

Computer Science

(For 9th Class)



ਇਹ ਪੁਸਤਕ ਪੰਜਾਬ ਸਰਕਾਰ ਦੁਆਰਾ ਮੁਫਤ ਦਿੱਤੀ
ਜਾਣੀ ਹੈ ਅਤੇ ਵਿਕਾਊ ਨਹੀਂ ਹੈ।



Punjab School Education Board
Sahibzada Ajit Singh Nagar

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Third Edition 2020

Fourth Edition 2021 27,700 Copies

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Nagar - 160062 and Printed by M/s Vishal Quality Printers, Jalandhar.

PREFACE

Punjab School Education Board has been updating the school level syllabi compatible with modern approach and latest research. The previously written text-books are in continuous process of revision according to the latest syllabi. The Board has also launched a special drive to prepare new text books as per latest National Policies in this regard. The present book is a part of this prestigious program.

The knowledge in the subject of Computer Science is the need of the hour because its study is essential for enhancement of efficient usage of Science and Technology in every field of modern era. Computerization of every department is done to keep it updated in light of all round development of Information Technology and Communication. The knowledge of Computer Education as well as usage of internet is necessary for everyone to have latest information about different departments, to avail facilities of E-Ticketing etc.

Keeping in view of these requirements Punjab School Education Board has introduced Computer Science as a compulsory subject at Elementary and Secondary levels as per guidelines of Punjab Government. This subject is already being taught by PICTES in some Government Schools. The present book is English translation of its Punjab version prepared according to revised syllabus on the demand of teachers. Every effort has been made to include each requisite information regarding the subject in this book. I hope it will be useful for students and teachers.

All suggestions for the improvement of the book will be highly appreciated.

Chairman

Punjab School Education Board

‘ਸਮਾਜਿਕ ਨਿਆਂ, ਅਧਿਕਾਰਤਾ ਅਤੇ ਘੱਟ ਗਿਣਤੀ ਵਿਭਾਗ’ ਪੰਜਾਬ

Contents

<i>Lesson</i>	<i>Pages No.</i>
1. MS Excel Part - I	1 – 36
2. MS Excel Part - II	37 – 60
3. Networking	61 – 80
4. Introduction to DBMS	81 – 95
5. Introduction to MS-Access	96 – 120
6. Internet Applications	121 – 144
7. E - governance	145 – 156

For any types of Suggestions regarding this book,
Please mail to subjectexpert@pseb.ac.in

Objective of this Lesson

- 1.1 Formatting Cells
 - 1.1.1 Merge and Centre
 - 1.1.2 Styles
 - 1.1.2.1 Conditional Formatting
 - 1.1.2.2 Formatting as Table
 - 1.1.2.3 Cell Styles
- 1.2 Cells
- 1.3 Editing
 - 1.3.1 Formulas & Functions
 - 1.3.1.1 Auto Sum-Functions (Sigma)
 - 1.3.2 Sorting & Filters
 - 1.3.3 Find & Replace

Introduction

We know that Microsoft Excel is used to calculate mathematical and scientific calculations. An Excel Workbook consists of many worksheets that are used to perform these calculations. A worksheet is made up of Rows and columns. Intersection of a Row and Column generate a cell.

1.1 Formatting Cells

Each cell in a worksheet can be formatted with many properties. Changing the format of a cell doesn't affect the cell value that Excel uses when performing calculations. For example, we have a cell that is formatted to display a number with no decimal points. But, if that cell content is a mathematical formula of division, the actual cell value can have many decimal points.

There are six tabs in the "**Format Cells**" window, and all formatting options may be found on one of these tabs. Multiple cells can be formatted in one step by first selecting the cells and applying formatting as per your choice.

The "Format Cells" window can be opened in from the right-click menu. In Excel formatting options are available on the Home Tab on the Font, Alignment, and



Number groups. To see formatting options not displayed, click the little arrow (called launcher) in the lower right corner of the group and the "Format Cells" window displays as shown in fig. 1.1

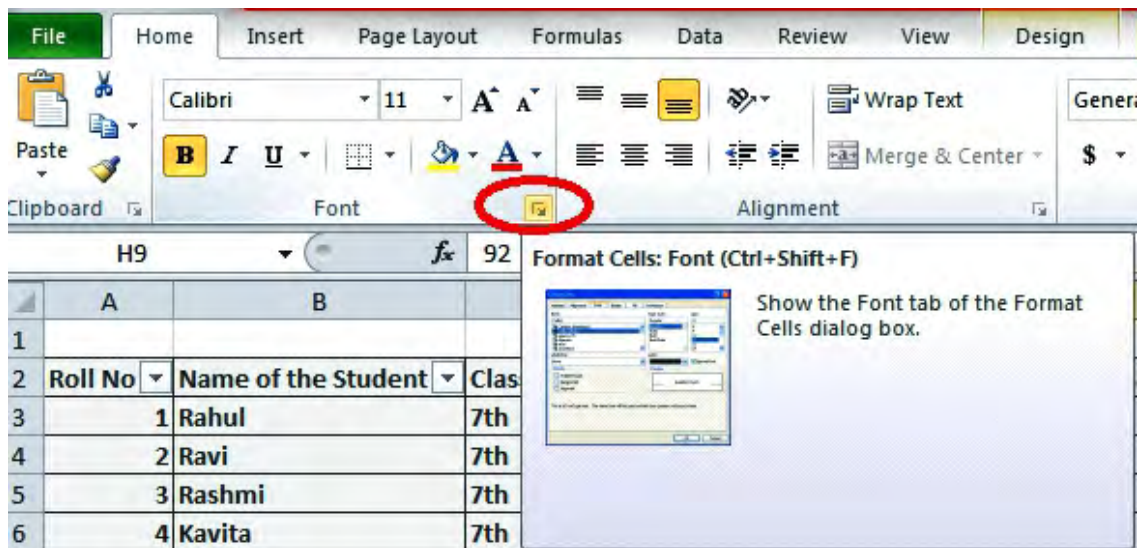


Fig. 1.1

1.1.1 Merge and Centre

Merging cells is often used when a title is to be centered over a particular section of a spreadsheet. When a group of cells is merged, then the text of this cell is merged as per selection and aligned center. Let's see how to do this :

A	B	C	D
List of Students			
Sr.No	Class	Name of Student	Father's Name

Fig. 1.2

To merge a group of cells : Following are the steps :

1. Type your data as shown in fig. 1.2 in your worksheet.
2. Highlight or select a range of cells.
3. Right-click on the highlighted cells and select Format Cells. Format Cells dialog box will open see in fig. 1.3.
4. Click the **Alignment** tab of Format Cells dialog box and place a checkmark in the checkbox labeled **Merge cells** as shown in fig. below :



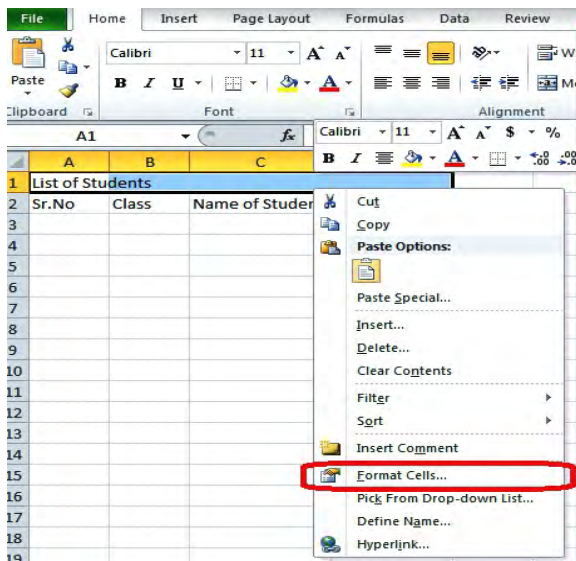


Fig 1.3

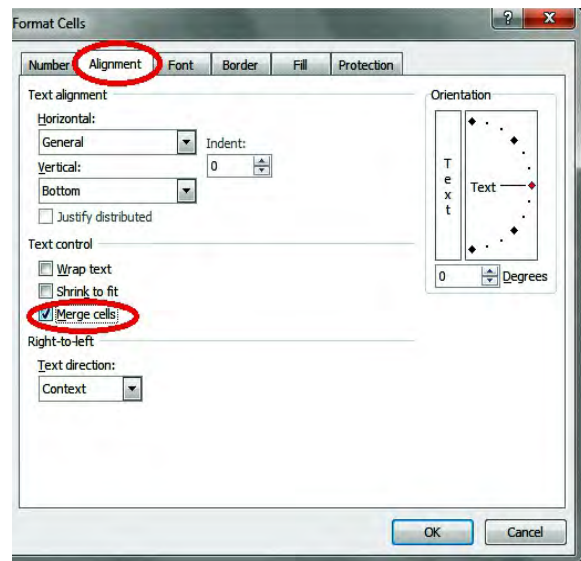


Fig 1.4

5. Your typed text will be shown as fig. 1.5.

A	B	C	D
List of Students			
Sr.No	Class	Name of Student	Father's Name

Fig 1.5

To merge a group of cells and center the text, we can also use the Merge and Center button on the Excel tool bar. Let's study about this :

Steps :

1. Highlight or select a range of cells. Click the **Merge and Center** button on the toolbar as shown in fig 1.6

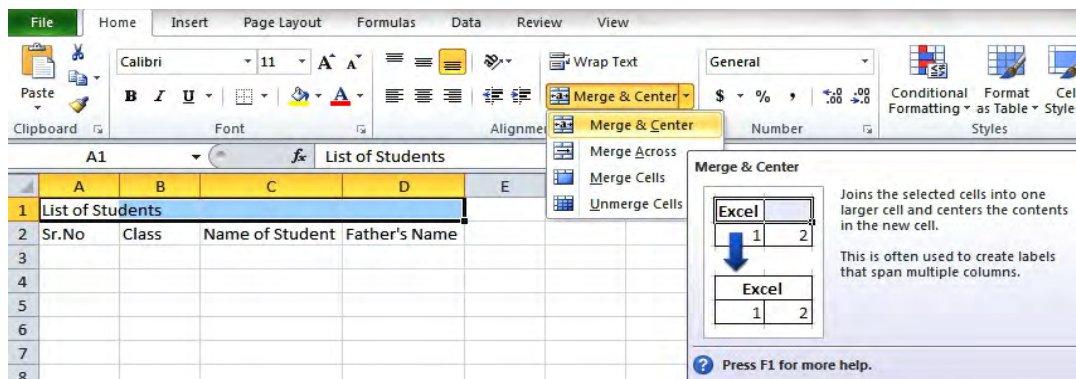


Fig. 1.6

Clicking this button will automatically merge our highlighted cells and center the cell value.

1.1.2 Styles in MS Excel

A style is just a set of cell formatting settings it is named such as conditional formatting. All cells to which a style has been applied look the same according to formatting. When you change a part of a style, all cells to which that style has been applied also change their formatting accordingly to new style.

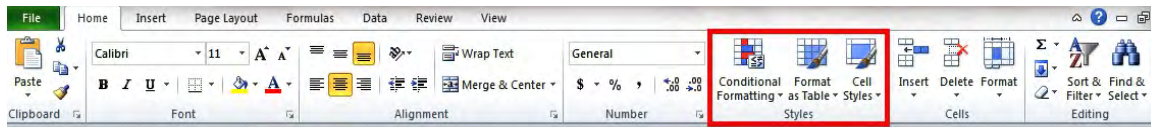


Fig. 1.7

1.1.2.1 Conditional Formatting

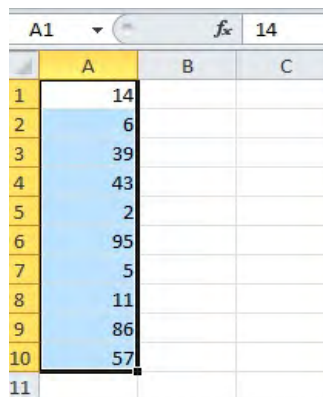
Conditional Formatting is a tool in MS Excel that allows applying formats to a cell or range of cells. It also allows formatting change depending on the value of the cell or the value of a formula. For example, you can have a cell appear bold only when the value of the cell is greater than 100. Conditional formatting in Excel enables you to highlight cells with a certain color, depending on the cell's value.

Conditional formatting applies one or more rules to any cells we want. For example we want to apply a rule if the cell value is greater than 80 then color the cell Red. By applying this rule to the cells in a worksheet, we'll be able to see which cells are more than 80.

How to create a conditional formatting rule : If we want to highlight the cells having value more than desired value. We can use conditional formatting in the following example we will set the cell value more than 80 using conditional formatting.

