Background and Overview:

What is Microsoft ® Excel?

Microsoft ® Excel is a commercial spreadsheet application that is produced and distributed by Microsoft for Microsoft ® Windows and Mac OS operating systems. It features the ability to perform basic calculations, use graphing tools, create pivot tables and create macros, among other useful features.

Microsoft ® Excel uses a collection of cells arranged into rows and columns to organize and manipulate data. The data could also be displayed using charts, histograms, and line graphs.

Pre-Lab Activities:

Renaming worksheet:

- Double click the **"Sheet 2"** worksheet tab to select its name

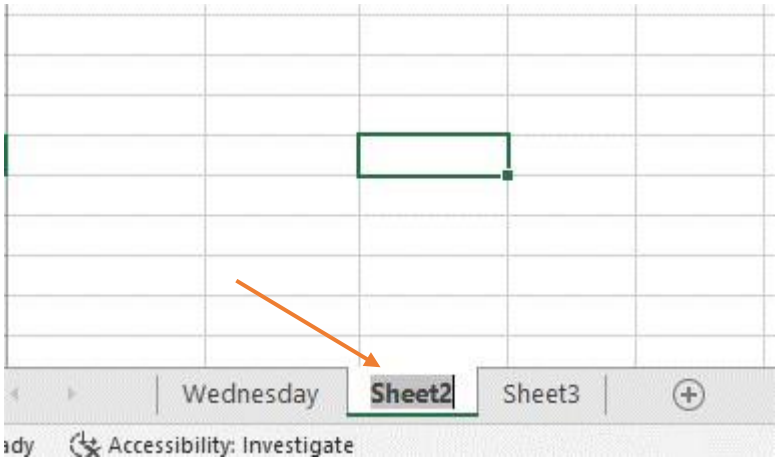


Fig. 1 (Renaming worksheet)

- Type **"Monday"** and press **"Enter"**. New name will appear on the tab.
- Repeat the steps for **"Sheet 3"** and name it **"Tuesday"**

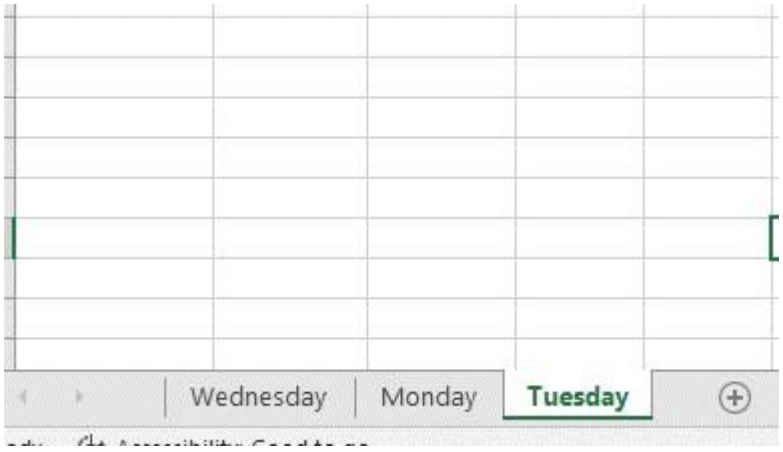


Fig. 2 (Renaming Worksheet)

Reposition worksheets:

- Click the **"Wednesday"** worksheet tab. On the Home tab, in the Cells group, click **"Format"** → Click **"Move or Copy Sheet"**

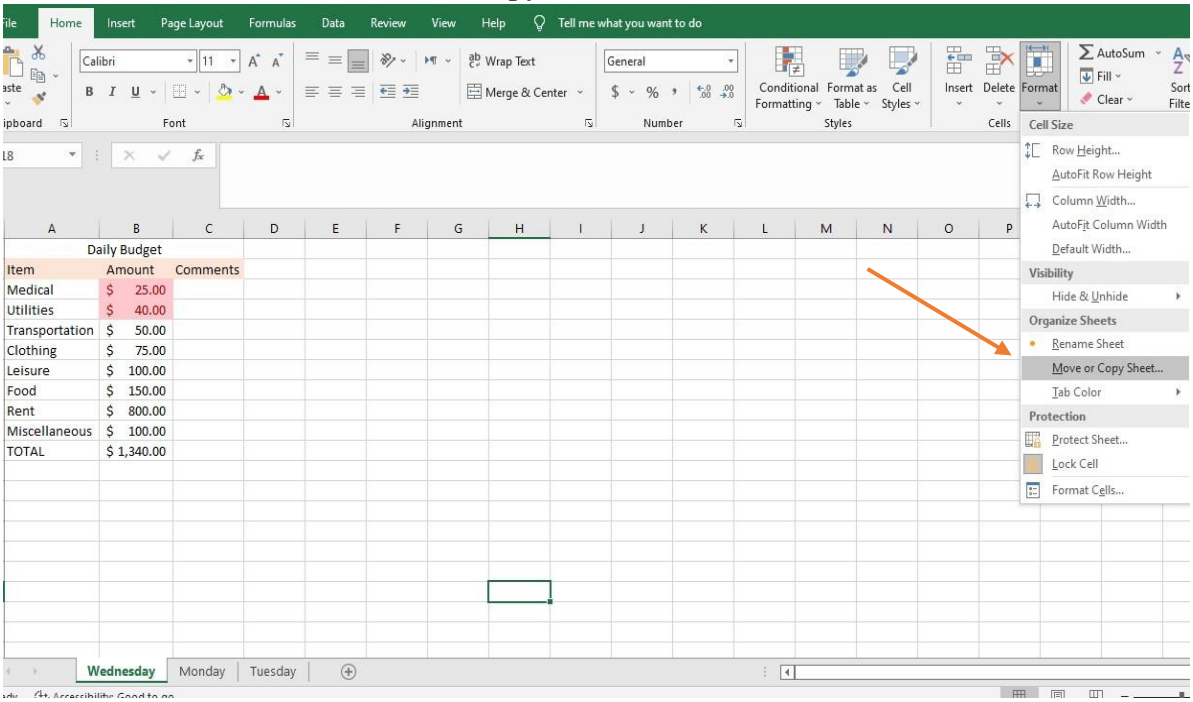


Fig. 3 (RepositionWorksheet)

- Move or Copy dialog will appear
- Select **"(move to end)"**. Then click **"OK"**

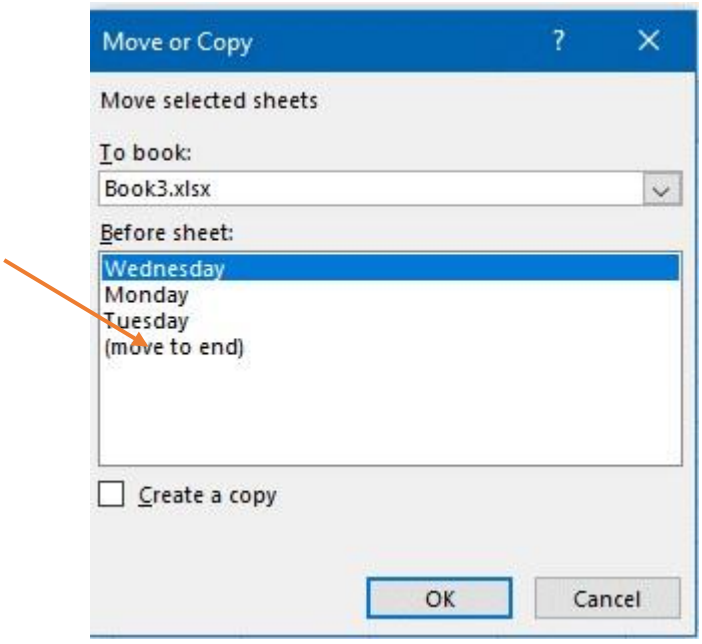


Fig. 4 (Move or Copy dialog)

Wednesday worksheet will be moved to the end of the tab.

Fig. 5 (Reposition Worksheet)

Change color of worksheet tab:

- Right-click the **"Monday"** worksheet tab
- In the shortcut menu, click **"Tab Color"**

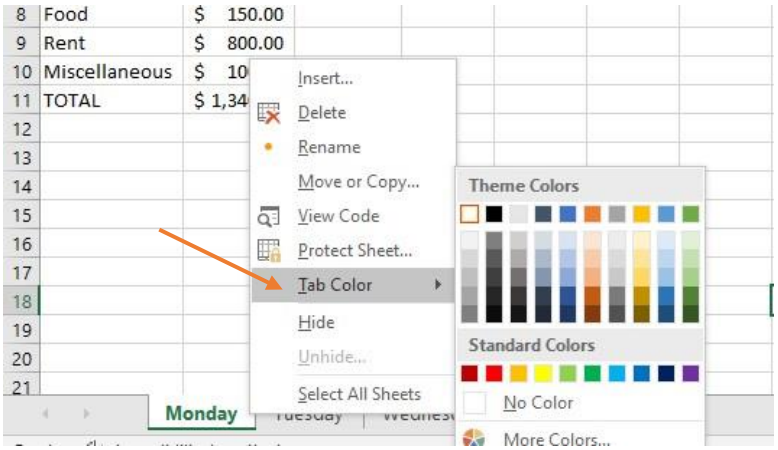


Fig. 6 (Tab Color)

- Select **"Red"** color
- Similarly change colors of **"Tuesday"** and **"Wednesday"** worksheets

Fig. 7 (Tab Color)

Hide/Unhide worksheets:

- Right-click the **"Monday"** worksheet tab
- In the shortcut menu, click **"Hide"**

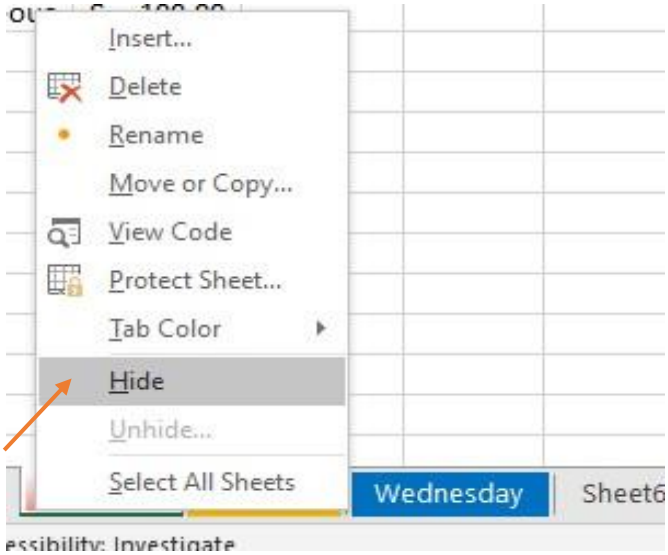


Fig. 8 (Hide worksheet)

- Similarly, to unhide a worksheet, right click the worksheet tab
- In the shortcut menu, click **"Unhide"**

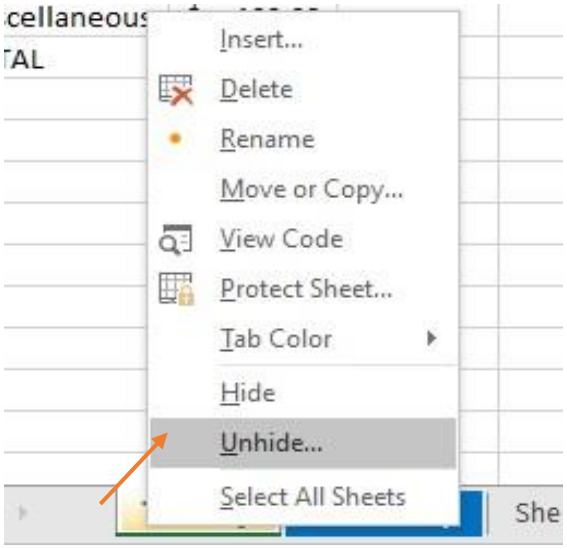


Fig. 9 (Unhide worksheet)

- Unhide dialog box will appear
- Select the worksheet you want to unhide
- Click **"OK"**

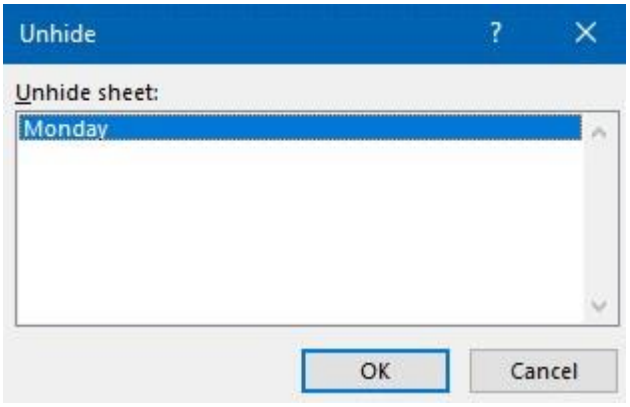


Fig. 10 (Unhide dialog)

Task 01: Creating a Workbook **[Estimated 20 minutes / 20 marks]**

- Show your daily University time table
- Create a separate worksheet for each day
- Apply different colors to worksheet tabs
- Hide any two worksheets
- Save the document named **"Your Roll No"**
- Email the document named with your roll no like **"BSEF19M021"** to the respective TA.
- The subject of your email should be "Your RollNo_Pre-Lab07".

