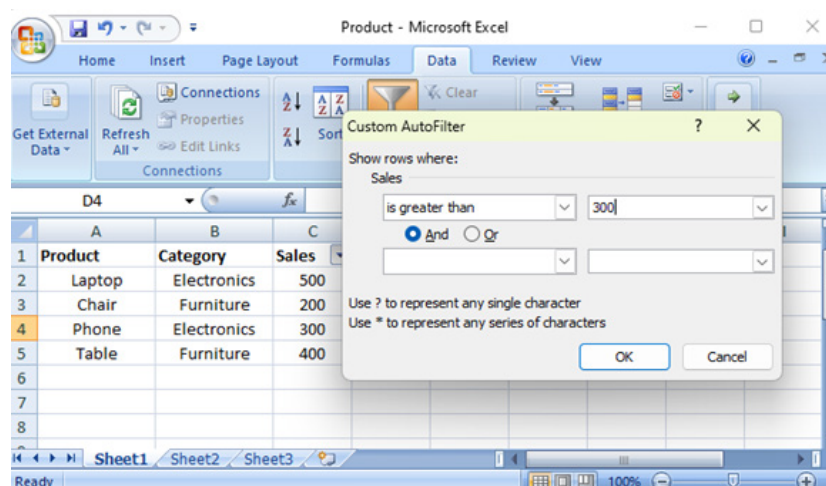


Fig 1.3.12 Filtering sales greater than 300

3. Filtering Based on Text, Numbers, or Dates

You can filter data by text, numbers, or dates depending on the type of data in your columns.

Text Filters

For columns with text data (e.g., names, categories, locations), you can filter based on conditions such as “begins with,” “contains,” or “equals.”

Example: Filter Products that Begin with “P”

Using the same dataset, filter products that begin with “P”:

- ◆ Click the filter dropdown in the Product column.
- ◆ Choose Text Filters > Begins With.
- ◆ Enter P and click OK.

Number Filters

For numeric data (e.g., sales, prices), you can filter using logical conditions such as **equal to**, **greater than**, **less than**, or ranges.

Example: Filter Sales Equal to 300

To filter sales exactly equal to **300**:

- ◆ Click the filter dropdown in the **Sales** column.
- ◆ Choose **Number Filters > Equals**.
- ◆ Enter **300** and click **OK**.

Date Filters

For date-based data, Excel provides predefined date filters like Before, After, Between, or specific periods like Last Week or This Year.

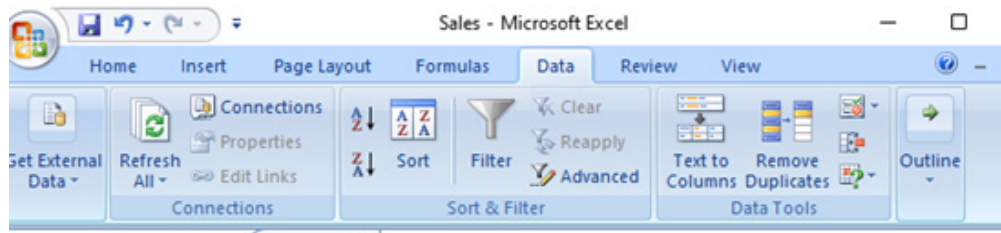
Example: Filter Sales After a Specific Date

If your dataset contains dates, say the Sale Date column has values, and you want to filter sales after January 1, 2024:

- ◆ Click the filter dropdown in the Sale Date column.
- ◆ Choose Date Filters > After.
- ◆ Enter 1-Jan-2024 and click OK.

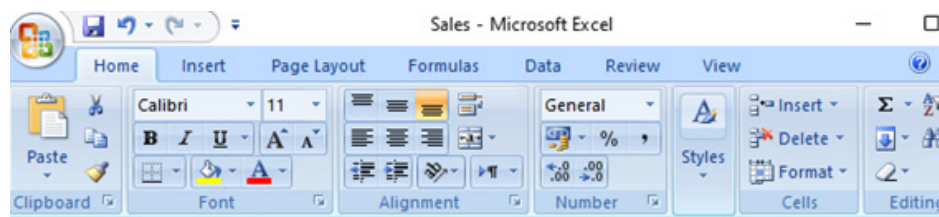
Exercise questions

1. Using a dataset of sales records, filter the data to show only sales from the “South” region.



	A	B	C	D	E	F	G	H	I
1	Sales ID	Region	Amount						
2	201	East	500.00						
3	202	South	600.00						
4	203	North	300.00						
5	204	East	400.00						
6	205	South	700.00						

2. You have a dataset of employees with their names, departments, and salaries. Filter the data to show only employees in the “HR” department with salaries greater than ₹ 50,000.



	A	B	C	D	E	F	G	H	I
1	Employee ID	Name	Department	Salary					
2	E001	John	HR	55,000					
3	E002	Sarah	IT	60,000					
4	E003	Jake	HR	45,000					
5	E004	Lisa	Marketing	52,000					
6	E005	Anna	HR	58,000					

Experiment 4

Introduction to Charts

Discussion

1.4.1 Introduction

Charts in **Excel** are visual tools that help represent data in a graphical format, making it easier to understand and analyze. Instead of looking at large sets of numbers, charts allow users to spot trends, compare values, and interpret information quickly. They are widely used in business reports, financial analysis, and presentations to display patterns clearly. By using charts, data becomes more meaningful, making decision-making faster and more effective.

1.4.2 Theory

Microsoft Excel provides various chart types, including **Bar Charts**, **Line Charts**, and **Pie Charts**, which are commonly used for analysis and presentations.

1.4.2.1 Types of Charts

1. Bar Chart

A **Bar Chart** represents data using rectangular bars of different lengths. It is useful for comparing values across categories.

Steps to Create a Bar Chart in Excel

1. **Enter Data** in Excel. Example

Table 1.4.1 Sales Table

Month	Sales
Jan	5000
Feb	7000
March	6000
April	3000
May	8000

2. Select the data range (A1:B4).
3. Click on the **Insert** tab.

4. Choose **Bar Chart** from the **Charts** section.
5. Select the **Clustered Bar Chart** option.
6. Your bar chart appears on the sheet.

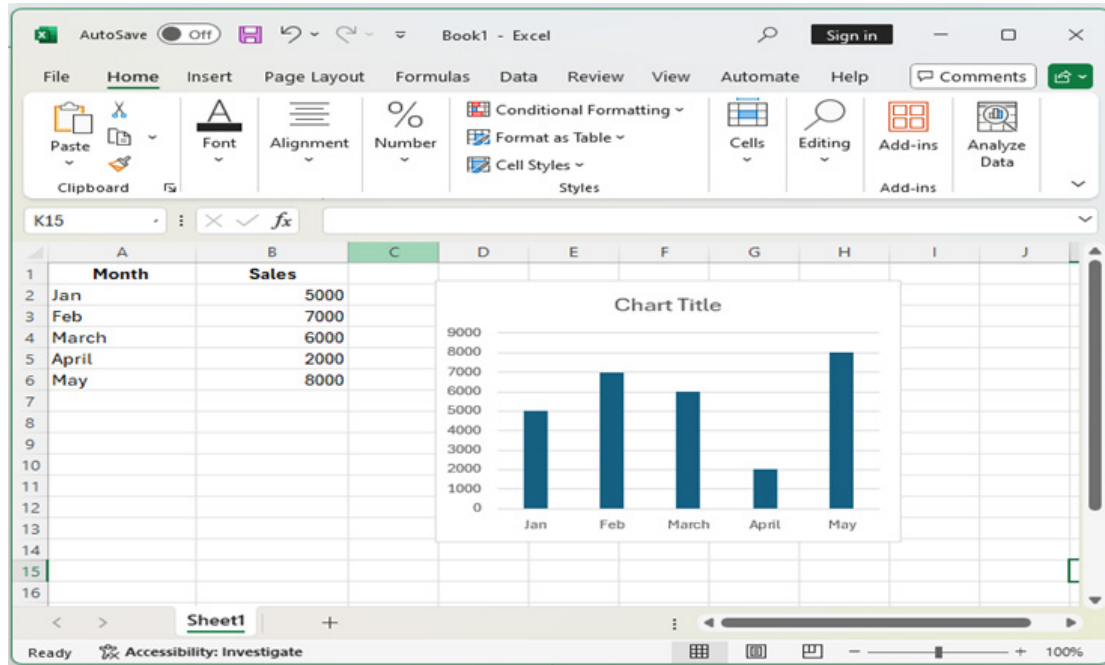


Fig. 1.4.1 Bar chart of Sales in various months

2. Line Chart

A **Line Chart** connects data points using a continuous line, making it ideal for showing trends over time.

Steps to Create a Line Chart in Excel

1. Enter data in Excel, such as months and temperature values.
2. Select the data range.
3. Click on the **Insert** tab.
4. Choose **Line Chart** from the **Charts** section.
5. Select a **Simple Line Chart**.
6. The line chart appears, displaying trends.

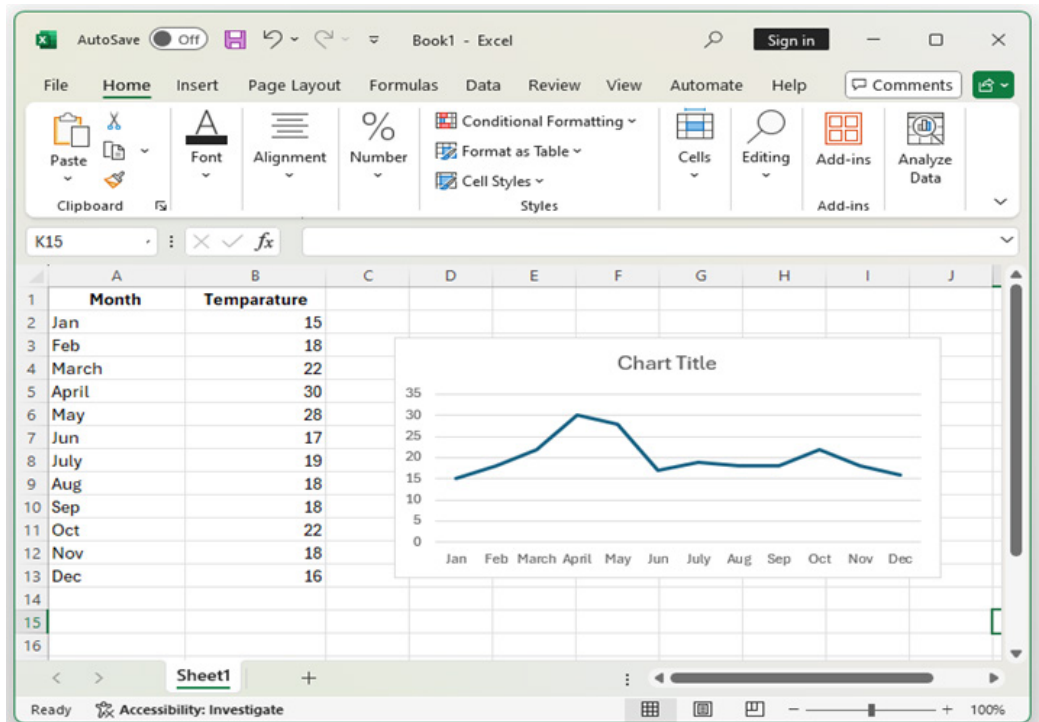


Fig. 1.4.2 Line chart of Temperature in various months

3. Pie Chart

A **Pie Chart** displays data as slices of a circle, showing proportions or percentages.

Steps to Create a Pie Chart in Excel

1. Enter category-based data (e.g., sales distribution per product).
2. Select the data.
3. Click on the **Insert** tab.
4. Choose **Pie Chart** from the **Charts** section.
5. Select **2D Pie Chart**.
6. The pie chart appears with color-coded slices.

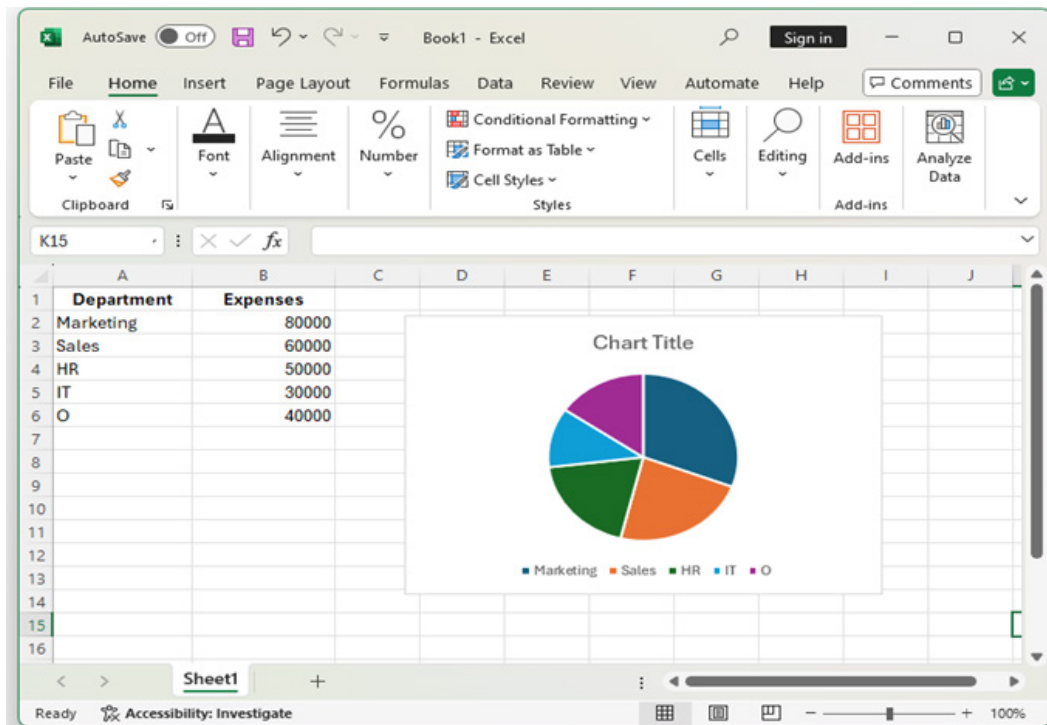


Fig.1.4.3 Pie Chart of Departments and its expenses

4. Chart Elements

1. Chart Title

A chart title explains what the chart represents.

Click on the chart → Click Chart Elements (+ icon) → Select Chart Title → Type the title.

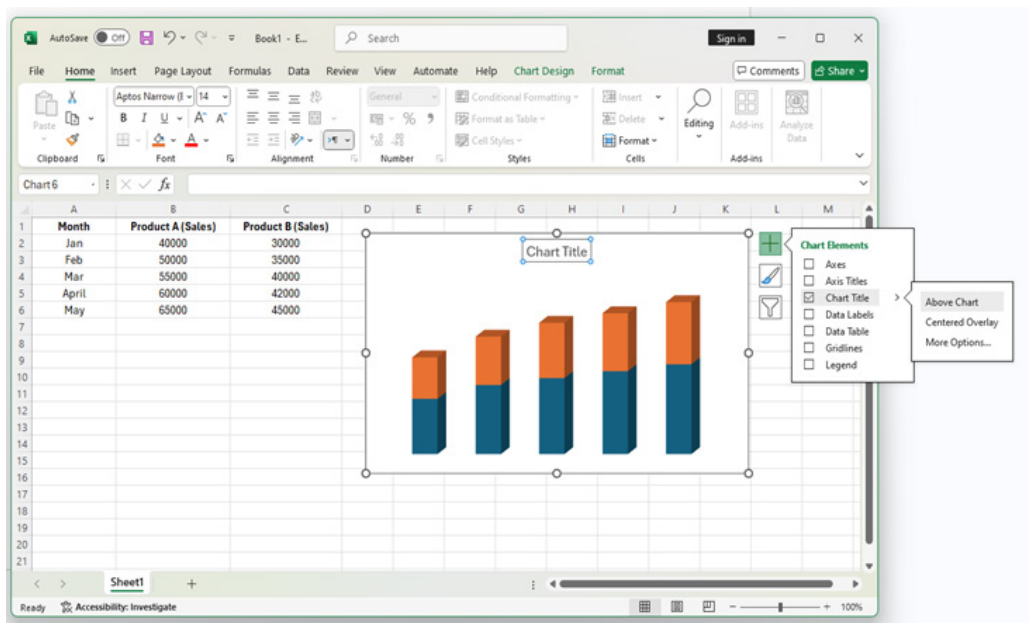


Fig. 1.4.4 Chart title

2. Axis Labels

Labels describe what the X-axis (horizontal) and Y-axis (vertical) represent.

Click on the chart → Click Chart Elements (+ icon) → Select Axis Titles → Type relevant labels.

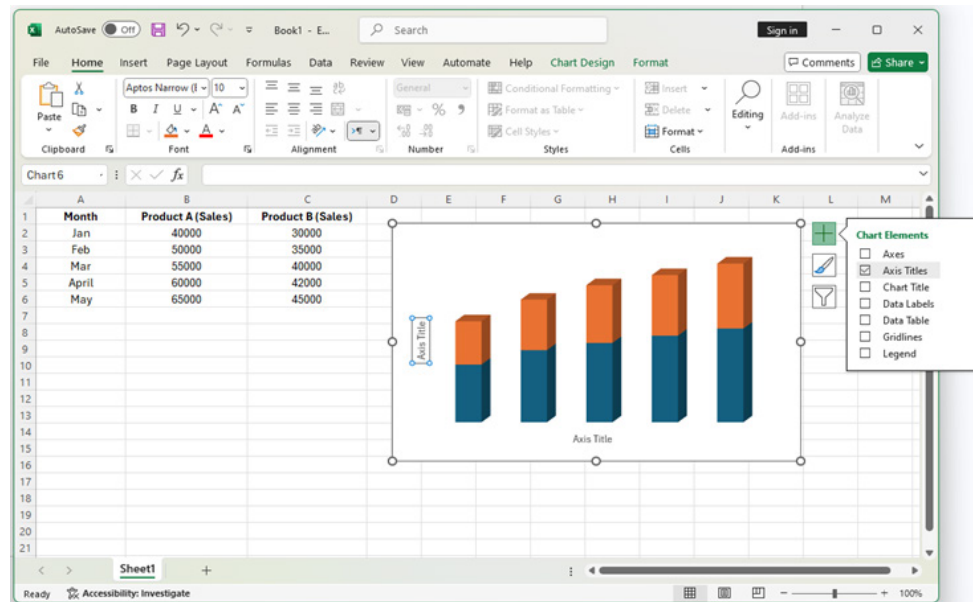


Fig. 1.4.5 Axis title

3. Legends

Legends explain the colors or patterns in the chart, helping identify data categories.

Click on the chart → Click Chart Elements (+ icon) → Select Legend → Choose placement (top, right, bottom, left).

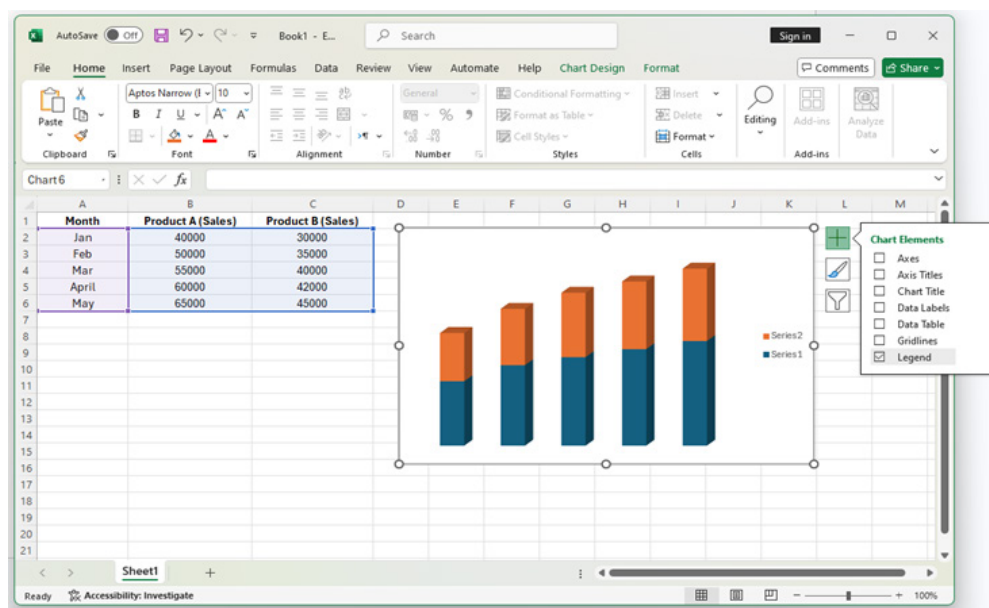


Fig.1.4.6 Legend

Exercise questions

Create a chart in Excel and customize its elements.

1. Open **Microsoft Excel** and enter the following data:

Month	Product A Sales (₹)	Product B Sales (₹)
Jan	40,000	30,000
Feb	50,000	35,000
Mar	55,000	40,000
Apr	60,000	42,000
May	65,000	45,000

2. Select the data and create a **Bar Chart** to compare the sales of Product A and Product B.
3. Add the following **Chart Elements**:
Chart Title: “Monthly Sales Comparison”

Axis Titles:

X-axis: “Month”

Y-axis: “Sales in ₹”

Legend: Place it at the **bottom**.

Save the Excel file and take a screenshot of your chart.

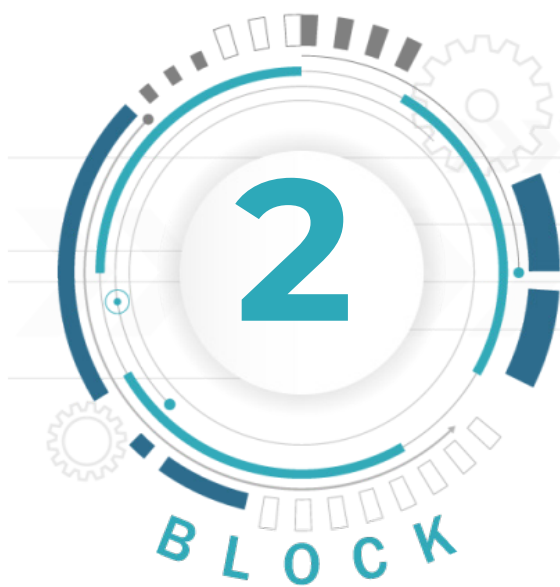
Create a Pie Chart and customize its elements.