Highlight Cells Rules : To highlight cells that is greater than a value. Steps are as follow :

1. Type the data in our worksheet as shown in fig. 1.8 below.
2. Select the range A1:A10.



	A	B	C
1	14		
2	6		
3	39		
4	43		
5	2		
6	95		
7	5		
8	11		
9	86		
10	57		
11			

Fig. 1.8

3. Now go to Home Tab as shown in fig 1.9 click Conditional Formatting → Highlight Cells Rules → Greater Than

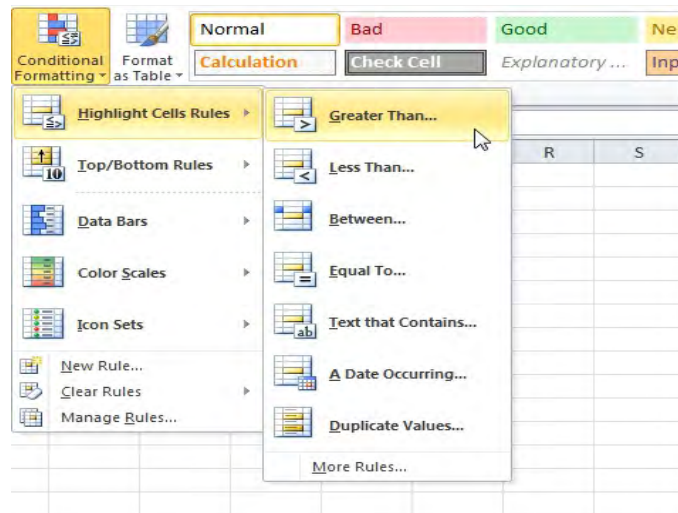


Fig. 1.9

4. Enter the desired value 80 and select a formatting style as shown in fig. 1.10

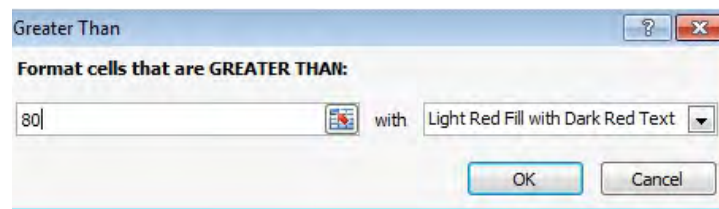


Fig. 1.10

5. Click on OK

Now Excel will highlight the cells with Red color that are greater than 80.

	E14		fx
	A	B	C
1	14		
2	6		
3	39		
4	43		
5	2		
6	95		
7	5		
8	11		
9	86		
10	57		
11			
12			

Fig. 1.11

1.1.2.2 Formatting as Table

Once we have entered information into a spreadsheet, we can format it. Formatting can not only improve the look of your spreadsheet, but it also can make it easier to use.

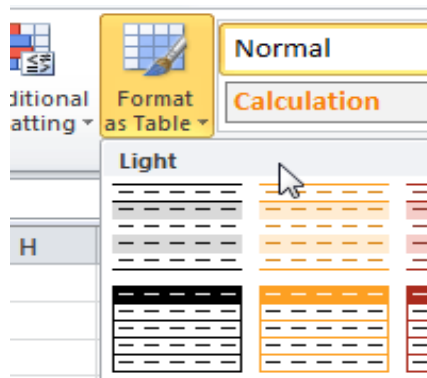
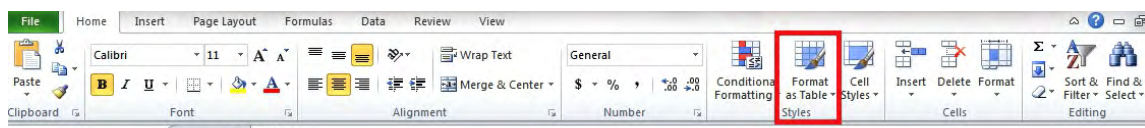


Fig. 1.12

Just like regular formatting, tables can help to organize our content and make it easier for us to find the information we need. To use tables effectively, we'll need to know how to format information as a table, modify tables, and apply table styles.

To format information as a table :

1. Type the data in worksheet as shown in the fig. 1.13 below.
2. Select the cells we want to format as a table. In this example, an invoice, we'll format the cells containing the column headers and order details.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1																
2	Roll No	Name of the Student	Class	Section	English	Punjabi	Hindi	Maths	Science	Social Studies	Computer	Phy.Edu				
3	1	Rahul	7th	A	85	87	85	87	85	87	85	87				
4	2	Ravi	7th	A	82	86	82	86	82	86	82	86				
5	3	Rashmi	7th	A	87	89	87	89	87	89	87	89				
6	4	Kavita	7th	A	88	84	88	84	88	84	88	84				
7	5	Nirmal	7th	A	89	85	89	85	89	85	89	85				
8	6	Sehaj	7th	A	92	96	92	96	92	96	92	96				
9	7	Dhanvin	7th	A	95	92	95	92	95	92	95	92				
10	8	Monu	7th	A	94	94	94	94	94	94	94	94				
11	9	Urvashi	7th	A	91	93	91	93	91	93	91	93				
12	10	Manisha	7th	A	92	96	92	96	92	96	92	96				

Fig. 1.13

- Click the Format as Table command in the Styles group on the Home tab.

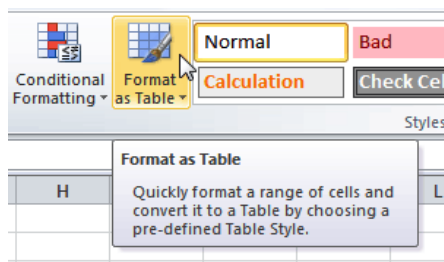


Fig. 1.14

- A list of predefined table styles will appear as shown in fig. 1.15 . Click a table style to select it.

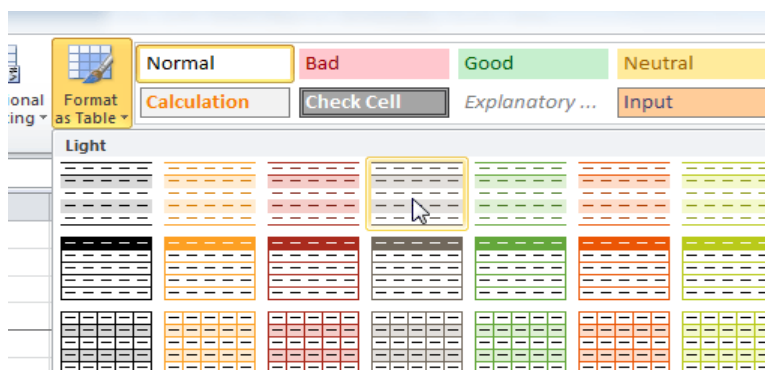


Fig. 1.15

- A dialog box will appear as per fig 1.16 confirming the range of cells we have selected for our table. The cells will appear selected in the spreadsheet and the range will appear in the dialog box.
- If necessary, change the range by selecting a new range of cells directly on your spreadsheet.
- If our table has headers check the box next to My table has headers as shown in fig. 1.16 below.

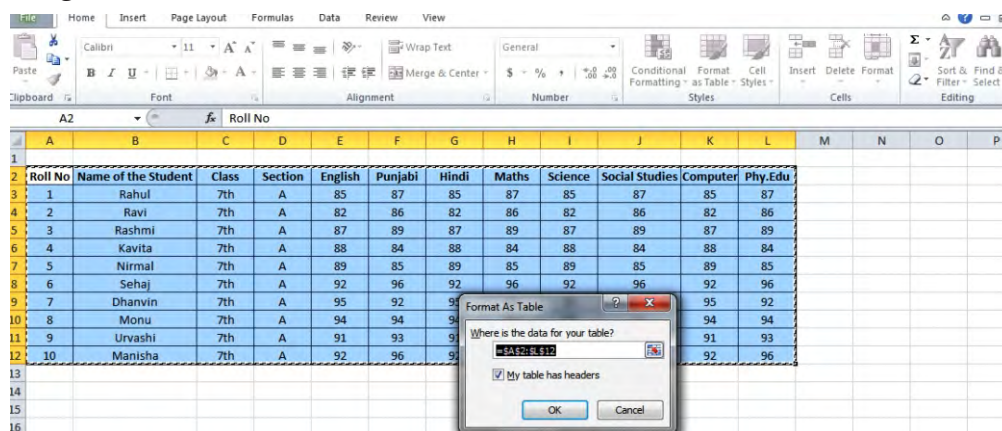


Fig. 1.16

- Click OK. The data will be formatted as a table in the style we chose as shown in fig. 1.17.

Roll No.	Name of the Student	Class	Section	English	Punjabi	Hindi	Math	Science	Social Studies	Computer	Phy. Ed.
1	Rahul	7th	A	85	87	85	87	85	87	85	87
2	Ravi	7th	A	82	86	82	86	82	86	82	86
3	Rashmi	7th	A	87	89	87	89	87	89	87	89
4	Kavita	7th	A	88	84	88	84	88	84	88	84
5	Nirmal	7th	A	89	85	89	85	89	85	89	85
6	Sehaj	7th	A	92	96	92	96	92	96	92	96
7	Dhanvin	7th	A	95	92	95	92	95	92	95	92
8	Monu	7th	A	94	94	94	94	94	94	94	94
9	Urvashi	7th	A	91	93	91	93	91	93	91	93
10	Manisha	7th	A	92	96	92	96	92	96	92	96

Fig. 1.17

- Tables include filtering by default. We can filter our data at any time using the drop-down arrows in the header.

1.1.2.3 Cell Styles

When we want to format cells in Microsoft Excel, we can do it manually either by selecting fonts, font color and size, background colors and borders, or we can do the formatting quickly and automatically using styles.

Microsoft Office Excel has several built-in cell styles that we can apply or modify. We can also modify or duplicate a cell style to create our own such as custom cell style.

Cell styles are based on the document theme that is applied to the whole workbook. When you switch to another document theme, the cell styles are updated to match the new document theme.

Applying a cell style :

- Type the data in our worksheet as show in fig. 1.17
- Select the cells that we want to format.
- On the Home tab, in the Styles group, click Cell Styles.

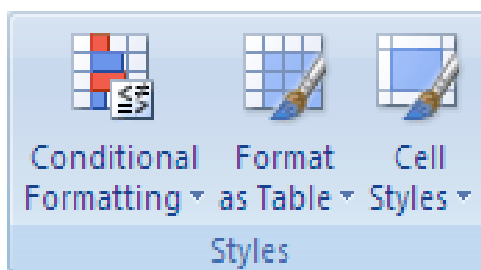


Fig. 1.18



If we do not see the Cell Styles button, click Styles, and then click the more buttons next to the cell styles box as shown in fig. 1.19

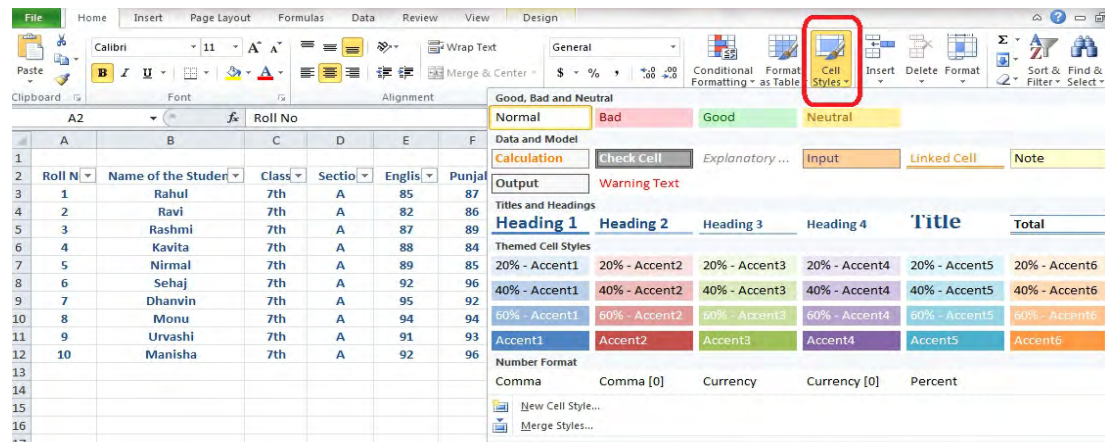


Fig. 1.19

4. Click the cell style that we want to apply. Our data will be changed according to our selected style.

1.2 Cell Group

If we need to add new data within an existing worksheet we need to enter blank cells. So we can insert new cells, columns, or rows in the worksheet.

