IT at SCHOOL

Computer Literacy Program - Book 6

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This is the first version of the book and could contain not only omissions, but also areas of improvement. We request the reader to excuse us for the omissions, but please do bring to our notice any feedback for correction and improvement in subsequent versions. We will remain grateful to you for your support and feedback. You can write to **'Tamil Nadu Arya Samaj Educational Society'** 212-213, Avvai Shanmugam Salai, Gopalapuram, Chennai – 600 086 or email to publications@davchennai.org. You may also write to us to seek permission to print all or only certain chapters of the book.

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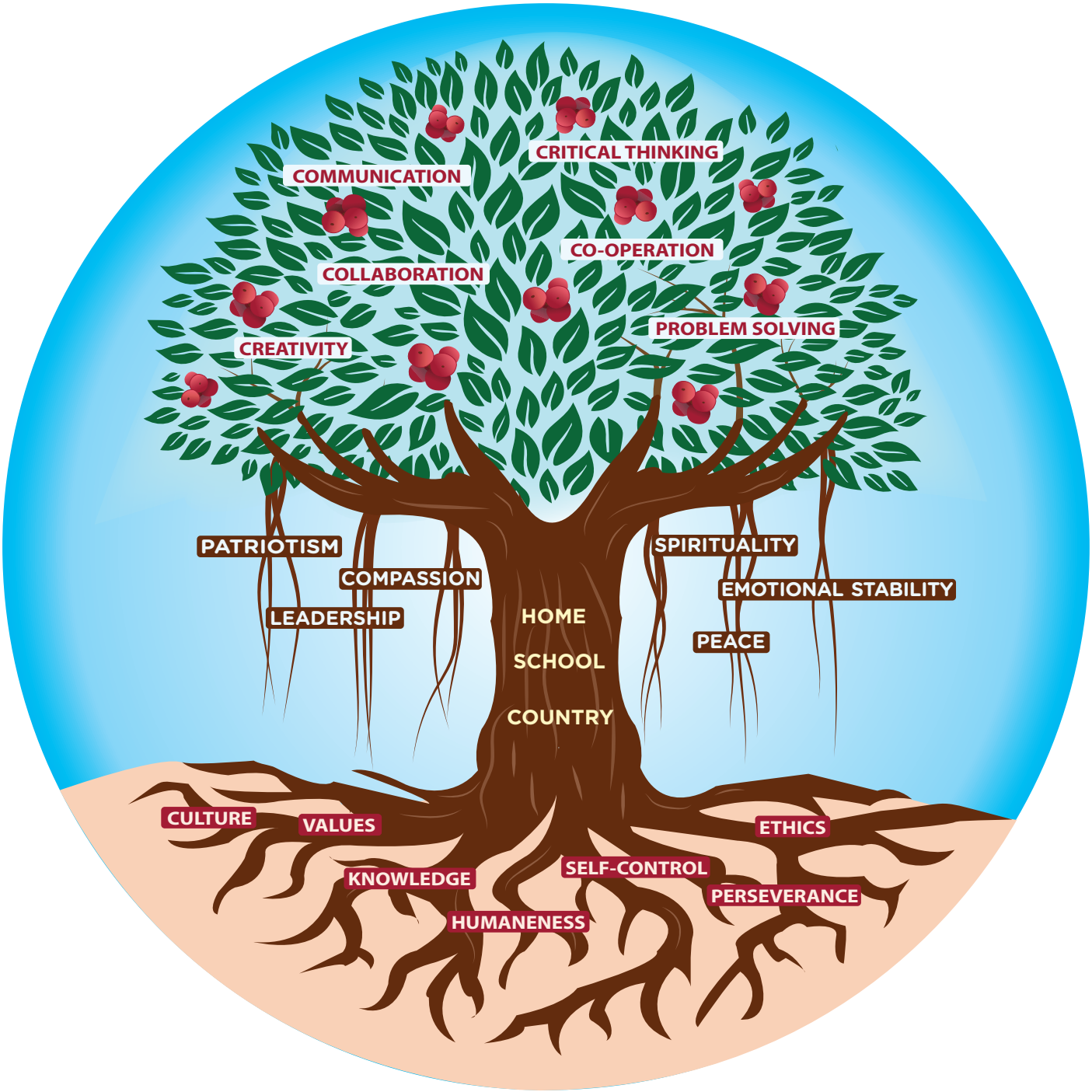
CRITICAL THINKING
COMMUNICATION
CO-OPERATION
COLLABORATION
PROBLEM SOLVING
CREATIVITY
PATRIOTISM
SPIRITUALITY
COMPASSION
EMOTIONAL STABILITY
LEADERSHIP
HOME
SCHOOL
COUNTRY
PEACE
CULTURE
VALUES
ETHICS
SELF-CONTROL
KNOWLEDGE
PERSEVERANCE
HUMANENESS

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CHAPTER 1

INTRODUCTION TO MS EXCEL 2013

ESSENTIAL LEARNING OBJECTIVES

1.1 STARTING A EXCEL PROGRAM
1.2 BASIC SPREASDSHEET ELEMENTS
1.3 NAVIGATING IN A WORKSHEET
1.4 SAVING A WORKBOOK
1.5 OPENING A WORKBOOK
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1.7 COPYING AND PASTING FORMULAS AND FUNCTIONS
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1.16 TAB COLOURS
1.17 CHARTS
1.18 FINDING AND REPLACING DATA
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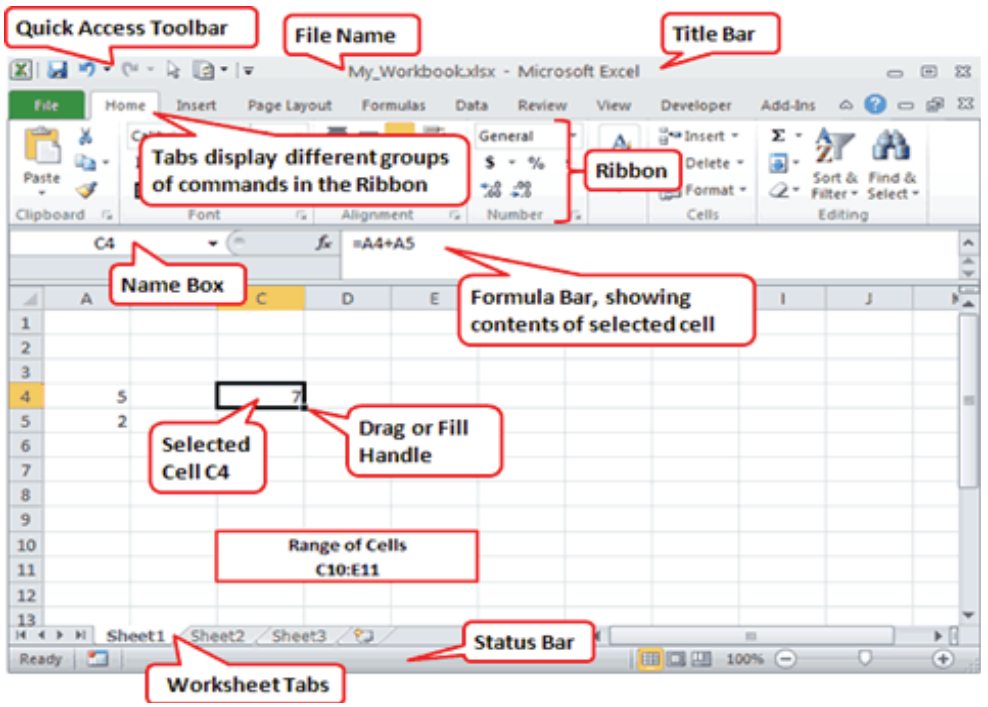
INTRODUCTION TO MS EXCEL

There are different spreadsheet programs available like Microsoft Excel, Lotus 123, etc. A spreadsheet is defined as a large sheet which contains data and information arranged in rows and columns. Data is entered in a cell, which represents the intersection of a row and a column. The most powerful feature of a spreadsheet is that it automatically recalculates the result of mathematical formulas if the source data changes. A spreadsheet can help us quickly record and manipulate a large amount of numerical information and share it with others in a wide variety of forms. Spreadsheets, also known as worksheets, allow us to perform detailed analysis on numerical data.

1.1 STARTING A EXCEL PROGRAM

There are number ways available to start MS Excel. The most common way to start MS Excel is given below:

1. Click Start button
2. Click All Programs
3. Click MS Office
4. Click on MS Excel



A Blank spreadsheet as shown in this figure is seen here.

DID YOU KNOW?

An excel sheet is quite big with **17.2 billion** cells in it alone!!!

1.2.1 1.2 BASIC SPREASDSHEET ELEMENTS

1.2.1 WORKBOOK AND WORKSHEET

Excel spread sheet file is known as a **workbook** and is has a default extension name .**xlsx**. Each workbook can contain many sheets, so various kinds of related information can be organised in a single file. Each workbook can contain up to 255 worksheets, but by default it displays only three. **Worksheet** is the area where the data is stored and work is performed. Extra worksheets can be added as and when required. A workbook can also have sheets that show charts – and these sheets are called chart sheets.

1.2.2ROWS, COLUMNS AND CELLS

The Excel Worksheet is made up of rows and columns. The horizontal arrangement of cells is called as a row and the vertical arrangement of cells is called as a column. The rows in a worksheet are numbered from top to bottom along the left side of the worksheet. The columns are labelled from left to right with letters along the top of the worksheet. . The total number of rows in Excel are 1048576 and the total number of columns are **16,384**. Columns are named from **A to XFD**. The rows are numbered from **1** to **1048576**.

A **Cell** is the intersection of a row and a column. Every cell is identified by a cell **address** that consists of the column name followed by the row number. For example, the first cell is referred to as **A1**, which indicates that cell lies at the intersection of the column A and row 1. One cell in the worksheet has a **dark border** around it and is referred to as the active/ selected cell. All the action in the worksheet happens in the active cell. You can click the cell to make it the active cell. The active cell is ready for accepting any action or input. A small group of contiguous cells is defined as a **range**. The

range is referred to by writing the starting address of the cell in the range: Ending address of the cell in a range or vice versa. **For example** A1:A10 (can also be referred as **A10 : A1**).

1.3 NAVIGATION

1.3.1 NAVIGATING IN A WORKSHEET

There are a numbers of ways that you can use to navigate in the worksheet. 1) The **cursor keys**, 2) **mouse** and 3) the **scroll bars** can be used to navigate through the worksheet. However, navigating through the **1048576** rows and **16,384** rows and columns using these techniques is very inefficient. **Shortcut keys** are more efficient and can be used to move to any cell directly without scrolling through the entire worksheet. Some

Method 1 : Using key combinations

MOVEMENT	KEY STROKE
One cell up	Up arrow (↑)
One cell down	Up arrow (↓)
One cell left	Up arrow (←) or Shift + Tab key
One cell right	Up arrow (→) or Tab key
Cell A1	Ctrl + Home
End of the worksheet (last cell containing data)	Ctrl + End
End of row	Ctrl + right arrow
End of column	Ctrl + down arrow

Method 2 : Using the Name Box

1. Type the cell address in the Name Box
2. Press ENTER to reach the desired cell.

For example, to move to cell D6, enter D6 in the Name Box and press ENTER. The cursor is positioned on the cell in the D column and 6th row.

Method 3 : Using the Go To

1. Press F5 or CTRL + G or choose Go To option from the Edit menu to invoke the Go To dialog box.
2. Enter the cell coordinates in the Reference textbox.
3. Click OK to move to the desired cell.

1.3.2 NAVIGATING BETWEEN WORKSHEETS

To move between worksheets, simply click on the sheet number in the lower left corner of the screen . In case the number of worksheets is more than the number which can be displayed use the tab scrolling buttons, located next to the sheet numbers and then click on the sheet number to select it.

The tab scrolling buttons and their use are given below:

ICON	MOVEMENT
▶|	To display the last worksheet
|◀	To display the first worksheet
▶	To display adjacent worksheets on the right
◀	To display adjacent worksheets on the left

1.4 SAVING A WORKBOOK

There are a numbers of ways that you can use to save a workbook. The most common method to save a Workbook is given below:

1. Click File tab
2. Click Save or Click on the Save button on the Quick access Toolbar or Close the workbook by clicking on the Close button. (Follow the steps 3 to 6 if the file is already not saved.)
3. Click Browse
4. Select the directory in which the file is to be saved.
5. Type the name of the file in the File Name text box.
6. Click **Save**.

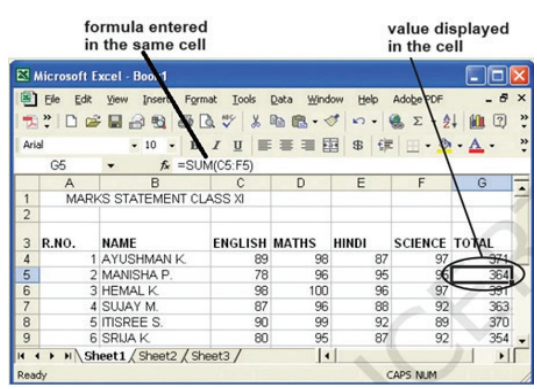
1.5 OPENING A WORKBOOK

There are a numbers of ways that you can use to open a workbook. The most common method to oprn a Workbook is given below:

1. Click File Tab
2. Choose Open option or Click on the Open button on the Quick access Toolbar.
3. Click Browse
4. Select directory in which the file has been saved.
5. Type /Select the name of the file to open.

1.6 USING FORMULAS AND FUNCTIONS:

A formula is an expression that operates on values in a range of of cells. Formulas are mathematical equations that perform calculations and data analysis on the contents of the cells. Formulas can be as simple as adding a column of numbers together or as complex as a statistical graph of a data set. They can be incredibly useful when you want to turn spreadsheet data into meaningful information for driving business decisions.



DID YOU KNOW?