1. Open **Microsoft Excel** and enter the following data:

Department	Budget Allocation (₹)
Marketing	80,000
Sales	60,000
IT	50,000
HR	30,000
Operations	40,000

2. Select the data and create a **Pie Chart** to show the budget distribution among departments.

3. Add the following **Chart Elements**:
 - **Chart Title:** “Department Budget Allocation”
 - **Data Labels:** Display percentages inside each slice.
 - **Legend:** Place it on the **right side** of the chart.
4. Change the **color theme** of the chart to make it visually appealing.
5. Save the Excel file and take a screenshot of your chart.
6. Try using a **3D Pie Chart** and compare it with the 2D version.



Data Analysis Techniques

Experiment 1

Advanced Formulas and Looping Functions

Discussion

2.1.1 Introduction

In this lesson, we will explore advanced formulas and lookup functions, which are essential for handling large datasets in spreadsheets. Functions like IF, AND, OR allow us to make logical decisions by evaluating conditions and returning specific results. These formulas are especially useful for applying rules, comparing values, and automating calculations. Additionally, we will learn about lookup functions such as VLOOKUP and HLOOKUP, which help us quickly find and retrieve specific data from large tables. Instead of manually searching for values, these functions enable efficient and accurate data retrieval. By mastering these advanced formulas and lookup functions, you will be able to manage data more effectively and enhance your ability to analyze and process information in spreadsheets.

2.1.2 Theory

In data analysis, tools like Excel and other spreadsheet software offer various functions that help users organize, analyze, and interpret data, make decisions, and perform calculations quickly and accurately. Among these functions, logical functions such as IF, AND, and OR are especially important because they allow users to evaluate multiple conditions at once and automate complex decision-making processes.

These logical functions work by testing whether certain conditions are true or false. Based on the result, they return different outputs or values. For example, if a student's score is above a certain threshold, you can automatically label them as "Passed" or "Failed" using the IF function. By combining these logical functions, you can handle more complex situations, such as checking if a student meets both attendance and performance criteria before awarding a certificate.

2.1.3 IF

The IF function checks whether a condition is true or false and returns one value if true, and another if false.

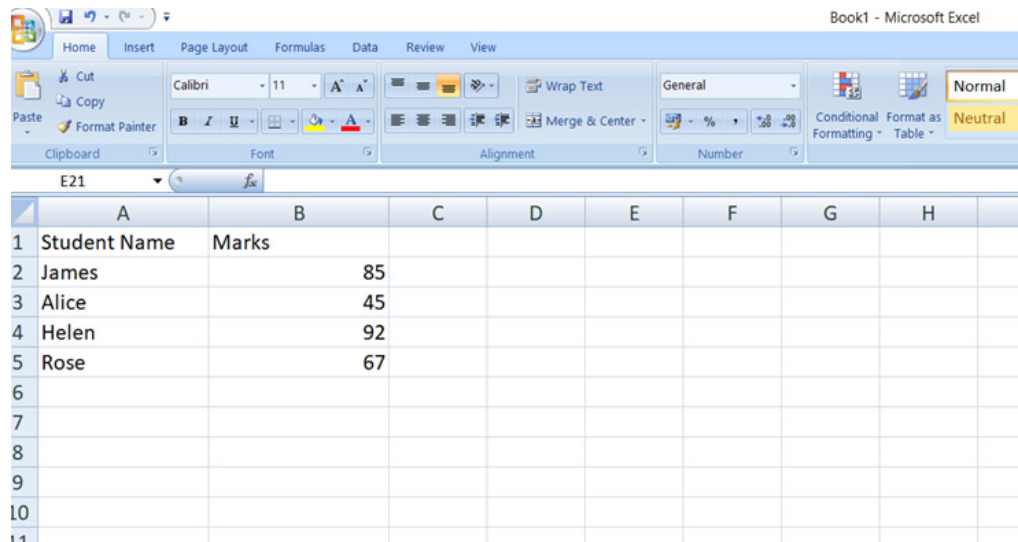
Syntax:

=IF(logical_test, value_if_true, value_if_false)

Steps to Implement IF function

Step 1: Using the IF Function

Open Excel and create a table with a set of data. For example, use the following data:



The screenshot shows the Microsoft Excel interface with a table containing student names and their marks. The table is located in the range A1:B5. The columns are labeled 'Student Name' and 'Marks'. The rows contain the following data:

	A	B	C	D	E	F	G	H	I
1	Student Name	Marks							
2	James	85							
3	Alice	45							
4	Helen	92							
5	Rose	67							
6									
7									
8									
9									
10									
11									

Fig. 2.1.1 Original data

Step 2: Write the IF function to determine if each student has passed or failed

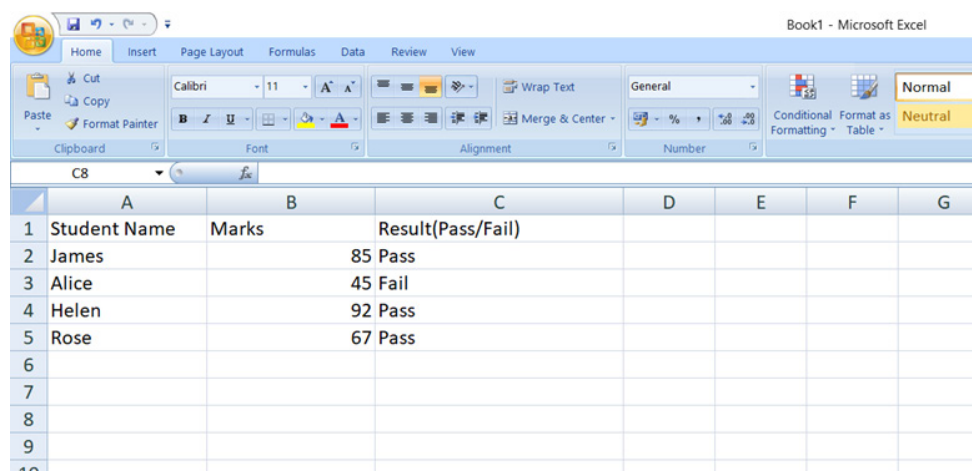
Use the formula in column C to display “Pass” if the marks are greater than or equal to 50, and “Fail” otherwise.

Formula:

=IF(B2>=50, “Pass”, “Fail”)

Step 3: Drag down the formula for other rows in column C.

Result:



The screenshot shows the same Excel table as in Fig. 2.1.1, but with an additional column 'C' added. The column is labeled 'Result(Pass/Fail)'. The formula has been applied to the data, resulting in 'Pass' for James (85), Helen (92), and Rose (67), and 'Fail' for Alice (45). The rows are numbered 1 to 10, and the columns are labeled A to G.

	A	B	C	D	E	F	G
1	Student Name	Marks	Result(Pass/Fail)				
2	James	85	Pass				
3	Alice	45	Fail				
4	Helen	92	Pass				
5	Rose	67	Pass				
6							
7							
8							
9							
10							

Fig. 2.1.2 Result after IF function

2.1.4 AND

The AND function returns TRUE if all the given conditions are true. If any condition is false, it returns FALSE.

Syntax:

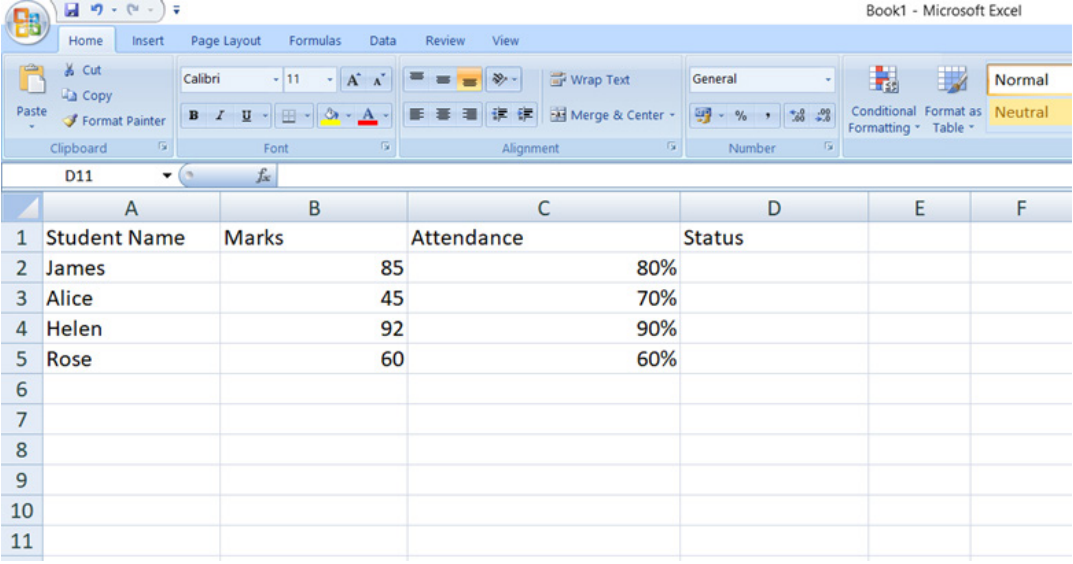
`=AND(logical1, logical2, ...)`

Steps to Implement AND function

Step 1: Use the AND function to check if a student has achieved both the following:

- ◆ Marks greater than or equal to 50.
- ◆ Attendance greater than or equal to 75%.

Suppose you add an attendance column:



	A	B	C	D	E	F
	Student Name	Marks	Attendance	Status		
1	James	85	80%			
2	Alice	45	70%			
3	Helen	92	90%			
4	Rose	60	60%			
5						
6						
7						
8						
9						
10						
11						

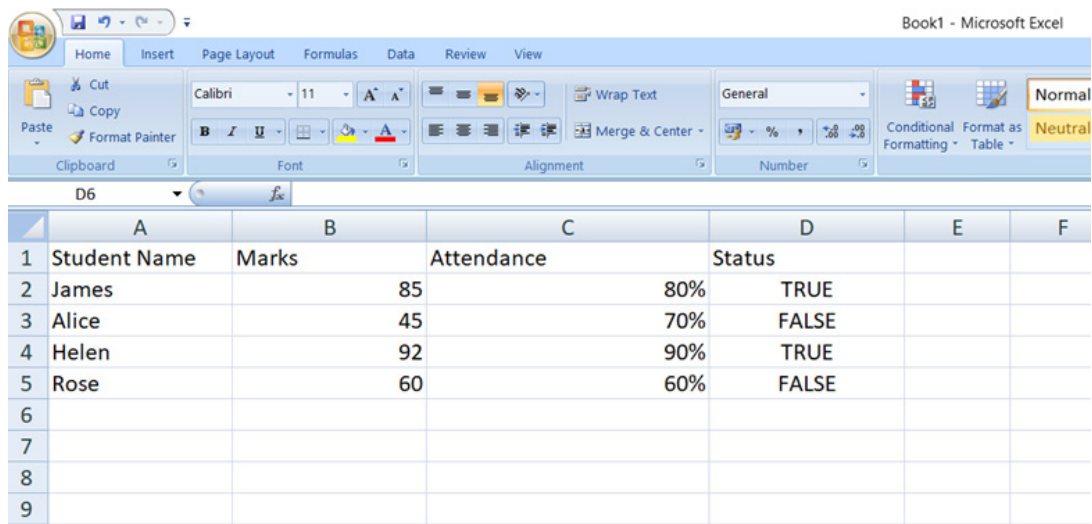
Fig. 2.1.3 Original data with attendance column

Step 2: Write the formula to check both conditions (Marks $\geq$ 50 AND Attendance $\geq$ 75%):

Formula:

`=IF(AND(B2 $\geq$ 50, C2 $\geq$ 0.75), "Eligible", "Not Eligible")`

Step 3: Drag down the formula to check the status for all students.



	A	B	C	D	E	F
1	Student Name	Marks	Attendance	Status		
2	James	85	80%	TRUE		
3	Alice	45	70%	FALSE		
4	Helen	92	90%	TRUE		
5	Rose	60	60%	FALSE		
6						
7						
8						
9						

Result 2.1.4 Result after AND function

2.1.5 OR

The OR function returns TRUE if at least one condition is true. If all conditions are false, it returns FALSE.

Syntax:

`=OR(logical1, logical2, ...)`

Steps to Implement OR function

Step 1: Use the OR function to check if a student has either:

- ◆ Marks greater than or equal to 50.
- ◆ Attendance greater than or equal to 75%.

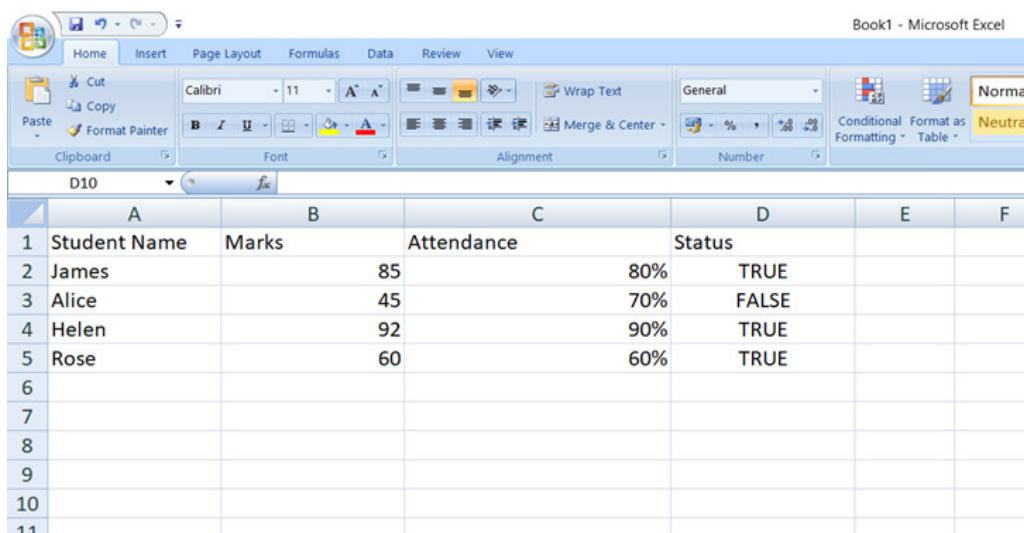
Step 2: Modify the formula to check for either condition:

Formula:

`=IF(OR(B2>=50, C2>=0.75), "Eligible", "Not Eligible")`

Step 3: Drag down the formula to apply it to all rows.

Result:



	A	B	C	D	E	F
1	Student Name	Marks	Attendance	Status		
2	James	85	80%	TRUE		
3	Alice	45	70%	FALSE		
4	Helen	92	90%	TRUE		
5	Rose	60	60%	TRUE		
6						
7						
8						
9						
10						
11						

Fig. 2.1.5 Result after OR function

2.1.6 Lookup Functions

Lookup functions are essential features in spreadsheet programs like Microsoft Excel and Google Sheets, designed to locate specific data within a table or a defined range of cells. They streamline the process of retrieving information, reducing the need for manual effort and saving significant time, especially when working with extensive datasets. These functions play a crucial role in managing, analyzing, and interpreting data by connecting related information spread across different rows and columns.

2.1.6.1 VLOOKUP

The VLOOKUP function, which stands for Vertical Lookup, is designed to locate a specific value in the first column of a data table and return related information from another column within the same row. This function is particularly useful for handling organized datasets, such as tables or lists.

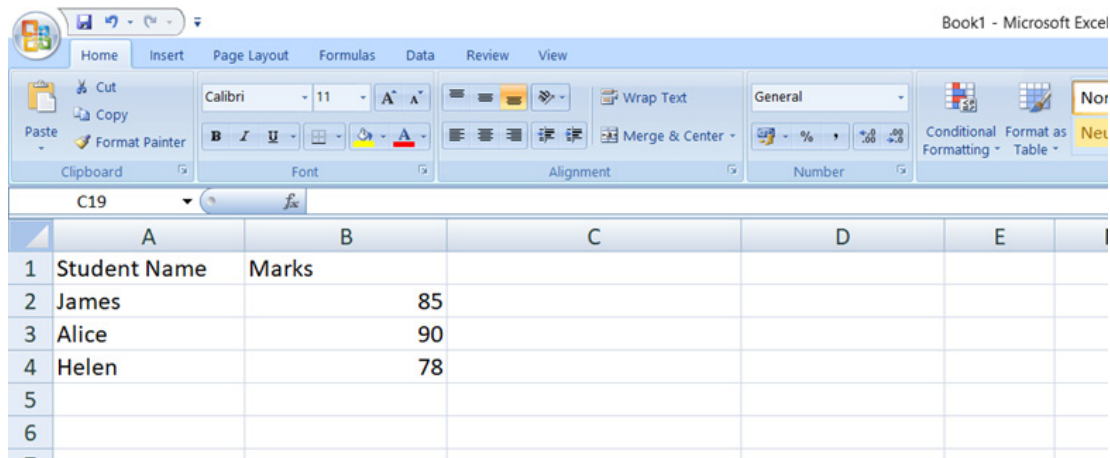
Syntax:

```
=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])
```

- ◆ **lookup_value**: The value you want to search for.
- ◆ **table_array**: The range of cells containing the data (must include the column with the lookup_value).
- ◆ **col_index_num**: The column number in the table_array from which to return a result.
- ◆ **[range_lookup]**: An optional argument:
 - Use TRUE for an approximate match (default).
 - Use FALSE for an exact match.

Example:

Imagine you have a list of students and their scores in a table, and you want to find the score of a specific student.



The screenshot shows the Microsoft Excel interface with the 'Home' tab selected. The ribbon includes options for Clipboard, Font, Alignment, Number, and Styles. The active cell is C19. The data is organized in a table with two columns: 'Student Name' and 'Marks'.

	A	B	C	D	E
1	Student Name	Marks			
2	James	85			
3	Alice	90			
4	Helen	78			
5					
6					

Fig. 2.1.6 Original data

Formula:

=VLOOKUP("Bob", A2:B4, 2, FALSE)

- ◆ lookup_value: "Alice"
- ◆ table_array: A2:B4 (includes both columns)
- ◆ col_index_num: 2 (to return the value from the second column, "Score")
- ◆ range_lookup: FALSE (ensures an exact match).

Result:

The formula returns 90, which is Alice score.

2.1.6.2 HLOOKUP

The HLOOKUP function, which stands for Horizontal Lookup, allows you to search for a specific value in the first row of a table or range and return the related data from a specified row beneath it. It is especially useful for working with data organized in a horizontal layout.

Syntax:

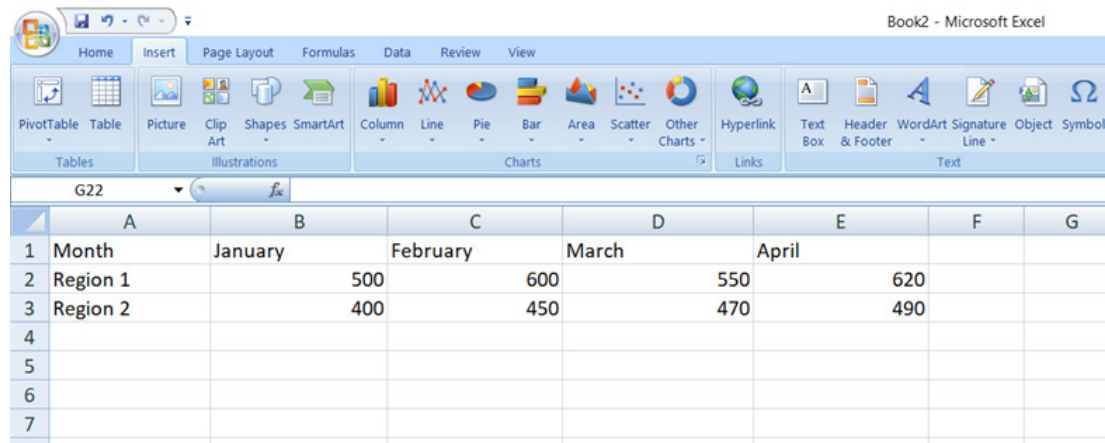
=HLOOKUP(lookup_value, table_array, row_index_num, [range_lookup])

- ◆ **lookup_value**: The value you want to search for in the first row of the table.
- ◆ **table_array**: The range of cells containing the data. The first row should contain the values to look up.
- ◆ **row_index_num**: The row number in the table from which to retrieve data, starting with 1 for the first row.

- ◆ **[range_lookup]:** Optional argument:
 - Use FALSE for an exact match.
 - Use TRUE for an approximate match (default).

Example:

You have a table that contains months in the first row and sales figures for different regions in the rows below. You need to find the sales for March in Region 2.



	A	B	C	D	E	F	G
1	Month	January	February	March	April		
2	Region 1	500	600	550	620		
3	Region 2	400	450	470	490		
4							
5							
6							
7							

Fig. 2.1.7 Sales data

Formula

=HLOOKUP("March", A1:E3, 3, FALSE)

Explanation:

- ◆ lookup_value: "March"
- ◆ table_array: A1:E3 (includes the entire table)
- ◆ row_index_num: 3 (to return the value from the third row, Region 2)
- ◆ range_lookup: FALSE (ensures an exact match).

Result:

The formula returns 470, which is the sales figure for March in Region 2.