To insert new cells, rows, or columns in an Excel worksheet, follow these steps :

1. Select the cells, rows, or columns where we want the new blank cells to appear.

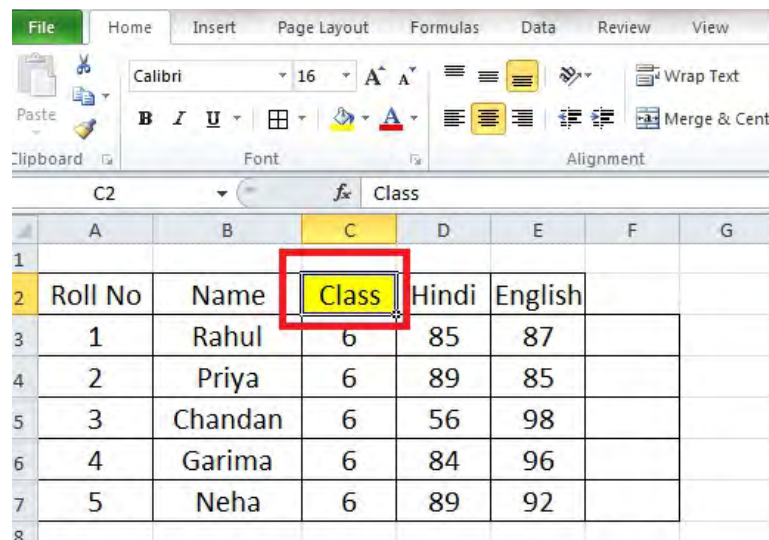


Fig 1.20

2. Click the drop-down arrow attached to the Insert button in the Cells group of the Home tab.

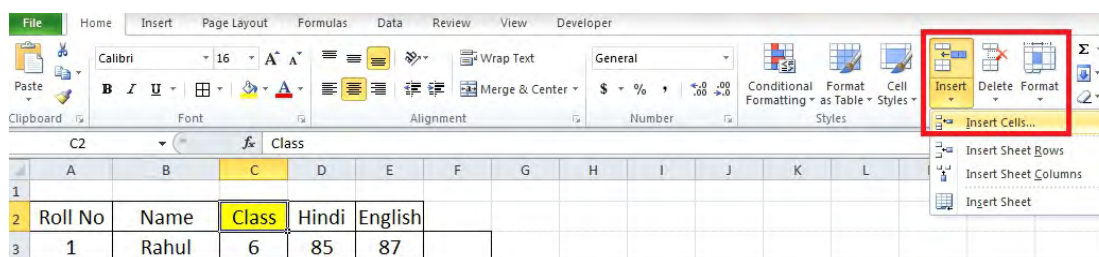


Fig. 1.21

3. Click Insert Cells on the drop-down menu as show in fig. 1.22.

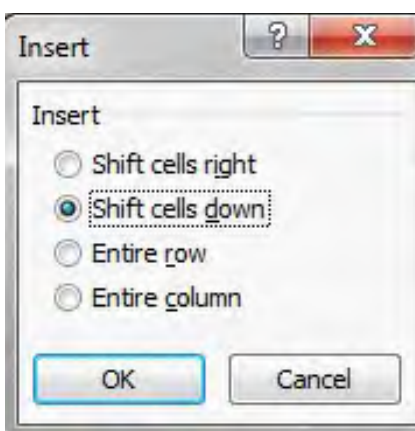


Fig. 1.22

The Insert dialog box opens with the following options:

- **Shift Cells Right** : It shifts existing cells to the right to make room for the blank cells you want to insert.
- **Shift Cells Down** : It instructs Excel to shift existing cells down. This is the default option.
- **Entire Row** : It inserts complete rows in the cell range. We can also select the row number on the frame before we choose the Insert command.
- **Entire Column** : It inserts complete columns in the cell range. We can also select the column letter on the frame before we choose the Insert command.

Shortcut Method :

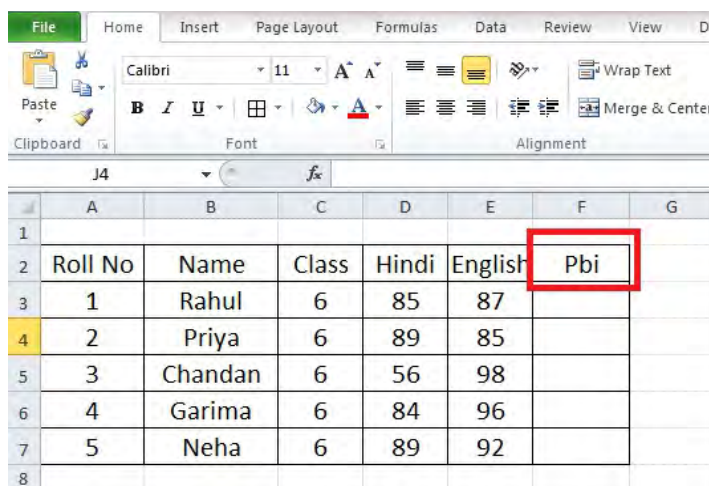
- To quickly insert an entire column or row into the worksheet, we can right-click the column letter such as A, B, C, D or row number such as 1, 2, 3, 4 on the worksheet window frame and then select Insert from the shortcut menu
- We should keep in mind that inserting entire columns and rows affects the entire worksheet, not just the part we see.

Deleting cells, rows, or columns

If some of the cells/rows/columns are not necessary we can delete it easily. We can delete a cell structure along with all its contents and formatting. When we delete a cell (or an entire row or column), Excel has to shuffle the position of entries in the surrounding cells to plug up any gaps caused by the deletion.

To delete the actual cell selection rather than just clear the cell contents, follow these steps :

1. Type data in our worksheet as shown in fig. 1.23.
2. Select the cells, rows, or columns we want to delete.



	A	B	C	D	E	F	G
1							
2	Roll No	Name	Class	Hindi	English	Pbi	
3	1	Rahul	6	85	87		
4	2	Priya	6	89	85		
5	3	Chandan	6	56	98		
6	4	Garima	6	84	96		
7	5	Neha	6	89	92		
8							

Fig. 1.23

3. Click the drop-down button attached to the Delete button in the Cells group of the Home tab as shown in fig. 1.24
4. Click Delete Cells on the drop-down menu.

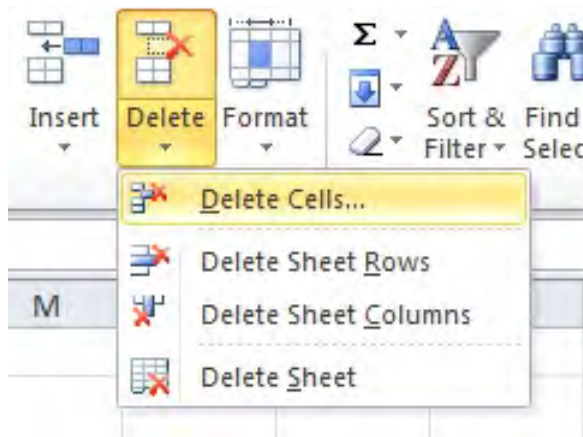


Fig 1.24

The Delete dialog box opens, showing these options for filling in the gaps:

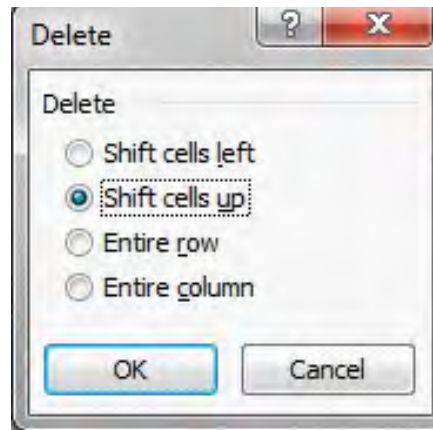


Fig. 1.25

- ➔ **Shift Cells Left** : It moves entries from neighboring columns on the right to the left to fill in gaps created when we delete the cell selection. This is the default option.
- ➔ **Shift Cells Up** : It moves entries up from neighboring rows below.
- ➔ **Entire Row** : It removes all the rows in the current cell selection.
- ➔ **Entire Column** : It deletes all the columns in the current cell selection.

Shortcut Method :

- ➔ If we want to quickly delete an entire column or row from the worksheet, we can right-click the column or row label and select Delete from the shortcut menu
- ➔ By deleting entire columns and rows from a worksheet is risky unless we're sure that the columns and rows contain no value.

How to Insert New Worksheets ?

As we can add new cells/row/columns in our existing worksheet, we can also add a new worksheet in our current workbook. For this click the Insert Worksheet icon as shown in fig. 1.26 below. A new worksheet will appear.

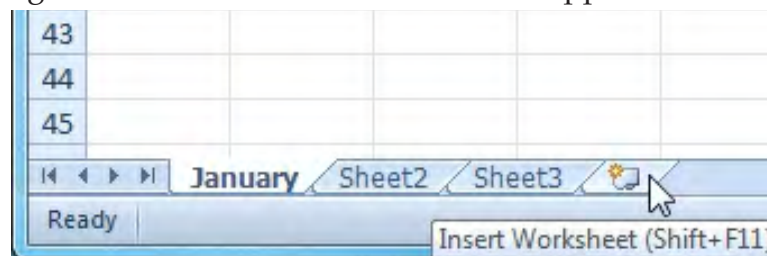


Fig. 1.26

We can change the setting for the default number of worksheets that appear in Excel workbooks. To do this click on the worksheet we want to keep in arrange. Now

keep pressing the left button of our mouse and drag that worksheet to desired location, release the mouse button when its done.

How To Delete Worksheets/worksheet ?

A Single Worksheet or Worksheets can be deleted from a workbook, including those containing data. Following are the steps for this:

1. Select the worksheet/worksheets we want to delete.
2. Right-click one of the selected worksheets. The worksheet menu appears as shown in fig. 1.27
3. Select Delete. The selected worksheets will be deleted from our workbook.

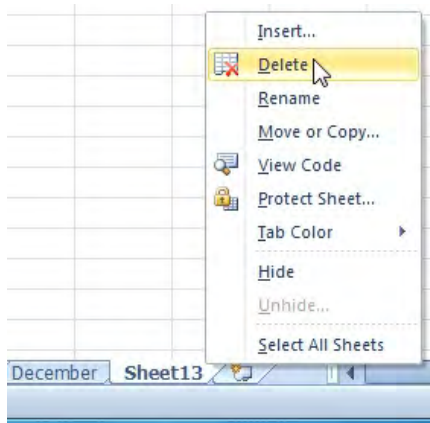


Fig 1.27

Cell Size : When we open a new blank workbook, the cells are set to a default size. We can modify size of cells according to our requirement. We will learn how to change row height and column width.

A screenshot of the Excel ribbon showing the Font and Alignment groups. The Font group includes options for font face (Calibri), size (16), bold, italic, underline, and color. The Alignment group includes options for text alignment, orientation, and fill. Below the ribbon, a table of student data is displayed. The table has 7 columns: Roll No, Name, Class, Hindi, English, and Pbi. The first row is highlighted in yellow. The cell containing 'Roll No' is highlighted with a red rectangle.

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Pbi
3	1	Rahul	6	85	87	
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	
8						

Fig. 1.28

Working with columns, rows, and cells : By default, every row and column of a new workbook is set to the same height and width. We can modify column width and row height in different ways in Excel.

How to modify column width ?

1. Place our mouse over the column line in the column heading so the white cross  becomes a double arrow  as shown in fig. 1.29

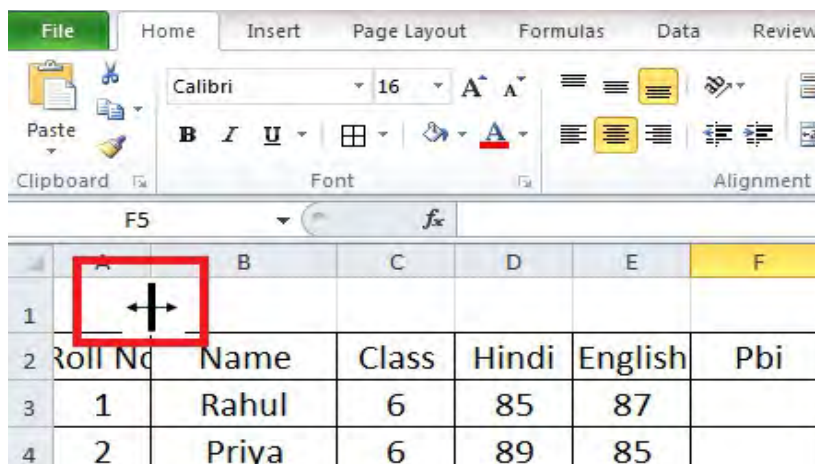


Fig. 1.29

2. Click and drag the column to the right to increase column width or to the left to decrease column width as shown in fig. 1.30

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Pbi
3	1	Rahul	6	85	87	
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	
8						

Fig. 1.30

3. Release the mouse. The column width will be changed in your spreadsheet as shown in fig. 1.31

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Pbi
3	1	Rahul	6	85	87	
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	

Fig 1.31

- When we have entered data in a cell and If you see Hash signs (#####) in a cell, it means that. the column size is not fit enough to display the cell content. Simply in crease the column width to adjust the cell content.

How to set column width with a specific measurement ?

1. Select the columns we want to modify.
2. Click the **Format** command on the **Home** tab. The format drop-down menu appears.
3. Select **Column Width**.

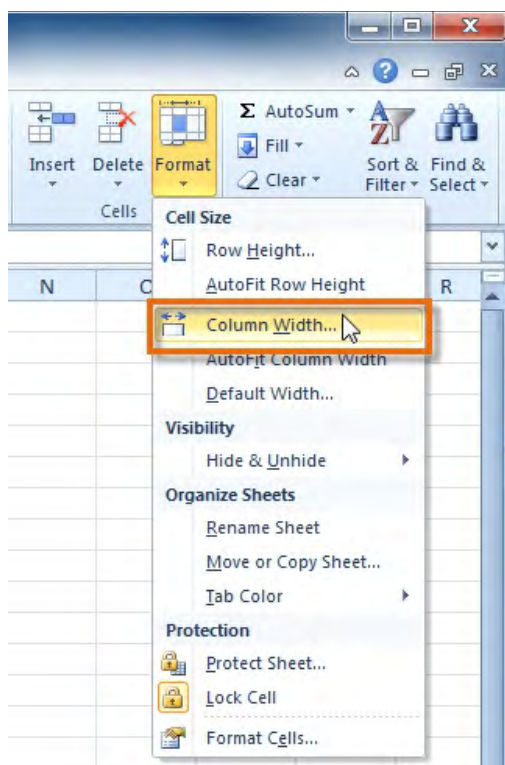


Fig. 1.32

- The Column Width dialog box appears. Enter our specific measurement.

