

**Prof. Adebayo Paul Adejola**



**IN COLLABORATION WITH**



**ASSOCIATION OF CHARTERED  
CERTIFIED SYSTEM ACCOUNTANTS**

*...Experts in IT-based Training & Practice of Accounting and Forensics*

**DIGITAL ACCOUNTING & FINANCE CHALLENGE**

**FOCUS COURSE: SPREADSHEET (MICROSOFT EXCEL)  
APPLICATIONS**

**STUDY MANUAL**

**2025**

## **About ACCSA Global**

The Association of Chartered Certified System Accountants (ACCSA) Global is a professional accounting training Association established in 2019 in Louisiana, United States, as a non-profit organization. Its mission is to bridge the digital divide in accounting education and practice across the continents. Training is offered in a hybrid format (online and in-person) and focuses on applying digital technologies to empower professionals in accounting, forensics, auditing, block - chain technology, digital currencies, artificial intelligence, and other emerging fields.

Since its inception, ACCSA Global has been delivering training programs, organizing conferences, seminars, masterclasses, and webinars for professionals across the United States, Europe, Africa, and Asia.

The goal of the Association of Chartered Certified System Accountants (ACCSA) is to provide high-quality education and training for professionals and academia, enabling them to reach their full potential. By fostering stimulating professional activities, the association aims to promote efficiency, dedication, and selfless service for the benefit of the public and the global community. This goal is grounded in ACCSA Global's commitment to using all available strategies to bridge the digital divide among the world's continents.

### **Vision**

To be the global hub for Chartered and Certified System Accountants, bridging the digital divide across continents through innovative training and accounting practices.

### **Mission**

To produce world-class system accountants through exceptional, IT-focused, career-driven, and innovative training programs, empowering accountants to become skilled global experts.

## Acknowledgement

The Association of Chartered Certified System Accountants (ACCSA) Global sincerely appreciate and acknowledges the support of the Training director, Africa Representative, System Analyst of ACCSA Global, other experts and affiliate organizations across the globe with several years of teaching and practice experiences who reviewed and contributed to these materials.



## Foreword

The landscape of accounting and finance is rapidly evolving, driven by the increasing adoption of digital technologies. In this dynamic environment, professionals must equip themselves with advanced digital skills to remain competitive and enhance financial decision-making processes. As technology transforms the industry, proficiency in spreadsheet applications, automation, and financial modeling is no longer optional—it is a fundamental necessity.

The **ACCSA Global Digital Accounting & Finance Challenge** is designed to inspire and empower accounting and finance professionals to embrace digital tools and develop critical thinking and problem-solving skills. This study manual serves as a **comprehensive resource**, offering participants structured guidance on mastering spreadsheet applications, financial analysis, and automation techniques. From foundational concepts to advanced data analytics, the manual provides a step-by-step approach to leveraging Microsoft Excel and other digital tools for professional excellence.

Through this initiative, **ACCSA Global** reaffirms its commitment to bridging the digital divide in accounting education and professional practice. By equipping professionals with cutting-edge knowledge and hands-on expertise, this challenge ensures that participants are well-prepared for the realities of a digital-driven financial world.

I extend my sincere appreciation to all expert contributors, educators, and professionals who have played a role in developing this resource. Their dedication to fostering innovation in accounting and finance has made this manual an invaluable tool for learning and career advancement.

To all participants, I encourage you to approach this challenge with enthusiasm, curiosity, and a mindset for innovation. The knowledge and skills you acquire through this program will not only help you excel in this competition but will also serve as a **solid foundation** for a successful career in digital accounting and finance.

**Wishing you all a rewarding and transformative learning experience.**

Warm regards,

**Prof. Paul A. Adejola, PhD FCCSA.**  
Training Director,  
ACCSA Global.

## **Course Outline**

Creating a course for training accountants on spreadsheet applications requires a structured approach, focusing on both foundational and advanced spreadsheet features. Accountants often use spreadsheets for data analysis, financial forecasting, reporting, and budgeting. Thus, the course outline cover these areas comprehensively:

### **Module 1: Introduction to Spreadsheets**

- **Overview of Spreadsheet Software:** Introduction to various spreadsheet applications (e.g., Microsoft Excel, Google Sheets, LibreOffice Calc).
- **Basic Operations:** Creating, saving, and opening spreadsheets. Overview of the interface.
- **Data Entry:** Best practices for data entry, formatting, and basic data manipulation.

### **Module 2: Working with Data**

- **Data Types and Formatting:** Understanding different data types (text, numbers, dates) and applying formatting.
- **Formulas and Functions:** Introduction to basic formulas and functions for accountants (SUM, AVERAGE, IF, VLOOKUP, HLOOKUP).
- **Data Validation and Conditional Formatting:** Ensuring data integrity and using conditional formatting to highlight data.

### **Module 3: Advanced Spreadsheet Techniques**

- **Advanced Functions and Formulas:** More complex formulas (INDEX, MATCH, INDIRECT), array formulas, and custom formulas.
- **PivotTables and PivotCharts:** Creating and manipulating PivotTables and PivotCharts for data analysis.
- **Data Analysis Tools:** Using tools like Goal Seek, Solver, and Data Tables for financial analysis and forecasting.

### **Module 4: Financial Modelling and Reporting**

- **Building Financial Models:** Principles of financial modeling, including scenario analysis and building dynamic models.
- **Advanced Charting and Graphing:** Creating advanced charts (waterfall, Gantt, etc.) for financial reporting.
- **Dashboard Creation:** Principles of dashboard design and creation for reporting financial metrics.

### **Module 5: Macros and Automation**

- **Introduction to Macros:** Basics of macros and VBA for automating repetitive tasks.
- **Developing Macros:** Writing simple macros to automate tasks within spreadsheets.
- **Automation Best Practices:** Tips and tricks for efficient automation.

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## Module 1: Introduction to Spreadsheets

### What is a Spreadsheet?

A spreadsheet is a computer application designed to input, display, analyze, organize, and manipulate data arranged in rows and columns. It is widely used for accounting, data analysis, reporting, and organizing information efficiently. In simple terms, spreadsheets are scalable, grid-based files that facilitate data management and computations. People globally use spreadsheets to create tables for both personal and professional purposes.

Spreadsheets also come equipped with built-in functions and formulas that enable users to analyze data effectively. For instance, they allow users to track data and automatically perform calculations such as addition, subtraction, multiplication, and division. They can also automate data entries and other repetitive tasks. Some commonly used spreadsheet software includes **Microsoft Excel**, **Google Sheets**, **Apache OpenOffice**, and **LibreOffice**. Among these, **Microsoft Excel** remains the most widely used spreadsheet tool, available on Windows, macOS, and Android. This course will use **Microsoft Excel** as the reference application.

### Common Uses of Spreadsheets

Spreadsheets have a broad range of applications, especially when dealing with numerical data. Some key uses include:

- **Finance:** Used for financial data management, including checking account records, taxes, transactions, billing, and budgeting.
- **Forms Management:** Utilized to create forms such as performance review templates, timesheets, and surveys.
- **Education:** Schools and universities use spreadsheets to manage student data, including attendance, grades, and performance tracking.
- **List Creation:** Commonly used for organizing lists, such as grocery lists, to-do lists, and contact directories.
- **Hospitality Industry:** Hotels use spreadsheets to store customer information, including personal details, room assignments, and check-in/check-out records.

### Overview of Spreadsheet Software

There are several spreadsheet applications available, each offering unique features. Below are some of the most commonly used spreadsheet programs:

#### 1. Google Sheets

A cloud-based spreadsheet application that is part of Google Workspace. Google Sheets allows real-time collaboration, enabling multiple users to work on a document simultaneously from any internet-enabled device. It also integrates seamlessly with other Google applications, making it an excellent choice for teams.

## 2. Microsoft Excel

A powerful spreadsheet tool that is part of the Microsoft Office suite. Excel offers advanced features suitable for both beginners and experienced users. With **Microsoft 365**, Excel supports real-time collaboration and cloud-based document sharing, making it highly versatile for business and financial applications.

## 3. Apple Numbers

A spreadsheet application designed for Mac and iOS users. It provides a user-friendly interface and supports real-time collaboration via iCloud, making it ideal for Apple device users.

### **Functions in Spreadsheets**

Spreadsheets offer built-in functions that simplify complex calculations. These functions apply predefined formulas to input data and generate results efficiently.

For example, instead of manually adding numbers in a column, users can apply the **SUM** function to total all values automatically. Functions help in performing arithmetic operations, data analysis, and statistical computations without requiring users to write formulas manually.

### **Components of a Spreadsheet**

A spreadsheet consists of several key components that facilitate data management and calculations:

1. **Title Bar:** Displays the name of the spreadsheet file and the application in use.
2. **Toolbar:** Contains various options and commands that users can access while working on the spreadsheet.
3. **Name Box:** Shows the address of the currently selected or active cell.
4. **Formula Bar:** Displays the data entered in an active cell and is also used for applying formulas.
5. **Column Headings:** Represent the vertical divisions in a spreadsheet. Columns are labeled alphabetically (A, B, C, etc.).
6. **Row Headings:** Represent the horizontal divisions in a spreadsheet. Rows are labeled numerically (1, 2, 3, etc.).
7. **Cell:** The intersection of a row and a column, where data such as numbers, text, and formulas are entered. Each cell has a unique address (e.g., A1, B5). The currently selected cell is called the **active cell**.
8. **Cell Reference:** A method for identifying a specific cell by combining its column letter and row number (e.g., A1, C3). Cell references are used in formulas to perform calculations or copy data from one cell to another.
9. **Navigation Buttons:** These include **First, Previous, Next, and Last** buttons, which allow users to move between different worksheets within a workbook.



10. **Sheet Tabs:** A **workbook** consists of multiple **worksheets**. By default, most spreadsheet applications provide three worksheets, but users can add more as needed. Sheet tabs help in navigating between different worksheets.

### What is Microsoft Excel?

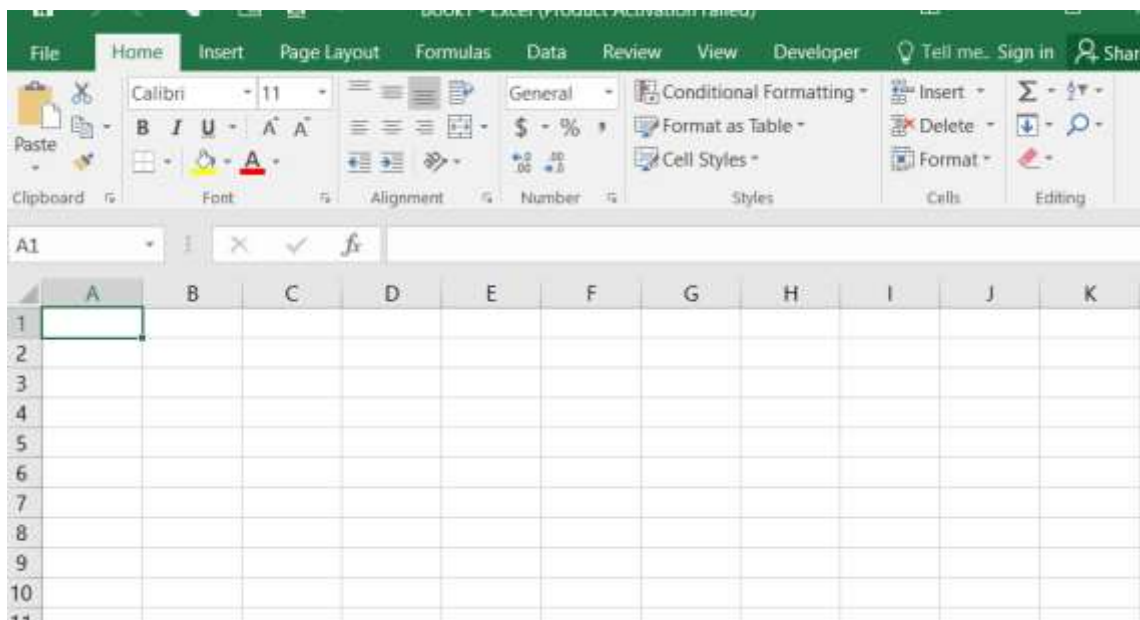
Microsoft Excel (MS Excel) is a spreadsheet program developed by Microsoft, available on platforms such as Windows, macOS, Android, iOS, and iPadOS. It is widely used for data organization, formatting, calculations, data analysis, and various other tasks.

MS Excel is a powerful business application that is part of the Microsoft Office suite. It enables users to store, manage, analyze, and visualize data in a structured tabular format. With its intuitive interface, advanced functionality, and extensive collection of formulas, Excel makes it easier to process and handle large volumes of data efficiently.

Due to its versatility, MS Excel is used across multiple industries, including finance, marketing, education, and research, among others.

Excel provides a user-friendly approach to organizing and analyzing data, making it an essential tool for professionals and businesses alike.

A visual representation of an Excel spreadsheet typically appears like



### **Advantages of Microsoft Excel**

Microsoft Excel is widely used for various purposes due to its ease of data storage, organization, and manipulation. It allows users to add, edit, and remove information effortlessly while maintaining data integrity.

- **Efficient Data Storage and Organization:** Excel enables users to store and manage large datasets effortlessly in an organized manner.
- **Easy Data Recovery:** As a Microsoft product, Excel provides reliable data recovery options to prevent data loss.
- **Simplified Data Visualization:** Users can create charts and graphs with ease, helping to represent data in a visually meaningful way.
- **Built-in Mathematical Formulas:** Excel allows the direct application of mathematical functions to perform calculations such as averages, standard deviations, and correlations.
- **Prebuilt Templates:** The software provides a variety of free templates, making it easier to create spreadsheets for different purposes.
- **Enhanced Security:** Compared to other spreadsheet applications, Excel offers better security features, ensuring data protection.
- **Improved Clarity for Complex Data:** Excel stores data in a structured tabular format, making it easier to handle and interpret large datasets.

## **Key Features of Microsoft Excel**

Excel provides a wide range of powerful features that enhance data management, analysis, and visualization.

- **AutoFormat:** Enables users to apply predefined table formatting settings quickly.
- **AutoSum:** Automatically calculates the sum of selected rows or columns using a built-in formula.
- **List AutoFill:** Applies consistent formatting to new entries added at the end of a list.
- **AutoFill:** Allows users to quickly fill cells with sequential or repetitive data, such as dates, numbers, or recurring values. It also enables the easy copying of formulas.
- **AutoShapes:** Provides a toolbar for designing geometric shapes, arrows, flowchart elements, stars, and other objects that can be used to create visual representations of data.
- **Wizard Tool:** Offers step-by-step guidance to help users work efficiently by providing recommendations and shortcuts. The drag-and-drop feature further simplifies repositioning data.
- **Charting Tools:** Enables users to create Pie, Bar, Line, and other charts for graphical representation of data.
- **PivotTables:** Facilitates quick data summarization and analysis, making it easy to generate reports such as financial statements and statistical summaries. PivotTables also allow users to visualize complex data relationships.
- **Shortcut Menus:** Offers quick-access commands that streamline tasks, reducing the need for lengthy manual processes.

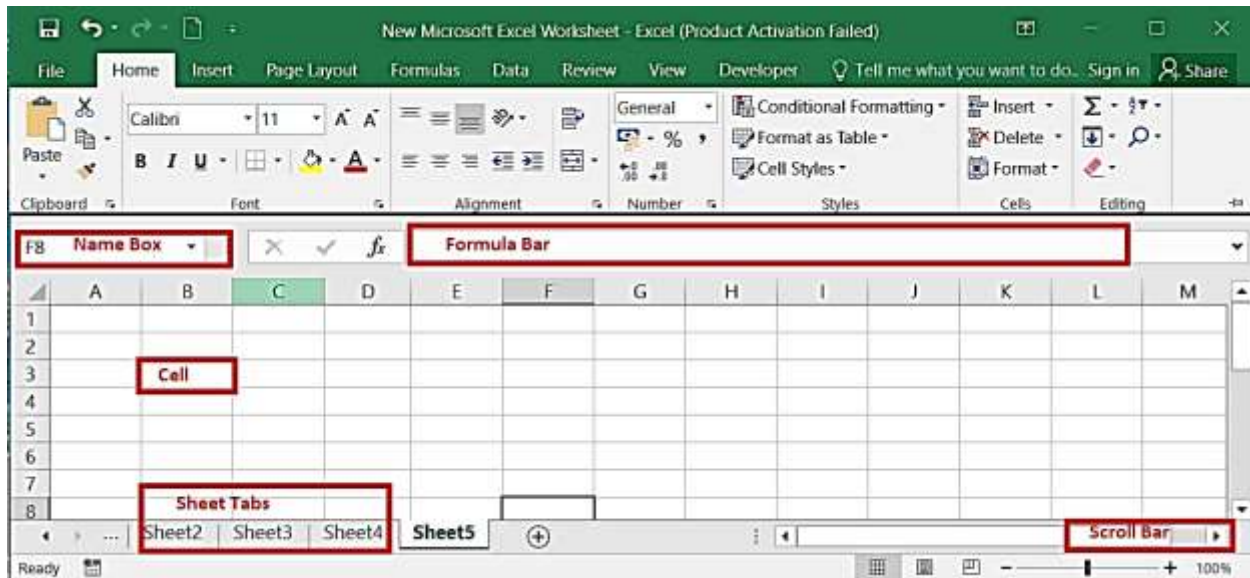
The easiest way to start using Microsoft Excel is through Microsoft 365 (formerly Office 365), which provides cloud-based access without requiring software installation.

## **Parts of the Excel Window**

Before you start using it, it's really important to understand what is where in the window. Some parts of the Excel window (like the **Ribbon** and **Scroll bars**) are standard in most Microsoft

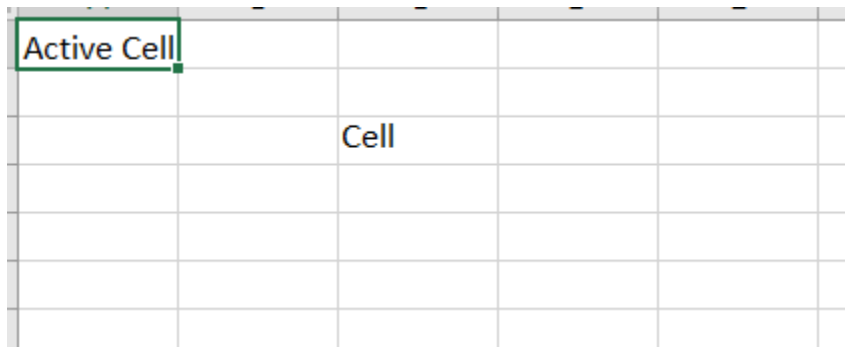
programs. However, there are other features that are more specific to spreadsheets, such as the **formula bar**, **name box**, and **worksheet tabs**.

## Excel Interface



## What is a Cell

A spreadsheet takes the shape of a table, consisting of rows and columns. A cell is created at the intersection point where rows and columns meet, forming a rectangular box. Here's an image illustrating what a cell looks like:



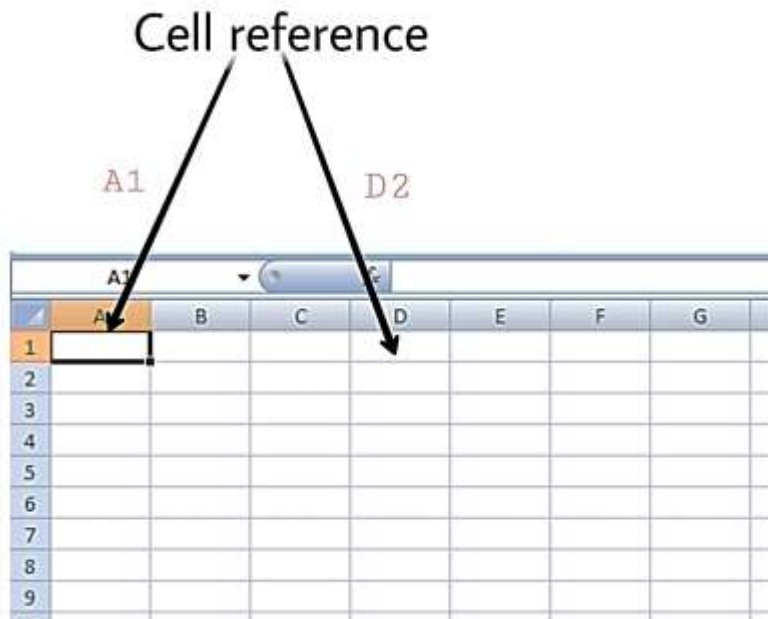
## What is Cell Address or Cell Reference

The address or name of a cell or a range of cells is known as **Cell reference**. It helps the software to identify the cell from where the data/value is to be used in the formula. We can reference the cell of other worksheets and also of other programs.

- Referencing the cell of other worksheets is known as External referencing.
- Referencing the cell of other programs is known as Remote referencing.