Experiment questions

1. Create a spreadsheet for student grades with columns: Student Name, Marks, and Result. Use the IF function to determine whether each student has passed or failed. A student passes if the marks are 50 or above; otherwise, they fail.
2. Design an employee performance evaluation sheet with columns: Employee Name, Attendance (%), and Sales Target Achieved (Yes/No). Use the AND function to check if an employee qualifies for a bonus. The employee gets a bonus only if attendance is 90% or above and sales target is achieved.
3. Create a product inventory with columns: Product ID, Product Name, Price, and Stock Available. Use the VLOOKUP function to search for a product's details when a Product ID is entered in a separate cell.
4. Create a fee structure table where different course names are listed in a row, and the fees for different semesters are listed below them. Use the HLOOKUP function to find the fee for a specific course in a given semester
5. Design a sheet with Employee Name, Years of Service, and Performance Rating to check special leave eligibility. Use the OR function to display "Eligible" if an employee has 5+ years of service or an "Excellent" rating; otherwise, show "Not Eligible"

Experiment 2

Data Validation and Conditional Formatting

Discussion

2.2.1 Introduction

Data Validation and Conditional Formatting are powerful tools in Excel that help ensure data accuracy and improve visual presentation. Data Validation allows you to set rules for acceptable data input, preventing errors and ensuring consistency. Conditional Formatting lets you apply formatting based on cell values, helping to highlight important trends or anomalies. Together, these features make data more reliable and easier to analyze.

2.2.2 Theory

Data validation and conditional formatting are powerful tools in spreadsheet software like Microsoft Excel, designed to improve data management and analysis.

Data validation helps ensure that the information entered into a spreadsheet is accurate and consistent by applying specific rules for acceptable inputs. It enables users to restrict entries to certain types of data, such as integers, dates, or predefined options from a drop-down menu. This feature is particularly valuable for minimizing errors and facilitating efficient data entry in large datasets.

Conditional formatting, on the other hand, offers a visually engaging way to analyze and interpret data by applying styles or colors based on predefined conditions. It can be used to emphasize significant details, reveal patterns, or highlight critical values. For instance, cells may be formatted with color gradients to reflect high or low values, or icons can be used to indicate performance levels.

2.2.2.1 Data Validation

Data validation is a feature in Excel that helps control the type of data entered into a cell or range. By setting rules for acceptable values, it ensures data consistency and integrity. You can use data validation to restrict the data type (e.g., whole numbers, dates), create drop-down lists, and apply custom rules to control data entry.

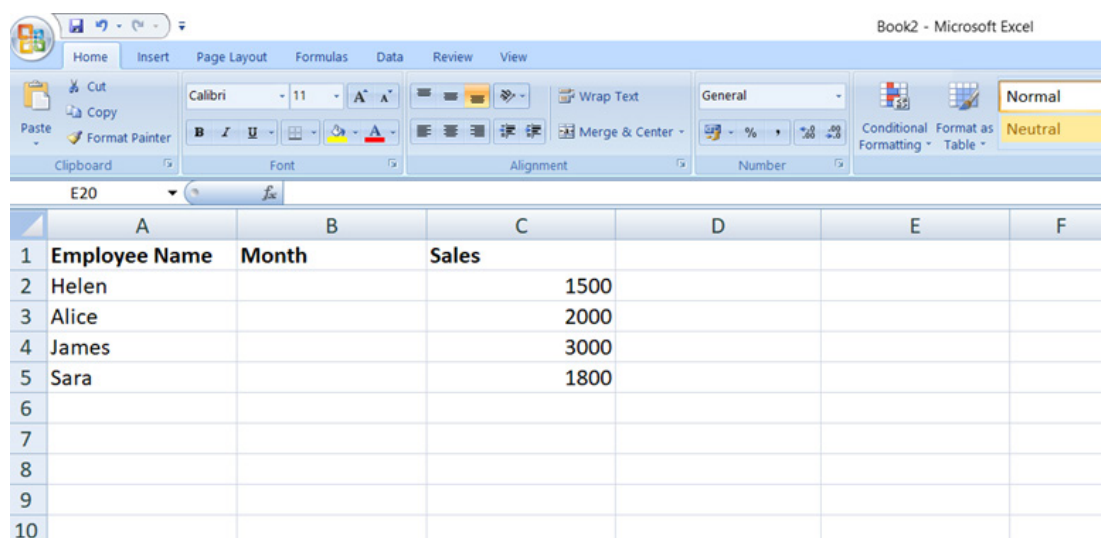
Steps to implement Data Validation

1. Select the cell or range where you want to apply data validation.
2. Go to **Data**→ **Data Validation**.
3. In the **Settings** tab, choose the validation criteria (e.g., Whole Number, Date, List).
4. For **List** validation, specify a list of allowed values or a range reference.
5. You can also set input messages or error alerts to guide the user.

Exercise

1. Create a Drop-down List for Months

Suppose you have the following data in a table for the months of the year:



The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. A table is displayed with the following data:

	A	B	C	D	E	F
1	Employee Name	Month	Sales			
2	Helen		1500			
3	Alice		2000			
4	James		3000			
5	Sara		1800			
6						
7						
8						
9						
10						

Fig.2.2.1 Sales data

You want to create a drop-down list in the “Month” column so that users can only select months from a predefined list (January to December).

Steps:

1. Select the range B2:B5 (cells where the month values are to be entered).
2. Go to **Data**→ **Data Validation**.
3. In the **Settings** tab, choose **List** from the “Allow” dropdown.
4. In the **Source** box, type:
January, February, March, April, May, June, July, August, September, October, November, December.
5. Click **OK**.

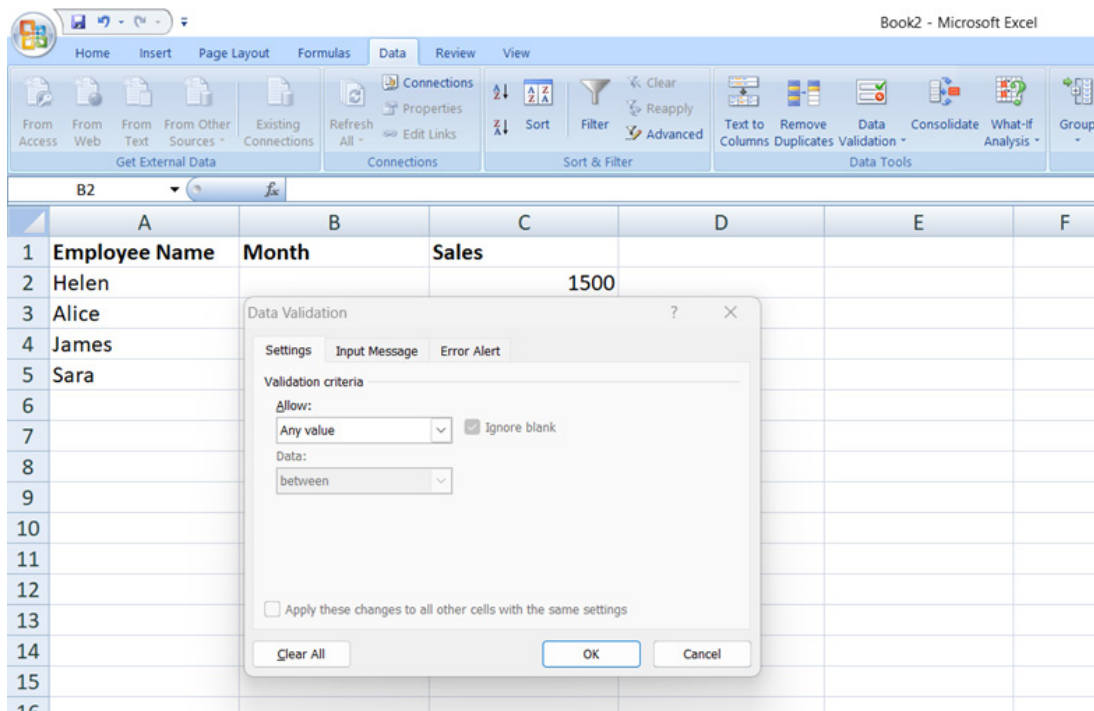


Fig. 2.2.2 Step 2 of Data validation

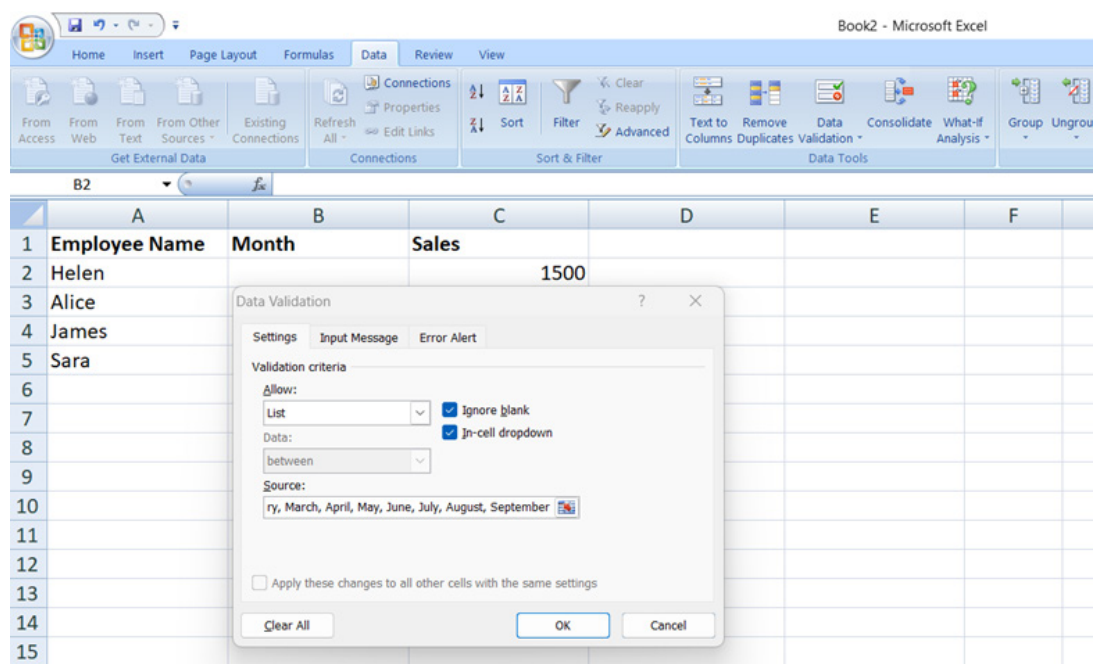
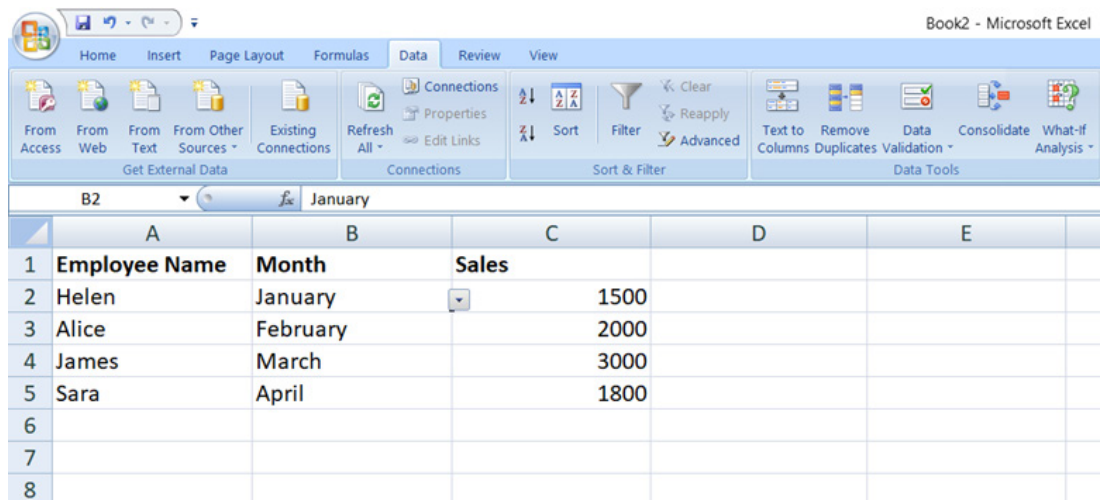


Fig.2.2.3 Step 4 of data validation

Result:

Now, cells B2:B5 will have a drop-down list, and users will only be able to select a month from the list.



Book2 - Microsoft Excel

Home Insert Page Layout Formulas Data Review View

From Access From Web From Text From Other Sources Existing Connections Refresh All Properties Edit Links Connections Sort & Filter Data Tools

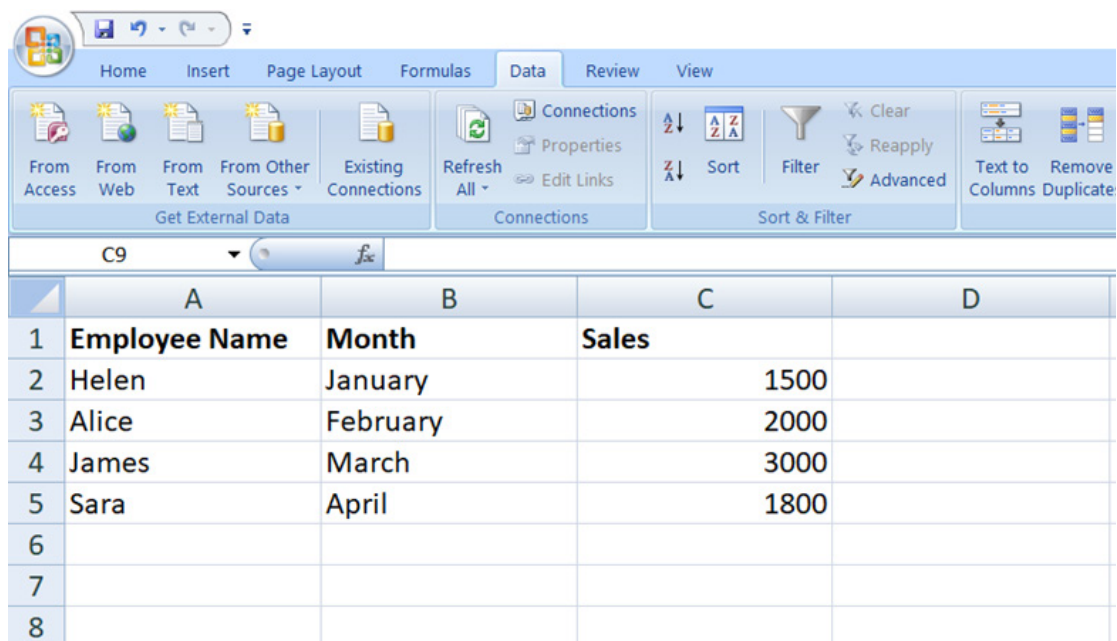
B2 January

	A	B	C	D	E
1	Employee Name	Month	Sales		
2	Helen	January	1500		
3	Alice	February	2000		
4	James	March	3000		
5	Sara	April	1800		
6					
7					
8					

Fig. 2.2.4 Result of data validation

2. Restrict Entry to Whole Numbers Between 1 and 500

Now, assume you want to restrict the **Sales** column to accept only whole numbers between 1 and 5000. You don't want anyone entering values outside this range.



Home Insert Page Layout Formulas Data Review View

From Access From Web From Text From Other Sources Existing Connections Refresh All Properties Edit Links Connections Sort & Filter Data Tools

C9

	A	B	C	D
1	Employee Name	Month	Sales	
2	Helen	January	1500	
3	Alice	February	2000	
4	James	March	3000	
5	Sara	April	1800	
6				
7				
8				

Fig. 2.2.4 Sales data

Steps:

1. Select the range C2:C5 (Sales column).
2. Go to **Data**→ **Data Validation**.
3. In the **Settings** tab, choose the **Whole Number** from the “Allow” dropdown.
4. Set the **Data** to “between,” and enter 1 in the **Minimum** field and 5000 in the **Maximum** field.
5. Click **OK**.

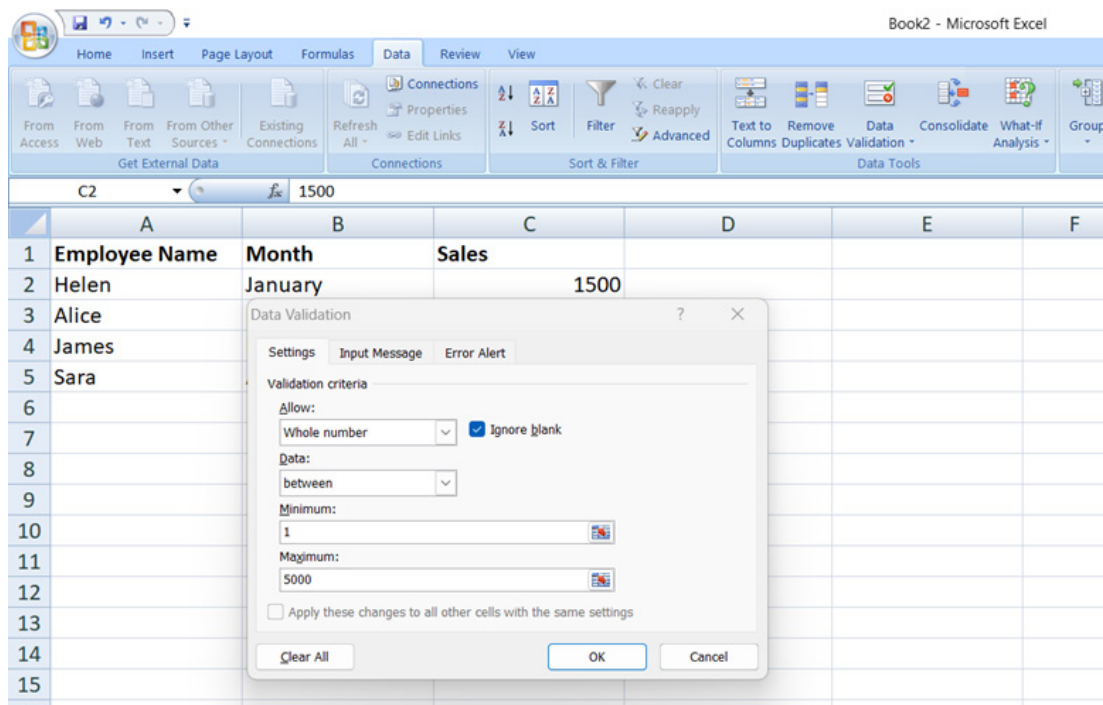


Fig. 2.2.5 Step 3, 4 of Data validation

Result:

Now, if someone tries to enter a value in the Sales column that is greater than 5000 or less than 1, Excel will show an error message.

2.2.2.2 Conditional Formatting

Conditional formatting in Excel is a feature that allows you to format cells based on their values. This feature helps you visually analyze data by changing the appearance of cells when certain conditions are met. You can use it to highlight values, apply color scales, and add icons based on specific criteria.

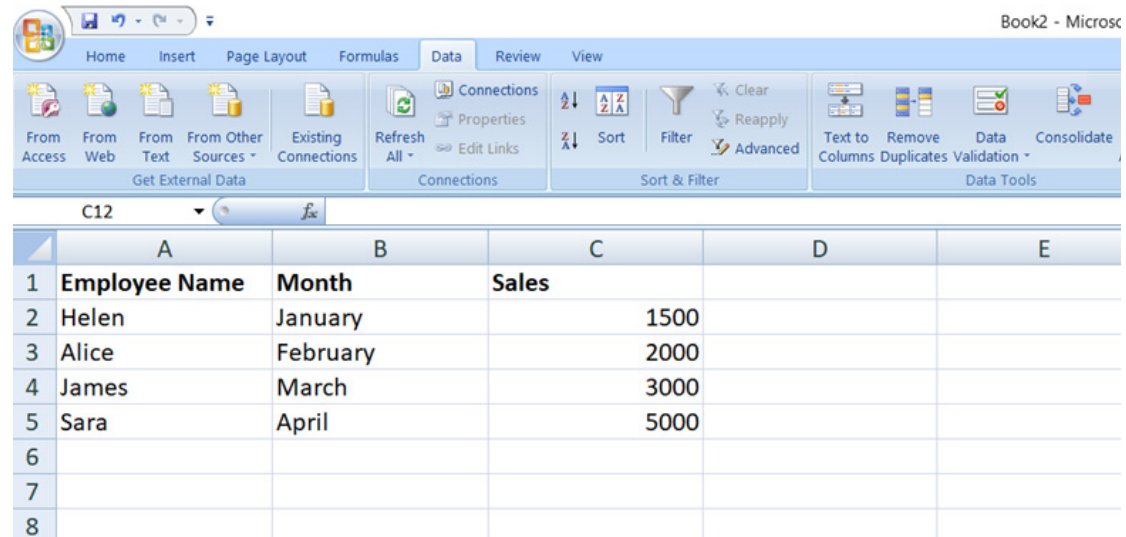
Steps to implement Conditional Formatting:

1. Select the cell or range where you want to apply conditional formatting.
2. Go to Home → Conditional Formatting.
3. Choose the type of formatting (e.g., Highlight Cells, Color Scales, Icon Sets).
4. Define the condition (e.g., greater than, less than, between, etc.).
5. Apply the desired formatting style (e.g., color fill, font change, etc.).

Exercise

1. Highlight Cells Greater Than 2000 in the Sales Column

Suppose the sales data for employees is entered, and you want to highlight all sales figures greater than 2000 in the Sales column.



The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The 'Data Tools' group is visible, including 'Sort & Filter' and 'Data Validation'. The worksheet contains the following data:

	A	B	C	D	E
1	Employee Name	Month	Sales		
2	Helen	January	1500		
3	Alice	February	2000		
4	James	March	3000		
5	Sara	April	5000		
6					
7					
8					

Fig. 2.2.6 Sales data

Steps:

1. Select the range C2:C5 (Sales column).
2. Go to **Home** → **Conditional Formatting** → **Highlight Cells Rules** → **Greater Than**.
3. In the dialog box, enter 2000 and choose a formatting style (e.g., red fill color).
4. Click **OK**.