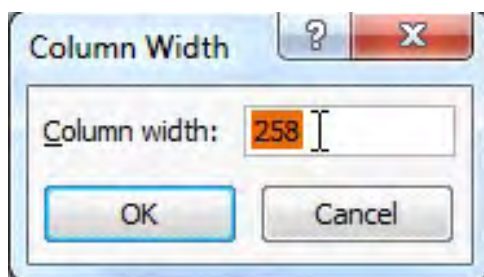


Fig 1.33

- Click OK. The width of each selected column will be changed in our worksheet.
- Select **AutoFit Column Width** from the format drop-down menu and Excel will automatically adjust each selected column so all of the text will fit.

How to modify row height ?

- Place the cursor over the row line so the white cross  becomes a double arrow  as shown in fig. 1.34

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						

Fig. 1.34

- Click and drag the row downward to increase row height or upward to decrease height as shown in fig. 1.35

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						

Fig 1.35

3. Release the mouse. The height of each selected row will be changed in our worksheet as shown in fig. 1.36

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Pbi
3	1	Rahul	6	85	87	
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	

Fig. 1.36

How to set row height with a specific measurement ?

1. Select the rows we want to modify.
2. Click the Format command on the Home tab. The format drop-down menu appears.
3. Select Row Height.

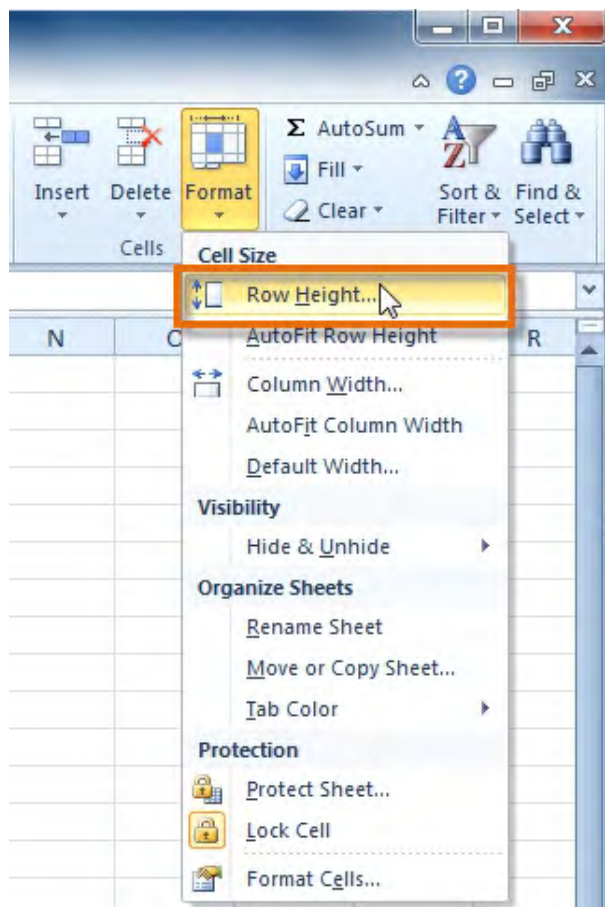


Fig 1.37

- The Row Height dialog box appears. Enter a specific measurement.

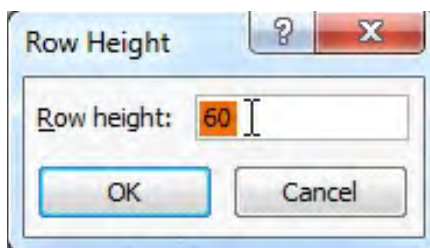


Fig. 1.38

- Click OK. The selected rows heights will be changed in your spreadsheet.
 - Select **AutoFit Row Height** from the format drop-down menu and Excel will automatically adjust each selected row so all of the text will fit.

1.3 EDITING

1.3.1 Formulas & Functions

We know that Excel is used to calculate numerical information. In this part, we will learn how to create simple formulas in Excel to add, subtract, multiply, and divide values in a workbook.

We will also learn how to make a formula easy and effective by using Cell reference.

To maximize the capabilities of Excel, it is important to understand how to **create simple formulas**.

Creating simple formulas :

Excel uses standard operators for equations, such as a **plus sign** for addition (+), **minus sign** for subtraction (-), **asterisk** for multiplication (*), **forward slash** for division (/), and **caret** (^) for exponents.

The key thing to remember when writing formulas for Excel is that all formulas must begin with an **equals sign (=)**.

To create a simple formula in Excel :

- Select the cell where the answer will appear (for example F3).

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Total Marks
3	1	Rahul	6	85	87	
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	
8						

Fig 1.39

- Type the equals sign (=).



- Type in the formula we want Excel to calculate (85+87, for example).

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Total Marks
3	1	Rahul	6	85	87	=85+87
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	
8						

Fig. 1.40

- Press **Enter**. The formula will be calculated, and the value will be displayed in the cell.

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Total Marks
3	1	Rahul	6	85	87	172
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	
8						

Fig. 1.41

Creating formulas with cell references : When a formula contains a cell address, it is called a **cell reference**. Creating a formula with cell references is useful because you can update data in our worksheet without having to rewrite the values in the formula. Let's learn how to create a formula using cell reference :

To create a formula using cell references :

- Select the cell where the answer will appear (for example F3).
- Type the **equals sign (=)**.



- Type the cell address that contains the first number in the equation (for example **D3**).

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Total Marks
3	1	Rahul	6	85	87	=D3
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	

Fig 1.42

- Type the operator we need for our formula. For example, type the **addition sign (+)**.
- Type the cell address that contains the second number in the equation (for example **E3**).

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Total Marks
3	1	Rahul	6	85	87	=D3+E3
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	

Fig. 1.43

- Press **Enter**. The formula will be calculated, and the value will be displayed in the cell.

	A	B	C	D	E	F
1						
2	Roll No	Name	Class	Hindi	English	Total Marks
3	1	Rahul	6	85	87	172
4	2	Priya	6	89	85	
5	3	Chandan	6	56	98	
6	4	Garima	6	84	96	
7	5	Neha	6	89	92	

Fig. 1.44



- If you change a value in either D3 or E3, the total will automatically recalculate.

	A	B	C	D	E	F	G	H
1								
2	Roll No	Name	Class	Hindi	English	Total Marks		
3	1	Rahul	6	98	87	185		
4	2	Priya	6	89	85			
5	3	Chandan	6	56	98			
6	4	Garima	6	84	96			
7	5	Neha	6	89	92			

Fig. 1.45

To Edit a Formula : A formula in excel can be edited as per requirement, but while doing so, the calculated answer will be reflected too. Step are :

1. Click the cell we want to edit.
2. Insert the cursor in the **formula bar** as shown in fig. 1.46 and edit the formula as desired. We can also **double-click the cell to view and edit the formula directly** from the cell or press F2 key.
3. When we're done, press **Enter** or select the **Enter** command 

SUM		X ✓ fx		=D3+F3			
	A	B	C	D	E	F	G
1							
2		Roll No	Name	Class	Hindi	English	Total Marks
3		1	Rahul	6	85	87	=D3+F3
4		2	Priya	6	89	85	
5		3	Chandan	6	56	98	
6		4	Garima	6	84	96	
7		5	Neha	6	89	92	
8							
9							
10							
11							

Edit a Formula from the formula Bar or cell.

Fig. 1.46

- The new value will be displayed in the cell **G3**.

G3 fx =D3+F3							
	A	B	C	D	E	F	G
1							
2		Roll No	Name	Class	Hindi	English	Total Marks
3		1	Rahul	6	85	87	93
4		2	Priya	6	89	85	
5		3	Chandan	6	56	98	
6		4	Garima	6	84	96	
7		5	Neha	6	89	92	

Fig. 1.47

- If we want to cancel the changes made, use the **Cancel** command  in the formula bar.

Cell Reference : Cell Reference is very important in Excel. In Excel, Cell Reference is termed to calculate important calculations by using a cell or a range of cells for a formula to calculate the result of the formula in a worksheet. We can use a cell reference for a single formula or for multiple formulas. Let's learn about it in detail :

Types of Cell Reference :

- Relative Reference.
- Absolute Reference.
- Mixed Reference.

Relative Reference : In Excel Relative reference is used by default. When it is copied to multiple cells then it changes according to cell position. For example : If we want to calculate a formula in cell C1=A1+B1 and we copy it to cell C2 then it becomes=A2+B2. Let's study it by using following example :

	A	B	C	D	E	F
1	55	70	=A1+B1			
2	58	59				
3	85	89				
4						
5						

Fig 1.48

- Type data in a worksheet as shown in fig. 1.48
- Now type our formula in cell C1=A1+B1



3. Drag the fill handle of cell C1 as shown in fig. 1.49, we will see that the formula becomes in cell C2=A2+B2.

	A	B	C	D	E	F
1	55	70	125			
2	58	59	=A2+B2			
3	85	89				
4						
5						

Fig. 1.49

Absolute Reference : Sometimes we want that during copying a formula from one cell to another, its cell reference should not be changed. So, in this case Absolute Reference is used, in this type of reference the cell address doesn't change even during copying a formula. Using this reference we can keep a row/column constant. Dollar(\$) sign is used during typing a formula using Absolute Reference. Dollar(\$) sign can be used either for a row or a column. We can also use it for both together. Let's make it clear while using the following example :

	A	B	C	D	E
1	55	70	=A\$1+B1		
2	58	59	114		
3	85	89			
4					
5					

Fig. 1.50

1. Type data in a worksheet as shown in fig 1.49
2. Now type our formula in cell C1=A\$1+B1
3. Drag the fill handle of cell C1 as shown in fig. 1.50, we will see that the formula becomes in cell C2=A\$1+B2. We will notice that cell address in formula remain constant as C2=A\$1.

	A	B	C	D	E
1	55	70	125		
2	58	59	=A\$1+B2		
3	85	89			
4					
5					

Fig 1.51

Mixed Reference : Mixed Reference is the combination of both Relative and Absolute Reference. In Mixed Reference a Dollar(\$) sign is used either to a Row or Column. Let's make it clear while using the following example :

	A	B	C	D
1	25	38	=A1+B\$1	
2	28	29	66	
3	48	58	86	
4	87	54	125	
5	89	98	127	
6				

Fig. 1.52

1. Type data in a worksheet as shown in fig 1.52
2. Now type our formula in cell C1=A1+B\$1
3. Drag the fill handle of cell C1 as shown in fig. 1.53, we will see that the formula becomes in cell C2=A2+B\$1. We will notice that cell address in formula has changed in cell C2 to A2 which is an example of Relative Cell and B\$1 remains constant, is an example of Absolute Reference.

	A	B	C	D
1	25	38	63	
2	28	29	=A2+B\$1	
3	48	58	86	
4	87	54	125	
5	89	98	127	
6				

Fig 1.53

Basic functions : A **function** is a **predefined formula** that performs calculations using specific values in a particular order. One of the key benefits of functions is that they can save our time because we do not have to write the formula yourself. Excel has hundreds of functions to assist with our calculations.

To use these functions correctly, we need to understand the different **parts of a function** and how to create **arguments** in functions to calculate values and cell references.

The parts of a function : The order in which we insert a function is important. Each function has a specific order – called **syntax** – which must be followed in order for the function to work correctly. Sequence of a function can be learnt as follows :

1. First of all equal to (=) sign is written.
2. After this the function name is written (**SUM**, for example, if we want to add two numbers)
3. After this argument is written. Arguments contain the information we want the formula to calculate, such as a range of cell references.

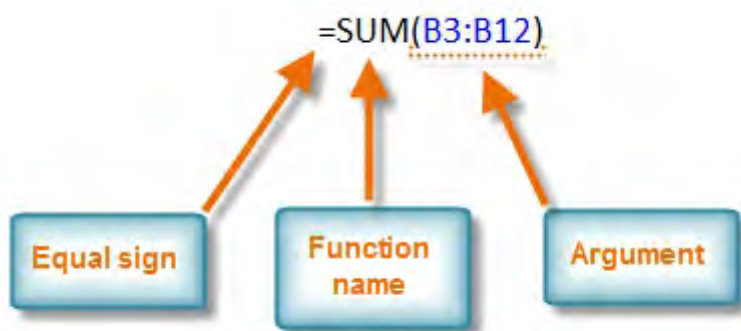


Fig. 1.54

Working with arguments : Arguments are a vital part of a Function. So while writing Arguments for a functions, following point are taken care :

1. Arguments must be enclosed in **parentheses** for example ().
2. If there are Individual values or cell references inside the parentheses are separated by either **colons** or **commas**. **Commas** separate individual values, cell references, and cell ranges in parentheses. If there is more than one argument, we must separate each argument by a comma.