Importing data:

- Click the **"Data"** tab
- In the **"Get External Data"** group, click **"From Text"**

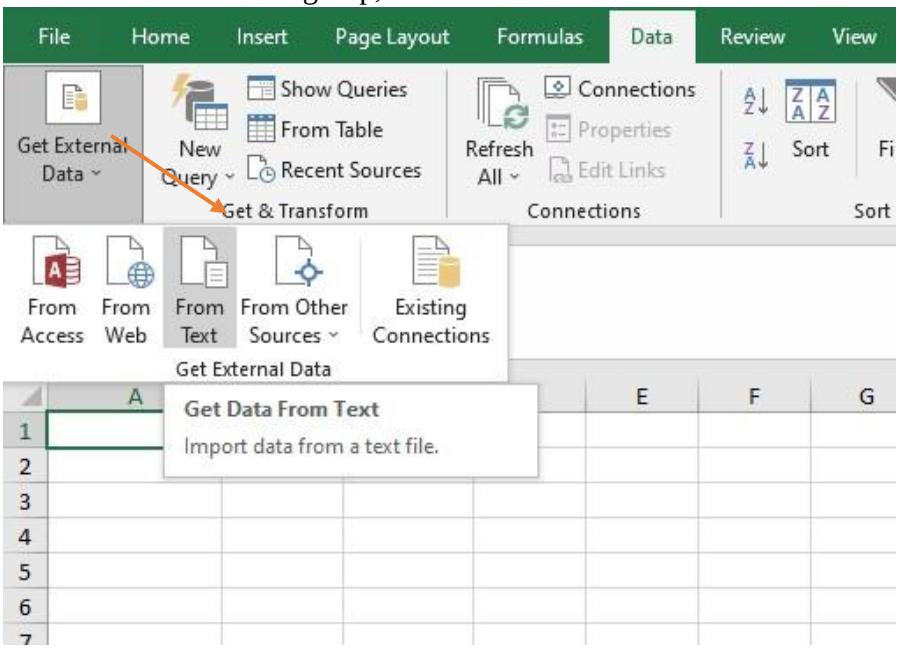


Fig. 11 (Importing data)

- In the **"Text Import Wizard"** dialog, choose the option that best describes your data Click **"Next"**

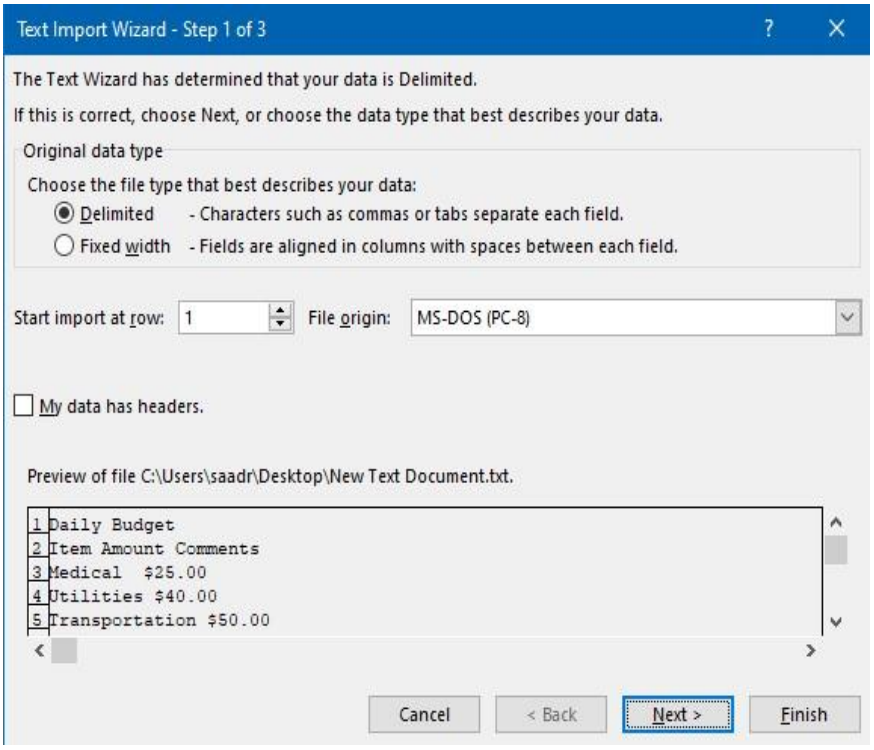


Fig. 12 (Text Import Wizard dialog)

- Select the delimiters, then click finish

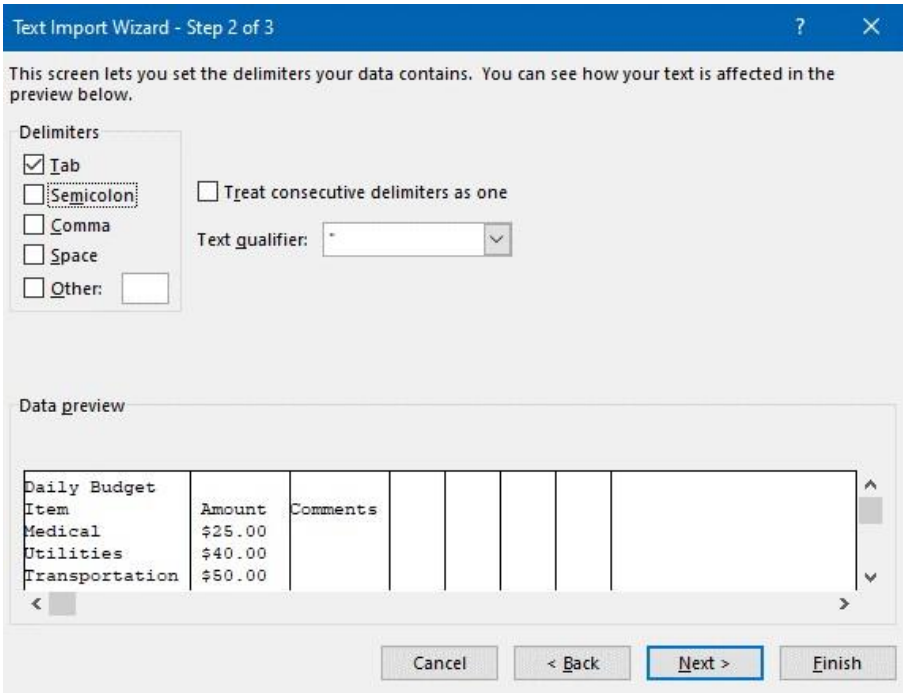


Fig. 13 (Text Import Wizard dialog)

Data from the text file will be added to your worksheet depending on the options you selected.

Allow specific values:

- Select a column C
- On the **"Data tab"**, in the **"Data Tools"** group, click **"Data Validation"**

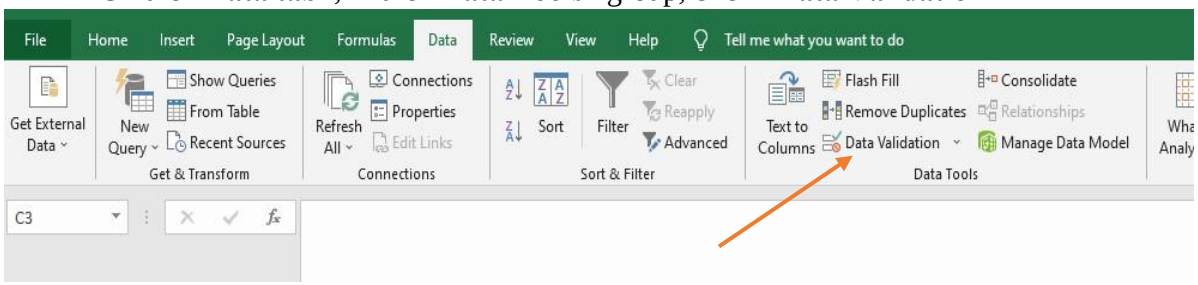


Fig. 14 (Data Validation)

- Data Validation dialog will appear. Select **"text length"** in allow tab
- Enter minimum value as **"5"**
- Enter minimum value as **"10"**
- Click **"OK"**

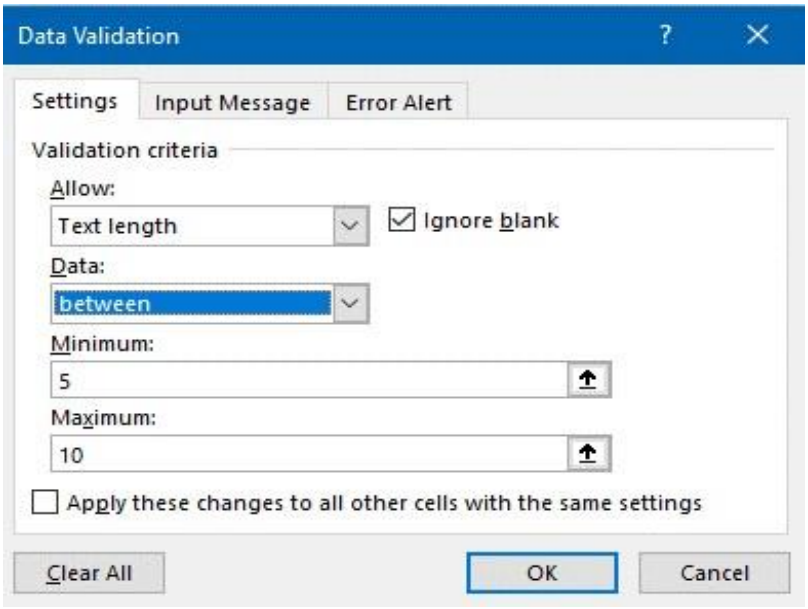


Fig. 15 (Data Validation dialog)

Now if you enter a value out of the range between 5 to 10, then an error message will appear.

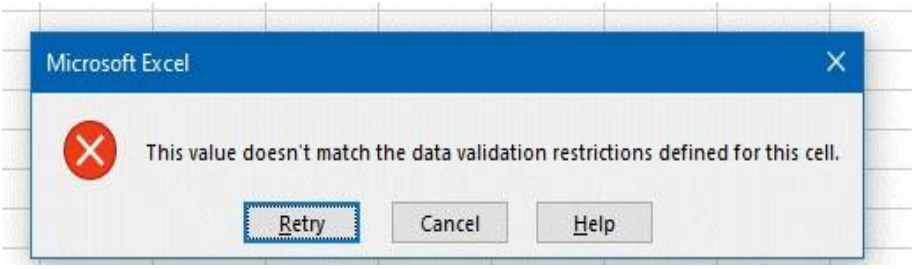


Fig. 16 (Error message)

Macro in Microsoft ® Excel:

If you have tasks in Microsoft ® Excel that you do repeatedly, you can record a macro to automate those tasks. A macro is an action or a set of actions that you can run as many times as you want. When you create a macro, you are recording your mouse clicks and keystrokes.

Record a Macro:

- Click the **"View tab"** on the Ribbon
- Click **"Macros"** in the **"Macros group"**
- Select **"Record Macro"** from the drop-down list

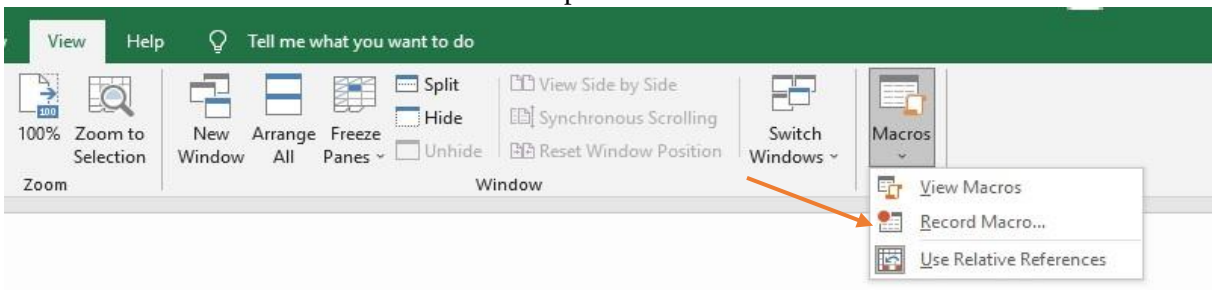


Fig. 17 (Macros)

The **"Record Macro"** dialog box appears.

- Type **"First Macro"** in Macro name box
- Click **"OK"**

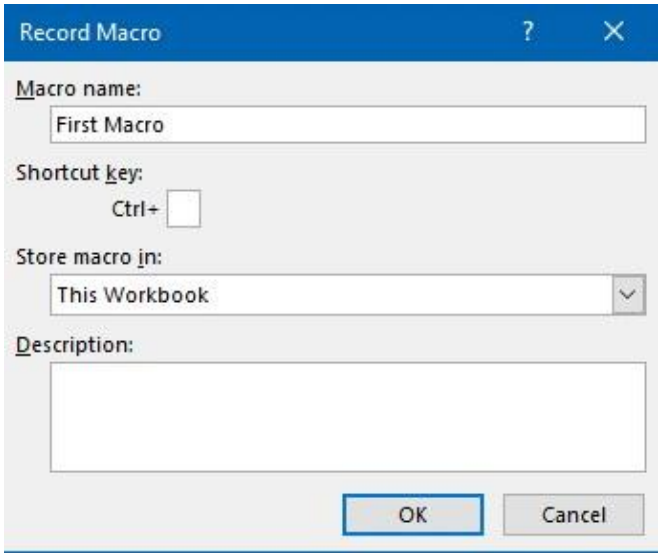


Fig. 18 (Record Macro dialog)

- Create a table
- Click the **"View tab"** on the Ribbon
- Click **"Macros"** in the **"Macros group"**
- Select **"Stop Recording"** from the drop-down list

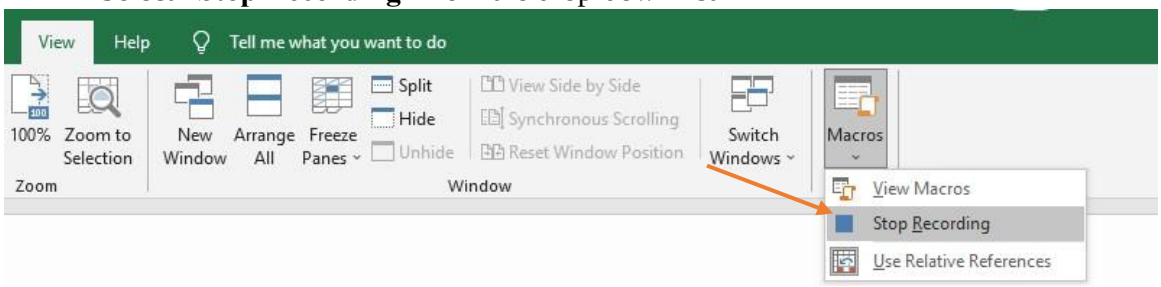


Fig. 19 (Macros)

Running a Macro:

- Click the **"View tab"** on the Ribbon
- Click **"Macros"** in the **"Macros group"**
- Select **"View Macros"** from the drop-down list

Fig. 20 (Macros)

Click the Macro name in the Macro dialog box

- Click the **"RUN"** button

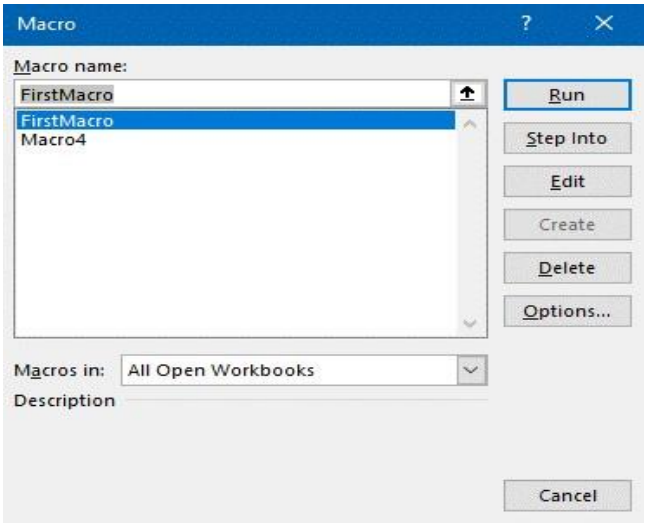


Fig. 21 (Macro)

Advanced Formulas:

Function	Syntax
SUMIF	SUMIF (Range, Criteria, Sum_range)
SUMIFS	SUMIFS (Sum_range, Criteria_range1, Criteria1, Criteria_range2, Criteria2, ...)
COUNTIF	COUNTIF (Range, Criteria)
COUNTIFS	COUNTIFS (Criteria_range1, Criteria1, Criteria_range2, Criteria2, ...)
AVERAGEIF	AVERAGEIF (Range, Criteria, Average_range)
AVERAGEIFS	AVERAGEIFS (Average_range, Criteria_range1, Criteria1, Criteria_range2, Criteria2, ...)
VLOOKUP	VLOOKUP (Lookup_value, Table_array, Col_index_num, Range_lookup)
HLOOKUP	HLOOKUP (Lookup_value, Table_array, Row_index_ num, Range_lookup)
IF	IF (Logical_test, Value_if_true, Value_if_false)
AND	AND (Logical1, Logical2, ...)
OR	OR (Logical1, Logical2, ...)
LEFT	LEFT (Text, Num_chars)
RIGHT	RIGHT (Text, Num_chars)
MID	MID (Text, Start_num, Num_chars)
TRIM	TRIM (Text)
PROPER	PROPER (Text)
UPPER	UPPER (Text)
LOWER	LOWER (Text)
CONCATENATE	CONCATENATE (Text1, Text2, ...)