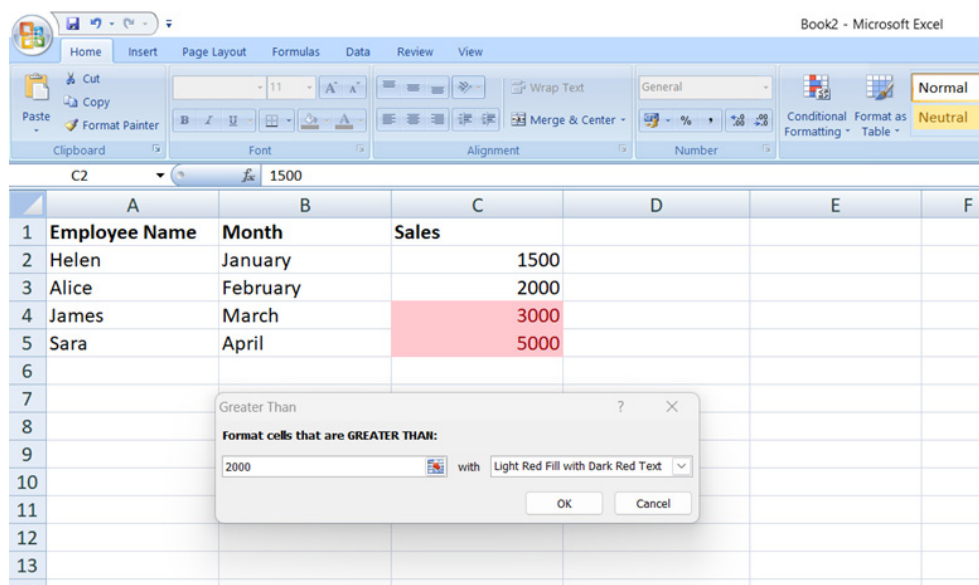
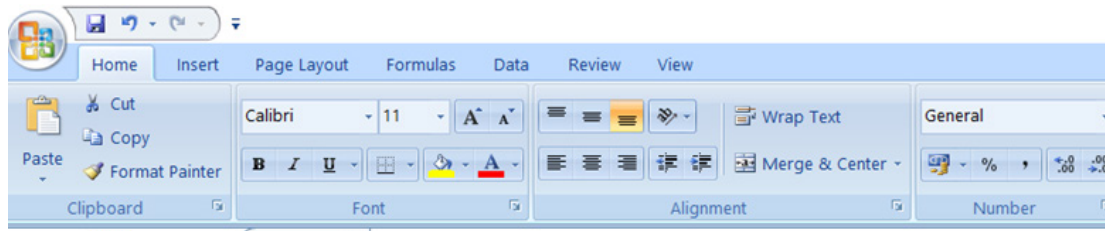


Fig.2.2.7 Step 2 of conditional formatting

Result:

Any cells in the Sales column with values greater than 2000 will now be highlighted with a red fill color.

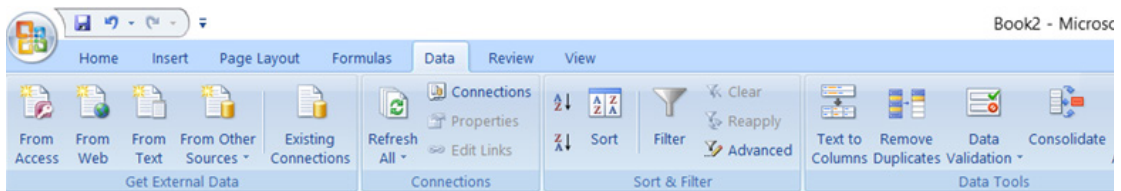


	A	B	C	D
1	Employee Name	Month	Sales	
2	Helen	January	1500	
3	Alice	February	2000	
4	James	March	3000	
5	Sara	April	5000	
6				
7				
8				
9				

Fig.2.2.8 Step 3 of conditional formatting

2. Apply a Color Scale to Show Value Distribution in Sales

Suppose you want to visually analyze the sales distribution using color, where lower sales are displayed in red and higher sales in green.



	A	B	C	D	E
1	Employee Name	Month	Sales		
2	Helen	January	1500		
3	Alice	February	2000		
4	James	March	3000		
5	Sara	April	5000		
6					
7					
8					

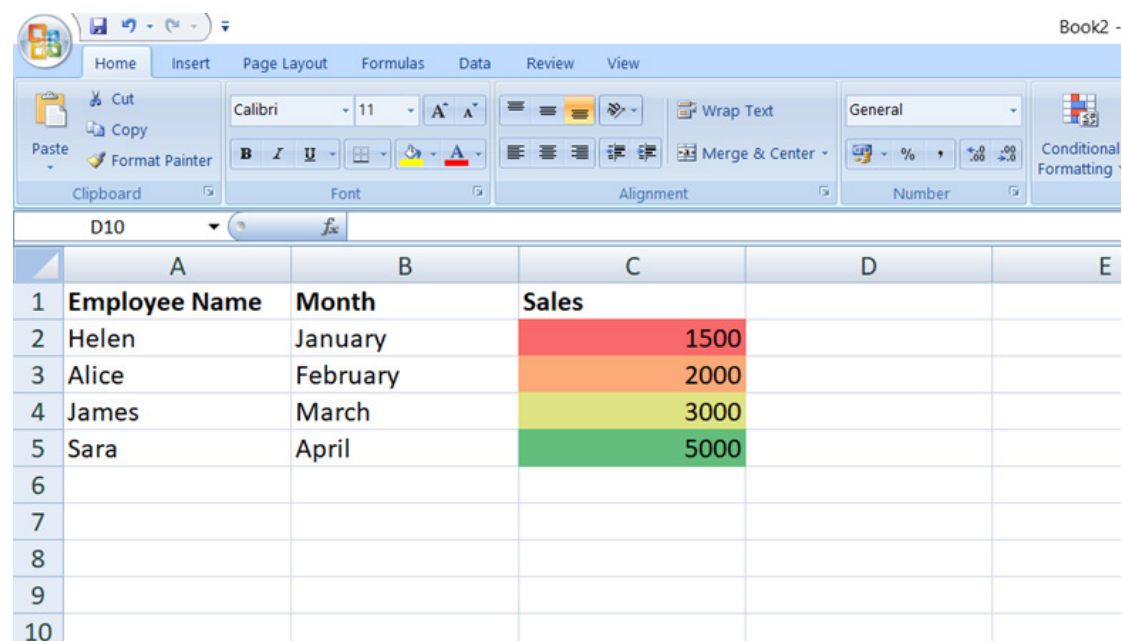
Fig. 2.2.9 Sales data

Steps:

1. Select the range C2:C5 (Sales column).
2. Go to **Home** -> **Conditional Formatting** - > **Color Scales**.
3. Choose a color scale (e.g., red for low values and green for high values).
4. Click **OK**.

Result:

Any cells in the Sales column with lower sales are displayed in red and higher sales in green.



	A	B	C	D	E
1	Employee Name	Month	Sales		
2	Helen	January	1500		
3	Alice	February	2000		
4	James	March	3000		
5	Sara	April	5000		
6					
7					
8					
9					
10					

Fig. 2.2.10 Result after conditional formatting

Experiment questions

Q1. To use Data Validation in Excel to control the type and range of data entered into cells to ensure the integrity and consistency of an employee database.

Table 2.2.1 Employee data table

Employee ID	Name	Age	Department	Salary (\$)
101	John Doe	29	HR	45,000
102	Jane Smith	34	Marketing	60,000
103	Mike Lee	42	Finance	70,000
104	Sarah Ray	22	IT	50,000
105	David Wong	25	HR	45,000

1. Limit the age values to be between 18 and 100 to ensure employees are within a reasonable age range.
2. Ensure that the “Department” column contains only valid department names (HR, Marketing, IT, Finance).

Q2.You are given a dataset of student scores for a class in an Excel sheet. Your task is to apply conditional formatting to highlight specific ranges of scores.

Table 2.2.2 Dataset of student scores

Student Name	Score
Alice	85
Bob	92
Charlie	58
David	73
Eva	96

Steps:

1. Apply Color Scales:
Apply a two-color scale where the lowest scores are highlighted in red, and the highest scores are highlighted in green.
2. Highlight Scores Above 90:
Apply conditional formatting to highlight scores above 90 with a green fill color.
3. Highlight Scores Below 60:
Apply conditional formatting to highlight scores below 60 with a red fill color.

Q3.To apply conditional formatting in Excel to analyze and highlight key sales performance metrics across different sales representatives.

Table 2.2.3 Sales performance of five persons

Sales Rep	Sales (\$)	Target (\$)	Commission Rate (%)
John	15,000	12,000	5
Sarah	18,500	18,000	6
Mike	9,200	10,000	4
Linda	22,000	20,000	5
David	11,800	15,000	5

1. Highlight the sales representatives who have exceeded their target sales in **green**..
2. Highlight sales reps who did not meet their target in red.

Experiment 3

Pivot Tables

Discussion

2.3.1 Introduction

A Pivot Table in Excel is a powerful tool that helps users organize, analyze, and extract insights from large datasets without altering the original data. It enables dynamic summarization, making it easier to analyze sales, performance trends, and expenses by applying operations like SUM, AVERAGE, COUNT, and more on grouped data. Pivot Tables allow users to categorize and filter data interactively using slicers or built-in filters, and they provide customization options for sorting and formatting layouts based on the analysis needs. This versatility makes Pivot Tables an invaluable tool for quickly identifying trends and making informed decisions.

2.3.2 Theory

2.3.2.1 Steps to Create a Pivot Table

1. Select Data:
 - Highlight the dataset or use a named range that includes column headers.
2. Insert Pivot Table:
 - Go to the *Insert* tab and click on the Pivot Table option.
 - Specify whether the pivot table should be created in a new worksheet or an existing one.
3. Design the Layout:
 - Drag and drop fields into the Rows, Columns, Values, and Filters areas in the Pivot Table Field Pane.
4. Customize:
 - Apply value field settings (e.g., sum or count).
 - Add calculated fields, grouping, and conditional formatting for enhanced analysis.

Example: Dataset of sales transactions.

Table 2.3.1 : Dataset of sales transactions

Region	Product	Month	Sales Amount
East	Laptop	January	1500
East	Laptop	February	2000
East	Printer	January	800
West	Laptop	January	1700
West	Printer	February	900
North	Laptop	February	2500
North	Printer	January	1200

1. Create a Pivot Table to analyze the total sales amount for each product in different regions.

Solution:

Creating the Pivot Table

- ◆ Highlight the dataset (A1:D8).
- ◆ Go to the Insert tab and select Pivot Table.
- ◆ Place the Pivot Table in a new worksheet.

Configuring the Fields

- ◆ Drag Region into the Rows area.
- ◆ Drag Product into the Rows area below Region.
- ◆ Drag Sales Amount into the Values area (ensure the aggregation is set to SUM).
- ◆ Verify the total sales amount for each product in different regions.

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PivotTable Analyze

PivotTable Name:

PivotTable1

Options

PivotTable

Active Field:

Region

Field Settings

Active Field

Group Selection

Ungroup

Group Field

Group

Insert Slicer

Insert Timeline

Filter Connections

Filter

Refresh

Change Data Source

Data

Clear

Select

Move

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Fig:2.3.1 Pivot Table Layout.

2. Modify the Pivot Table to show the sales amount split by months as columns.

Solutions:

Adding Months as Columns:

- ◆ Drag Month into the Columns area.
- ◆ The Pivot Table now shows sales amounts split by months.

Sum of Sales Amount	Column Labels		
Row Labels	January	February	Grand Total
East	2300	2000	4300
Laptop	1500	2000	3500
Printer	800		800
North	1200	2500	3700
Laptop		2500	2500
Printer	1200		1200
West	1700	900	2600
Laptop	1700		1700
Printer		900	900
Grand Total	5200	5400	10600

Fig:2.3.2 Updated Pivot Table Layout.

3. Apply a filter to show data for only the East region

Solution:

Applying Filters:

- ◆ Drag Region into the Filters area.
- ◆ Use the dropdown filter to select East.

Sum of Sales Amount	Column Labels		
Row Labels	February	January	Grand Total
Laptop	2000	1500	3500
Printer		800	800
Grand Total	2000	2300	4300

Fig:2.3.3 Filtered Pivot Table (East)

2.3.2.2 Common Commands and Options:

1. Value Field Settings: Configure how numerical data is summarized (e.g., Sum, Average).
2. Grouping: Group data by categories, dates, or numeric ranges.
3. Slicers and Timelines: Add interactive filters for quick analysis.
4. Refresh: Update the Pivot Table if the underlying data changes.

Example: Dataset containing sales data for a retail store.

Table 2.3.1 : Dataset of sales transactions.

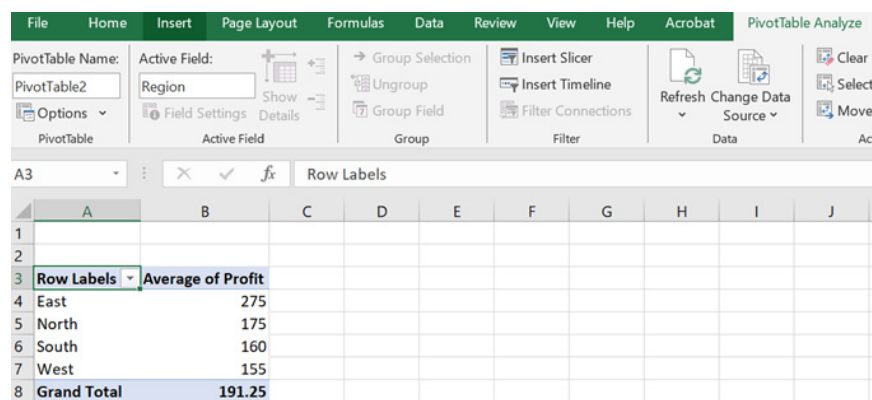
Date	Region	Product	Category	Sales	Quantity	Profit
2024-01-01	North	Laptop	Electronics	1500	5	300
2024-01-02	South	Smartphone	Electronics	800	4	200
2024-01-03	East	Tablet	Electronics	600	3	150
2024-01-04	West	Smartphone	Electronics	1000	5	250
2024-01-05	North	Accessories	Accessories	300	10	50
2024-01-06	South	Tablet	Electronics	500	2	120
2024-01-07	East	Laptop	Electronics	2000	8	400
2024-01-08	West	Accessories	Accessories	400	15	60

1. Value Field Settings:

- i. Create a Pivot Table to calculate the average Profit for each Region.
- ii. Modify the Value Field Settings to show the data as an average instead of the default sum.

Solution:

- ◆ Place the Region in the Rows area.
- ◆ Place Profit in the Values area and set the aggregation to Average.



Row Labels	Average of Profit
East	275
North	175
South	160
West	155
Grand Total	191.25

Fig:2.3.4 Filtered Pivot Table (East)

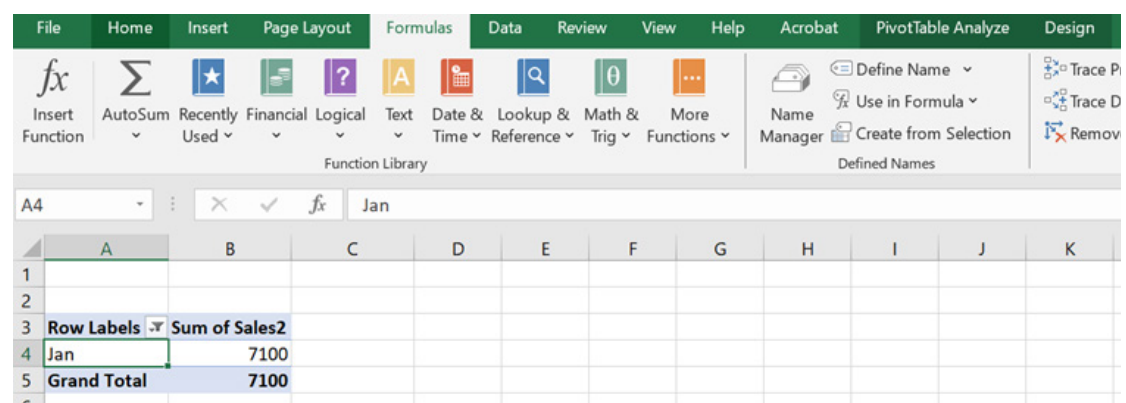
2. Grouping by Date:

- Group the sales data by Month using the Date field in the Pivot Table.
- Calculate the total Sales for each month.

Solution:

- ◆ In the Pivot Table:
- ◆ Place Date in the Rows area.
- ◆ Group by Months using the Grouping feature.
- ◆ Place Sales in the Values area (sum aggregation).

Output:



	A	B	C	D	E	F	G	H	I	J	K
1											
2											
3	Row Labels	Sum of Sales2									
4	Jan	7100									
5	Grand Total	7100									

Fig:2.3.5 Filtered Pivot Table (East)

3. Slicers for Interactive Filters

- Add a Slicer for the Region field to filter the Pivot Table dynamically.
- Use the Slicer to display data for the North region only and calculate the total Quantity sold.

Solution: Using the Slicer for Region (filtering North)

Output:

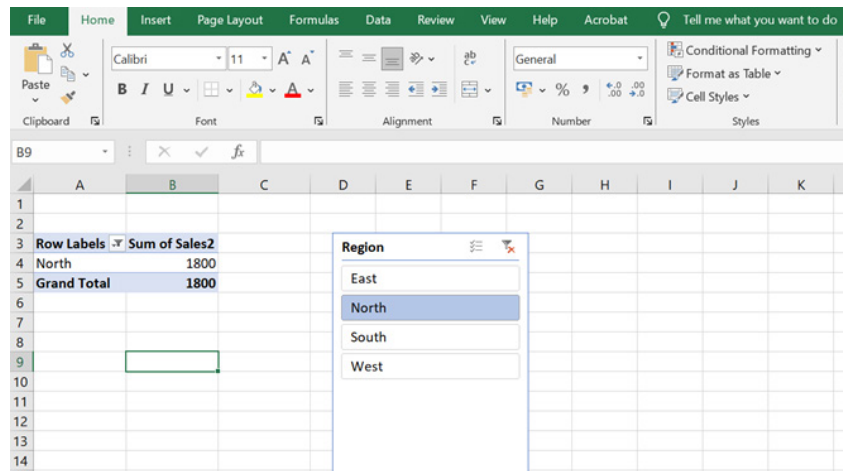


Fig:2.3.6 Sliced Pivot Table (East)

4. Timelines for Date Analysis

- Add a Timeline for the Date field to filter sales data for transactions in the first week of January (2024-01-01 to 2024-01-07).
- Calculate the total Profit for this period.

Solution: Using the Timeline to filter dates between 2024-01-01 and 2024-01-07:

Output:

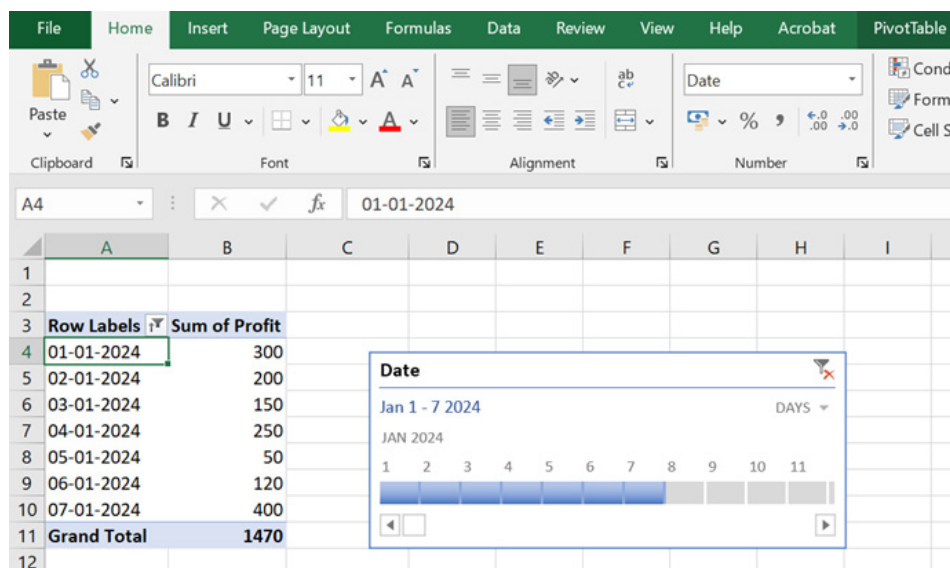


Fig:2.3.7 Timeline in Pivot Table.

5. Refresh Pivot Table

- Suppose the dataset is updated, and the Sales for the South region's Tablet on 2024-01-06 changes from 500 to 600.
- Refresh the Pivot Table and calculate the updated total Sales for the South region.