The cell will ***Automatically recalculate*** the value of a formula when **cell reference** is used in the formula**.**

1.6.1 ENTERING FORMULAS:

All formulas in Excel start with the equal sign (=) - and build from there. The formula consists of the coordinates of the cells that are used in the formula, operators and functions. Formulas **must begin with an = sign,** otherwise it is **treated as a text entry.**

1.6.2USING ARITHMETIC OPERATORS

To add the numbers in two cells together, first click the on the target cell where you want the total to appear. Then type = in the cell to start the formula. Next type or click the cell - to refer to the cell containing the number - here it is A1, A1 will appear next to the equal sign in the formula. Type + next to the first cell reference- A1. Then click the cell that contains the second number you want to add, here it is A2 and its cell reference (such as A2) will appear next to the + sign. The full syntax for the formula to add the values in cells A1 and A2 is:

=A1+A2

Note that in addition to appearing in the target cell, the **formula** also appears in the **formula bar** directly above the worksheet. Once you've inserted the initial = sign in the target cell, you can type your formula in the formula bar. It's sometimes easier to see the whole formula and work with it in the formula bar than down in the worksheet page.

If you wanted to add additional numbers to your total, you'd type another + sign, select another cell, and so on. Once your formula is complete, press ***Enter***, and the **result** appears in the **target** cell.

Subtraction, multiplication, and division calculations work the same way. You simply change the ***operator*** — the symbol that tells Excel what math operation you want to perform — from the + sign to the – sign for subtraction, the * sign for multiplication, or the / sign for division.

1.6.3 FUNCTIONS

A **function** is a **predefined formula** that performs calculations using specific values in a particular order. A function will simplify the formulas that you should type in manually. There are a number of functions available in Excel.

The general form of writing a function

1. Use an equal to sign (=) to begin a formula.
2. Specify the function name.
3. Enclose arguments (data values that is/are calculated by the function) within parentheses.
4. Use a comma to separate arguments.

1.6.4 USING AUTO SUM

AutoSum is a feature in Microsoft Excel spreadsheet software that allows you to quickly and automatically calculate the sum of a range of numbers.

To use AutoSum in Microsoft Excel, first select the cell where you want the sum to appear. Then, click on the AutoSum button (Σ) located in the Home tab of the ribbon. Excel will automatically detect the range of adjacent cells containing numbers and **suggest a sum formula**. Press **Enter** to apply the formula and display the calculated sum in the selected cell.

AutoSum provides quick access to various other common functions like Average, Count, Max, Min, and more. This feature makes it convenient to perform a variety of calculations without having to manually type the formulas.

1.7 COPYING AND PASTING FORMULAS AND FUNCTIONS

After creating a formula in Excel, you can use the Copy and Paste commands to duplicate or transfer the formula into other areas of your worksheet.

When you use cell references in your formulas, Excel uses the data stored in that location in its calculations. The benefit is that when you change the original data, the formula is updated as well.

If you copy a formula from one location to another, Excel adjusts the cell reference based on its new location. For instance, the formula =B2*B3 entered in cell B5 would be adjusted to =C2*C3 when copied to cell C5. However, you can modify the cell reference so it remains fixed to its original location.

1.8 CELL REFERENCING:

Each cell has a unique address, Cell address is also called Cell reference and it identifies the location of the cell in the spreadsheet by using a combination of column name and row number. For example, "A1" refers to the cell located at column A and row 1.

Cell References are crucial, particularly when working with huge data sets in functions and formulas.

1.9 WORKING WITH WORKSHEET RANGES

Each cell is referred to by a cell address. A range is a block of two or more cells. A group of cells are referenced using the **range reference operator** - : (the Colon)

A range reference consists of two cell addresses separated by a **colon**. A **range** reference refers to all the cells between and including the reference. The range reference **B1:B4** includes cells B1, B2, B3 and B4. The range reference **A1:B3** includes A1, A2, A3, B1, B2 and B3.

1.10 WORKING WITH ROWS AND COLUMNS

To add extra information to a worksheet, it may sometimes be desirable to insert new rows and columns. To insert a new row/ column, execute the following steps:

1.10.1 INSERTING A ROW

1. Click on the Row header (or any cell in that row) above which the new row is to be added.
2. Choose the **Insert>Insert Sheet Rows** in the **Home tab**. A new row is added above the selected row (or right click any cell in the row and choose **insert** > **entire row**)

1.10.2 INSERTING A COLUMN

1. Click on the Column header (or any cell in that column) to the left of which the new column is to be added.
2. Choose the **Insert>Insert Sheet Column** in the **Home tab**. A new column is added to the left of the selected column (or right click any cell in the column and choose **insert** > **entire column**)

1.10.3 DELETING ROWS AND COLUMNS

1. Click on the Row header/Column header to be deleted.
2. Choose the **Delete** option from the **Home tab** or right click and select **Delete sheet column/row** option from the pop-up menus.

1.10.4 INSERTING AND DELETING CELLS

a. Inserting a Cell

1. Click on the cell where new cell(s) is to be inserted.
2. Choose the Insert Cells option from the Home tab. The Insert dialog box is displayed (Figure →)
3. Choose the appropriate option. The result of each option is explained as under:

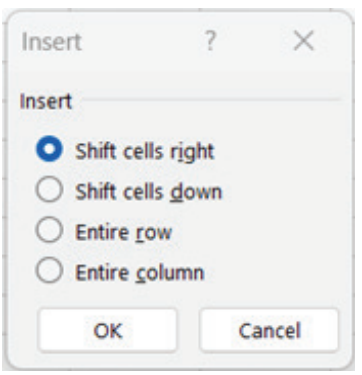
(a) **Shift cells right** – adds a blank cell to the left of the selected cell.

(b) **Shift cells down** – adds a blank cell above the selected cell.

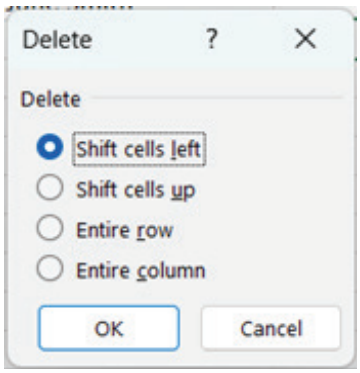
(c) **Entire row** – adds a new row above the selected cell.

(d) **Entire column** – adds a new column to the left of the selected cell.

(e) Click on OK button.



b. Deleting a Cell



1. Click on the cell which is to be deleted.
2. Click the Delete> Delete Cells option from the Home Tab. The Delete dialog box is displayed as shown in figure.
3. Choose the appropriate option. The result of each option is explained as under:

(a) **Shift cells left** – the cells to the right of the deleted cell are moved left.

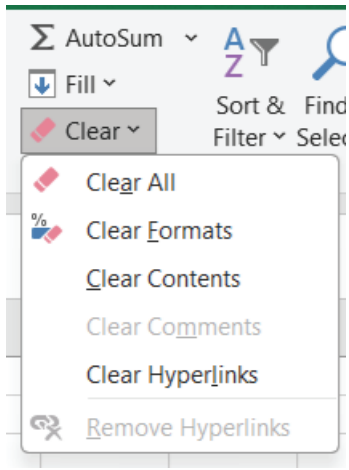
(b) **Shift cells up** – the cells below the deleted cell are moved up.

(c) **Entire row** – deletes the entire row and moves the row below upwards.

(d) **Entire column** – deletes the entire column and moves the row to the right leftwards.

4. Click on OK button.

1.11 CLEARING DATA



There are a number of options to clear the content from a cell:

1. Press Delete on the keyboard.
2. Right-click the cell and then select Clear Contents.
3. On the Home tab, in the Editing group, select Clear > Clear Contents.

Unfortunately, clearing a cell's content doesn't clear its formatting. To clear formatting: On the Home tab, in the Editing group, **select Clear > Clear Formats**

To clear both contents and formats at once, **select Clear All**.

In contrast, **deleting the cell removes the cell itself** from the stack and makes the surrounding cells shift. Think about what happens when you pull a box out of a stack of boxes-the boxes above it fall down one position, right? It's the same thing with Excel cells, except it's reverse-gravity (cells fall up rather than down), and you have the choice of making the remaining cells shift up or to the left.

Choose the relevant option from the Clear sub-menu. The Clear sub-menu offers four choices.

1.12 SELECTING CELLS

To perform a function on any particular cell or a group of cells, the cell or cells need to be first selected. Selecting a single cell is as simple as clicking on it.

a. SELECT A ROW

To select an entire row, click on the row number to be selected on the left side of the spreadsheet.

b. SELECT A COLUMN

To select an entire column, click on the column label at the top of the spreadsheet.

c. SELECT ALL CELLS IN A WORKSHEET

Click on the empty grey box in the left corner between A and 1. This area is called the Select All button.

1.13 EDITING CELL CONTENTS

Once you've entered data into cells, select the area you want to edit by highlighting it.

Method 1 : Using the **F2** Key

1. Move the cursor to the desired cell whose contents have to be edited.
2. Press F2. Make the necessary changes.
3. Press Enter.

Method 2 : Using the Formula Bar

1. Move the cursor to the desired cell whose contents have to be edited.
2. Click in the formula area of the Formula Bar.
3. Make the necessary changes.
4. Press Enter.

Method 3 : Double-click in the Cell

1. Move the cursor to the desired cell whose contents have to be edited.
2. Double-click in the cell.
3. Make the necessary changes.
4. Press Enter.

1.14 CHANGING ROW HEIGHT

There are two methods to change the row height.

Method 1 : Using the Home Tab

1. Place the cursor anywhere in any cell of the row whose height is to be changed.
2. Choose the Format > Row Height in Cells group, of the Home tab. A dialog box opens.
3. Type in the required Row Height in the dialog box and click on OK.

Method 2 : By Dragging

1. Place the cursor on the line between the 1 and 2 row headings. The cursor should look like the one displayed above, with two arrows.
2. Move the mouse downwards or upwards while holding down the left mouse button. The height indicator appears on the screen.
3. Release the left mouse button when the height indicator shows the desired height.

1.15 CONDITIONAL FORMATTING:

This feature allows the user to apply formats to cells that satisfy a predefined criterion. To apply conditional formatting, perform the following steps:

1. Choose Conditional Formatting option from the Format menu.
2. In the Conditional Formatting dialog box (Figure 4.19) specify criteria using the various options.
3. Click Format.
4. Select the font styles, borders, shading and other options to be applied.
5. Click OK to apply the formats to cells that meet the specified criterion.

1.16 TAB COLOURS

To separate out worksheets from one another, it is possible to give different colours to the name of the worksheets at the bottom left corner. The steps to be followed for achieving this are

1. Click on the Sheet name.
2. Right click and in the pop up box choose the Tab Color option.
3. Select the desired colour from the Format Tab Color Dialog Box
4. Click on OK to see the effect.

1.17 CHARTS

A chart is a graphical representation of data. Graphics are easier to understand than boring numbers and texts, so Charts are valuable tools for Data Visualisation. Charts represent data graphically, making it easier for anyone to interpret it within seconds. Various Chart in Excel, such as List of Column Chart, Bar Chart, Area Chart, Line Chart, Surface Chart, Scatter Chart, Pie Chart, Stock Chart, Bubble Chart, and Radar Chart helps in communicating valuable insights when there are large volumes of data.

1.18 FINDING AND REPLACING DATA

Use the Find and Replace features in Excel to search for something in your workbook, such as a particular number or text string. You can either locate the search item for reference, or you can replace it with something else.

The shortcut keys to open the Find dialog box is Ctrl + F and keys used to replace the text is Ctrl + H.

1.19AUTOFILL

Excel contains a feature called AutoFill, which copies a logical series of values, labels or formulas. The AutoFill handle, which is like the "+" mathematical operator, can be located at the bottom right corner of the active cell.

To fill series perform the following steps:

1. Click on the first cell and type in "01-May".
2. Click on the cell again and then position the mouse in the bottom right of the cell so that the cursor turns to a small black plus sign, as shown below.
3. With the cursor, click, hold and drag the mouse down.
4. It automatically copies the date and increments by one day for each cell going down, giving the series 1-May, 2-May, ... , 10-May. It keeps showing exactly which day is being filled. Release the mouse when the desired date is reached.

DO IT YOURSELF ACTIVITY

ACTIVITY : - CREATING THE MARK SHEET TABLE

Step 1: To Create a MarkSheet Table with the following fields – Sno., Name, Eng, Lang, Maths, Sci, Soc. Enter 10 records for the given table.

Step 2: To add the following fields to the table – Total, Average, And update these new fields using appropriate formulae. (Use the SUM() and AVERAGE() functions)

Step 3: Also generate the subject totals and averages, and the Max and Min marks obtained in each subject.

Step 4 : Format the column headings. Also merge and center the Table headings between the Columns A and Column G.

Step 5: Use Conditional Formatting and show marks that are less than 40 in red colour and 100 marks in green colour.

Step 6 : Apply grid lines for the tabular data of the table.

ACTIVITY 2 : CREATE A CHART

Type the data for the given table from cell A1 to cell F6. Generate the total population using the sum() function in the cellsB7 to F7.

Format the table as shown in the picture.

Select the data from A3 to F6 and click **Insert Tab →Chart →Column Charts→Stacked** Column chart type under Illustrations.

	A	B	C	D	E	F
1	*Population Trends by Age Group for Region 5*					
2		2008	2009	2010	2011	2012
3	41 to 60	400,000	330,000	280,000	180,000	150,000
4	21 to 40	200,000	220,000	240,000	270,000	300,000
5	12 to 21	185,000	190,000	195,000	200,000	205,000
6	0 to 11	100,000	176,000	240,000	330,000	370,000
7	*Totals*	*885,000*	*916,000*	*955,000*	*980,000*	*1,025,000*

ACTIVITY 3:

Prepare an analytical result report of Second Monday Test Round Exam of your class in the format given below

Instructions :

- Calculate the total marks obtained by each student in column I.
- Calculate the highest and lowest marks obtained in each subject in row 9 and 10 respectively.

A	B	C	D	E	F	G	H	I
1ST QUARTERLY CYCLE TEST								
SNO	NAME	ENG	MATH	SCI	SOC	CSC	LANG2	TOT
1	ANKIT	78	65	77	88	76	54	
2	ACHALA	77	98	90	66	99	76	
3	HIMANSHU	67	78	87	56	84	92	
4	PAARTH	81	91	98	77	100	78	
TOT APPEARED								
MAX MARK								
MIN MARK								

- Also calculate the aggregate/percentage marks obtained by each student in column J (Insert a column after column I)
- Give the number of students appearing for each subject in cell B8.
- Find the subject-wise average marks and display them cells from c8 to H8.

