

Microsoft Excel 2007 Level 2

Version 164.04.02



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Table of Contents

Chapter 1: Introduction to Microsoft Excel 2007	1
About Excel.....	1
Components of the Excel Window	1
Interacting with Excel.....	2
Changing Default Settings	3
Chapter 2: Cell References and Range Names	4
Why Use Different Types of References?	4
Types of Cell Reference:.....	4
Named Ranges	7
Exercise	9
Chapter 3: Working with Formulas and Functions.....	10
Using Formulas in a Worksheet	10
Array Formulae.....	10
Using functions.....	11
IF function	11
Nested IF	12
IF with AND	13
IF with OR	14
IF with NOT.....	14
Lookup Functions	15
V-lookup.....	15
H-lookup.....	16
Making V-Lookup Dynamic	17
Index.....	19
Index-Match	20
Exercise	21
Chapter 4: Data Validation.....	22
Setting Data Validation Rules.....	22
Methods of Data Validation	22
Exercise	24
Chapter 5:Protection	25
Protecting a Worksheet by using Passwords	25
Protecting a Workbook	25
Protecting Part of a Worksheet.....	26
Password Protecting a File	26
Case Study	28
Chapter 6: Sorting a Database.....	29

Simple Sort	29
Multilevel Sort.....	29
Customized Sorting	30
Chapter 7: Filtering a Database	31
Auto Filter.....	31
Number, Text or Date Filters.....	31
Filtering a List using Advanced Filter.....	32
Filtering Unique Records.....	33
Exercise	33
Chapter 8: Subtotals	34
Display Subtotal at Single Level.....	34
Displaying Nested Subtotals.....	35
Chapter 9:Pivot Tables.....	36
Examining Pivot Tables.....	36
Format a PivotTable report	37
Calculate the Percentage of the field.....	38
Top/ Bottom Report.....	38
Group Items in a PivotTable.....	38
Create a Graph using Pivot Data	38
Chapter 10:Conditional formatting	40
Conditional Formatting using Cell Values (Column Based Conditional Formatting)	40
Conditional Formatting using Formula (Record Based Conditional Formatting).....	41
Database Case Study	42
Chapter 11:What-if-Analysis Tools	43
Goal Seek.....	43
Projecting Figures Using a Data Table.....	44
What-If Scenarios	45
Merge Scenarios from Another Worksheet.....	47
Protecting Scenarios	47
Chapter 12: Working with multiple worksheets, workbooks and applications	49
Creating Links between Different Worksheets	49
Creating links between different software	50
Workgroup collaboration.....	51
Merging workbooks	52
Tracking changes.....	52
Creating Hyper Link.....	53
Chapter 13:-Working with Charts	55
Creating Charts using Chart Tools	55
Including Titles and Values in Charts using Chart Tools.....	56
Formatting charts.....	57
Charts for my Data	57
Chart Templates	57

Exercise	58
Chapter 14:Macros	59
Trust Center settings.....	59
Creating a macro	59
Recording a Macro	60
Running a Macro Using Menu Commands.....	60
Writing a macro.....	61
Creating a sub procedure.....	62
Creating a function.....	63
Assigning a Macro to a Button	65
Final Assignment	66
Shortcuts In Excel 2007	68

Chapter 1: Introduction to Microsoft Excel 2007

Objective:

This chapter

- Introduces you to the brand new layout of Microsoft Excel 2007.
- Helps to Figure out how to change default settings.
- Makes the user comfortable with the tool in general.

About Excel

Microsoft Excel is a powerful spreadsheet application from Microsoft Corporation. It makes it easy for you to create various kinds of spreadsheets, tables and statements along with the graphical representation of data. While working in Excel, you can make use of its most important feature of **automatic recalculation**, to save time and effort.

In Excel, you work with worksheets, which consist of rows and columns that intersect to form cells. Cells contain various kinds of data that you can format, sort, and analyze. You can also create charts based on the data contained in cells. An Excel file is called a workbook, which by default contains three worksheets.

Tips: Default number of sheets to open can be set to a maximum of **255**.

Components of the Excel Window

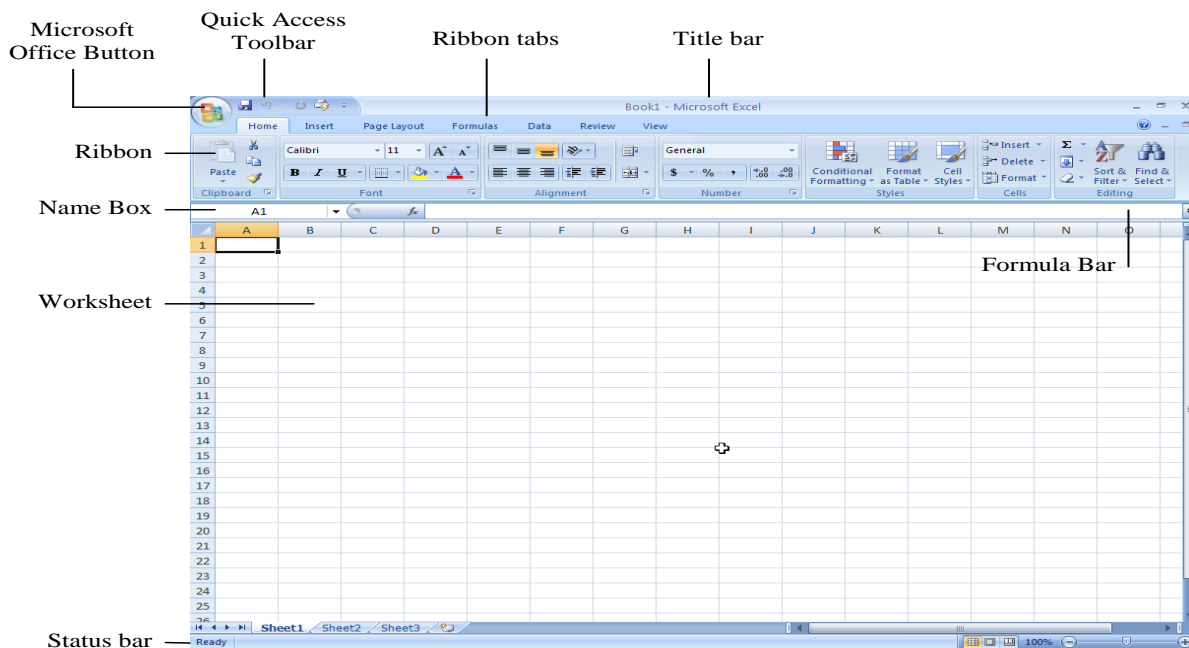


Figure 1.1

The components of the Excel window interact with the program or display information about what you are working on. Some of these components are explained below:

Quick Access Toolbar: Displays commands for saving the current workbook, undoing the last action, and repeating the last action. You can customize the Quick Access Toolbar by adding buttons for frequently used commands. The Quick Access Toolbar can be moved below the Ribbon.

Ribbon: Each Ribbon tab activates a Ribbon, which in turn contains groups of commands or functions. Within each group are buttons and commands.

Gallery: Galleries might display within a Ribbon but more often are drop-down groups of commands or functions. They use icons or other graphics to show the results of commands rather than the commands themselves.

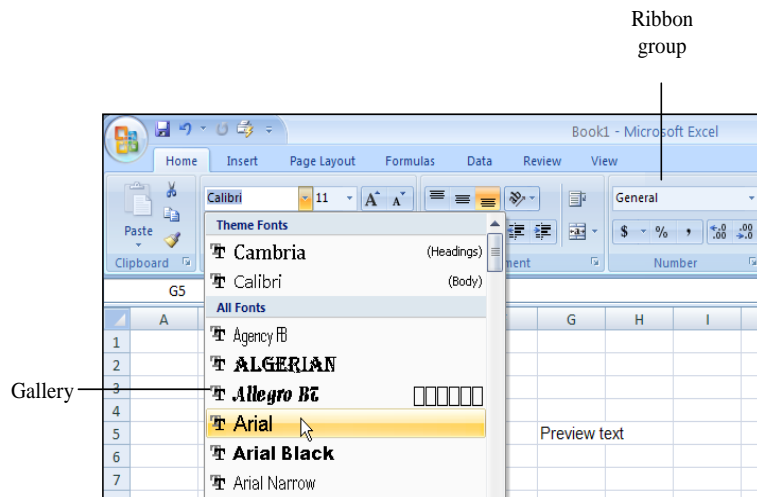


Figure 1.2

Interacting with Excel

You interact with Excel by typing and by using the mouse to choose commands, make selections, click buttons and options.

Using the Ribbon

The Ribbon is the main container for menus and tools. When you choose a **Ribbon tab**, the Ribbon displays **Ribbon groups** that contain tools such as buttons and lists. Some of these tools expand to display simple lists and some display **galleries**, as shown in **Figure 1.2**. A list is a collection of related commands or selections.

Using galleries

A gallery is an interactive list of options. Each gallery displays the options under the clicked command. For example, the font gallery shows the different font face options available. Some galleries use live preview. When you move the pointer over options on a gallery, each option is previewed on whatever

is selected in the worksheet. For example, if you select text in the worksheet, and display the Font gallery, moving the pointer over each font in the gallery causes the selected text on the screen to display in that font.

Using Tools

When you point to a tool, a description called a super tooltip appears. The super tooltip provides less description than Help, but more than an ordinary screen tip.

Tips: Press the “Alt” key to see the shortcuts to navigate through the ribbon.

Changing Default Settings

Excel allows you to change many aspects of its behavior and how you interact with it. You can change default settings such as number of iterations, font, file locations, and the file that opens on starting Excel.

To select the dialog box of Options you need to click on **MS-Office Button** then select Excel Options.

The Personalize Option

You can change workbook settings by using the Personalize Options to change the type of font, size of the font, number of worksheets in the workbook and can also activate the Developer tab, which is used for macros.

The Save Option

The Save Option allows you to change the default file location, file format, and AutoRecover settings of the file.

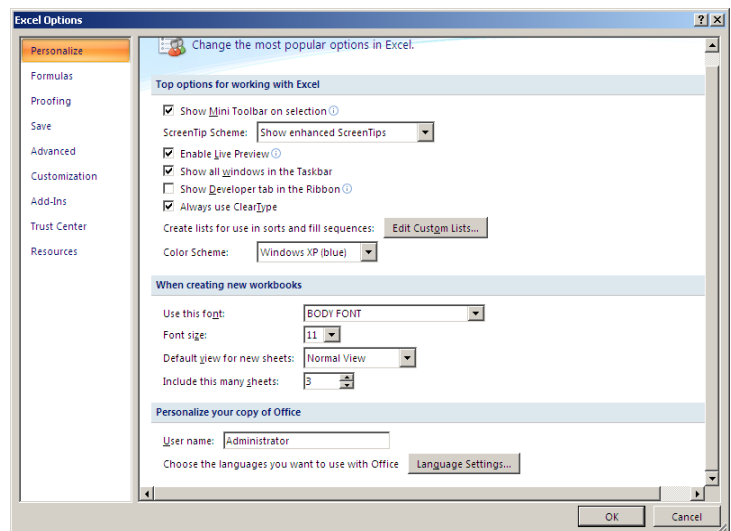


Figure 1.3

Chapter 2: Cell References and Range Names

Objective:

After completing this chapter, you will be able to know

- Meaning and usage of cell references.
- Type of cell references.
- Usage of range names.

Why Use Different Types of References?

When we copy a reference from one cell to another, it gets updated automatically. Say, we have a reference in cell C1 as A1 and we copy the same to D1, it automatically updates itself to B1. Sometimes, we need to keep a part of the used cell references as constant. This can be done using different types of cell references.

Types of Cell Reference:

There are three types of cell references as mentioned below;

- 1) Relative cell references
- 2) Absolute cell references
- 3) Mixed cell references

Relative Cell References

Relative references are the default cell references in Excel. When you copy and paste a relative cell reference, it is updated automatically to suit the cell in which it is pasted. For Example,

If you want to calculate HRA as 50% of basic, you can write the formula =H2*50%

	A	B	C	D	E	F	G	H	I
1	Empcode	FirstName	LastName	Dept	Region	Branch	Hiredate	Basic	HRA
2	1	Raja	Raymondekar	Sales	north	Ferozepur	1-Jan-77	15,625.00	=H2*50%
3	2	Suman	Shinde	Sales	east	Cuttack	1-Jan-77	12,500.00	
4	2	Kuldeep	Sharma	Admin	south	Hydrabad	1-Mar-99	5,000.00	
5	3	Beena	Mavadia	Mktg	north	Delhi	24-Nov-79	8,750.00	

Figure 2.1

This is the HRA for one employee to apply this to all the records, you may drag the formula down till the last record, as shown in Figure 2.2.

	A	B	C	D	E	F	G	H	I
1	Empcode	FirstName	LastName	Dept	Region	Branch	Hiredate	Basic	HRA
2	1	Raja	Raymondekar	Sales	north	Ferozepur	28126	15625	=H2*50%
3	2	Suman	Shinde	Sales	east	Cuttack	28126	12500	=H3*50%
4	2	Kuldeep	Sharma	Admin	south	Hydrabad	36220	5000	=H4*50%
5	3	Beena	Mavadia	Mktg	north	Delhi	29183	8750	=H5*50%
6	4	Seema	Ranganatha	R&D	north	Kanpur	32755	15000	=H6*50%
7	5	Julie	D'Souza	R&D	north	Mathura	32390	8875	=H7*50%
8	5	Pragati	Patel	Finance	west	Pune	32400	9000	

Figure 2.2

Tips: Select the cells to fill and Press Ctrl + D to fill the range or double click on fill handle

Absolute Cell references

When you want to freeze a cell reference or you do not want a reference to change when you copy a formula, you can use absolute cell references. To make a cell reference absolute, we place a **dollar (\$)** sign before the column name and row number of the reference.

Assume you want to calculate 10% of 1000, 2000, 3000, and 4000.

	A	B	C	D	E	F
1		1000	2000	3000	4000	5000
2	0.1	=B1*A2				
3						

Figure 2.3

If you write as above, the formula when copied to the right would change itself to **c1*b2**, **d1*c2**etc. However, this is not the right calculation. We would need to freeze the cell reference **A2**, such that it remains the same each time we copy the formula.

Here, **A2** need to be changed to **\$A\$2** to achieve the required output.

	A	B	C	D	E	F
1		1000	2000	3000	4000	5000
2	0.1	=B1*\$A\$2	=C1*\$A\$2	=D1*\$A\$2	=E1*\$A\$2	=F1*\$A\$2
3						

Figure 2.4

Tips: First select the cells from B2 to F2 and then press Ctrl+R keys. This would copy the formula from B2 in C2, D2, E2 and F2.

Once this is done, we can see that, the formula when copied gives the required output as given in **Figure 2.5**.

	A	B	C	D	E	F	G
1		1000	2000	3000	4000	5000	
2	0.1	100	200	300	400	500	
3							

Figure 2.5

Mixed Cell References

However at times you may want to freeze only the row or column in a cell reference. In the below example, we need to calculate 10%, 20%, 30%, 40% and 50% of 1000, 2000, 3000, 4000..... and so on.

	A	B	C	D	E	F
1		1000	2000	3000	4000	5000
2	0.1	=B1*A2				
3	0.2					
4	0.3					
5	0.4					
6	0.5					

Figure 2.6

If you drag the formula towards the right it changes to **c2*b3**, **d2*c3**etc and once dragged down it would change to **b3*a4**, **b4*a5**etc

However these are not the right formulae.

	A	B	C	D	E	F
1		1000	2000	3000	4000	5000
2	0.1	=B1*A2	=C1*B2	=D1*C2	=E1*D2	=F1*E2
3	0.2	=B2*A3	=C2*B3	=D2*C3	=E2*D3	=F2*E3
4	0.3	=B3*A4	=C3*B4	=D3*C4	=E3*D4	=F3*E4
5	0.4	=B4*A5	=C4*B5	=D4*C5	=E4*D5	=F4*E5
6	0.5	=B5*A6	=C5*B6	=D5*C6	=E5*D6	=F5*E6
7						

Figure 2.7

If we observe **Figure 2.7** closely, we can see that, if we need to get the right answer, we would need to freeze the row number of **B2** (as it is common for all the formulae right and down) and the column name for **A3** (As it is common for all the formulae towards right and down). When copied, the resultant formulae would be as given in **Figure 2.8**.

	A	B	C	D	E	F
1		1000	2000	3000	4000	5000
2	0.1	=B\$1*\$A2	=C\$1*\$A2	=D\$1*\$A2	=E\$1*\$A2	=F\$1*\$A2
3	0.2	=B\$1*\$A3	=C\$1*\$A3	=D\$1*\$A3	=E\$1*\$A3	=F\$1*\$A3
4	0.3	=B\$1*\$A4	=C\$1*\$A4	=D\$1*\$A4	=E\$1*\$A4	=F\$1*\$A4
5	0.4	=B\$1*\$A5	=C\$1*\$A5	=D\$1*\$A5	=E\$1*\$A5	=F\$1*\$A5
6	0.5	=B\$1*\$A6	=C\$1*\$A6	=D\$1*\$A6	=E\$1*\$A6	=F\$1*\$A6
7						

Figure 2.8

And the answer would be as given in **Figure 2.9**. This type of references where either the row or the column number is frozen are called Mixed Cell References.

	A	B	C	D	E	F	G
1		1000	2000	3000	4000	5000	
2	0.1	100	200	300	400	500	
3	0.2	200	400	600	800	1000	
4	0.3	300	600	900	1200	1500	
5	0.4	400	800	1200	1600	2000	
6	0.5	500	1000	1500	2000	2500	
7							

Figure 2.9

Tips: Keep cursor near the cell reference and press **f4** to toggle between the different cell references.

Press F4 key in cell reference

One Time	\$A\$3
Second Time	A\$3
Third Time	\$A3
Fourth Time	A3

Named Ranges

Many a times, when we write formulas/functions, we need to select a range of cells. However, doing this can be time consuming. Excel allows us to use a cell or a group of cells by its name. eg. **Sum(Basic)** sounds much easier compared to **sum(H2:H101)**. However to do this, first we would need to name the range **H2:H10** as **Basic**.

Creating a Named Range

To name a range, we may use one of the following procedures

- 1) Select the range (eg: H2:H101) and type the name (eg: Sal) in the name box (see **Figure 2.10**).
- 2) If you want to name the cells with the value in one of the cells, you may select the range along with the name, click on "Create from Selection" in the Formulas Tab, select one of the options and click Ok.
- 3) You may also create a named range by clicking on "Define name" in Formulas Tab. Write the name for the range in the name box, click on the refers to box, select the range you wish to name and click Ok.