For example, `=COUNT(A1:A5,B1:B5,C1:C5)`

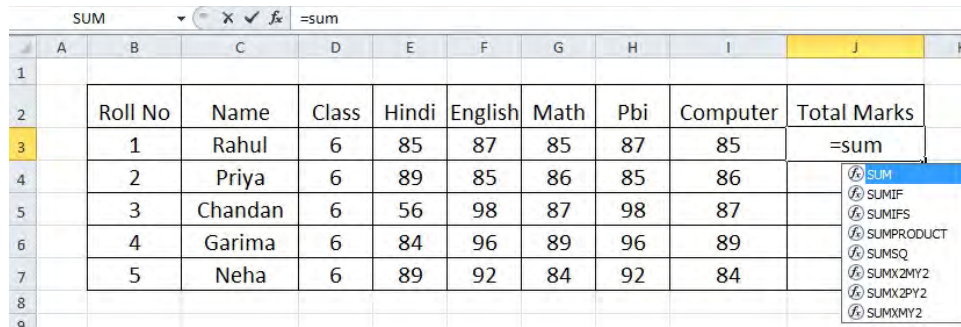
3. If there is a cell range in argument then it is written with colon in braces, **Colons** create a reference to a range of cells.

For example, `=AVERAGE(E19:E23)`

To create a basic function in Excel :

1. Select the cell where the answer will appear (**J3**, for example).
2. Type the **equals sign (=)**, then enter the **function name (SUM)**, for example).

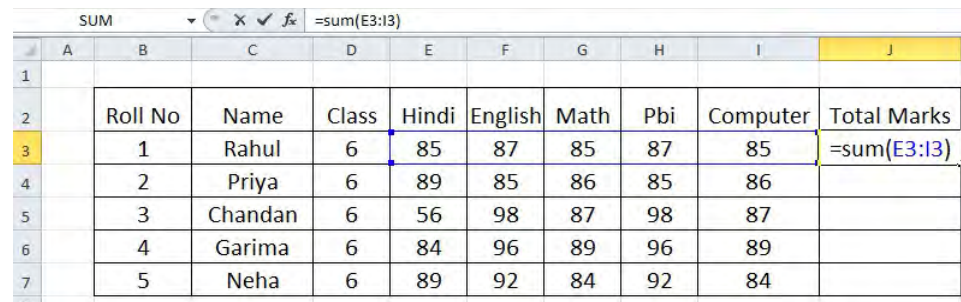




	A	B	C	D	E	F	G	H	I	J
1										
2		Roll No	Name	Class	Hindi	English	Math	Pbi	Computer	Total Marks
3		1	Rahul	6	85	87	85	87	85	=sum
4		2	Priya	6	89	85	86	85	86	
5		3	Chandan	6	56	98	87	98	87	
6		4	Garima	6	84	96	89	96	89	
7		5	Neha	6	89	92	84	92	84	
8										
9										

Fig 1.55

3. Enter the cells for the **argument** inside the parentheses.



	A	B	C	D	E	F	G	H	I	J
1										
2		Roll No	Name	Class	Hindi	English	Math	Pbi	Computer	Total Marks
3		1	Rahul	6	85	87	85	87	85	=sum(E3:I3)
4		2	Priya	6	89	85	86	85	86	
5		3	Chandan	6	56	98	87	98	87	
6		4	Garima	6	84	96	89	96	89	
7		5	Neha	6	89	92	84	92	84	
8										
9										

Fig. 1.56

4. Press **Enter**, and the result will appear.

Excel **will not always tell us** if our function contains an error, so it's up to you to check all of our functions.

1.3.1.1 Using AutoSum to select common functions

The **AutoSum** command allows us to automatically return the results for a range of cells for common functions like SUM and AVERAGE.

1. Select the cell where the answer will appear (J3, for example).
2. Click the **Home** tab.
3. In the **Editing** group, click the **AutoSum** drop-down arrow and select the function we want (**Count Numbers**, for example).

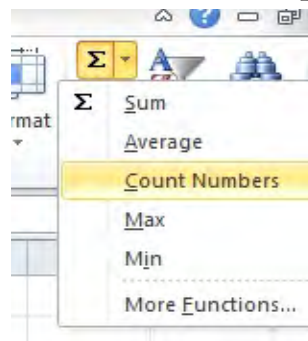


Fig. 1.57

4. A formula will appear in **J3**, the selected cell. If logically placed, AutoSum will select our cells for us. Otherwise, we will need to click the cells to choose the argument we want.

SUM =COUNT(D3:I3)										
	A	B	C	D	E	F	G	H	I	J
1										
2		Roll No	Name	Class	Hindi	English	Math	Pbi	Computer	Total Marks
3		1	Rahul	6	85	87	85	87		=COUNT(D3:I3)
4		2	Priya	6	89	85	86	85	86	COUNT(value1, [value2], ...)

Fig 1.58

5. Press **Enter**, and the result will appear.

☛ The **AutoSum** command can also be accessed from the **Formulas** tab.

1.3.2 What is Sorting ?

Sorting data in Excel basically means that we can arrange the data according to some specific criteria like for example, the numbers in ascending or descending order or ascending order according to the dates. We can even arrange data alphabetically. To sort data, follow these steps :

To sort in alphabetical order :

1. Type data in our worksheet as shown in Fig. 1.59
2. Select a cell in the column we want to sort by. In this example, we'll sort by Last Name.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Roll No	Name of the Student	Class	Section	English	Punjabi	Hindi	Maths	Science	Social Studies	Computer	Phy.Edu
2	1	Anu	7th	A	85	87	85	87	85	87	85	87
3	2	Ritu	7th	A	82	86	82	86	82	86	82	86
4	3	Bhawna	7th	A	87	89	87	89	87	89	87	89
5	4	Jaspal	7th	A	88	84	88	84	88	84	88	84
6	5	Bomika	7th	A	89	85	89	85	89	85	89	85
7	6	Tarsem	7th	A	92	96	92	96	92	96	92	96
8	7	Kuldeep	7th	A	95	92	95	92	95	92	95	92
9	8	Nitu	7th	A	94	94	94	94	94	94	94	94
10	9	Salma	7th	A	91	93	91	93	91	93	91	93
11	10	Monu	7th	A	92	96	92	96	92	96	92	96

Fig. 1.59

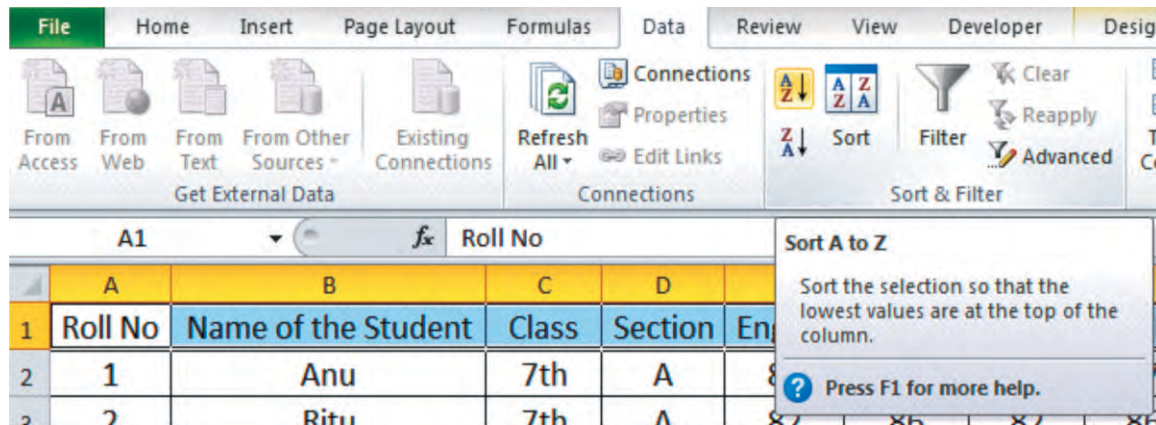


Fig. 1.60

3. Select the **Data** tab, then locate the **Sort and Filter** group.
4. Click the ascending command to **Sort A to Z** or the descending command to **Sort Z to A** as shown in fig. 1.61

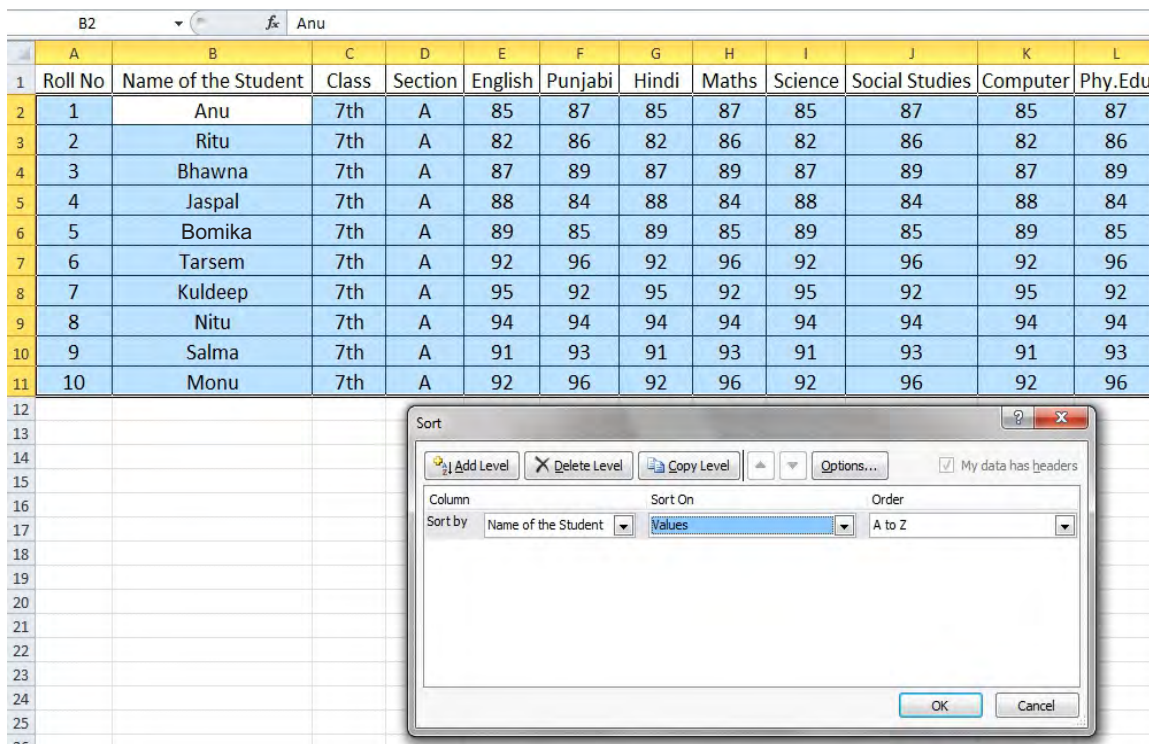


Fig. 1.61

5. The data in the spreadsheet will be organized alphabetically as shown in fig. 1.62

	A	B	C	D	E	F	G	H	I	J	K	L
1	Roll No	Name of the Student	Class	Section	English	Punjabi	Hindi	Maths	Science	Social Studies	Computer	Phy.Edu
2	1	Anu	7th	A	85	87	85	87	85	87	85	87
3	3	Bhawna	7th	A	87	89	87	89	87	89	87	89
4	4	Jaspal	7th	A	88	84	88	84	88	84	88	84
5	7	Kuldeep	7th	A	95	92	95	92	95	92	95	92
6	10	Monu	7th	A	92	96	92	96	92	96	92	96
7	8	Nitu	7th	A	94	94	94	94	94	94	94	94
8	5	Bomika	7th	A	89	85	89	85	89	85	89	85
9	2	Ritu	7th	A	82	86	82	86	82	86	82	86
10	9	Salma	7th	A	91	93	91	93	91	93	91	93
11	6	Tarsem	7th	A	92	96	92	96	92	96	92	96

Fig. 1.62

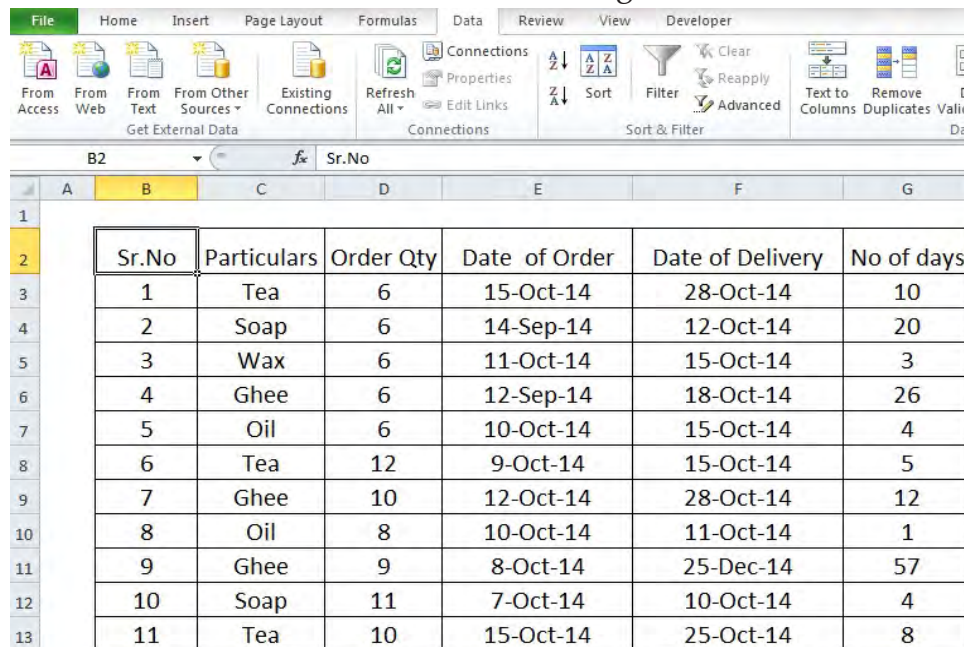
- Sorting options can also be found on the Home tab, condensed into the **Sort & Filter** command.