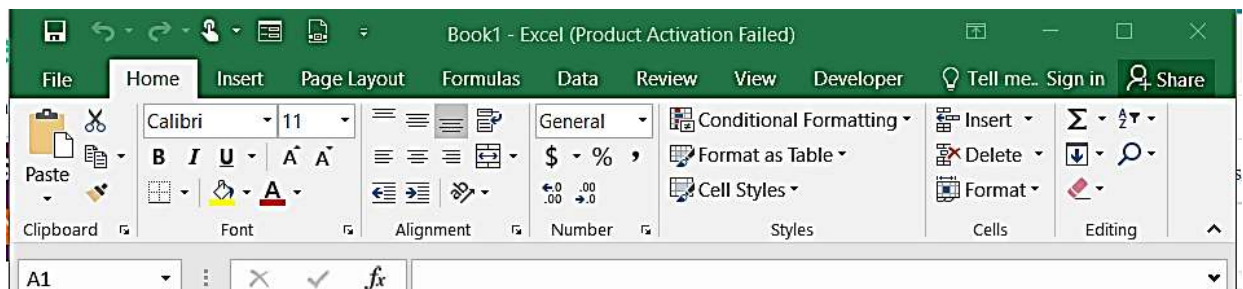
There are three types of cell references in Excel:

1. Relative reference.
2. Absolute reference.
3. Mixed reference.



### **Features of MS Excel**

**Ribbon:** The Ribbon in MS-Excel is the topmost row of tabs that provide the user with different facilities/functionalities. These tabs are:



**Home Tab:** It provides the basic facilities like changing the font, size of text, editing the cells in the spreadsheet, auto sum, etc.

**Insert Tab:** It provides the facilities like inserting tables, pivot tables, images, clip art, charts, links, etc.

**Page layout:** It provides all the facilities related to the spreadsheet-like margins, orientation, height, width, background etc. The worksheet appearance will be the same in the hard copy as well.

**Formulas:** It is a package of different in-built formulas/functions which can be used by user just by selecting the cell or range of cells for values.

**Data:** The Data Tab helps to perform different operations on a vast set of data like analysis through what-if analysis tools and many other data analysis tools, removing duplicate data, transpose the row and column, etc. It also helps to access data(s) from different sources as well, such as from MS-Access, from web, etc.

**Review:** This tab provides the facility of thesaurus, checking spellings, translating the text, and helps to protect and share the worksheet and workbook.

**View:** It contains the commands to manage the view of the workbook, show/hide ruler, gridlines, etc., freezing panes, and adding macros.

### **What are Workbooks?**

A collection of worksheets is referred to as a workbook (spreadsheet). Workbooks are your Excel files. There are various ways to begin working with an Excel workbook. Excel files are called workbooks. There are various ways to begin working with an Excel workbook. You can either start from scratch or use a pre-designed template to create a new workbook.

#### Creating and Opening Workbooks

Steps to Create a new blank workbook:

**Step 1:** Select the **File** tab

**Step 2:** Click **New**

**Step 3:** Click **Blank Workbook**

**Step 4:** A new blank workbook will appear.

You can also use **Templates**. A template is a predesigned spreadsheet you can use to create a new workbook quickly. Templates often include custom formatting and predefined formulas.

#### Saving Workbook

Whenever we create a new workbook in Excel and insert the data into it, then we must save our workbook so that our data is not lost. As in previous versions of Excel, you can save files **locally** to

your computer You can also save your workbook to the cloud and also export your workbook with others.

**Save:** When you save a file, you'll only need to choose a file name and location the first time. Then you can just use the save command to save it with the same name and location.

**Save As:** When you use Save As, you'll need to choose a different name and /or location for the copied version.

Excel automatically saves your workbooks to a temporary folder while you are working on them. If you forget to save your changes or if Excel crashes, you can restore the file using **Auto Recover**.

### **What are Worksheets in Excel?**

A Worksheet is a collection of cells (basic data unit in the worksheet). Where you can store and manipulate data. Adding information to multiple worksheets simultaneously is also easily accomplished by grouping worksheets. In Excel, Worksheets can be easily added, renamed, and deleted.

#### **Working with Worksheets**

When you open an Excel Workbook, there are three sheets by default and the name on them is sheet1, sheet2, and sheet3 you can change the name. You can perform multiple functions in Worksheets such as **View** a Worksheet, **Select** a Worksheet, **Insert** a Worksheet, **Rename** a Worksheet, and **Delete** a Worksheet.

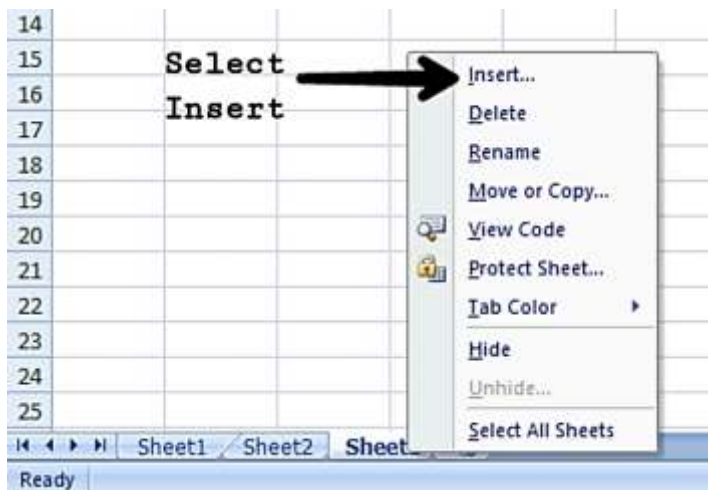
### **How to Create a New Spreadsheet**

In Excel 3 sheets are already opened by default, now to add a new sheet:

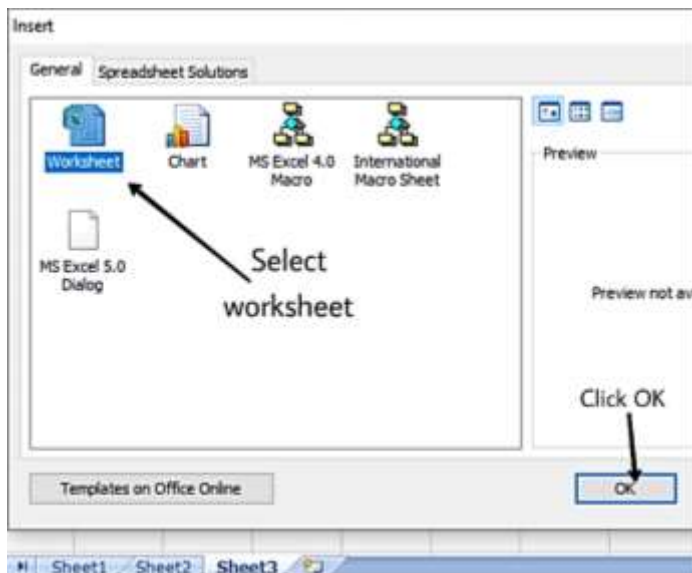
- In the lowermost pane in Excel, you can find a button.
- Click on that button to add a new sheet.



- We can also achieve the same by Right-clicking on the sheet number before which you want to insert the sheet.
- Click on Insert.



- Select Worksheet.
- Click OK.

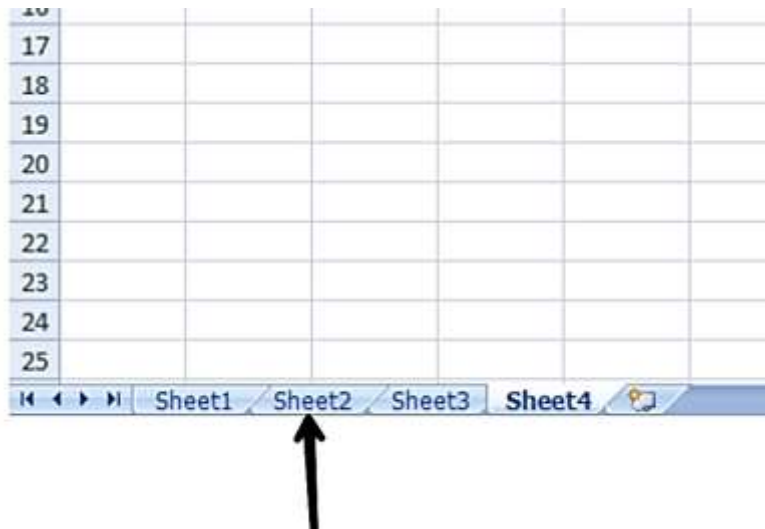


### How to Open an Existing Worksheet

On the lowermost pane in Excel, you can find the name of the current sheet you have opened.

On the left side of this sheet, the name of previous sheets are also available like Sheet 2, Sheet 3 will be available at the left of sheet4, click on the number/name of the sheet you want to open and the sheet will open in the same workbook.

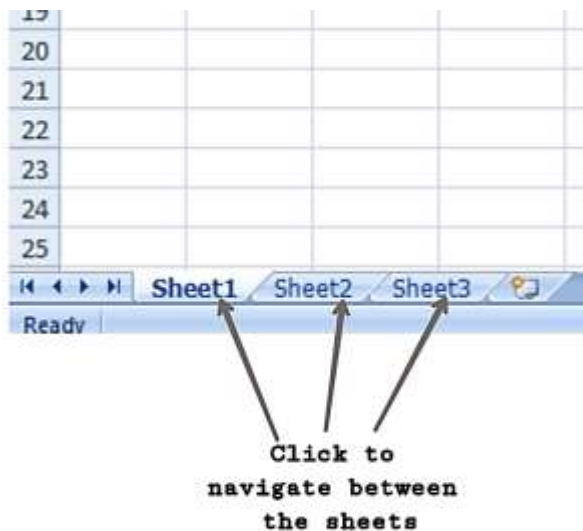
For example, we are on Sheet 4, and we want to open Sheet 2 then simply just click on Sheet2 to open it.



## Managing the Spreadsheets

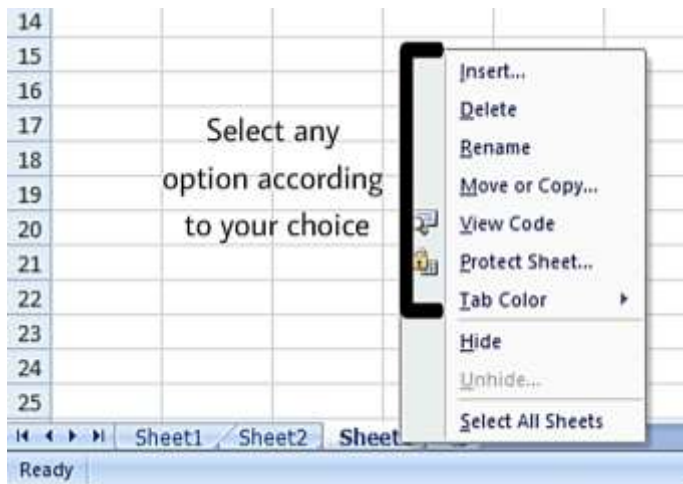
You can easily manage the spreadsheets in Excel simply by:

- Simply navigating between the sheets.



- Right-clicking on the sheet name or number on the pane.
- Choose among the various options available like, move, copy, rename, add, delete etc.
- You can move/copy your sheet to other workbooks as well just by selecting the workbook in the *To workbook* and the sheet before you want to insert the sheet in *Before sheet*.





## Modifying Columns, Rows, and Cells

Every row and column of a new workbook is set with the same height and width. Excel allows you to modify column width and row height in different ways including wrapping text and merging cells.

### Inserting, Deleting, Moving, and Hiding

After working with a workbook for a while, you may want to Insert new columns or rows, Delete certain rows and columns, Move them to a different location in the worksheet, or even Hide them.

You can easily search your workbook using the Find feature, which also allows you to modify using the Replace feature.

Excel includes a Spell-check tool that ensures everything is spelled correctly in your workbook.

### What is Data Formatting?

All cell content uses the same Formatting by default, which can make it difficult to read a workbook with a lot of information. Data Formatting can be used to Change the font size, To change the font, To change the font color, and many more.

### MS Excel Formulas

The most important and useful feature of Microsoft Excel is to Calculate numerical information using formulas. Excel can perform different calculations using mathematical operators (Addition, Subtraction, Multiplication, Division) We can Insert a formula, Create a Formula, and Edit a Formula. Also, values can be modified on the basis of Cell References.

### What are Functions?

A function is a predefined formula that is used to perform calculations using specific values in a sequence. Excel has many common functions that can be used to quickly find the Sum, Average, Count, Maximum Value, and Minimum Value of a range of cells.

## Basic Tips for Working with Data

Excel Workbooks are designed to store a lot of information no matter you are working with 10 cells or 10,000 cells. Excel has many features to help you Organize your data and find what you need.

### 1. Sorting Data

You can quickly reorganize your data in a sequence you want in your worksheet by sorting your data. You can sort your data alphabetically, numerically, and in many other ways.

### 2. Filtering Data

Filters can be applied to data in your worksheet allowing you to view only the information you need. Formatting Data as a Table can improve the overall look of your workbook and help you to organize your content and make your data easier to use.

### 3. Groups and Subtotals

Worksheets with a lot of content can sometimes feel overwhelming. Excel provides you with the feature of organizing data into Groups, allowing you to easily show and hide different sections of your worksheet. The Subtotal command allows you to quickly summarize data.

## Tables

After entering your data in the worksheet, you may want to format your data as a table. They will help to organize your data content and make your data easier to use and understand. Excel has many predefined table styles, allowing you to create tables quickly and easily.

Formatting Data as a Table

**Step 1:** Select the **Cells** you want to format as a table

**Step 2:** Click the **Format as Table** in the **styles** group from the **Home** tab

**Step 3:** Now select **Table Style** from the drop-down menu

**Step 4:** Confirm the cell range for the table

**Step 5:** Click **OK** if your table has headers

**Step 6:** The cell range will be formatted in the selected table style.

## Modifying Tables

It is easy to modify the look of the table after adding it to a worksheet. Excel includes several options for customizing a table, including adding rows or columns, changing the table style, Modifying the table style options, and removing a table.

## What are Charts?

It is difficult to examine Excel workbooks that contain a lot of data. **Charts** help you to illustrate your workbook **data graphically**, which makes it easy to examine and compare the Excel workbook and make **better decisions**.

## Understanding Conditional Formatting

Similar to charts **Conditional formatting** provides a way to visualize data and make worksheets easier to understand. It allows you to automatically apply formatting- such as **formatting**, and **data bars** to one or more cells.

How to use Conditional Formatting in Excel

**Step 1:** Select **desired cells**

**Step 2:** Click on the **Conditional formatting** command from the **Home** Tab

**Step 3:** Select the **desired rule** from the menu that appears

**Step 4:** Enter the desired values in the dialog box

**Step 5:** Select **Formatting styles**.

You can also use **Conditional Formatting presets** and **Remove the Conditional Formatting**.

## What are Pivot Tables?

If your workbook contains lots of data, it can sometimes be difficult to analyze all the information in your worksheet. PivotTables can help to make worksheets more manageable by summarizing data and allowing you to manipulate it in different ways.

How to Create Pivot Tables

**Step1:** Select the **Create** or cells

**Step 2:** From the **Insert tab** click on the **PivotTable**

**Step 3:** Choose your settings in the **Create PivotTable** Dialog box and click **ok**

**Step 4:** A blank **PivotTable** and **Field List** will appear in a new worksheet.

## Statistics in Spreadsheets

Microsoft office contains multiple applications that altogether serve as a complete information management system. A spreadsheet is among those tools and is very important when the analysis of data is required. A spreadsheet is defined as a large sheet that contains data and information arranged in rows and columns. Statistical features of Spreadsheets are today a huge asset as many large multinational companies and research institutions use them for organization, categorization,

and analysis of their financial data. There are multiple tools through which we can statistically analyze the data. Tools that facilitate working with statistics in spreadsheets are:

- Pre-Defined Mathematical functions like *average*, *max*, *min*, *mean*, *mode*, etc.
- 2D and 3D charts of various types like line charts, pie charts, bar charts, etc.

### Mathematical Functions in Spreadsheets

Microsoft Excel supports a wide range of statistical functions through which we can perform various operations like means, mode, average, etc. of the given data.

Some of the commonly used statistical functions are as follows:

| Function Name                | Formula                                 | Description                                                                                                                                                  |
|------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AVERAGE(val1, [val2], .... ) | AVERAGE(num1, [num2], .... )            | This function is used to find the arithmetic mean or average of the cell in the given range                                                                  |
| AVERAGEIF Function           | AVERAGEIF(range, criteria, [avg_range]) | This function is used to find the average of the cells that meet the given criteria.                                                                         |
| MEDIAN Function              | MEDIAN(num1, [num2], ...)               | This function is used to get the median of the given data.                                                                                                   |
| MODE Function                | MODE.SNGL(num1, [num2],...)             | This function is used to find the most frequent value of the cell in the given range.                                                                        |
| STANDARD DEVIATION Function  | STDEV.P(num1, [num2], ...)              | This function is used to find how much the observed value deviated or varied from the average.                                                               |
| VARIANCE Function            | VAR(num1, [num2], ...)                  | This function is used to find the degree of variation in the given data.                                                                                     |
| QUARTILES Function           | QUARTILE(arr, quart)                    | This function is used to divide the given data into four parts and can return minimum value, first quartile, second quartile, third quartile, and max value. |

| Function Name        | Formula                  | Description                                                                                                                       |
|----------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| CORRELATION Function | CORREL(arr1, arr2)       | This function is used to find the relationship between two variables. The range of correlation coefficient lies between -1 to +1. |
| MAX Function         | MAX(num1, [num2], ...)   | This function is used to find the largest numeric value in the given data.                                                        |
| MIN Function         | MIN(num1, [num2], ...)   | This function is used to find the smallest numeric value from the given data.                                                     |
| LARGE Function       | LARGE(arr, x)            | This function is used to find the nth largest value from the given data.                                                          |
| SMALL Function       | SMALL(arr, x)            | This function is used to find the nth smallest value from the given data.                                                         |
| COUNT Function       | COUNT(val1, [val2], ...) | This function is used to count the number of cells containing a number.                                                           |
| COUNTA Function      | COUNTA(val1, [val2],...) | This function is used to count everything including numbers, error values, empty text, etc, present in the given data.            |
| COUNTBLANK Function  | COUNTBLANK(Srange)       | This function is used to count only blank and empty cells.                                                                        |

**Example:**

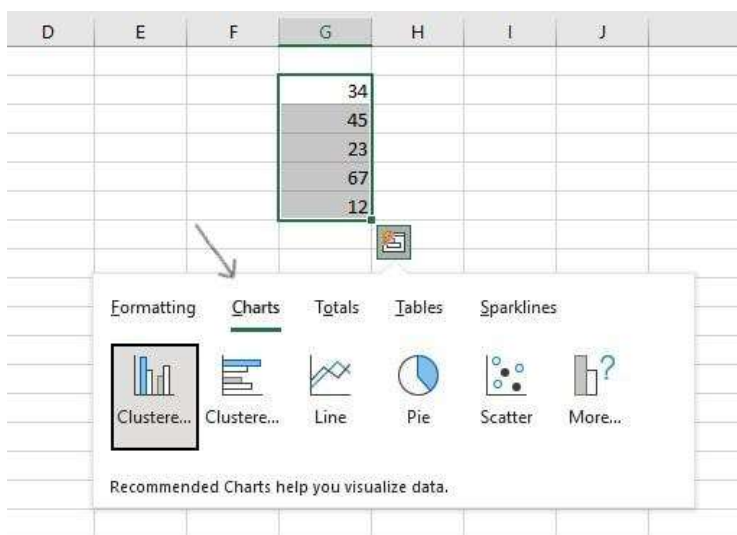
In this example, we are finding the average of the following given data:

|    |                            |          |          |          |          |          |   |
|----|----------------------------|----------|----------|----------|----------|----------|---|
| D9 |                            |          |          |          |          |          |   |
|    | A                          | B        | C        | D        | E        | F        | G |
| 1  | Subject                    | 1st Test | 2nd Test | 3rd Test | 4th Test | 5th Test |   |
| 2  | English                    | 19       | 20       | 12       | 18       | 19       |   |
| 3  | Hindi                      | 20       | 19       | 15       | 17       | 19       |   |
| 4  | Maths                      | 10       | 20       | 20       | 19       | 19       |   |
| 5  | Science                    | 15       | 20       | 17       | 19       | 17       |   |
| 6  | SSC                        | 15       | 11       | 19       | 18       | 19       |   |
| 7  | Computer                   | 18       | 17       | 19       | 19       | 20       |   |
| 8  |                            |          |          |          |          |          |   |
| 9  | Average Marks of 2nd test: |          |          | 17.83333 |          |          |   |
| 10 |                            |          |          |          |          |          |   |

Here, we use the AVERAGE(C2:C7) formula to find the average of 2nd test. Similarly, we can use other functions.