	A	B	C	D	E	F	G	H
1	Empcode	FirstNam	LastName	Dept	Region	Branch	Hiredate	Basic
2	1	Raja	Raymond	Sales	north	Ferozepur	28126	15625
3	2	Suman	Shinde	Sales	east	Cuttack	28126	12500
4	2	Kuldeep	Sharma	Admin	south	Hydrabad	36220	5000
5	3	Beena	Mavadia	Mktg	north	Delhi	29183	8750
6	4	Seema	Ranganatha	R&D	north	Kanpur	32755	15000
7	5	Julie	D'Souza	R&D	north	Mathura	32390	8875
8	5	Deepak	Jain	Personal	west	Pune	33102	9875
9	6	Neena	Mukherjee	R&D	north	Agra	32755	8875
10	7	Pankaj	Sutradhar	Sales	north	Ambala	36506	10625
11	8	Andre	Fernandes	Mktg	east	Darjeeling	28326	11250
12	9	Sujay	Madhrani	Finance	west	Pune	31402	10625
13	10	Shilpa	Lele	Admin	north	Jammu	30376	15000
14	11	Meera	Lalwani	Finance	east	Cuttack	31027	13750
15	12	Sheetal	Desai	Director	south	cochin	31028	35000
16	13	K.Sita	Narayanan	Personal	north	Jammu	31029	10625
17	14	Priya	Shirodkar	Personal	north	Jaipur	31030	10625
18	15	Aalok	Trivedi	Admin	east	Cuttack	30376	11250
19	16	Aakash	Dixit	Admin	west	Nasik	30376	11250
20	17	Parvati	Khanna	Mktg	north	Mathura	31637	7500
21	18	Farhan	Sadiq	Mktg	north	Jaipur	36316	4250
22	19	SatinderKa	Sasan	Mktg	east	Patna	36317	5625
23	20	Suchita	Panchal	Mktg	west	Nasik	36318	5625
24	21	Shazia	Sheikh	Mktg	west	Pune	36319	5625
25	22	Pooja	Nimkar	Sales	west	Nasik	29362	10625
26	23	Jasbinder	Khurana	R&D	south	Manglore	36274	5625
27	24	Bharat	Shetty	Sales	east	Cuttack	30225	13750
28	25	Rishi	Malik	Sales	south	Banglore	33787	9375
29	26	Mala	Bhaduri	R&D	west	Mumbai	34777	7500

Figure 2.10

Now you may use the name instead of the range anywhere in the workbook. The usage of named range can be seen in **Figure 2.11**.

	A	B	C
1			
2			
3		Total salary	=SUM(sal)
4		Lowest salary	=MIN(sal)
5		Highest Salary	=MAX(sal)
6		Average of Salary	=AVERAGE(sal)
7		No of Emp	=COUNT(sal)

Figure 2.11

Editing or Deleting Named Ranges

Sometimes we would need to rename or redefine a named range. This can be done from Formulas Tab. In the "Formulas" Tab, click "Name Manager". It gives a Name Manager Dialog box as shown in **Figure 2.12**.

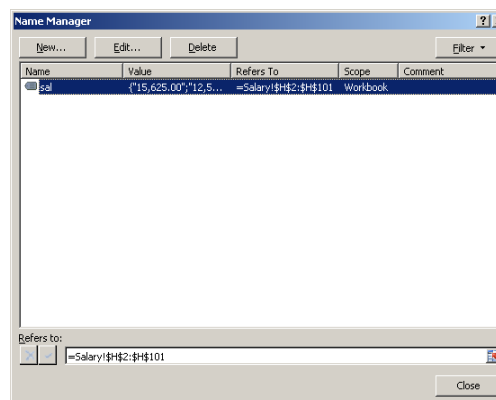


Figure 2.12

To edit a named range, click on the Named Range that you want to edit and click on the Edit button. An Edit Name dialog box as shown in **Figure 2.13** appears where you may rename or redefine the range name.

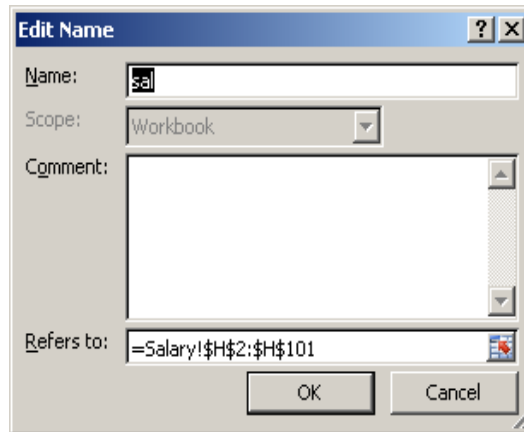


Figure 2.13

To delete a range, select the range from the Name Manager list and click Delete.

Tips: Press Ctrl + F3 to get a Name Manager dialog box

Exercise

- 1) Identify Relative, Absolute and Mixed references
 - a) A\$1
 - b) \$A\$1
 - c) \$A1
 - d) A1
- 2) In the Excel Training Folder, open Advanced Excel Assignment.xlsx file, go to Mixed-Cell sheet calculate percentage sales of each product in different regions in such a way that when you copy the cell formula of east sales and paste in each of the region columns, It automatically calculates sales for the region.

Chapter 3: Working with Formulas and Functions

Objectives

In this chapter we would learn

- Effective usage of formulae and functions.
- If Functions.
- Logical Functions.

Using Formulas in a Worksheet

Formulas are equations that perform calculations on values. A formula starts with an equal sign (=). It contains at least two operands and at least one operation. For example, the following formula multiplies 2 by 3 and adds 5 to the result.

=5+2*3

Operand in a formula can be functions, references or constants. Operators may be any arithmetic or logical operator.

Note: Excel follows BODMAS rule to solve a formula when multiple operators are involved.

Array Formulae

Observe Figure 3.a. Here we have quantity and price of five products. We need to find the Total Sales which is the result of adding together the product of quantity and price for all products. In a normal scenario we would individually calculate the amount for each product and add them to get the answer. However, to make things simpler we may also use Array Formulae.

Select **B8** and write sum (**A2:A6*B2:B6**) and press **Ctrl + Shift + Enter** key combination to fill the formula **{=sum(A1:A3*B1:B3)}** in the selected cell (**Figure 3.2**). This calculates quantity*price for all the products in the cell B8.

Note: Curly Brackets ({}) around the formula indicates that it is applied to an array.

	A	B
1	Quantity	Price
2	12	\$6.00
3	18	\$17.25
4	12	\$25.00
5	3	\$20.00
6	7	\$10.00
7		
8	Total Sales	

Figure 3.1

	A	B	C	D	E
1	Quantity	Price			
2	12	\$6.00			
3	18	\$17.25			
4	12	\$25.00			
5	3	\$20.00			
6	7	\$10.00			
7					
8	Total Sales	812.5			

Figure 3.2

Using functions

Performing calculations on each value in a range of cells can be complicated and time-consuming. For example, if you have a range consisting of 20 cells, a formula that adds each of these values will be very long. Excel Functions simplify complex tasks. A function is a predefined formula that performs a specific calculation or other action on a number or a text string and returns a value. You may specify the values on which the function performs calculations.

The syntax of a function begins with the function name, followed by an opening parenthesis, the arguments for the function separated by commas and a closing parenthesis. If the function starts a formula, type an equal sign (=) before the function name. As you create a formula that contains a function, the Formula Palette will assist you.

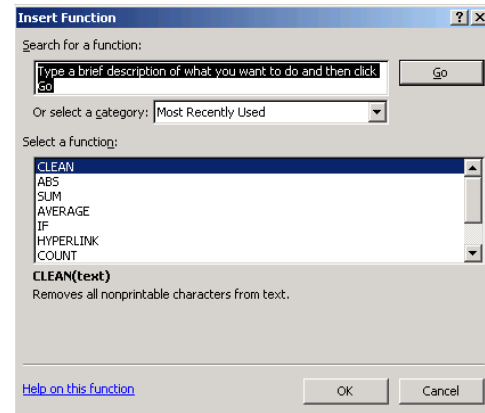


Figure 3.3

Tips: From an empty cell, you may click on the **fx** symbol near the formula bar to see all the available functions in excel.

The syntax of a function is as follows

=Function_name(argument1,argument2,...)

Example:

=SUM (A10, B5: B10, 50, 37)

You don't need to memorize all the functions available and the arguments necessary for each function. Instead, you can use Sigma sign (Σ) which is used for sum or click on the drop down for some more function like Max, Min, etc. Excel prompts you for required and optional arguments.

Tips: You can use "Alt + =" key combination to get the sum function on your worksheet.

IF function

In Chapter 2, we have seen how to calculate the income heads like HRA and DA. The formula we saw was the same for the entire database. However, sometimes we need to decide the formula to apply in a cell according to certain conditions. For example, incentives may be calculated according to the department. This is where conditional functions like "IF" come in to the picture.

You can use the IF function to evaluate a condition. The **IF** function returns different values depending on whether the condition is true or false. The syntax for the IF function is:

if(logical_test, [Value_if_true], [Value_if_false])

The first argument is the condition that you want the function to evaluate. The second argument is the value to be returned if the condition is true and the third argument is the value to be returned if the condition is false. Second and third parameters are optional.

Example

Suppose you want to calculate HRA based on designation of the employees, if Designation is Manager then HRA is 1000 or else 500. Then the function code will be as follows:

=if (C2="Manager", 1000, 500)

F2		=IF(C2="Manager",1000,500)					
	A	B	C	D	E	F	G
1	EMPNO	NAME	DESG	Branch	BASIC	HRA	
2	1	RAJ	OFFICER	Mumbai	5000	500	
3	2	RAJESH	CLERK	Mumbai	3500	500	
4	3	ANAND	MANAGE	Delhi	7000	1000	
5	4	RAJU	CLERK	Delhi	4000	500	
6	5	HEMANT	MANAGE	Mumbai	8000	1000	
7	6	SANTOSH	CLERK	Delhi	3780	500	
8	7	BHAUMIK	OFFICER	Delhi	4200	500	
9	8	MANJIT	OFFICER	Mumbai	5000	500	
10	9	KAMAL	OFFICER	Delhi	3800	500	
11	10	SONU	CLERK	Mumbai	2500	500	
12							

Figure 3.4

As given in **figure 3.3**, above function calculates HRA as 1000 for Managers and 500 for others.

Nested IF

A Nested IF function is when a second IF function is placed inside the first in order to test additional conditions.

The syntax for the Nested IF function is:

If(logical_test, [Value_if_true], If(logical_test, [Value_if_true], [Value_if_false]))

Examples:

You can use nested IF functions to evaluate complex conditions. For example, if the Salary < 5000 then tax is 5%, if salary between 5000 and 10000 then it is 10% else 15%.

=if(salary<5000,salary*.05,if(salary<10000,salary*.10,salary*.15))

I2		=IF(H2<5000,H2*0.05,IF(H2<10000,H2*0.1,H2*0.15))							
	A	B	C	D	E	F	G	H	I
1	Empcode	FirstNam	LastNam	Dept	Region	Branch	Hiredat	Salary	Tax
2	1	Raja	Raymond	Sales	north	Ferozepur	1-Jan-77	15,625.00	2343.75
3	2	Suman	Shinde	Sales	east	Cuttack	1-Jan-77	12,500.00	1875
4	2	Kuldeep	Sharma	Admin	south	Hydrabad	1-Mar-99	5,000.00	500
5	3	Beena	Mavadia	Mktg	north	Delhi	24-Nov-79	8,750.00	875
6	4	Seema	Ranganath	R&D	north	Kanpur	4-Sep-89	15,000.00	2250
7	5	Julie	D'Souza	R&D	north	Mathura	4-Sep-88	8,875.00	887.5
8	5	Deepak	Jain	Personal	west	Pune	17-Aug-90	9,875.00	987.5

Figure 3.5

Suppose you want to assign letter grades to numbers referenced by the name Average Score. See the following table.

If Average Score is	Then return
Greater than 89	A
From 80 to 89	B
From 70 to 79	C
From 60 to 69	D
Less than 60	F

You can use the following nested IF function:

`IF(AverageScore>89,"A",IF(AverageScore>79,"B",IF(AverageScore>69,"C",IF(AverageScore>59,"D","F"))))`

Tips: You can nest up to sixty four levels of If functions in a single formula.

IF with AND

AND is a logical function in excel which returns the combined truth value of two arguments or conditions. It returns false only when all the conditions listed are false.

Syntax

AND(logical1, logical2...)

If there is a scenario where we have two conditions whose combined truth value would decide the output of an IF function, we can use AND with IF.

Syntax using AND with If

If(and(Condition1, condition2....), True, False)

Example:

If we need to give 10% of his basic salary as incentive to every one working in "Sales" department "North" region, we would use the following formula.

=IF (AND (Department="sales", Region="north"), 10%*Basic Salary, 0)

IF with OR

OR is a logical function in excel which returns False if any one of the arguments returns false.

Syntax

OR(logical1, logical2...)

If there is a scenario where we have two conditions of which any one of the conditions is false, the if should return the value in the false argument, we may use OR with IF.

Syntax using OR with If

If(OR(Condition1, condition2....), True, False)

Example:

If the employee is in Sales, Mktg or Hrd, then hra is 50% of Basic salary otherwise, it is 30% of Basic salary.

if(or(Department ="Mktg",Department ="Sales",Department="Hrd"),Basic salary*.5,Basic salary*.3)

IF with NOT

Not is a logical function used to negate an argument.

Syntax

NOT(logical)

If we have a condition which when not satisfied we need to apply the formula, we may use **NOT** with IF.

Syntax using NOT with If

If(NOT(Condition), True, False)

Example:

If we need to give an incentive to everyone but people working in the "Marketing" department we may use the following formula.

IF(NOT(Department="Mktg"),10%*salary,0)

Tips: There can be maximum 255 conditions which can be passed to AND/OR function and we can pass only one condition to NOT.

We may also use multiple not inside if.

Example

If you need to give an incentive to everyone but people from the sales ad admin department, you may use the following function.

If(And(Not(Department="Sales"),Not(Department="Admin")),10%*Salary,0)

Lookup Functions

Sometimes, we need to search for a value in a database based on a lookup value. For example, given Employee Id, how can I look up the incentive value from some other sheet or some other file?

In such scenarios, depending on the source database, we may use one of the following lookup functions.

- 1) V-lookup (If the database is vertical as in **Figure 3.6**)
- 2) H-lookup (If the database is horizontal as in **Figure 3.7**)

	A	B	C	D	E	F	G	H
1	Empcode	First Name	Last Name	Dept	Region	Branch	Hiredate	Salary
2	75	Suraj	Saksena	Admin	east	Calcutta	25-Oct-88	17500
3	65	Timsi	Desai	CCD	east	Calcutta	26-Oct-88	17500
4	13	Meera	Lalwani	Finance	east	Calcutta	11-Dec-84	19250
5	70	Reeta	Naik	Mktg	east	Calcutta	4-Mar-95	14000
6	42	Pooja	Gokhale	R&D	east	Calcutta	29-Sep-91	13300
7	84	Pinky	Robert	R&D	east	Calcutta	3-Mar-99	7000
8	91	Niki	Digaria	Sales	east	Calcutta	13-Nov-79	22750
9	17	Aalok	Trivedi	Admin	east	Cuttack	1-Mar-83	15750
10	44	Shaheen	Khan	Personnel	east	Cuttack	17-Nov-90	13825
11	82	Kalpna	Shirishkar	R&D	east	Cuttack	1-Nov-88	17500
12	26	Bharat	Shetty	Sales	east	Cuttack	1-Oct-82	19250
13	2	Suman	Shinde	Sales	east	Cuttack	1-Jan-77	17500
14	41	Kirtikar	Sardesai	Admin	east	Darjeeling	14-Jun-97	7875
15	10	Andre	Fernandes	Mktg	east	Darjeeling	20-Jul-77	15750

Figure 3.6

	A	B	C	D	E	F	G	H
1	Empcode	75	65	13	70	42	84	91
2	First Name	Suraj	Timsi	Meera	Reeta	Pooja	Pinky	Niki
3	Last Name	Saksena	Desai	Lalwani	Naik	Gokhale	Robert	Digaria
4	Dept	Admin	CCD	Finance	Mktg	R&D	R&D	Sales
5	Region	east	east	east	east	east	east	east
6	Branch	Calcutta	Calcutta	Calcutta	Calcutta	Calcutta	Calcutta	Calcutta
7	Hiredate	25-Oct-88	26-Oct-88	11-Dec-84	4-Mar-95	29-Sep-91	3-Mar-99	13-Nov-79
8	Salary	17500	17500	19250	14000	13300	7000	22750

Figure 3.7

V-lookup

If we need to get the value of a column from some other file or sheet based on a common field, you may use Vlookup. V-lookup is a function that searches for a value (lookup value) in the leftmost column of a given database (table array) and returns a value in the same row from a column you specify.

Syntax:

VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

You can write this function using Built-in Function Arguments dialog-box. Click on Formulas Tab and search in the Lookup & Reference category for Vlookup. Click on Vlookup and you will get a Function Arguments dialog box as shown in **Figure 3.8**.

Lookup_value is the value to be found in the first column of the table. It is the value that you are looking for. Lookup_value can be a value, a reference or a text string.

Table_array is the table of information in which data is looked up. It is the source database. Use a reference to a range or a range name.

Col_index_num is the column number in table_array from which the matching value must be returned.

Range_lookup is a logical value that specifies whether you want VLOOKUP to find an exact match or an approximate match. If Range Lookup is set as FALSE or 0, VLOOKUP will find an exact match. If exact match is not found, the error value #N/A is returned. If it is set to TRUE or non-zero, it finds the nearest value that is less than lookup value.

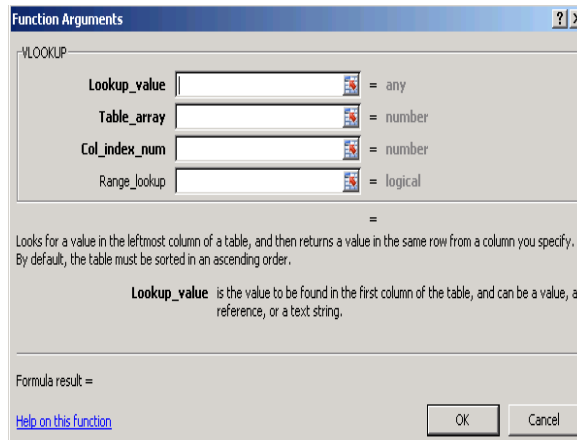


Figure 3.8

H-lookup

H-lookup function searches for a value in the top most row of a table, and then returns a value in the same column from a row you specify.

Syntax:

HLOOKUP(lookup_value,table_array,row_index_num,range_lookup)

H-lookup works the same way as V-lookup. However, in this case we need to specify the row index number instead of the column index number

Tips: You may also get the function argument box by the following method

Type =vlookup(or =hlookup(as the case may be and press Ctrl+A.

Example of Vlookup with Range 0 (False):

Suppose you want to add incentive in the Salary Sheet according to the incentive table who's Range is A1:B12 in the Incentive worksheet, do the following.