Solution: After refreshing the Pivot Table:

Output:

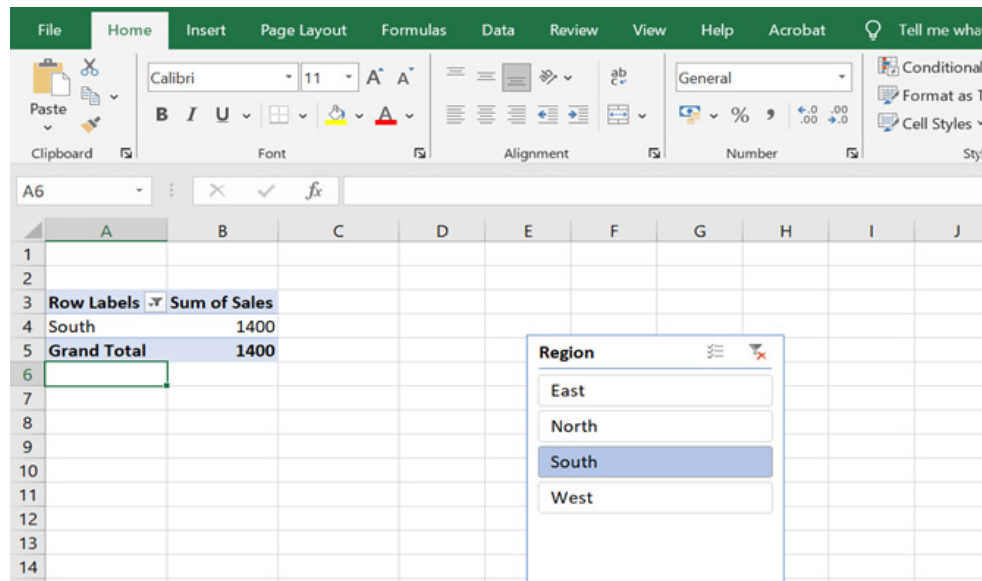


Fig:2.3.8 Filtered Pivot Table

Experiment questions

1. Use the following dataset, which contains sales information for a retail store:

Table 2.3.2 : Dataset of Sales Transactions

Date	Region	Product	Category	Sales	Quantity	Profit
2024-01-01	North	Laptop	Electronics	1500	5	300
2024-01-02	South	Smartphone	Electronics	800	4	200
2024-01-03	East	Tablet	Electronics	600	3	150
2024-01-04	West	Smartphone	Electronics	1000	5	250
2024-01-05	North	Accessories	Accessories	300	10	50
2024-01-06	South	Tablet	Electronics	500	2	120
2024-01-07	East	Laptop	Electronics	2000	8	400
2024-01-08	West	Accessories	Accessories	400	15	60

Tasks:

- ◆ Create a Pivot Table to analyze total Sales for each Region.
- ◆ Create another Pivot Table to calculate the total Quantity sold for each Product across all regions.
- ◆ Add a Filter: Modify the first Pivot Table (Region vs. Sales) to include only regions where total Sales exceed \$1500.

- ◆ Analyze Profit by Category: Create a Pivot Table to calculate the average Profit for each Category (Electronics and Accessories).

2. Use the following dataset that contains sales and customer data for a retail store:

Table 2.3.3 : Dataset of Sales Transactions.

Date	Region	Product	Category	Sales	Quantity	Profit	Customer
2024-01-01	North	Shirt	Clothing	500	20	100	John Doe
2024-01-02	South	Jeans	Clothing	800	15	150	Jane Smith
2024-01-03	East	Jacket	Clothing	1200	8	300	Emily White
2024-01-04	West	T-Shirt	Clothing	400	25	75	David Brown
2024-01-05	North	Hoodie	Clothing	600	12	120	Sarah Miller
2024-01-06	South	Shoes	Footwear	1000	10	200	Michael Green
2024-01-07	East	Sneakers	Footwear	1500	5	400	Olivia Adams
2024-01-08	West	Boots	Footwear	700	18	150	Daniel Carter

Tasks:

- ◆ Create a Pivot Table to Calculate Total Sales for Each Region
- ◆ Create a Pivot Table to Calculate the Total Quantity Sold for Each Product
- ◆ Filter to Show Only Products with Sales Over \$1000
- ◆ Analyze Average Profit by Category
- ◆ Add a Slicer for Product

Experiment 4

Named Ranges

Discussion

2.4.1 Introduction

Named Ranges in Excel allow you to give a simple name to a group of cells, making it easier to work with your data. Instead of using cell references like A1:A10, you can use a name like Sales Data, which makes your formulas clearer and easier to understand. This is especially helpful in large or complex spreadsheets, as it makes navigation simpler, reduces mistakes, and allows you to use the names in different sheets or workbooks.

2.4.2 Theory

Named ranges in Excel provide a way to assign a unique, descriptive name to a cell or range of cells. This helps improve formula readability and makes data easier to manage. Named ranges can be used across the entire workbook, allowing for quicker navigation and clearer formulas. They also help reduce errors, as it's easier to understand and work with names than complex cell references. Named ranges enhance both the organization and clarity of your spreadsheets.

2.4.2.1 Creating Named Ranges

Creating Named Ranges is straightforward and can be done in multiple ways.

Steps to Create a Named Range:

1. Using the Name Box:
 - ◆ Select the range of cells you want to name.
 - ◆ Click on the Name Box (left of the formula bar).
 - ◆ Type the desired name (e.g., MonthlyExpenses) and press Enter.
2. Using the Define Name Option:
 - ◆ Go to the Formulas tab and click Define Name.
 - ◆ In the New Name dialog box:
 - Enter the name.
 - Specify the range in the “Refers to” box.
 - ◆ Click OK.

3. Shortcut Method:
4. Use Ctrl + F3 to open the Name Manager, then click New to create a Named Range.

Naming Rules

- ◆ Must start with a letter or underscore.
- ◆ Cannot include spaces (use underscores instead, e.g., Net_Profit).
- ◆ Cannot conflict with cell references (e.g., A1 is invalid).

2.4.2.2 Managing Named Ranges in Formulas

After creating Named Ranges, you can use them in formulas, edit them, or delete them if no longer needed.

Using Named Ranges in Formulas:

- ◆ Replace cell references with Named Ranges (e.g., =SUM(SalesData)).
- ◆ Combine with functions for better readability (e.g., =AVERAGE(Revenue2023)).

Editing or Deleting Named Ranges:

1. Open the Name Manager:
 - ◆ Go to the Formulas tab and click Name Manager or press Ctrl + F3.
2. Edit a Named Range:
 - ◆ Select the name and click Edit.
 - ◆ Update the name or the referenced range.
3. Delete a Named Range:
 - ◆ Select the name in the Name Manager and click Delete.

Exercise

1. You are provided with the following dataset of employee performance scores:

Table 2.4.1 Dataset of Employee Performance Scores

Employee	Department	Score
Alice	Sales	85
Bob	HR	90
Carol	IT	78
David	Sales	88
Emma	HR	92

Tasks:

1. Introduce Named Ranges for the following:
 - ◆ Employee names (Employees)
 - ◆ Department names (Departments)
 - ◆ Performance scores (Scores)
2. Use a Named Range to calculate the average performance score.
3. Edit the Named Range Scores to exclude David's score, and recalculate the average performance.
4. Delete the Named Range Departments.

Solution:

1. Creating Named Ranges:

- ◆ Highlight the range A2:A6 (Employee names).
- ◆ Go to the Formulas tab and click Define Name.
- ◆ Enter Employees in the Name box and click OK.
- ◆ Repeat the same process for:
 - B2:B6 (Department names) as Departments.
 - C2:C6 (Performance scores) as Scores.

2. Named Ranges Created:

- ◆ Employees: A2:A6
- ◆ Departments: B2:B6
- ◆ Scores: C2:C6

3. Calculating Average Performance Score:

- ◆ In any cell, type the formula:
=AVERAGE(Scores)

=86.6

Result:	86.6
---------	------

4. Editing the Named Range Scores:

- ◆ Press Ctrl + F3 to open the Name Manager.
- ◆ Select Scores and click Edit.
- ◆ Update the range to C2:C5 (excluding David's score).
- ◆ Click OK.
- ◆ Recalculate the average by typing:
=AVERAGE(Scores)=85.25

Result:	85.25
---------	-------

5. Deleting the Named Range Departments:

- ◆ Open the Name Manager (Ctrl + F3).
- ◆ Select Departments and click Delete.
- ◆ Confirm the deletion.

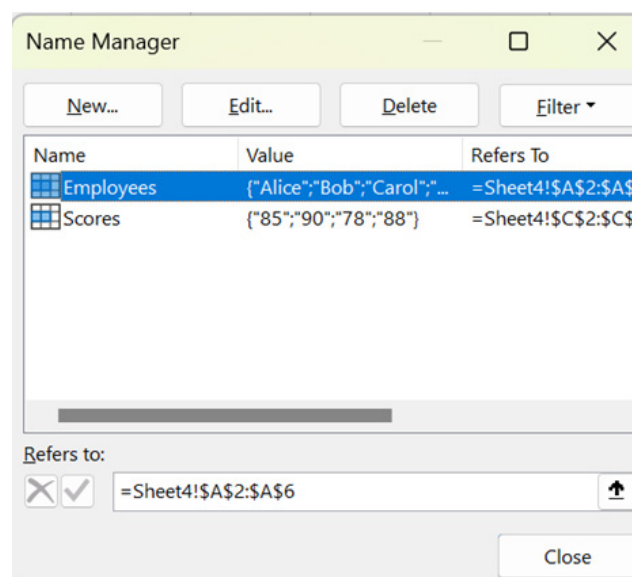


Fig. 2.4.1 Name manager window

Experiment Questions

1. Create the following dataset in excel and perform the task given.

Table 2.4.2 Dataset of five fruits with their price and quantity

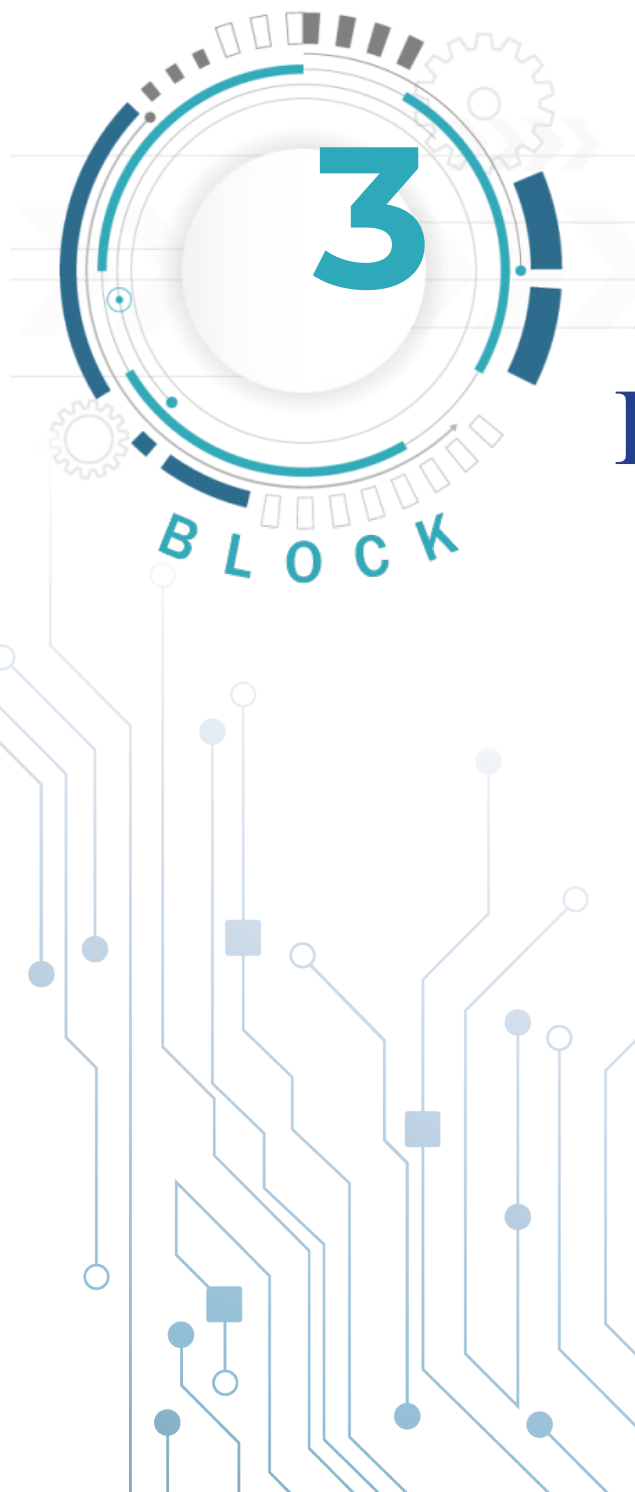
Product	Price	Quantity
Apples	2.5	50
Bananas	1.2	100
Oranges	3.0	30
Grapes	4.0	40

- ◆ Create named ranges for the following:
 - Product_List for the Product column.
 - Prices for the Price column.
 - Quantities for the Quantity column.
 - ◆ In another cell, calculate the total revenue using the named ranges (Price × Quantity for all products).
2. Consider the following dataset

Table 2.4.3 Sales details of five fruits

Product	Region-Area	Revenue	Discount Rate	Profit	Sales2024
Apples	North	1500	10%	300	1200
Bananas	South	1200	5%	150	1050
Oranges	East	1800	8%	400	1400
Grapes	West	2000	12%	500	1500
Pineapples	Central	2200	15%	600	1600

- ◆ In a new worksheet, attempt to create the following named ranges. Identify which ones follow the naming rules and which ones don't:
 - Total_Profit
 - Sales2024
 - 1st_Quarter
 - Revenue\$
 - Region-Area
 - _DiscountRate
- ◆ Correct the invalid names and apply them to corresponding data ranges.



Data Visualisation and Dashboarding

Experiment 1

Advanced Visualisations

Discussion

3.1.1 Introduction

In this experiment, you will explore advanced visualization techniques in Excel, including scatter plots, histograms, combo charts, and trendlines. These tools help in analyzing data patterns, identifying relationships, and making data-driven decisions. You will learn how to create and customize these visualizations to effectively represent complex datasets. By the end of this experiment, you will be able to apply best practices in data visualization for clear and meaningful insights.

3.1.2 Theory

3.1.2.1 Histogram

A histogram is a graphical representation of data distribution that organizes numerical data into continuous intervals, called bins. Unlike bar charts, which compare discrete categories, histograms depict the frequency of data points within specified ranges, making them useful for analyzing patterns, trends, and variations in large datasets. The x-axis represents the data intervals, while the y-axis shows the frequency or count of values within each bin.

Steps to Create a Histogram:

1. Prepare a dataset in Excel with a column for the data values.
2. Select the data range.
3. Go to the **Insert** tab.
4. Click on **Insert Statistic Chart** and choose **Histogram**.
5. Customize the bins using the **Format Axis** pane.

Exercise Question:
Sample Data (Exam Scores)

Table 3.1.1 Exam Score Data

Student	Score
John	85
Jane	78
Sam	92
Alice	88
Bob	65
Emma	79

Resulting Histogram:

The histogram will group scores into bins and show the frequency of scores within each range.

Output

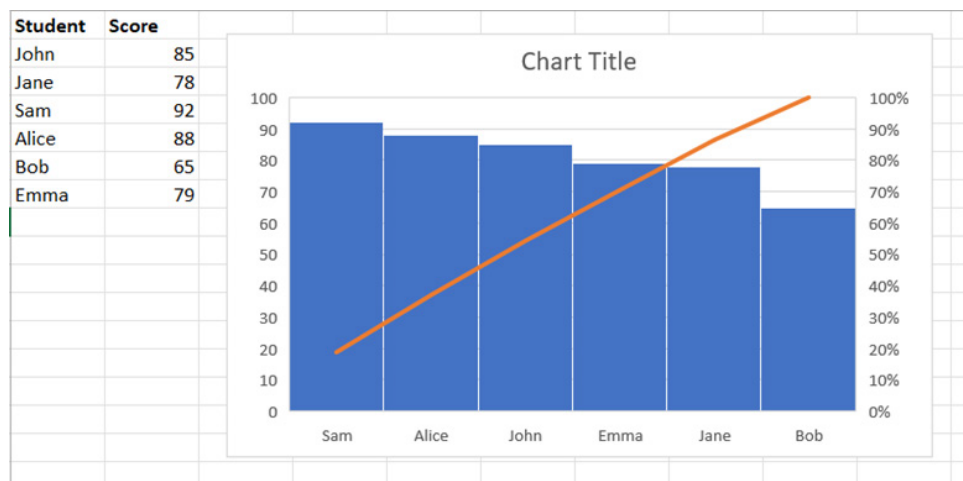


Fig 3.1.1 Histogram output with data

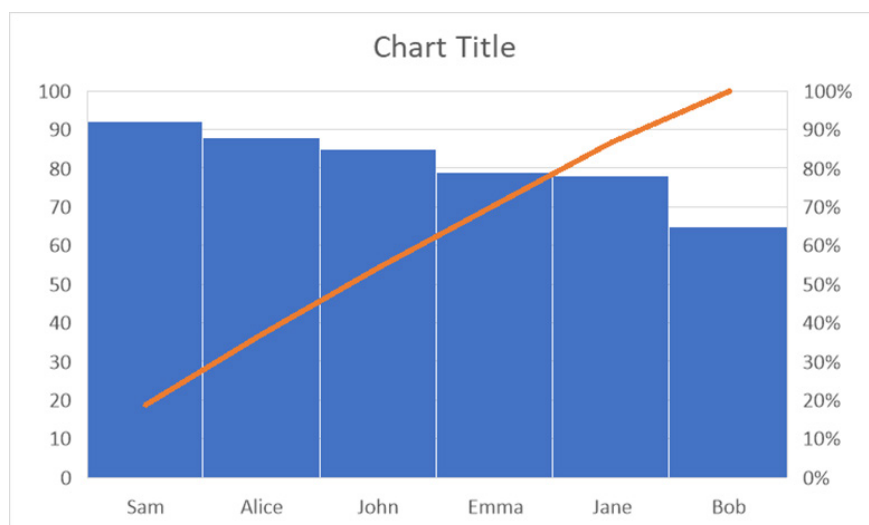


Fig 3.1.2 Histogram Output

3.1.2.2 Scatter Plots

A scatter plot is a powerful visualization tool used to analyze the relationship between two numerical variables. Each point on the plot represents a data pair, with one variable mapped to the x-axis and the other to the y-axis. This chart is particularly useful for identifying patterns, trends, and correlations, such as positive, negative, or no correlation between variables.

Steps to Create a Scatter Plot

1. Prepare a dataset with two numeric columns (e.g., X and Y values).
2. Select the data range.
3. Go to the **Insert** tab.
4. Click on **Insert Scatter (X, Y) or Bubble Chart**.
5. Format the chart as needed.

Exercise Question

Sample Data (Height vs. Weight):

Table 3.1.2 Height vs. Weight Data

Person	Height (cm)	Weight (kg)
John	170	70
Jane	160	55
Sam	180	80
Alice	165	65
Bob	175	75

Resulting Scatter Plot:

The scatter plot shows the relationship between height and weight.

Output

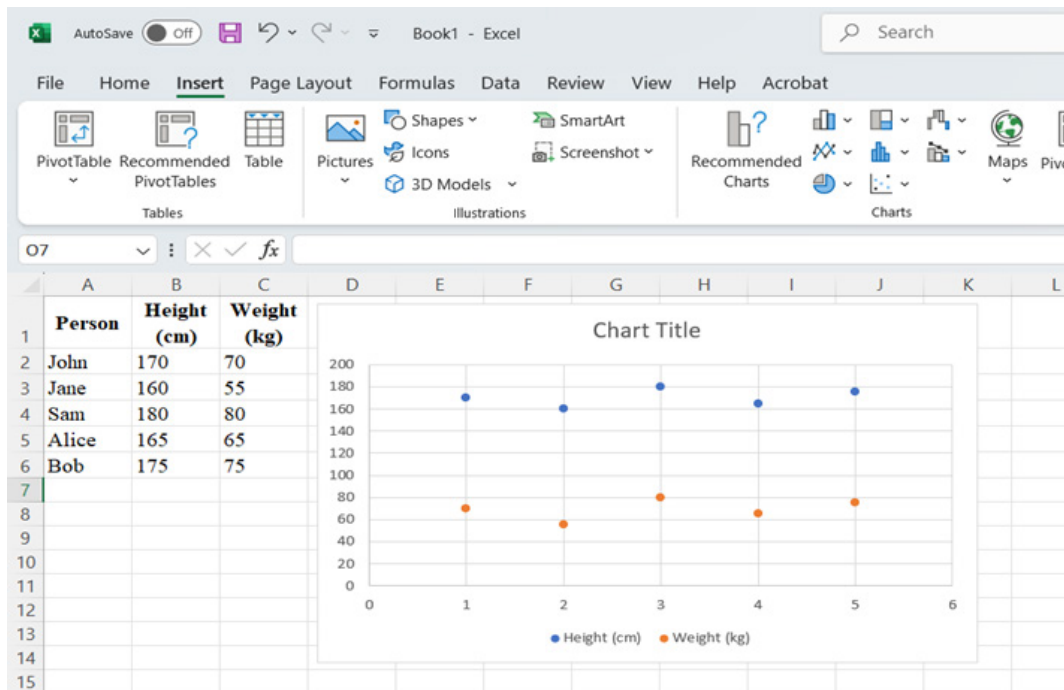


Figure 3.1.3 Scatter Plot Output

3.1.2.3 Combo Charts

A combo chart is a versatile visualization tool that combines two or more chart types, such as bar and line charts, to effectively represent multiple data series with different visualization styles. This type of chart is particularly useful when comparing datasets with varying scales or highlighting trends alongside categorical data. By integrating different chart types, a combo chart provides a clearer understanding of complex relationships within the data.

Steps to Create a Combo Chart

1. Prepare a dataset with at least two data series.
2. Select the data range.
3. Go to the **Insert** tab.
4. Click on **Insert Combo Chart**.
5. Choose a chart type for each series and customize.

Exercise Question:

Sample Data (Sales and Profit):

Table 3.1.3 Sales and Profit data

Month	Sales	Profit
Jan	2000	500
Feb	2500	700
Mar	2200	650
Apr	3000	900
May	2700	800

Resulting Combo Chart:

A column chart for sales and a line chart for profit over months.