ACTIVITY 4:

Prepare a score sheet of an inter-house cricket match in your school:

A	B	C	D	E	F
Batsman	**Balls Faced**	**Fours**	**Sixes**	**Singles**	**Total**
Gurman Singh	**61**	**7**	**3**	**23**	
Harinder Singh	**12**	**2**	**4**	**2**	
Sachin					
Gupta	**132**	**21**	**10**	**64**	
Gourav Sachdev	**17**	**4**	**5**	**7**	
Ishwaq Ahmed	**23**	**3**	**3**	**6**	

Instructions

1. Calculate the total runs obtained by each student in column E. (Total = No. of sixes x 6 + No. of fours x 4 + No. of Singles)
2. Calculate the Strike Rate of each batsman in column F.
3. Draw the pie chart to compare the strike rate of each batsman.

ACTIVITY 5:

Prepare a personal expenditure report of last financial year in the format as below.

A	B	C	D	E	F	G	H	I
Pocket -Money Expenditure Report 2008-09								
SNO	MONTH	MOBILE	TRAVEL	HOBBY	DINNER DATES	SAVINGS	TOT	
1	**APRIL**	**1200**	**900**	**500**	**1000**			
2	**MAY**	**1440**	**788**	**700**	**1500**			
3	**JUNE**	**1320**	**1110**	**700**	**1200**			

Instructions

- Assume that you are given a monthly pocket-money of Rs. 6000.
- Calculate the savings made by you every month.
- Calculate the total expenditure in each month.
- Calculate the highest and lowest expenditure made.
- Calculate the total savings after the three months
- Draw the bar graph to compare the expenditure of various months

BRAIN DEVELOPER

I. CHOOSE THE CORRECT ANSWERS:

1. The name box

a. Shows the location of the previously active cell
b. Appears to the left of the formula bar
c. Appears below the status bar
d. Appears below the menu bar

2. An excel workbook is a collection of

a. Workbooks
b. Worksheets
c. Charts
d. Worksheets and charts

3. **Excel 2013 files have a default extension of**

a. Xls
b. Xlsx
c. Both a. and b.
d. 123

4. **Without using the mouse or the arrow keys, what is the fastest way of getting to cell A1 in a spreadsheet?**

a. Press Ctrl +Home
b. Press Home
c. Press Shift + Home
d. Press Alt + Home

5. **Which of the following methods cannot be used to edit the contents of a cell?**

a. Press the Alt key
b. Clicking the formula bar
c. Pressing the F2 key
d. Double clicking the cell

6. **To copy cell contents using drag and drop press the**

a. End key
b. Shift key
c. Ctrl key
d. Esc key

7. **Where does the active cell's contents display in Excel?**

a. Name Box
b. Row Headings
c. Formula Bar
d. Task Pane

8. A range refers to a

a. Row
b. Column
c. a rectangular selection of cells
d. Group of non-contiguous cells

9. What type of cell referencing does not change while copying formulas.

a. Relative referencing
b. Mixed referencing
c. Absolute referencing
d. None of the above

10. Which of the following function keys is used as a toggle key for changing referencing modes?

a. F2
b. F8
c. F4
d. F6

Teacher's Signature

CHAPTER 2

USING ABSOLUTE AND RELATIVE REFERENCES IN EXCEL FORMULAS

ESSENTIAL LEARNING SKILLS :

2.1 Cell References in Excel

2.2 Cell Reference in a Function

2.3 Types of Cell References in Excel

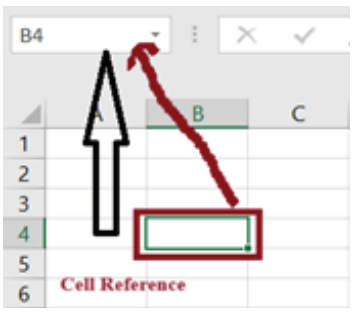
2.4 Switching between Different Reference Types

2.5 Cross Reference in Excel Do It Yourself Activities Answer the following

2.1 CELL REFERENCES IN EXCEL

Excel workbook is made up of worksheets and chart sheets.. Each worksheet in Excel consists of several cells formed by rows and columns. Each cell has a specific reference (or cell address) which helps the users easily access/address the desired cell (s) from within the functions. Cell references play an important role in Excel, especially when using functions and formulas with large data sets.

2.1.1 What is a cell reference?



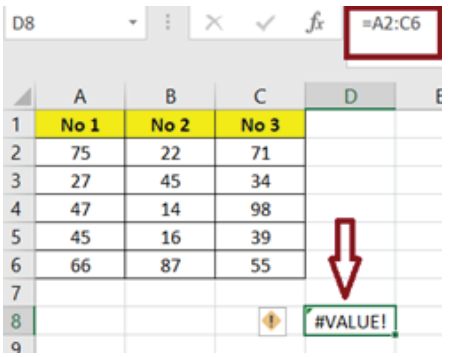
What is a cell reference in Excel?

A **cell reference** or **cell address** is a combination of a column letter and a row number that **identifies** a cell on a worksheet.

For example, A1 refers to the cell at the intersection of column A and row 1; B2 refers to the second cell in column B, and so on.

Cell reference mainly helps the Excel program locate the cell within the sheet and read or use its data in the specified formula to generate the result. We can use cell references or a range of multiple cells in other cells when creating a formula, even if the corresponding cell is on the same sheet, different sheet, or different workbook.

2.1.2 Relative Reference



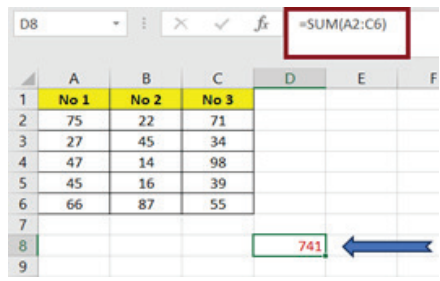
The basic use of a cell reference can be displayed by simply mentioning the referred cell with the equal sign. For example, if we enter "**=A1**" without quotes in another cell within the sheet, the value of A1 will be displayed in the corresponding cell. This means that the value of the selected cell, where the cell reference is entered, is exactly equal to that of cell A1.

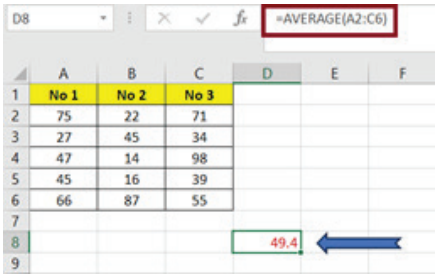
2.1.3 Reference to a Cell Range

We can also use the reference of multiple cells at once by referring to their cell range. For example, if we use the notation "**=A2:C6**" without the quotes, we refer to the entire cell range from A2 to C6. However, a range alone is not valuable data in Excel. When we use this cell reference in an Excel cell, Excel gives the **#VALUE!** error, which means that the formula is missing. Therefore, ***a reference to a cell range (A2:C6) has meaning only when used within a function or formula.***

2.2 CELL REFERENCE IN A FUNCTION

Excel has a wide range of built-in functions that can be used with cell references in formulas. These functions perform specific calculations or operations, and they can greatly enhance the power and flexibility of your Excel formulas.





For example, the SUM function adds up the values in a range of cells, the AVERAGE function calculates the average of a range of cells, and the COUNT function counts the number of cells in a range that contain numbers. These functions can be used with any type of cell reference, depending on your needs.

2.3 TYPES OF CELL REFERENCES IN EXCEL

References in Excel are a fundamental part of the spreadsheet. They refer to each cell of a workbook and thus access the value contained in them. Cell references in Excel are a widely used resource when performing mathematical operations.

The two main types of cell references: relative and absolute. Each one has a specific purpose, and knowing how to use each type is key to creating accurate formulas and working with data.

- Relative Cell Reference
- Absolute Cell Reference

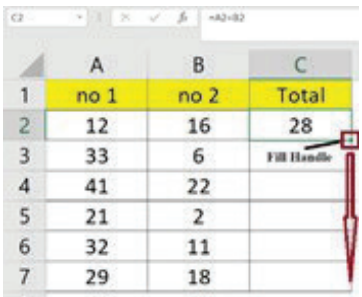
2.3.1 Relative Cell Reference

A relative cell reference is a reference to a cell that is relative to the position of the formula. Relative references are useful when you want to copy a formula to a range of cells. The reference will change when you copy the formula, so that it always refers to the correct cells. For example, if you have a formula in cell A1 that sums the values in cells A2:A5, the references in the formula will change when you copy the formula to cell B1. The new formula will sum the values in cells B2:B5.

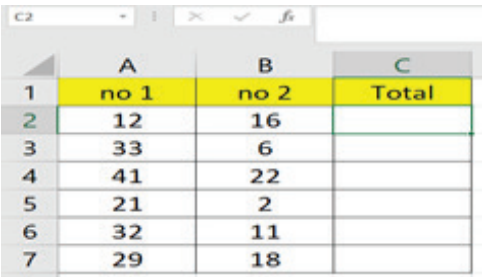
To create a relative reference, simply enter the cell address without using dollar signs ($). For example, if you want to reference cell A1, you would just enter A1 (without the $ sign).

When we copy formulas from one relative cell to others, the cell references are automatically adjusted by Excel based on respective rows and columns. The relative cell references are commonly used to perform the same operation on multiple relative cells by changing the corresponding cell's column and row addresses in the formula.

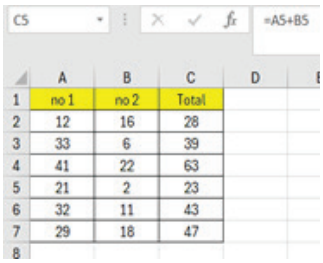
Example- we have the following Excel sheet with numbers in columns A and B, and we want to show the sum of the values in column C.



Select cell C2 to enter the formula "=A2 + B2" without quotes. and press the **Enter** key to get the calculated value in the cell C2. Now let's copy-paste formula in cell C2 to the cells C3 to C8, Alternately, we can click and drag the **fill handle** (at the bottom-right corner of the active cell C2) from cell C2 to C8.



After copying the formula to all corresponding cells from C2 to C8, check the addition formulas in the cells C3 to C8. For instance, if we select cell C5, we can see that the addition is performed between cells A5 and B5.



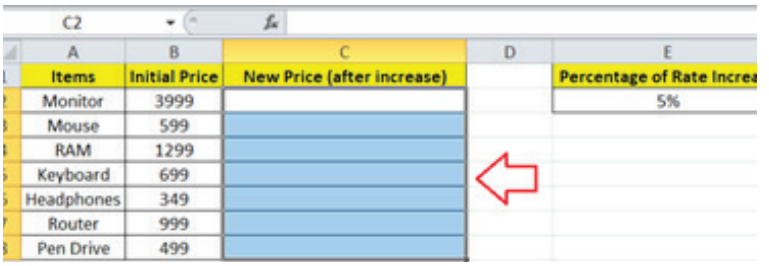
It is clear that the relative address of cell A2 changes to A5 and B2 to B5. Similarly, the relative addresses of other cells also change accordingly based on the relative position of the respective row and column.
To create a relative reference, simply enter the cell address without using dollar signs ($). For example, if you want to reference cell A1, you would just enter A1.

2.3.2 Absolute Cell Reference

An absolute cell reference, on the other hand, does not change when copied and pasted. It always refers to the same cell, regardless of where the formula is located. An absolute cell reference is indicated by a dollar sign ($) before the column letter and row number. For example, A1 is an absolute reference to cell A1.
This type of cell reference is useful when you have a constant value in a formula. For example, if you have a tax rate in cell A1 and you want to apply it to a range of income values in column B, you would use an absolute reference to cell A1 in your formula.

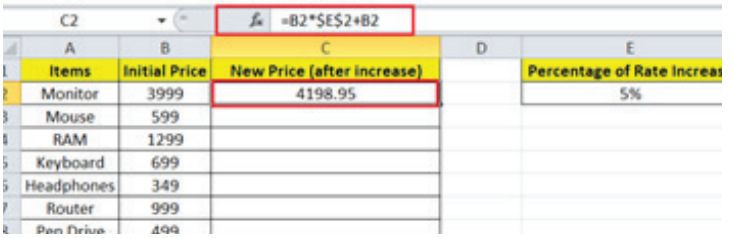
Using Absolute Cell References in Excel?
Suppose, we have the following Excel sheet with some items (Column A) with their initial prices (Column B). However, the prices have increased by 5% (cell E2), and we need to calculate the new price for each item using the absolute cell reference.

Perform the following steps using absolute reference to calculate increased prices (Column C) for each item:



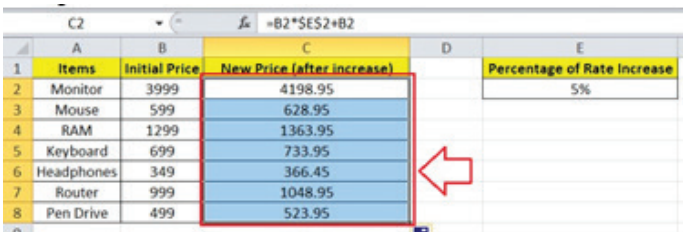
1. Select the destination cell and enter the formula to calculate the new/increased price. In our case, we select cell C2 and enter the formula "**=B2*E2+B2**" without quotes and press the **Enter** key to get the new increased price in cell C2.

- According to the formula above, we multiply the item's initial price with the increased percentage rate and add the resultant value to the old price for the respective item. In this way, we can calculate the increased price of the item.

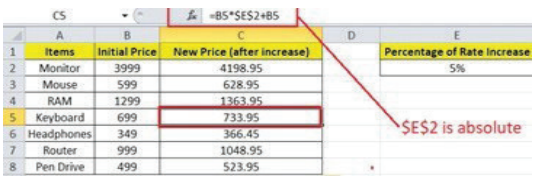


- Since the increased rate percentage is fixed (5%) for each item, we add the dollar ($) signs with E2 cell to make it absolute, i.e., E2. Thus, E2 will be unchanged after copying the formula into other cells.

Next we must copy-paste cell C2 to other relative cells from C3 to C8. Alternately, we can click and hold the fill handle from the bottom-right corner of cell C2. We must drag the fill handle to the last cell we want to copy the respective formula. In our case, we drag the fill handle to cell C8.



- When copied the formula into other relative cells, the values from column B change automatically. However, the absolute reference (E2) does not change. For instance, if we select cell C5, we can see that cell B2 has changed to B5, but E2 is constant.