- 1) Select the cell, where you want the result.
- 2) Click on Insert Function –Select the Vlookup () function from Lookup and Reference category.
- 3) Lookup Value – Select A2 [The Employee code]
- 4) Table Array: Select the Incentive Sheet and Select the Range from \$A\$1:\$B\$12 [i.e. Employee code and incentive Column]
- 5) Column Index: Type 2 [Column 2 is the Incentive column in Incentive table]
- 6) Range Lookup: Type False [we are searching the exact match from the table for the lookup value]

Tips: To remove **#NA (Not Available Error)**, you can use the function Iferror. The Syntax of iferror is as follows:

=iferror(vlookup....),"")

Example of Vlookup with Range Non-Zero (True)

Suppose you want to add incentive based on salary Slab-wise. In this case, instead of If condition you can use can use Vlookup with True range. In this scenario, we would create a table as given below. In table array, select this table and in the field for range lookup, type "True" instead of "False".

0	2%
5000	5%
10000	10%
15000	15%

Note: The table in this case would be sorted in ascending order of first column.

Example

In the "Advanced Excel Assignment" file, "emp_inf" sheet, we need to retrieve information of the employee based on his employee id. To do this, we may use vlookup as follows.

Employee Information System	
Employee Code	<input type="text" value="1"/>
Name	<input type="text" value="=VLOOKUP(B3,Salary!\$A\$1:\$H\$101,2,0)"/>
Region	<input type="text"/>
Department	<input type="text"/>
Salary	<input type="text"/>

Figure 3.9

To find the other details, you may use the same formula and change the column index number accordingly.

Making V-Lookup Dynamic

When we have a dynamic database, where a new column gets added to the database frequently, position of the current columns may also change. However, column index number of Vlookup does not update automatically with the growing database. This is where we would need to make VLookup Dynamically pickup the column index number. To do this, we may use one of the following functions to retrieve the column index number dynamically.

- 1) Column
- 2) Match

Using Column Function in Vlookup

To make Vlookup dynamic, we may use the column header as an indicator that would dynamically pickup the index number of the particular column in which the required value exist.

The syntax of using column function in vlookup

=vlookup(lookup_value,table_array,COLUMN(reference),Range_lookup)

Here, Reference parameter of column function would contain the cell reference of the column header from the original database.

Example:

In the above example of vlookup, if we need to find the column index number dynamically we may use column function as follows.

Employee Information System	
Employee Code	<input type="text" value="1"/>
Name	<input type="text" value="=VLOOKUP(B3,Salary!\$A\$1:\$H\$101,COLUMN(Salary!\$B\$1),0)"/>
Region	<input type="text"/>
Department	<input type="text"/>
Salary	<input type="text"/>

Figure 3.10

B1 is the reference to the column header of the First Name column in the 'Salary' worksheet.

Using Match Function in Vlookup

As we saw in the above case, we would require access to the original database or at least an idea as to the current position of the column. However, this information would not always be available. Here we would need to use a function that can retrieve the position of the column header just by the name.

A Match function does just the same. Match function returns the position of a string in a range.

Syntax of match function is as follows:

MATCH(lookup_value, lookup_array,[match_type])

Lookup_Value: It is the string that we are looking up for. It may be a string eg: "Salary" or a cell reference where the string is stored.

Lookup_Array: It is the range from which we need to know the position of Lookup_value.

Match_Type: It is an optional parameter that is used to specify the type of match we require 0: Exact match, 1: Less than, -1: Greater Than.

For example, if we need to find out the position of the string "salary" in the first row of the salary sheet, we would write,

```
=match("salary",salary!$1:$1,0)
```

We may use the match function instead of column Index number to get the column index number dynamically.

The syntax of using match function in vlookup:

```
=vlookup(lookup_value,table_array,match(label,firstrow of source-database,0),Range_lookup)
```

Example:

In the emp_inf example, if we need to make the vlookup more dynamic using the column headers, we may use match with vlookup as shown in **figure 3.11**. Here the match looks for the labels on each field in the header of salary database and returns the position of the column dynamically.

Employee Information System	
Employee Code	<input type="text" value="1"/>
FirstName	=VLOOKUP(B3,Salary!\$A\$1:\$H\$101,MATCH(A5,Salary!\$A\$1:\$H\$1,0),0)
Region	<input type="text"/>
Department	<input type="text"/>
Salary	<input type="text"/>

Figure 3.11

Index

Sometimes, we would need to lookup for a data in the database based on its row number and column number. Index function helps us do this.

Syntax of index function is as follows:

```
INDEX(array, row_number,[column_number])
```

As you can see there are two ways in which you can use the Index function. The first syntax is used to look for data in a single database and the second syntax is used when more than one database is involved.

Example

Suppose we need to find the data at the intersection of row number 3 and column number 4 of a database, we may use the following function.

```
=index(database,3,4)
```

Index-Match

As discussed earlier, vlookup can look for the data based on the values in the first column of the database. However, if we have a database where our lookup value is in the middle and we need to search towards the left, we would have to move the column to the left most corner before we use vlookup. **Index function** when used along with **match** helps us search for the data even if the lookup value is not present on the left-most column.

The syntax for index-match is as follows:

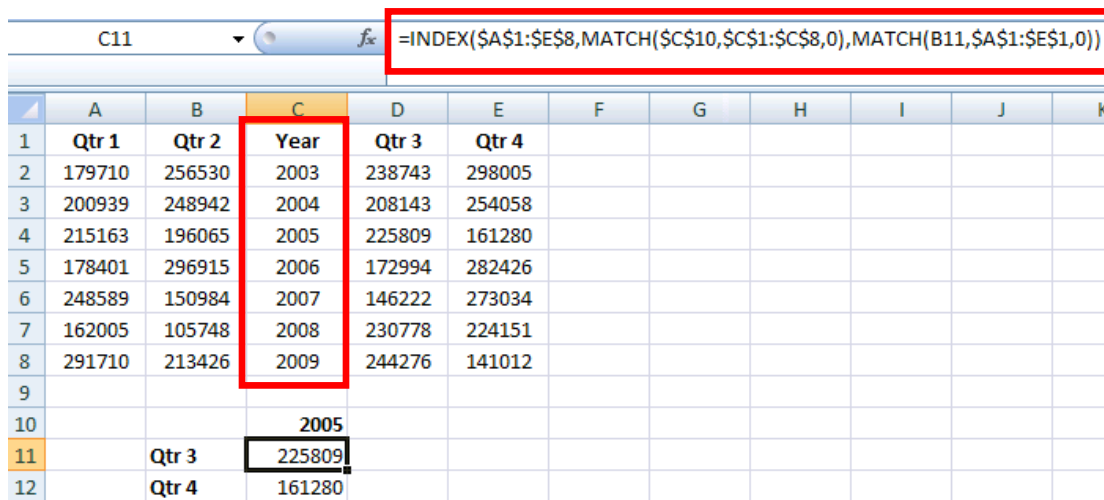
INDEX(array,[MATCH(lookup_value,lookup_array,[match_type])],[Match(lookup_value,lookup_array,[match_type])])

Here, you may use match function for row number or column number or both.

Example:

Suppose, from the data given in the below figure, we need to find the total sales, given year and quarter, we may use the function.

=INDEX(database,MATCH(qtr 3,column header,0),MATCH(year,years column,0))



The screenshot shows an Excel spreadsheet with a formula bar at the top displaying the formula: `=INDEX(A1:E8,MATCH(C10,C1:C8,0),MATCH(B11,A1:E1,0))`. Below the formula bar is a table with columns A through J. The table contains data for quarters 1 through 4 across years 2003 to 2009. A red box highlights the formula bar and the data table. A black box highlights the cell B11, which contains the value '225809'.

	A	B	C	D	E	F	G	H	I	J
1	Qtr 1	Qtr 2	Year	Qtr 3	Qtr 4					
2	179710	256530	2003	238743	298005					
3	200939	248942	2004	208143	254058					
4	215163	196065	2005	225809	161280					
5	178401	296915	2006	172994	282426					
6	248589	150984	2007	146222	273034					
7	162005	105748	2008	230778	224151					
8	291710	213426	2009	244276	141012					
9										
10			2005							
11		Qtr 3	225809							
12		Qtr 4	161280							

Figure 3.12

In the following figure, empcode is the third column. Here if we need to find out the DA or Salary Based on the empcode, we normally copy and paste the column towards the left and use vlookup. Instead, we may use index match as given below.

B10		=INDEX(\$A\$3:\$F\$7,MATCH(\$A10,\$C\$3:\$C\$7,0),MATCH(B\$9,\$A\$4:\$F\$4,0))					
	A	B	C	D	E	F	G
1							
2							
3	A	B		C	D	E	
4	Salary	Da	empcode	Hra	Gross	Tax	
5	10	1	2	10	3	4	
6	55	5	3	6	7	8	
7	60	9	4	10	11	12	
8							
9	empcode	DA	Salary	Gross			
10	3	5	55	7			
11	2	1	10	3			
12	4	9	60	11			

Figure 3.13

Exercise

- 1) Make a copy of the Salary worksheet from advanced excel assignment workbook. Calculate the following incentive schemes
 - 1) Incentive 1- Everyone working in “Sales” department gets 10% of their salary as incentive all others gets 0
 - 2) Incentive 2- Everyone working in “sales” or “marketing” department gets 5% of their salary as incentive all others gets 2%.
 - 3) Incentive 4- Give incentive as follows

Dept	Incentive
CCD	1000
R&D	1500
Personnel	1200
Others	800

- 2) Calculate the incentive scheme in Q.1 c using V-lookup

- 1) Make a column “Reporting Manager” after Salary column and deploy the employee code of the managers to the employees according to their employee numbers as follows using V-Lookup.

Emp Code	Reporting Manager
1-35	14
36-55	61
56-75	16
75-100	5

Chapter 4: Data Validation

Objective

This chapter

- Helps you understand how to restrict data entry in a cell or a worksheet.
- Discusses the different Data Validation techniques in excel.

Suppose you do not want the user to enter a non text value in a cell or you want to restrict data entry to certain values. You may use Data Validation for these.

Data Validation is a process which restricts the users from entering invalid data for individual cells or cell ranges. It limits the data entry to a particular type, such as whole numbers, decimal numbers or text and sets limit on valid entries.

Setting Data Validation Rules

To create a set of rules for data validation, do the following.

- 1) Select the cells for which you want to create a validation rule.
- 2) On the Data tab, in the Data Tools group, click Data Validation to open the Data Validation dialog box (Figure 4.1).
- 3) Activate the Settings tab.
- 4) From the Allow list, select a data validation option.
- 5) From the Data list, select the operator you want. Then complete the remaining entries.
- 6) Enter the Input Message if required in Input Message tab.
- 7) Enter the error message if required in Error Alert tab.
- 8) Click OK to set the validation rule and close the dialog box.

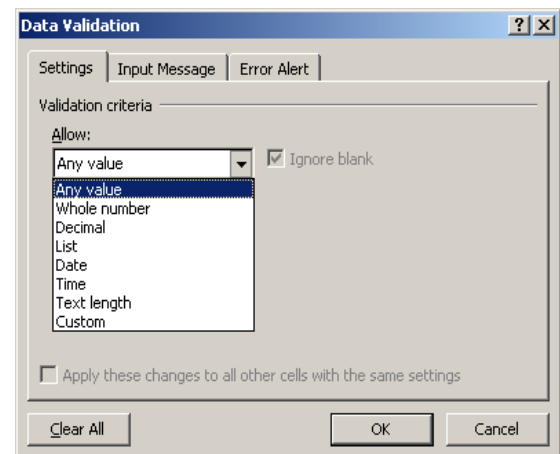


Figure 4.1

Methods of Data Validation

Creating a List

A list is an effective form of data validation where the user is allowed to select an option from a drop-down list which is built-in to the cell (Figure 4.2). The data source may be written manually by the user or selected from the same sheet.

Steps are as follows.

- 1) Select a blank cell
- 2) Select Data Tab
- 3) Select Data Validation from Data Tool group
- 4) Select List
- 5) In Source, select the cell with values, or type the data with comma.

D	E
Dept	Region
Sales	north
Sales	north
Admin	east
Mktg	west
R&D	south
R&D	north
R&D	north

Figure 4.2

Tips: If the source is from a different sheet, create a named range for all the values and use the name in the Source field for Data Validation.

Allow Numbers within Limits

- 1) In the Allow box, click Whole Number or Decimal.
- 2) In the Data box, select the type of restriction you want. For example, to set upper and lower limits, select Between.
- 3) Enter the minimum, maximum, or specific value to allow.

Allow Dates or Times within a Timeframe

- 1) In the Allow box, select Date or Time.
- 2) In the Data box, select the type of restriction you want. For example, to allow dates after a certain day, select greater than.
- 3) Enter the start, end, or specific date or time to allow.

Allow Text of a Specified Length

- 1) In the Allow box, click Text Length.
- 2) In the Data box, click the type of restriction you want. For example, to allow up to a certain number of characters, click less than or equal to.
- 3) Enter the minimum, maximum, or specific length for the text.

Calculate What is Allowed Based on the Content of another Cell

- 1) In the Allow box, select the type of data you want.
- 2) In the Data box, select the operator (for the criteria) you want.
- 3) In the box or boxes below the Data box, click the cell that you want to use to specify what's allowed. For example, to allow entries for an account only if the result won't go over the budget, click Decimal for Allow, select less than or equal to for Data, and in the Maximum box, click the cell that contains the budget amount.

Use a Formula to Calculate What is Allowed

- 1) In the Allow box, click Custom.
- 2) In the Formula box, enter a formula that calculates a logical value (TRUE for valid entries or FALSE for invalid). For example, to give an incentive only if the dept is sales and the region west, you may use the following custom formula `=and(d2="sales",e2="west")`.

To display an optional input message when the cell is clicked, click the Input Message tab, and make sure that, the Show Input Message When Cell is Selected - check-box is selected and fill in the title and text for the message.

Specify how you want Microsoft Excel to respond when invalid data is entered:

- 1) Click the Error Alert tab, and make sure the "Show Error Alert After Invalid Data is Entered" check box is selected.
- 2) Select one of the following options for the Style box:
 - To display an information message that does not prevent entry of invalid data, select Information.

- To display a warning message that does not prevent entry of invalid data, select Warning.
 - To prevent entry of invalid data, select Stop.
- 3) Fill in the title and text for the message (up to 225 characters).

If you do not enter a title or text, the title defaults to "**Microsoft Excel**" and the message to "**The value you entered is not valid. A user has restricted values that can be entered into this cell.**"

Exercise

- 1) Open Advance Excel Assignment workbook. In the sheet named Validation, so the following data validations.
- 1) No duplicates should be allowed in emp_code..
 - 2) Only text should be allowed in emp name.
 - 3) Age should be only numeric data.
 - 4) Salary should be between 5000 and 50000.
 - 5) Joining Date should be less than current Date.
- 2) In the "emp_inf" sheet create a dropdown list of all the employee codes in cell B3.

Chapter 5: Protection

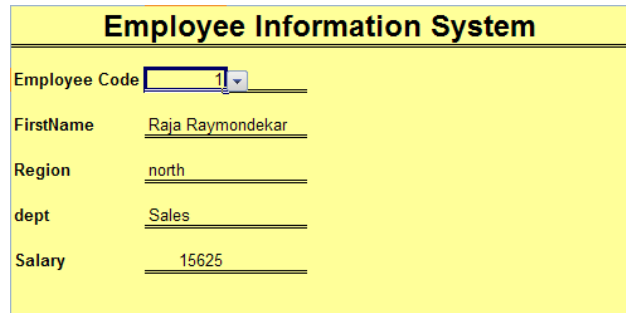
Objectives:

After reading this chapter you will learn

- How to prevent unauthorized changes to your worksheets
- How to password protect your workbooks

In the emp_inf example (**Figure 5.1**), if we wish to use the worksheet as a public template, we would need to prevent un-authorized access to the vlookup formulas. We would want to restrict the data entry only to the cell B3. To do these, we may use Protection.

In excel, there are 3 levels of Protection. Cell Level, worksheet Level and Workbook level Protection.



The screenshot shows a form titled "Employee Information System" with a yellow background. It contains several input fields: "Employee Code" with a dropdown menu showing "1", "FirstName" with the text "Raja Raymondekar", "Region" with the text "north", "dept" with the text "Sales", and "Salary" with the text "15625".

Figure 5.1

Protecting a Worksheet by using Passwords

To password-protect a worksheet,

- 1) Activate the Review ribbon tab.
- 2) In the Changes ribbon group, click Protect Sheet to open the Protect Sheet dialog box.
- 3) Check the options you want.
- 4) Type a password and click OK. The Confirm Password dialog box appears.
- 5) In the "Reenter Password to Proceed" box, type the same password to confirm.
- 6) Click OK to close the password confirmation box and the dialog box.

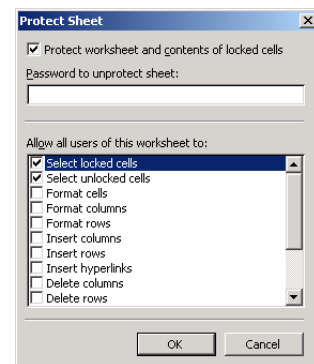


Figure 5.2

Protecting a Workbook

Workbook level protection can be done in two ways. Either you may wish to protect the workbook **structure** (prevent changes like worksheets being moved, deleted, inserted, hidden, unhidden, or renamed) or you may want to protect the workbook **window** (ensure that a workbook's window is the same size and position each time it is opened.)

To protect a workbook, follow the steps below.

- 1) Activate the Review ribbon tab.
- 2) In the Changes ribbon group, click Protect Workbook.
- 3) In the Protect Workbook dialog box that appears, select either or both the options (Structure or Windows) as

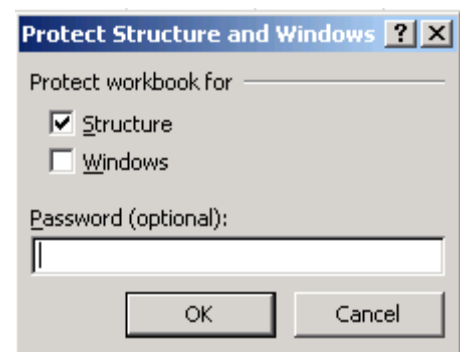


Figure 5.3

required.

- 4) To prevent others from removing workbook protection, you can set a password. After specifying options in the Protect Workbook dialog box, click OK.

Protecting Part of a Worksheet

When you protect an entire worksheet, all the cells in the worksheet are locked by default. This means that users cannot make changes to any cell in the worksheet. To allow the users to make changes to particular cells only, you must unlock the cells manually before protecting the worksheet. This will allow the users to change data only in the unlocked cells. You can hide the formula before protecting the sheet, so that it is not visible to the user after sheet level protection is activated.

To password protect only part of a worksheet perform the following steps.

Step 1:

- Select the range of cells that you want users to be able to modify.
- Right-click and choose Format Cells to open the Format Cells dialog box.
- Activate the Protection tab.
- Clear the Locked check box, and click OK.
- Follow Step 2 only if you wish to hide your formulae or proceed to step 3.

Step 2:

- Select the range of cells with formulae that you want to hide from users.
- Right-click and choose Format Cells to open the Format Cells dialog box.
- Activate the Protection tab.
- Check the "Hidden" check box along with the "locked" check box and click ok.
- Follow step 4 to password protect the worksheet.