Filtering data : Filter is a tool in MS Excel that is used to get the information according to our requirement. When we need to find special information from a list, then we use **Filter**. Filters can be applied in different ways to improve the performance of our worksheet. We can filter text, dates, and numbers. We can even use more than one filter to further narrow our results.

How to filter data : In this example, we'll filter the contents of a shopkeeper. We'll display only the Tea and Oil commodities that are delivered. Let's study how to do this :

Steps :

- Type the data in a worksheet as shown in the fig. 1.63 below :



The screenshot shows the Microsoft Excel interface with the 'Sort & Filter' ribbon selected. The ribbon includes options like 'Sort' (A-Z, Z-A, On My Own), 'Filter' (funnel icon), 'Advanced' (funnel with plus icon), 'Clear', 'Reapply', 'Text to Columns', 'Remove Duplicates', and 'Validate Data'. Below the ribbon, a data table is visible with the following content:

Sr.No	Particulars	Order Qty	Date of Order	Date of Delivery	No of days
1	Tea	6	15-Oct-14	28-Oct-14	10
2	Soap	6	14-Sep-14	12-Oct-14	20
3	Wax	6	11-Oct-14	15-Oct-14	3
4	Ghee	6	12-Sep-14	18-Oct-14	26
5	Oil	6	10-Oct-14	15-Oct-14	4
6	Tea	12	9-Oct-14	15-Oct-14	5
7	Ghee	10	12-Oct-14	28-Oct-14	12
8	Oil	8	10-Oct-14	11-Oct-14	1
9	Ghee	9	8-Oct-14	25-Dec-14	57
10	Soap	11	7-Oct-14	10-Oct-14	4
11	Tea	10	15-Oct-14	25-Oct-14	8

Fig. 1.63

2. Select the **Data** tab, and then locate the **Sort & Filter** group.
3. Click the **Filter** command.

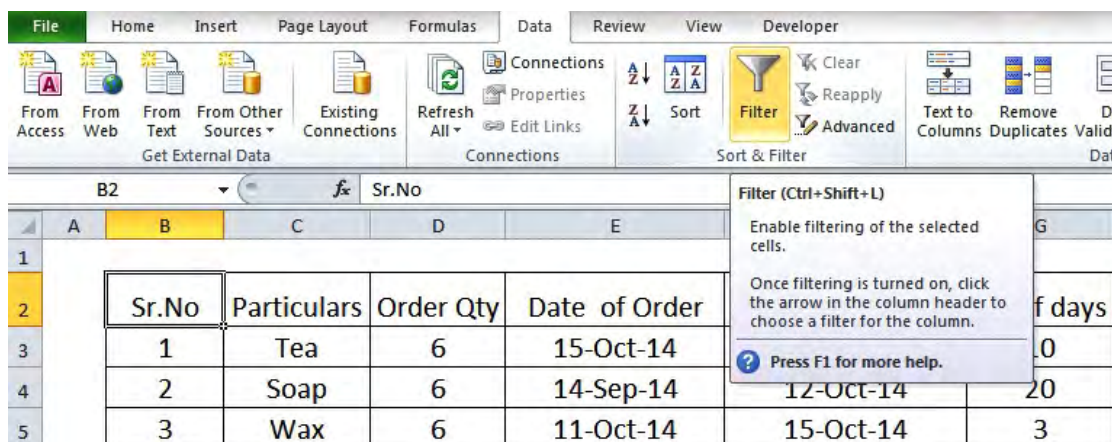


Fig 1.64

4. Drop-down arrows will appear in the header of each column.
5. Click the **drop-down arrow** for the column we want to filter. In this example, we'll filter the Type column to view only certain types of commodities.

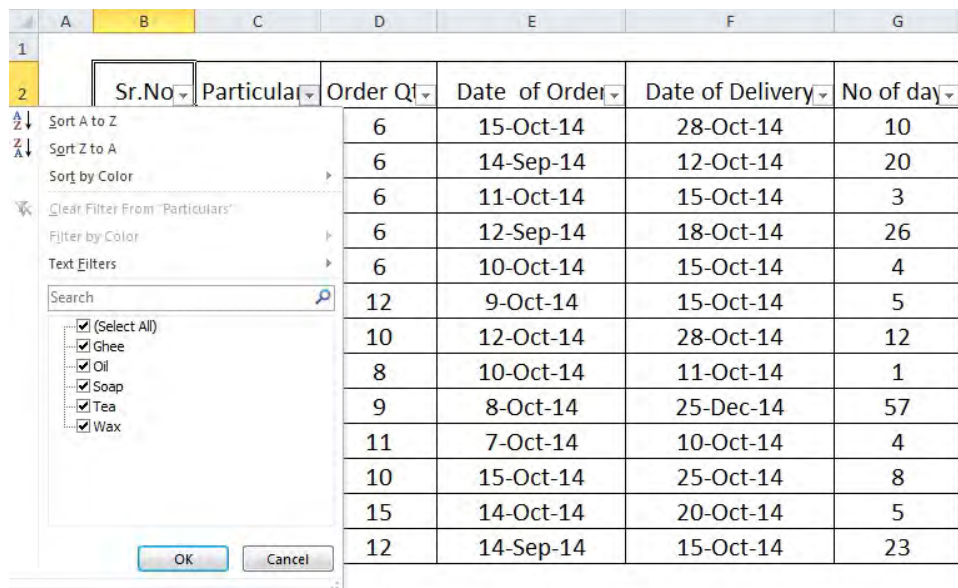


Fig. 1.65

6. The **Filter** menu appears.
7. **Uncheck** the boxes next to the data we don't want to view, or uncheck the box next to **Select All** to quickly uncheck all.
8. **Check** the boxes next to the data we do want to view. In this example, we'll check Tea and Oil to view only these types of commodities.

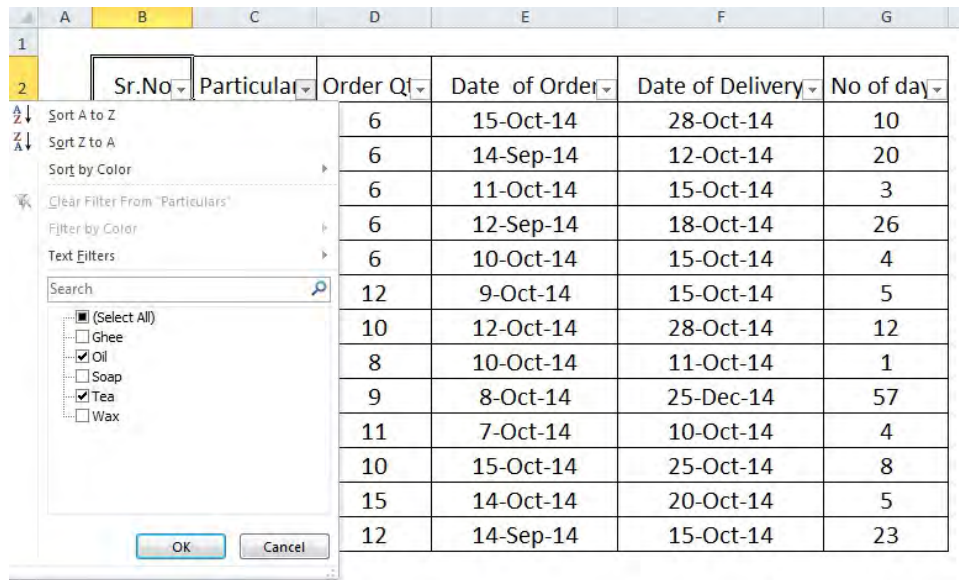


Fig. 1.66

- Click **OK**. All other data will be filtered, or temporarily hidden. Only Tea and Oil will be visible.

	A	B	C	D	E	F	G
1							
2		Sr.No	Particulars	Order Qty	Date of Order	Date of Delivery	No of day
3		1	Tea	6	15-Oct-14	28-Oct-14	10
7		5	Oil	6	10-Oct-14	15-Oct-14	4
8		6	Tea	12	9-Oct-14	15-Oct-14	5
10		8	Oil	8	10-Oct-14	11-Oct-14	1
13		11	Tea	10	15-Oct-14	25-Oct-14	8
14		12	Tea	15	14-Oct-14	20-Oct-14	5
16							

Fig. 1.67

- Filtering options can also be found on the Home tab, condensed into the **Sort & Filter** command.

To clear a filter : We can clear a filter very easily. To do so, following are the step :

- Click the **drop-down arrow** in the column from which we want to clear the filter.
- Choose **Clear Filter From**.

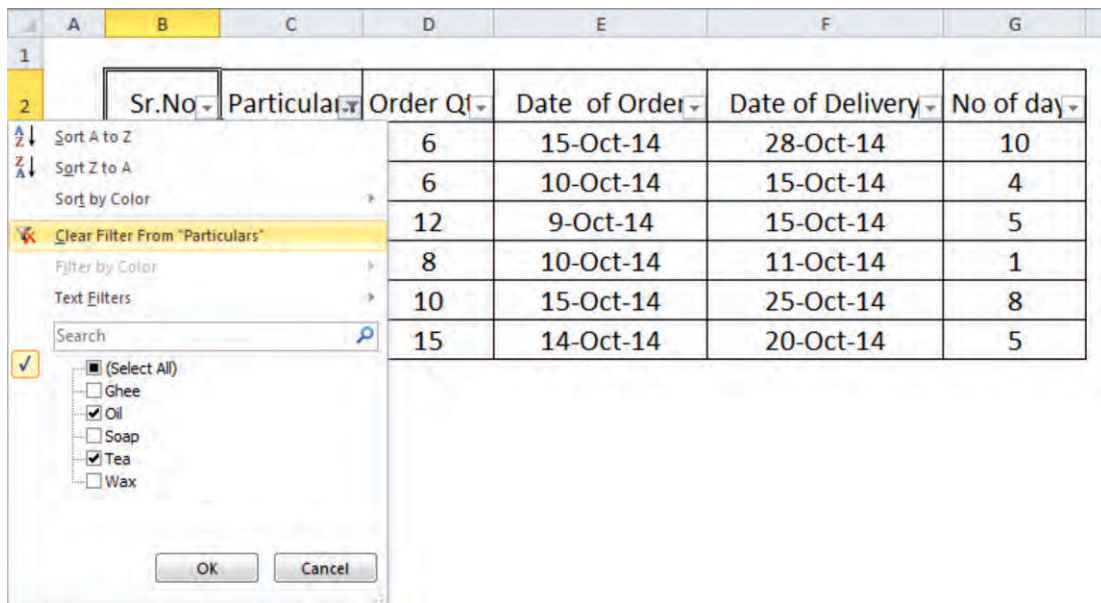


Fig 1.68

3. The filter will be cleared from the column. The data that was previously hidden will be on display once again.
- ☛ To instantly clear all filters from our worksheet, click the Filter command on the Data tab.

1.3.3 Find and Replace

Excel Find and Replace feature are powerful tools that we can use for special criteria such as to Find a text and to Replace it with our new text. We can narrow the search results by specifying formatting to look for as well as other search options, including Match Case.

How to use Find Option : Following are the steps to locate data in a worksheet :

1. Choose Find & Select in the Editing group on the Home tab, and then select Find (or press Ctrl+F).The Find and Replace dialog box appears with the Find tab on top.

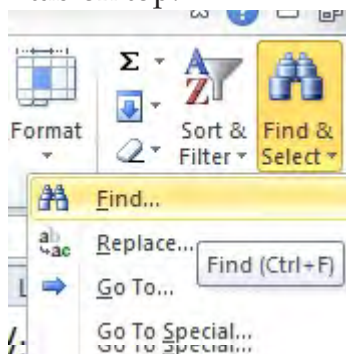


Fig 1.69

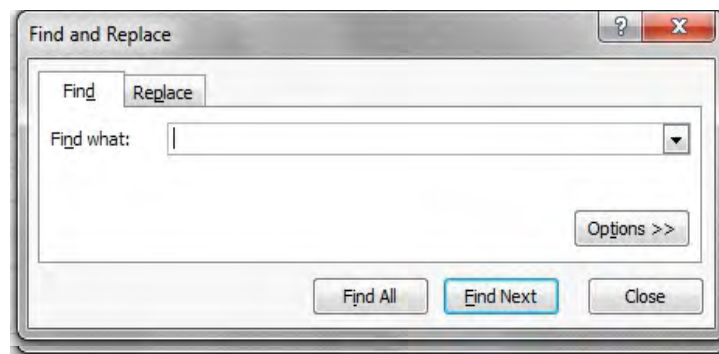


Fig 1.70

2. In the Find What box, enter the data we want to locate as shown in fig. 1.79.

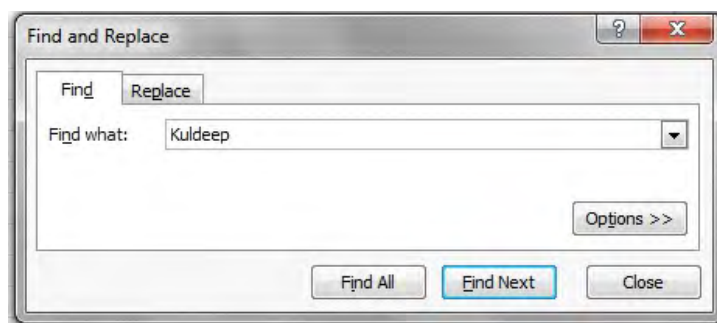


Fig 1.71

Click the Options button to expand the dialog box and specify any desired options.