SUMIF Function:

The SUMIF function is used to sum the values in a range that meet a specific criteria. For example, suppose that in a column that contains numbers, you want to sum only the values that are less than 300000. You can use the following formula: =SUMIF(C3:C6,"<300000"). It will result the sum of all those values which are less than 300000 in cells C3, C4, C5 and C6.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"Math & Trig"**. Scroll to and click **"SUMIF"**

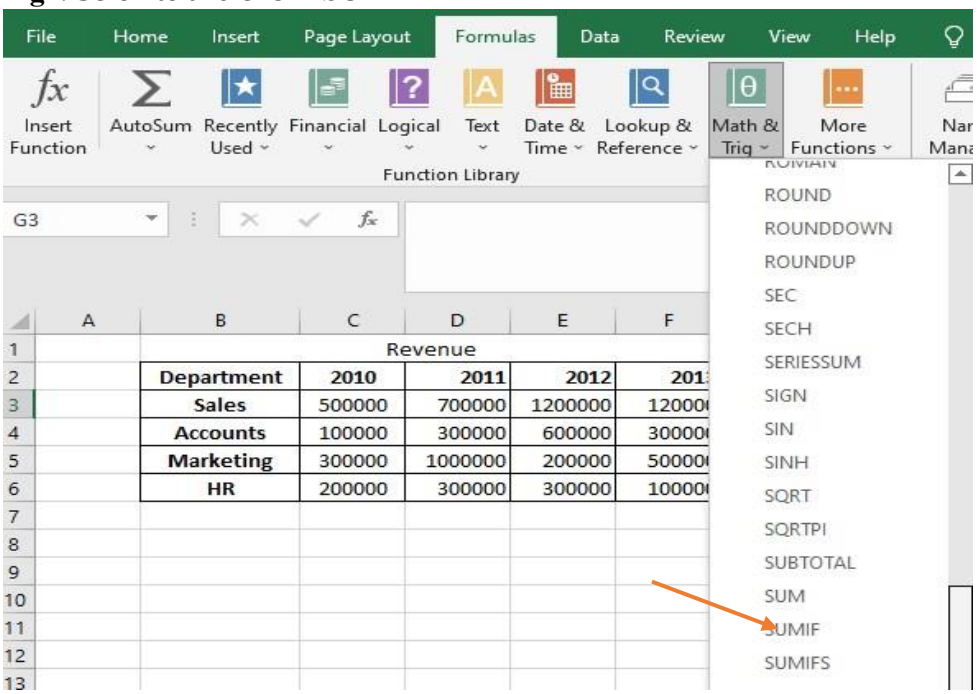


Fig. 22 (SUMIF Function)

The Function Arguments dialog box opens with text boxes for the arguments, a description of the formula, and a description of each argument

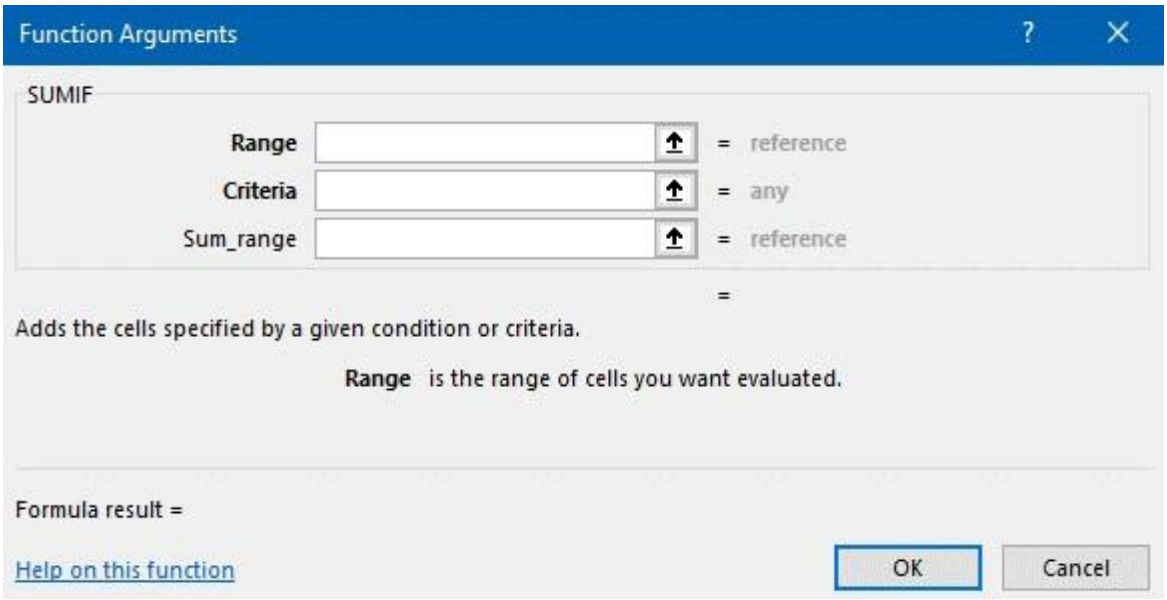


Fig. 23 (Function Arguments dialog)

- In **"Range"** box, select the cell range **C3:C6**. Press **"Enter"**. By doing this, you apply the cell range that the formula will use in the calculation

- In the **"Criteria"** box, type **"< 300000"** and then press **"Tab". "Sum_range"** is not bold, that means this is optional
- Click **"OK"**

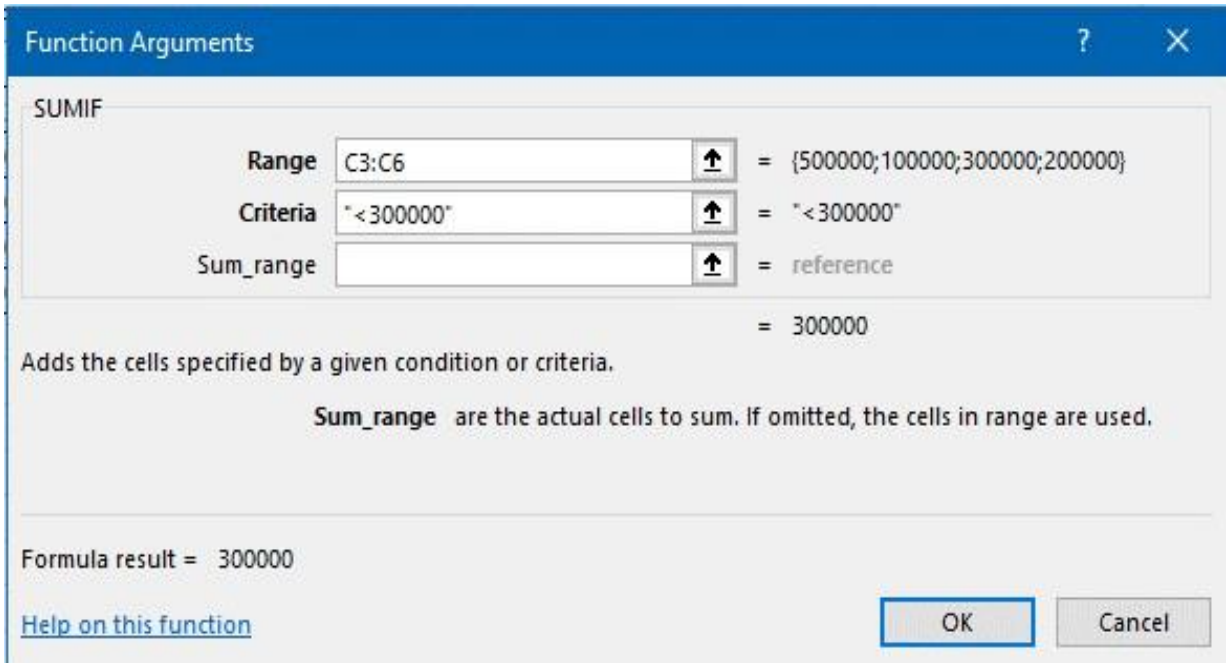


Fig. 24 (Function Arguments dialog)

Result will be displayed in the active cell.

	A	B	C	D	E	F	G
1		Revenue					
2		Department	2010	2011	2012	2013	
3		Sales	500000	700000	1200000	120000	
4		Accounts	100000	300000	600000	300000	
5		Marketing	300000	1000000	200000	500000	
6		HR	200000	300000	300000	100000	
7			300000				
8							
9							

Fig. 25 (SUMIF Function)

COUNTIF Function:

COUNTIF function is used to count the number of cells that meet a criterion; for example, to count the number of times the Revenue was more than 400000.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"More Functions"**. In **"Statistical"** group, scroll to and click **"COUNTIF"**

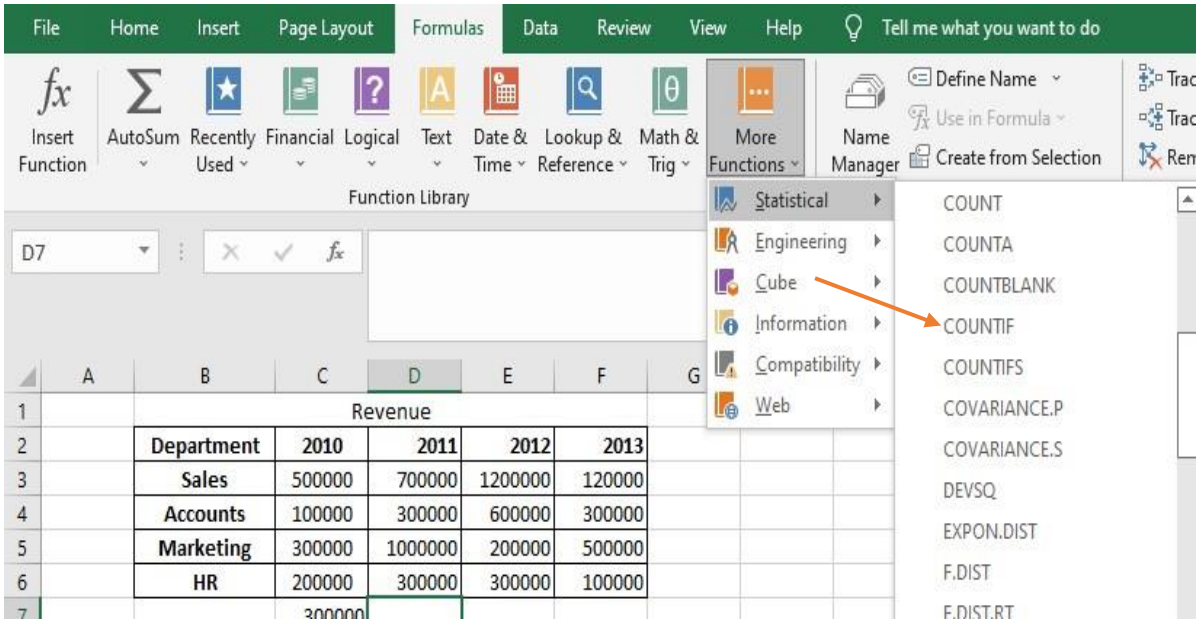


Fig. 26 (COUNTIF Function)

The Function Arguments dialog box opens with text boxes for the arguments

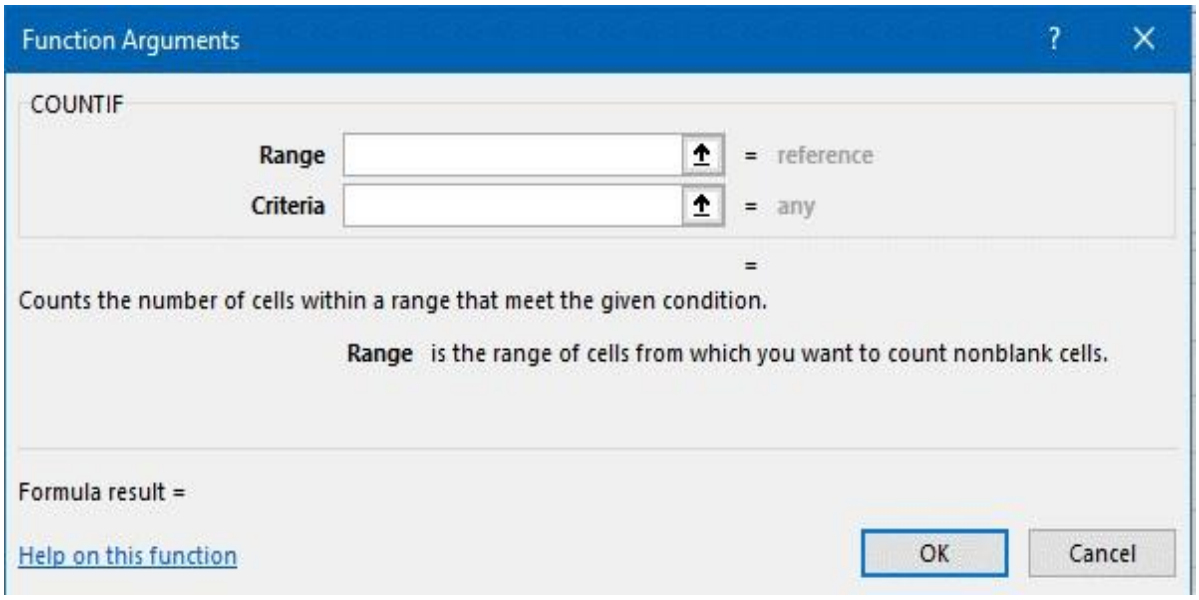


Fig. 27 (Function Arguments dialog)

- In **"Range"** box, select the cell range **D3:D6**. Press **"Enter"**. By doing this, you apply the cell range that the formula will use in the calculation
- In the **"Criteria"** box, type **"> 400000"**
- Click **"OK"**

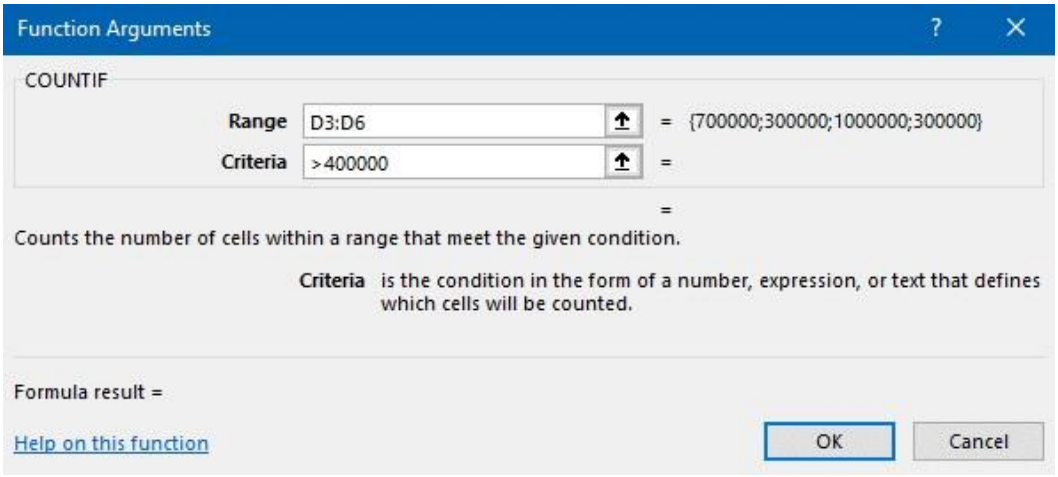


Fig. 28 (Function Arguments dialog)

Result will be displayed in the active cell.