Step 3:

- Activate the Review ribbon tab.
- In the Changes ribbon group, click Protect Sheet to open the Protect Sheet dialog box,
- Type a password and click OK. The Confirm Password dialog box appears.
- In the "Re-enter password to proceed" box, type the same password.
- Click OK to close both the password confirmation box and the dialog box.

Password Protecting a File

Alternatively, you may also wish to save your file with a password such that any user would be asked for a password before he is able to view or modify your file. To do this, follow the steps below.

- 1) Click on office-button > Save as
- 2) in the save as dialog box, click on tools > General options(**Figure5.4**).
- 3) Set the password to open or modify as the case may be.
- 4) Save the file.

Now the File is password protected.

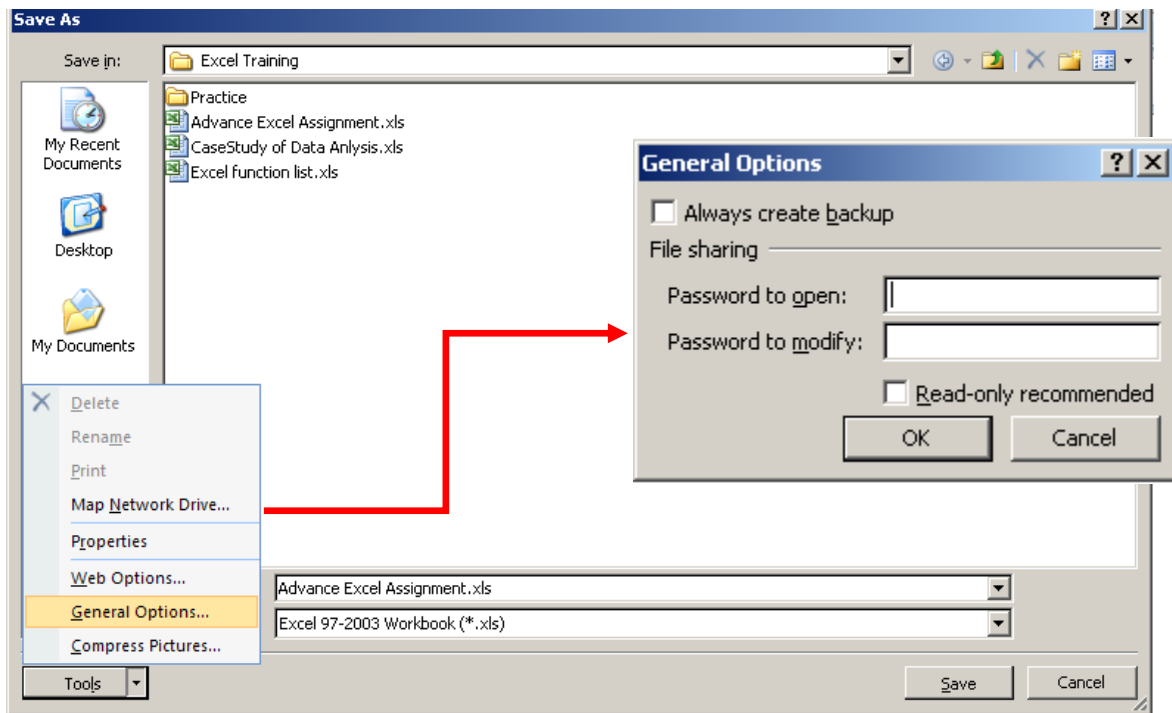


Figure 5.4

Note: To use an excel sheet as a template, save the file with .xlt extension.

Case Study

Open Practice Folder in the File named "Practice Assignment Product-Invoice", Prepare the invoice template by doing the following.

[illegible]

- 1) In M/s create a drop-down list of all customer names.
- 2) Address should be looked up based on the customer name from the "customers" worksheet.
- 3) Product column would contain a list of all the products listed in the "product" worksheet.
- 4) Rate should be looked up based on the product selected in the adjoining product list.
- 5) First "Sr No" would be put by the vendor and the rest would appear only if a product is selected from the product list.
- 6) Amount would be calculated as $qty \times rate$.
- 7) Gross Amount is sum of all amounts. Vat is 14% of gross amount.
- 8) Discount should be calculated as 10% of gross amount if Gross amount is greater than 15000.
- 9) Net amount should be calculated as $Gross\ Amount + Vat - Discount$.
- 10) Save the file as template.

Note: There should be no visible errors in the template.

Chapter 6: Sorting a Database

Objectives

In this chapter you will learn

- How to perform different types of sorting.

If you need to organize your data in a specific order based on a field, you may sort your data.

Simple Sort

To perform a simple sort on a column,

- 1) Select any cell in the column by which you want to sort.
- 2) Activate the Data ribbon tab.
- 3) In the Sort & Filter group, click the Sort Ascending or Sort Descending button.

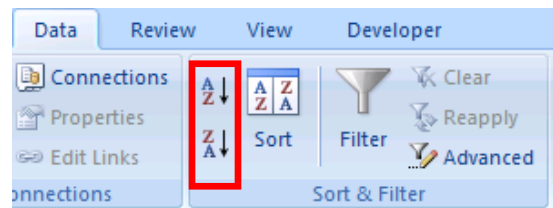


Figure 6.1

This will sort the entire database.

Multilevel Sort

Sometimes, you may want to sort your data on multiple columns. For example, you want to sort employee information by Region and Department. This can be done by multilevel sorting.

To sort a list based on two or more columns:

- 1) Select any cell in the list.
- 2) Activate the Data ribbon tab.
- 3) In the Sort & Filter ribbon group, click "Sort" to open the Sort dialog box.
- 4) From the Sort by list, select the column heading of the column by which you want to sort the list, and then select a sorting order. All records will be sorted first based on the column and the sorting order you selected.
- 5) From the Then by list, select the next column by which you want to sort.
- 6) If necessary, add more "Then by" fields by clicking "Add Level."
- 7) When all "Then by" fields are complete, click OK.

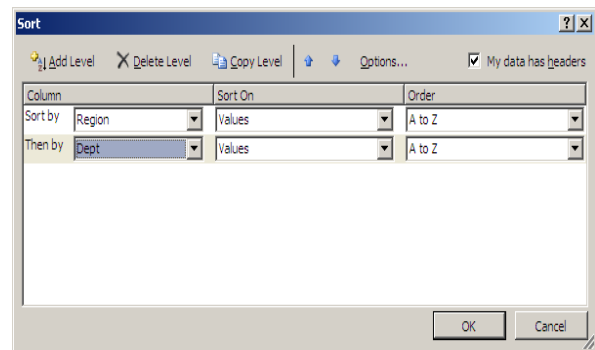


Figure 6.2

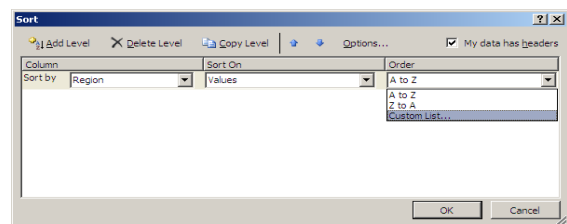


Figure 6.3

Tip: Make sure that no "Then By" fields are empty before clicking on okay.

Customized Sorting

When we sort the data, region wise, it sorts either in the ascending or descending order. However, if you want to sort your data in a customized order, for Example East, West North, and South, we would need to perform a custom sort. To perform a custom sort, follow the steps as under.

- 1) Select any cell in the list.
- 2) Activate the Data tab.
- 3) In the Sort & Filter group, click Sort to open the Sort dialog box,
- 4) From the Sort By list, select the column heading of the column by which you want to sort the list and from sorting order, select Custom List
- 5) It will open the Custom List dialog box,
- 6) Type the sequence by which you wish to sort and click on "Add" button to add the list in custom sort
- 7) Click Ok

This will sort the data in the sequence you specified.

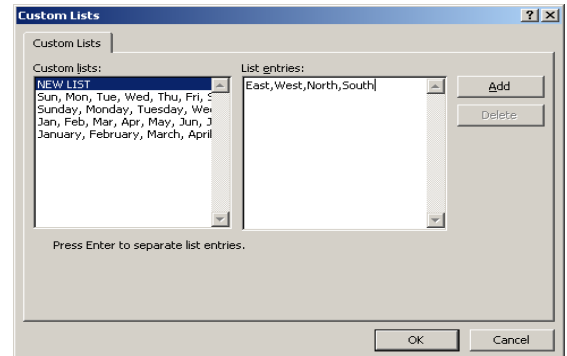


Figure 6.4

Chapter 7: Filtering a Database

Objectives

This chapter teaches you

- The different types of filter
- How to use them

At times, you will need to display only those rows of information that meet specific criteria. To help you do this, you may use Filter.

Auto Filter

For commonly used criteria, Excel provides the AutoFilter feature. Here's how it works:

- 1) Select any cell in the list.
- 2) Activate the Data tab.
- 3) In the Sort & Filter group, click Filter to display the AutoFilter arrows next to each column heading.
- 4) From the list for the column by which you want to filter, select a criterion.
- 5) Click OK.

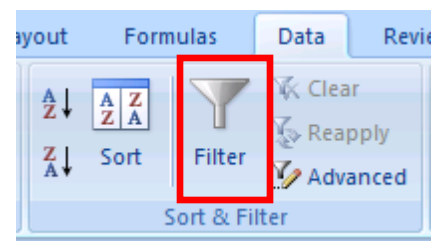


Figure 7.1

To clear the filter and show the entire list, click on filter again.

You can filter a list based on more complex criteria by using Excel's Advanced Filtering features. For example, you can display the records of all those employees whose salary is between 7000 and 12000. Excel provides two tools for specifying complex filter criteria:

- 1) Number, Text or date filters
- 2) Advanced Filter

Number, Text or Date Filters

Once you add a filter to data, you also get a Number, Text or Date Filter option in each fields depending on the type of data in that column. These can be used for field specific filtering like "Begins With", "Contains" for text fields, "Greater Than", "Lesser Than", "Between" for number fields or "Before", "After" for date fields. Every filter field has a Custom Filter option where you may specify formulas or options other than the ones that are already provided.



Figure 7.2



Figure 7.3

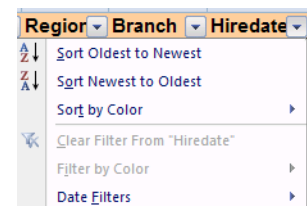


Figure 7.4

From the drop-down list of the column for which you want to create criteria, choose Text Filters, Date Filters or Number Filters, click on Custom to display the Custom AutoFilter dialog box.

- 1) Select the first comparison operator and its associated comparison criterion.
- 2) Select And or Or. By selecting "And", you'll decrease the number of rows that meet the criteria. By selecting "Or", you will increase the number of matching rows.
- 3) Select the second comparison operator and its associated comparison criterion.
- 4) Click OK.

Filtering a List using Advanced Filter

If you wish to filter your data such that only the records of employees of Sales and admin departments from north and south region who earns between 7000-12000 or 15000-20000 are displayed, auto filter will not serve the purpose. This is because one number filter cannot be applied over another in Auto Filter. However, the above query requires us to do just the same on salary field. So to solve this query, we may have to use Advanced-Filter.

While using Advanced Filter, we need to have a criteria range and a list range.

List range is your database. To create a criteria range, we need to make a copy of the column header of the database.

Criteria Range →

Empcode	FirstName	LastName	Dept	Region	Branch	Hiredate	Salary
			sales	north		>=7000	<=12000
			admin	north		>=7000	<=12000
			sales	south		>=7000	<=12000
			admin	south		>=7000	<=12000
			sales	north		>=15000	<=20000
			admin	north		>=15000	<=20000
			sales	south		>=15000	<=20000
			admin	south		>=15000	<=20000

→ List Range

Empcode	FirstName	LastName	Dept	Region	Branch	Hiredate	Salary
1	Raja	Raymondekar	Sales	north	Ferozepur	1-Jan-77	15,625.00
2	Suman	Shinde	Sales	east	Cuttack	1-Jan-77	12,500.00
2	Kuldeep	Sharma	Admin	south	Hydrabad	1-Mar-99	5,000.00
3	Beena	Mavadia	Mktg	north	Delhi	24-Nov-79	8,750.00
4	Seema	Ranganathan	R&D	north	Kanpur	4-Sep-89	15,000.00
5	Julie	D'Souza	R&D	north	Mathura	4-Sep-88	8,875.00
5	Deepak	Jain	Personal	west	Pune	17-Aug-90	9,875.00
6	Neena	Mukherjee	R&D	north	Agra	4-Sep-89	8,875.00
7	Pankaj	Sutradhar	Sales	north	Ambala	12-Dec-99	10,625.00

Figure 7.5

- 1) Enter a comparison criterion below the cell that contains the criteria label. You may use same row for "AND" criteria and different rows for "OR" criteria. For example, the criteria given in **figure 7.5** can be used to display only records of people in north or south regions.
- 2) Activate the Data tab.
- 3) In the Sort & Filter group, click Advanced to open the Advanced Filter dialog box. (**Figure 7.6**).
- 4) In the List Range box, select the cell range you want to filter. The

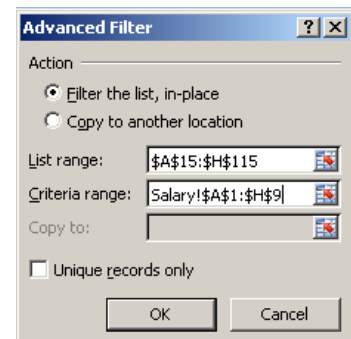


Figure 7.6

cell range must include the associated column headings.

- 5) In the Criteria Range box, select the cell range that contains your criteria.
- 6) Click OK.

Tip: While designing the criteria range, it is better to copy and paste the column header of the entire database as the heading of the criteria range.

For better visibility, keep the criteria range and list range on different rows.

The Advanced Filter command filters your list in place, as Auto Filter does, but it does not display drop-down lists for columns. Instead, you have to select the List Range i.e. your data, type criteria in a criteria range on your worksheet and select the Criteria Range and in output range type the cell address where you want to display the output. It is optional.

Filtering Unique Records

Advanced filter can also be used to filter out unique values in a list at a separate location. Though remove duplicates functionality of excel can help in creating a list of unique values in a list, you would need to copy paste the unique values, if you need it at a different location. To avoid this, use the advance filter option as follows.

- 1) Select the column or click a cell in the range or list you want to filter.
- 2) On the Data Tab, Click Filter, and then click Advanced Filter.
- 3) Do one of the following.
 - To filter the range or list in place, similar to using AutoFilter, click Filter the list, in-place.
 - To copy the results of the filter to another location, click Copy to another location. Then, in the Copy To box, enter a cell reference.
 - To select a cell, click Collapse Dialog to temporarily hide the dialog box. Select the cell on the worksheet, and then press Expand Dialog.
 - Select the Unique records only check box.

Tips: Advanced filter, Copy to option copies on a same worksheet, if you want to copy the Filter data in to different worksheet, and then select the Advanced Filter command while you are at the worksheet where you want the data to be placed.

Exercise

- 1) Open the sheet named Filter. Use Auto filter to display only records of
 - 1) People working in sales or admin
 - 2) People from North or South
- 2) Display records of people working in sales or admin, north or south whose salary is between 7000 and 12000.
- 3) Display records of people working in sales or admin, north or south whose salary is between 7000 and 12000 or between 15000 and 20000.

Chapter 8: Subtotals

Objectives:

After this chapter, you would be able to

- Create single level summary of data using subtotals.
- Create multi level subtotals.

Many a times in our reporting, we need to do subtotals followed by Grand total at the end of report. We generally add a row at the end of each group and use the SUM function to achieve this result. Though there is nothing wrong in this method, the amount of manual intervention maximizes the possibility of errors.

Excel provides an effective tool to solve this issue. Using the Subtotal functionality of excel, one can automatically calculate subtotal and grand total values in a list.

Depending on the type of reporting we need to do, we may require to perform

- 1) Single Level Subtotal
- 2) Multi level Subtotal

Display Subtotal at Single Level

For performing Subtotal on data, first the table must be sorted on the field on which subtotal needs to be done. For example, if you need to have region wise subtotal, we need to sort data on region. To perform Subtotal,

- 1) Click on the Subtotals command from the Data Tab, Outline Group.
- 2) A Subtotal dialog box appears as shown in **figure 8.1**.
- 3) Select the desired column from "At Each Change In:" list box.
- 4) Select the function which you want to perform on data from the "Use function" list box.
- 5) Select the column on which you want to perform subtotals from the Add Subtotal To: field.

When you click the OK button, Microsoft Excel inserts a subtotal row for each group of identical items in the selected column.

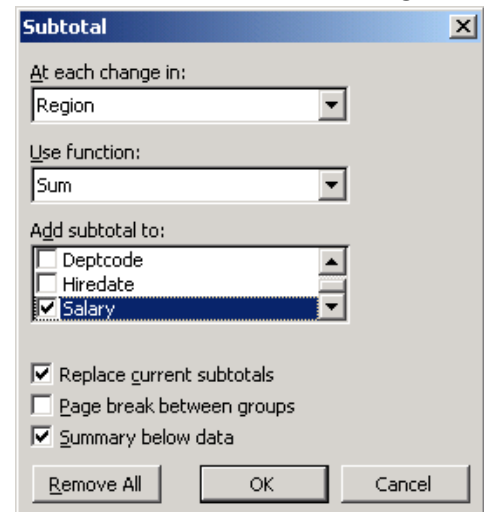


Figure 8.1

There are a few more options in the Subtotal dialog as seen in **figure 8.1**. These are explained below.

Choosing a Summary Function

The first time you use the Subtotals command for a list, Microsoft Excel suggests a summary function based on the type of data in the column you select in the Add Subtotal To box, Choose a different calculation, such as Average, by selecting a different summary function in the Use Function box in the Subtotal dialog box.

Choosing the Values to Summarize

The first time you use the Subtotals command; the Add Subtotal To box displays the label of the right-most column. You can leave that label as selected, or you can select the label of any other column in the list. The next time you use the Subtotals command, Microsoft Excel displays the label of the last column you selected.

Displaying Subtotal Rows above the Detailed Data

If you want your subtotal rows to appear above their associated detailed data and if you want the Grand Total row to appear at the top of the list, clear the "Summary below Data" check box.

Displaying Nested Subtotals

Sometimes, you need to perform multiple levels of subtotals on data, for example you need to group data on Region and then on Dept.

- 1) First, as discussed earlier, you need to sort the data on Region and then by Dept.
- 2) Click the Subtotals command from the Data Tab, Outline Group.
- 3) Select the Region column from "At Each Change In" list box.
- 4) Select the function which you want to perform on data from the "Use function" list box.
- 5) Select the column on which you want to perform subtotals from the Add Subtotal to field.
- 6) Click the OK button, to perform first level of subtotals
- 7) Again Select the Subtotal command and select the Dept column from "At Each Change In" list box.
- 8) Select the function which you want to perform on data from the "Use function" list box.
- 9) Select the column on which you want to perform subtotals from the "Add Subtotal to" field.
- 10) Clear the check box of "Replace the current subtotal" before you clicks on the OK button.