- Within : It searches just the current worksheet or the entire workbook.
- Search : It selects whether to search first across the rows or down the columns.
- Look In : It selects whether we want to search through the values or formula results, through the actual formulas, or if we want to look in the comments.
- Match Case : It checks this box if we want our search to be case-specific.
- Match Entire Cell Contents: It checks this box if we want our search results to list only the items that exactly match our search criteria.

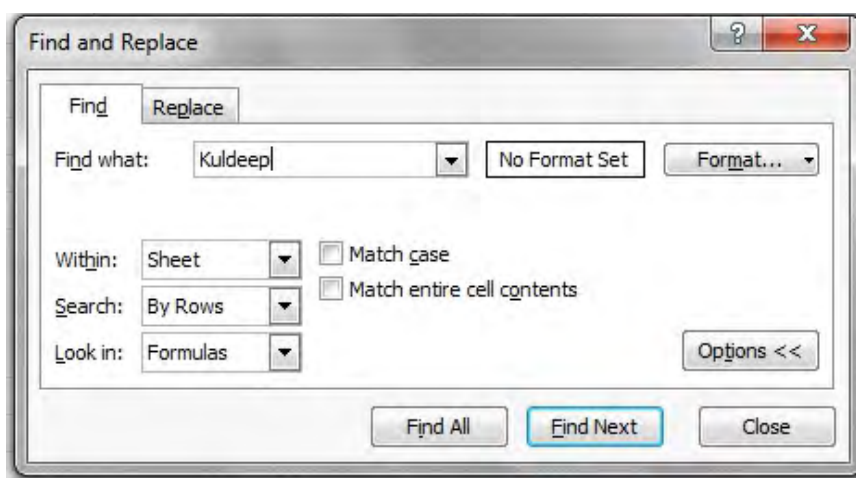


Fig 1.72

3. Click Find Next.

Excel jumps to the first occurrence of the match. If this is not the entry we're looking for, click Find Next again.

Click Close when we've located the entry we want.

Using Replacing data Option : Replace option is used to change data according to our requirement. We can change each entry of a cell while typing on, but it require more time and labour so we can do it easily using Replace option. To find and replace data in a worksheet, follow these steps :

1. Choose Find & Select in the Editing group on the Home tab, and then select Replace (or press Ctrl+H).The Find and Replace dialog box appears with the Replace tab on top.

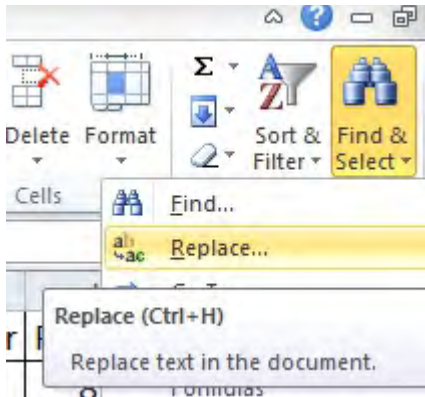


Fig 1.73

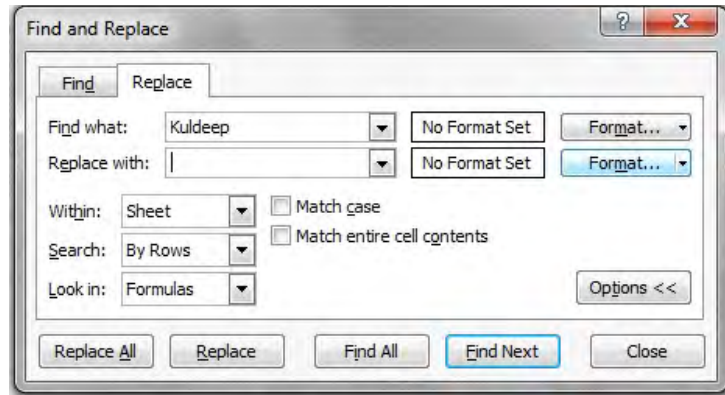


Fig 1.74

2. In the Find What box, enter the data we want to locate.
3. In the Replace With box, enter the data with which we want to replace the found data.

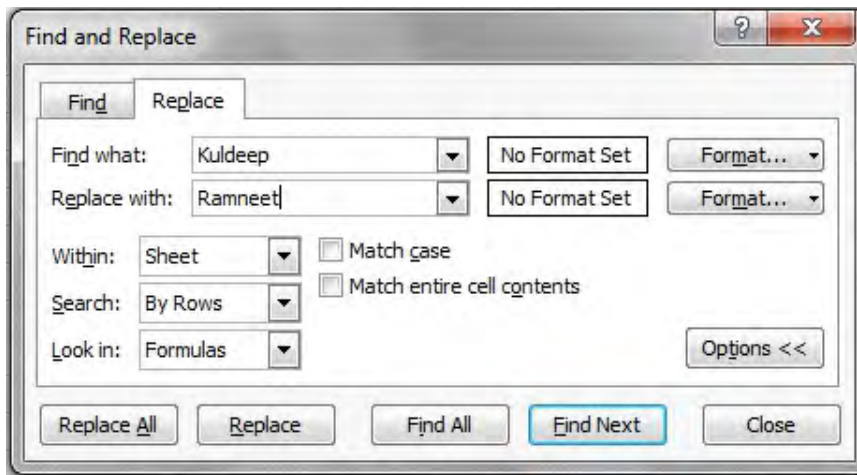


Fig 1.75

4. Click the Options button and specify any desired options.
5. Click Find Next to locate the first occurrence or click Find All to display a list of all occurrences.

We can sort the results of a Find All search by clicking a column heading.

6. If we want to use the replacement data, click Replace.

Excel performs the replacement and locates the next occurrence.

7. If we want to replace all occurrences at the same time, click Replace All.

Excel displays an information box indicating the number of replacements made.

8. Click OK in the alert box and then click Close.

Things to Remember

1. Microsoft Excel is used to calculate mathematical and scientific calculations.
2. By applying different number formats, we can change the appearance of a number without changing the number itself.
3. Formatting can not only improve the look of our spreadsheet, but it also can make it easier to use.
4. If we need to add new data within an existing worksheet, we can insert new cells, columns, or rows in the worksheet.
5. Worksheets can be deleted from a workbook, including those containing data.
6. A formula is an equation that performs a calculation.
7. When a formula contains a cell address, it is called a cell reference.
8. A function is a predefined formula that performs calculations using specific values in a particular order.
9. Each function has a specific order called syntax
10. Sorting data in Excel basically means that we can arrange the data according to some specific criteria.

Exercise

1. Fill in the Blanks :

1. An Excel Workbook consists of
(a) Worksheets (b) Rows (c) Columns (d) Formulas
2. The actual value of a cell is displayed in bar.
(a) Title (b) Menu (c) Formula (d) None of these



3. Formatting applies one or more rules to any cells we want.
(a) Formula (b) Function (c) Conditional (d) None of these
4. Format Command is available on Tab.
(a) Home (b) Insert (c) Data (d) Formulas
5. All Formulas must begin with an sign.
(a) Sigma (b) Plus (c) Equal (d) None of these
6. A data in our worksheet can be arranged in an order using
(a) Formula (b) Function (c) Filter (d) Sorting
7. Sort & Filter command is available on Tab.
(a) Home (b) Insert (c) Data (d) Formulas

2. Short Answer Type Questions :

1. What is conditional Formatting ?
2. What is Merge & Centre ? .
3. Write different types of cell reference ?
4. Define Sorting.
5. Define Filter.

3. Long Answer Type Questions :

1. What is a cell ? How can we insert a new cell in our current worksheet ?
2. What is a Formula ? Write down the steps to create a simple Formula in Excel.
3. What is a Function ? Write different parts of function ?

4. True/ False

1. A function is a predefined formula.
2. Sign X is used to do Multiply.
3. A formula is equation that performs a calculation.
4. Each function has a specific order called Syntax.
5. Filter is used to find special information from list.

Objective of this Lesson

- 2.1 Charts
 - 2.1.1 Inserting Charts
- 2.2 Data Tools
 - 2.2.1 Text to Columns
 - 2.2.2 Data Validation
- 2.3 Protection
 - 2.3.1 Protect Sheet
 - 2.3.2 Protect Workbook
- 2.4 View Tab
 - 2.4.1 Split
 - 2.4.2 Freeze
 - 2.4.3 Hide and Unhide

Introduction

A chart is a tool in MS Excel that is used to communicate our data graphically. A chart can allow us to know the meaning behind our data. We can use these charts to make comparisons much easier.

2.1 Charts

An Excel workbook can contain a large amount of data. So it is difficult for us to interpret this data. For example if we have numbers in our worksheet and we want to know the highest and lowest numbers from these numbers. So we can do it clearly by representing this data as a chart. Excel has various types of charts, so we can choose one that most effectively represents our data.

2.1.1 Types of Chart

- ➡ Pie Chart
- ➡ Column Chart



- ➡ Line Chart
- ➡ Bar Chart
- ➡ Area Chart
- ➡ Scatter Chart etc.

2.1.2 How to create a Chart?

In this part we will learn how to create a chart. It is very easy to create a chart. Before making a chart first of all we need to define a data series. A data series is a related set of data points. In an Excel worksheet it is usually one row of data with the associated column headings or one column of data with the associated row headings. All chart types can plot both single and multiple data series except Pie Chart.

Let's learn creating charts using line chart :

To create a **line chart**, the steps are as follows :

1. Type the data in our excel worksheet as shown in fig. 2.1 below.
2. Select the range A1:C6
3. On the Insert tab, in the **Charts** group, choose Line, and select Line with Markers.

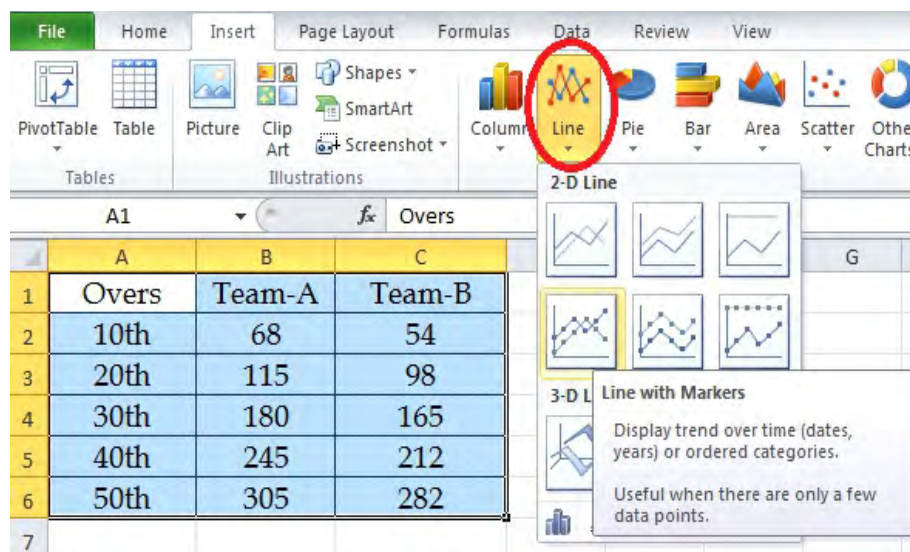
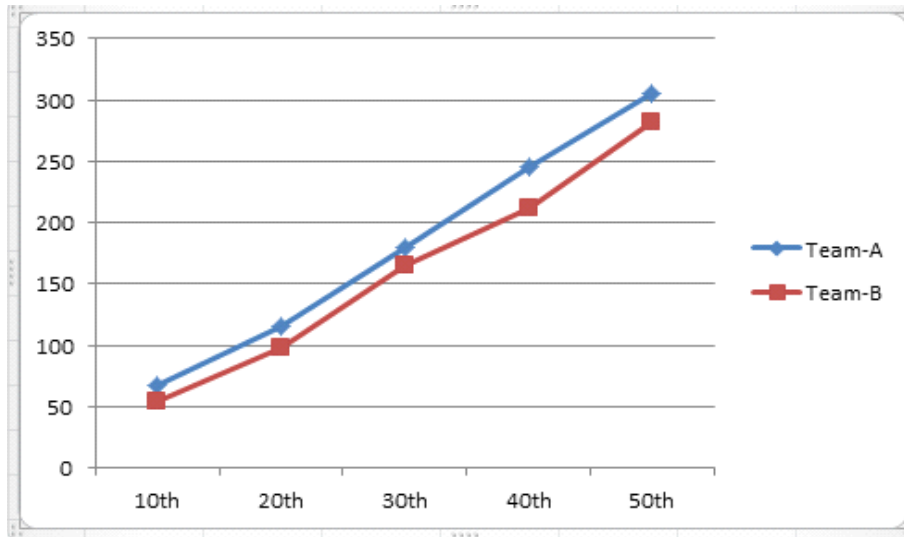


Fig. 2.1. Inserting a chart type Line chart

Result :



2.1.3 How to add chart Title

We can easily add a chart title to our Chart in Excel. To add a chart title following are the steps below :

1. Select the chart. We will notice that the Chart Tools contextual tab is activated as shown in fig. 2.7
2. On the Layout tab, click Chart Title, Above Chart.