	A	B	C	D	E	F
1		Revenue				
2		Department	2010	2011	2012	2013
3		Sales	500000	700000	1200000	120000
4		Accounts	100000	300000	600000	300000
5		Marketing	300000	1000000	200000	500000
6		HR	200000	300000	300000	100000
7			300000	2		

Fig. 29 (COUNTIF Function)

IF Function:

The IF function is one of the most popular functions in Excel, and it allows you to make logical comparisons between a value and what you expect. So an IF statement can have two results. The first result is if your comparison is True, the second if your comparison is False.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"Logical"**. Click **"IF"**

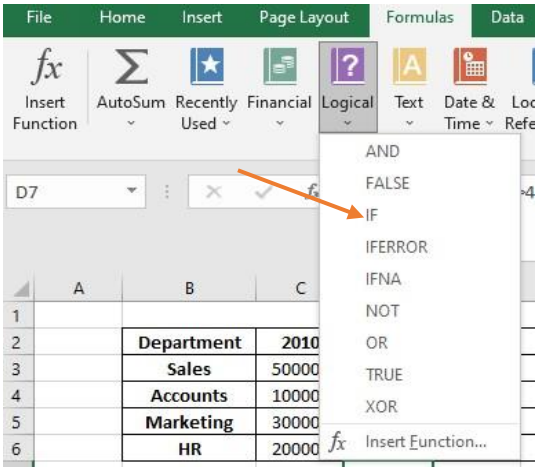


Fig. 30 (IF Function)

The Function Arguments dialog box opens with text boxes for the arguments.

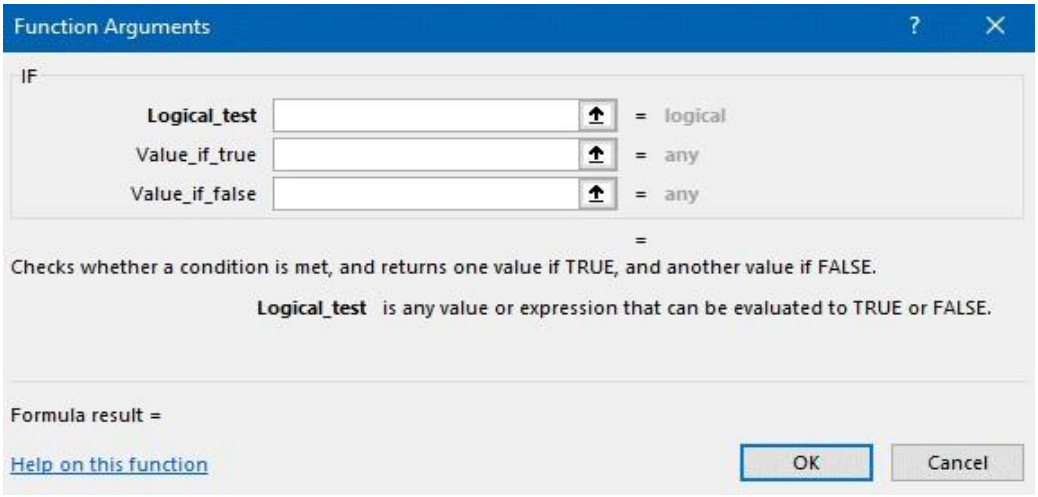


Fig. 31 (Function Arguments dialog)

- In **"Logical_test"** box, type **C3 > D3**. Press **"Enter"**. This component defines whether the sales of 2010 are more than 2011 and vice versa
- In the **"Value_if_true"** box, type **"More sales in 2010"** and then press **"Tab"**
- In the **"Value_if_false"** box, type **"More sales in 2011"** and then press **"Tab"** and Click **"OK"**

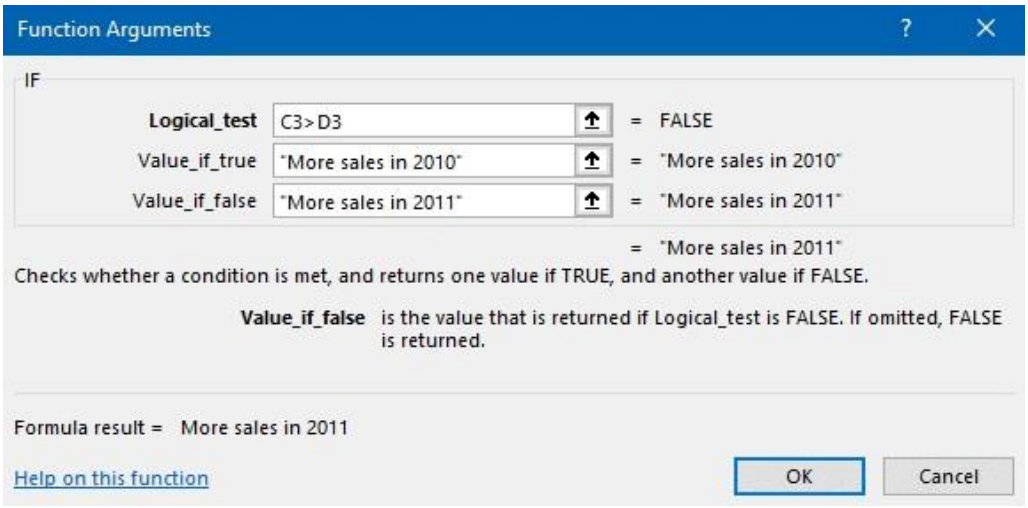


Fig. 32 (Function Arguments dialog)

Result will be displayed in the active cell.

	A	B	C	D	E	F	G
1		Revenue					
2		**Department**	**2010**	**2011**	**2012**	**2013**	
3		**Sales**	500000	700000	1200000	120000	More sales in 2011
4		**Accounts**	100000	300000	600000	300000	
5		**Marketing**	300000	1000000	200000	500000	
6		**HR**	200000	300000	300000	100000	
7			300000	2			

Fig. 33 (IF Function)

We can also use IF function with text data. For example if you type, **=IF(C2="Yes", 1, 2)** in a cell it means, IF the value in the **cell C2** is equal to **Yes**, then return a 1, otherwise return a 2.

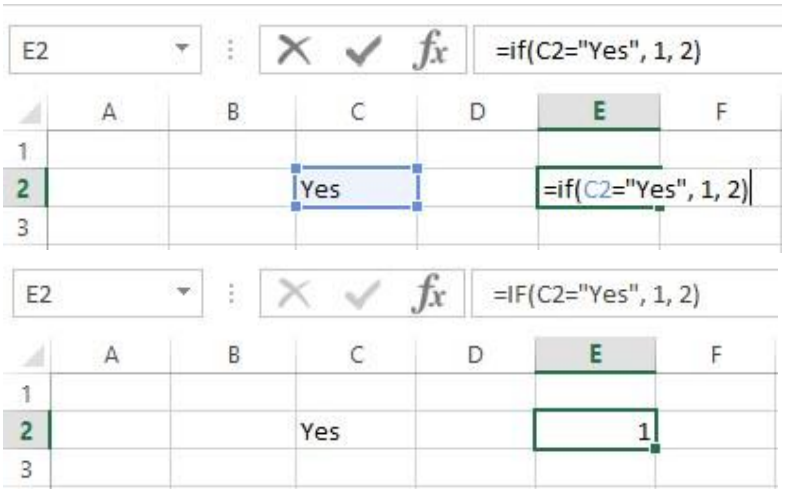


Fig. 34 (IF Function)

AND Function:

The AND function is used to determine if all conditions in a test are TRUE. The AND function returns TRUE if all its arguments evaluate to TRUE, and returns FALSE if one or more arguments evaluate to FALSE.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"Logical"**. Click **"AND".** The Function Arguments dialog box opens with text boxes for the arguments.

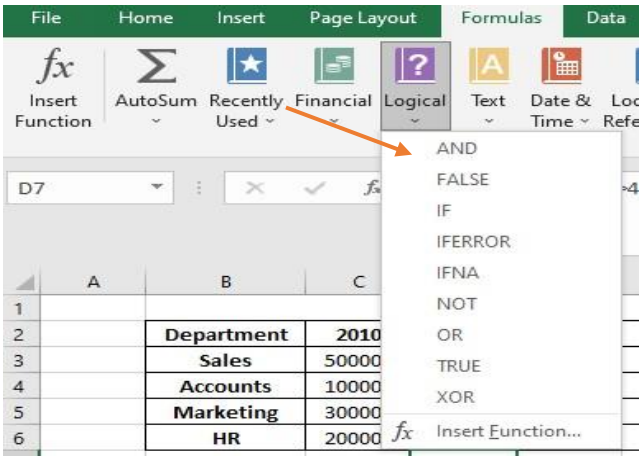


Fig. 35 (AND Function)

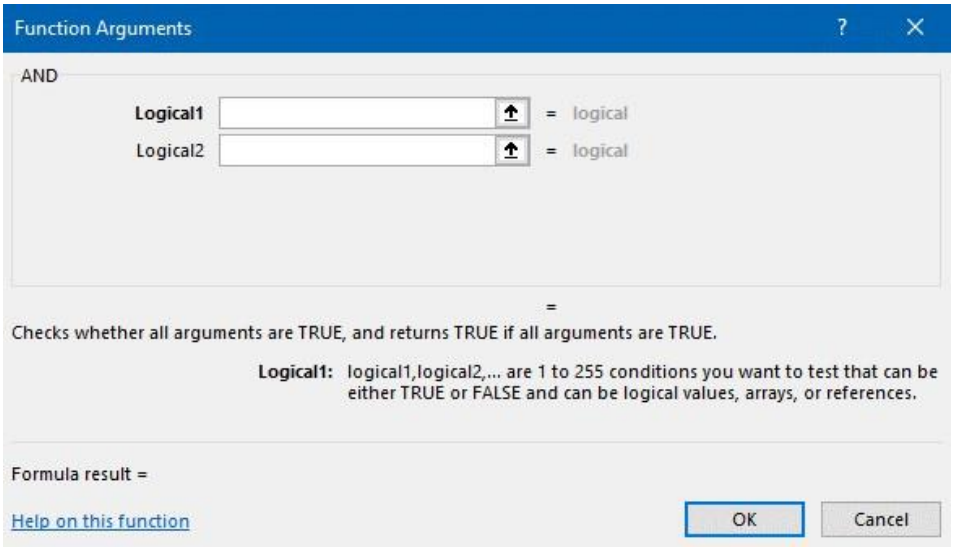


Fig. 36 (Function Arguments dialog)

- In **"Logical 1"** box, type **"C3 < D3"**. Press **"Tab"**
- In **"Logical 2"** box, type **"C3 < E3"**. Press **"Tab"** and
- Click **"OK"**

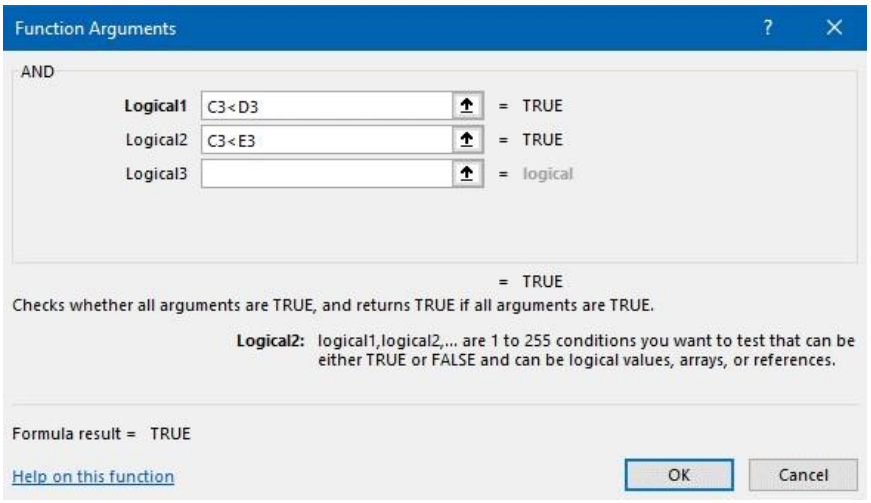
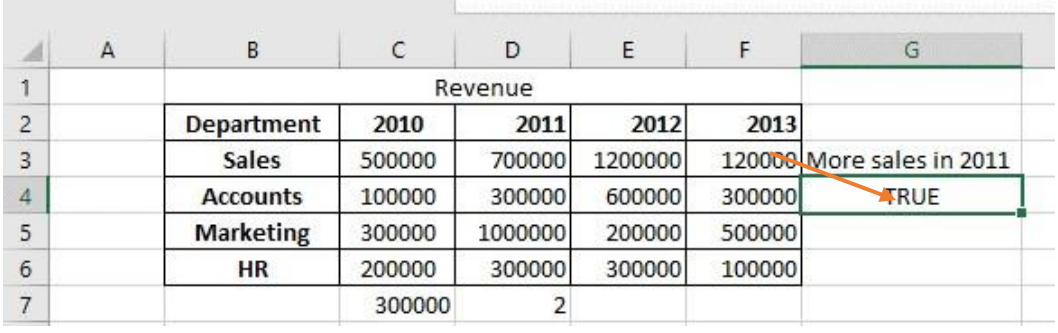


Fig. 37 (Function Arguments dialog)

Result will be displayed in the active cell. It will return **TRUE** if all logical conditions are true else will return **FALSE.**



	A	B	C	D	E	F	G
1		Revenue					
2		Department	2010	2011	2012	2013	
3		Sales	500000	700000	1200000	120000	More sales in 2011
4		Accounts	100000	300000	600000	300000	TRUE
5		Marketing	300000	1000000	200000	500000	
6		HR	200000	300000	300000	100000	
7			300000	2			

Fig. 38 (AND Function)

We can also use AND function in an IF function. For example if you type, **=IF(AND(A2=10,**

B2=20), 1, 0) in a cell it means, **IF** the value in the **cell A2** is equal to **10**, **AND** the value in the **cell B2** is equal to **20** then return **1**, otherwise return **2**.