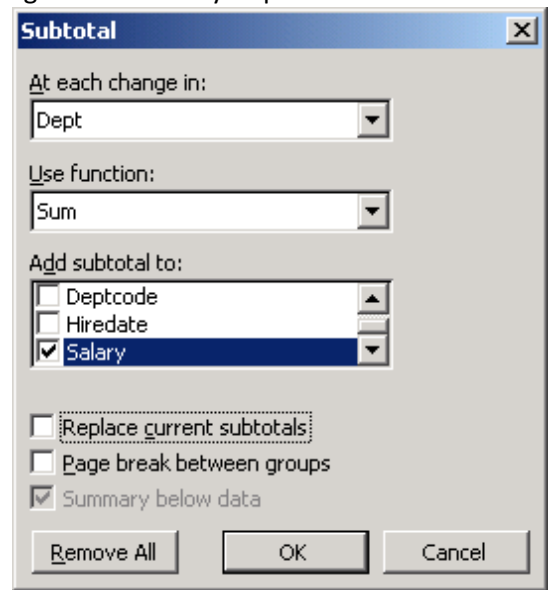


Figure 8.2

Tips: If you want to copy only the summary details, select the outline where summary is present. Select the columns required, press Alt; (to select only visible cells) then copy and paste it.

Chapter 9:Pivot Tables

Objectives:

This chapter would help you learn how to

- Create Pivot Tables.
- Make different reports using Pivot Tables.
- Use advanced features of Pivot Tables.

A **Pivot Table** is an interactive worksheet based table that quickly summarizes large amounts of data using the format and calculation methods you choose. It is called a Pivot Table because you can rotate its row and column headings around the core data area to give you different views of the source data. As source data changes, you can update a pivot table. It resides on a worksheet thus; you can integrate a Pivot Table into a larger worksheet model using standard formulas. You can use a PivotTable to analyze data in an Excel workbook or from an external database such as Microsoft Access or SQL Server.

Examining PivotTables

The data on which a PivotTable is based is called the Source Data. Each column represents a field or category of information, which you can assign to different parts of the PivotTable to determine how the data is arranged. You can add four types of fields, as shown in **figure 9.1**. The fields are explained in the following table:

Field	Description
Report Filter	Filters the summarized data in the PivotTable. If you select an item in the report filter, the view of the PivotTable changes to display only the summarized data associated with that item. For example, if Region is a report filter, you can display the summarized data for North, West, or all regions.
Row Labels	Displays the items in a field as row labels. For example given below, the row labels are values in the Quarter field, which means that the table shows one row for each quarter.
Column Labels	Displays the items in a field as column labels. For example, given below, the column labels are values in the Product field, which means that the table shows one column for each product.
Σ Values	Contains the summarized data. These fields usually contain numeric data, such as sales and inventory. The area where the data itself appears is called the data area.

Report Filter list Column Labels list

Report Filter	Region	(All)					
Row Labels list	Sum of Sales	Column Labels					
	Row Labels	Anise Seeds	Basil Leaf	Cassia	Chives	Cloves	Grand Total
	Qtr1	138662	80115	238684	150837	173047	781345
	Qtr2	149449	82151	240398	166792	178253	817043
Σ Values	Qtr3	144931	84346	250219	169073	181556	830125
	Qtr4	147804	84320	247687	168926	177227	825864
	Grand Total	580846	330932	976988	655628	710083	3254477

Figure 9.1

- 1) Select any cell in a data range that includes a heading for each column in the top row.
- 2) Activate the Insert tab.
- 3) In the Tables group, click the PivotTable button, or click the PivotTable list and select PivotTable to open the Create PivotTable dialog box.
- 4) In the Table/Range box, select the range that contains the data to be used in the PivotTable.
- 5) Select the location for the PivotTable. You can place the PivotTable in a new or existing worksheet. Click OK to create the PivotTable.

Add fields

You can add fields to a PivotTable to specify the data you want to display. The fields of the source data appears in the "PivotTable Field List" task pane.

To add fields, drag the relevant field from the top of the PivotTable Field List to one of the four areas at the bottom. You can add more than one field to an area, and you do not need to add all fields to the table. To display data and not just headings, you need to place at least one field in the Σ Values area.

After the fields are in place, you can filter the information that appears in the table by selecting from the Filter columns, Filter rows, or report filter lists. For example, you can show all data values, or restrict the PivotTable to summarizing only a couple of them.

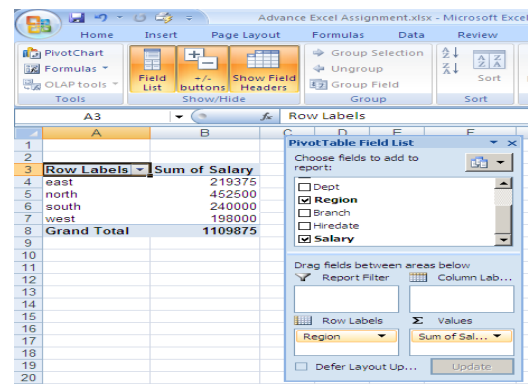


Figure 9.2

Format a PivotTable report

You can modify the format of a PivotTable by using styles and the Field Settings dialog box. You can use styles to format an entire PivotTable in one step. You can use the Field Settings dialog box to change number formats, specify how data is summarized, and show or hide data.

- 1) Activate the Design tab
- 2) In the PivotTable Styles group, select a style that you want to apply to your Pivot Table as shown in **Figure 9.3**.

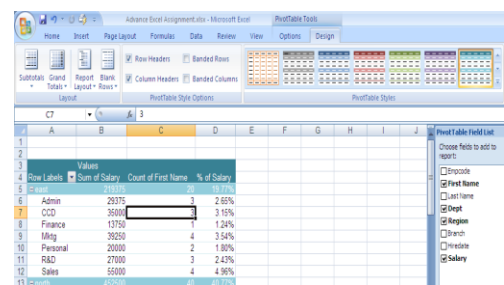


Figure 9.3

Calculate the Percentage of the field

You can change field settings to alter how data appears or is summarized in a PivotTable. To change field settings:

- 1) Activate option Tab.
- 2) Click on the Field setting From Activate Field Group.
- 3) Form the Given dialog box change the custom name to % of Salary.
- 4) Select the Tab Show vales as and from the drop down select the % of Total.

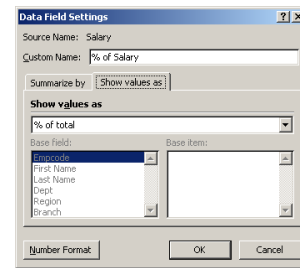


Figure 9.4

Top/ Bottom Report

- 1) Select the Field on the Pivot.
- 2) Select Value Filters and Select Top 10.
- 3) Apply the condition according to your requirement.

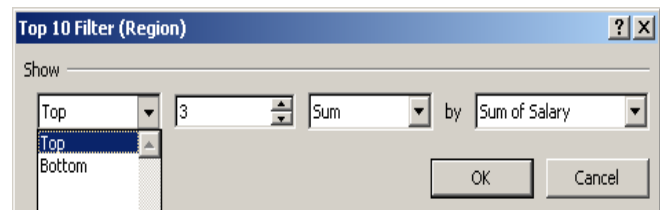


Figure 9.5

Group Items in a PivotTable

If you want to generate a report on Year wise Quarter wise based on existing data you have for such scenario you can use Group Option in Pivot Table.

- 1) Select any cell in a data range.
- 2) Activate the Option tab.
- 3) Click on Group Field
- 4) In the "By" box, click one or more time periods for the groups.

If you have grouping on date field, you can group items by weeks, click Days in the "By" box, make sure Days is the only time period selected, and then click 7 in the Number of days box. You can then click additional time periods to group by, such as Month, if you want.

Create a chart from data in a PivotTable report.

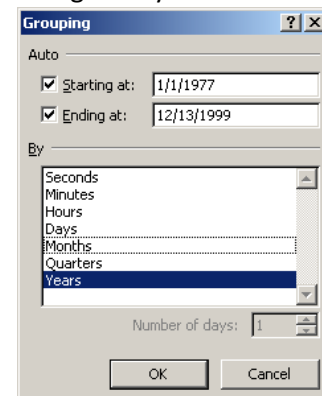


Figure 9.6

Create a Graph using Pivot Data

You can use a PivotChart to graphically display data from a PivotTable. A single PivotChart provides different views of the same data .When you create a PivotChart, the row fields of the PivotTable become the categories, and the column fields become the series.

To create a PivotChart, select any cell within a PivotTable, and click Chart in the Tools group on the Options tab. Select options for the chart as you would a standard chart, then click OK. You can also create a new PivotChart and PivotTable at the same time by selecting a cell in the source data, and selecting PivotChart from the PivotTable list in the Tables group on the Insert tab.

Figure 9.7 shows a Pivot Table for region wise department wise sum of salary and pivot chart created from it.

Sum of Salary	Region				
Dept	north	east	west	south	Grand Total
Admin	46875	29375	11250	18750	106250
CCD	67375	35000	35000	35000	172375
Director				35000	35000
Finance	35000	13750	18125	23125	90000
Mktg	58000	39250	29250	45250	171750
Personal	58125	20000	40750	12500	131375
R&D	98375	27000	29875	30500	185750
Sales	88750	55000	33750	39875	217375
Grand Total	452500	219375	198000	240000	1109875

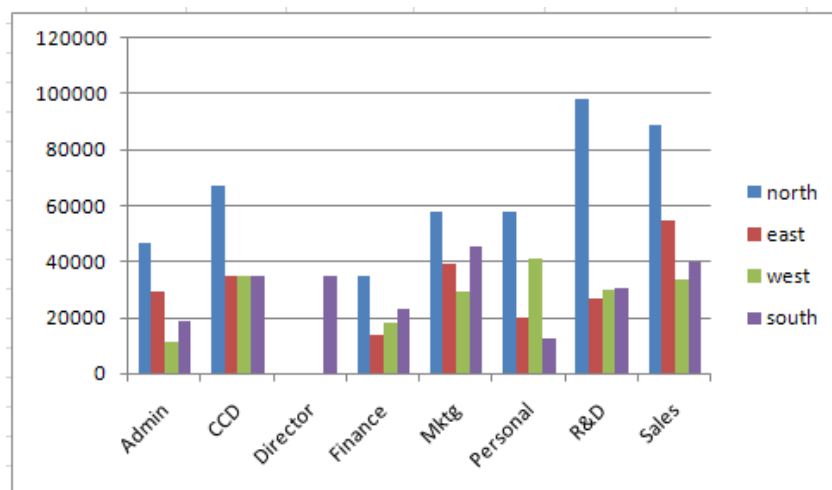


Figure 9.7

Tips: Click anywhere inside the pivot table and press **alt F1** key combination to create a pivot chart. **F11** creates the chart on a new sheet.

Chapter 10: Conditional formatting

Objectives:

This chapter would teach you how to

- Highlight data based on conditions.
- How to specify complex criteria for highlighting data.

When data needs to be formatted based on certain conditions, we may use conditional formatting. It is easy to highlight cells or range of cells, emphasize unusual values, and visualize data by using data bars, color scales or icon sets. Conditional Formatting changes the appearance of a cell range, based on a condition (or criterion). If the condition is true, the cell range is formatted based on that condition. If the conditional is false, the cell range is not formatted.

You can select any of the following types of formatting, as per requirement

- Format all cells by using a two-color scale
- Format all cells by using a three-color scale
- Format all cells by using data bars
- Format all cells by using an icon set
- Format only cells that contain text, number, or date or time values
- Format only top or bottom ranked values
- Format only values that are above or below average
- Format only unique or duplicate values
- Compare table columns to determine which cells to format
- Use a formula to determine which cells to format
- Clear conditional formats

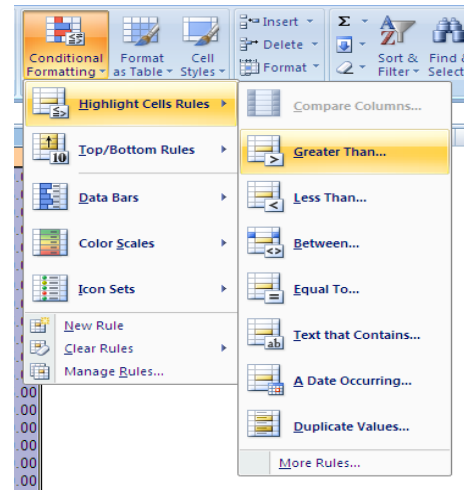


Figure 10.1

For example, you can highlight in green, all sales figures that exceed 75,000. Conditional Formatting can be applied based on a cell value or a formula.

Note: The area that you select before applying Conditional Formatting decides the area in the worksheet to which the format would be applied.

Conditional Formatting using Cell-Values (Column Based Conditional Formatting)

To use conditional formatting to apply shading based on cell values,

- 1) Select the cells to which you want to apply the Conditional Shading.
- 2) Activate the Sheet ribbon tab.
- 3) In the Style group, click Conditional Formatting.
- 4) From the gallery that appears, select Highlight Cell Rules.
- 5) From the menu, select a condition for the value in the cell or select More Rules.
- 6) Specify a condition and cell shading.
- 7) Click OK to apply the format.

Conditional Formatting using Formula (Record Based Conditional Formatting)

To apply conditional formatting based on formulas,

- 1) Select the cells to which you want to apply the formatting.
- 2) In the Style ribbon group, click Conditional Formatting.
- 3) From the menu, select Conditional Formatting Rules Legend to open the Formatting Rules Legend dialog box.
- 4) Click New Rule to open the Add Formatting Rule dialog box.
- 5) In the Select a Rule Type box, select Use a formula to determine which cells to format.
- 6) In the Format values where this formula is true box, enter a formula that evaluates a value to be True or False.
- 7) Click Format to open the Format Cells dialog box.
- 8) In the Format Cells dialog box, specify the format in which the cells satisfying the condition should appear, and click OK.
- 9) Click OK to close the Add Formatting Rule dialog box.
- 10) Click OK to close the Formatting Rules Legend dialog box and apply the format.

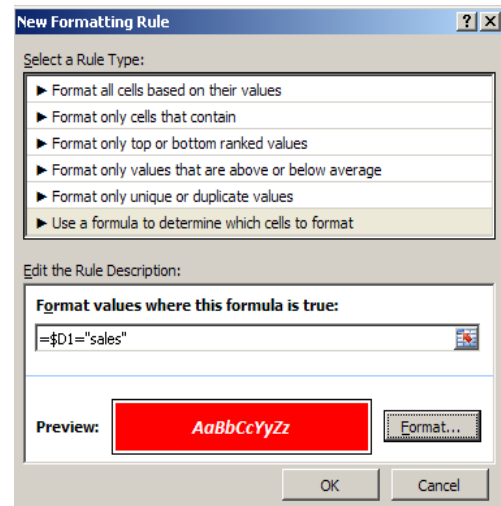


Figure 10.2

Note: If the format needs to be applied on the entire database, select the database with or without the header before applying conditional formatting. However, the formula should be applied to the first row in selection.

Example

Figure 10.b depicts the formula to highlight the records of every one in the **sales** department if the selection is along with the column headers.

To highlight the records of the person who earns the highest salary, we need to use the following formula if we have selected the database without the header.

=\$h2=max(\$H\$2:\$H\$101)

However if the selection is along with the header, the formula would be,

=\$h1=max(\$H\$2:\$H\$101)

Database Case Study

Open the worksheet of Invoice from Excel_Basic from the practice folder and solve the below questions

1	2	3	4	5	6	7	8
Invoicedate	Invoice No.	Customer	Type	Product	Qty	Retail Price	Sales Price
2-Jun-04	1001	Octopus		A1	150		0.00
2-Jun-04	1001	Octopus		A2	200		0.00
2-Jun-04	1002	Encarta		A1	100		0.00
3-Jun-04	1003	DBT		A3	200		0.00
3-Jun-04	1003	DBT		A3	140		0.00
3-Jun-04	1004	Silver Line		A2	210		0.00
3-Jun-04	1005	Darmilla		A2	230		0.00
4-Jun-04	1005	Darmilla		A2	45		0.00
4-Jun-04	1006	Brooks		A3	75		0.00
16-Jun-04	1006	Brooks		A3	180		0.00
16-Jun-04	1007	Gravity		A1	250		0.00
21-Jun-04	1007	Gravity		A2	100		0.00
21-Jun-04	1008	ATPL		A2	235		0.00
24-Jun-04	1008	ATPL		A3	125		0.00
24-Jun-04	1009	Nitco		A3	90		0.00
27-Jun-04	1009	Nitco		A2	60		0.00
27-Jun-04	1010	Silver Line		A1	340		0.00
4-Jul-04	1011	BTK		A2	200		0.00
4-Jul-04	1011	BTK		A3	300		0.00
6-Jul-04	1011	BTK		A3	280		0.00
6-Jul-04	1012	Novalty		A2	140		0.00
8-Jul-04	1012	Novalty		A3	160		0.00
8-Jul-04	1013	Encarta		A3	110		0.00
10-Jul-04	1014	Oscar		A2	80		0.00
14-Jul-04	1014	Oscar		A1	35		0.00

1) Get the Type of the customer and Rate using Vlookup

Create 6 copy of Invoice worksheet and solve other question

- 2) Sort the Record [Retailer, Direct/Wholesaler
- 3) Filter the Records for June month whose sales price is between 3000-5000
- 4) Filter the Records for retailer and wholesale qty between 100-150 and 250-500
- 5) Subtotal Records according to Type and customer wise total Qty and Total Amt
- 6) Create a summary Report Month wise / customer wise Total Qty/Total Amt and % of Amt
- 7) Highlight the row for Type of customer with the name "Direct".

Chapter 11:What-if-Analysis Tools

Objectives

This chapter tells you how to analyze data using

- Goal Seek
- Data Tables
- Scenario Manager

In situations where, you may have to use several different sets of values in one or more formulas to explore all the various results, manual interference may increase leading to errors. What-If Analysis tools can come to your rescue at such situations. There are 3 What-If Analysis tools in excel namely:

- 1) Goal-seek
- 2) Data-Tables
- 3) Scenario-Manager

Goal Seek

Suppose you have created a formula to calculate PMT based on the formula, you want to know the number of months you need to pay to complete the installment provided you pay x amount per month. For such kind of reverse analysis, you may use Goal Seek utility. This type of analysis involves changing the values in a worksheet and observing how these changes affect the results of the formulas. You use Goal Seek to solve problems that have one variable.

The Goal Seek feature in Excel helps us to compute a value for the spreadsheet input that makes the value for the given formula match the goal you specify. Goal Seeking saves you from performing time-consuming trial-and-err analysis.

Using the Goal Seek Command

To find a specific value that solves a formula, select the cell containing the formula.

- 1) Activate the Data tab.
 - 2) In the Data Tools group, click What-If Analysis and choose Goal Seek to open the Goal Seek dialog box,
 - 3) In the Set cell box, specify the cell that contains the formula you want to solve.
 - 4) In the "To Value" field, enter the result you want.
 - 5) In the "By Changing Cell" field, specify the cell that contains the value you want to adjust.
- 1) Click OK.