### Obtaining Charts in Spreadsheets

We can also use charts to represent our statistical data in graphic form. Or we can say that a chart is basically a diagram through which we can plot information such that it is easier to perceive and analyze different relationships between data points. The spreadsheets allow us to embed charts of various types for better data visualization.



For using charts, one just needs to select the data cells that need to be plotted into a chart and then choose the chart of their choice. We can customize various properties related to charts such as the color, title of the chart, adjustment of size, etc. as per our requirements as well. The general instructions to create a chart for any given data are as follows:

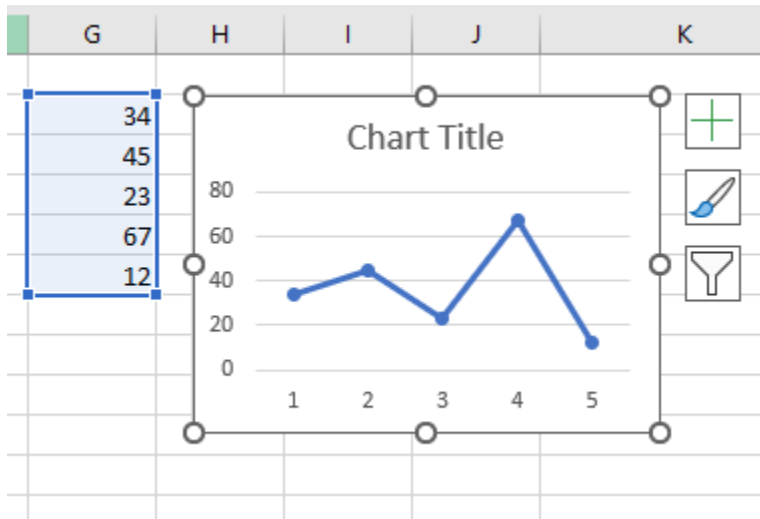
- Select the data for which the chart has to be created.

- Go to **INSERT > Recommended Charts**. There a dialog box appears that contains recommended charts for given data as well as All Charts that are available.
- Select the one which you feel is most suitable for information and click **OK**. The chart will be presented in the worksheet area.

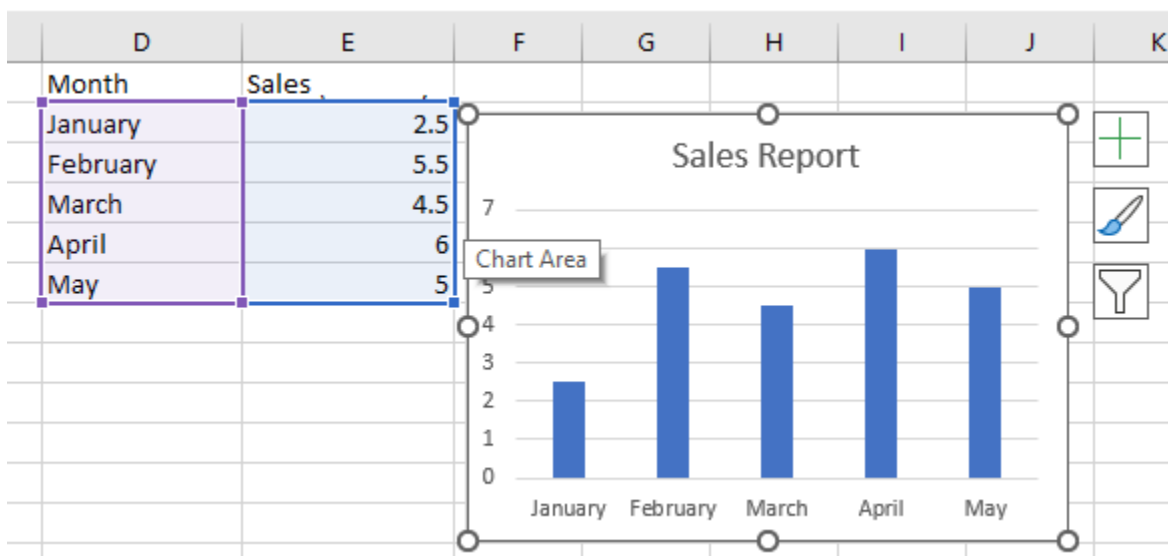
## Type of Charts

The spreadsheet supports various types of charts:

1. **Line Chart:** A line chart that shows the variation of some data by sequentially connected points.

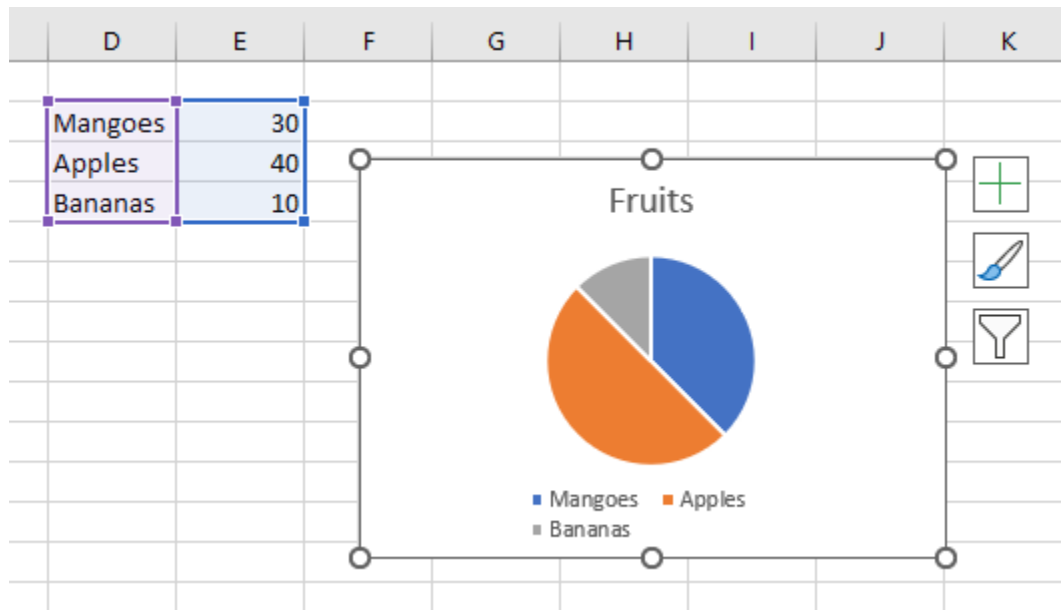


2. **Bar Chart:** This is another kind of Chart where data is represented in form of rectangular bars with height being proportional to the cell value.



3. **Scatter Plot:** This plot is used to compare at least two sets of values of pair of data.

**4. Pie Chart:** In a pie chart any information is presented as proportions to the whole data. For example – A person purchased 30 mangoes, 40 apples, and 10 bananas then a pie chart would present this information in the given fashion.



There are also many other kinds of charts besides the above that have different use cases such as hierarchy charts and pivot charts. Each and every one of these charts also supports 3D diagrams as well.



## Module 2: Working with Data

### Understanding Data Types and Formatting

Spreadsheets handle different types of data, each serving distinct purposes in calculations and data analysis. Proper classification and formatting enhance readability, ensure accuracy, and optimize spreadsheet performance.

#### Primary Data Types in Spreadsheets

1. **Text (String Data):** Comprises alphanumeric characters, including letters, numbers, and symbols, often used for names, labels, and descriptions.
2. **Numeric Data:** Includes integers, decimals, and percentages, which are critical for performing mathematical operations.
3. **Date & Time Data:** Supports chronological analysis, allowing for date-based calculations.
4. **Boolean (Logical) Data:** Represents TRUE or FALSE values for logical computations.
5. **Currency Data:** Displays monetary values with appropriate currency symbols and decimal formatting.

#### Applying Data Formatting

- **Number Formatting:** Adjusts how numerical data is presented without changing its core value (e.g., thousands separators, decimal places).
- **Text Formatting:** Modifies font type, color, and size for better organization and emphasis.
- **Date and Time Formatting:** Standardizes date/time representation based on region-specific settings.
- **Cell Alignment and Borders:** Enhances structure by positioning content properly within cells.

#### Practice Exercises:

1. Identify the correct data type for the following values: “Revenue”, 325.50, 01/01/2024, FALSE.
2. Format a dataset to display numbers with two decimal places and apply currency formatting.
3. Convert an unformatted list of dates into a standardized DD-MM-YYYY format.

### Working with Formulas and Functions

Formulas and functions are essential for processing data, automating tasks, and performing complex calculations efficiently.

## Fundamental Formulas for Accountants

- **SUM:** Adds up a specified range of values.

=SUM(A1:A10)

- **AVERAGE:** Computes the mean of selected numbers.

=AVERAGE(B1:B10)

- **IF Statement:** Returns different values based on logical conditions.

=IF(A2>1000, "Profitable", "Loss")

- **VLOOKUP:** Searches for a value in the first column of a specified range and returns data from another column.

=VLOOKUP(102, A2:C10, 3, FALSE)

- **HLOOKUP:** Similar to VLOOKUP but searches within a row instead of a column.

=HLOOKUP("Q2", A1:D5, 3, FALSE)

- **LEN:** Determines the number of characters in a text string.

=LEN(A1)

- **TRIM:** Removes extra spaces from text.

=TRIM(A1)

## Best Practices for Applying Formulas

- Use **absolute references (\$A\$1)** when you need fixed cell references.
- Apply **named ranges** for better readability and maintenance.
- Utilize **nested functions** to combine multiple operations in a single formula.

## Practice Exercises:

1. Calculate the total revenue from a sales dataset using the SUM function.
2. Use an IF formula to classify transactions above \$5000 as “High Value” and others as “Standard”.
3. Implement VLOOKUP to find the corresponding department for an employee ID.

## Data Validation and Conditional Formatting

Ensuring accuracy in spreadsheet data is crucial for meaningful analysis. Data validation restricts incorrect input, while conditional formatting enhances data interpretation.

### Using Data Validation to Control Inputs

- Restrict entries to whole numbers within a specific range:  
Data > Data Validation > Allow: Whole Number > Minimum: 1, Maximum: 100
- Create a **drop-down list** for user selection:  
Data > Data Validation > Allow: List > Source: A1:A5
- Prevent duplicate entries in a dataset:  
Data > Data Validation > Custom Formula: =COUNTIF(A:A, A1)=1

### Applying Conditional Formatting

- Highlight sales exceeding \$10,000:  
Home > Conditional Formatting > New Rule > Format cells where value > 10000
- Apply **color scales** to visualize variations in numeric data.
- Use **icon sets** to represent trends (e.g., arrows for increasing or decreasing sales).

### Practice Exercises:

1. Set up data validation to allow only positive values in a budget sheet.
2. Apply conditional formatting to highlight overdue invoices in red.
3. Create a drop-down list for selecting product categories.

## Sorting and Filtering Data

Sorting and filtering enhance the organization and analysis of large datasets.

### Sorting Data

- Sort data in **ascending** or **descending** order.  
Home > Sort & Filter > Sort A-Z or Sort Z-A
- Perform **custom sorting** (e.g., sort by department, then by employee name).

### Filtering Data

- Apply filters to display only relevant records.  
Data > Filter > Select Criteria

- Use **advanced filtering** to extract unique values.

Data > Advanced Filter > Unique Records Only

### Practice Exercises:

1. Sort a list of products based on price from highest to lowest.
2. Filter a dataset to show only transactions above \$5000.
3. Use advanced filtering to extract unique customer names from a sales list.

### Practice Questions & Answers

#### Question 1:

Which of the following data types is most appropriate for performing numerical calculations in a financial spreadsheet?

- A) Text (String)
- B) Boolean (Logical)
- C) Numeric (Integer/Decimal)
- D) Currency (Formatted)

**Answer:** C) Numeric (Integer/Decimal)

#### Question 2:

Which Excel function is used to search for a value in the first column of a specified range and return a corresponding value from another column?

- A) INDEX
- B) MATCH
- C) VLOOKUP
- D) INDIRECT

**Answer:** C) VLOOKUP

#### Question 3:

When applying **Data Validation** in Excel, which method ensures that a user can only enter specific values from a predefined list?

- A) Setting a whole number limit
- B) Applying a drop-down list
- C) Using conditional formatting
- D) Enabling Goal Seek

**Answer:** B) Applying a drop-down list

**Question 4:**

Which of the following **best describes** the purpose of **Conditional Formatting** in data analysis?

- A) To automate repetitive tasks using macros
- B) To apply formulas across multiple cells
- C) To visually highlight important data based on predefined conditions
- D) To filter and sort data dynamically

**Answer:** C) To visually highlight important data based on predefined conditions

**Question 5:**

A financial analyst needs to test how **different interest rates** affect a company's loan payments in Excel. Which of the following features would be most appropriate?

- A) Data Validation
- B) Conditional Formatting
- C) Data Table (What-If Analysis)
- D) Named Ranges

**Answer:** C) Data Table (What-If Analysis)

## Module 3: Advanced Spreadsheet Techniques

### Advanced Functions and Formulas

To efficiently manage and analyze data, spreadsheets offer advanced functions that facilitate complex calculations and enhance decision-making. These functions allow users to extract, manipulate, and organize data with greater accuracy and flexibility.

#### Key Advanced Functions

- **INDEX:** Retrieves the value of a specified cell within a given range based on row and column positions.

=INDEX(A2:C10, 3, 2)

- **MATCH:** Returns the position of a specific value within a defined range.

=MATCH(50, A2:A10, 0)

- **INDIRECT:** Dynamically references a cell based on a text string, useful for linking to variable ranges.

=INDIRECT("A"&B2)

- **Array Formulas:** Allow multiple calculations on a dataset, returning a single or multiple outputs.

{=SUM(A1:A10\*B1:B10)}

- **Custom Formulas:** Created using a combination of built-in functions to meet specific analytical needs.

#### Best Practices for Using Advanced Formulas

- Combine **INDEX** and **MATCH** to create a more flexible lookup function.
- Use **INDIRECT** for dynamic referencing in dashboards and reports.
- Apply array formulas to process bulk calculations efficiently.

#### Practice Exercises:

1. Retrieve the value from the third row and second column of a dataset using INDEX.
2. Use MATCH to identify the row number of a specific product in a sales list.
3. Apply INDIRECT to reference data dynamically from another sheet.
4. Create an array formula that multiplies values across two columns and sums the results.

## PivotTables and PivotCharts

PivotTables and PivotCharts are essential for summarizing large datasets and creating interactive reports that aid in data-driven decision-making.

### Creating and Customizing PivotTables

- **Step 1:** Select the dataset and navigate to the **Insert** tab.
- **Step 2:** Click on **PivotTable** and define the data range.
- **Step 3:** Drag fields into **Rows, Columns, Values, and Filters** sections.
- **Step 4:** Apply sorting, filtering, and grouping to refine analysis.

### Working with PivotCharts

- Insert a PivotChart from an existing PivotTable.
- Choose appropriate chart types such as bar, line, or pie charts.
- Use slicers and filters to make charts more interactive.

### Common Uses of PivotTables and PivotCharts

- Analyzing sales performance by region.
- Summarizing expenses by category.
- Comparing financial trends over different periods.

### Practice Exercises:

1. Create a PivotTable to summarize total revenue by department.
2. Develop a PivotChart to visualize monthly sales trends.
3. Implement filters to show data only for high-value transactions.
4. Use slicers to interactively filter PivotTable results.

## Data Analysis Tools for Financial Forecasting

Excel provides various tools to facilitate financial forecasting and business decision-making.

### Goal Seek

- Helps determine the input value needed to reach a specific output.
- Useful for break-even analysis and financial projections.

Data > What-If Analysis > Goal Seek

### Solver

- Optimizes multiple variables to achieve a defined target based on constraints.
- Used for cost minimization, resource allocation, and investment planning.

Data > Solver > Define Objective

### Data Tables

- Perform sensitivity analysis by varying input values to observe different outcomes.
- Useful for modeling financial scenarios and risk assessments.

Data > What-If Analysis > Data Table

### Using Data Analysis Tools Effectively

- Clearly define objectives before applying Goal Seek or Solver.
- Set appropriate constraints to improve the accuracy of Solver results.
- Utilize Data Tables to compare multiple financial projections efficiently.

### Practice Exercises:

1. Use Goal Seek to determine the sales volume required to achieve a target profit.
2. Apply Solver to optimize a company's production costs while maintaining demand.
3. Create a one-variable Data Table to analyze how different interest rates impact loan payments.
4. Implement a two-variable Data Table to compare revenue forecasts based on pricing and sales volume.

### Practice Questions & Answers

#### Question 1:

Which of the following function combinations is the most effective for performing **dynamic lookups** in a dataset?

- A) INDEX and MATCH
- B) VLOOKUP and HLOOKUP
- C) SUM and AVERAGE
- D) INDIRECT and COUNT

**Answer:** A) INDEX and MATCH

#### Question 2:

A financial analyst wants to create a summary report that can dynamically adjust based on different **regions, time periods, and sales categories**. Which Excel tool should be used?

- A) Goal Seek
- B) PivotTable
- C) Data Validation
- D) Conditional Formatting



**Answer:** B) PivotTable

**Question 3:**

Which of the following data analysis tools is **best suited** for determining the required **input value** to achieve a specified output in financial projections?

- A) Solver
- B) Goal Seek
- C) Data Table
- D) Pivot Chart

**Answer:** B) Goal Seek

**Question 4:**

An accountant is tasked with **evaluating different investment scenarios** based on fluctuating interest rates and tax rates. Which **Excel tool** is most appropriate for this task?

- A) PivotTable
- B) Scenario Manager
- C) Data Validation
- D) Conditional Formatting

**Answer:** B) Scenario Manager

**Question 5:**

A company wants to **optimize resource allocation** by adjusting constraints on available funds and project costs. Which **Excel feature** provides the best solution?

- A) Solver
- B) INDEX-MATCH
- C) Data Table
- D) Flash Fill

**Answer:** A) Solver

## Module 4: Building Financial Models

### Understanding Financial Modeling

Financial modeling is the process of constructing a mathematical representation of a company's financial performance. It involves forecasting and evaluating business finances using spreadsheets, financial instruments, and quantitative techniques. The primary objective of financial modeling is to facilitate informed decision-making by assessing the financial implications of different scenarios.

### Key Components of Financial Modeling

- **Historic Data Analysis:** Examining past financial data to identify trends and patterns that provide insights into future performance.
- **Assumptions:** Making informed estimates regarding potential market conditions, business operations, and other factors that could impact financial results.
- **Forecasting:** Predicting future financial performance based on historical trends and assumptions, often involving the preparation of cash flow, balance sheet, and income statements.
- **Valuation:** Determining the value of a business, investment, or financial undertaking using methods like discounted cash flow (DCF), comparable company analysis (CCA), and precedent transactions.
- **Sensitivity Analysis:** Evaluating how changes in key variables or assumptions impact financial outcomes, helping assess associated risks.

### Applications of Financial Models

Financial models are widely used across various industries and financial functions. Common applications include:

1. **Forecasting and Business Planning:** Evaluating an organization's financial health based on historical data and assumptions to aid in planning and resource allocation.
2. **Cost Estimation and Budgeting:** Developing financial plans that detail projected revenues, expenses, and cash flows, ensuring efficient financial management.
3. **Valuation:** Assessing businesses, investments, and projects using methods like DCF, CCA, and transaction-based analyses.
4. **Investment Analysis:** Evaluating risks and returns on investment opportunities, including stocks, bonds, and real estate.
5. **Mergers & Acquisitions (M&A):** Assessing the financial impact of business mergers or acquisitions, including synergies, risks, and combined financial projections.
6. **Project Feasibility:** Determining the financial viability of a project to support funding decisions and return-on-investment calculations.
7. **Risk Management:** Utilizing scenario analysis and sensitivity testing to understand potential risks and develop strategies for mitigating financial uncertainties.

### Who Builds Financial Models?

Financial models are created by various professionals across different industries. Key roles include:

1. **Financial Analysts:** Responsible for developing and maintaining financial models for forecasting and strategic planning.
2. **Investment Bankers:** Build financial models for valuations, M&A, initial public offerings (IPOs), and other transactions.
3. **Corporate Finance Professionals:** Use models for budgeting, capital expenditure analysis, and financial strategy development.
4. **Consultants:** Provide financial modeling services to support business decision-making and strategic planning.
5. **Real Estate Professionals:** Develop models to assess property investments, cash flow projections, and return on investment.
6. **Accounting and Treasury Specialists:** Optimize working capital, manage cash flow, and determine liquidity requirements.
7. **Risk Managers:** Use models to quantify financial risks, conduct stress testing, and assess financial stability.