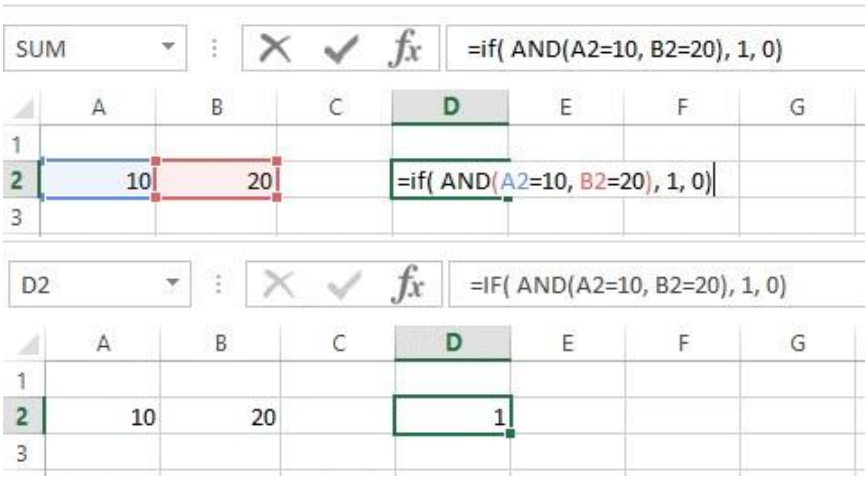


Fig. 39 (AND Function)

OR Function:

The OR function is used to determine if any conditions in a test are TRUE. The OR function returns
TRUE if any of its arguments evaluate to TRUE, and returns FALSE if all of its arguments evaluate to FALSE.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"Logical"**. Click
  "OR"

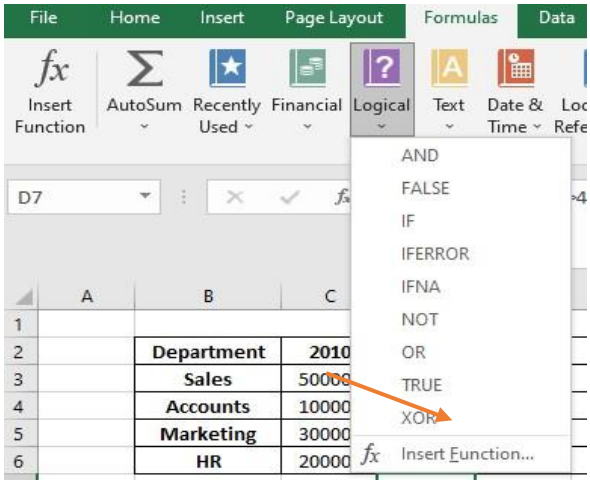


Fig. 40 (OR Function)

The Function Arguments dialog box opens with text boxes for the arguments.

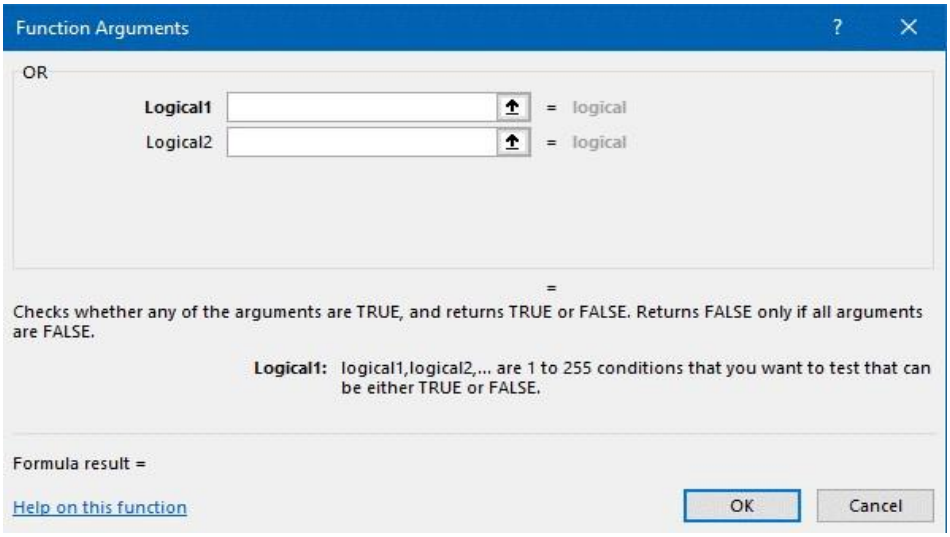


Fig. 41 (Function Arguments dialog)

- In **"Logical 1"** box, type **"C3 > D3"**. Press **"Tab"**
- In **"Logical 2"** box, type **"C3 > E3"**. Press **"Tab"** and
- Click **"OK"**

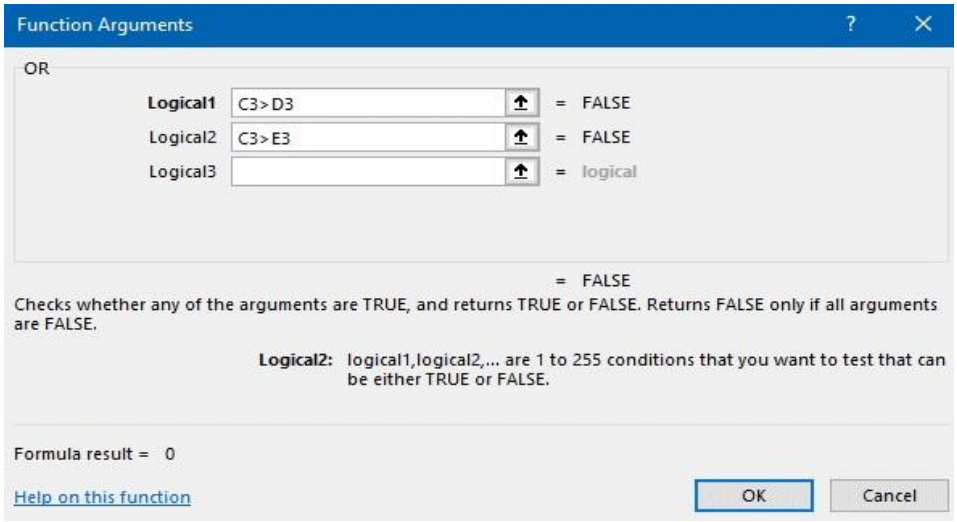
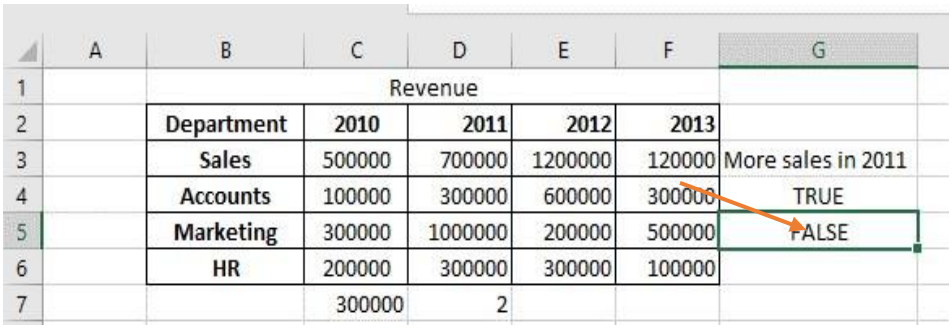


Fig. 42 (Function Arguments dialog)

Result will be displayed in the active cell. It will return **FALSE** if all logical conditions are false else will return **TRUE.**



	A	B	C	D	E	F	G
1		Revenue					
2		Department	2010	2011	2012	2013	
3		Sales	500000	700000	1200000	120000	More sales in 2011
4		Accounts	100000	300000	600000	300000	TRUE
5		Marketing	300000	1000000	200000	500000	FALSE
6		HR	200000	300000	300000	100000	
7			300000	2			

Fig. 43 (OR Function)

We can also use OR function in an IF function. For example if you type, **=IF(OR (A2=10, B2=20), 1, 0)** in a cell it means, **IF** the value in the **cell A2** is equal to **10**, **OR** the value in the **cell B2** is equal to **20** then return **1**, otherwise return **2**.

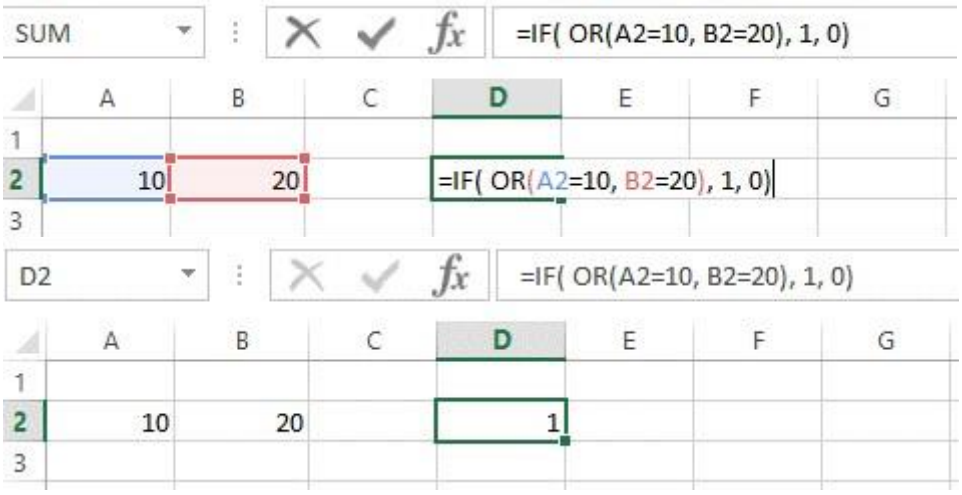


Fig. 44 (OR Function)

PROPER Function:

The PROPER function capitalizes the first letter in a text string and any other letters in text that follow any character other than a letter. Converts all other letters to lowercase letters. For example

The function **=PROPER ("pakistan zindabad")** written in any cell of the worksheet will return the text **Pakistan Zindabad** in the same cell.

The function **=PROPER (C2)** written in any cell of the worksheet will return the text **of the cell C2** in the current cell in proper form as described above.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"Text"**. Scroll to and click **"PROPER"**

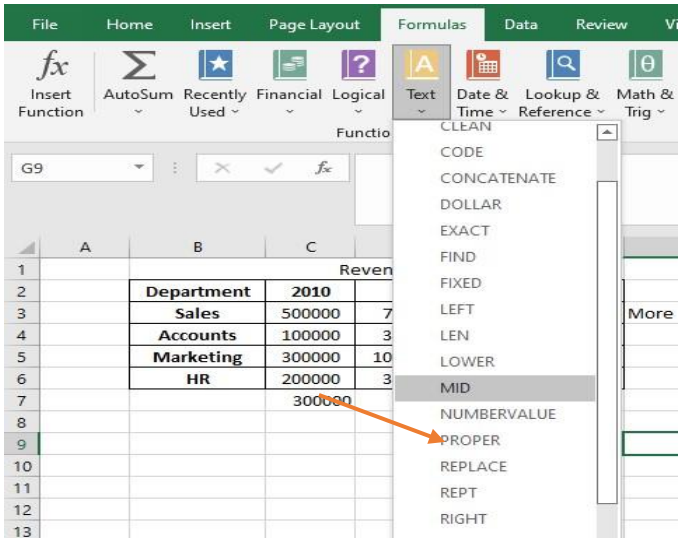


Fig. 45 (PROPER Function)

The Function Arguments dialog box opens with text boxes for the arguments

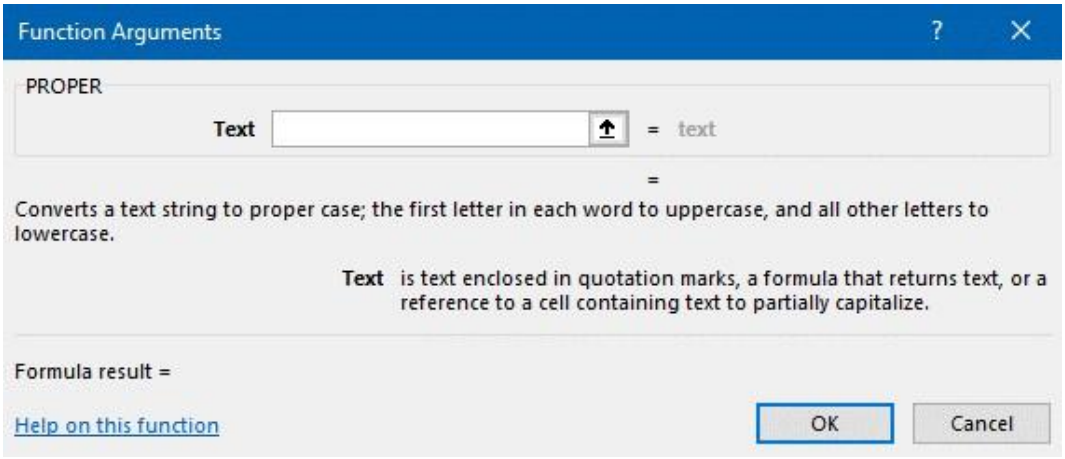


Fig. 46 (Function Arguments dialog)

- In **"Text"** box, enter any text. Press **"Tab"** and Click **"OK"**

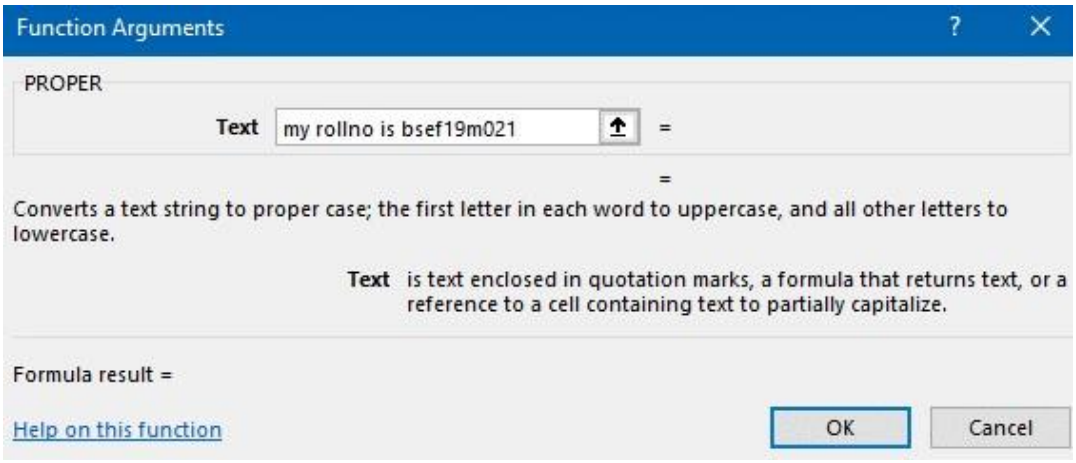


Fig. 47 (Function Arguments dialog)

Result will be displayed in the active cell. Text will be returned in proper case

Fig. 48 (PROPER Function)

PROPER can also be used directly to convert text any cell to PROPER case as follows

- In **cell B4** type **pakistan zindabad.** In any cell for example **cell D4** type **=PROPER (B4)** and press **Enter**. This will convert text of **cell B4** into PROPER case in **cell D4**.