	A	B
4	Loan Amount	100000
5	Rate of Intrest	10.50%
6	Payment /month	36
7	PMT [EMI]	(\$3,250.24) PMT(B5/12,B6,B4)

E.g.If a person takes a Loan of 100000 for 36 Months and the EMI [PMT] is 3250, if he pays Rs. 5000 monthly, in how many months would he complete his payment.

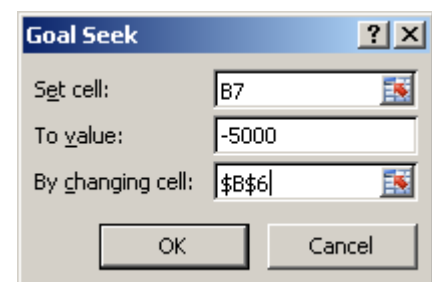


Figure 11.1

Projecting Figures Using a Data Table

A Data Table is a range that displays the results when certain values are changed in one or more formulas. The different values you want to enter in a formula are also included in the Data Table. A Data Table can have either a single variable or two variables.

One-Variable Data Tables

You can use a one-variable Data Table to observe the effects of change in a single variable in one or more formulas. For example, you can see, how changing the interest rate affects monthly payments in the function `PMT(b5/12,36,100000)`. In this function, A5 is called the input cell, where various input values are substituted from the Data Table.

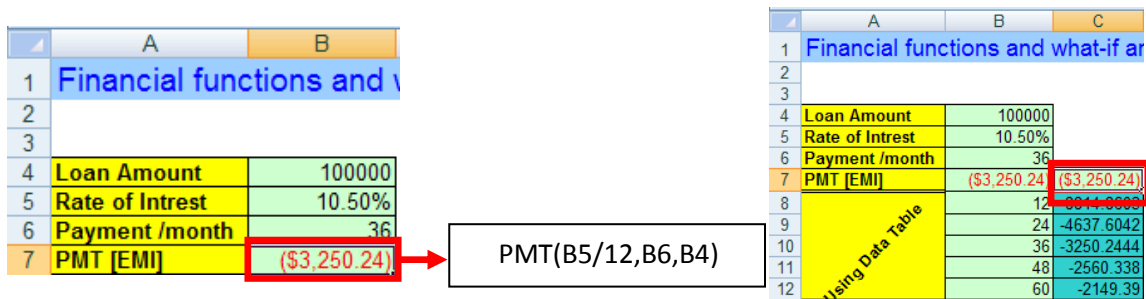


Figure 11.2

To create a one-variable Data Table:

- 1) Enter input values in a row or a column.
- 2) If you list the input values in a column, then enter the formula in the cell located at the intersection of the row above the first input value and the column to the right of the input values, as shown in diagram. If you list the input values in a row, enter the formula in the cell located at the intersection of the column to the left of the first value and the row just below the row of input values.
- 3) Select the range containing the input values and the formula.
- 4) On the Data tab, in the Data Tools group, click What-If Analysis and choose Data Table to open the Table dialog box.
- 5) If the input values are in a column, specify the input cell in the Column input cell box. If the input values are in a row, use the Row input cell box.
- 6) Click OK.

Two-Variable Data Tables

You can use a two-variable Data Table to see the effect of changing two variables in one or more formulas, as shown in diagram. For example, you can see how changing the Loan Amount and the number of payments affect the monthly payment.

To create a two-variable data table:

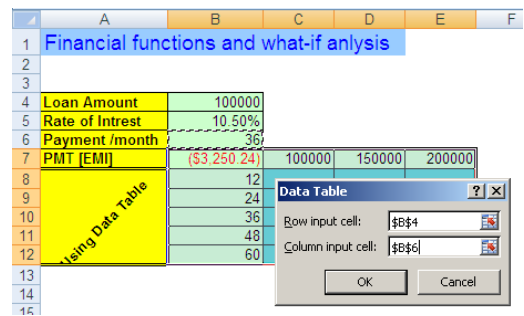


Figure 11.3

- 1) Enter a formula that contains two input cells.
- 2) In the same column, below the formula, enter the first list of input values. In the same row, to the right of the formula, enter the second list of input values.
- 3) Select the range containing both the input values and the formula.
- 4) In the Data Tools group, click What-If Analysis and choose Data Table to open the Table dialog box.
- 5) In the Row input cell box, specify the row input cell.
- 6) In the Column input cell box, specify the column input cell.
- 7) Click OK.

What-If Scenarios

Scenarios are part of a suite of commands sometimes called what-if analysis tools. A scenario is a set of values that Microsoft Excel saves and can substitute automatically in your worksheet. You can use scenarios to forecast the outcome of a worksheet model. You can create and save different groups of values on a worksheet and then switch to any of these new scenarios to view different results. You can define up to 32 changing cells per scenario.

You can use the Scenario Manager to:

- Create multiple scenarios with multiple sets of changing cells.
- View the results of each scenario on your worksheet.
- Create a summary report of all input values and results.
- Merge scenarios from a group into a single scenario model.
- Protect scenarios from modification and hide scenarios.
- Keep track of modifications with an automatic scenario history.

Creating Scenarios

For example, you have to analyze the net income of a business side-by-side under best, worst and current circumstances in the below illustration. You may use scenario manager to achieve the required result in a summary format.

You can use the Scenario Manager Dialog box to create scenarios. Follow the steps below to do the same

- 1) Activate the Data tab.
- 2) From the What-If Analysis list in the Data Tools group, select Scenario Manager to open the Scenario Manager Dialog box.
- 3) Click the Add button to open the Add Scenario dialog box.
- 4) In the Scenario name box, specify the name of the scenario.
- 5) In the Changing cells box, specify the cells that contain the values you want to change. [eg select the range of current scenario range]
- 6) Click OK to open the Scenario Values dialog box.
- 7) In the Scenario Values dialog box, specify values for the changing cells.
- 8) Click OK to create the scenario

If you want to create additional scenarios, click Add again, and then repeat the procedure. When you finish creating scenarios, click OK.

Example

In the following example, if we need to know the pmt for a range of loan amounts, rate of interests and number of payments, we may use scenarios.

Loan Amount	100000
Rate of Intrest	10.50%
Payment /month	36
PMT [EMI]	(\$3,250.24)

Figure 11.4

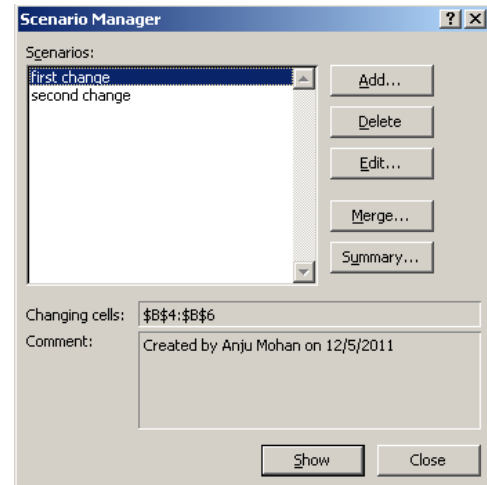


Figure 11.5

In First Change, the loan amount is 150000, rate of interest is 10.6% and number of terms is 24. In second change, the loan amount is 200000; the rate of interest is 11% and number of payments 48

Create a Scenario Summary Report

- 1) Click Summary. Scenario Manager dialog box
- 2) In the Result cells box, enter the references for the cells that refer to cells whose values are changed by the scenarios [Net Income in the above example]. Separate multiple references with commas.

Scenario Summary			
	Current Values:	first change	second change
Changing Cells:			
Loan_Amount	100000	150000	200000
Rate_of_Intrest	10.50%	10.60%	11.00%
Payment_month	36	24	48
Result Cells:			
Loan_Amount	100000	150000	200000
Rate_of_Intrest	10.50%	10.60%	11.00%
Payment_month	36	24	48
PMT_EMI	(\$3,250.24)	(\$6,963.35)	(\$5,169.10)

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

Figure 11.6

Delete a Scenario

- 1) Activate the Data tab.
- 2) From the What-If Analysis list in the Data Tools group, select Scenario Manager to open the Scenario Manager Dialog box. Click the name of the scenario you want to delete, and then click Delete.

Display a Scenario

When you display a scenario, you change the values of the cells saved as part of that scenario.

- 1) Activate the Data tab.
- 2) From the What-If Analysis list in the Data Tools group, select Scenario Manager to open the Scenario Manager dialog box.
- 3) Click the name of the scenario you want to display.
- 4) Click Show.

Tip: Double-clicking the name of the scenario displayed in the Scenarios box is the same as selecting the name and choosing the Show values.

Merge Scenarios from another Worksheet

It is easier to merge scenarios when all what-if models on the worksheets are identical. All changing cells on the source worksheet must refer to the corresponding changing cells on the active worksheet. Microsoft Excel copies all scenarios on the source sheet to the active worksheet.

- 1) Open all of the workbooks that contain the scenarios you want to merge.
- 2) Switch to the worksheet where you want to merge the scenarios.
- 3) Activate the Data tab.
- 4) From the What-If Analysis list in the Data Tools group, select Scenario Manager to open the Scenario Manager dialog box.
- 5) Click Merge.
- 6) In the Book box, click a workbook name.
- 7) In the Sheet box, click the name of a worksheet that contains the scenarios you want to merge, and then click OK.
- 8) Repeat this process if you want to merge scenarios from more worksheets.

Protecting Scenarios

The Add Scenario and Edit Scenario dialog boxes contain two protection options:

- Prevent Changes
- Hide.

If you select Prevent Changes and then activate sheet protection, the scenarios you define cannot be edited. However, this does not prevent you from seeing the values of the changing cells directly on the sheet (unless the cells themselves are locked). Rather, the scenarios themselves are protected from modification when the Prevent Changes check box is selected.

In addition, selecting the Hide check box removes a scenario name from the list of defined scenarios, preventing its display.

Once you select protection options in the Add Scenario or Edit Scenario dialog box, you must activate sheet protection. To do this, use the protection command on the Tools menu, and then choose Protect Sheet.

Note: When sheet protection is activated, you can still add scenarios. However, you cannot edit or delete them unless the Prevent Changes check box is cleared.

Chapter 12: Working with multiple worksheets, workbooks and applications

Objectives:

This chapter will teach you,

- The different ways to work with multiple worksheets
- The different ways to work with multiple workbooks

Creating Links between Different Worksheets

If there are month wise data in different worksheets and we need to have yearly data on a different worksheet as shown in **figure 12.1**, we may use inter-sheet reference.

Product	Price	Product	Price	Product	Price
Product1	412	Product1	856	Product1	329
Product2	212	Product2	782	Product2	436
Product3	856	Product3	720	Product3	466
Product4	499	Product4	718	Product4	158
Product5	849	Product5	748	Product5	411
Product6	611	Product6	225	Product6	468
Product7	725	Product7	663	Product7	728

Figure 12.1

To use a cell-reference from a different sheet, you can use the following syntax

Sheetname!Reference

Product	Price
Product1	=Jan!B2+Feb!B2+March!B2
Product2	1430
Product3	2042
Product4	1375
Product5	2008
Product6	1304
Product7	2116

Figure 12.2

However, if the product names are not the same or are not in the same order, in all the other sheets, this method would not prove useful. In these scenarios, you may use the consolidation feature of excel.

Product	Price
Product1	412
Product2	212
Product5	849
Product6	611
Product7	725

Product	Price
Product1	856
Product2	782
Product3	720
Product4	718
Product5	748

Product	Price
Product1	329
Product2	436
Product3	466
Product4	158
Product5	411
Product6	468
Product7	728

Figure 12.3

To consolidate data from different worksheets, follow the steps below.

- 1) Go to Data Tab >> Consolidate
- 2) You will get the consolidate dialog box
- 3) Select the function you want to apply on the data from the function drop down box
- 4) Click on browse and select the first group of data
- 5) Click on add
- 6) Repeat Step 2 and 3 for all the data
- 7) Click on Top Row And Left Column if you want the row and column Title to be picked up
- 8) Select create links to source data if you wish to have the updated data for every change in the source data

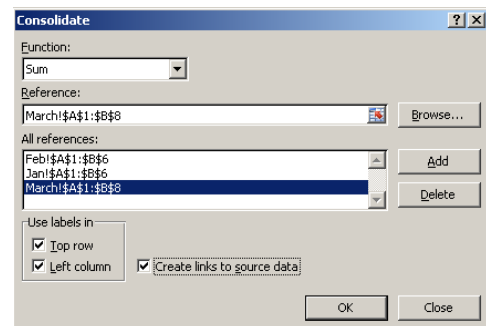


Figure 12.4

1	2	A	B	C
	1	Product		Price
	2		Report	856
	3		Report	412
	4		Report	329
	5	Product1		1597
	9	Product2		1430
	12	Product3		1186
	15	Product4		876
	19	Product5		2008
	22	Product6		1079
	25	Product7		1453

Figure 12.5

Creating links between different software

Let's assume we have to copy a certain data from an excel sheet to the Word document .If you do a normal copy-paste the contents pasted in the Word document are static i.e. they will not be updated even if there is a change of data in the excel worksheet. Now let's see how to create a link so that the data is updated even in the Word document.

- 1) Copy the contents from the Excel worksheet.
- 2) While pasting in a Word document click on home tab from clipboard group
- 3) select Edit-Paste special
- 4) In the Paste Special dialog box select the option Paste Link then select Microsoft Office word Object Document
- 5) click on OK

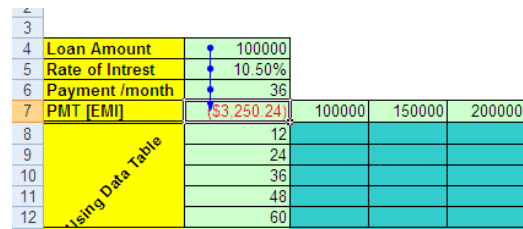
Now whenever the data in the excel worksheet is changed the change will be automatically reflected in the word document.

Auditing features

You can use Excel's auditing features to trace errors in a worksheet. You can also trace the relationships between cells and formulas on your worksheets. You might want to identify the cells on which the value of a formula is based. Excel provides the Trace Precedents and Trace Dependents commands to point out such cells.

Dependent and precedent cells

A precedent cell provides data to a specific cell. A dependent cell relies on the value of another cell. When you click the Trace Precedents and Trace Dependents buttons in the Formula Auditing ribbon group on the Formulas ribbon tab, Excel draws arrows showing precedent and dependent cells.



3				
4	Loan Amount	100000		
5	Rate of Interest	10.50%		
6	Payment /month	36		
7	PMT (EMI)	=B3*B5*B6	100000	150000
8				
9				
10				
11				
12				

Figure 12.6

Workgroup collaboration

Sharing a workbook makes it possible for several members of a workgroup to collaborate on the same set of data. For example, several sales managers could enter their respective regional sales figures in the same workbook, making it unnecessary to collect and consolidate the data manually.

Sharing workbooks

To share a workbook:

- 1) Open the workbook that you want to share.
- 2) Activate the Review ribbon tab.
- 3) In the Changes ribbon group, click Share Workbook to open the Share Workbook dialog box.
- 4) Activate the Editing tab.
- 5) Check Allow changes by more than one user at the same time, and t
- 6) Save the workbook in a location where other users can access it

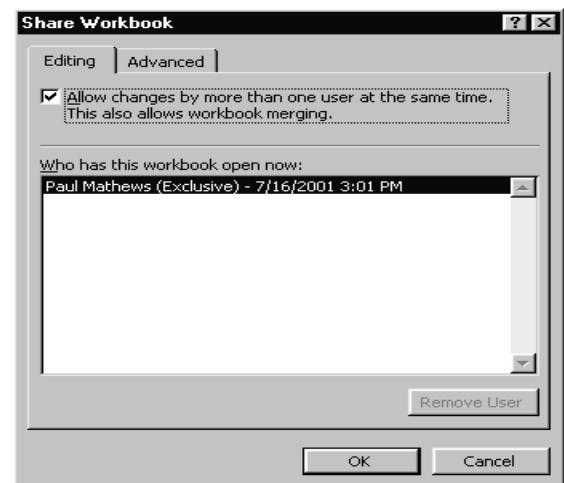


Figure 12.7

You can control how a workbook is shared by using the advanced tab of the Share Workbook dialog box. For example, under Update changes, you can select when file is saved to see other users'

changes each time you save the workbook. You can also set the interval at which changes will be shown automatically.

Merging workbooks

You may need to share a workbook among users who cannot access the same file simultaneously. In such a situation, you can distribute copies of the shared workbook, allow users to make changes to their copies, and then merge those copies into a single workbook. To share a workbook that you intend to merge later:

- 1) Open the Share Workbook dialog box, activate the Editing tab, and check Allow changes by more than one user at the same time.
- 2) On the Advanced tab, under Track changes, select Keep change history for. In the box, enter the number of days you want to allow users to make changes in the workbook, and then click OK.
- 3) Make copies of the workbook and distribute one to each user.
- 4)
- 5) After the users have made changes to their copies of the workbook, you can merge the copies into a single workbook. Here's how:
- 6)
- 7) Choose File, Excel Options to open the Excel Options dialog box.
- 8) Select Customization, and add Compare and Merge Workbooks to the Quick Access Toolbar.
- 9) On the Quick Access Toolbar, choose Compare and Merge Workbooks to open the Select Files to Merge into Current Workbook dialog box.
- 10) Select the copies of the workbook that contain changes you want to merge.
- 11) Click OK.

Tracking changes

You can analyze changes users have made to a workbook by using the Track Changes feature. This will tell you who made the changes, when they were made and the original and changed values without having to manually compare the two workbooks. If your workbook is not shared, Excel makes the workbook shared automatically when you turn on the Track Changes feature.

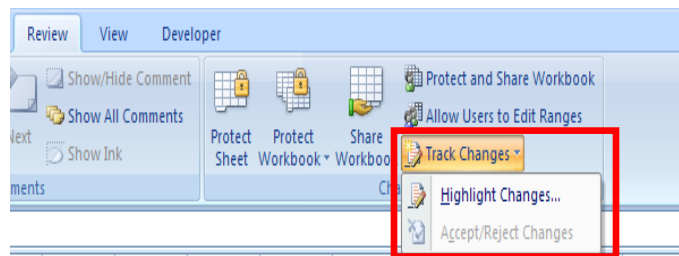


Figure 12.8

To highlight changes:

- 1) Activate the Review ribbon tab.
- 2) In the Changes ribbon group, click Track Changes and choose Highlight Changes to open the Highlight Changes dialog box.
- 3) If the workbook is not shared, check Track changes while editing. If the workbook is shared, this option will be checked by default.
- 4) Specify how you want the changes to be tracked:
- 5) If you want to view changes based on when they were made—for example, after a specific date—check "When", and then select the necessary setting from the list.
- 6) If you want to view the changes made by a specific user, check "Who", and then select "Everyone" or "Everyone but Me" from the list.