Note that we must use the dollar ($) sign in **both row** and **column** letters of cell reference to create an **Absolute Cell Reference**.

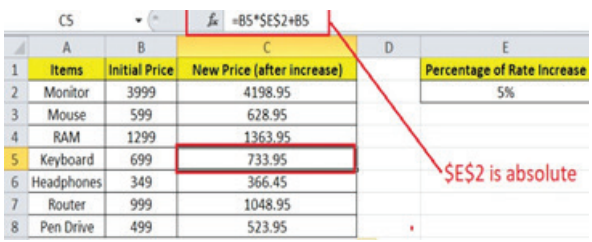
2.4 SWITCHING BETWEEN DIFFERENT REFERENCE TYPES:

To switch from a relative reference to absolute and vice versa, you can either type or delete the $ sign manually, or use the F4 shortcut:

a. Double-click the cell that contains the formula.

b. Select the reference you want to change.

c. Press F4 to toggle between the four reference types. Repeatedly hitting the F4 key switches the references in this order:



A1 > A1 > A$1 > $A1

2.5 EXTERNAL REFERENCE IN EXCEL:

An external reference in Excel allows you to refer to cells in other worksheets or workbooks. This can be extremely useful when you need to use data from multiple sources in your calculations or analysis.

External Referencing can be of two kinds.

1. Referring to a cell in another **worksheet of the same** workbook
1. Referring to a cell in another **worksheet of another** workbook

1. **Creating An External Cell Reference: To Worksheet Of The Same Workbook**

Syntax : **=SheetName!CellAddress**

Where SheetName is the name of the worksheet where the cell is located and CellAddress is the address of the cell you want to reference.

Simple practice example:

Assume that we have two worksheets in the same workbook – Sheet1 and Sheet2. There are a list of numbers in cells A1:A5, and we want to show the sum these numbers in A1 cell ofSheet2.

To achieve this – Click A1 cell in Sheet2 use external cell reference in the sum formula to reference the numbers in Sheet1. Finally press the enter key to get the total.

=SUM(Sheet2!A1:A5)

Notice the use of ! symbol after the sheetname

1. **Creating An External Cell Reference: To Worksheet Of another Workbook**

External Cell Referencing in Excel allows to link data from one workbook to another, making it easier to consolidate and analyse information from multiple sources.

Syntax : ***=[workbookName]SheetName!CellAddress***

Where workbookName is the name of the Excel file, SheetName is the name of the sheet in this workbook, and CellAddress is the address of the cell you want to reference.

Example:- Type this formula , to reference cell A1 in a sheet named **'QuarterlyReport'**, in a workbook named **SalesData.xlsx**

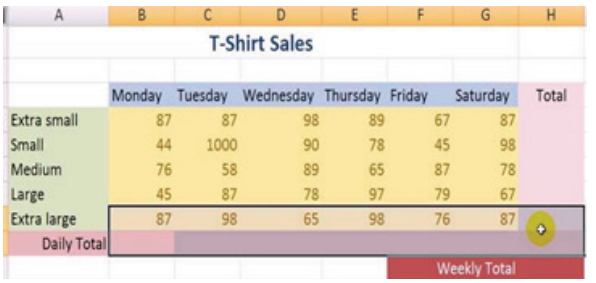
=[SalesData.xlsx]QuarterlyReport!A1

Notice the use of ! symbol after the sheetname and the square brackets enclosing the workbook name

By using external cell references across different workbooks, you can easily access data from various sources and create dynamic reports that automatically update when source data changes.

DO IT YOURSELF

DIY-Activity 2.1 : Prepare the T- Shirt Sales report excel sheet with daily total, product wise total and weekly total



T-Shirt Sales

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Extra small	87	87	98	89	67	87	
Small	44	1000	90	78	45	98	
Medium	76	58	89	65	87	78	
Large	45	87	78	97	79	67	
Extra large	87	98	65	98	76	87	
Daily Total							Weekly Total

a) Click cell H4 and type =sum(B4:G4) to find total number of Extra small T- Shirts.

b) Click H4 cell - Using the fill handle copy the formula to cells H5 to H8.

c) Click cell B9 and type

=sum(B4:B8)…to find total sales for Monday

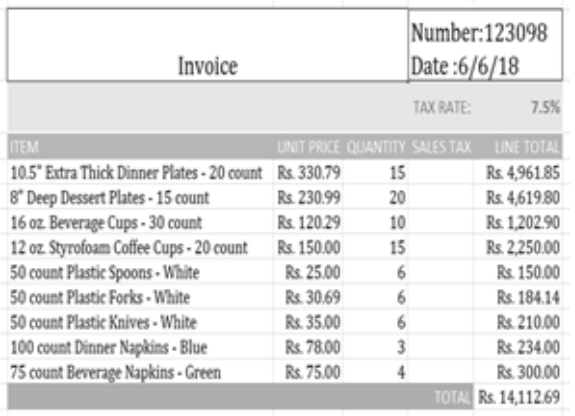
d) Copy this formula to the cells C9 to G9 to find total sales for the other days of the week.

e) Also copy the formula to the cell H9 to find the Weekly Total sales for all the T-Shirts.

DIY Activity 2.2 : Prepare the following worksheet

1. Use absolute referencing to calculate Sales Tax.

2. Line total is to be recalculated as Unit Price * Quantity + Sales Tax



Invoice			Number:123098 Date :6/6/18
		TAX RATE:	7.5%
ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
10.5" Extra Thick Dinner Plates - 20 count	Rs. 330.79	15		Rs. 4,961.85
8" Deep Dessert Plates - 15 count	Rs. 230.99	20		Rs. 4,619.80
16 oz. Beverage Cups - 30 count	Rs. 120.29	10		Rs. 1,202.90
12 oz. Styrofoam Coffee Cups - 20 count	Rs. 150.00	15		Rs. 2,250.00
50 count Plastic Spoons - White	Rs. 25.00	6		Rs. 150.00
50 count Plastic Forks - White	Rs. 30.69	6		Rs. 184.14
50 count Plastic Knives - White	Rs. 35.00	6		Rs. 210.00
100 count Dinner Napkins - Blue	Rs. 78.00	3		Rs. 234.00
75 count Beverage Napkins - Green	Rs. 75.00	4		Rs. 300.00
			TOTAL	Rs. 14,112.69

Solution:

Step 1: Type the data from cell A2 to D13.

Step 2: Click the cell E5 and type "**=C5*F3/100**" to calculate Sales Tax for the Item - 10.5 Extra Thick Dinner Plates.

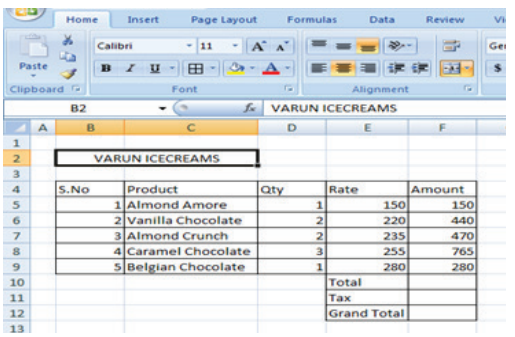
Step 3: Copy this formula from cell E5 to cells E13.

Step 4: Click cell F5 and type the formula =**C5*D5+E5** to calculate the Line total for 10.5" Extra Thick Dinner Plates

Step 5: To calculate the total cost click cell F14 and type =**sum(F5:F13)**

Step 6: Format the Table

DIY Activity 2.3 : Prepare the following worksheet



VARUN ICECREAMS

S.No	Product	Qty	Rate	Amount
1	Almond Amore	1	150	150
2	Vanilla Chocolate	2	220	440
3	Almond Crunch	2	235	470
4	Caramel Chocolate	3	255	765
5	Belgian Chocolate	1	280	280
			Total	
			Tax	
			Grand Total	

a) Calculate total using auto sum–Click cell F10 and click the **∑Auto Sum** tool from the **Home tab**.

b) Calculate Tax using the tax percentage saved in sheet 2 (cell F3)

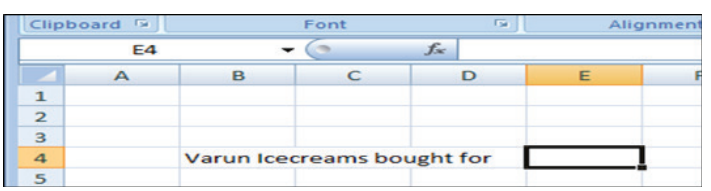
Click in cell F11 and type the formula - **=F10*'Sheet 2'!F3**

c) Calculate the grand total as **=F10+F11**

DIY Activity 2.4 :

Fill the content of cell E4 using the grand total, created in Activity 2.3

- Type the formula - ='Sheet 3'!F12 in cell E4 of Sheet 4.



Varun Icecreams bought for

ANSWER THE FOLLOWING :

1. If in D3 you have "=A1", What cell does D3 refer to?

a. D3 c. A1

b. D1 d. A3

2. Getting data from a diferent cell is called …

a. Accessing b. Referencing

c. Updating d. Functioning

3. Which of the following is an absolute cell reference?

a. !A!1 b. A1

c. #a#1 d. A1

4. In Absolute Referencing, the relative position of rows and columns changes when you copy a formula. (TRUE OR FALSE?)

5. To use the sheet reference, which address is appropriate out of the following options?

a. D4! Sheet1 b. Sheet1! D4 c. Sheet! D4

6. Which of the following is relative reference?

a. $D6 b. A3 c. A$1

7. You can switch between references by pressing the

a. F1 key b. F2 key c. F3 key d. F4 key

8. The fastest way to go to a particular cell of a worksheet is to type the cell address in the

a. Name box b. Formula bar c. Zoom box d. Sheet tab

9. The default cell reference to another Excel file is

a. Relative reference b. Absolute reference c. Mixed cell reference

Teacher's Signature

CHAPTER 3

CONDITIONAL STATEMENTS IN EXCEL

ESSENTIAL LEARNING SKILLS:

3.1 **Introduction**

3.2 **IF( ) function in Excel**

3.3 **Comparison Operators**

3.4 **Countif Function**

3.5 **SUMIF Function**

3.6 **Averageif Function**

3.1 INTRODUCTION:

Conditional statements are the backbone of decision making in Excel. They allow users to create dynamic formulas that are capable of responding to data changes, thus making Excel a powerful tool for **data analysis** and **decision making**.

In this module we will learn to use the most commonly used If() function, and a few more advanced Conditional statements like COUNTIF(), SUMIF(), AVERAGEIF() that come in handy in certain situations.

3.2 IF( ) FUNCTION IN EXCEL:

The **If function/statement** in Excel is a **conditional** statement that performs different operations based on logical tests. The IF function performs the logical test and return one value for a TRUE result, or another value for a FALSE result.

The IF function takes **three** arguments: **logical_condition**,

value_if_true, and

value_if_false:

DID YOU KNOW?

Arguments are the values that are enclosed within the parenthesis of a function. Functions perform calculations on these arguments.

SYNTAX : **IF(logical condition, value_if_true, value_if_false)**

Example:- if it's raining, you take an umbrella; if not, you don't.

You can write the Excel IF statement to represent this.

=if (Raining="Yes", "Take Umbrella", "Don't take Umbrella")

1. Here the logical condition is **"Raining="Yes",**
2. the two actions are **action 1:-** Take umbrella, **action 2:-** Don't take umbrella.
3. The logical test, action 1, action 2 are the **three arguments** of the IF statement.

The **if statement** checks the logical test – **is it raining??** And **decides:- to Take Umbrella OR Not to take Umbrella.**

If function checks the result of logical condition and decides to return either value_if_true OR value_if_false

Note: We have used **Comparison Operators** while specifying the **logical test**.

The If function in Excel often uses **comparison operators** to create the **logical tests**. These operators compare two or more values and the expression using them return TRUE or FALSE.

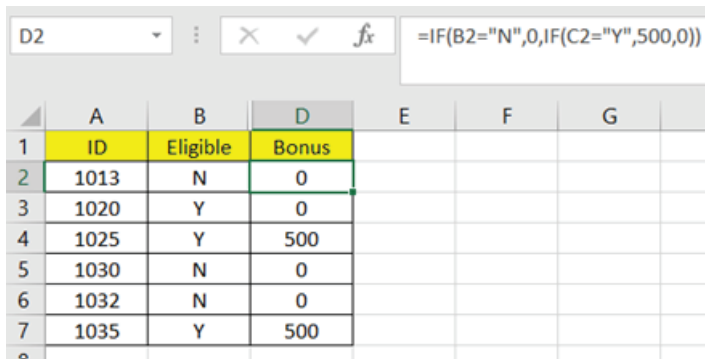
0.1 Comparison Operators:

1) **equal (=)** : Checks if two values or strings are the same **(A3="apple")**
2) **greater than (>)** : Checks if one value is larger than the other **(A4 > 8)**
3) **less than (<)** : Checks if one value is smaller than the other **(B3 < 10)**
4) **greater than or equal to (>=)** : Checks if one value is larger or equal to another **(E5>= 10)**
5) **less than or equal to (<=)** : Checks if one value smaller than or equal to another **(D3 <= 5)**
6) **not equal to (<>)** : Checks if two values are not the same.**(a2<>b2)**

More than one logical test can be tested by **nesting** in the IF function or use the **logical functions** like **AND** and **OR** in conditional argument of the IF function.

In the given picture, we want to calculate bonus either as 500 or 0 based on the Eligibility column. The If function for this **=IF(B2="Y", 500, 0)**

Translation: If the value in B2 is equal to "Y", return 500 Otherwise, return 0.



	A	B	D	E	F	G
1	ID	Eligible	Bonus			
2	1013	N	0			
3	1020	Y	0			
4	1025	Y	500			
5	1030	N	0			
6	1032	N	0			
7	1035	Y	500			

The same formula can be also be written as given below by changing the logic of the logical test. This formula also returns the same result: **=IF(B2<>"Y",0,500)**

Translation: If the value in B2 is not equal to "Y", return 0. Otherwise, return 500.

3.4 COUNTIF FUNCTION:

Excel can do more than just simple math.

The COUNTIF function is one of the most useful function and you can use it to count the number of cells that contain a specific value in a range of values. It's **easier to use COUNTIF** than to **manually** count yourself. The Countif function takes 2 arguments between the parenthesis.

DID YOU KNOW?