Similarly the functions of UPPER convert a text string into upper case. For example the function **=UPPER ("pakistan zindabad")** written in any cell of the worksheet will return the text **PAKITAN ZINDABAD** in the same cell.

The functions of LOWER convert a text string into lower case. For example the function **=LOWER ("PAKITAN ZINDABAD")** written in any cell of the worksheet will return the text **pakistan zindabad** in the same cell.

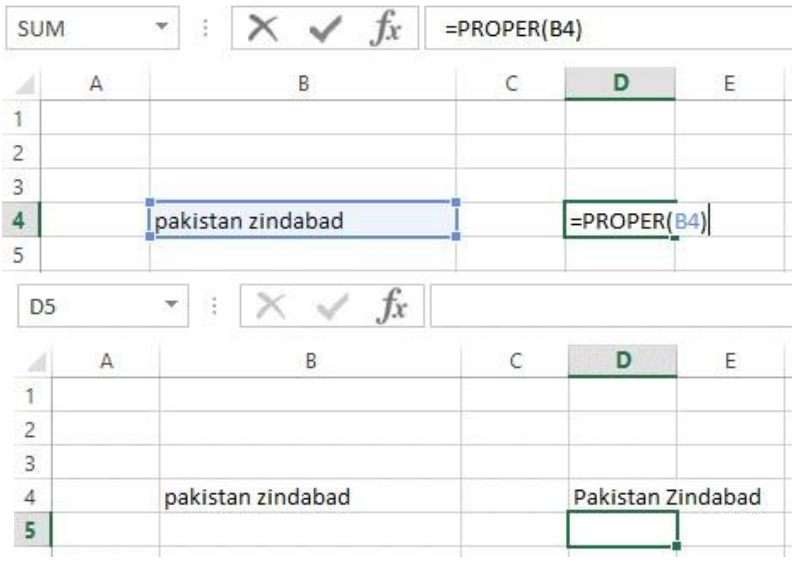


Fig. 49 (PROPER Function)

CONCATENATE Function:

The CONCATENATE functions is used to join two or more text strings into one string. For example if one types **=CONCATENATE("Mr Ahmad obtained ", A2, " marks in exams.")**. Assume that the **cell A2** contains the value 998 than this will return the string **Mr. Ahmad has obtained 998 marks in exams**. The value 998 would be taken from the **cell A2**.

- Click the **"Formulas Tab"** and then in the **"Function Library"** group, click **"Text"**. Scroll to and click **"CONCATENATE"**

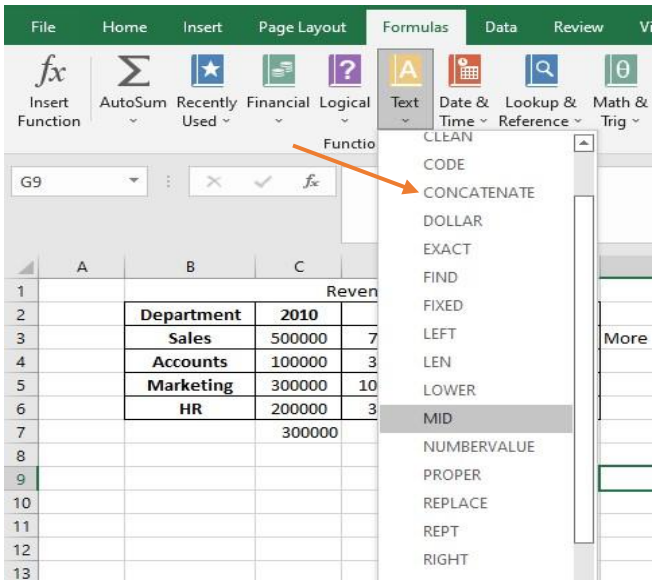


Fig. 50 (CONCATENATE Function)

The Function Arguments dialog box opens with text boxes for the arguments

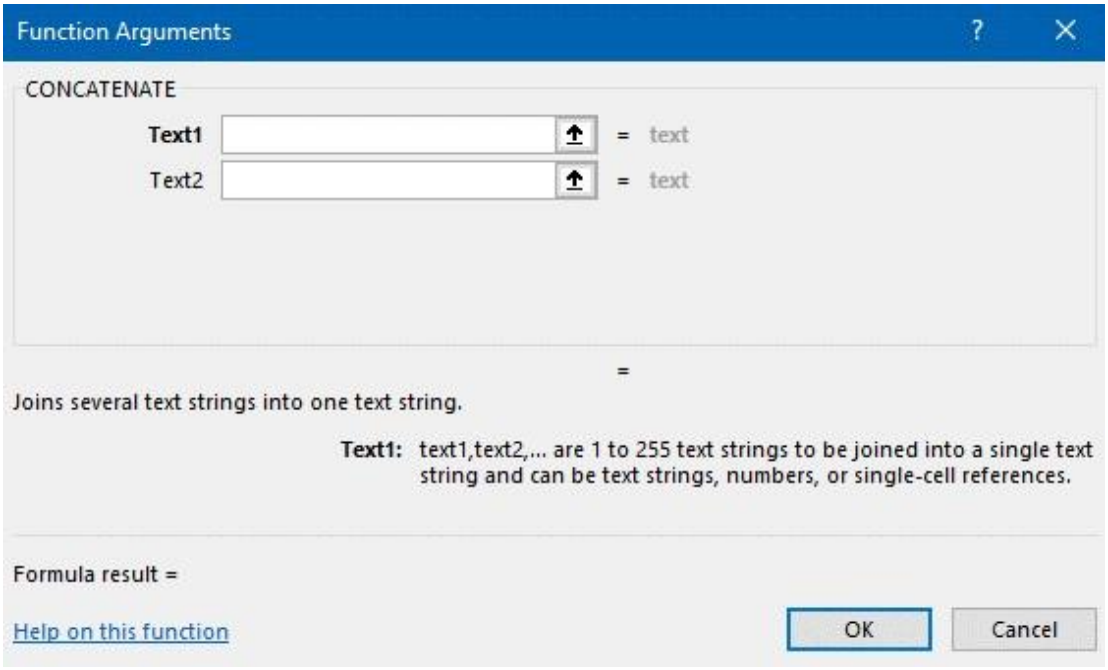


Fig. 51 (Function Arguments dialog)

- In **"Text 1"** box, enter any text or Cell No. Press **"Tab"**
- In **"Text 2"** box, enter any text or Cell No. Press **"Tab"**
- Click **"OK"**

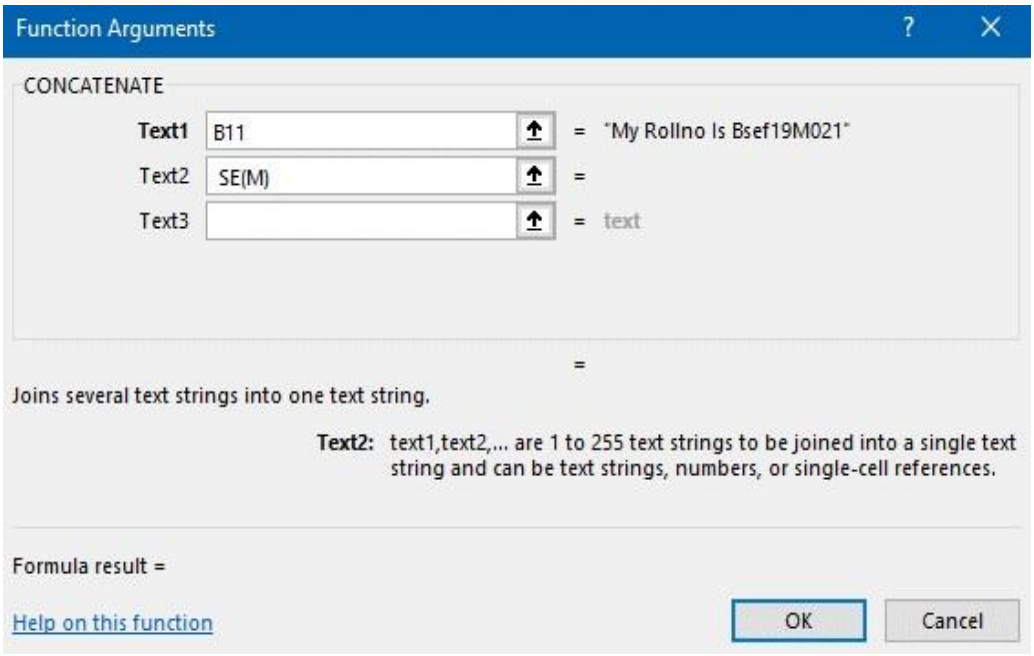


Fig. 52 (Function Arguments dialog)

Result will be displayed in the active cell. Concatenated text will be returned.

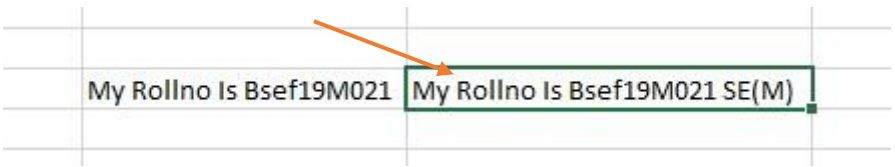


Fig. 53 (CONCATENATE Function)

Concatenate can also be used directly to combine text in two cells as follows

- In **cell B4** type **Pakistan,** and **cell D4** type **Zindabad.** In any cell for example **cell B6** type **=CONCATENATE (B4, D4)** and press **Enter**. This will join text from both cells and display it in the **cell B6**.

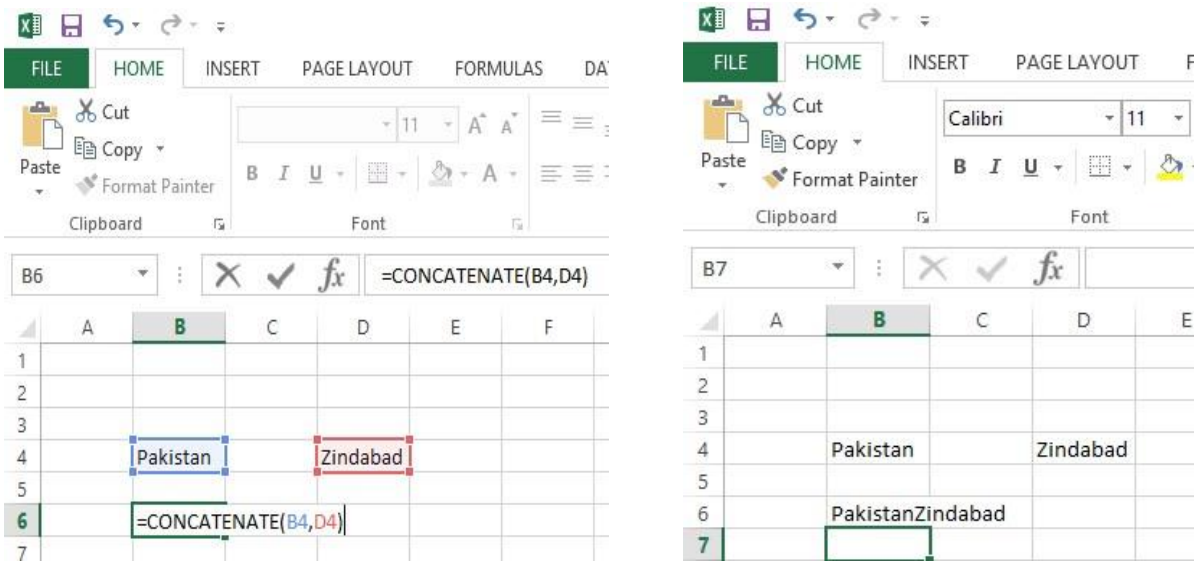


Fig. 54 (CONCATENATE Function)

Creating Charts:

- Select the data
- Click the **"Insert tab"** on the ribbon
- Click the **"Insert Column Chart"** on the ribbon

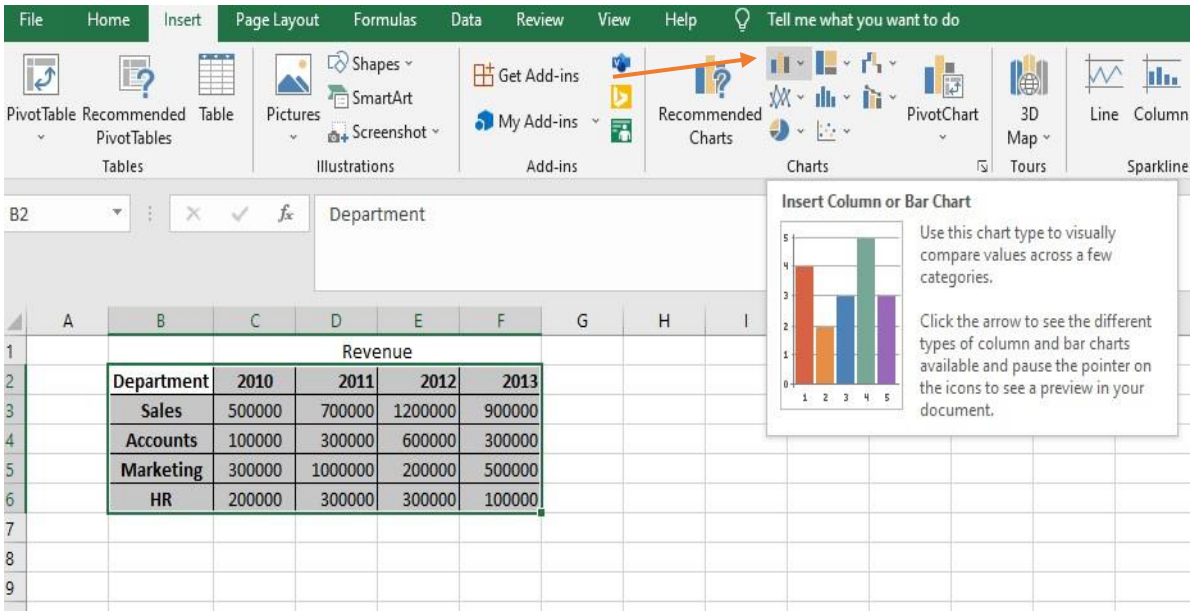


Fig. 55 (Creating Charts)

The 2-D column, 3-D Column chart options are displayed. Further, More Column Charts… option is also displayed. Move through the charts to see the preview.