### How to Learn Financial Modeling

Developing expertise in financial modeling requires a combination of theoretical knowledge, practical application, and continuous refinement. A structured approach includes:

1. **Understanding Finance and Accounting:** Gain foundational knowledge of financial principles, accounting standards, and financial statement interpretation.
2. **Learning Excel and Spreadsheet Skills:** Master fundamental and advanced spreadsheet functions, formulas, and data manipulation techniques.
3. **Enrolling in Online Courses:** Platforms such as Udemy, LinkedIn Learning, and Coursera offer specialized courses on financial modeling.
4. **Reading Books and Materials:** Recommended resources include *Investment Banking* by Joshua Rosenbaum and *Financial Modeling in Excel for Dummies* by Danielle Stein Fairhurst.
5. **Taking Advanced Financial Modeling Courses:** Universities and training institutions provide specialized courses focusing on industry-specific financial modeling.
6. **Using Financial Modeling Software:** Tools like Tableau and Power BI can enhance modeling capabilities through advanced visualization and automation features.
7. **Pursuing Professional Certifications:** Certifications such as the Financial Modeling and Valuation Analyst (FMVA) or Chartered Financial Analyst (CFA) add credibility and expertise.

### Steps to Building a Financial Model

Constructing an effective financial model involves a systematic approach:

1. **Define the Purpose:** Identify whether the model is for forecasting, valuation, budgeting, or investment analysis.
2. **Gather Data:** Collect historical financial statements and key assumptions, such as inflation rates and interest rates.
3. **Structure the Spreadsheet:** Create organized sections for assumptions, income statements, balance sheets, and cash flow projections.

4. **Input Historical Data:** Populate past financial information while ensuring accuracy and consistency.
5. **Develop Assumptions:** Define revenue growth rates, cost structures, tax rates, and other key financial inputs.
6. **Create the Income Statement:** Forecast revenues, expenses, and profits using linked formulas.
7. **Build the Balance Sheet:** Use projections to estimate assets, liabilities, and equity while maintaining balance.
8. **Develop the Cash Flow Statement:** Model cash inflows and outflows, ensuring alignment with the balance sheet.
9. **Conduct Sensitivity Analysis:** Test various scenarios to determine the impact of assumption changes.
10. **Validate and Test the Model:** Check for errors, balance sheet mismatches, and formula inconsistencies before finalizing.

### **Best Practices for Financial Modeling**

- Clearly define the model's purpose and maintain a structured layout.
- Use logical and transparent formulas to ensure accuracy.
- Incorporate flexibility for scenario testing and stress analysis.
- Apply error checks and validation rules to improve model reliability.
- Keep formatting consistent for readability and clarity.
- Utilize charts and graphs for better data visualization.
- Regularly update the model with new financial data and assumptions.

### **Common Financial Model Types**

1. **Merger & Acquisition (M&A) Model:** Used to analyze the financial effects of mergers and acquisitions, evaluating synergies and deal structures.
2. **Leveraged Buyout (LBO) Model:** Focuses on acquisition financing using debt, requiring complex debt scheduling and cash flow forecasting.
3. **Initial Public Offering (IPO) Model:** Assesses a company's valuation before going public, incorporating comparable analysis and investor sentiment.
4. **Sum-of-the-Parts Model:** Combines individual business unit valuations to estimate a company's total worth.
5. **Consolidation Model:** Integrates financial data from multiple business units into a unified financial structure.

### **Advanced Charting and Graphing**

#### **How to Create Advanced Charts and Graphs in Excel?**

Charts, graphics, and images are excellent ways to visualize and convey data, and Excel does the same for us by generating charts automatically. We might occasionally want to go beyond the basic charts that Excel generates for us. Let's learn about advanced charts and graphs used in excel,

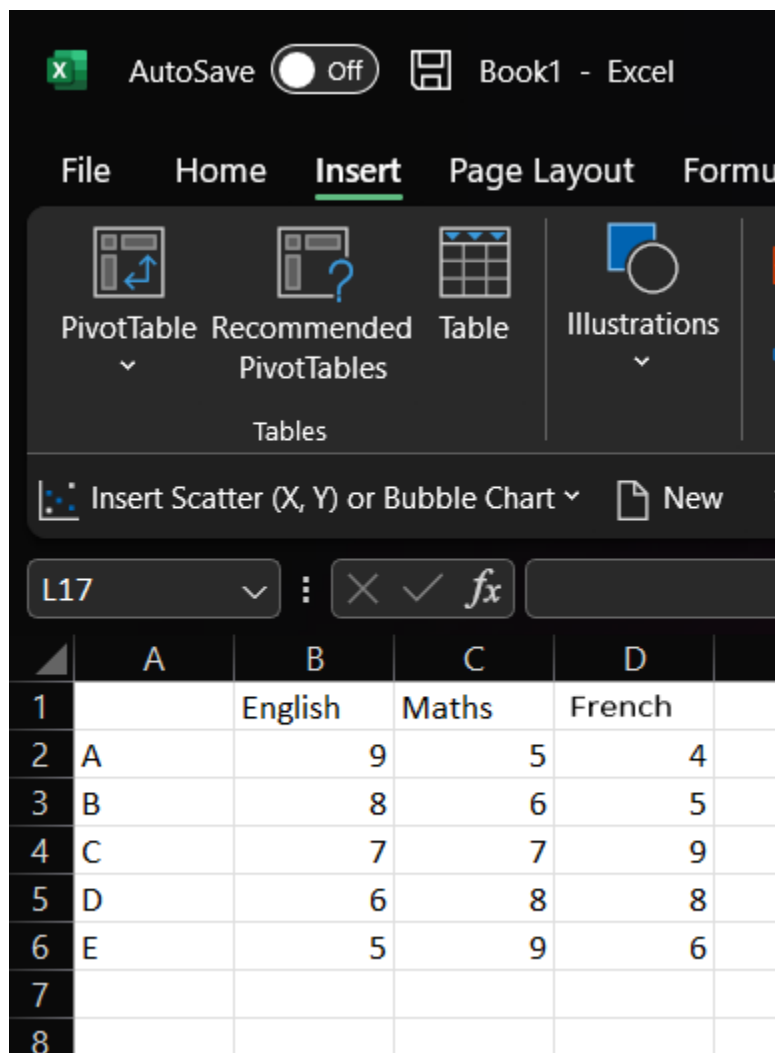
## Advanced Chart

A more complex chart than Excel's default one is referred to as an advanced chart. If you want to compare many sets of data on the same chart, you can start by creating your basic chart with just one set of data, then add other datasets and other elements, such as formatting. Advanced charts are all about this. For complicated charts in Excel, they provide aggregated data in a single chart, making it simpler to evaluate many data sets and take quick decisions. They let us modify how the expert Excel charts appear and operate.

### How to Add Charts and Graphs in Excel

Below are the steps to add charts and graphs in excel:

**Step 1:** First open the MS-EXCEL and then write your data there in the sheet.



**Step 2:** Then select all your data. Go to the insert option, from this you can insert any type of chart and graph according to your data.

AutoSave ☐ Off Book1 - Excel

File Home Insert Page Layout Formulas Data Re

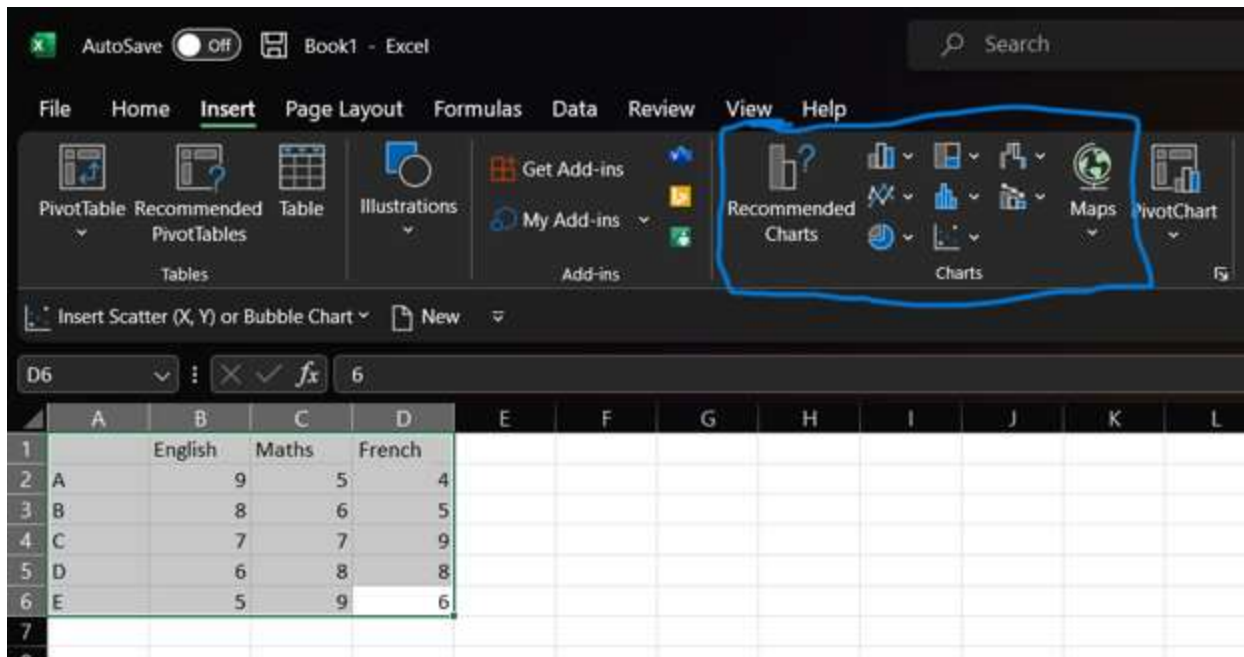
PivotTable Recommended PivotTables Table Illustrations Get Add-ins My Add-ins

Insert Scatter (X, Y) or Bubble Chart New

D6 : ☐ ☒  $f_x$  6

|   | A | B       | C     | D      | E | F |
|---|---|---------|-------|--------|---|---|
| 1 |   | English | Maths | French |   |   |
| 2 | A | 9       | 5     | 4      |   |   |
| 3 | B | 8       | 6     | 5      |   |   |
| 4 | C | 7       | 7     | 9      |   |   |
| 5 | D | 6       | 8     | 8      |   |   |
| 6 | E | 5       | 9     | 6      |   |   |
| 7 |   |         |       |        |   |   |
| 8 |   |         |       |        |   |   |
| 9 |   |         |       |        |   |   |

**Step 3:** You will find different charts that are shown below. When hovering over the chart it shows a brief description and the kind of data it should be used is included in each part.



### *Charts in excel*

Now we are going to discuss all the charts in detail.

#### **Column or Bar Chart**

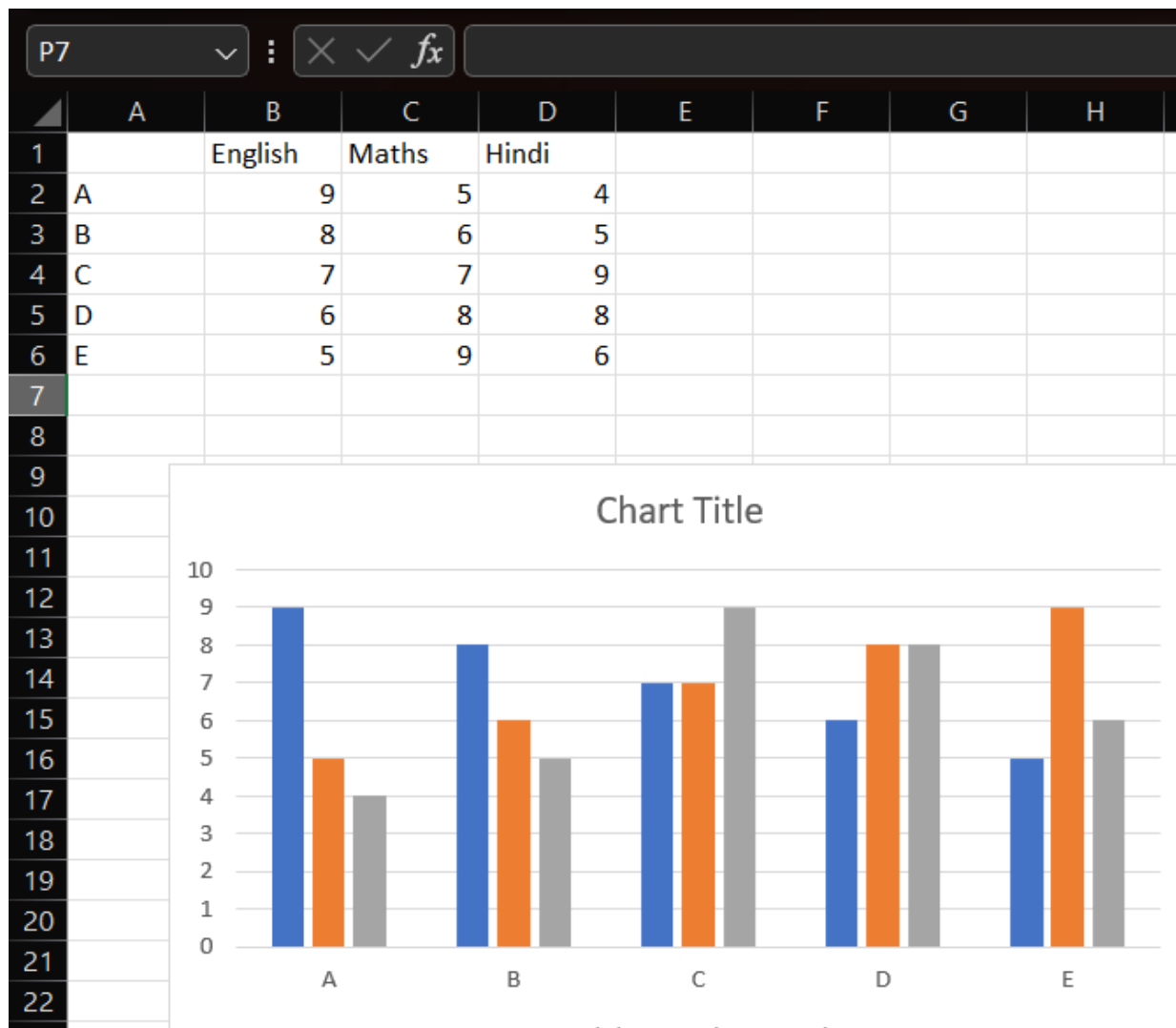
When displaying categorical data, a bar chart or bar graph employs rectangular bars with heights or lengths proportional to the values they stand for. Vertical or horizontal bar plots are both possible. Vertical bar graphs are also referred to as column charts. Any type of data column or bar chart can be used. For example, if we have to show the above-mentioned data in a column chart then.

**Step 1:** Select all the data. Click on insert a column or bar chart.

**Step 2:** You will observe the column and bar chart in 2-D and 3-D forms.

**Step 3:** Here, we are choosing the clustered column for our data representation.

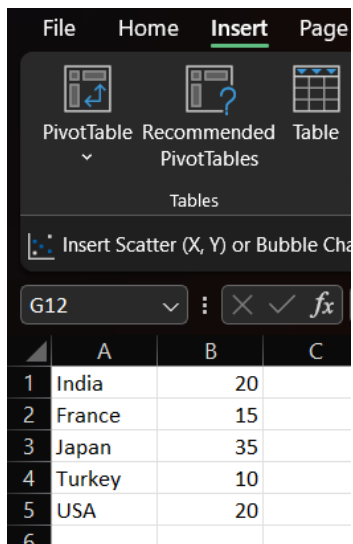
**Step 4:** Now we can see the clustered column chart with the table.



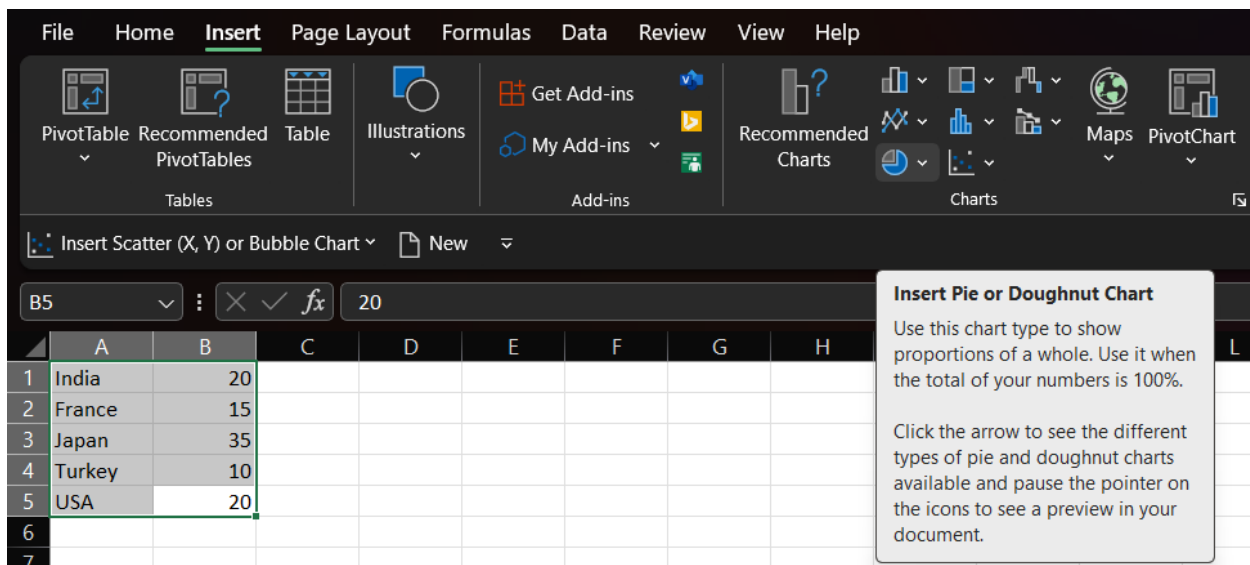
### Pie or Doughnut Chart

A pie chart is a circular graph that resembles a pie cut into slices (sectors). Slices display the percentage that each value makes up of the total, with the area of each slice corresponding to the amount it stands for and the circle signifying 100%. A doughnut chart is a pie diagram with a blank circle in the center. When comparing categories in tiny data sets, pie charts are frequently utilized. When there are more than a handful of categories, they shouldn't be used and cannot be multiple-series. For example, if we want to show the given below data in a pie chart then:

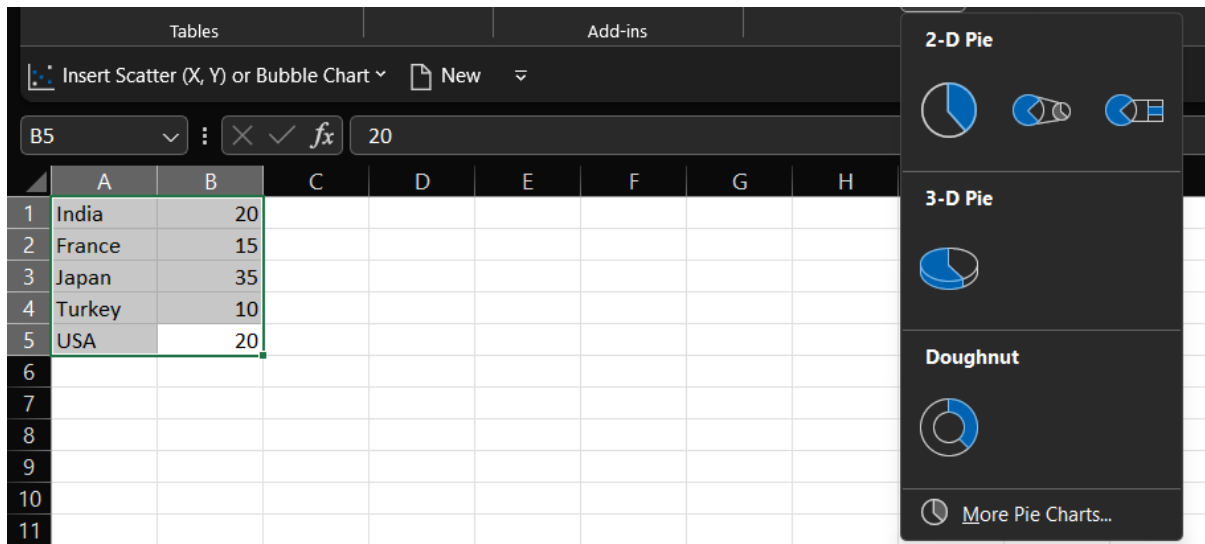




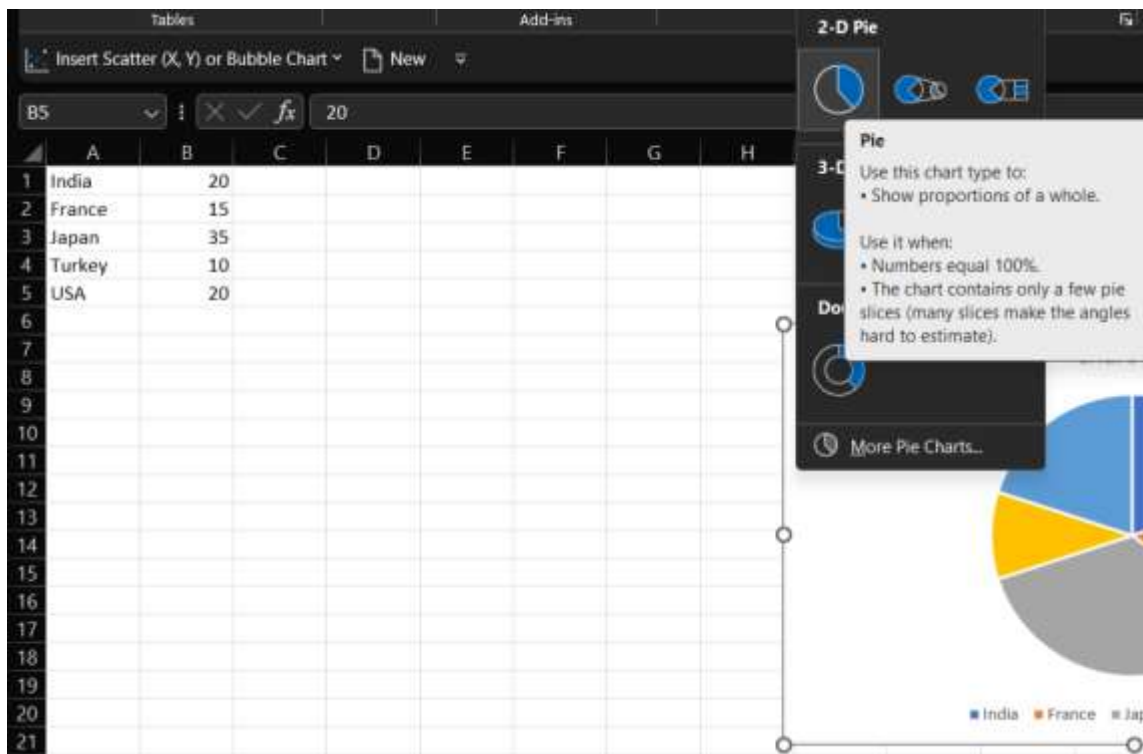
**Step 1:** Select all the data. Go to the option insert and then in the chart group select pie or doughnut chart.