Arguments are also called parameters

SYNTAX : = COUNTIF(**Range**, **Criteria**)

Range: the range of cells to be evaluated

Criteria: the condition that the cells must meet to be counted – can be a number, expression, cell reference, text

Examples

1. **Counting cells equal to a specific value:**

=COUNTIF(A1:A10, 5)

Counts the number of cells in the range A1:A10 that are **equal to** 5.

2. **Counting cells greater than a specific value:**

=COUNTIF(A1:A10, ">5")

Counts the number of cells in the range A1:A10 that are **greater than 5.**

3. **Counting cells less than or equal to a specific value (can be used for greater than or equal to):**

=COUNTIF(A1:A10, "<=5")

Counts the number of cells in the range A1:A10 that are **less than 5.**

4. **Counting cells that are not equal to a specific value:**

=COUNTIF(A1:A10, "<>5")

Counts the number of cells in the range A1:A10 that are **not equal to 5.**

5. **Counting cells containing a specific text:**

=COUNTIF(A1:A10, "Apple")

Counts the number of cells in the range A1:A10 that contain the text "Apple"**.**

6. **Counting cells based on a cell reference:**

=COUNTIF(A1:A10, B1)

Counts the number of cells in the range A1:A10 that are **equal to the value in cell B1.**

The COUNTIF function is useful for analyzing data and summarizing specific information based on defined criteria

3.5 SUMIF FUNCTION:

The SUMIF function in Microsoft Excel allows you to calculate the sum of numbers in a range, based on a specific criterion. The Sumif function takes 3 arguments between the parenthesis.

SYNTAX : = SUMIF(**Range**, **Criteria, Sum_Range**)

Parameters:

Range: The range of cells that you want to apply the criteria to.

Criteria: The condition that must be met for the cells in the range to be included in the sum. This can be a number, expression, cell reference, or text string.

Sum_Range: The actual cells to sum. If omitted, Excel sums all the cells in the range parameter.

USAGE:

1. **Sum cells equal to a specific value:**

   =SUMIF(A1:A10, 5)

   Sums the values in the range A1:A10 that are equal to 5.

2. **Sum cells greater than a specific value (can be used with lesser than):**

   =SUMIF(A1:A10, ">5")

   Sums the values in the range A1:A10 that are greater than 5.

3. **Sum cells less than or equal to a specific value (can be used for greater than or equal to):**

   =SUMIF(A1:A10, "<=10")

   Sums the values in the range A1:A10 that are less than or equal to 10.

4. **Sum cells not equal to a specific value:**

   =SUMIF(A1:A10, "<>5")

   Sums the values in the range A1:A10 that are not equal to 5.

5. **Sum cells containing specific text:**

   =SUMIF(A1:A10, "Apple", B1:B10)

   Sums the values in the range B1:B10 only when the corresponding cells in the range A1:A10 contain the text "Apple".

6. **Sum cells based on a cell reference:**

   =SUMIF(A1:A10, B1, C1:C10)

   Sums the values in the range C1:C10 only when the corresponding cells in the range A1:A10 match the value in cell B1.

The **SUMIF** function is powerful for Summing based on specified criteria, allowing for flexible data analysis and summarization.

3.5 AVERAGEIF FUNCTION:

The **AVERAGEIF** function in Excel calculates the average of the cells that meet a specified condition.

SYNTAX:- =**AVERAGEIF**(Range, Criteria, Average Range)

Parameters:

***Range*:** The range of cells that you want to apply the criteria to.

***Criteria*:** The condition that must be met for the cells in the range to be included in the average calculation. This can be a number, expression, cell reference, or text string.

***Average_Range*:** The actual cells to average. If omitted, Excel averages the cells in the range parameter.

USAGE:

1. **Average cells equal to a specific value:**

   =AVERAGEIF(A1:A10, 5)

   Averages the values in the range A1:A10 that are equal to 5.

2. **Average cells greater than a specific value (can be used for less than)**:

   =AVERAGEIF(A1:A10, ">5")

   Averages the values in the range A1:A10 that are greater than 5.

3. **Average cells less than or equal to a specific value (can be used for greater than or equal to)**:

   =AVERAGEIF(A1:A10, "<=10")

   Averages the values in the range A1:A10 that are less than or equal to 10.

4. **Average cells not equal to a specific value:**

   =AVERAGEIF(A1:A10, "<>5")

   Averages the values in the range A1:A10 that are not equal to 5.

5. **Average cells containing specific text:**

   =AVERAGEIF(A1:A10, "Apple", B1:B10)

   Averages the values in the range B1:B10 where the corresponding cells in the range A1:A10 contain the text

"Apple".

6.Average cells based on a cell reference:

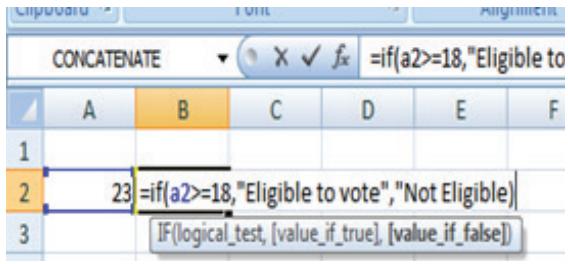
=AVERAGEIF(A1:A10, B1, C1:C10)

Averages the values in the range C1:C10 where the corresponding cells in the range A1:A10 match the value in cell B1.

The **AVERAGEIF** function is useful for calculating the average of values that meet specific criteria, allowing for Targeted data analysis and summarization.

DO IT YOURSELF ACTIVITIES

A. **Enter the age of a person in cell A2. Display if he/she is eligible to vote in cell B2 using IF function.**



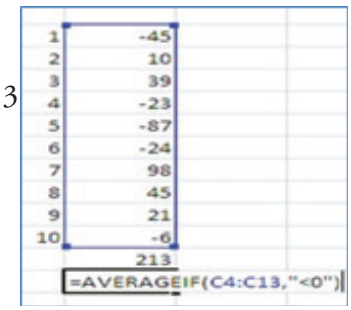
Step 1: Click on cell A2

Step 2: Enter the age of a person

Step 3: Click on cell B2

Step 4 : Enter =if(A2>=18,"Eligible to vote", "Not Eligible")

B. **Enter ten number (positive and negative). Calculate and display the total of only positive numbers. Calculate and display the average of all negative numbers.**



Step 1: Enter numbers 1 to 10 in cells B4 to B13

Step 2: Enter 10 numbers (positive and negative numbers) in cells C4 to C13

Step 3: Click on cell C14 and enter

=**SUMIF**(C4..C13 0")

Step 4: Click on cell C15 and enter =**AVERAGEIF**(C4..C13, "<0")

C. **Enter the points scored by 5 people and display the badge they are eligible to receive. A person gets a GREEN badge if the points scored are above 80 otherwise gets a BLUE badge. Also calculate the number of blue and green badges (use IF & COUNTIF)**

Step 1: Click on B3 and enter Points

Step 2 : Click on C3 and enter Badge

Step 3: Enter the values as shown above in cells to B8

Step 4: Click on C4 and enter

=**IF**(B4>80,"GREEN","BLUE")

Step 5: Click and drag till C8 to get the badge colours for other cells.

Step 6: Click on cell B10 and enter Blue Badges

	B	C
3	Points	Badge
4	56	BLUE
5	92	GREEN
6	87	GREEN
7	67	BLUE
8	52	BLUE
10	Blue Badges	3
11	Green Badges	2

Step 7: Click on cell B11 and enter Green Badges

Step 8: Click on cell C10 and enter

=**COUNTIF**(C4:C8,"BLUE")

Step 9: Click on cell C11 and enter =**COUNTIF**(C4:C8,"GREEN")

D. **Enter the age of 5 people. Calculate discount in train ticket of 8% for minors and senior citizens and 5% for the rest.**

Step 1: Click on B2 and enter Age

Step 2: Click on C2 and enter Amount

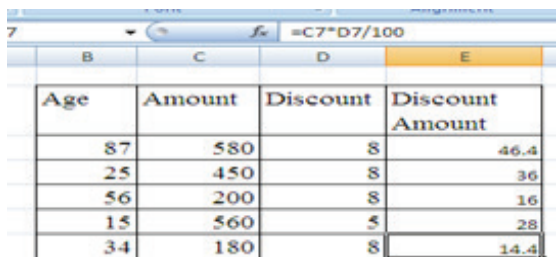
Step 3: Click on D2 and enter Discount

Step 4: Enter the values 87,25,56,15,34 in cells B3 to B7

Step 5: Enter the values 580, 450, 200, 560 and 180 in cells C3 to C7

Step 6: Click on cell D2 and type " Discount"

Step 7: Click on cell D3 and enter =**IF**(B3>=18,8,5) and press Enter Key.



Step 8: Drag till cells D7 to get discount for other cells

Step 9: Click on cell E2 and enter Discount amount

Step10: Click on cell E3 and enter =C3*D3/100 and press Enter key

Step 11: Drag till cells E7 to get discount amount for other cells

E. **Prepare a worksheet of 5 students to find the eligibility for rank. (use data given in the picture below)**

Step 1: Enter the row header as Student, sub1, sub2, sub3, sub4, sub5, Eligible for rank - in the cells from B2 to H2

Step 2: Enter student details in cells B3 to G7

Student	Sub1	Sub2	Sub3	Sub4	Sub5	Eligible for Rank
Ramesh	77	74	83	81	69	Yes
Ravi	66	61	69	71	60	Yes
Guru	56	24	61	35	50	No
Shwetha	75	85	76	81	88	Yes
Rani	62	38	55	69	50	No

Step 3: Click on H3 and type the formula below

=**IF**(AND(C3>40,D3>40,E3>40,F3>40,G3>40), "Yes", "No")

Step 4: Click and drag fill handle from H3 till H7 to get eligibility for all other students.

DID YOU KNOW?

AND operator is used in the If function to check multiple conditions.

1. **What is the =COUNTIF function in Excel used?**

   a. Counts cells as specified

   b. Counts blank cells in a range

   c. Counts cells with numbers in a range

   d. Returns values based on a TRUE or FALSE condition

2. **The correct syntax of IF() Function.**

   e. =IF (logical_test, TRUE([value_if_true]), FALSE([value_if_false]))

   f. =IF (logical_test, [value_if_true], [value_if_false])

   g. =IF (logical_test, {[value_if_true]}, {[value_if_false]})

   h. =IF (logical_test: [value_if_true], [value_if_false])

3. Which of the following is the not equal to comparison operator used in an IF, COUNTIF or SUMIF function?

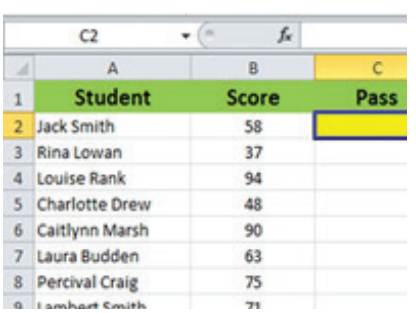
   a. <=

   b. <>

   c. >=

   d. ><

4. **Study the screenshot on the right. Which of the following functions, when inserted in the highlighted cell (C2) above, will return the word "yes" ?**



   a. =IF(B2>50,"yes")

   b. =IF(C2="yes")

   c. =IF(B2=C2, "yes")

   d. =IF(B2=50, "yes")

5. **Which function is used to add all numbers based on a specific criteria.**

   a. =SUMIF( )

   b. Countif()

   c. Averageif()

   d. + operator

6. **If the cell B2 is 68, what will this IF function give you as a result?**

=IF (B2>60, ‘’pass”, ‘’fail”)

a. Pass b. fail c. 60 d. none of these

7. **Values enclosed within parenthesis of a function are called**

a. Data b. Cell pointer c. Arguments d. Operators

8. **The IF function can check more than one condition using**

a. Nested If **c. Comparison operators**

b. Countif() **d. Sumif()**

Teacher’s Signature

CHAPTER 4 WHAT...IF ANALYSIS IN EXCEL

ESSENTIAL LEARNING SKILLS

4.1 Introduction

4.2 Goal Seek

4.3 Scenario Manager

4.4 Pivot Tables Exercises

4.1 INTRODUCTION

Microsoft Excel is a powerful spreadsheet tool created by Microsoft. With many capabilities to handle a vast amount of data and perform various calculations, the software program has become the go-to for many business organizations and individuals. One of the features of Microsoft Excel that sets it apart from other programs is its What-If Analysis tools.

In this module, we will learn the What-If Analysis feature, its applications, and how it works in Microsoft Excel.

What is What-If Analysis in Excel?

What-If Analysis is a feature in Microsoft Excel that provides a way for users to **explore different scenarios** by **changing variables** in a formula. There are three main types of What-If Analysis in Excel:

- Goal Seek
- Scenario Manager
- Data Tables

(Only Goal Seek and Scenario Manager are discussed in this module)

4.2 GOAL SEEK

Goal Seek is Excel's built-in What-If Analysis tool that shows how one value in a formula impacts another. More precisely, it determines what value you should enter in an input cell to get the desired result in a formula cell.
The best thing about Excel Goal Seek is that it performs all calculations behind the scenes, and you are only asked to specify these three parameters:

- Formula cell
- Target/desired value
- The cell to change in order to achieve the target

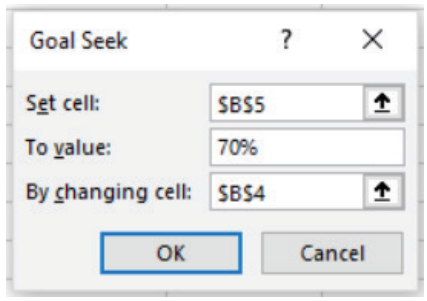
Goal Seek can tell you what score you must achieve for your last exam to receive an overall passing score of 70% (example 1). Or, how many votes you need to get in order to win the election (example 2).
On the whole, whenever you want a formula to return a specific result but are not sure what input value within the formula to adjust to get that result, stop guessing and use the Excel Goal Seek function!