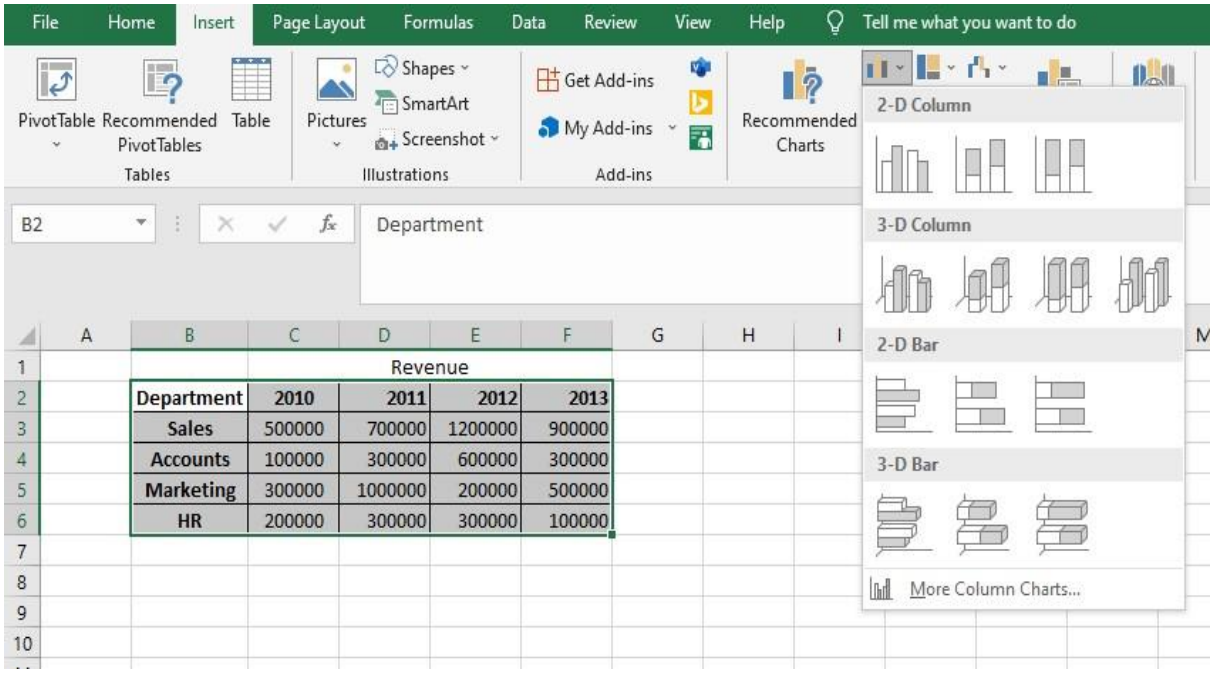


Fig. 56 (Creating Charts)

- Click any of the chart, it will be displayed on the worksheet.

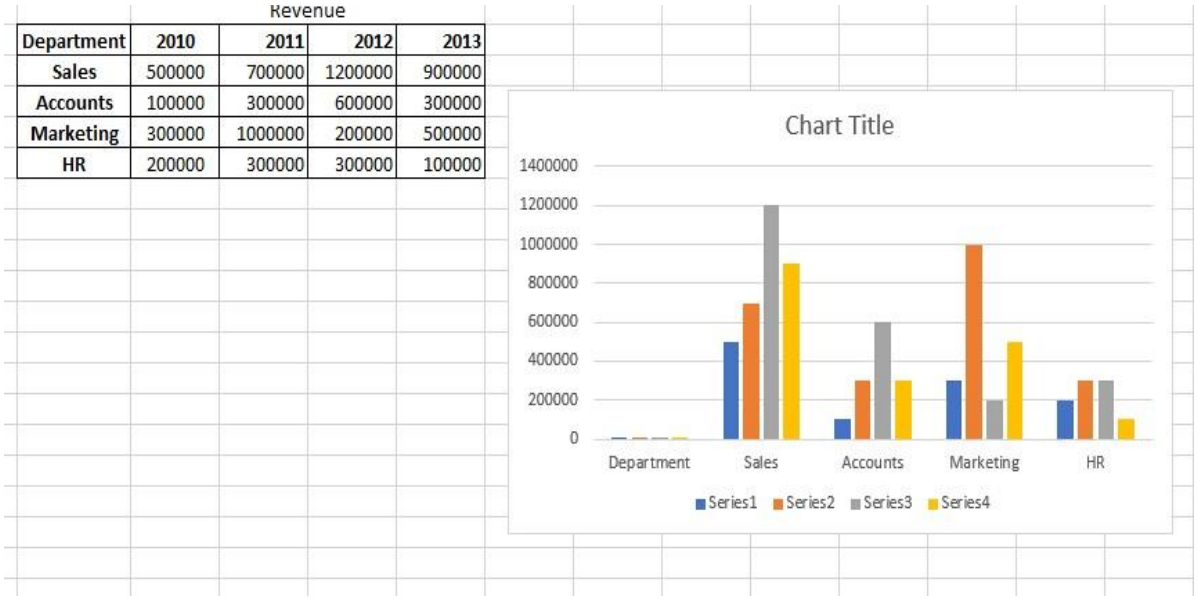


Fig. 57 (Creating Charts)

Format Chart:

- Select the chart
- Click on **"Chart Design Tab"**
- Click on **"Quick Layout"**. As you move to each of the options, the chart changes to preview what it will look like if you select the option
- Select any option you want

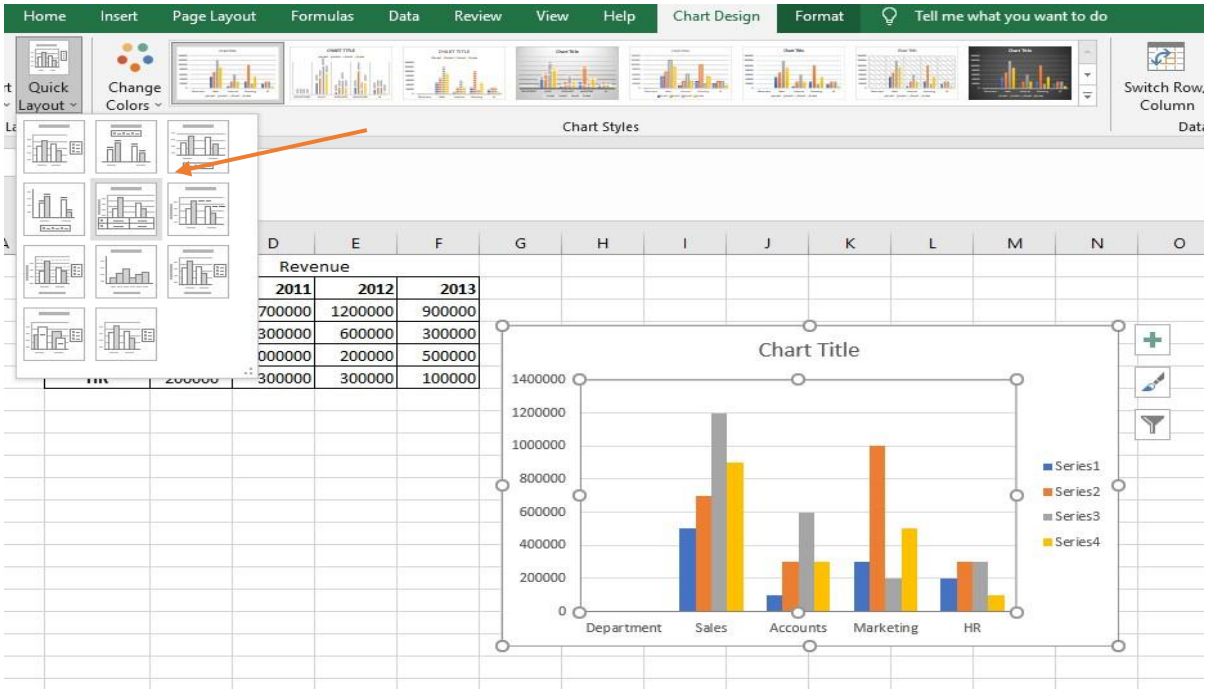


Fig. 58 (Format Charts)

Add / Delete Chart elements:

- Select the chart
- Click the **"Charts Element"** button

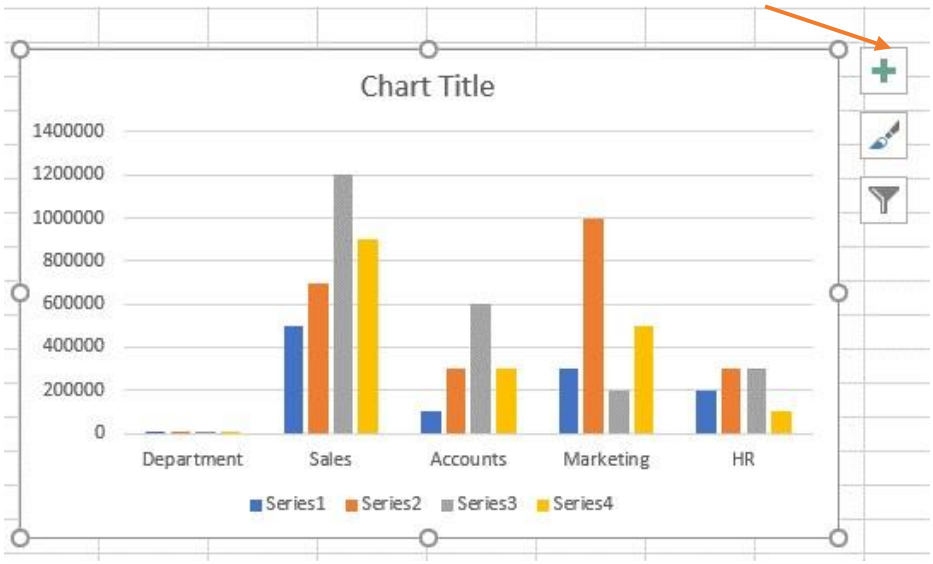


Fig. 59 (Format Charts)

- Check the **"unchecked boxes"** to add elements

Fig. 60 (Add Chart Elements)

- Uncheck the **"checked boxes"** to delete elements

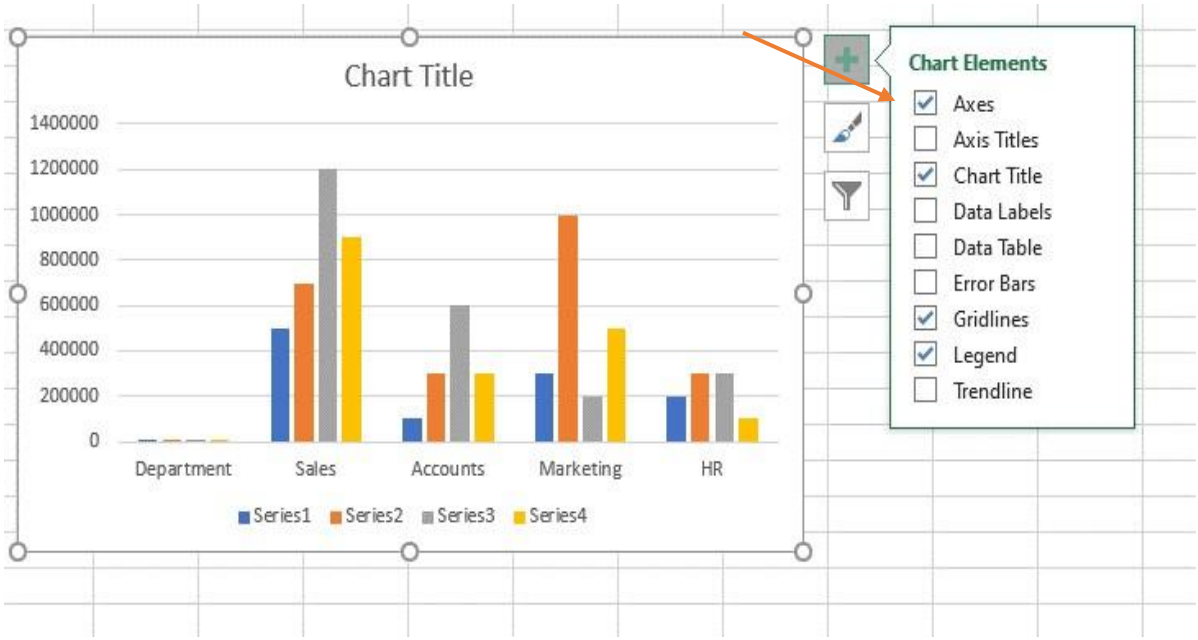


Fig. 61 (Delete Chart Elements)

Add Sparklines:

- On the **Insert tab** go to the **Sparklines group** and click **Line**

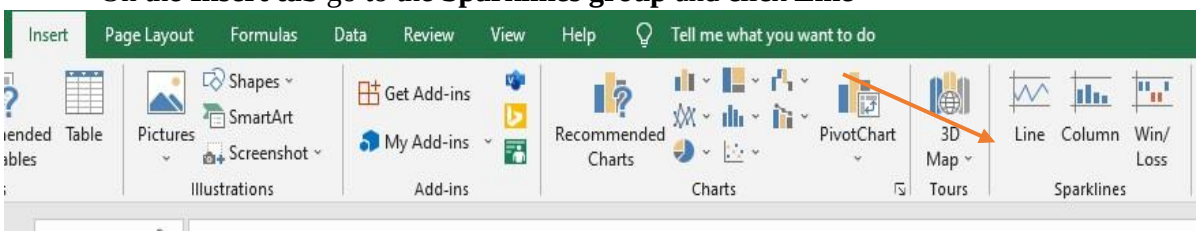


Fig. 62

(Sparklines) ⇨ **Create Sparklines** dialog will appear.

- Select **"data range"** for which you want to create sparkline
- Select **"location range"** according to the data range
- Click **"OK"**

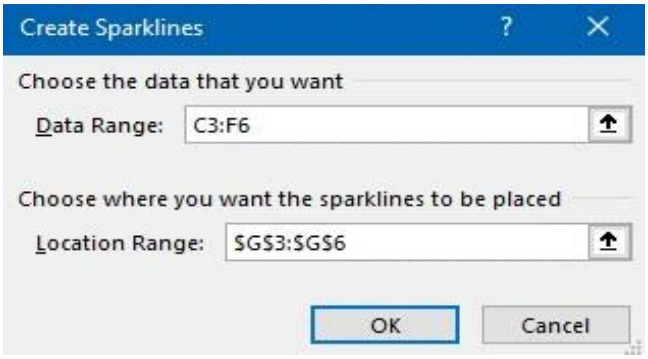


Fig. 63 (Create Sparklines dialog)

- Sparklines will be created at specified location range.