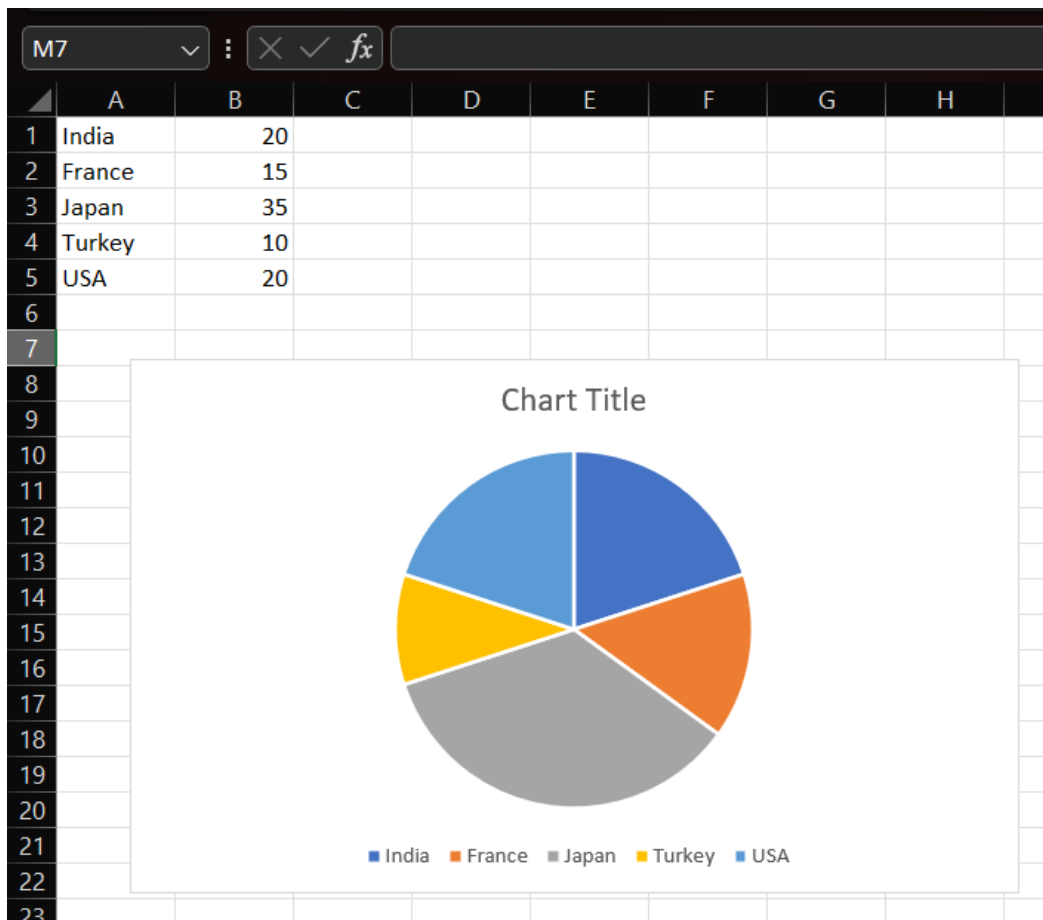
**Step 2:** You will observe here the pie chart in 2-D and 3-D forms.



**Step 3:** We are here using the 2-D pie option that is shown below image:



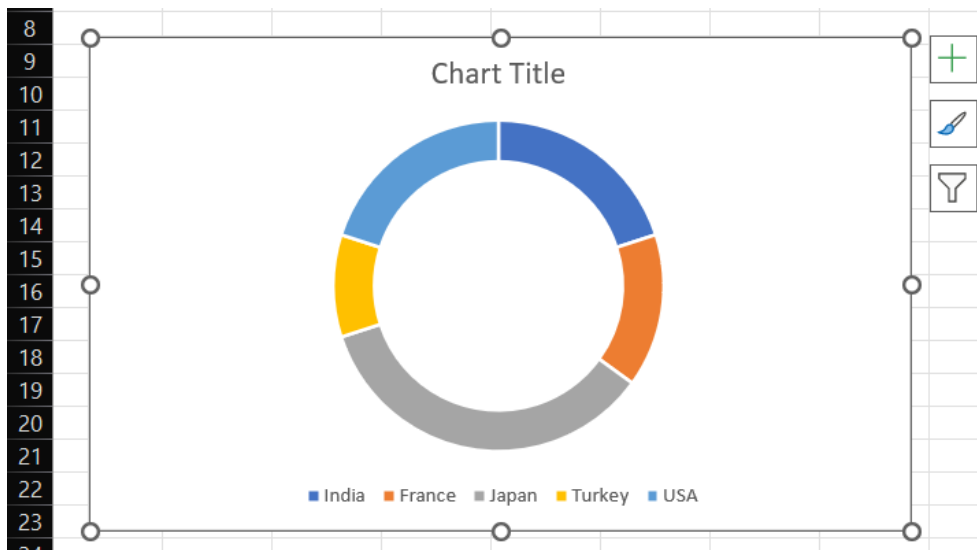
**Step 4:** Now we can see the pie chart with the table.



*pie chart*

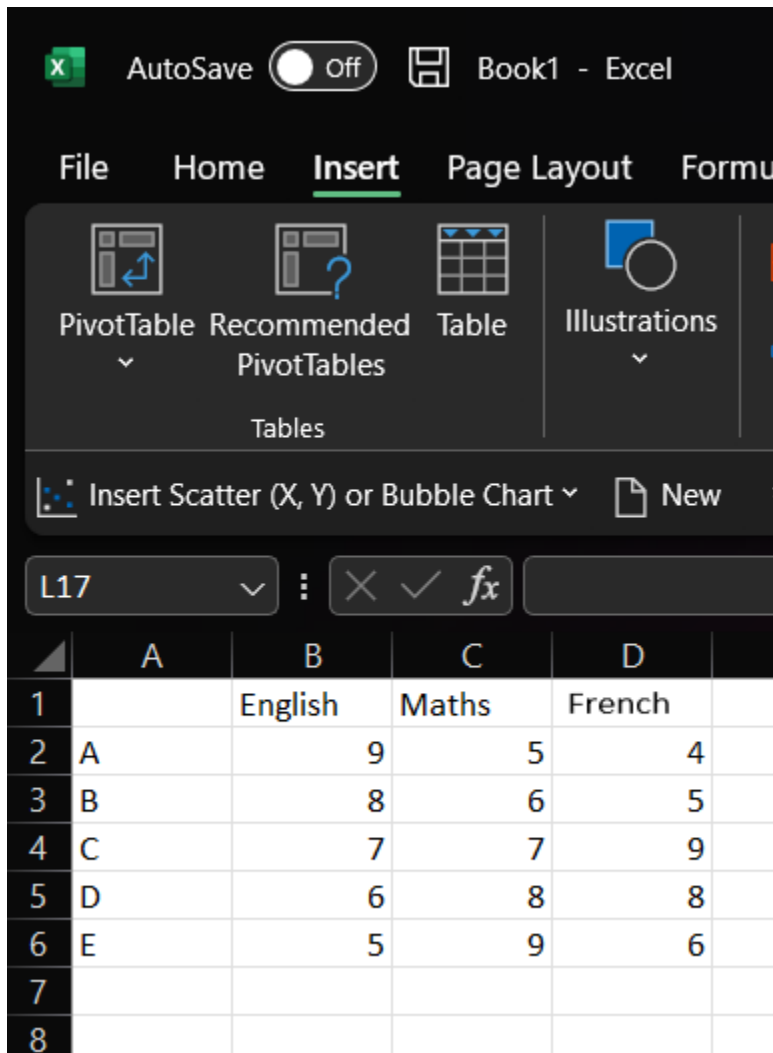
## Doughnut Chart

If we have to show the above-mentioned data in a doughnut chart for that you need to follow step1 and step2 the same and then you just have to choose a doughnut chart option this time.



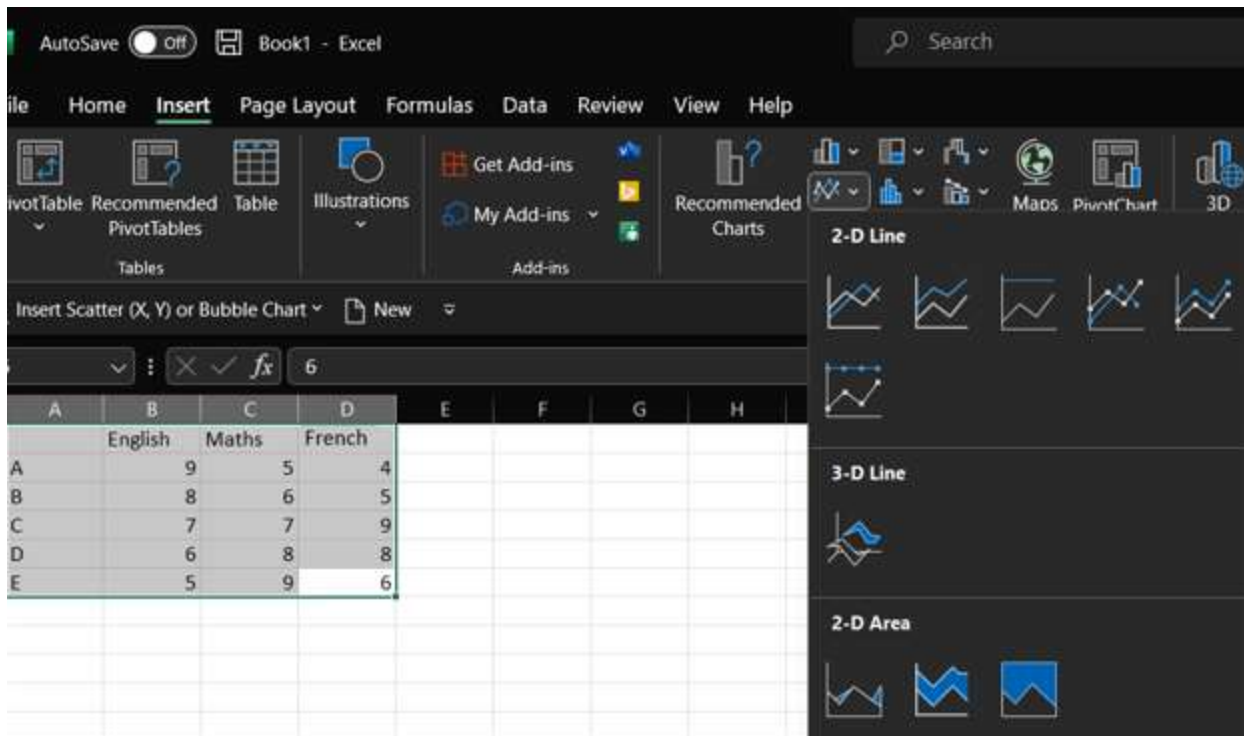
## Line and Area Chart

Typically, line charts are used to discuss trends over a specific period. The X-axis represents certain significant measurements, whereas the Y-axis displays numerical values. Since you can see the specific trend for each data category on a line chart, they are simple to interpret. In practice, finance managers welcome line types to examine trends in earnings and other aspects of the business. Line charts and area charts both follow similar patterns. However, a certain hue fills the space between each line and the X-axis. Area charts are typically the best choice for showing changes between various data sources. For example, if we want to show the given below data in a line chart then,



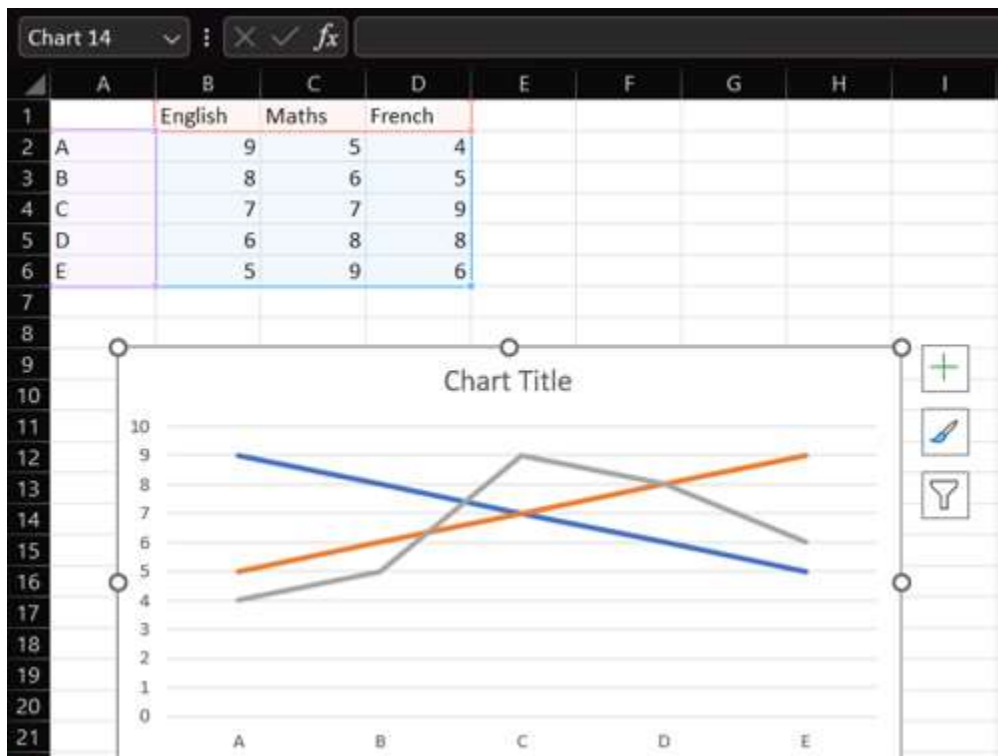
**Step 1:** Select all the data. Go to the option insert line or area chart.

**Step 2:** You will observe the line and area chart in 2-D and 3-D forms.



**Step 3:** Here, we are using a 2-D normal line chart.

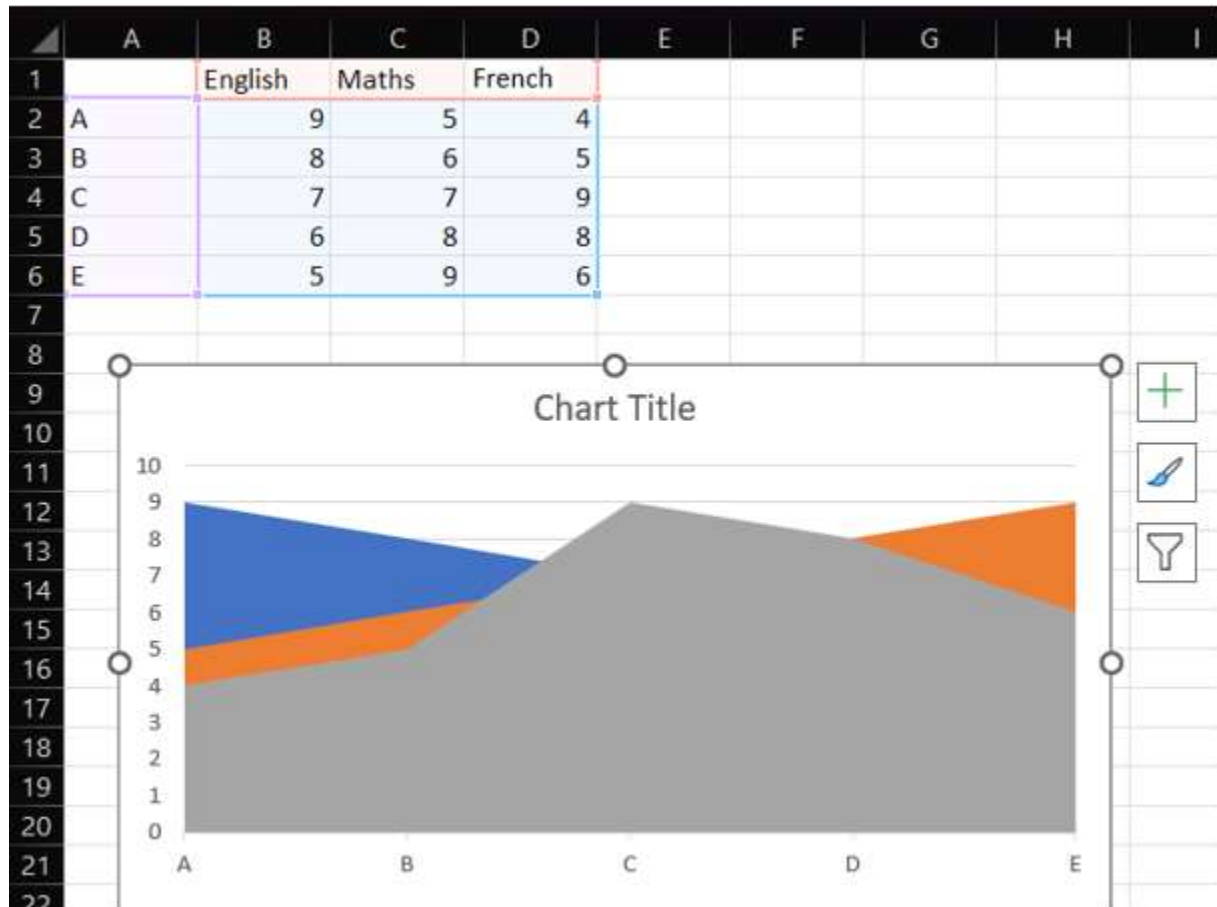
**Step 4:** Now we can see the line chart with the table.



## Area Chart

**Step 1:** If we have to show the above-mentioned data in an area chart for that you need to follow step 1 and step 2 the same and then you just have to choose an area chart option this time.