- 7) If you want to view the changes made to a specific range of cells, check "Where", and then enter the range.
- 8) Click OK.

To Review Workbook Changes and Accept or Reject them:

- 1) Open the workbook that contains the tracked changes.
- 2) Activate the Review ribbon tab.
- 3) In the Changes ribbon group, click Track Changes and choose Accept/Reject Changes. You'll be prompted to save the workbook.
- 4) Click OK to save the workbook. The Select Changes to Accept or Reject dialog box appears.
- 5) If you want to view changes based on when they were made, check "When" and select a time period.
- 6) Click OK to open the Accept or Reject Changes dialog box. At the same time, a cell that contains a changed value will be highlighted. This dialog box displays information about each change, including the name of the person who made the change, the date and time it was made, and other changes that will occur if you accept or reject the suggested change. You can scroll down to view the rest of the contents.
- 7) Click Accept to accept the change, or click Reject to restore the original value. The next cell with a changed value will be highlighted

Creating Hyper Link

Creating Links within the Same Workbook

To link a particular cell, first name the cell.

- 1) Select the cell, click on Formula Tab – select Define Name .The define name dialogue box will appear. In the define dialogue box type a name for the cell and click on Add. Click on Close.
- 2) Now click on the cell where the hyper link is to be created and Click on Insert- Hyperlink or press Ctrl+K.
- 3) The Insert Hyperlink box will appear. Click on "Place in this document" option.
- 4) Click on the "Defined name" option the defined names for the workbook would appear. Select the defined name, which we created in the above step and click on OK.

The link is created.

Creating Links to a Different File

To link a particular cell, first define name to the cell.

- 1) Select the cell, click on Formula Tab – select Define Name .The define name dialogue box will appear. In the define dialogue box type a name for the cell and click on Add. Click on Close.
- 2) Now click on the cell where the hyper link is to be created and Click on Insert- Hyperlink or press Ctrl+K.
- 3) The Insert Hyperlink box will appear. Click on "Existing file or webpage" option.
- 4) Browse to the folder where you have saved the file you want to link to.
- 5) Click on the file in the list below
- 6) The path of the file will appear in the address box below.
- 7) Click ok

You may use this method to link to a webpage as well. To do this, type the URL of the webpage in the address box. To link to a particular cell in an excel workbook, at step six in the above process, mention the sheet name and cell reference at the end of the file path in the address box in this format

File Path#sheetname!Named Range
--

For example, use **c:\test.xlsx#salary!A1** to refer to cell A1 of Salary sheet in the file test.xlsx located in the c drive.

You may also create a new document while creating a hyper link or hyper link to an email address using the options in the hyperlink dialog box.

Chapter 13:-Working with Charts

Objective

After completing this chapter, you will be able to know;

- How to Create Charts
- The different type of charts
- How to Format charts

Creating Charts using Chart Tools

Charts may be used to present data more effectively. For example, it takes time to analyze trends in data, but if it is graphically represented, it becomes easy for us. There are many types of charts like Column, Line, Pie, Bar, Area, scatter etc. To create a chart, follow the steps below.

- 1) Select the data
- 2) Go to "Insert" tab
- 3) From the "Charts" group, select the chart that you want to create.

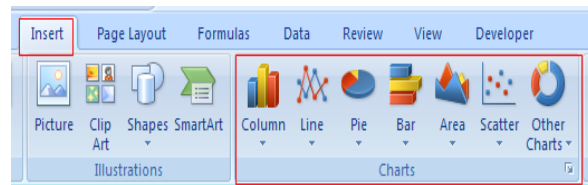


Figure 13.1

We can select any type of Column charts or click on All Chart Types..... "Insert Chart" dialog box will appear. Select the desired chart and click Ok. The chart will be created on the same worksheet

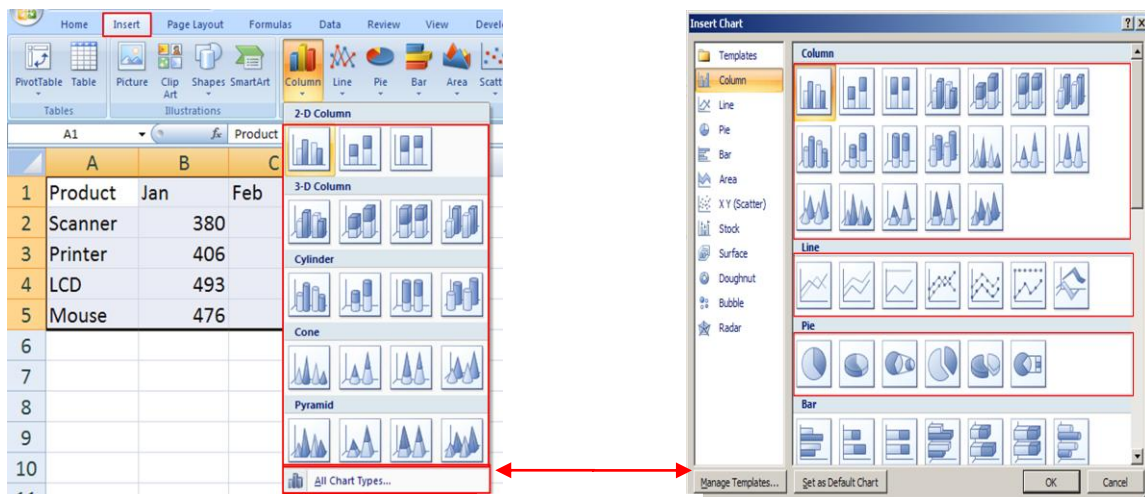


Figure 13.2

Chart Designs

Excel provides different chart designs with every chart type which we can select from Design Tab. An example of Design Gallery is given in **figure 13.c**.



Figure 13.3

Including Titles and Values in Charts using Chart Tools

There are a few inbuilt layouts that Excel provides, these can be selected from the Design tab in Chart Tools. However, we would need to create some custom layouts where the chart title, Axis Title, legend, Data Label and Data Table positions are different from the given layouts. In this case, you may use the layout tab, where you get wide range of positioning options for the various elements of a chart.

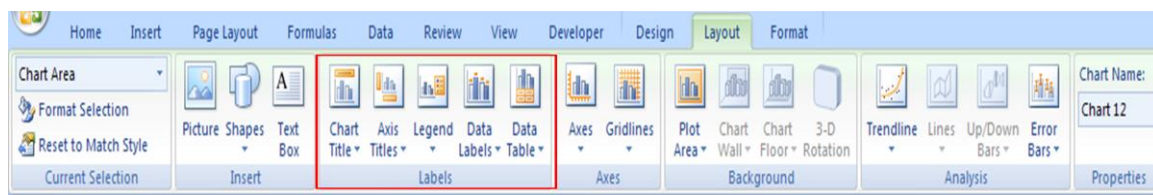


Figure 13.4

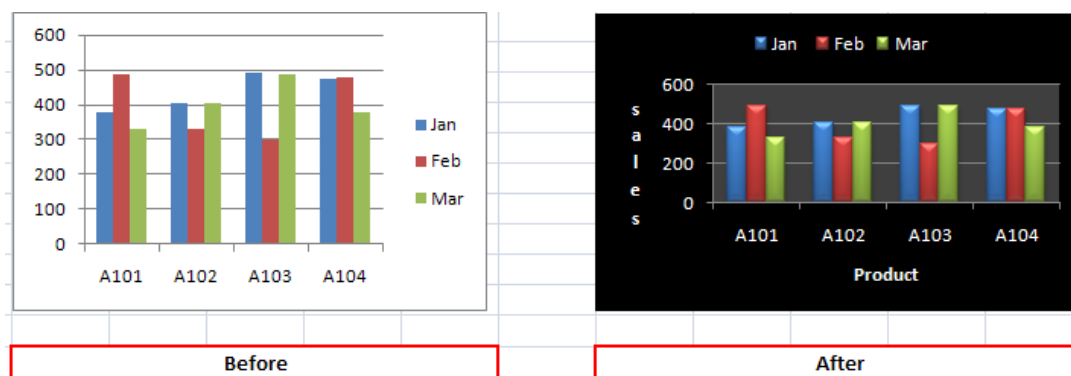


Figure 13.5

Formatting charts

If you wish to change the color used to represent a series in the default design templates provided by excel, you may use the contextual tab "Format" under Chart Tools tab group. It also gives us options to change the outline color, the shape alignment and positioning of the chart.

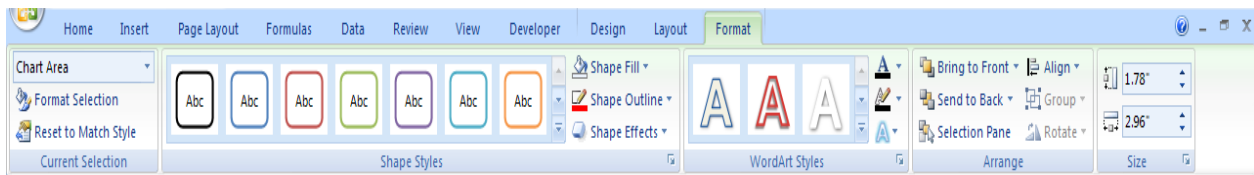


Figure 13.6

Charts for my Data

Depending on what you wish to represent, you may select the different types of chart to use. The table shows the different type of data and the charts that can be used to represent them effectively.

Type of chart	Data it represents
Column Chart	To show data changes over a period of time & for illustrating comparisons among items.
Bar Chart	Numerical Comparisons.
Line chart	Representing evenly spaced values
Scatter chart	Displaying and comparing numeric values, such as scientific, statistical, and engineering data.
Pie chart	Summarizing a set of categorical data or displaying the different values of a given variable
Doughnut chart	a Doughnut Chart shows the relationship of parts to a whole
Bubble chart	To Present Financial Data
Area chart	To find optimum combinations between two sets of data
Radar chart	Radar charts are useful when you want to look at several different factors all related to one item.

Chart Templates

Sometimes, after creating a chart, we decide to use the same design in the future as well. This may prove to be tedious if we do it manually every time. Thus to do this easily, excel provides us the facility to save our charts as templates.

To save a chart as template, after creating the chart, click on "Save as Templates" from the design tab in chart tools and save your chart in the folder that opens. In the future, if you wish to use this template, you may do so by right clicking on the new chart. In the context menu that appears, click on "Change Chart Type". In the "Insert Chart" dialog box, click "Templates". You will find

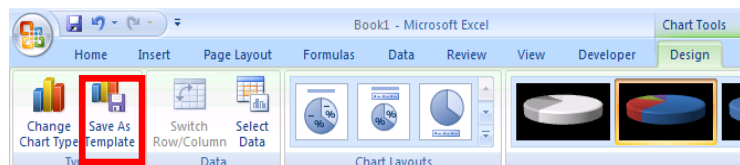


Figure 13.7

all your saved templates here. Now, you may select the template you want to apply to the current chart.

Exercise

- 1) Open Advance excel assignment. For the database in salary sheet, use subtotal to find the region wise sum of salary. Copy and paste the summary data (from tab 2) to a new sheet. Now create a pie chart for this data
- 2) Create a pivot table from the salary sheet for department wise region wise number of employees. Now create a column chart to represent this data

Chapter 14:Macros

Objectives

In this chapter you would be able to learn

- What are macros?
- How to use macros.
- How to record macros.
- How to write macros.

You can use macros to automate complex and repetitive tasks. A Macro is a series of instructions that execute automatically with a single command. For example, you can create a macro to format a worksheet or to print a report. You can use the macros already available in Excel or create your own from the Developer Tab. To activate the Developer Tab, Click on Office Button, Excel Option and enable "Show Developer Tab in Ribbon".

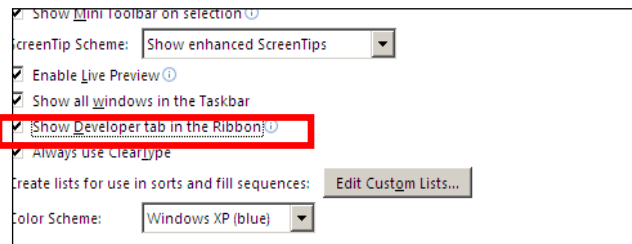


Figure 14.1

Enabling macros

Macros can contain viruses that can harm your computer. To prevent this problem, by default Excel requires you to enable macros after opening a file that contains them. To enable macros, click More Options in the Security Warning bar that appears, then click Enable this content.

If Windows is set to display file extensions, you can distinguish an Excel file that contains macros from one without them by its filename. A standard Excel file uses the extension .xlsx. An Excel file with macro code uses the extension .xlsm.

Trust Center settings

You can protect your workbook by setting a macro security level. The security levels available are:

- Disable all macros without notification.
- Disable all macros with notification.
- Disable all macros except digitally signed macros
- Enable all macros(Not recommended; Potentially dangerous code can run)

To set the macro security level, click on macro security command in the developer tab. In the trust center dialog that appears, select the security level you want to apply.

Creating a macro

There are two ways by which you may create a macro

- Recording
- Writing

Recording a Macro

To record a macro:

- 1) Click Macro Recording in the status bar to open the Record Macro dialog box.
- 2) Specify a name for the macro and a shortcut key. Macro names must begin with a letter and cannot contain spaces. They can include letters, numbers, and underscores.
- 3) Click OK to start recording the macro.
- 4) Perform the actions you want to include in the macro. As you work, Excel records the sequence of steps.

When you're finished, click the Stop Recording button on the status bar.

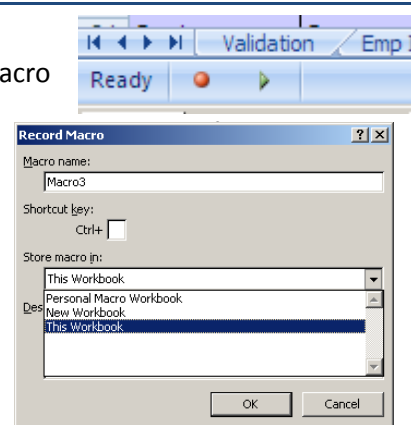


Figure 14.3

Store In

This field in the Record macro dialog box, specify where the macro to be recorded will be stored. There are three options you can select from.

Personal Macro Workbook: This workbook, named PERSONAL.XLS, is automatically opened and hidden, each time you start Excel. This is a good place to store macros that you want available at all times.

This Workbook: Place the macro in the active workbook. If there is no active workbook, this option is not available.

New Workbook: A new workbook will be created, and the macro will be recorded in it.

Running a Macro Using Menu Commands

To run a macro, click the Play Macro button in the status bar to open the Macro dialog box, as shown in diagram. Select the macro of your choice, and click the Run button

Macros that are contained on all currently open workbooks are displayed in the list. To run a macro, select macro from the list and click Run. The Macro dialog box provides several additional capabilities:

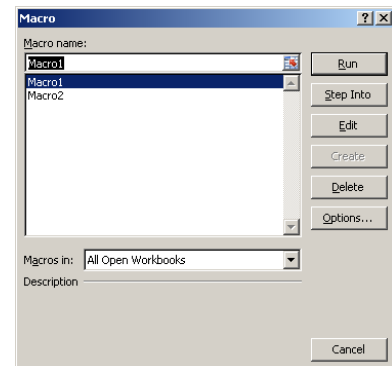


Figure 14.4

Step	Click this button to run the macro step by step. Stepping through a macro is useful for debugging purposes
Edit	The module containing the macro is activated, and the macro is displayed in the visual basic editor for editing purposes.
Delete	Deletes the selected macro. (You can also delete macros by activating the module and clearing the macro.)
Options	Lets you assign a shortcut key, add a command to Excel's Tools menu that runs the macro, and change the description of the macro.

Viewing the recorded Macro

As mentioned in the table above, from the macro dialog box, we can edit or step into a macro's code. Clicking on either of these options opens the visual basic editor. The visual basic editor layout is shown in **figure 14.5**.

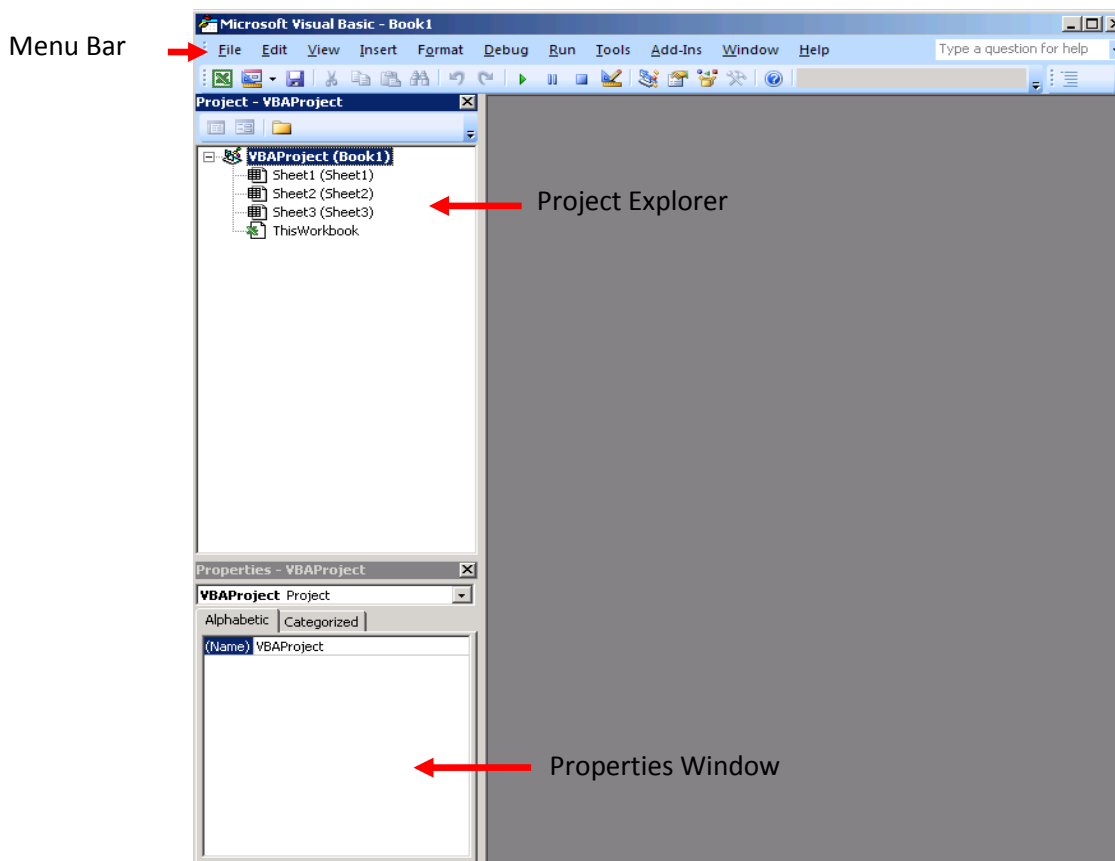


Figure 14.5

The above image shows the editor when book1 is open. If you have macros in this workbook, you would see an additional folder in the project explorer called "Modules". All macros in a file are stored in Modules. These modules are by default named as Module1, Module2 etc.