Output

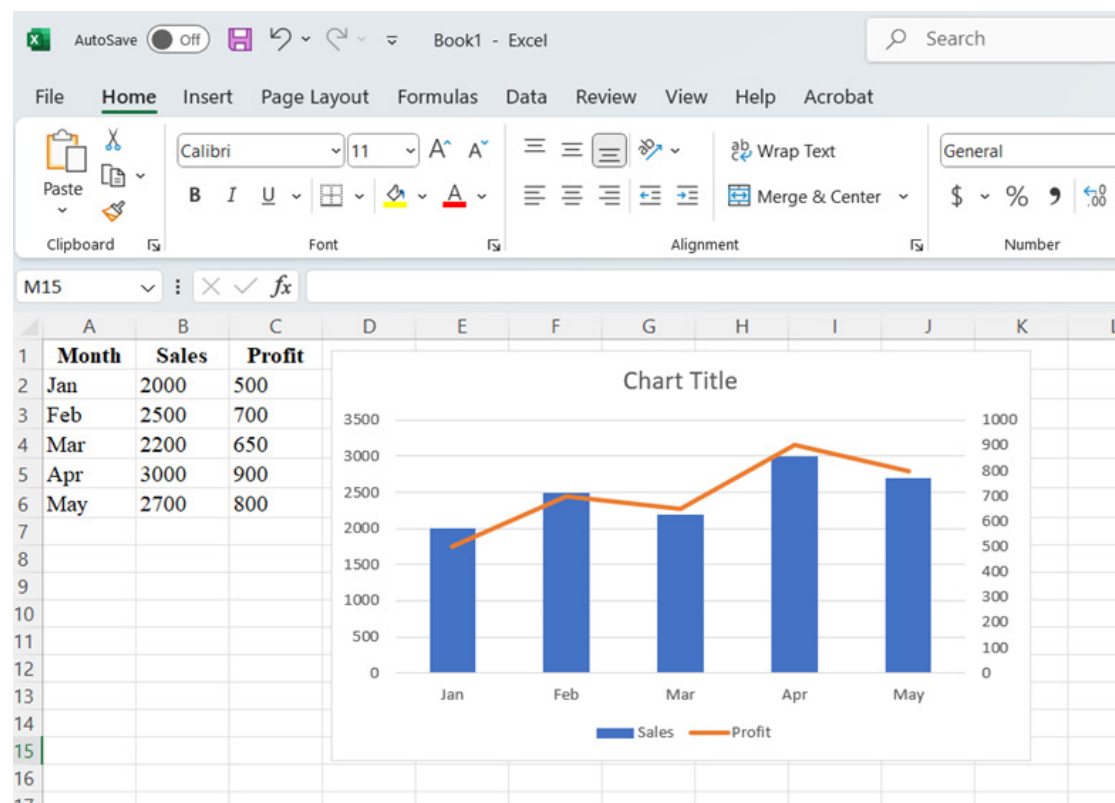


Figure 3.1.4 Combo chart output

3.1.2.4 Trendlines

Trendlines are an essential analytical tool used in charts to identify patterns, trends, and the overall direction of data over time. They are commonly applied to line

charts, scatter plots, and combo charts to highlight underlying trends, making it easier to interpret long-term movements and relationships within a dataset.

Steps to Add a Trendline

1. Select a chart (e.g., scatter plot or line chart).
2. Click on a data series.
3. Go to **Chart Tools** and select **Add Trendline**.
4. Choose the type of trendline (e.g., linear, exponential).
5. Customize and display the equation if needed.

Exercise Question

Sample Data (Yearly Sales):

Table 3.1.4 Yearly Sales data

Year	Sales
2018	5000
2019	6000
2020	7000
2021	8000
2022	9000

Resulting Chart with Trendline:

The trendline shows the increasing sales trend over years.

Output

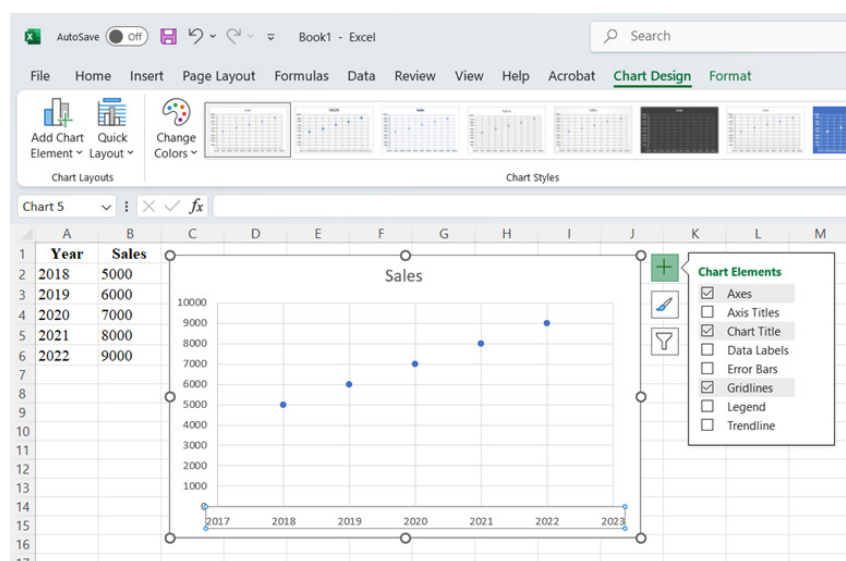


Fig 3.1.5 Scatter plot before drawing a Trendline

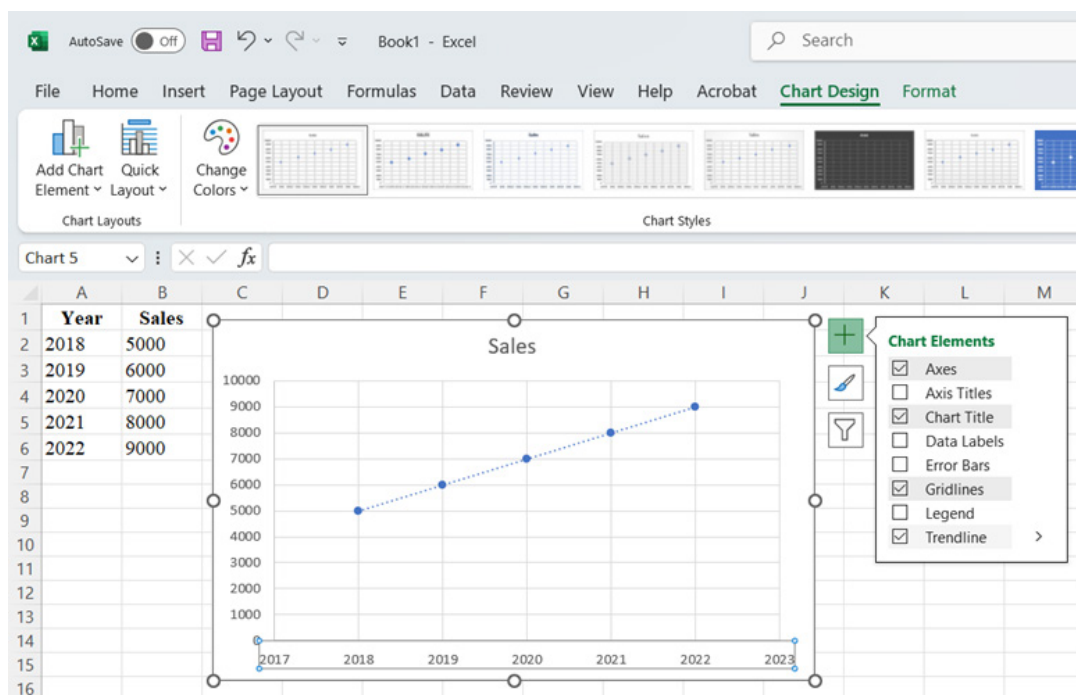


Fig. 3.1.6 After drawing a trendline on that scatter plot

Experiment Questions

1. Generate a histogram to display the frequency of employees' ages in a company.
2. Create a histogram to categorize product sales data into predefined ranges..
3. Create a histogram to analyze customer purchase amounts and identify the most common range of spending.
4. Create a scatter plot to study the relationship between advertising expenses and sales revenue.
5. Generate a scatter plot to analyze the correlation between hours studied and test scores for students.
6. Use a combo chart to analyze yearly profits for two different branches of a company.
7. Add meaningful labels, a title, and a legend to a combo chart for better interpretation.
8. Apply an exponential trendline to a chart showing population growth over the years
9. Use a polynomial trendline to analyze fluctuations in monthly website traffic.

Experiment 2

Interactive Dashboards and Data Fitering

Discussion

3.2.1 Introduction

In this experiment, you will learn how to create interactive dashboards in Excel using slicers and timelines for efficient data filtering. Dashboards help in visualizing key insights by combining multiple charts, tables, and filters into a single interactive view. Slicers provide an easy way to filter data dynamically, while timelines allow filtering based on date ranges. By following data visualization best practices, you will design dashboards that are clear, insightful, and user-friendly, enabling better decision-making and analysis.

3.2.2 Theory

3.2.2.1 Dashboards

Dashboards provide a visual summary of key metrics, allowing users to explore and analyze data interactively. They integrate multiple elements, such as charts, slicers, pivot tables, and conditional formatting, to present a comprehensive and dynamic view of data. By consolidating information from various sources into a single interface, dashboards enhance data-driven decision-making and improve efficiency.

Steps to Create an Interactive Dashboard

1. Prepare a clean dataset.
2. Insert pivot tables and charts for key metrics.
3. Add slicers to filter data interactively.
4. Use timelines for date-based filtering.
5. Arrange charts and slicers on a single sheet.

Exercise Question

Sample Data

Dataset containing sales, regions, and product details.

Table 3.2.1 Dataset containing sales, regions, and product details

Region	Product	Sales	Quantity Sold	Profit Margin (%)
North	Product A	25000	120	20
South	Product B	40000	200	25
East	Product C	35000	150	18
West	Product D	20000	80	15
North	Product E	30000	140	22
South	Product F	45000	210	28
East	Product G	50000	250	30

Resulting Dashboard:

- ◆ Interactive charts showing sales trends, product performance, and regional analysis with slicers for filtering by region or product.

Output

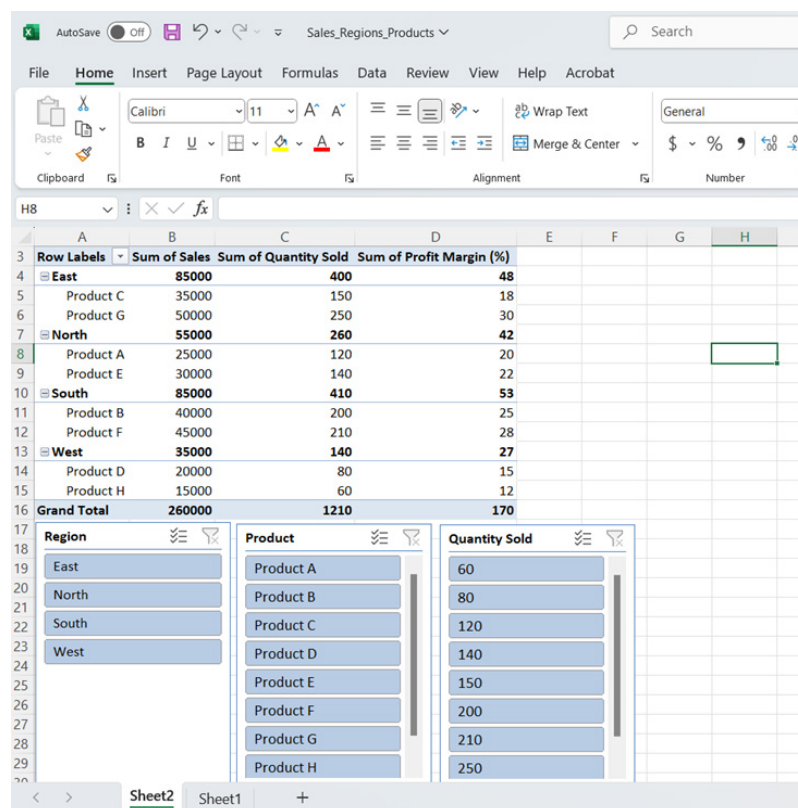


Fig. 3.2.1 Dashboard

3.2.2.2 Using Slicers and Timelines for Filtering Data

Slicers are interactive visual filters used in Excel to refine and filter data dynamically within pivot tables and charts. They provide an intuitive and user-friendly way to segment data by selecting specific categories, making data analysis more efficient. Unlike traditional drop-down filters, slicers display filter options as clickable buttons, allowing users to apply multiple filters simultaneously.

Steps to Add Slicers and Timelines:

1. Create a pivot table or chart.
2. Go to the **PivotTable Analyze** tab.
3. Click **Insert Slicer** or **Insert Timeline**.
4. Select the fields to filter.

Exercise Question

Sample data

Table 3.2.2 Sales and Product dataset

Date of Sales	Region	Product	Sales (INR)
2024-01-01	North	Laptop	1500
2024-01-02	South	Smartphone	800
2024-01-03	East	Tablet	600
2024-01-04	West	Smartwatch	400
2024-01-05	North	Headphones	200
2024-01-06	South	Laptop	1400
2024-01-07	East	Tablet	650
2024-01-08	West	Smartphone	750
2024-01-09	North	Smartwatch	450
2024-01-10	South	Headphones	300

Resulting Visualization

Filter data dynamically using slicers and timelines.

Output

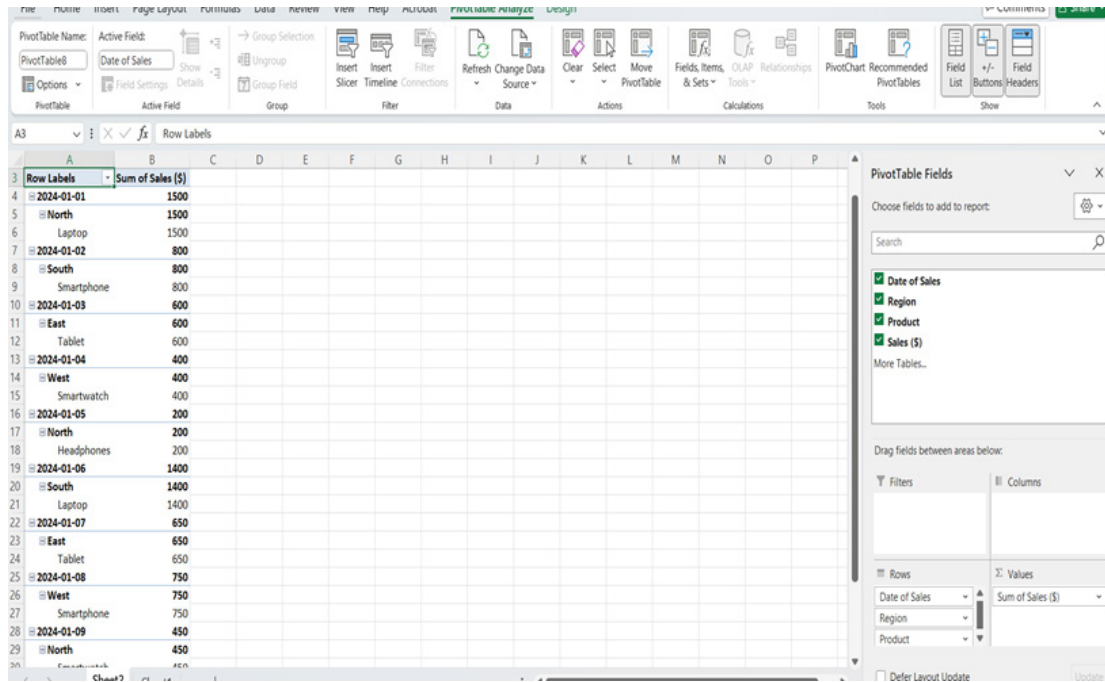


Fig. 3.2.2 Pivot Table for the above dataset

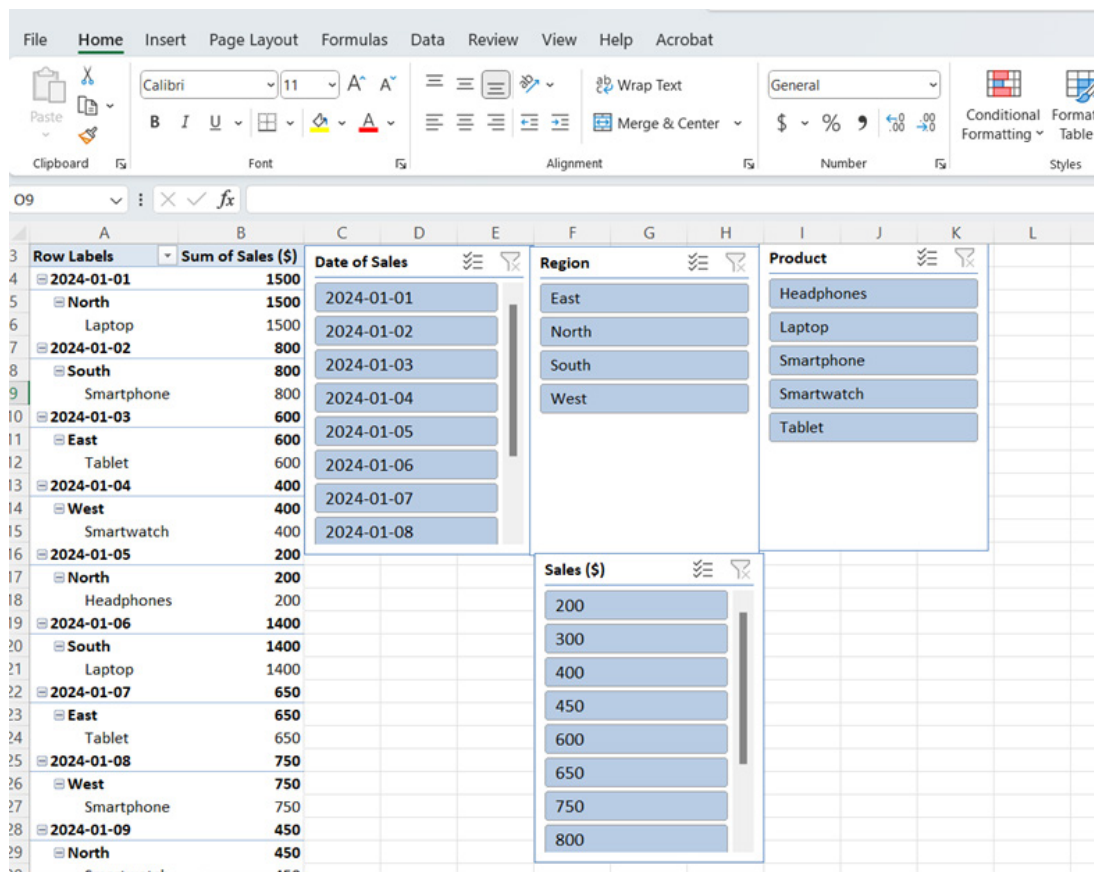


Fig. 3.2.3 Result after using Filters

3.2.2.2 Data Visualization Best Practices

- ◆ Use simple and clear charts to convey your message.
- ◆ Choose appropriate chart types for the data.
- ◆ Avoid clutter and unnecessary decorations.
- ◆ Use consistent colors and labels.
- ◆ Ensure the visualizations are accessible and readable.

Data visualization is an essential technique for representing complex data in a clear and understandable way. Effective visualizations help in identifying patterns, trends, and insights that may not be obvious in raw data. Following best practices ensures clarity, accuracy, and accessibility in data presentation.

Best Practices for Effective Data Visualization

1. Use Simple and Clear Charts

The primary goal of data visualization is to communicate information effectively. Using simple and uncluttered charts helps convey the message without confusion. Avoid excessive design elements that do not add value to the visualization.

2. Choose the Appropriate Chart Type

Selecting the right chart type is crucial for accurate data representation:

- ◆ **Bar Charts** – Best for comparing categorical data.
- ◆ **Line Charts** – Ideal for showing trends over time.
- ◆ **Pie Charts** – Suitable for displaying proportions but should be used sparingly.
- ◆ **Scatter Plots** – Useful for showing relationships between two variables.

3. Use Consistent Colors and Labels

Colors and labels play a vital role in enhancing readability:

- ◆ Use a consistent color scheme to avoid confusion.
- ◆ Choose contrasting colors to differentiate data categories.
- ◆ Ensure labels are clear, legible, and positioned correctly.

4. Ensure Accessibility and Readability

A good visualization should be understandable to all users, including those with visual impairments. To enhance accessibility:

- ◆ Use colorblind-friendly palettes.

- ◆ Provide alternative text descriptions for visual elements.
- ◆ Use appropriate font sizes and avoid overly complex designs.

Exercise Questions

1. Create a well-designed sales dashboard with clear charts and meaningful labels with the given dataset.

Table 3.2.3 Product sales data

Region	Date of Sales	Product	Sale Amount
North	2024-01-01	Laptop	50000
South	2024-01-02	Smartphone	18000
East	2024-01-03	Tablet	6000
West	2024-01-04	SmartWatch	4000
North	2024-01-05	Headphones	800
South	2024-01-06	Laptop	40000
East	2024-01-07	Tablet	6500
West	2024-01-08	Smartphone	17500
North	2024-01-09	Smartwatch	4500
South	2024-01-10	Headphone	900

Output

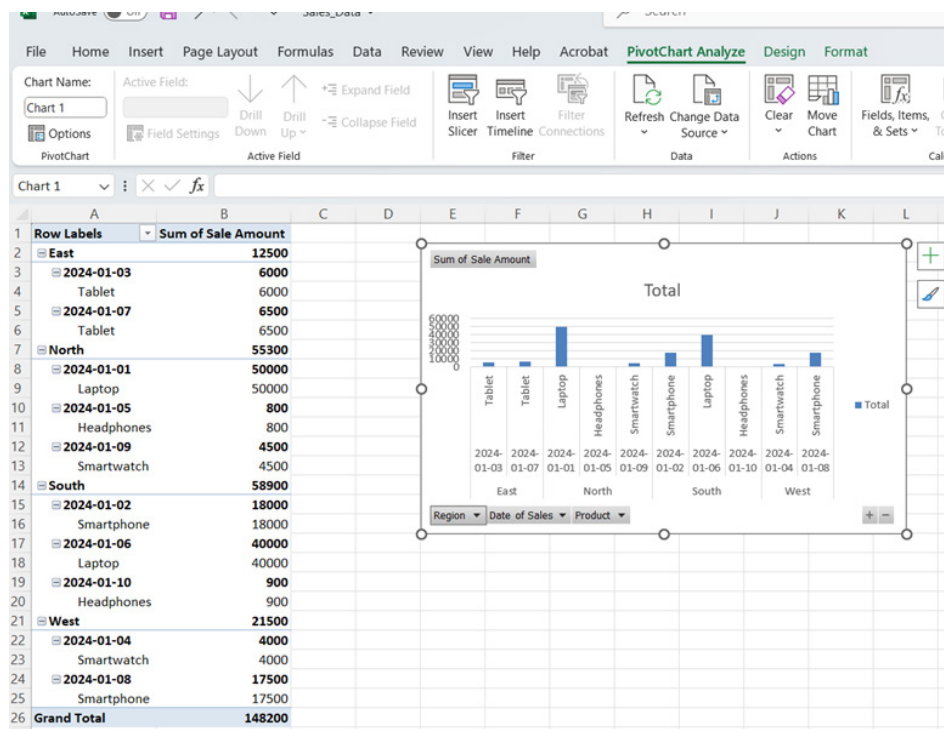


Fig 3.2.4 Sales Dashboard

Experiment Questions

1. Incorporate a scatter plot and histogram into an interactive dashboard for data exploration.
2. Build a dashboard to track inventory levels and order trends for different product categories.
3. Use a timeline to filter sales data by year and quarter in a pivot table.
4. Create a chart that updates dynamically based on slicer selections for region and salesperson.
5. Combine slicers and timelines in a dashboard to explore monthly sales trends for specific products.
6. Create a bar chart that adheres to data visualization best practices by avoiding clutter and unnecessary 3D effects.
7. Design a pie chart for market share distribution with a focus on clear labels and meaningful colors.
8. Create a line chart for stock price trends and ensure accessibility for viewers with color blindness.