**Step 2:** Now we can see the area chart with the table.



## Histogram

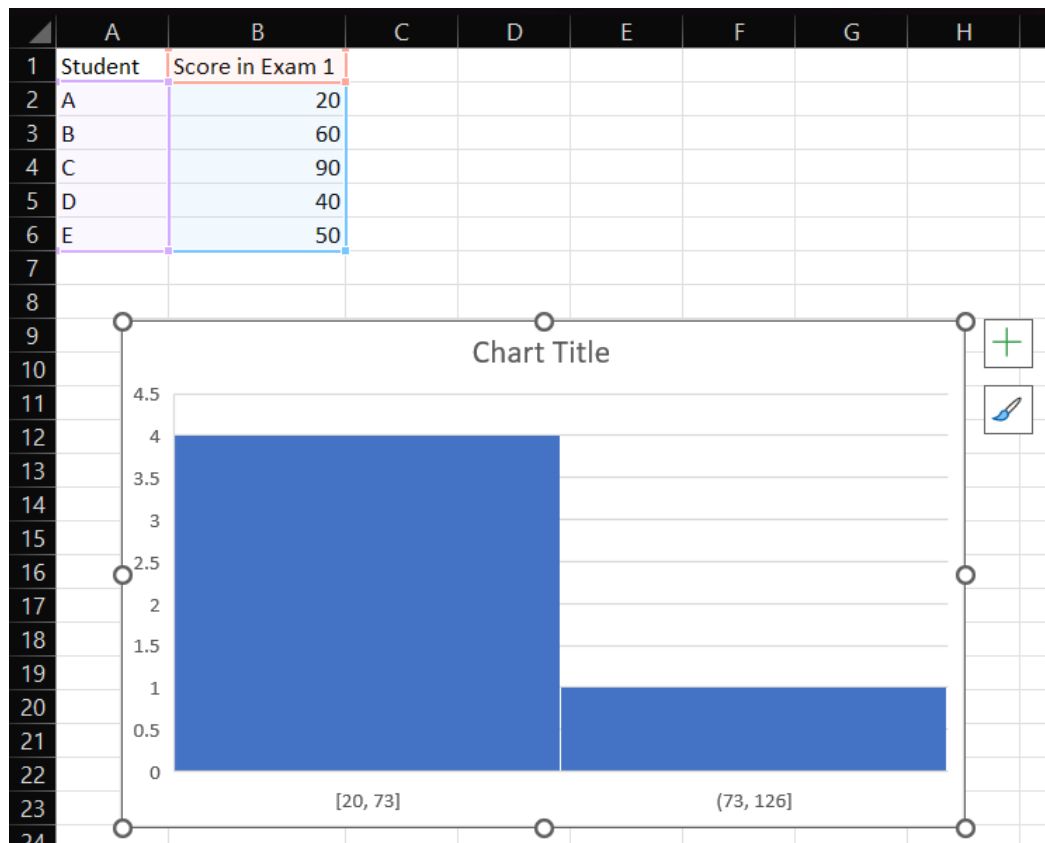
A histogram is a diagram that shows how numerical data are distributed. A histogram is a column chart that more easily conveys the frequency of data within a given range. Utilizing the number of data points that fall inside a given range of values, allows the visualization of numerical data. For any type of data, the histogram can be used.

**Step 1:** Select all the data. Go to the option insert statistic chart.

**Step 2:** You will observe here the histogram and box & whisker.

**Step 3:** Here you choose a histogram.

**Step 4:** Now we can see the histogram with the table.

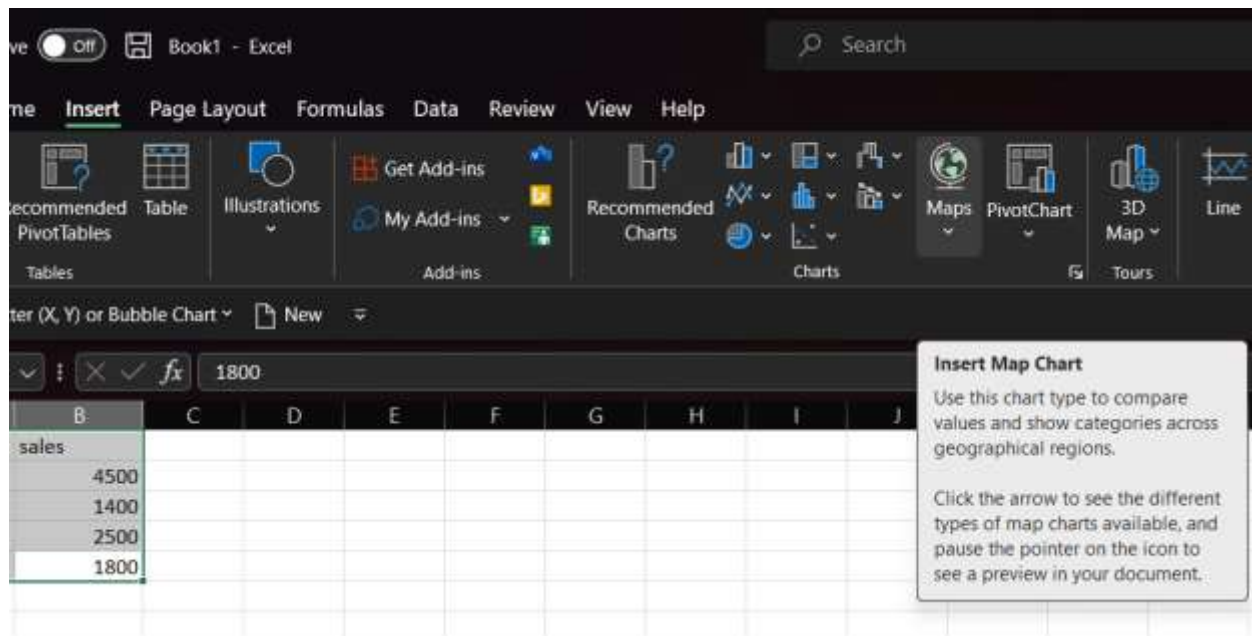


## Map

The newest versions of Microsoft Excel have the Excel Map Chart feature. It enables beautiful and creative visualization of any kind of geographic data. The Map Chart's cool feature is the automatic geographic data identification and recognition, which eliminates the need for you to manually match your data points with a certain map area. Excel takes care of everything instead, regardless of whether your data are at the level of a country, state, country, or even postal code. For example, if we want to show the given below data on a map then:

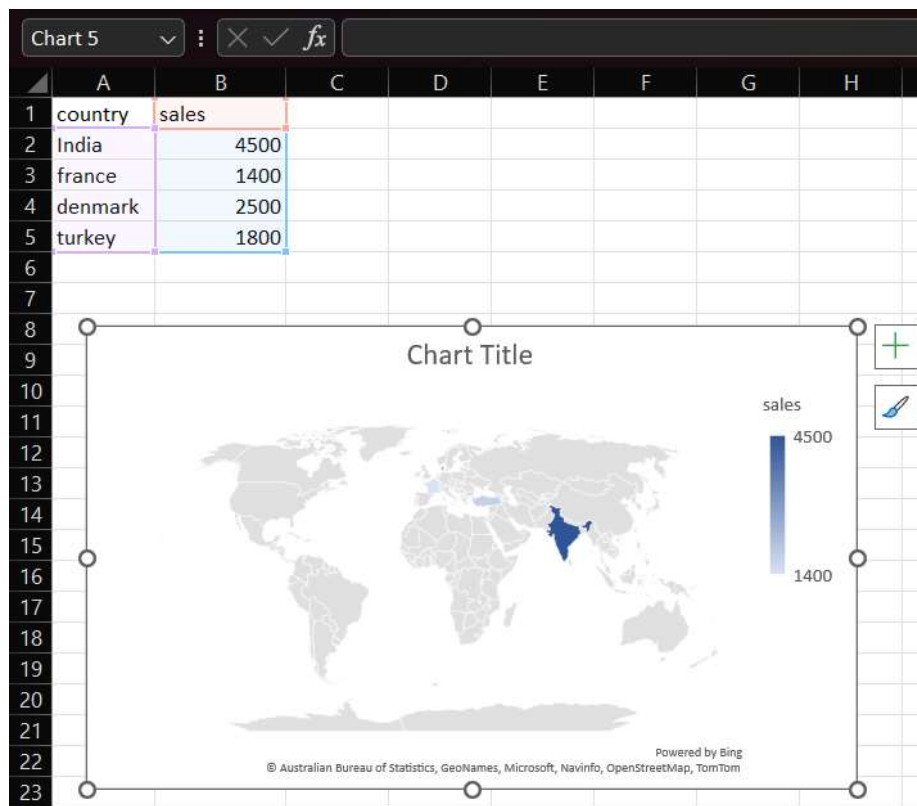
| H7 |         |       |   |   |
|----|---------|-------|---|---|
|    | A       | B     | C | D |
| 1  | country | sales |   |   |
| 2  | India   | 4500  |   |   |
| 3  | france  | 1400  |   |   |
| 4  | denmark | 2500  |   |   |
| 5  | turkey  | 1800  |   |   |
| 6  |         |       |   |   |
| 7  |         |       |   |   |

**Step 1:** Select all the data. Go to **option maps**.



**Step 2:** Here you just need to choose maps.

**Step 3:** Now we can see the map with the table.





## Module 5: Macros and Automation

### Understanding Macros and VBA for Automation

In Microsoft Excel, where spreadsheets serve as a dynamic workspace, users frequently encounter repetitive tasks that demand continuous attention. These recurring tasks can consume significant time and effort if performed manually. However, with advancements in technology, an efficient solution exists to streamline such processes—**Macros**.

Macros are Excel's built-in automation tools, designed to execute sequences of actions without manual intervention. They serve as silent enablers of productivity, significantly reducing the time required for tasks that would otherwise take hours to complete manually. By leveraging macros, users can automate routine operations, enhancing efficiency and accuracy in data processing.

### What is a Macro in Excel?

A macro is essentially a sequence of recorded actions that Excel can replay on demand. Each mouse click and keystroke is captured and stored within a macro, allowing users to execute complex tasks with a single command. Macros operate within **Visual Basic for Applications (VBA)**, a programming language that enables advanced customization and automation within Excel.

Macros are particularly useful in automating repetitive data manipulation tasks, ensuring consistency and accuracy in spreadsheet operations.

### Key Features of Macros

- Automates repetitive tasks, reducing manual effort.
- Enhances accuracy by minimizing human error.
- Saves time by executing predefined sequences instantly.
- Can be customized and edited using VBA for advanced functionality.
- Can be enabled or disabled based on security preferences.

### Example of Macro Usage

Consider a scenario where a school generates monthly performance reports for all teachers. Manually compiling these reports every month can be tedious and time-consuming. By creating a macro, the entire process can be automated—ensuring that all required data is formatted, analyzed, and presented efficiently without manual input.

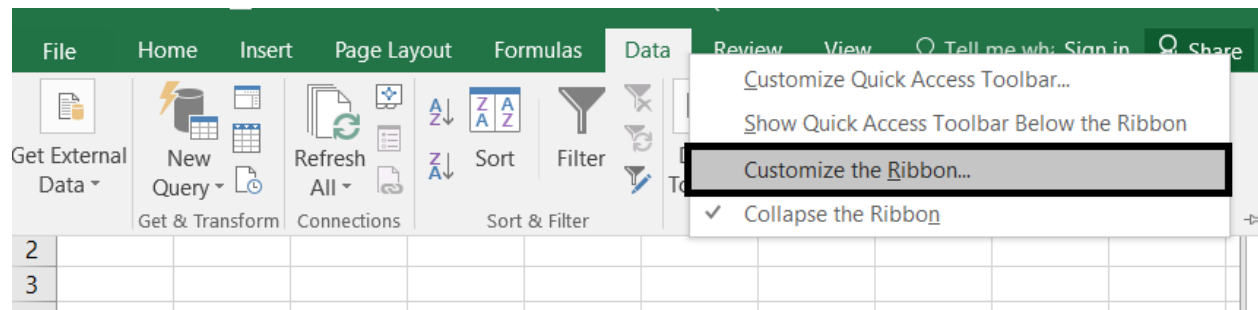
By understanding and utilizing macros, Excel users can optimize their workflow, improve productivity, and focus on more strategic tasks rather than repetitive manual operations.

**For example:** Suppose for every month, a report is to be created for all the teachers of a school. As it is a repetitive task, macros can come into action here.

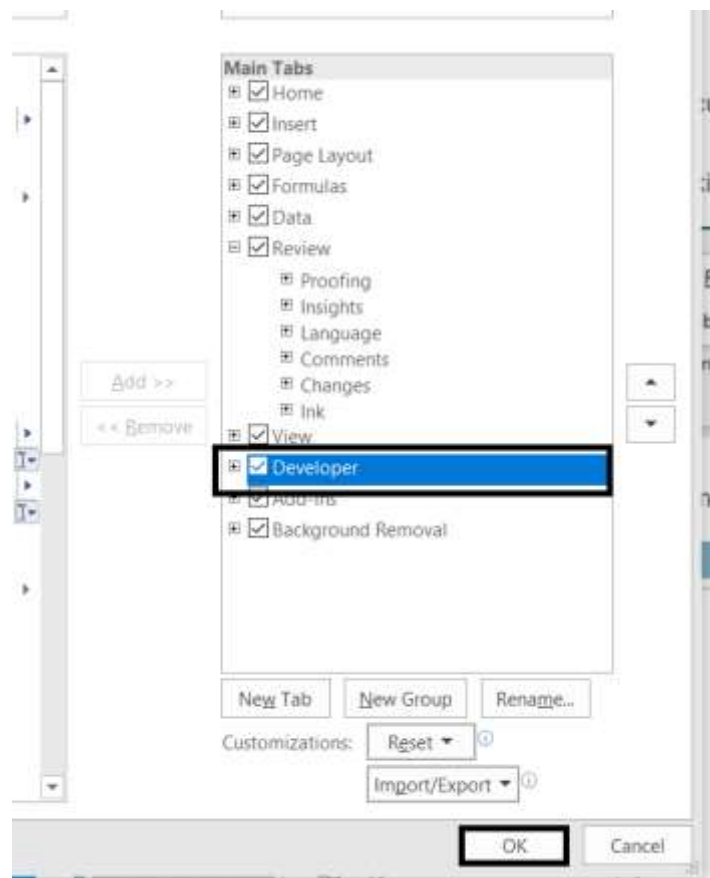
### How to Turn on the Developer Tab in Excel

The developer tab is hidden by default on the ribbon. To customize the Ribbon, Follow these steps:

### Step 1: Right-click on the Ribbon



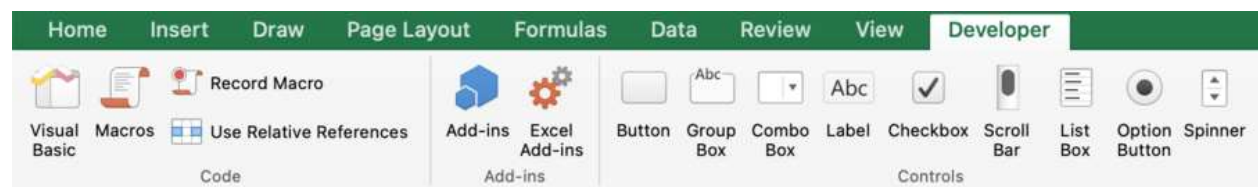
### Step 2: Navigate to Customize the ribbon and place a check on the Developer Checkbox



### How to Record a Macro in Excel

The following steps can be performed to record a macro in Excel:

### Step 1: Click on the Developer Tab in the Ribbon



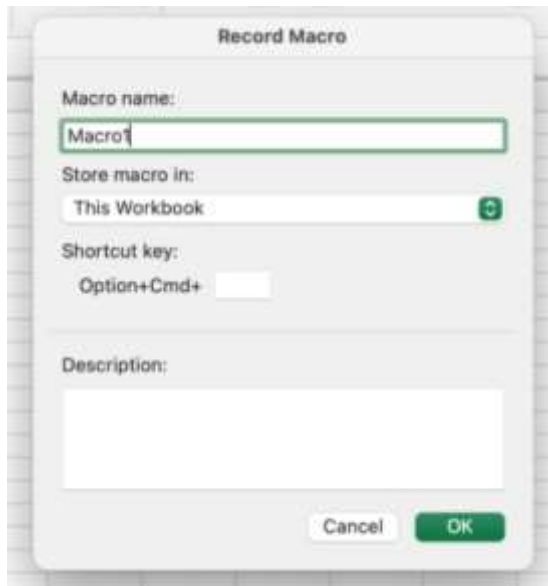
### Step 2: Click on the Record Macro

In the Code Group, the tool Record Macros is located. Click on it.



### Step 3: Fill the Record Macro Dialog Box

As macros are selected, a dialog box is opened which contains the following options to fill.

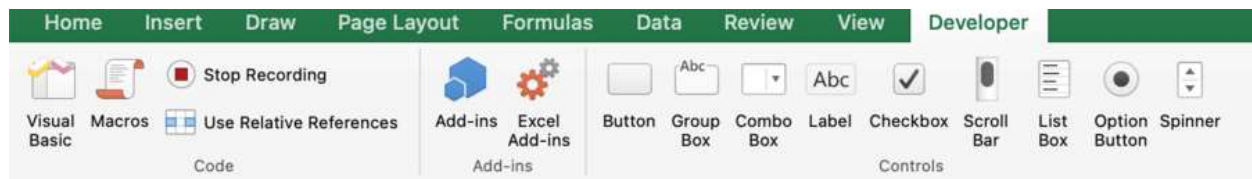


In the dialog box, enter the name of the macro in the Macro name. However, space cannot be used in the Macro name to separate the words, underscore (\_) can be used for this purpose.

**Example:** *Macro\_name*.

There are some other options also in the dialog box, i.e., where to store the macro, the shortcut key which can be used to activate the macro, and the description for the macro created. They can be filled accordingly.

- After filling in the dialog box, click on OK.
- As soon as OK is clicked, Excel Macro records the set of operations the user is practicing.
- Once, the work is done, in the Developer Tab, an option “**Stop Recording**” can be seen. Clicking on which the recording gets stopped and the created macro is saved.



## How to Run the Macro in Excel

There are different methods by which a macro can run.

### Run the Macro by Clicking on a Shape

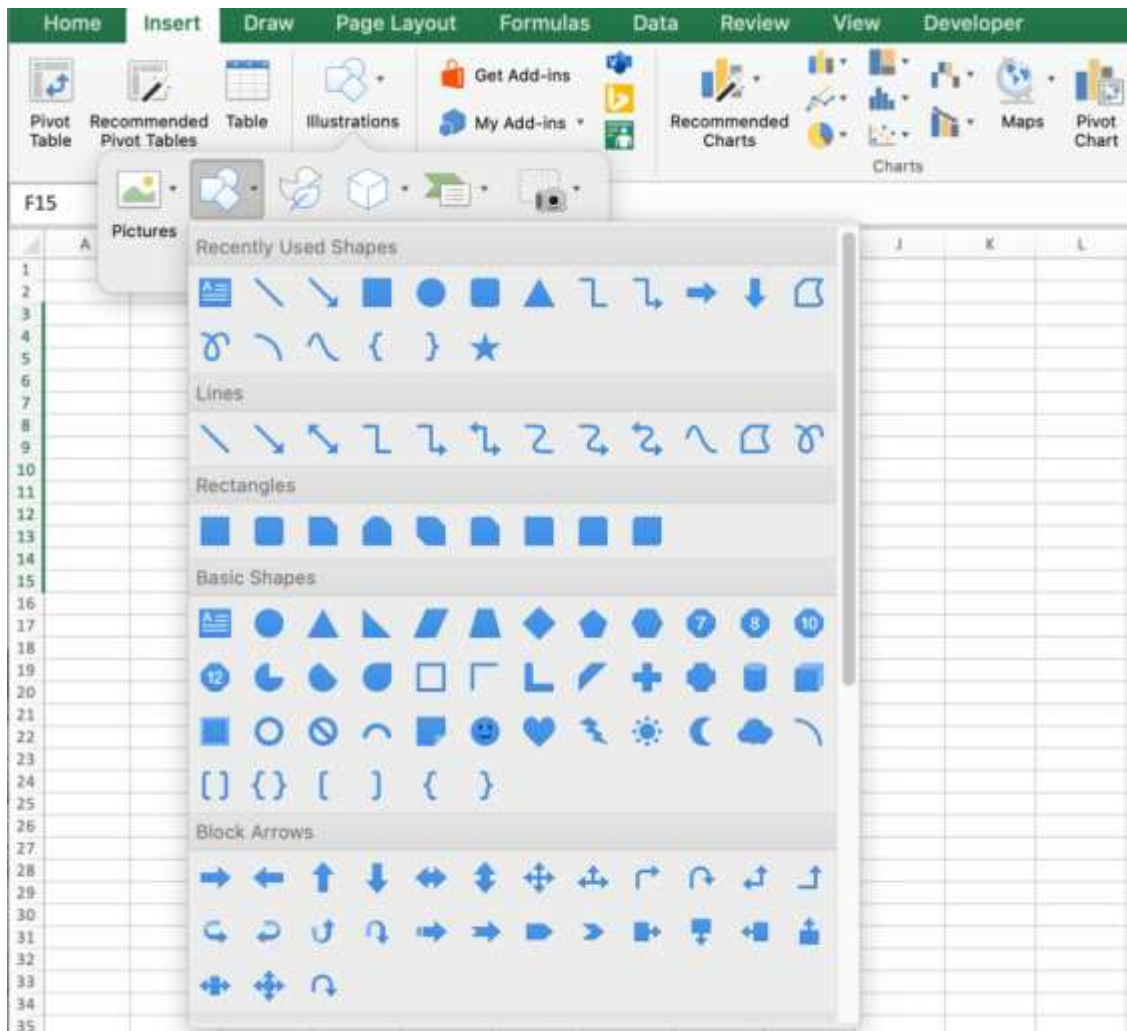
It is one of the easiest ways to run a macro to create any shape in the worksheet and use it for running the macro.