Department	2010	2011	2012	2013	Sparkline
Sales	500000	700000	1200000	900000	
Accounts	100000	300000	600000	300000	
Marketing	300000	1000000	200000	500000	
HR	200000	300000	300000	100000	

Fig. 64 (Sparklines)

Creating PivotTable:

- Select the data you want to use in PivotTable
- On **"Insert tab"** in **"Tables"** group, click **"PivotTable"** then click **"From Table/Range"**

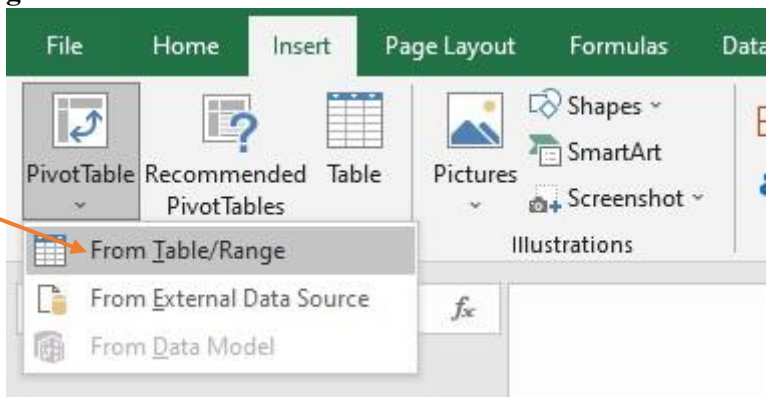


Fig. 65 (PivotTable)

- Click **"OK"** on the dialog box
- The worksheet now shows the layout for PivotTable. You will also see the PivotTable Fields which shows the column tiles from the source data

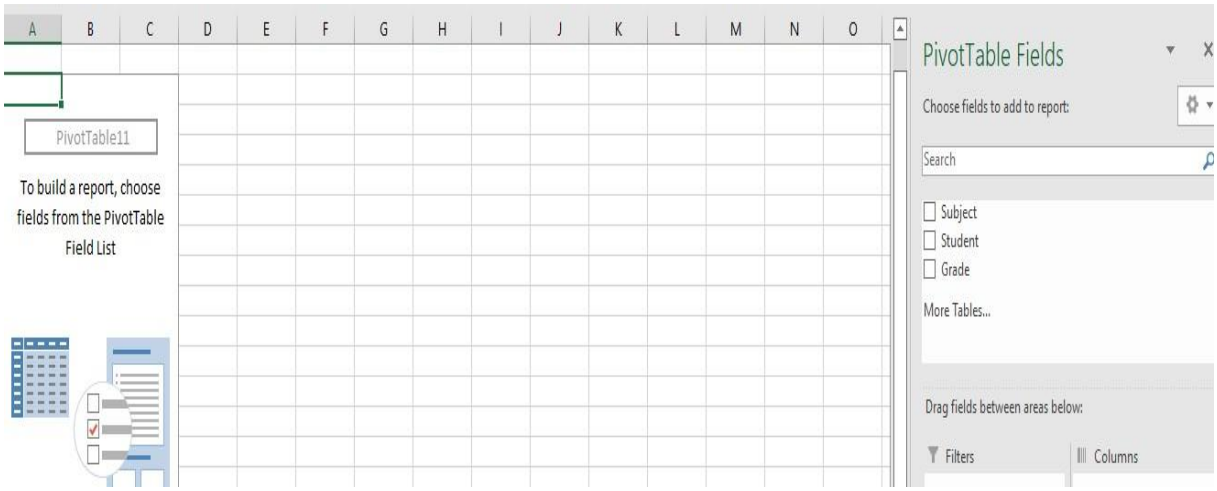


Fig. 66 (PivotTable)

The PivotTable is created by moving fields from the Fields to the layout area. What you drag where depends on what question you are trying to answer. This can be done in four ways:

- Select the check box next to the field name. Excel will automatically put the field in place.
  - Non-numeric fields are automatically placed in Row Labels on the left side of the report. As you add more non-numeric fields, Excel places them on the inside of fields already on the PivotTable report, building a hierarchy.
  - Numeric fields will be placed in Column Labels.
- Right click the field name and select desired locations of the field
- Drag the field name to the locations listed below the field list
- Drag the field name directly to the layout are

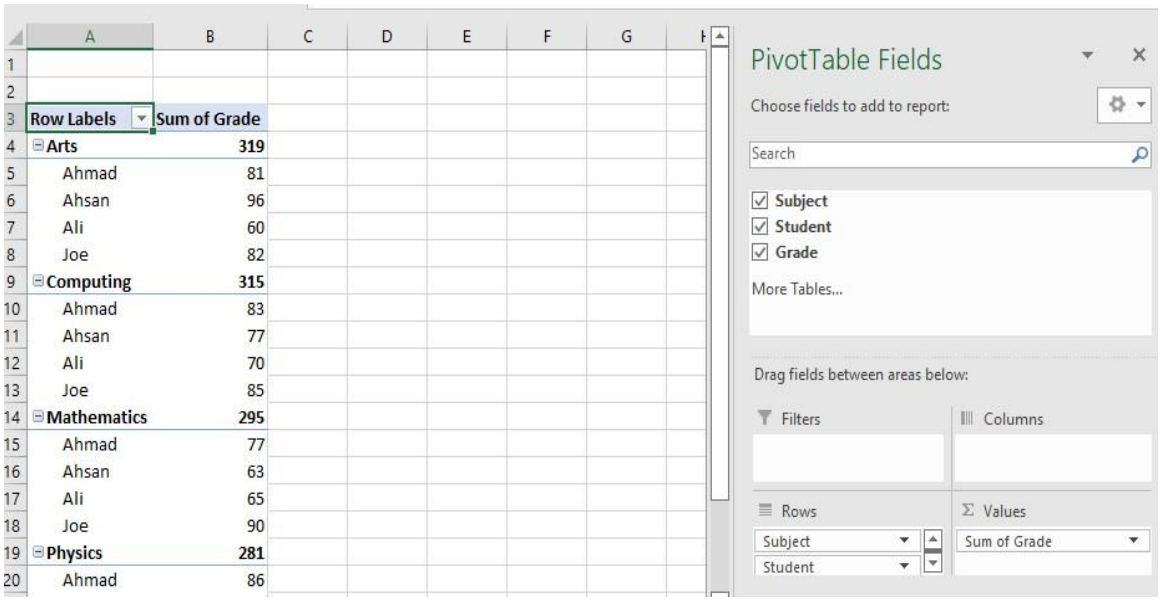


Fig. 67 (PivotTable)

Filter PivotTable:

Filtering specific student marks.

- Move **"Student"** to the **"Filters"** field. PivotTable will be updated

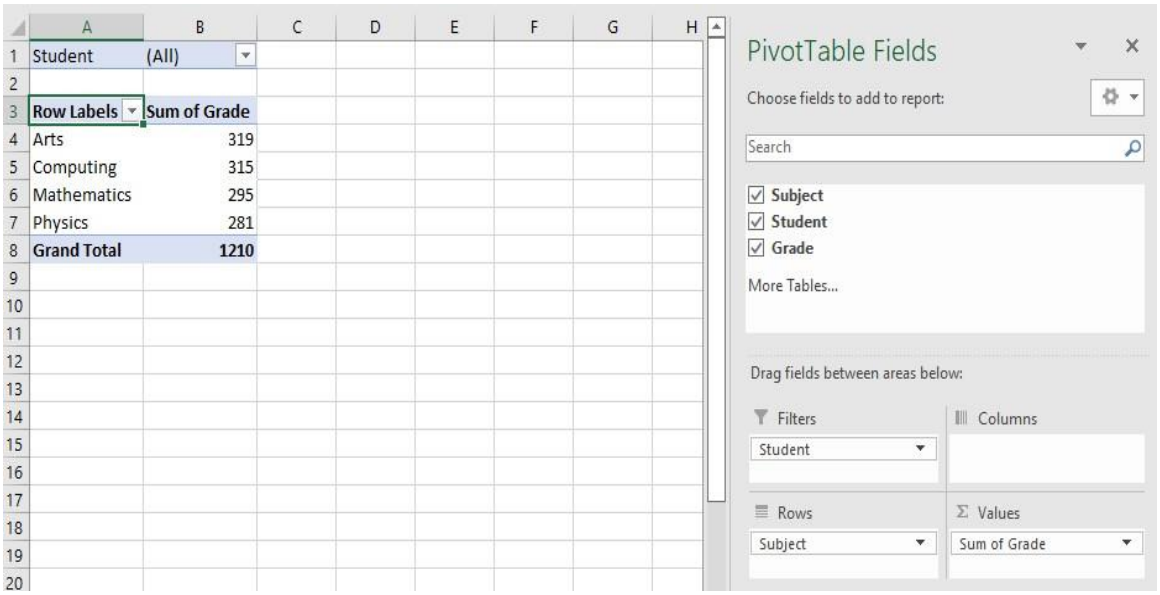


Fig. 68 (Filter PivotTable)

- From the drop-down menu against Student in the layout area, select **"Ali"** Click **"OK"**

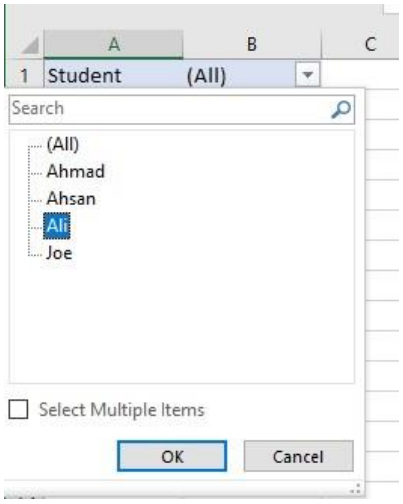


Fig. 69 (Filter PivotTable)

Marks of Ali will be shown against each subject.

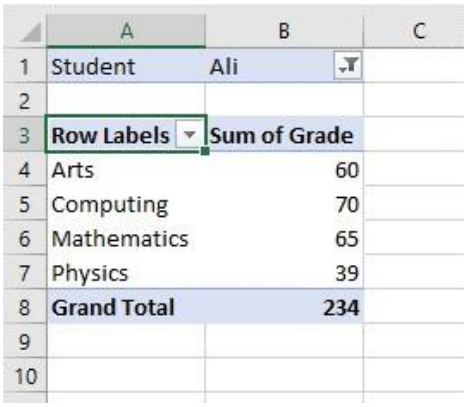


Fig. 70 (Filter PivotTable)

Securing Workbook:

- On **"Review tab"** in **"Protect"** group, click **"Protect Workbook"**

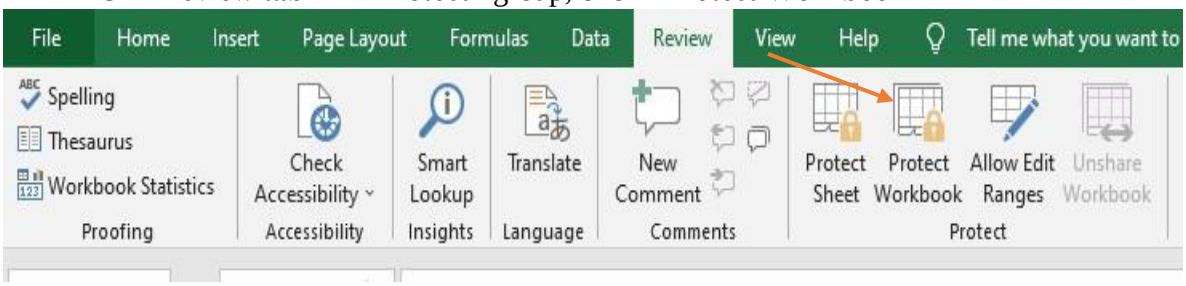


Fig. 71 (Secure Workbook)

- Enter password in the **"Protect Structure & Windows"** dialog and click OK

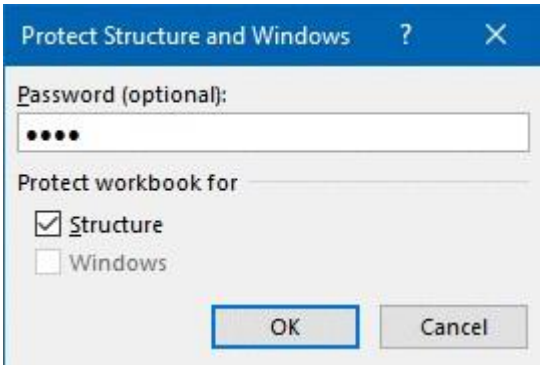


Fig. 72 (Secure Workbook)

- Press **"Esc"** and then click the **"File tab"**. Select **"Save As"** and then click the **"Browse"** button
- In the Save As dialog box, click the **"Tools"** button
- Select **"General Options"**

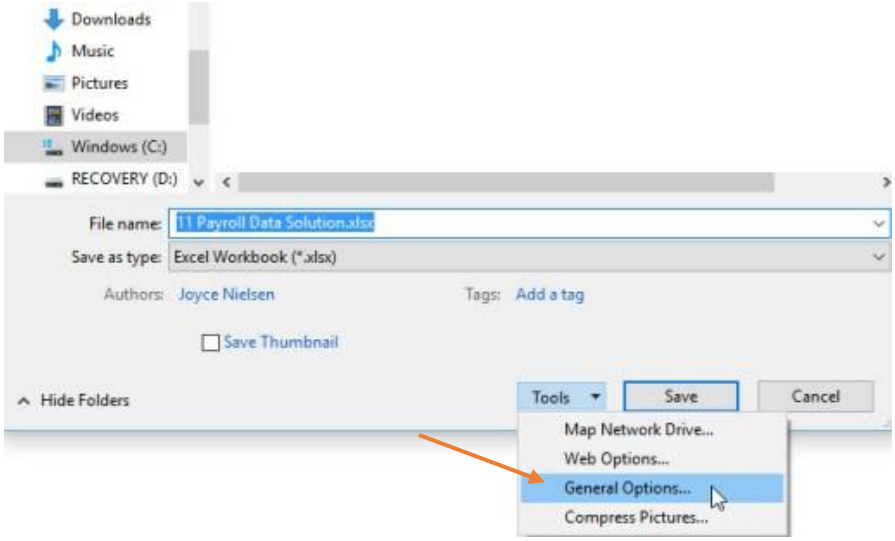


Fig. 73 (Secure Workbook)

- In **"General Options"**, enter **Password to open** and **Password to modify** and Click **"OK"**

Fig. 74 (General Options dialog)

- Save the workbook
- Now password will be required every time when you open the workbook.