Experiment 3

Importing Data and External Sources

Discussion

3.3.1 Introduction

In today's digital world, data is stored in formats like CSV files and online databases. Instead of manual entry, we can import data from websites and CSV files to save time and reduce errors. This lesson covers efficient data importing into spreadsheets or databases, helping you manage large datasets, analyze information, and streamline your workflow.

3.3.2 Theory

In data management, working with large datasets is common, and manually entering data can be time-consuming and prone to errors. To handle data efficiently, we can import data from external sources, such as websites and CSV files. This process allows us to bring in structured data quickly and accurately, making analysis and decision-making easier. A CSV (Comma-Separated Values) file is a simple text file that stores data in a structured format, where each value is separated by a comma. Many applications, including spreadsheets and databases, support CSV files, making them a popular format for data exchange. Importing a CSV file allows us to work with large amounts of data without manually typing it. Similarly, importing data from websites enables us to retrieve real-time information, such as stock prices, weather updates, or financial reports, directly into a spreadsheet or database. This helps keep data updated and relevant without the need for repeated manual entry. By learning how to import data from external sources, you will be able to manage information more effectively, improve accuracy, and save time when working with large datasets. This skill is essential for handling real-world data efficiently and making informed decisions based on accurate and up-to-date information.

3.3.2.1 Importing Data from a Website Select Data

Steps

1. Open a new Excel workbook.
2. Go to the 'Data' tab.

3. Select 'From Web'.
4. Enter the URL of the website from which you want to import data. (<https://drive.google.com/uc?id=1phaHg9objxK2MwaZmSUZAKQ8kVqlng4&export=download>)
5. Click 'OK' and wait for Excel to connect to the website and load the data.
6. Select the data you want to import and click 'Load'.

Example Dataset: Let's say you are importing daily weather data from a website(URL: <https://drive.google.com/uc?id=1phaHg9objxK2MwaZmSUZAKQ8kVqlng4&export=download>)

After importing, your data might look like this:

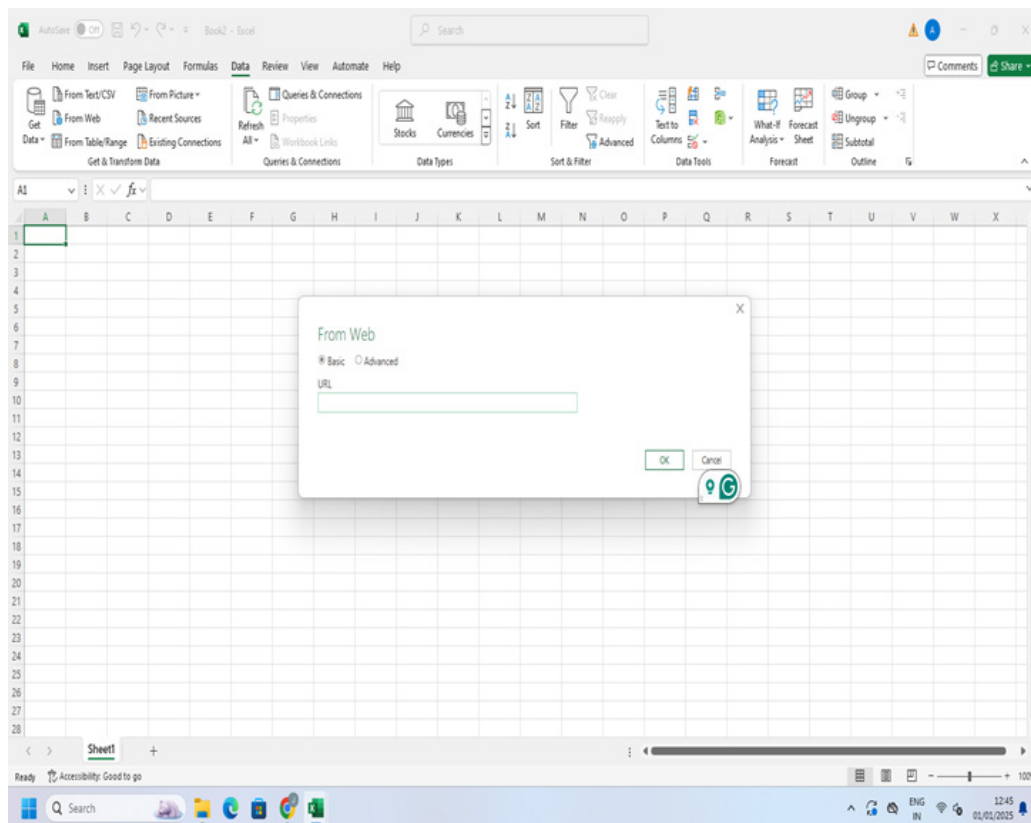


Fig 3.3.1 Entering the URL for importing the data

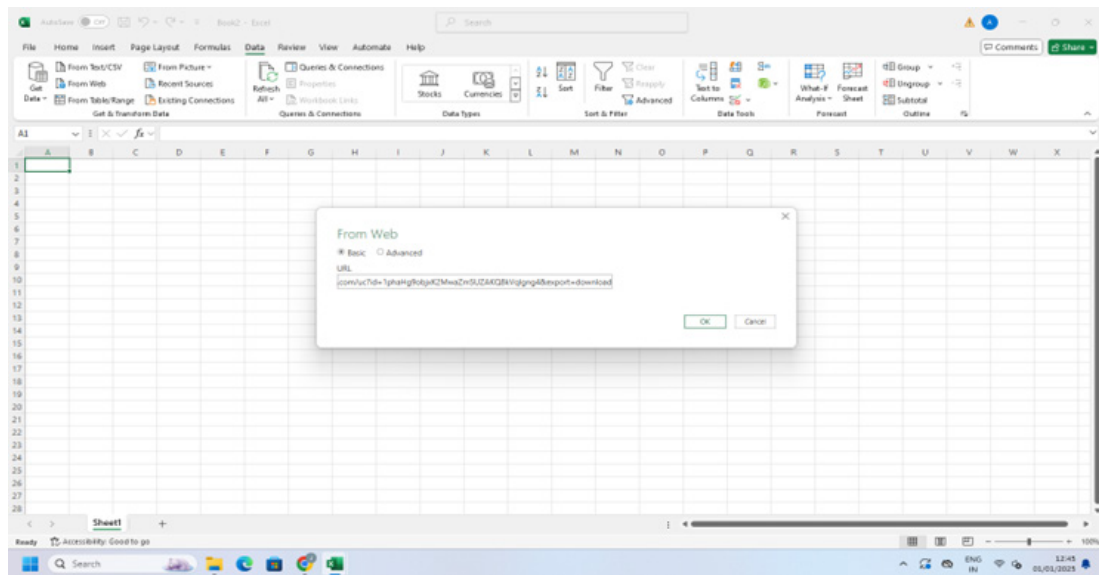


Fig 3.3.2 Entered URL for importing

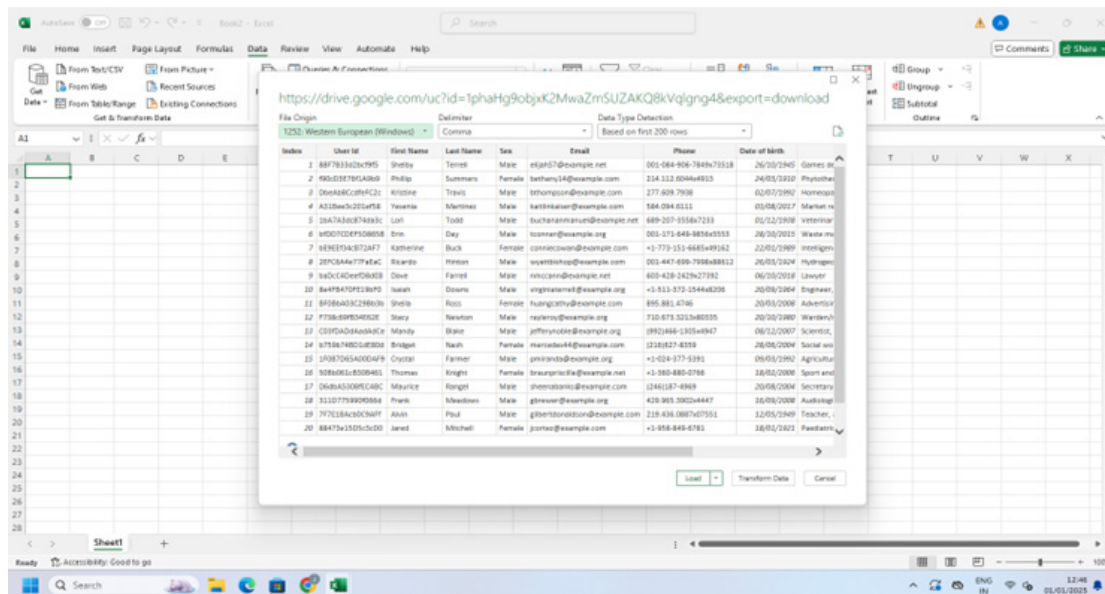


Fig 3.3.3 Sample Data

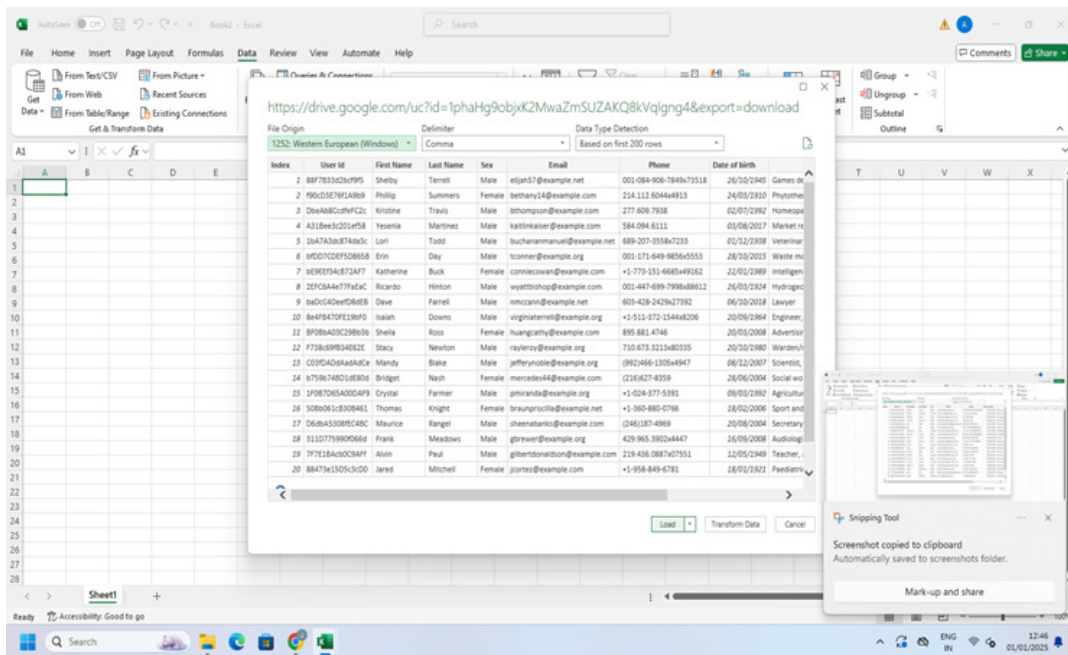


Fig 3.3.4 Importing from Web site

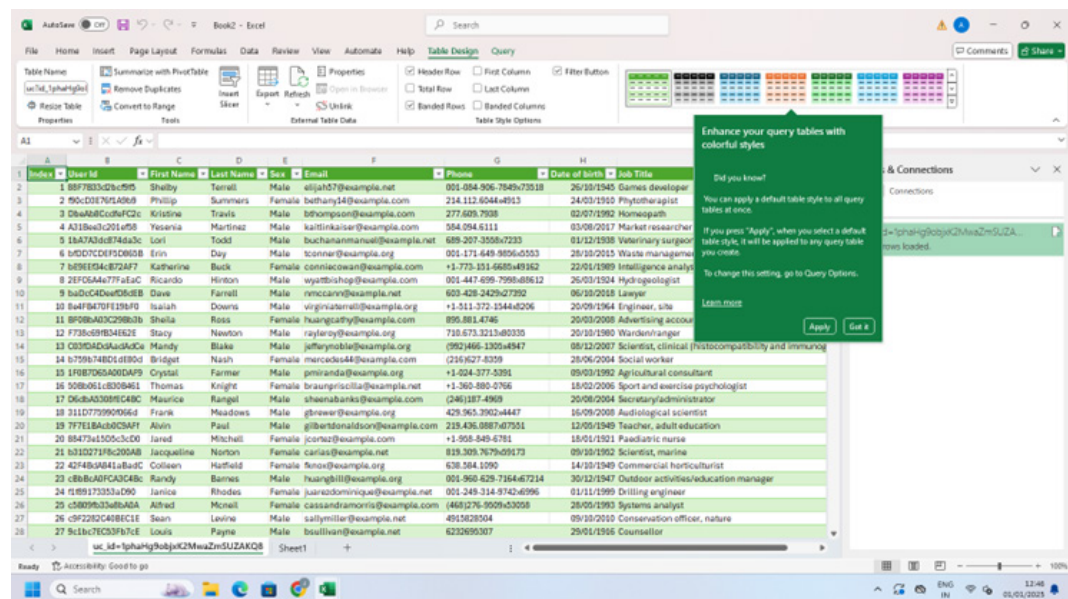


Fig 3.3.5 Imported data displayed in Excel

Result

After importing, the data will be displayed in Excel as a table, and you can perform various analyses such as sales trends and product performance comparisons.

Exercise Questions

1. Import daily weather data from a weather forecasting website and analyze the temperature variations over a week.
2. Import exchange rate data from a financial website and create a line chart to visualize currency fluctuations over a month.

3. Import stock price data from a stock market website and calculate the moving average for a selected stock.
4. Import population statistics from a government website and create a bar chart to represent the population distribution across different states.
5. Import sports statistics from a sports website and compare the performance metrics of two athletes.
6. Import COVID-19 case data from a health organization's website and analyze the trend of new cases over time.

3.3.2.2 Importing Data from CSV Files

Steps

1. Click on “Get Data” → “From File” → “From Text/CSV”.
2. Enter the CSV URL (e.g., <https://raw.githubusercontent.com/datablist/sample-csv-files/main/people/people-100.csv>) and click Import.
3. Excel will display a preview of the data. Click Load to import it into your workbook.

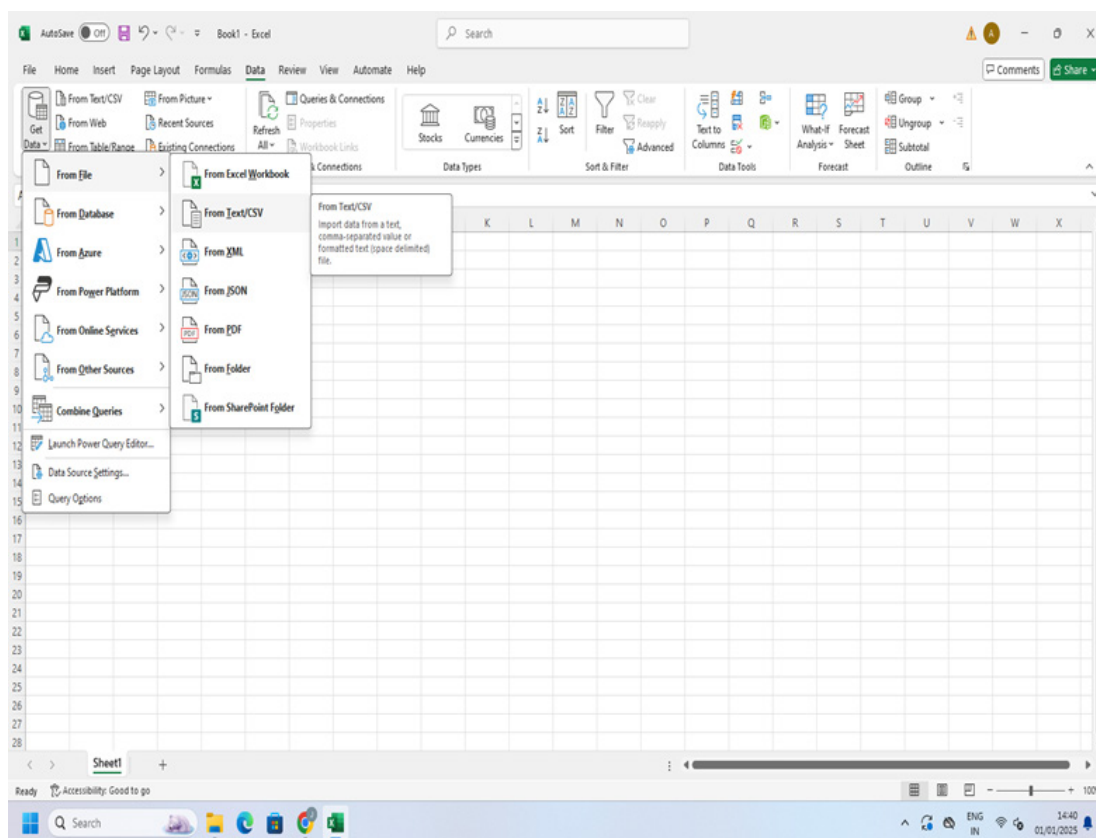


Fig 3.3.6: Importing Data from a CSV File in Excel

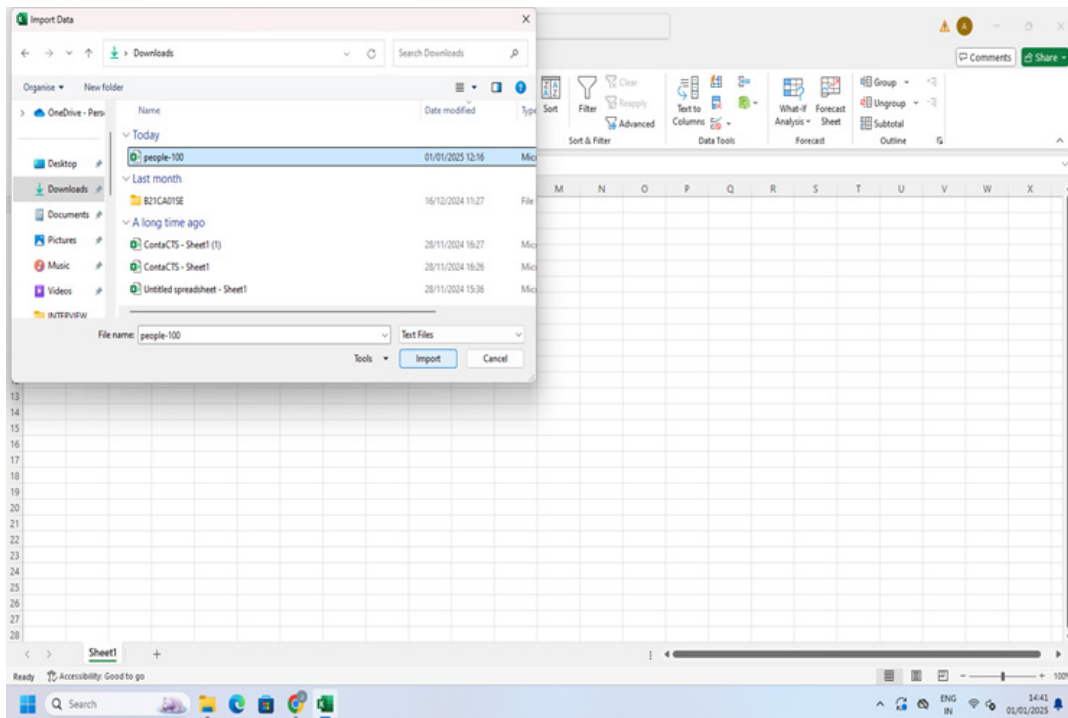


Fig 3.3.7 :Import data

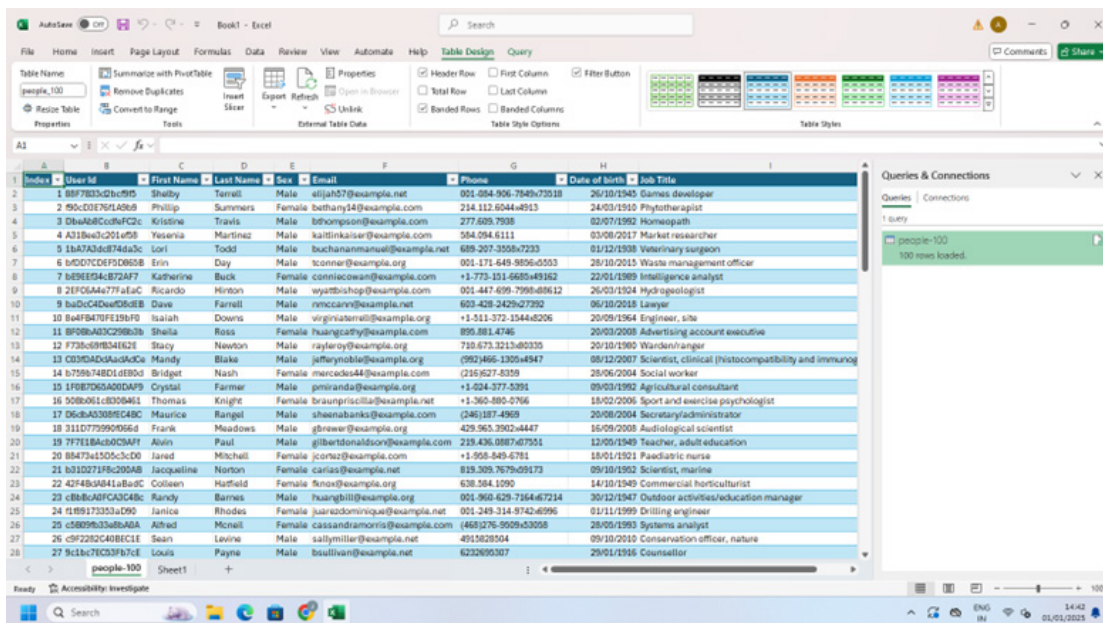


Fig 3.3.8 :Preview of Data

Result

After importing, the data will be displayed in Excel as a table, and you can perform various analyses such as sales trends and product performance comparisons.