#### Step 1: Click on the Insert Tab on the ribbon



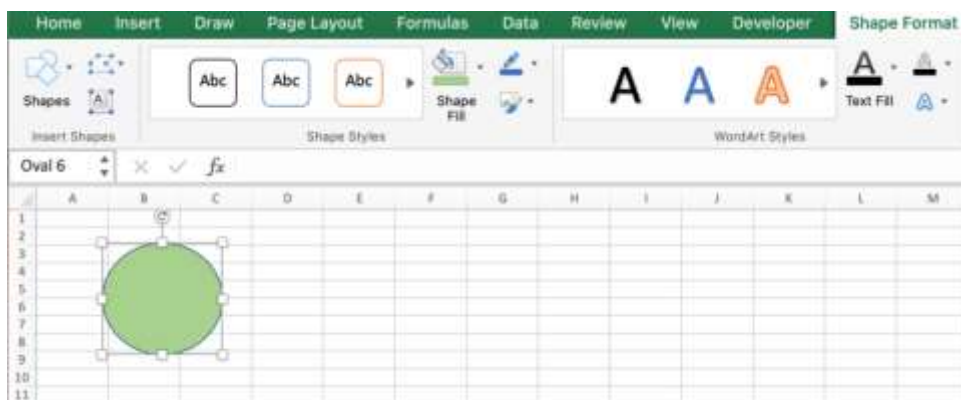
#### Step 2: Choose any Shape

Go to the Illustrations group and click on the Shapes icon. In the sheet, choose any shape we like and want it to be assigned as the macro.

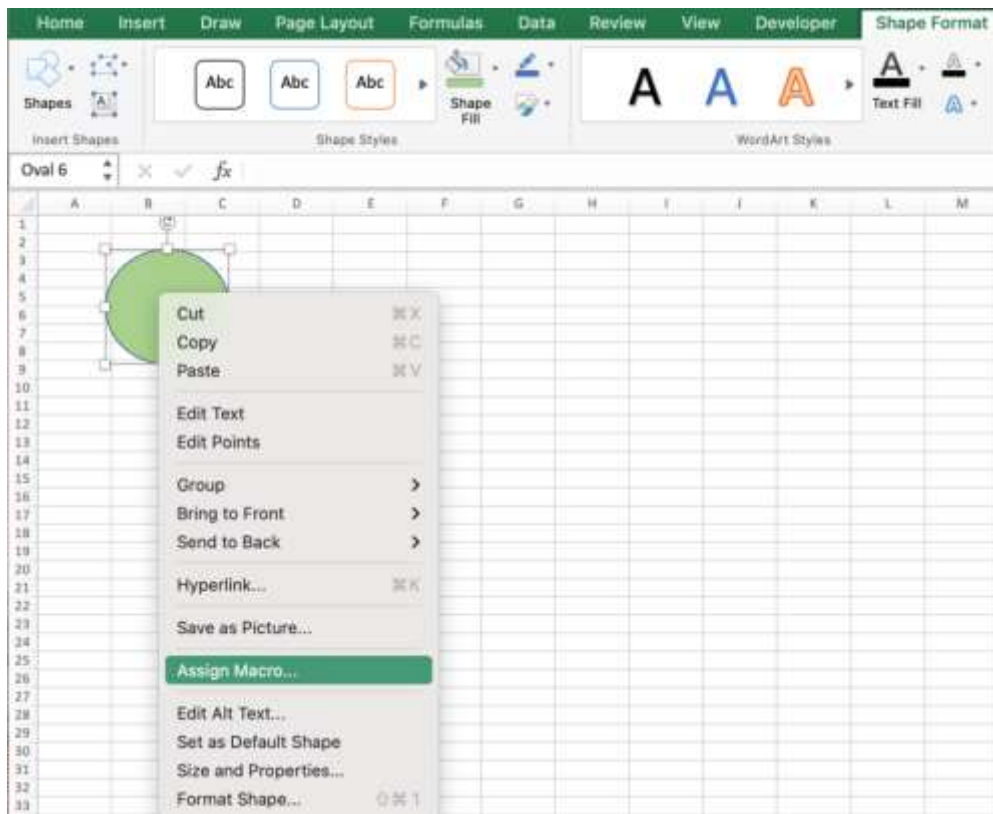


### Step 3: Add and Edit the Shape

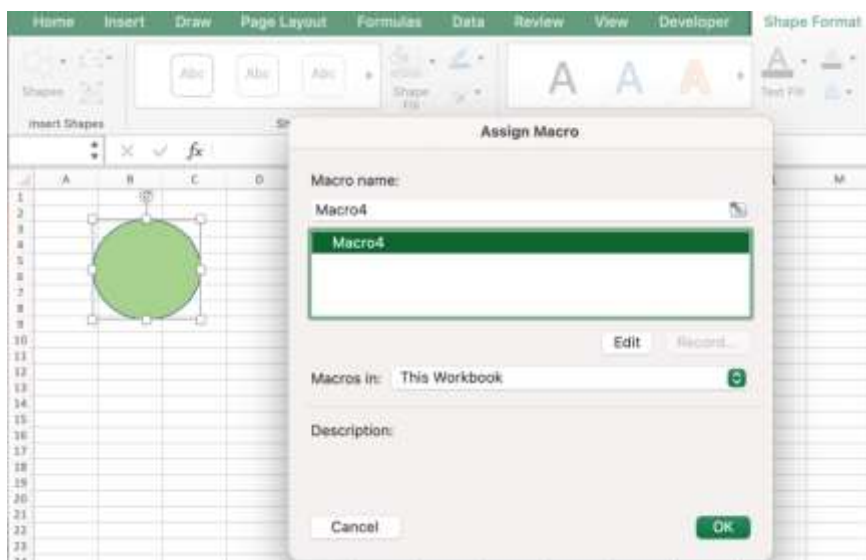
Click where you want to add the shape in the sheet and the shape will automatically get inserted. The shape can be resized or re-formatted accordingly to the way you want. Text can also be added to the shape.



### Step 5: Right Click on the Shape and Click on Assign Macro



After right-clicking on the shape, another dialog box of Macro would be opened.



### Step 6: Now Select the Macro

In the dialog box, select the macro from the list you want to assign to your shape and click the OK button. Now the shape would work as a button and whenever you click on it, it will run the assigned macro.

## How to Run Macro by clicking a button

While the shape is something you can format and play with it, a button has a standard format. A macro can also be assigned to a button for easy use and then can run the macro by simply clicking that button.

### **Step 1: Go to the Developer Tab on the Ribbon**



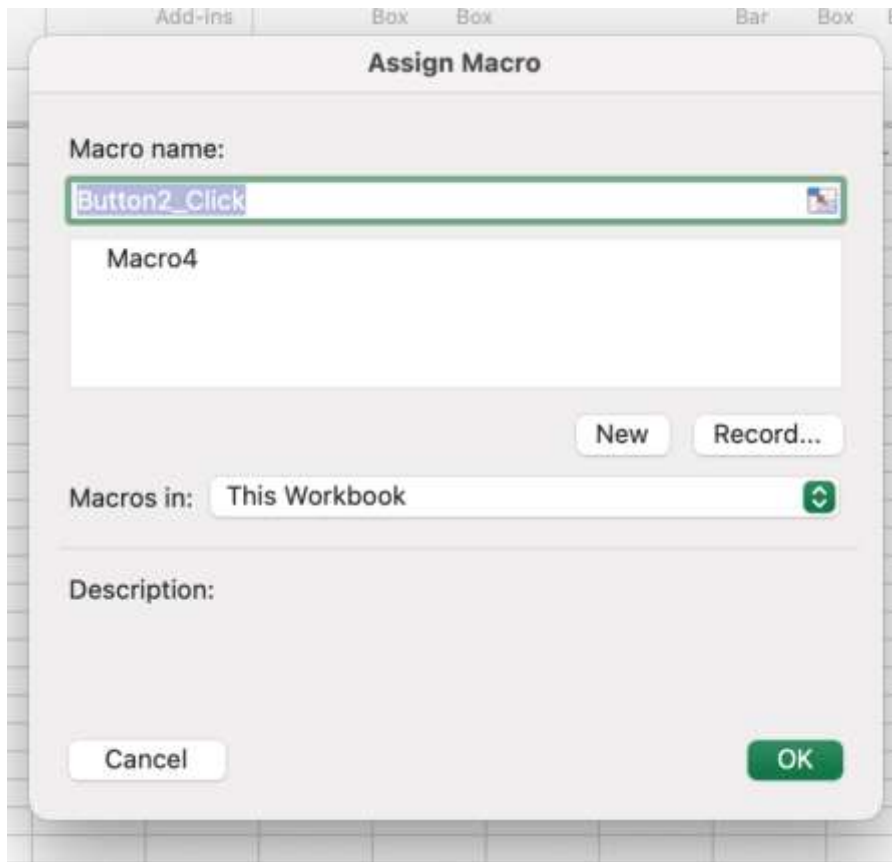
### **Step 2: In the Controls group, click on the Button Tool**



### **Step 3: Click on the Excel Sheet and Fill the Details in the Dialog box**

Now, click anywhere on the Excel sheet. As soon as you do this, the **Assign Macro** dialog box would be opened.



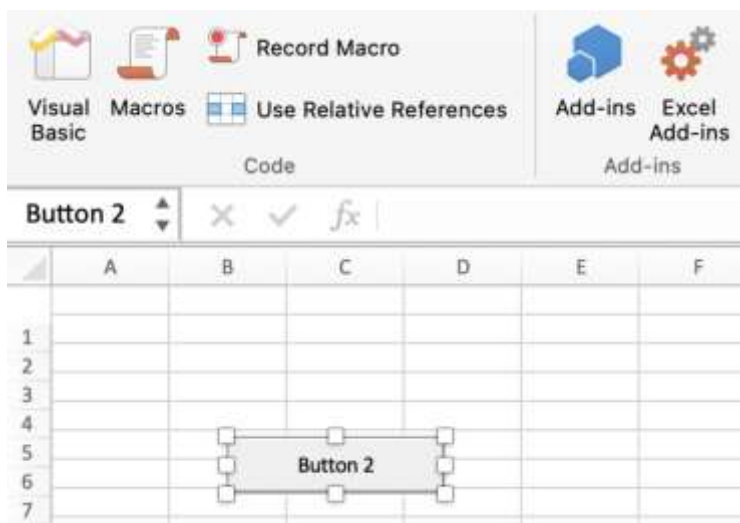


#### Step 4: Select the Macro you want to Assign and Click OK

Select the macro you want to assign to that button and fill in the other options. Then click on **OK**.

#### Step 5: Preview the Shape

After that, a rectangular button can be seen on the sheet, and ready to be used.

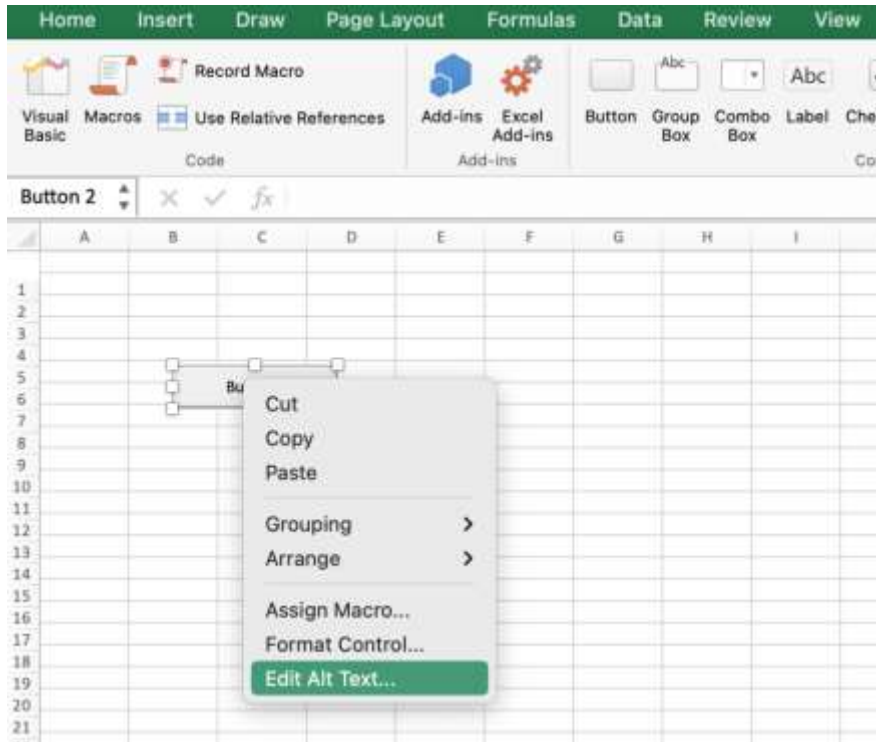


#### Step 6: Format the Button



The button which appears on the sheet has default settings, and you can't format it like the color, or shape of the button.

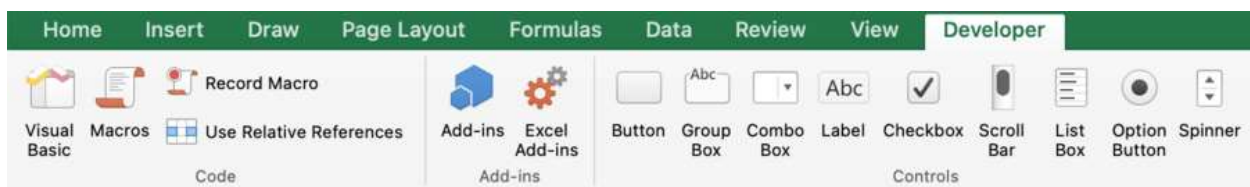
However, the text which appears on the button can be changed. Just a right-click on the button and a dialog box would open. Click on Edit Alt Text and change the text.



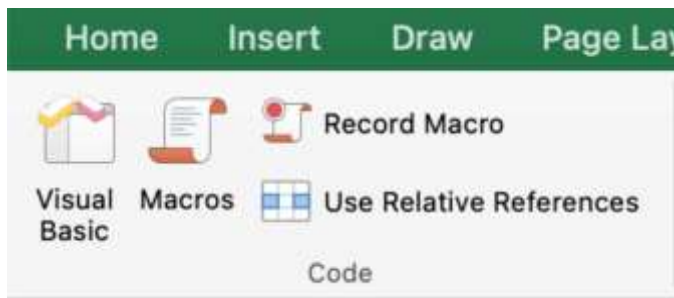
### How to run a Macro from Excel Ribbon (Developer Tab)

If you have multiple macros in the workbook defining different tasks, you can see a list of all the macros in the Macros dialogue box and it makes it easy to run multiple macros from a single list.

#### Step 1: Go to the Developer Tab on the Ribbon

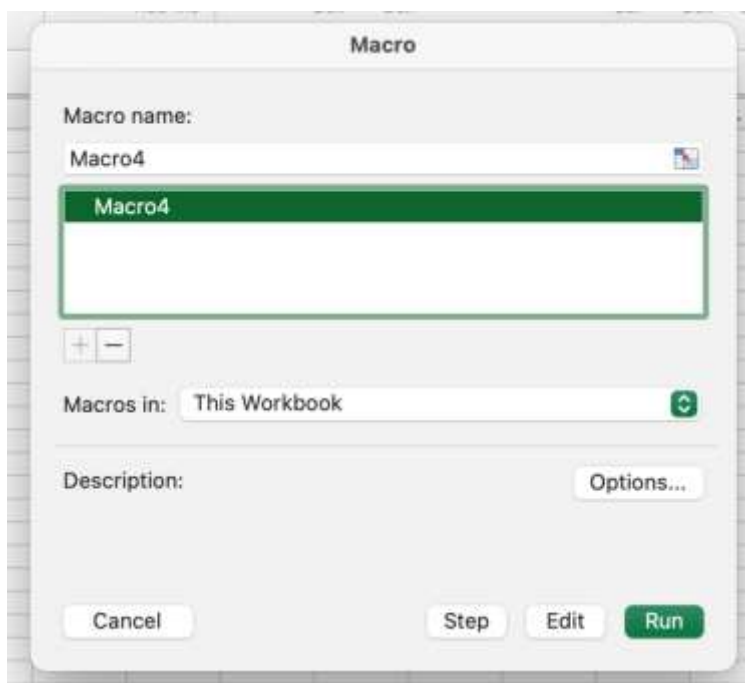


#### Step 2: Then in Code Group, click on the Macros Tool



### Step 3: Select the Macro that you want to Run

A dialog box would be opened containing the list of all the macros created in that particular workbook.

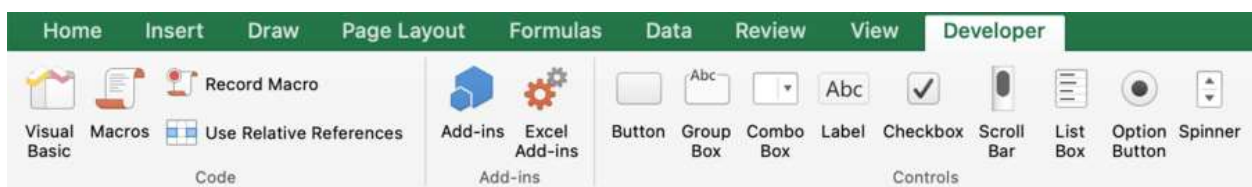


### Step 4: Click Run

## How to Create Macro in VBA Editor

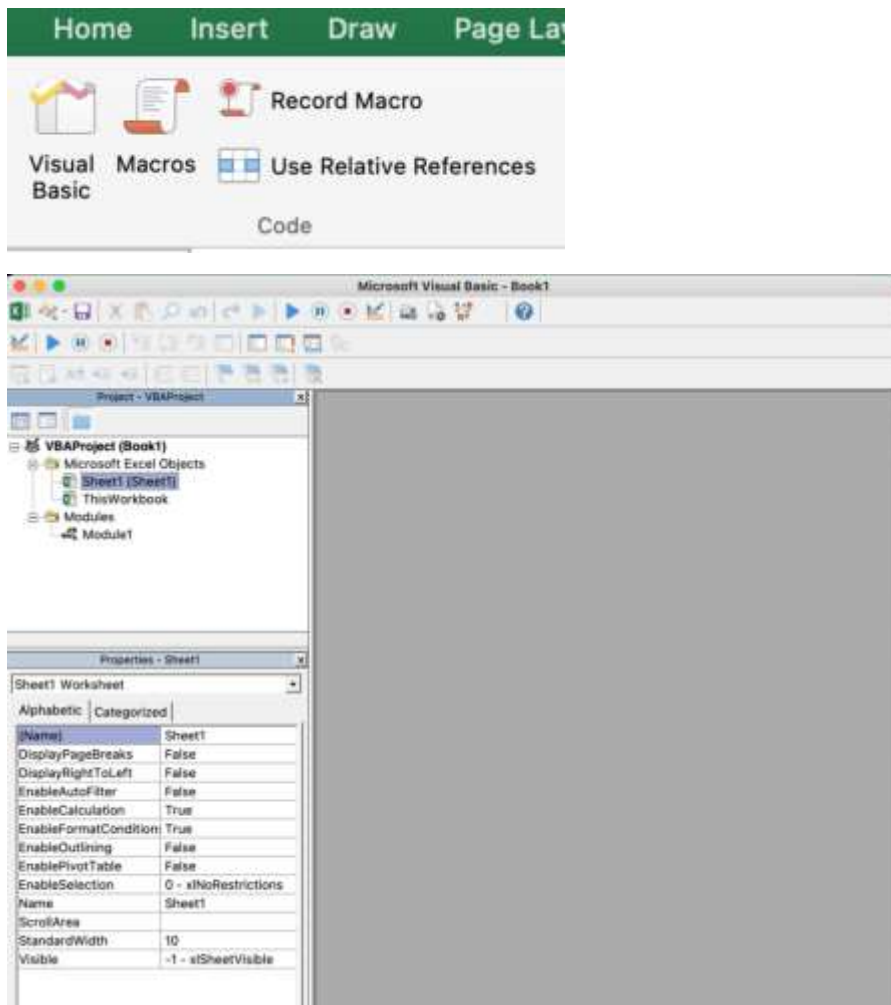
If the user and creator of the macros are the same, then instead of spending time creating buttons and shapes, we can directly run the macro from the VBA Editor.

### Step 1: Go to the Developer Tab on the Ribbon



### Step 2: Click on the Visual Basic

In the Code Group, click on Visual Basic and a new window would be opened.



### Step 3: Click on Run Macro

Then click on the Run Macro sign, it will open a dialog box listing all the macros of that workbook.