Writing a macro

A macro can be written inside a module. To insert a new module into a file right click on the file name in the project explorer, click on insert and select module. Double clicking on the last module created will open it. You may start writing you macro here.

VBA can be used to create

- 1) A Sub Procedure (Macro)
- 2) User Defined functions

Creating a sub procedure

A recorded macro is a sub procedure. Thus if you wish to have a macro like the one recorded (to be able to run it from the macro dialog box), you have to write the code in the sub block. The syntax of a sub block is as follows

```
Sub procedure_name()
```

```
End Sub
```

Procedure name must begin with a letter and cannot contain spaces. It can include letters, numbers, and underscores.

For example, given below are two procedures Ucase and lowercase. They convert data in the selected cells to upper case and lowercase respectively.

```
Sub ucase()  
For each cell In Selection  
cell.Value = ucase(cell.Value)  
Next  
End Sub
```

```
-----  
Sub lowercase()  
For each cell In Selection  
cell.Value = lcase(cell.Value)  
Next  
End Sub
```

Tip: If you write Sub and the procedure name in a module and press enter, end sub comes automatically.

Display alerts or messages using sub procedures

If you need to display messages or alerts using sub procedures, you may use the msgbox object. The syntax for a message box is as follows

```
Msgbox "message"
```

For example, msgbox "Hello!" will give a message box which says "Hello!". To concatenate a variable you may use "&" symbol.

Example:

```
Sub message()  
Name="Pragati"  
Msgbox "Hello!" & name  
End sub
```

Accept inputs using sub procedures

In the above example, if you need to take the name from the user while the sub procedure is run, you may use **inputbox** object. The syntax of inputbox is as follows

```
Inputbox ("message")
```

Example

```
Name=Inputbox("Enter the name")
```

This would accept a name from the user and save it in the variable name. Thus to make the above example even more dynamic, that is to take the name from the user and display a message box with the name, you may use the following code

```
Sub message()  
Name=Inputbox("Enter the name")  
Msgbox "Hello!" & name  
End sub
```

Creating a function

If use a complex formula frequently and wish to have a function that represents the formula so that it becomes easier to use it, you may define the function using the visual basic editor.

A function is written in the function block. The syntax of function block is as follows

```
Functionfunction_name(parameter1,parameter2,.....)
```

```
End function
```

Parameters are inputs to a function. If you want that your function take two inputs, you can have two parameters. These parameters would be variables that would store the values you accept as input.

Note: Variables are memory areas that hold value. Eg: a=2 here a is a variable that holds the value 2

Once defined, you may use a user defined function like you use any worksheet function. In the functions list dialog box, you can find the new function under user defined functions.

For example, given below is a sample function to calculate profit.

Function Profit (sp,cp)
Profit=sp-cp
End function

	A	B	C
1	Cost Price	Selling Price	Profit
2	236	300	=pro
3			

	A	B	C
1	Cost Price	Selling Price	Profit
2	236	300	=Profit(B2,A2)
3			

	A	B	C
1	Cost Price	Selling Price	Profit
2	236	300	64
3			

Function

Usage

Figure 14.6

Using conditions in a function

To use conditions in a function, you may want to do a calculation where, tax is calculated as follows, Tax is 5% of salary if salary is less than 5000, 7% if salary is between 5000 and 10000 and for all the others it is 10%. To do this in a function, use the "If---Else---Endif" block. The syntax for the same is as follows

Syntax

If condition then
Statement
Else
Statement
Endif

Here, else is an optional syntax. There may exist an If-Endif block without an else. If there are multiple conditions, you may use Elseif instead of else. The syntax of if with Elsif is as follows,

Syntax

If condition then
Statement
Elseif
Statement
Endif

Using the discussed concept, the scenario discussed earlier can be solved as below

```

Function Ptax(sal)
If sal< 5000 Then
Ptax = sal * .05
ElseIf sal> 5000 And sal<= 10000 Then

Ptax = sal * .07
Else: Ptax = sal * .1
End If
End Function

```

Assigning a Macro to a Button

Having created macros using the discussed methods, there are several ways to run a macro. One of them is to assign a macro to a button in the Quick Access Toolbar. After assigning the macro to a button, you can run it by clicking that button.

To assign a macro to a button:

Click the options menu on the Quick Access Toolbar, and select Customize Quick Access Toolbar. The Application Settings dialog box opens with the Customization pane displayed.

From the Available commands list, select Macros.

Select the macro to add to the toolbar and click Add >>.

Click OK to close the Application Settings dialog box

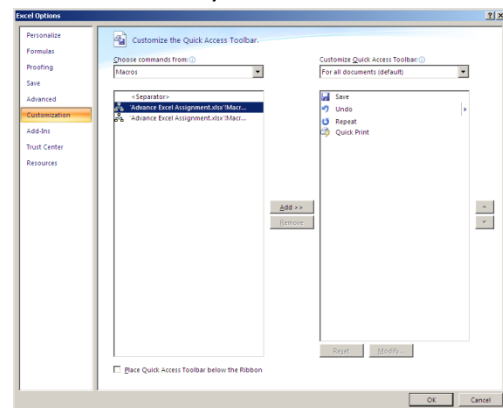


Figure 14.7

Final Assignment

Salary statement for the month of April

EMPNO	NAME	DESG	Branch	BASIC
1	RAJ	OFFICER	Mumbai	5000
2	RAJESH	CLERK	Mumbai	3500
3	ANAND	MANAGER	Delhi	7000
4	RAJU	CLERK	Delhi	4000
5	HEMANT	MANAGER	Mumbai	8000
6	SANTOSH	CLERK	Delhi	3780
7	BHAUMIK	OFFICER	Delhi	4200
8	MANJIT	OFFICER	Mumbai	5000
9	KAMAL	OFFICER	Delhi	3800
10	SONU	CLERK	Mumbai	2500

Open Final Assignment Sheet In the assignments workbook and solve the below questions

- 1) Calculate DA for Officer 10%, Manager 15%, & Clerk 5% of Basic (using Vlookup).
- 2) Calculate HRA as following condition (using If condition)
For Officer 1000, Manager 1500, Clerk 500
- 3) Calculate Conveyance 10 % of Basic using (Range Name)
- 4) Calculate Gross [ie Basic + DA +HRA+CONV]
- 5) Calculate ESIC according to Slab-wise on Basic as follows(using Vlookup)
 - From 0 - 1000 = 50
 - 1001 - 3000 = 100
 - 3001 - 5000 = 250
 - >5000 = 300
- 6) Calculate Tax according to Slab-wise on Gross (using if function)
 - i.e. <10000 = 0
 - >10000 & <15000 = 750
 - >15000 = 1500
- 7) Calculate P.F as 5 % on Basic Salary
- 8) Calculate Loan 2% of Gross
- 9) Calculate Net Salary ie [Gross-[ESIC+IT+PF+LOAN]]

Make multiple copies of the Worksheet and solve the following questions in different sheets. Name the sheets with question number example answer to question number 10 would be solved in the worksheet name q10.

- 10) Create a Chart of Name, Basic, Gross & Net [Should be well formatted]
- 11) Sort your Records Desg wise. [ie Manager then officer and then clerk] [Custom Sort]

- 12)** Display only the records of Clerk & Manager [Using Auto Filter].
- 13)** Display the Records of those people whose Net Salary is between 1000 –3000 and 6000-9000 and get the result on a new page [Using Advance Filter].
- 14)** Get the total salary branch wise by subtotal [Using Subtotal Command].
- 15)** Create a Pivot Report Branch wise, Designation wise Net Salary & count the No of Employee.
- 16)** Freeze the Name column & the heading of the data. [Using Freeze Pane].
- 17)** Highlight the Entire Row where the Designation = Manager [Using Conditional Formatting].
- 18)** Protect the Whole sheet in such a fashion that you can make changes in Salary column and all the formula should be lock and hidden.
- 19)** Create a Scenario of Increment for Kamal and Sonu in their basic Salary by 5000 and find out what will be the Net salary.
- 20)** Give Password to the File as Final.

Shortcuts In Excel 2007

Shortcut	Command
CTRL combination shortcut keys Microsoft Excel 2007	
CTRL+SHIFT+(Unhide any hidden rows within the selection.
CTRL+SHIFT+)	Unhide any hidden columns within the selection.
CTRL+SHIFT+&	Applies the outline border to the selected cells.
CTRL+SHIFT_	Removes the outline border from the selected cells.
CTRL SHFT ~	Applies the General number format in Microsoft Excel.
CTRL+SHIFT+\$	Applies the Currency format with two decimal places (negative numbers in parentheses).
CTRL+SHIFT+%	Applies the Percentage format with no decimal places.
CTRL+SHIFT+^	Applies the Exponential number format with two decimal places.
CTRL+SHIFT+#	Applies the Date format with the day, month, and year.
CTRL+SHIFT+@	Applies the Time format with the hour and minute, and AM or PM.
CTRL+SHIFT+!	Applies the Number format with two decimal places, thousands separator, and minus sign (-) for negative values.
CTRL+SHIFT+*	Selects the current region around the active cell (the data area enclosed by blank rows and blank columns). In a PivotTable, it selects the entire PivotTable report.
CTRL+SHIFT+:	Enters the current time.
CTRL+SHIFT+	Copies the value from the cell above the active cell into the cell or the Formula Bar.
CTRL SHFT Plus ()	Displays the Insert dialog box to insert blank cells in Microsoft Excel.
CTRL+Minus (-)	Displays the Delete dialog box to delete the selected cells.
CTRL+;	Enters the current date.
CTRL+`	Alternates between displaying cell values and displaying formulas in the worksheet.
CTRL+'	Copies a formula from the cell above the active cell into the cell or the Formula Bar.
CTRL+1	Displays the Format Cells dialog box.

CTRL+2	Applies or removes bold formatting.
CTRL+3	Applies or removes italic formatting.
CTRL 4	Applies or removes underlining in Microsoft Excel.
CTRL+5	Applies or removes strikethrough.
CTRL+6	Alternates between hiding objects, displaying objects, and displaying placeholders for objects.
CTRL+8	Displays or hides the outline symbols.
CTRL+9	Hides the selected rows.
CTRL 0	Hides the selected columns in Microsoft Excel.
CTRL+A	Selects the entire worksheet. If the worksheet contains data, CTRL+A selects the current region. Pressing CTRL+A, a second time selects the current region and its summary rows. Pressing CTRL+A a third time selects the entire worksheet. When the insertion point is to the right of a function name in a formula, displays the Function Arguments dialog box. CTRL+SHIFT+A, inserts the argument names and parentheses when the insertion point is to the right of a function name in a formula.
CTRL+B	Applies or removes bold formatting.
CTRL+C	Copies the selected cells. CTRL+C followed by another CTRL+C, displays the Clipboard.
CTRL+D	Uses the Fill Down command to copy the contents and format of the topmost cell of a selected range into the cells below.
CTRL+F	Displays the Find and Replace dialog box, with the Find tab selected. While SHIFT+F5 also display this tab, SHIFT+F4, repeats the last Find action. CTRL+SHIFT+F, opens the Format Cells dialog box with the Font tab selected.
CTRL+G	Displays the Go To dialog box. F5 also displays this dialog box.
CTRL+H	Displays the Find and Replace dialog box, with the Replace tab selected.
CTRL I	Applies or removes italic formatting in Microsoft Excel.
CTRL+K	Displays the Insert Hyperlink dialog box for new hyperlinks or the Edit Hyperlink dialog box for selected existing hyperlinks.
CTRL+N	Creates a new, blank workbook.
CTRL O	Displays the Open dialog box to open or find a file. CTRL SHIFT O selects all cells that contain comments in Microsoft Excel.
CTRL+P	Displays the Print dialog box. CTRL+SHIFT+P, opens the Format Cells dialog box with the Font tab selected.
CTRL+R	Uses the Fill Right command to copy the contents and format of the leftmost cell of a selected range into the cells to the right.
CTRL+S	Saves the active file with its current file name, location, and file format.
CTRL T	Displays the Create Table dialog box in Microsoft Excel.
CTRL+U	Applies or removes underlining. CTRL+SHIFT+U switches between expanding and

	collapsing of the formula bar.
CTRL+V	Inserts the contents of the Clipboard at the insertion point and replaces any selection. Available only after you have cut or copied an object, text, or cell contents.
CTRL+W	Closes the selected workbook window.
CTRL+X	Cuts the selected cells.
CTRL Y	Repeats the last command or action, if possible in Microsoft Excel.
CTRL+Z	Uses the Undo command to reverse the last command or to delete the last entry that you typed. CTRL+SHIFT+Z, uses the Undo or Redo command to reverse or restore the last automatic correction when AutoCorrect Smart Tags are displayed.

Function keys	
F1	Displays the Microsoft Office Excel Help task pane. CTRL+F1 displays or hides the Ribbon, a component of the Microsoft Office Fluent user interface. ALT+F1 creates a chart of the data in the current range. ALT+SHIFT+F1, inserts a new worksheet.
F2	Edits the active cell and positions the insertion point at the end of the cell contents. It also moves the insertion point into the Formula Bar when editing in a cell is turned off. SHIFT+F2, adds or edits a cell comment. CTRL+F2, displays the Print Preview window.
F3	Displays the Paste Name dialog box. SHIFT+F3, displays the Insert Function dialog box.
F4	Repeats the last command or action, if possible. CTRL+F4, closes the selected workbook window.
F5	Displays the Go To dialog box. CTRL F5 restores the window size of the selected workbook window in Microsoft Excel.
F6	Switches between the worksheet, Ribbon, task pane, and Zoom controls. In a worksheet that has been split (View menu, Manage This Window, Freeze Panes, Split Window command), F6 includes the split panes when switching between panes and the Ribbon area. SHIFT+F6 switches between the worksheet, Zoom controls, task pane, and Ribbon. CTRL+F6 switches to the next workbook window when more than one workbook window is open.
F7	Displays the Spelling dialog box to check spelling in the active worksheet or selected range. CTRL+F7, performs the Move command on the workbook window when it is not maximized. Use the arrow keys to move the window, and when finished, press ENTER, or ESC to cancel.
F8	Turns extend mode on or off. In extend mode, Extended Selection appears in the status line, and the arrow keys extend the selection. SHIFT+F8, enables you to add a nonadjacent cell or range to a selection of cells by using the arrow keys. CTRL+F8 performs the Size command (on the Control menu for the workbook window) when a workbook is not maximized. ALT+F8 displays the Macro dialog box to create, run, edit, or delete a macro.

F9	Calculates all worksheets in all open workbooks. SHFT F9 calculates the active worksheet in Microsoft Excel. CTRL ALT F9 calculates all worksheets in all open workbooks, regardless of whether they have changed since the last calculation. CTRL ALT SHFT F9 rechecks dependent formulas, and then calculates all cells in all open workbooks, including cells not marked as needing to be calculated. CTRL F9 minimizes a workbook window to an icon.
F10	Turns key tips on or off. SHFT F10 displays the shortcut menu for a selected item in Microsoft Excel. ALT SHFT F10 displays the menu or message for a smart tag. If more than one smart tag is present, it switches to the next smart tag and displays its menu or message. CTRL F10 maximizes or restores the selected workbook window.
F11	Creates a chart of the data in the current range. SHFT+F11, inserts a new worksheet. ALT+F11 opens the Microsoft Visual Basic Editor, in which you can create a macro by using Visual Basic for Applications (VBA).
F12	Displays the Save As dialog box.

Other useful shortcut keys	
ARROW KEYS	Move one cell up, down, left, or right in a worksheet. CTRL+ARROW KEY moves to the edge of the current data region (data region: A range of cells that contains data and that is bounded by empty cells or datasheet borders.) in a worksheet. SHFT+ARROW KEY, extends the selection of cells by one cell. CTRL+SHFT+ARROW KEY extends the selection of cells to the last nonblank cell in the same column or row as the active cell, or if the next cell is blank, extends the selection to the next nonblank cell
BACKSPACE	Deletes one character to the left in the Formula Bar in Microsoft Excel. Also clears the content of the active cell. In cell editing mode, it deletes the character to the left of the insertion point.
DELETE	Removes the cell contents (data and formulas) from selected cells without affecting cell formats or comments. In cell editing mode, it deletes the character to the right of the insertion point.
END	Moves to the cell in the lower-right corner of the window when SCROLL LOCK is turned on. Also selects the last command on the menu when a menu or submenu is visible. CTRL+END moves to the last cell on a worksheet, in the lowest used row of the rightmost used column. If the cursor is in the formula bar, CTRL+END, moves the cursor to the end of the text. CTRL+SHFT+END, extends the selection of cells to the last used cell on the worksheet (lower-right corner). If the cursor is in the formula bar, CT
ENTER	Completes a cell entry from the cell or the Formula Bar, and selects the cell below (by default). In a data form, it moves to the first field in the next record. Opens a selected menu (press F10 to activate the menu bar) or performs the action for a selected command. In a dialog box, it performs the action for the default command button in the dialog box (the button with the bold outline, often the OK button). ALT+ENTER starts a new line in the same cell. CTRL+ENTER fills the selected cell range
ESC	Cancels an entry in the cell or Formula Bar in Microsoft Excel. Closes an open menu or submenu, dialog box, or message window. It also closes full screen mode when

	this mode has been applied, and returns to normal screen mode to display the Ribbon and status bar again.
HOME	Moves to the beginning of a row in a worksheet. Moves to the cell in the upper-left corner of the window when SCROLL LOCK is turned on. Selects the first command on the menu when a menu or submenu is visible. CTRL+HOME moves to the beginning of a worksheet. CTRL+SHFT+HOME, extends the selection of cells to the beginning of the worksheet.
PAGE DOWN	Moves one screen down in a worksheet. ALT+PAGE DOWN moves one screen to the right in a worksheet. CTRL+PAGE DOWN, moves to the next sheet in a workbook. CTRL+SHFT+PAGE DOWN, selects the current and next sheet in a workbook.
PAGE UP	Moves one screen up in a worksheet. ALT+PAGE UP moves one screen to the left in a worksheet. CTRL+PAGEUP, moves to the previous sheet in a workbook. CTRL+SHFT+PAGEUP, selects the current and previous sheet in a workbook.
SPACEBAR	In a dialog box, performs the action for the selected button, or selects or clears a check box. CTRL+SPACEBAR, selects an entire column in a worksheet. SHFT+SPACEBAR, selects an entire row in a worksheet. CTRL+SHFT+SPACEBAR, selects the entire worksheet. If the worksheet contains data, CTRL+SHFT+SPACEBAR, selects the current region. Pressing CTRL+SHFT+SPACEBAR a second time selects the current region and its summary rows. Pressing CTRL+SHFT+SPACEBAR a third time selects the entire worksheet.
TAB	Moves one cell to the right in a worksheet. Moves between unlocked cells in a protected worksheet. Moves to the next option or option group in a dialog box. SHFT TAB moves to the previous cell in a worksheet or the previous option in a dialog box in Microsoft Excel. CTRL TAB switches to the next tab in dialog box. CTRL SHFT TAB switches to the previous tab in a dialog box.