Example 1: Determine the exam passing score

Problem: At the end of the course, a student takes 3 exams. The passing score is 70%. All the exams have the same weight, so the overall score is calculated by averaging the 3 scores. The student has already taken 2 out of 3 exams. The question is: What score

	A	B	C	D
1	**Exam**	**Score**		
2	Exam 1	81%		
3	Exam 2	62%		
4	Exam 3			
5	**Final score**	**72%**	=AVERAGE(B2:B4)	

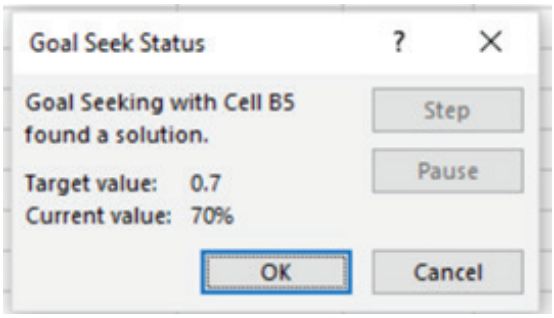
does the student need to get for the third exam to pass the entire course?



Solution: Let's do Goal Seek to determine the minimum score on exam 3:

- ***Set cell*** - the formula that averages the scores of the 3 exams (B5).
- ***To value*** - the passing score (70%).
- ***By changing cell*** - the 3rd exam score (B4).

Result: In order get the desired overall score, the student must achieve a minimum of 67% on the last exam:



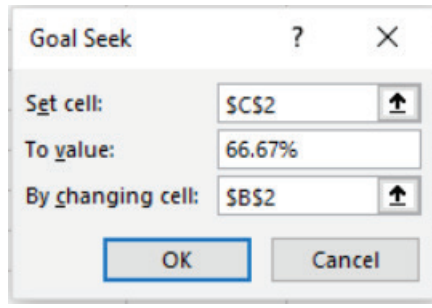
	A	B
1	**Exam**	**Score**
2	Exam 1	81%
3	Exam 2	62%
4	Exam 3	67%
5	**Final score**	**70%**

Example 2: Elections- Number of votes

Problem: You are running for some elected position where a two-thirds majority (66.67% of votes) is required to win the election. Assuming there are 200 total voting members, how many votes do you have to secure?

	A	B	C	D
1		**YES votes**	**%**	
2	Current	98	49.00%	=B2/B3
3	Total	200	100.00%	

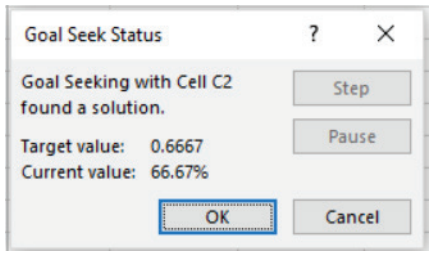
Currently, you have 98 votes, which is quite good but not sufficient because it only makes 49% of the total voters:



Solution: Use Goal Seek to find out the minimum number of "Yes" votes you need to get:

- ***Set cell*** - the formula that calculates the percentage of the current "Yes" votes (C2).
- ***To value*** - the required percentage of "Yes" votes (66.67%).
- ***By changing cell*** - the number of "Yes" votes (B2).

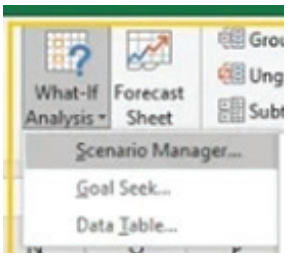
Result: What-If analysis with Goal Seek shows that to achieve the two-thirds mark or 66.67%, you need 133 "Yes" votes:



	A	B	C
1		**YES votes**	**%**
2	Current	133.34	66.67%
3	Total	200	100.00%

4.3 SCENARIO MANAGER

Another what if analysis tool is the **Scenario Manager**. This option is somewhat more advanced than Goal Seek in that it allows the adjustment of multiple variables at the same time. Scenario Manager is a digital tool that allows a user to create, analyse and compare data results in different business situations. You can store multiple versions of data within the same cell, then change them depending on a scenario's goal.



Some **noticeable differences between Goal Seek and Scenario Manager** are listed below:

- The Scenario Manager allows the creation of an unlimited number of possible scenarios by changing up to 32 variables at a time.
- Each scenario can be saved for comparative purposes.
- Scenarios may be named and edited, and a brief description provided.
- Only constant values should be changed within the Scenario Manager — cells with formulas should not be manually adjusted.

Example: To illustrate how Scenario Manager works, imagine that a bank is offering an interest rate of 9% per annum on personal loans with 24 months to repay, and that you would like to borrow $40,000.

	A	B
1	Principal	$40,000.00
2	Interest (annual)	9%
3	Term	24
4		
5	Principal + Interest	$47,200.00
6	Monthly	$1,966.67

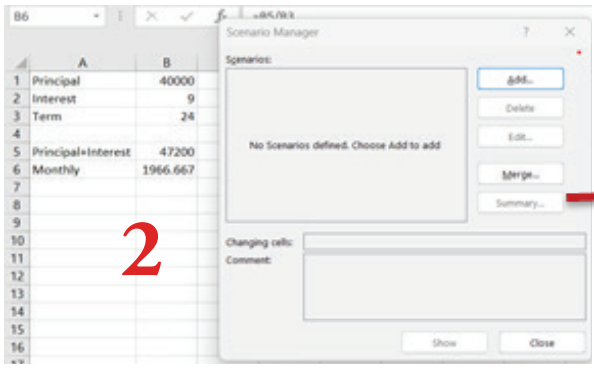
Using this information, the bank calculates the amount borrowed plus interest over the loan period will be $47,200, as shown in cell B5. The amount to be paid each month is also calculated and shown in cell B6.

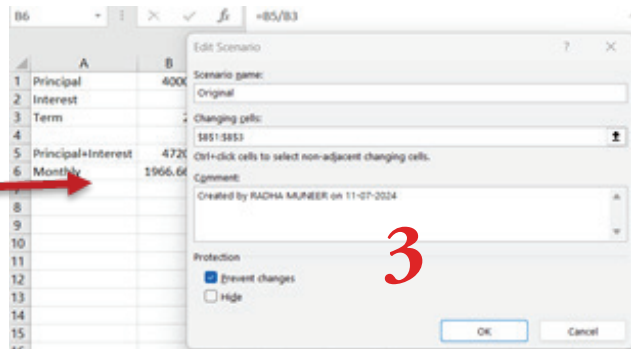
CREATING SCENARIOS:

As a best practice, the original worksheet data should be saved as a scenario so that you can revert to it after all the experiments have been completed.

Step 1 - Click 'What If Analysis' from the Data tab and select Scenario Manager.

Step 2 - Click 'Add' from the Scenario Manager pop-up window.

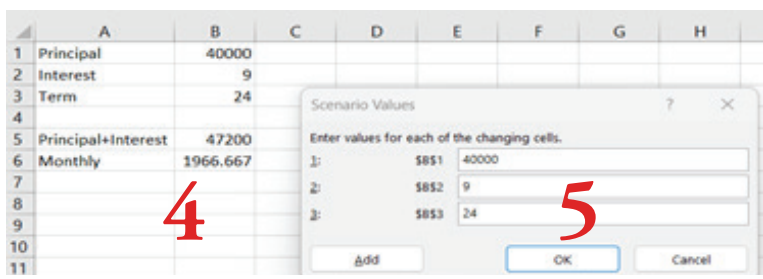




Step 3 - Name this scenario "Original" and enter the cell references of all cells with constant values that you may consider changing in other scenarios (maximum 32 cells). Click OK.

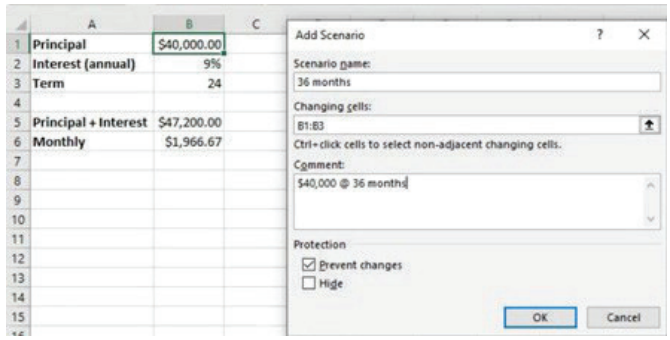
Step 4 - For the "Original" scenario, *do not a djust any values* in the 'Scenario Values' window.

Step 5 – Click 'Add to create your first experimental scenario.



Creating experimental scenarios

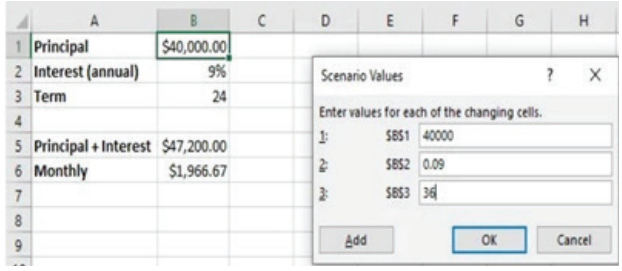
When creating an experimental scenario, give the scenario a descriptive name in the 'Add Scenario' pop-up window. The changing cells will be the same as the ones referenced in your 'Original' scenario.
Even if you will not be adjusting *all* the values in those cells, it is highly recommended that they remain referenced in the 'changing cells' field. You may place additional details about the experimental scenario in the 'Comment' field (



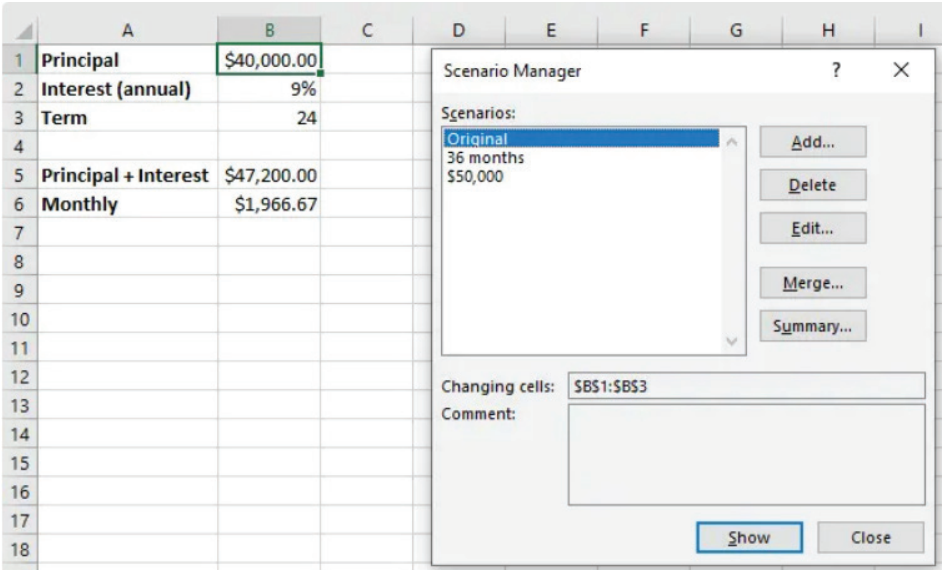
As illustrated above, our experimental scenario is given the name "36 months" and refers to cells B1 to B3 as changing cells. An additional comment indicates that this scenario is to determine the effect of borrowing $40,000 over a 36-month period.
In the 'Scenario Values' window, each changing cell is displayed as a field where we can manipulate the constant value so as to affect the outcome of the dependent cells — in our case, cells B5 and B6. As described in our scenario name and comments, we only adjust cell B3 by changing the value to 36.

To add another scenario at this point, select 'Add'. If not, click OK.

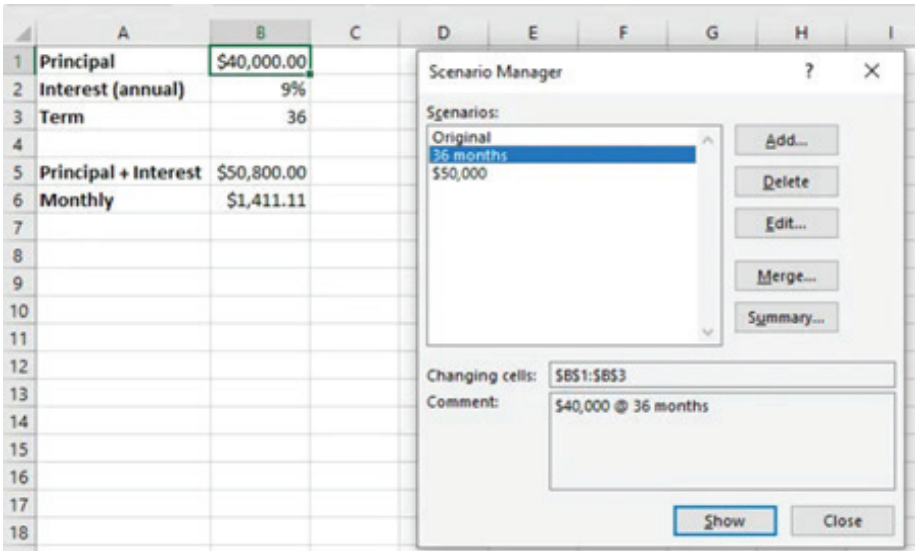
Adjust multiple variables



To experiment with adjusting multiple variables within one scenario, the steps are the same as above, with the exception that the desired changes would be made in the Scenario Values window.
For example, to get Excel to perform a what if analysis on borrowing
$50,000 over a 36-month period in the above situation at the same rate of interest, we would simply adjust the fields referencing those variables after creating a new scenario. Excel's Scenario Manager can handle an unlimited number of scenarios created in this same way.
A list of created scenarios can be viewed by clicking OK from the Scenario Values window, or by selecting Scenario Manager from the What If Analysis dropdown menu.



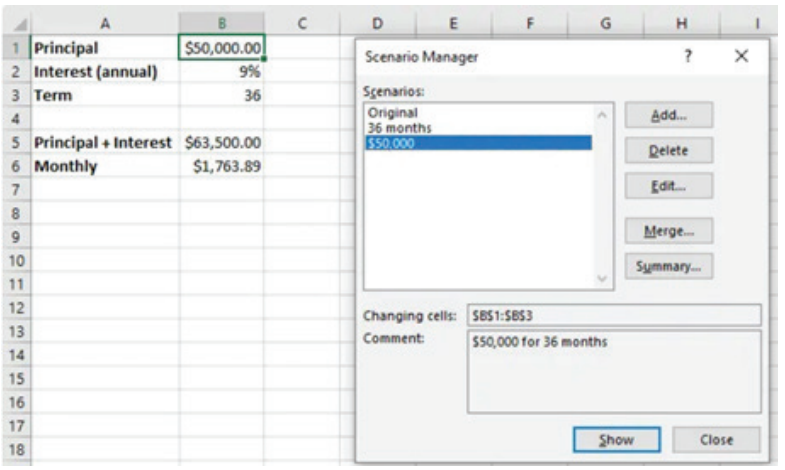
To see the outcome of each adjustment on the output cell(s), either double click on a scenario name, or highlight a name and click Show.