Exercise Questions

1. Import sales data from a CSV file and create a pivot table to summarize sales by product category.
2. Import employee information from a CSV file and create a scatter plot to analyze the relationship between years of experience and salary.
3. Import customer feedback data from a CSV file and create a word cloud to visualize the most common feedback terms.
4. Import transaction data from a CSV file and use conditional formatting to highlight transactions exceeding a certain amount.
5. Import survey results from a CSV file and create a pie chart to display the distribution of responses to a specific question.
6. Import inventory data from a CSV file and create a combo chart to visualize stock levels and reorder points.

Experiment 4

Collaboration and Protection in Excel

Discussion

3.4.1 Introduction

In today's fast-paced and interconnected work environment, collaboration is key to success. Microsoft Excel provides a range of tools and features that enable users to share, protect, and collaborate on workbooks with others. This lab manual will explore the various ways to collaborate with others in Excel, including sharing workbooks, protecting sensitive data, tracking changes and comments, and working together in real-time using Excel Online or shared workbooks.

3.4.2 Theory

Sharing a workbook in Excel enables collaboration and accessibility, allowing multiple users to view, edit, or comment on a single document. Protecting worksheets and workbooks in Excel prevents unauthorized users from making changes, while allowing authorized users to access and edit the data. By using passwords, permissions, and protection features, such as locking cells and worksheets, users can secure their Excel files and maintain data integrity. Excel Online allows multiple users to work on the same workbook simultaneously, improving collaboration and efficiency.

3.4.2.1 Sharing workbook with others

Sharing workbooks enables collaboration among team members, allowing them to view and edit the same document simultaneously.

Steps to sharing workbook with others:

1. Open the workbook you want to share.
2. Go to the 'File' tab.
3. For Microsoft Office 2010: Select Save and Send
4. Select 'Share' and choose the sharing method (via email, OneDrive, or SharePoint).
5. Follow the prompts to send the workbook to others.

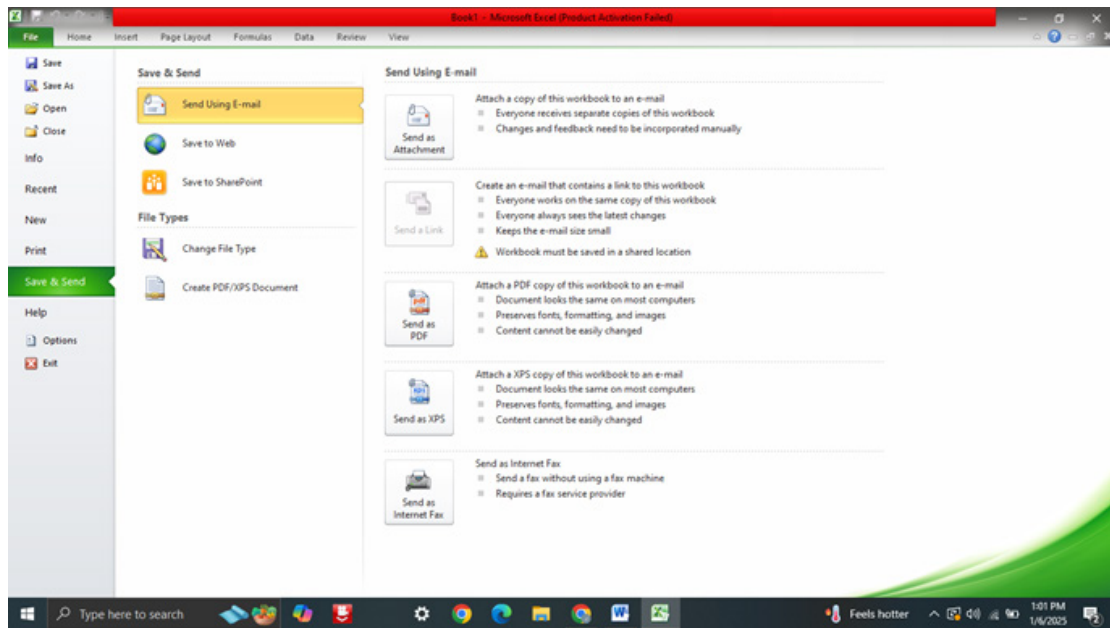


Fig: 3.4.1 Sharing Workbooks with Others

Exercise Question

Dataset: Consider a financial report that you want to share with your team:

Month	Revenue (₹)	Expenses (₹)	Profit (₹)
Jan	1,00,000	50,000	50,000
Feb	1,20,000	60,000	60,000
Mar	1,10,000	55,000	55,000
Apr	1,30,000	65,000	65,000
May	1,40,000	70,000	70,000

Result: Sharing the workbook allows team members to view and edit the data, providing real-time updates and collaborative insights.

3.4.2.2 Protecting Worksheets and Workbooks

Protecting worksheets and workbooks ensures data integrity and prevents unauthorized changes.

Steps to Protect a Worksheet

1. Go to the 'Review' tab.
2. Click on 'Protect Sheet' and set a password if desired.

3.4.2.2.2 Steps to Protect a Workbook:

1. Go to 'File', then 'Info', and select 'Protect Workbook'.
2. Choose the desired protection options.

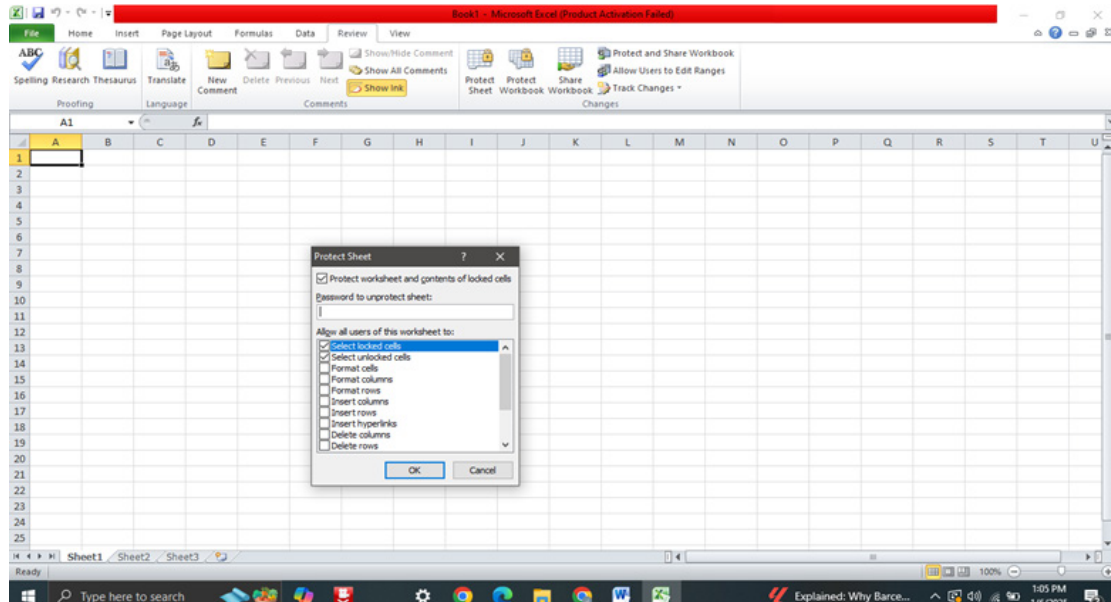


Fig: 3.4.2 Protect a worksheet

Protecting Worksheets and Workbooks in Microsoft Office 2010

Protecting your worksheets and workbooks is essential to maintain data integrity and prevent unauthorized changes. Here's how you can safeguard your data in Microsoft Office 2010:

Protecting a Worksheet:

1. Open the worksheet you want to protect.
2. Go to the Review tab in the ribbon.
3. Click on Protect Sheet.
4. Set a password (optional) to prevent others from removing the protection.
5. Select the elements you want to allow users to edit (e.g., select "Select locked cells" and "Select unlocked cells").
6. Click on OK.

Protecting a Workbook:

1. Open the workbook you want to protect.
2. Go to the Review tab in the ribbon.

3. Click on Protect Workbook.
4. Set a password to protect the structure and windows of the workbook.
5. Click on OK.

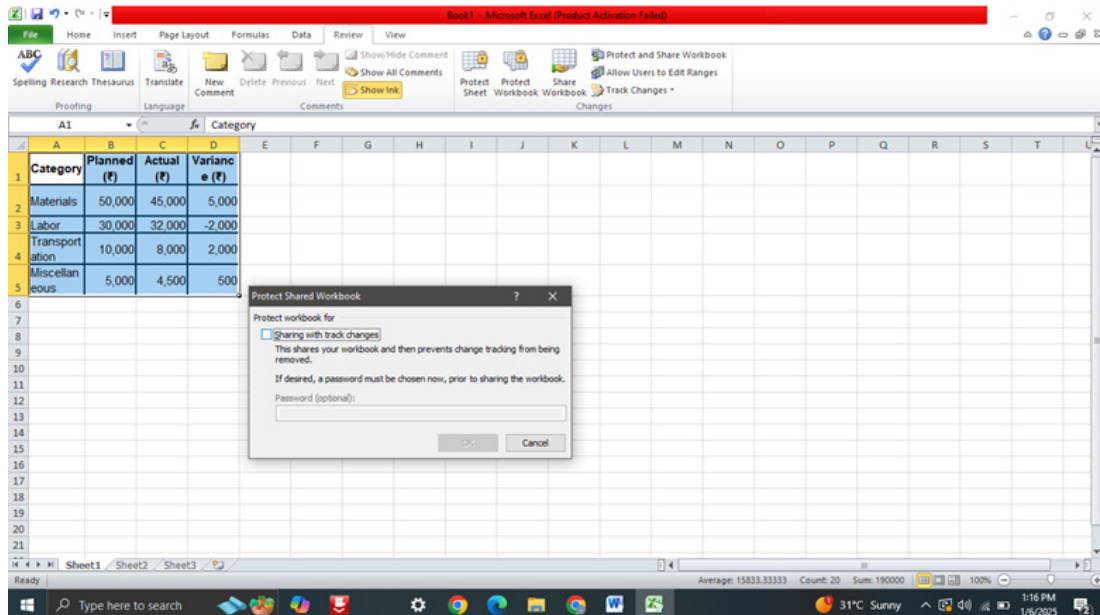


Fig:3.4.3 Protected Sheet

Examples of Protecting Worksheets and Workbooks

Example Dataset: A budget plan

Table 3.4.2.2.1 :Dataset of a budget plan

Category	Planned (₹)	Actual ₹)	Variance (₹)
Materials	50,000	45,000	5,000
Labor	30,000	32,000	-2,000
Transportation	10,000	8,000	2,000
Miscellaneous	5,000	4,500	500

Result: Protecting the worksheet ensures that only authorized users can make changes, maintaining data integrity.

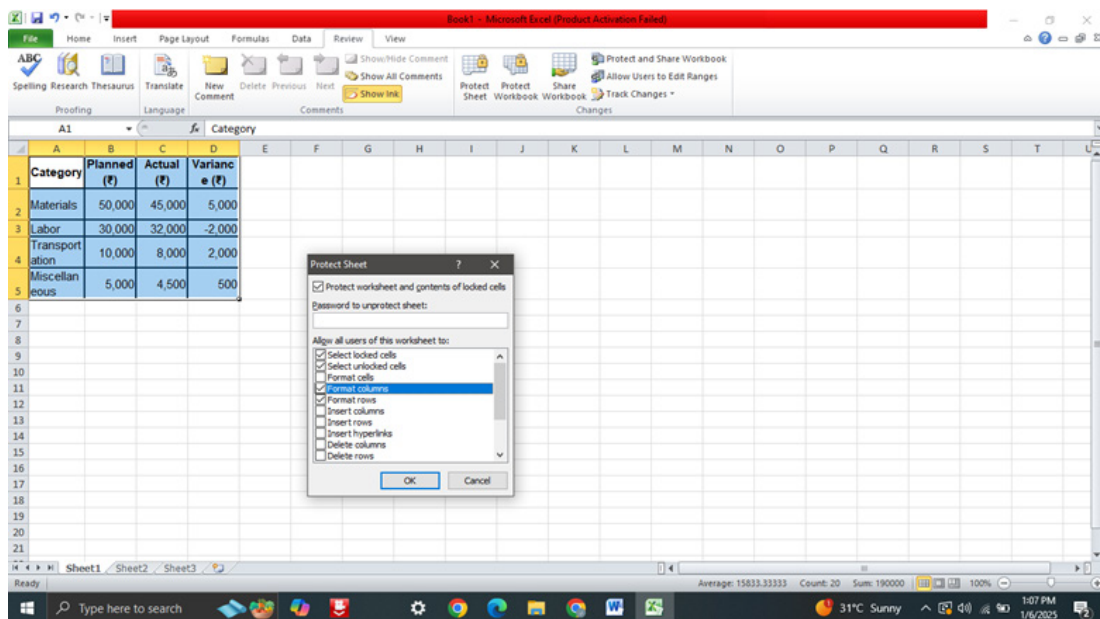


Fig:3.4.4 Protected worksheet

3.4.2.3 Tracking Changes and Comments

Tracking changes and adding comments helps in collaborative environments by providing a history of edits and facilitating communication among users.

Steps to Track Changes:

1. Go to the 'Review' tab.
2. Click on 'Track Changes' and select 'Highlight Changes'.

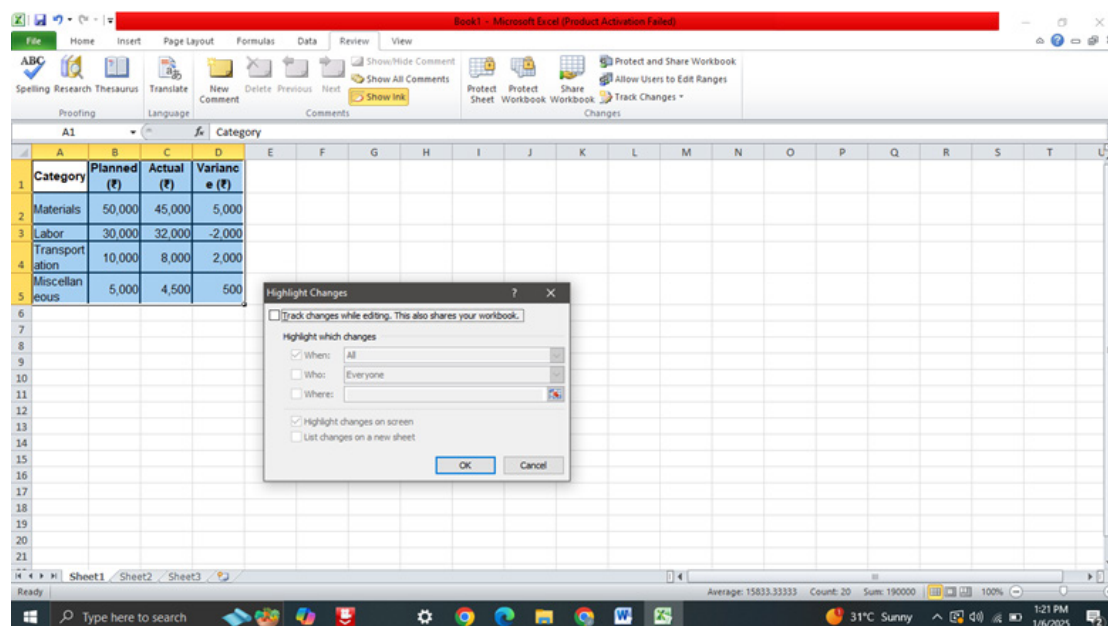


Fig: 3.4.2.3.1 Track changes window

3.4.2.3.2 Steps to Add Comments

1. Select the cell you want to comment on.
2. Go to the 'Review' tab and click on 'New Comment'.

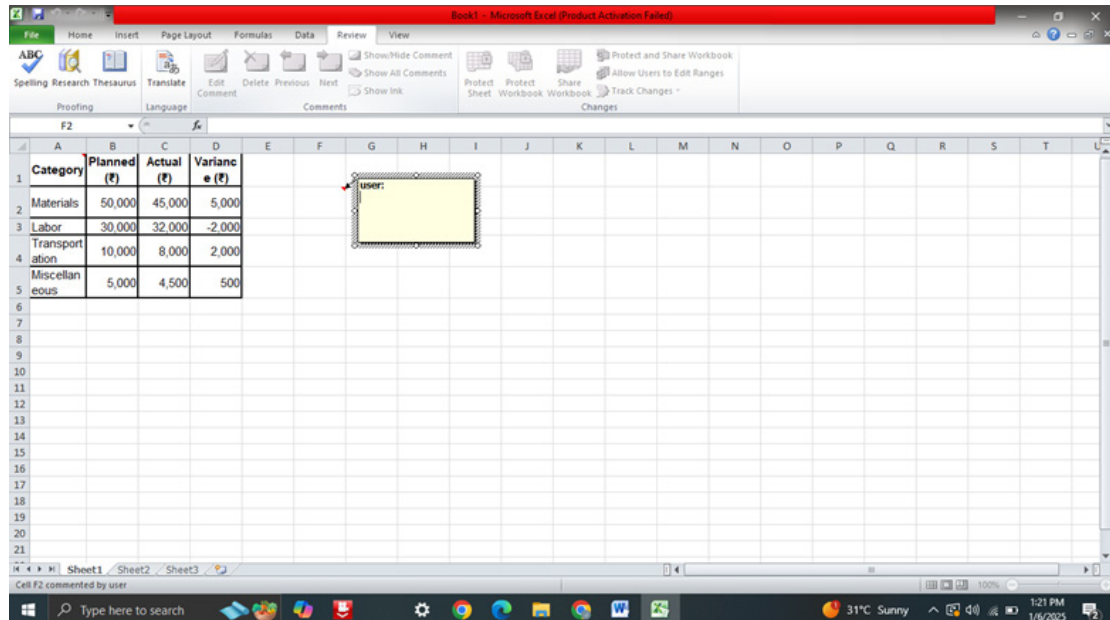


Fig: 3.4.5 Track Changes comment window

Example of Tracking Changes and Comments

Example Dataset: Consider a project timeline with tasks and deadlines:

Table : 3.4.2 Dataset Task and Deadline

Task	Assigned To	Due Date	Status
Design Phase	John	2024-12-10	Completed
Development	Jane	2025-01-20	In Progress
Testing	Sam	2025-02-15	Not Started
Deployment	Alice	2025-03-05	Not Started

Result: Tracking changes and adding comments helps monitor task progress and allows team members to provide feedback and updates.

3.4.2.4 Collaborating in Real-Time Using Excel Online

Steps to Collaborate in Real-Time.

1. Save the workbook to OneDrive.
2. Open the workbook in Excel Online.

To do this by uploading your Excel file to OneDrive or SharePoint and then opening it in Excel Online.

3. Share the Workbook.

Click on the “Share” button in the top-right corner.

4. Multiple users can now edit the workbook simultaneously and see changes in real time.

Questions

1: Sharing a Workbook

Steps to share a Workbook:

1. Go to the Excel Online website and sign in with your Microsoft account.
2. Click on the “New” button to create a new workbook.
3. Enter some sample data into the workbook.
4. Click on the “Share” button in the top-right corner of the screen.
5. Enter the email address of the person you want to share .
6. Choose the permission level you want to assign to the user (e.g. “Editor”, “Viewer”).
7. Click on the “Share” button to share the workbook.

2: Real-Time Co-Authoring

Steps to Real-Time Co-Authoring:

1. Create a new workbook in Excel Online.
2. Share the workbook with a colleague or classmate.

3: Using Comments

Steps to Add Comments:

1. Create a new workbook in Excel Online.
2. Add a comment to a cell.
3. Share the workbook with a colleague or classmate.
4. Observe the colleague or classmate respond to the comment.

4: Collaborating with Multiple Users

Steps to Collaborate with multiple Users:

1. Create a new workbook in Excel Online.
2. Share the workbook with multiple colleagues or classmates.
3. Observe the changes in real-time.



സർവ്വകലാശാലാഗീതം

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