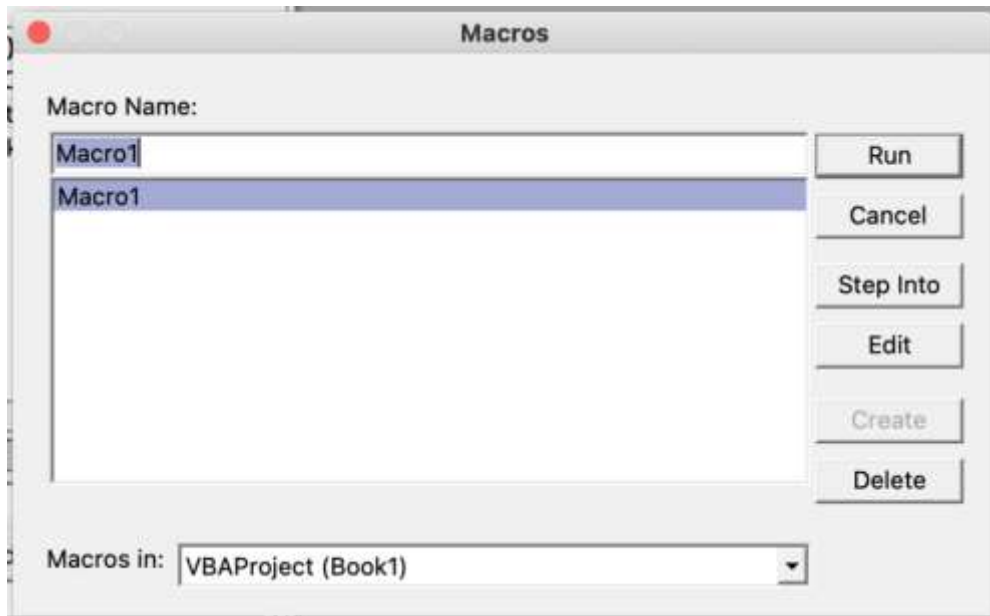


### Step 4: Select the Macro from the list

Select the macro you want to run from the list and click Run.

*As soon as Run is clicked, the macro would be executed on the excel-sheet. If you can only see the VB Editor window and not the sheet, then you may not see the changes happening in the worksheet.*

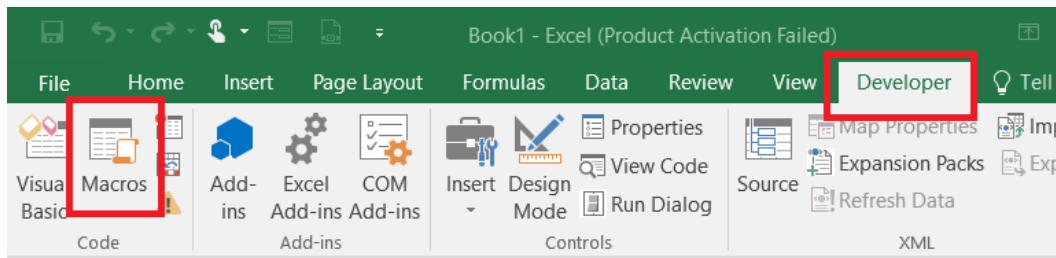
To see the changes, minimize/close the VB Editor window. You can also edit a macro as per your need.



### **How to View Macros in Excel**

**Step 1:** Open Microsoft Excel

**Step 2:** Click on the Developer Tab

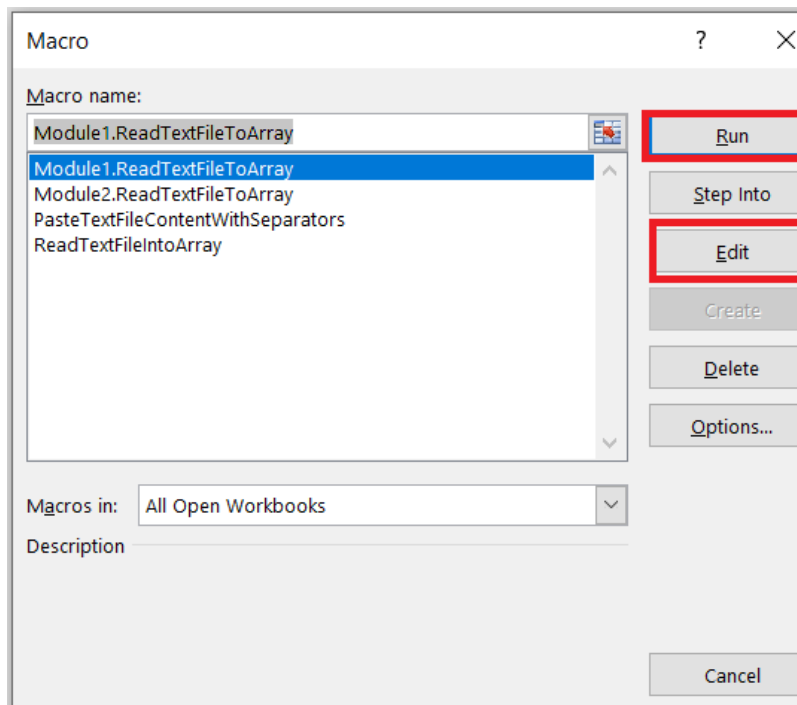


**Step 3:** Click Macros to see a list of available macros in the active workbook

**Step 4:** Select a Macro to View

**Step 5:** You can run or edit the macro from here if needed.

**Step 6:** Close the Macro dialog when you're done



## **How to Save the Recorded Macros in Excel**

**Step 1:** Record your Actions

**Step 2:** Click on Stop Recording

**Step 3:** Save your workbook as “.xlsm” (macro-enabled)

**Step 4:** Your macro is now saved in the workbook

## **How to Use the VBA Editor in Excel**

Unlock the full potential of Microsoft Excel by diving into the world of Visual Basic for Applications (VBA). The VBA Editor in Excel is a powerful tool that allows you to automate tasks, create custom functions, and streamline your workflow like never before. Whether you're looking to boost productivity, develop advanced macros, or enhance your data analysis capabilities, learning how to use the VBA Editor in Excel is essential. In this guide, we'll walk you through the steps of how to view and run VBA code in Excel, providing you with the skills needed to transform your Excel experience. By learning the VBA Editor, you can save time, reduce errors, and gain a competitive edge in the workplace. Let's explore how to harness the power of VBA to make your Excel tasks more efficient and effective.

## **What is Visual Basic Editor in Excel**

Visual Basic for Application is a programming language that allows you to automate tasks, create custom functions, and build interactive applications within Excel. VBA is an interface for creating scripts. If you have done any programming in the integrated development environment (IDE), the

VBA editor in Excel looks similar. It lets you create, manage, and run VBA code through VBA editor on your Excel Spreadsheet.

### **What are Visual Basic Editor User Interface**

The VBA interface is a user-friendly interface with various components that helps you to work with VBA code efficiently. Below are some elements:

#### **Toolbar and Menu Bar**

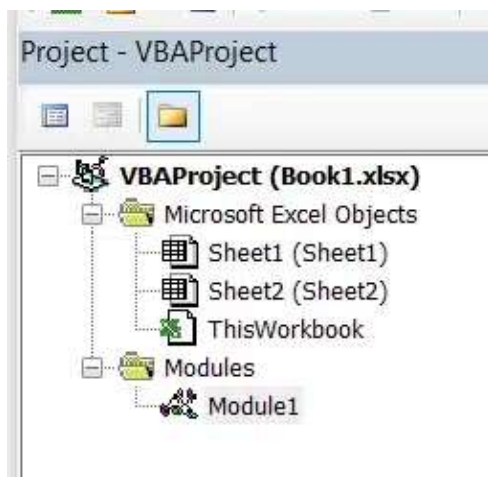
VBA Editor consists of a standard toolbar as well as a Menu bar same as other Windows applications. The toolbar provides quick access to common actions, such as running or stopping the code from being executed.



*Toolbar and Menu Bar*

#### **Project Explorer**

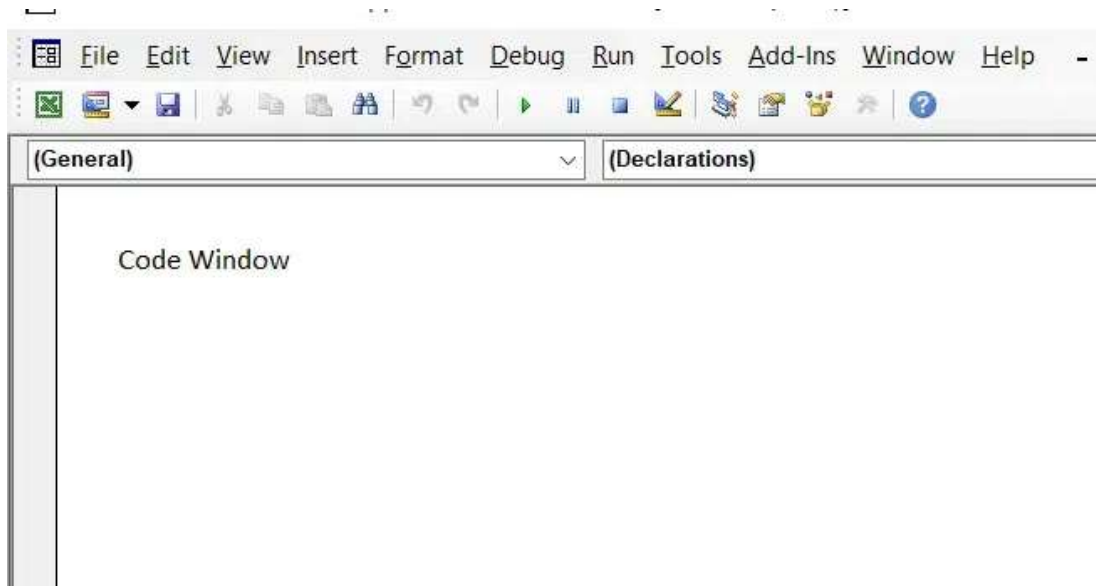
You can find the Project Explorer window in the left pane of the VBA editor. This will display a hierarchical view of all the open workbooks and their components in the current Excel Session.



*Project Explorer*

#### **Code Window**

Code Window is the central part of the VBA Editor. Here you can write, edit, and view your VBA code. This window is specific to the module in the Project Explorer.



*Code Window*

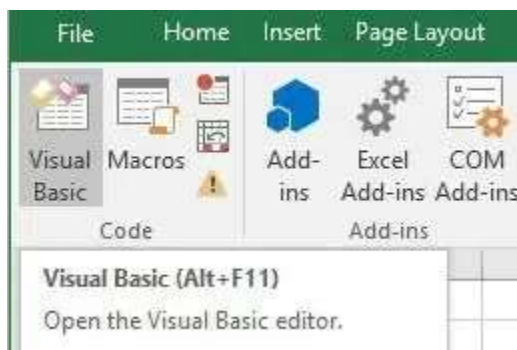
### **Immediate Window**

The immediate window is located at the bottom of the VBA Editor. It is used to execute single lines of code and view the results in real time. This will help you in testing and debugging.

### **How to Open Visual Basic Editor in Excel**

#### **Step 1: Select Developer Tab in Excel and Click on Visual Basic**

Select the “**Developer**” ribbon and then click on Visual Basic.

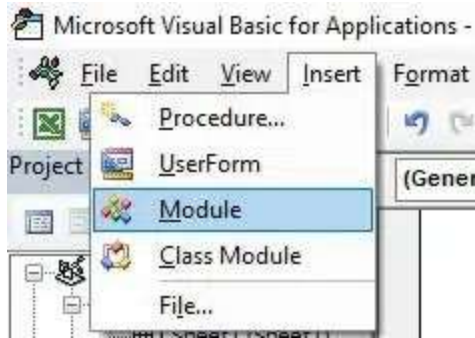


*Select Developer*

**Shortcut Key:** Press “**Alt+F11**” to get the VBA editor.

#### **Step 2: Click on Insert tab and Select Module**

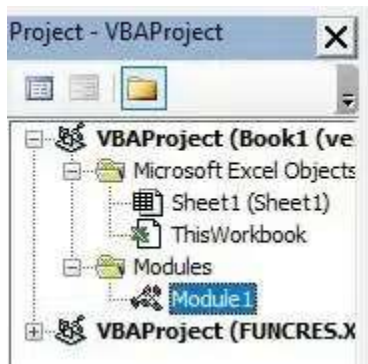
To insert a module in the VBA editor, select the **Insert** tab and then click on Module.



*Click on Insert tab >> Select “Module”*

### Step 3: Module 1 Added

**Module 1** will be added to the Modules of **Project- VBAProject**.



*Module 1*

**Note:** If the Modules folder does not exist in the VBAProject, it will be automatically created, and a new module will be added inside it. In this designated folder you can store your Excel VBA code after you are prepared to write it.

### How to Open Visual Basic Editor in Excel

The Excel VBA Editor serves as the central hub within any Microsoft Office application for handling all automation-related coding tasks. It offers versatile functionality:

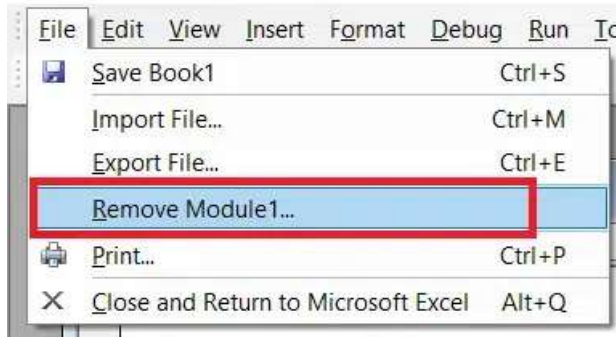
- **Macro Creation:** It can be utilized for crafting macros, achieved through code composition within the VBA Module or Sheet, or by recording macros.
- **File Integration:** The written code can also be employed to establish connections between various files of diverse extensions.”

### How to Delete a Module in VBA Excel

#### Step 1: Right Click on the left pane and Select Remove Module

To delete a module, right-click it on the left pane and choose the option “**Remove[module name]**”.

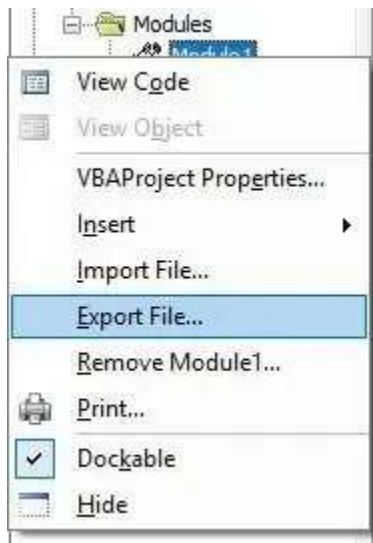




*Go to the File Tab >> Select “remove Module”*

## **How to Export a VBA module from Excel**

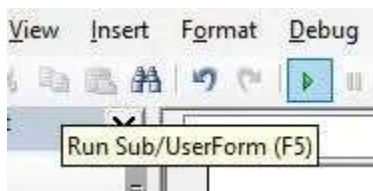
If we want to save the module on the computer then we can right-click on Module1 to select **Export File**.



*Select Export File*

## **How to Run Macro in VBA Excel**

**Step 1: Click on Run Macro to run the VBA code.**



*Click on Run Sub*

**Shortcut Key to Run VBA in Excel: Press F5 Key**

## **How to Debug a Macro in Excel**

While working with VBA code, you may face errors or unexpected behavior. VBA editor consists of several tools to debug your code and also handle them effectively. A few of them are listed below:

### **Breakpoints**

Users can set breakpoints in their code to pause execution at specific lines. Setting breakpoints in your code will closely examine variable values and step through the code line by line. This will help in effective debugging, as the user can observe how the program is behaving at critical points and can identify any issues.

### **Immediate Window**

Immediate Window is a feature that can be used for testing purposes and it also interacts with your code in real time. Users can print values, executes every single line of code, and check for errors.

### **Error Handling**

It is very important to write error-handling routines in your VBA code to manage unexpected errors gracefully. If something goes wrong during the execution, your code can handle it and continue running smoothly.

### **How to Open VBA editor on Microsoft Excel for Mac Shortcut**

- *Use keyboard shortcuts to open the VBA Editor: On Windows, press Alt + F11, and on Mac, press Opt + F11 or Fn + Opt + F11.*
- *It works even without the developer tab on the ribbon.*

By mastering the VBA Editor in Excel, you open up a world of possibilities for automation, customization, and efficiency. With the skills to create powerful macros and bespoke functions, you can significantly reduce your workload and enhance your data processing capabilities. As you become more proficient with VBA programming, you'll be able to tackle complex tasks with ease and impress your colleagues with your advanced Excel expertise. Remember, the key to leveraging VBA effectively lies in continuous practice and exploration. Start automating your daily tasks today and watch your productivity soar.

## Suggestion for Further Reading

### 1. Spreadsheets and Data Management (Excel Proficiency)

- **“Microsoft Excel Bible”** – John Walkenbach  
*A comprehensive guide to mastering Excel, covering everything from basic operations to advanced data analysis and automation.*
- **“Excel Formulas & Functions for Dummies”** – Ken Bluttman  
*A user-friendly resource explaining essential formulas, functions, and data analysis techniques.*
- **“Excel Power Query & Power Pivot For Dummies”** – Michael Alexander  
*Explores advanced data transformation and analysis tools in Excel, essential for financial modeling.*
- **“Excel Data Analysis For Dummies”** – Stephen L. Nelson  
*Focuses on using Excel for data analytics, filtering, pivot tables, and conditional formatting.*

### 2. Financial Modeling and Reporting

- **“Financial Modeling” (4th Edition)** – Simon Benninga  
*A structured introduction to financial modeling techniques using spreadsheets.*
- **“Financial Modeling in Excel for Dummies”** – Danielle Stein Fairhurst  
*A practical approach to building financial models, covering forecasting, sensitivity analysis, and more.*
- **“Principles of Financial Modelling”** – Michael Rees  
*Teaches best practices in financial modeling and structuring financial reports.*
- **“Mastering Financial Modelling in Microsoft Excel”** – Alastair Day  
*Provides step-by-step guides to building financial models using Excel.*

### 3. Data Analysis and Business Intelligence

- **“Data Smart: Using Data Science to Transform Information into Insight”** – John Foreman  
*A practical book on data analytics, covering topics such as regression, clustering, and optimization using spreadsheets.*
- **“Business Analytics: Data Analysis & Decision Making”** – S. Christian Albright, Wayne L. Winston  
*Explores real-world applications of data analytics in finance and business decision-making.*
- **“Analyzing Data with Power BI and Power Pivot for Excel”** – Alberto Ferrari, Marco Russo  
*A deep dive into Power BI and Power Pivot for building business intelligence dashboards.*

#### 4. Accounting and Digital Finance

- **“Accounting Information Systems”** – Marshall B. Romney, Paul J. Steinbart  
*Covers the role of digital technologies in accounting, including financial automation and cybersecurity.*
- **“Blockchain and the Future of Finance”** – Henri Arslanian, Fabrice Fischer  
*Explores the impact of blockchain, cryptocurrencies, and decentralized finance on traditional accounting.*
- **“FinTech Handbook for Accountants”** – Tsedal Neeley  
*Focuses on financial technologies shaping the accounting profession.*
- **“Digital Transformation in Accounting”** – Al Bhimani  
*Explores how digital technologies like AI, blockchain, and automation are reshaping accounting.*

#### 5. Macros, VBA, and Automation

- **“Excel VBA Programming for Dummies”** – Michael Alexander, John Walkenbach  
*An easy-to-follow guide for automating tasks using VBA in Excel.*
- **“Excel Power Programming with VBA”** – Michael Alexander, Dick Kusleika  
*A deep dive into Excel’s VBA capabilities, including automation and macro development.*
- **“Mastering VBA for Microsoft Office 365”** – Richard Mansfield  
*Covers advanced VBA techniques across Microsoft Office applications, including Excel.*

#### 6. Business Strategy and Financial Leadership

- **“Financial Intelligence: A Manager’s Guide to Knowing What the Numbers Really Mean”** – Karen Berman, Joe Knight  
*A practical guide to understanding financial statements and data-driven decision-making.*
- **“The Intelligent Investor”** – Benjamin Graham  
*A must-read for financial professionals focusing on investment strategies and risk management.*
- **“The CFO Guidebook: Third Edition”** – Steven Bragg  
*A detailed guide on financial management, forecasting, and corporate finance strategies.*

#### 7. Online Courses and Resources

- **Coursera** – Offers courses like:
  - *“Financial Engineering and Risk Management”* – Columbia University
  - *“Business Analytics with Excel”* – University of Pennsylvania
- **edX** – Free and paid courses on:
  - *“Finance & Accounting Digital Transformation”* – Harvard Business School
- **Udemy** – Practical courses on:
  - *“Excel Data Analysis and Dashboard Reporting”*
  - *“Excel VBA and Macros for Beginners”*



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