Scenario Summary

Scenarios that have been created may also be compared side by side with the creation of a Scenario summary worksheet, which is generated by selecting 'Summary' from the Scenario Manager window.

Choosing the 'Scenario summary' option will create a new sheet within the workbook that displays each scenario in columnar format. Changing Cells are highlighted in gray, and Result Cells are displayed under Changing Cells.



	A	B	C	D	E	F	G
2		Scenario Summary					
3				Current Values:	Original	36 months	$50,000
5		Changing Cells:					
6			B1	$50,000.00	$40,000.00	$40,000.00	$50,000.00
7			B2	9%	9%	9%	9%
8			B3	36	24	36	36
9		Result Cells:					
10			A1	Principal	Principal	Principal	Principal
11			B1	$50,000.00	$40,000.00	$40,000.00	$50,000.00
12			A2	Interest (annual)	Interest (annual)	Interest (annual)	Interest (annual)
13			B2	9%	9%	9%	9%
14			A3	Term	Term	Term	Term
15			B3	36	24	36	36
16			A5	Principal + Interest	Principal + Interest	Principal + Interest	Principal + Interest
17			B5	$63,500.00	$47,200.00	$50,800.00	$63,500.00
18			A6	Monthly	Monthly	Monthly	Monthly
19			B6	$1,763.89	$1,966.67	$1,411.11	$1,763.89
20		Notes: Current Values column represents values of changing cells at					
21		time Scenario Summary Report was created. Changing cells for each					
22		scenario are highlighted in gray.					

Note that if named ranges were created for Changing or Result Cells, range names will be displayed instead of cell references.

PIVOT TABLES IN EXCEL

Pivot tables in Excel is a powerful tool for summarizing, analyzing, and viewing large amounts of raw data in an easy-to-read format. They are a popular user-friendly tool enabling technical/non-technical people alike to dive deeper into their data. Pivot table doesn't change the raw data, but rather creates a new **view** of it. It is a simple tool to use, yet powerful.

At the most basic level, pivot tables enable you to create a data matrix in a row and column formats. You can apply filtering, sorting, aggregation, and summarization of your data in various ways.

Row Labels	Sum of Order Amount
Albertson, Kathy	2650
Brennan, Michael	3700
Davis, William	1935
Dumlao, Richard	1490
Flores, Tia	3155
Grand Total	**12930**

The major features of a PivotTable are as follows

- Creating a PivotTable is extremely simple and fast
- Instantly churning data by simple dragging of fields, sorting and filtering and different calculations on the data.
- Arriving at the suitable representation for your data as you gain insights into it.
- Creating reports on the fly.
- Producing multiple reports from the same PivotTable in a matter of seconds.

	A	B	C	D	E
1	Salesperson	Region	Account	Order Amount	Month
2	Albertson, Kathy	East	29386	$925.00	January
3	Albertson, Kathy	East	74830	$875.00	February
4	Albertson, Kathy	East	90099	$500.00	February
5	Albertson, Kathy	East	74830	$350.00	March
6	Brennan, Michael	West	82853	$400.00	January
7	Brennan, Michael	West	72949	$850.00	January
8	Brennan, Michael	West	90044	$1,500.00	January
9	Brennan, Michael	West	82853	$550.00	February
10	Brennan, Michael	West	72949	$400.00	March
11	Davis, William	South	55223	$235.00	February
12	Davis, William	South	10354	$850.00	January
13	Davis, William	South	50192	$600.00	March
14	Davis, William	South	27589	$250.00	January
15	Dumlao, Richard	West	67275	$400.00	January
16	Dumlao, Richard	West	41828	$965.00	February
17	Dumlao, Richard	West	87543	$125.00	March
18	Flores, Tia	South	97446	$1,500.00	March
19	Flores, Tia	South	41400	$305.00	January
20	Flores, Tia	South	30974	$1,350.00	January

The sample data which we are going to use throughout this article is shown above and also available for practice.

Before Creating a PivotTable Ensure that the first row in the data range has headers. You need headers **because they will be the** field names in your PivotTable**.**

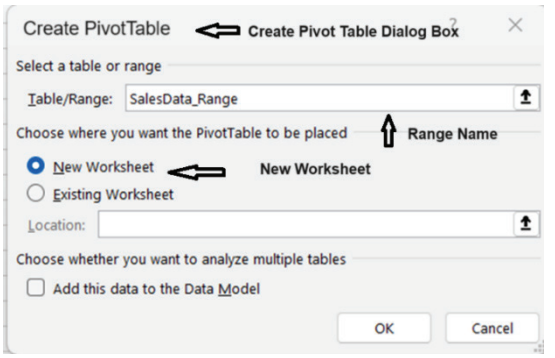
To Create a Pivot Table

- Click the INSERT tab on the Ribbon.
- Click Tables > Click PivotTable

The Create PivotTable dialog box appears.

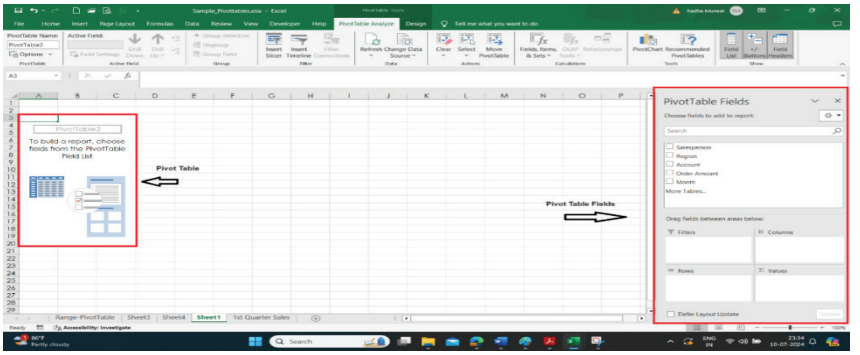
Select the following from the dialog box –

- In the **Table/Range** box, type the table name – SalesData_Range
- Under **Choose where you want the PivotTable to be placed** Click New Worksheet
- Click **OK**.



A new worksheet is created. The new worksheet contains an empty PivotTable on the left and a **PivotTable Fields** task pane on the right side of the worksheet. The **PivotTable Fields** task pane has four areas (**Filters**, **Columns**, **Rows**, and **Values**) where various field names can be placed to create the PivotTable. The task pane also includes a checklist area of the fields from which to choose from the data.

As you can observe, the **PivotTable Fields** list appears on the right side of the worksheet, containing the header



names of the columns in the data range Drag a field name into the four areas to create a PivotTable. Alternatively, you can check the boxes for fields to be added to the table. Each of the areas operate in the following manner in a PivotTable:

1. **Columns:** The field is used to measure and compare data.
2. **Rows:** The field is for data you want to analyze.
3. **Values:** The field containing the values a table uses for summarizing and comparisons.
4. **Filter (optional):** A field used to sort table data. It is displayed in the upper left corner of a table and is an optional field for tables.

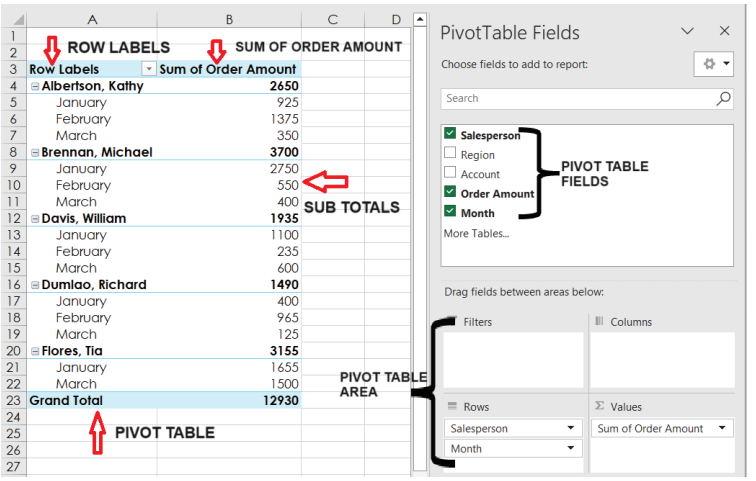
Further, on the Ribbon, two new tabs - PivotTable Tools – ANALYZE and DESIGN appear.

Adding Fields to the PivotTable

To summarize the order amount according to salesperson

- Click on the field Salesperson in the PivotTable Fields pane and drag it to the ROWS area.
- Click the field Month in the PivotTable Fields list and drag that also to ROWS area.
- Click on Order Amount and drag it to VALUES area.

Your first PivotTable is ready as shown here.



Observe that two columns appear in the PivotTable, one containing the Row Labels that you selected, i.e. **Salesperson and Month** and a second one from Values containing **Sum of Order Amount** . In addition to Sum of Order Amount month wise for each Salesperson, you will also get **subtotals** representing the total sales by that person. If you scroll down the worksheet, you will find the last row as **Grand Total** representing total sales.

Example : Create a pivot table to see region wise sales of each salesperson.

To summarize the order amount of salesperson for the months January, February, and March.

- Click on the field Salesperson in the PivotTable Fields list and drag it to the ROWS area.
- Click the field Region in the PivotTable Fields list and drag that also to COLUMNS area.
- Click on Order Amount and drag it to ∑ VALUES area.

Voila your second PivotTable is ready.

NOTE : In a Pivot Table, the aggregate function is a mathematical operation applied to the values within a specific group or category. It summarizes and condenses the data, providing a consolidated view for better analysis.

Common aggregate functions include **SUM**, **AVG** (average), **COUNT**, **MIN** (minimum), and **MAX** (maximum). The choice of the aggregate function depends on the type of data and the analysis goals.

To change the aggregate mathematical function, click the **numeric field** in the Values box of the Pivot Fields dialog box and click **Value Fields Settings-> Click Summarize Value fields by** and choose the **type of calculations** that you want to use to summarize data from the selected field **and click OK.**

Functions Mainly Used in a Pivot Table:

- **Sum:** Adds up the values in a selected field.
- **Count:** Counts the number of entries in a selected field.
- **Average:** Calculates the average of the values in a selected field.
- **Min:** Displays the minimum value in a selected field.
- **Max:** Displays the maximum value in a selected field.
- **Product:** Multiplies all the values in a selected field.
- **Count Numbers:** Counts only the numeric entries in a selected field.
- **StdDev:** Calculates the standard deviation of the values in a selected field.
- **StdDevp:** Calculates the standard deviation of the entire population of values in a selected field.
- **Var:** Calculates the variance of the values in a selected field.
- **Varp:** Calculates the variance of the entire population of values in a selected field.

These functions empower users to analyze and summarize data efficiently within a Pivot Table, providing valuable insights.

Rearrange fields in a variety of ways by dragging them into a new area of the Pivot Table Fields Box or clicking the option in the list of fields above the areas. Each action will affect the PivotTable. Move fields around into new areas until you have created a table giving you the best insight into your data.

The information above shows examples of what can be done with pivot tables, but keep in mind there are many more things you can do with pivot tables than what we have seen.

- If you update your source data, refresh the pivot table to capture the latest updates made in your data. This is because pivot prevents automatic up-gradation once the source data has been updated.

Please use the following url to download the practice file

https://tinyurl.com/3c7n4wv8

1. **A _____ is an interactive Excel report that summarizes and analyzes large amounts of data.**
2. **The _____ is an area to position fields by which you want to filter the PivotTable report.**
3. **The _____ is an area to position fields that contain data that is summarized in a PivotTable.**
4. **_____is a what-if analysis tool that finds the input needed in one cell to arrive at the desired result in another cell.**
5. **Under which tab and in which function group will you find the option to insert a Pivot Table?**
   a. Under the Insert tab in the Tables group
   b. Under the Formulas tab in the Data Analysis group
   c. In the Data group in the Pivot Tables group
   d. In the Data group in the Tables group
6. **Which of the following is NOT a box in the PivotTable Fields List?**
   a. Column Labels b. Values c. Filter d. Formula
7. **To apply Goal Seek command your cell pointer must be in**
   a) The Changing cell whose value you need to find
   b) The Result Cell where formula is entered
   c) The cell where your targeted value is entered
   d) None of above
8. **Which of the following is not What IF analysis tool in Excel?**
   a. Goal Seek b. Scenarios c. Data Tables d. Pivot Tables
9. **What is a PivotTable?**
   a. tool used to summarize data
   b. type of formula
   c. type of chart
   d. way to create macros
10. **What is the goal of "What-if" analysis?**
    a. to calculate the maximum and minimum values in a range
    b. to explore how changing input values affects calculated values
    c. to create charts and graphs
    d. to compare different versions of a workbook
11. **The four areas in this image are used to create a _____.**

Teacher's Signature

PROTECTION AND SECURITY IN EXCEL

ESSENTIAL LEARNING SKILLS:

5.1 **Protect Workbooks, Worksheets, and Cells**

5.2 **Make a Workbook Read-Only**

5.3 **Protect a Workbook's Structure**

5.4 **Protect a Worksheet from Editing**

5.1 PROTECT WORKBOOKS, WORKSHEETS, AND CELLS FROM EDITING

Excel files can be protected with passwords and other security options. Excel **files are not secure** by default. Security can be applied to Excel files at the workbook, sheet, or cell level, including the use of password security.

By protecting Excel workbooks, you can prevent other users from accidentally deleting important formulas or worksheets.

You can protect Excel workbooks at the file level or at the worksheet level. There are three levels of password protection in Excel: password protection to open a file, password protection to change data, or password protection for changing the file's structure, such as adding, deleting, or hiding worksheets.

Protection in Microsoft Excel is **password-based** and happens at **three different levels**.

- **Workbook:** You have a few options for protecting a workbook. You can encrypt it with a password to limit who can even open it. You can make the file open as read-only by default so that people have to opt into editing it. And you protect the structure of a workbook so that anyone can open it, but they need a password to rearrange, rename, delete, or create new worksheets.
- **Worksheet:** You can protect the data on individual worksheets from being changed.
- **Cell:** You can also protect just specific cells on a worksheet from being changed. Technically this method involves protecting a worksheet and then allowing certain cells to be exempt from that protection.

NOTE: Both Workbook and Excel File are the same.

PROTECT AN ENTIRE WORKBOOK FROM EDITING

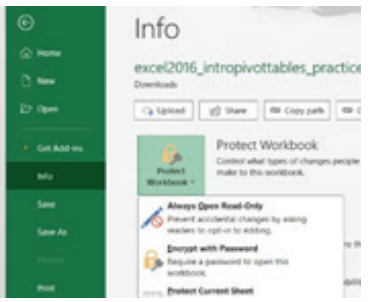
You have three choices when it comes to protecting an entire Excel workbook:

a. encrypt the workbook with a password,

b. make the workbook read-only

c. protect just the structure of a workbook.

a. Encrypt a Workbook with a Password



For the best protection, you can encrypt the file with a password. Whenever someone tries to open the document, Excel prompts them for a password first.

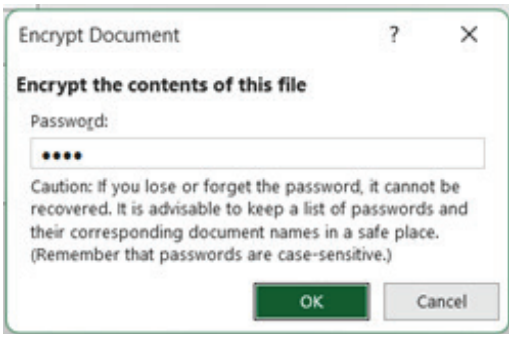
To set it up, open your Excel file and

1. Click the File tab and Click **Info**

2. Click the "**Protect Workbook**" button

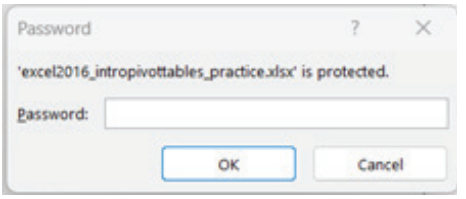
3. Choose "**Encrypt with Password**" from the dropdown menu.

4. In the Encrypt Document window that opens, type your password and then click "OK.", Type your Password again and then click OK.



Note: Pay attention to the warning in this window. Excel does not provide any way to recover a forgotten password, so make sure you use one you'll remember.

You'll be returned to your Excel sheet. But, after you close it, the next time you open it, Excel will prompt you to enter the password.

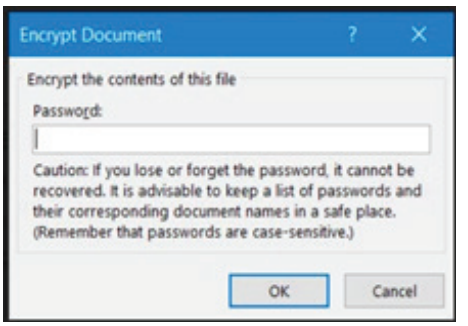


b) To remove the password protection from the file,

1. Open it up (which of course requires you to provide the current password),

2. follow the same steps you used for assigning the password.

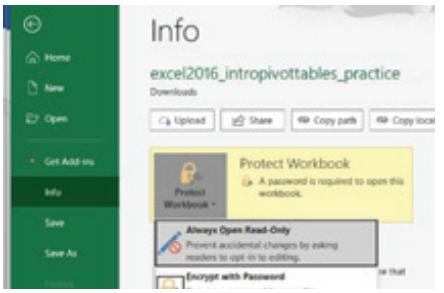
3. This time, make the password field blank an d then click "OK."



5.2 MAKE A WORKBOOK READ-ONLY

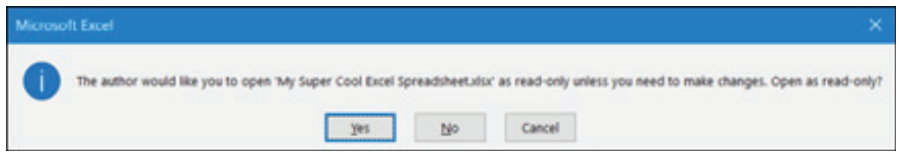
Making a workbook open as read-only is super simple. It doesn't offer any real protection because anyone who opens the file can

enable editing, but it can serve as a suggestion to be careful about editing the file.



To set it up, open your Excel file and head to the File menu. You'll see the "Info" category by default. Click the "Protect Workbook" button and then choose "Encrypt with Password" from the dropdown menu.

Now, whenever anyone (including you) opens the file, they get a warning stating that the file's author would prefer they open it as read-only unless they need to make changes.

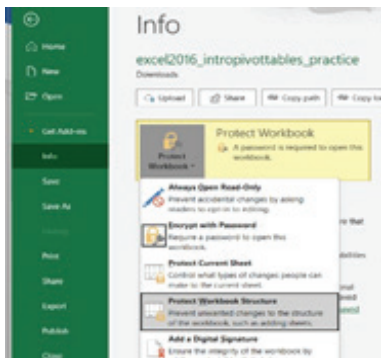


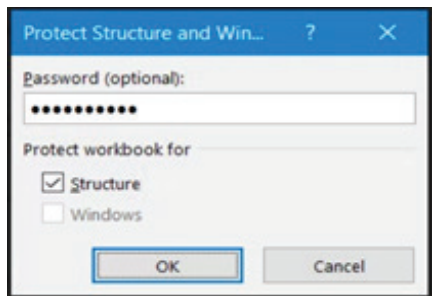
To remove the read-only setting, head back to the File menu, click the "Protect Workbook" button again, and toggle the "Always Open Read-Only" setting off.

5.3 PROTECT A WORKBOOK'S STRUCTURE

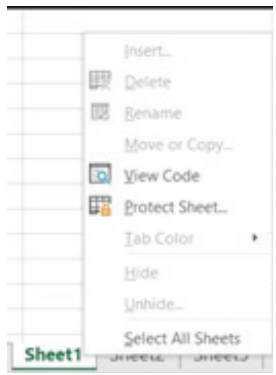
The final way you can add protection at the workbook level is by protecting the workbook's structure. This type of protection prevents people who don't have the password from making changes at the workbook level, which means they won't be able to add, remove, rename, or move worksheets.

To set it up, open your Excel file and head to the File menu. You'll see the "Info" category by default. Click the "Protect Workbook" button and then choose "Encrypt with Password" from the dropdown menu. Type your password and click OK., Confirm your password and click OK.

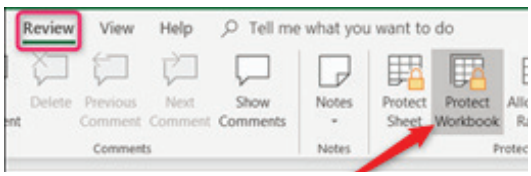




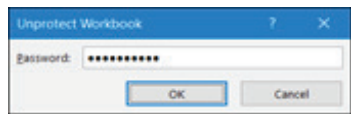
Anyone can still open the document (assuming you didn't also encrypt the workbook with a password), but they won't have access to the structural commands.



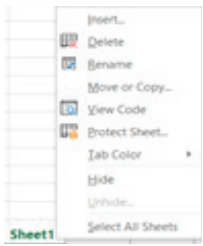
If someone knows the password, they can get access to those commands by switching over to the "Review" tab and clicking the "Protect Workbook" button.



They can then enter the password.



And the structural commands become available. This action removes the workbook structure protection from the document. To restore it, you must go back to the file menu and protect the workbook again.



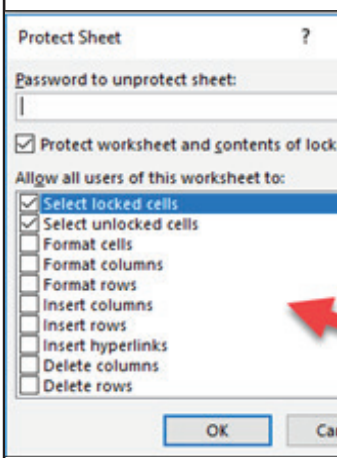
5.4 PROTECT A WORKSHEET FROM EDITING

Protecting your worksheet means that no one can edit, reformat, or delete the content.

You can also protect individual worksheets from editing. When you protect a worksheet, Excel locks all of the cells from editing.

Click on the "Review" tab on the main Excel ribbon and Click "Protect Sheet".

Enter the password you would like to use to unlock the sheet in the future.



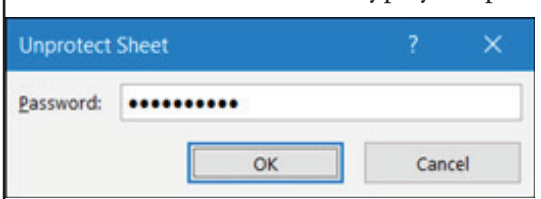
Select the permissions you would like users to have for the worksheet after it is locked. For example, you might want to allow people to format, but not delete, rows and columns.

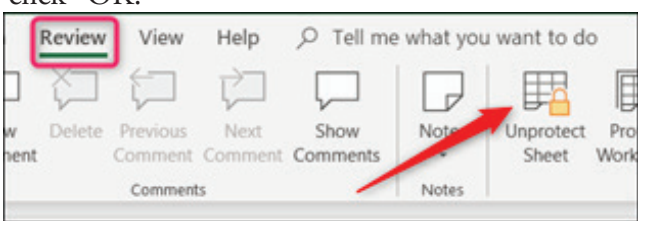
Click "OK" when you're done selecting permissions.

Re-enter the password you made to confirm that you remember it and then click "OK."

If you need to remove that protection, head to the "Review" tab and click the "Unprotect Sheet" button.

Type your password and then click "OK."

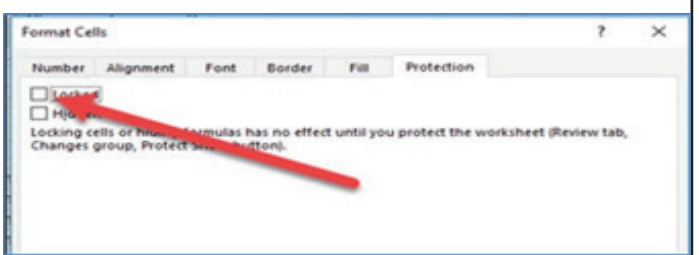




Your sheet is now unprotected. Note that the protection is entirely removed and that you'll need to protect the sheet again if you want.

a. Protect Specific Cells From Editing

Sometimes, you may only want to protect specific cells from editing in Microsoft Excel. For example, you might have an important formula or instructions that you want to keep safe. Whatever the reason, you can easily lock only certain cells in Microsoft Excel.



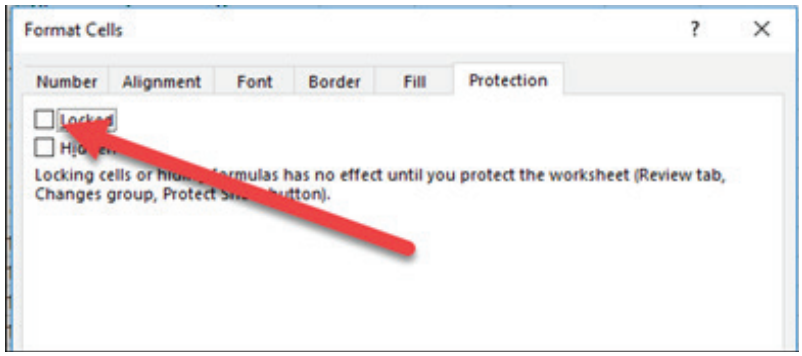
Start by selecting the cells you do not want to be locked. It might seem counterintuitive, but that's how it is.

Now, right-click on the selected cells and choose the "Format Cells" command. In the Format Cells window, switch to the "Protection" tab.

Untick the "**Locked**" checkbox and click "**OK**".
Now that you've selected the cells for which you want to allow editing, you can lock the rest of the worksheet by following the instructions in the previous section.

Note that you can lock a worksheet first and then select the cells you want to unlock, but Excel can be a little flaky about that. This method of selecting the cells you want to stay unlocked and then locking the sheet works better.

PROS AND CONS OF PROTECT SHEET IN EXCEL



Pros

1. A protected Excel sheet with a password is disables sensitive information from unwanted changes done by unauthorized entities.

2. Excel worksheet cell actions are access controlled. It means they can be configured to be available for some users and not others.

Cons

The password of the protected sheet is case-sensitive and is non-recoverable.

1.What is the purpose of Protecting sheet with a password?

To prevent users from accidentally or purposely making any modifications to the cells, worksheets, or the structure of the workbook, we can Protect the cells, worksheets, or workbook, respectively, by locking them with or without a password in the Excel worksheet.

2. What are the different methods to Protect Sheets in Excel?

There are three protection categories, as shown in the image below.

- Protect Sheet – It protects a particular worksheet from unwanted changes made by users by limiting their editing chances. If we want to protect multiple worksheets at a time, it is not possible. However, we can go to the necessary worksheets, one at a time, and protect sheets.

- Protect Workbook – It protects the entire workbook, i.e., Excel files worksheets. Here, users cannot make structural changes like adding, moving, or deleting worksheets.

- Allow Edit Ranges – It helps users to edit some cell ranges that are not password protected.

1. In order for the Lock or Unlock Cells function to work, which option should be enabled?

a. The *Protect Workbook* function needs to be enabled.

b. No functions need to be enabled other than the lock or unlock cells options.

c. The worksheet must be saved before the cells will become locked or unlocked.

d. The Protect Worksheet function needs to be enabled.

2. What is the only way of removing password encryption on an Excel file?

a. Resaving the workbook as a new document or making a copy of it.

b. Opening the workbook as *Read Only* and resaving it without a password.

c. Opening the workbook in *Protected View* and resaving it without a password.

d. Entering the password to open the Workbook and then deleting the password created in the Permissions – Encrypt with Password box.

3. To protect a worksheet, you can choose Protection and the Protect Sheet from the ….. Tab

a. Home b. Data c. Review d. Tools

4. What is the main advantage of selecting the Mark as Final option?

a. It ensures that the workbook is free of errors.

b. It discourages other users from editing the workbook.

c. It prevents other users from editing the workbook.

d. It prevents other users from viewing the workbook.

Teacher's Signature