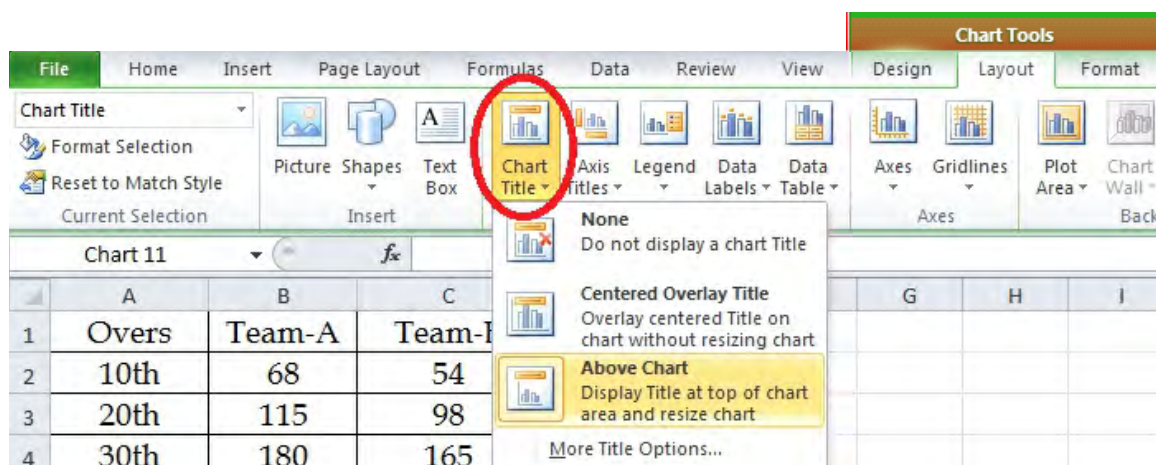


Fig. 2.3. Adding Chart Title

3. We will see a caption (Chart Title) above our chart. Enter our desired title. For example, Match Analysis.

Result :

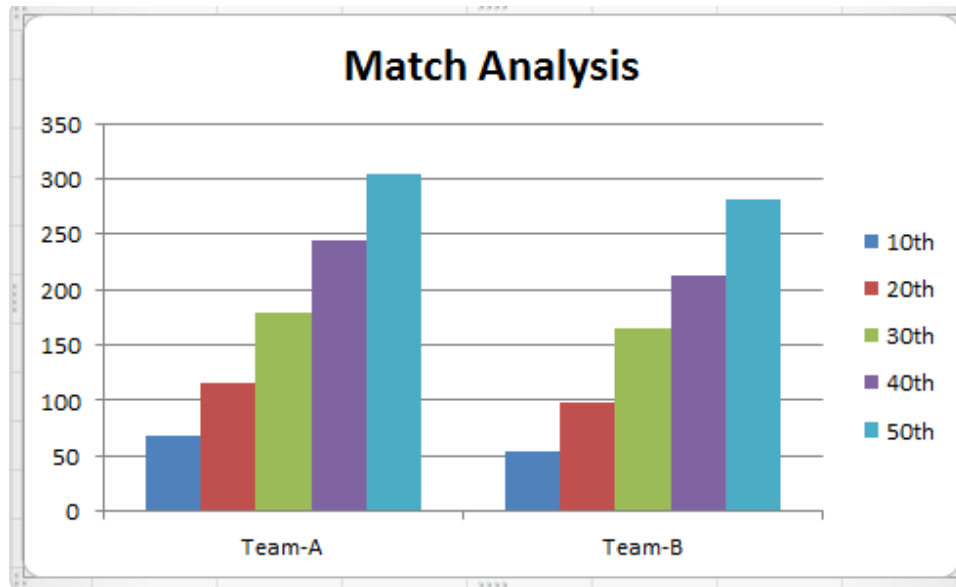


Fig. 2.4. Chart Title

2.1.4 Elements of a Chart

Elements of a Chart are explained as below :

1. **Chart area** : A chart area contains everything inside the chart window, including all parts of the chart.
2. **Data marker (or Data point)** : A data marker is a symbol on the chart that represents a single value in the worksheet. A data marker can be a bar in a bar chart, a pie in a pie chart, or a line on a line chart. Data markers with the same shape or pattern represent a single data series in the chart.
3. **Data series** : It is a group of related values such as all the values in a single row in the chart. A chart can have just one data series.
4. **Axis** : It is a line that is used as a major reference for plotting data in a chart. In two-dimensional charts there are two axes the x-axis (horizontal/category) and the y-axis (vertical/value).
5. **Tick mark** : It is a small line intersecting an axis. A tick mark indicates a category, scale, or chart data series. A tick mark can have a label attached to it.
6. **Plot area** : It is the area where our data is plotted and it includes the axes and all markers that represent data points.
7. **Gridlines** : These are the optional lines extending from the tick marks across the plot area. It make easier to view the data values represented by the tick marks.

8. **Chart text** : It is a label or title that we add to our chart. Attached text is a title or label that is linked to an axis such as the Chart Title.
9. **Legend** : It is a key that identifies patterns, colors, or symbols associated with the markers of a chart data series. The legend shows the data series name corresponding to each data marker

Just like with normal spreadsheet data, we can sort the data in a PivotTable using the **Sort & Filter** command on the **Home** tab. We can also apply any type of formatting we want.

2.2 Data Tools

In Microsoft Excel Data Tools are simply tools which make it easy to manipulate data. Some of them are used to save our time by extracting or joining data and others perform complex calculations on data.

2.2.1 How to convert Text to Columns:

Sometimes we need to separate the contents of one **Excel cell** into **separate columns**. For this we can use the 'Convert Text to Columns Wizard'. For example, when we want to separate a list of full names into last and first names.

Steps are as follows :

1. Type the data in our worksheet as shown in the fig. 2.5 below :
2. Select the range with full names.

	A	B	C	D
1				
2	Ravi Kumar			
3	Ranjan Sharma			
4	Kapil Kumar			
5	Amit Bhalla			
6	Ravi Singh			
7	Kulwant Kumar			
8				
9				
10				
11				
12				
13				

Fig. 2.5. Convert Text to Column

3. On the Data tab, click Text to Columns.

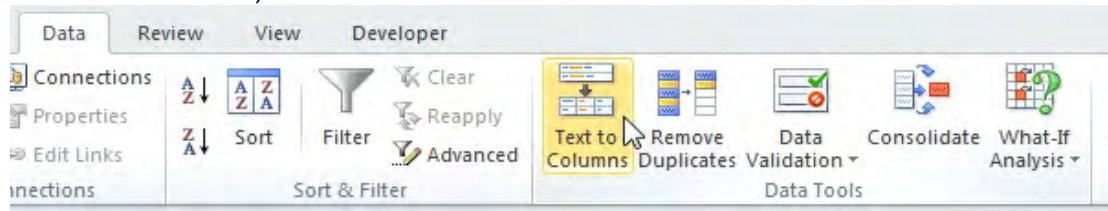


Fig. 2.6. Text to Column

The following dialog box appears.

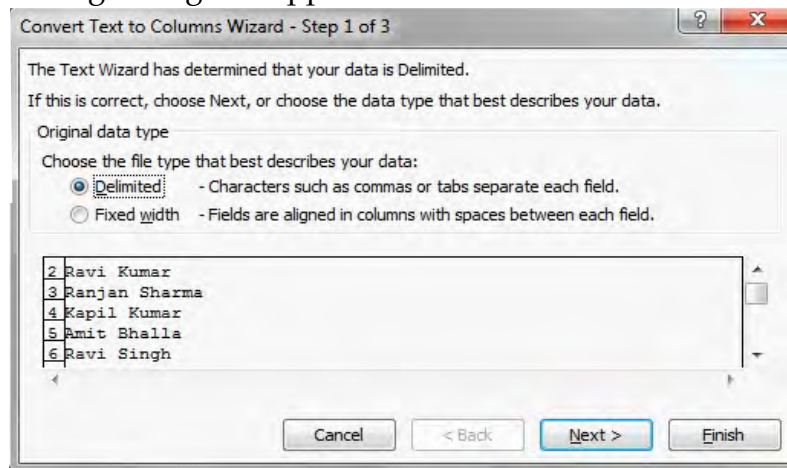


Fig. 2.7. Text to Column Wizard-1

4. Choose Delimited and click Next.
5. Clear all the check boxes under Delimiters except for the Comma and Space check box.

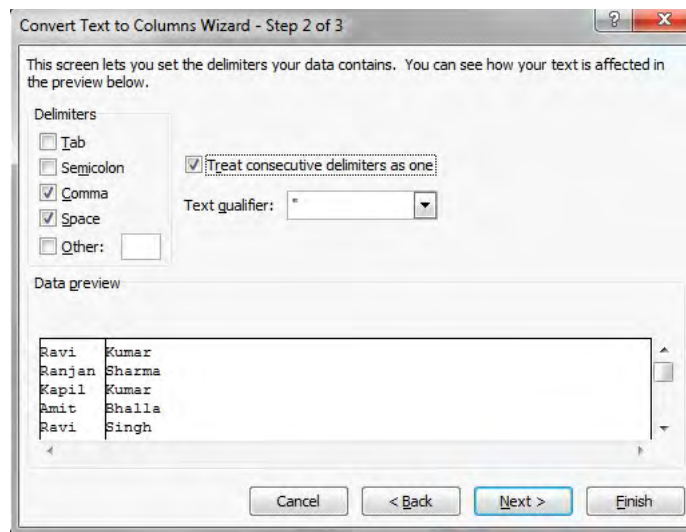


Fig. 2.8. Text to Column Wizard-2

6. Click Finish.

Result :

	A	B	C	D	E
1					
2	Ravi	Kumar			
3	Ranjan	Sharma			
4	Kapil	Kumar			
5	Amit	Bhalla			
6	Ravi	Singh			
7	Kulwant	Kumar			
8					
9					
10					
11					
12					
13					

Fig. 2.9. Text to Column Result

2.2.2 What is Data Validation ?

In MS Excel, data validation is a powerful feature that is used to set up certain rules to dictate what can be entered into a cell. For example, we may want to limit data entry in a particular cell to whole numbers between 0 and 10. If the user makes an invalid entry, we can display a custom message. Let us learn how to use Data Validation with the help of the example below :

Data Validation Example : In this example, we restrict a user to enter a whole number between 0 and 10.

	A	B	C
1		Customer Feedback	Rating(1 to 10)
2	1	How would you rate us for our service	
3	2	How would you rate us for your complaint rectification	
4	3	What would you give us regarding our Phone service	
5	4	Behaviour	
6			

Fig. 2.10. Data Validation Example

How to Create Data Validation Rule : To create a **data validation rule**, the steps are as follows :

1. Type the data in our excel worksheet as shown in the fig 2.11.
2. Select cell C2.

3. On the Data tab, click Data Validation.

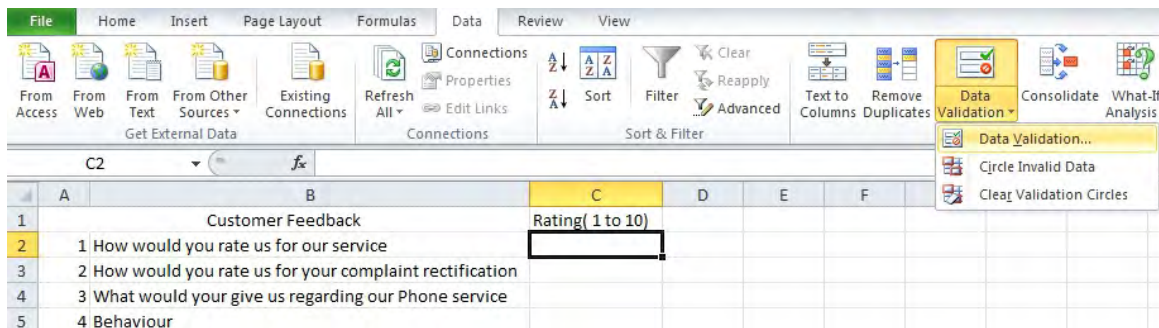


Fig. 2.11. Creating Data Validation Rule

On the Settings tab do as shown in the figure 2.12.

1. In the Allow list, click Whole number.
2. In the Data list, click between.
3. Enter the Minimum and Maximum values.

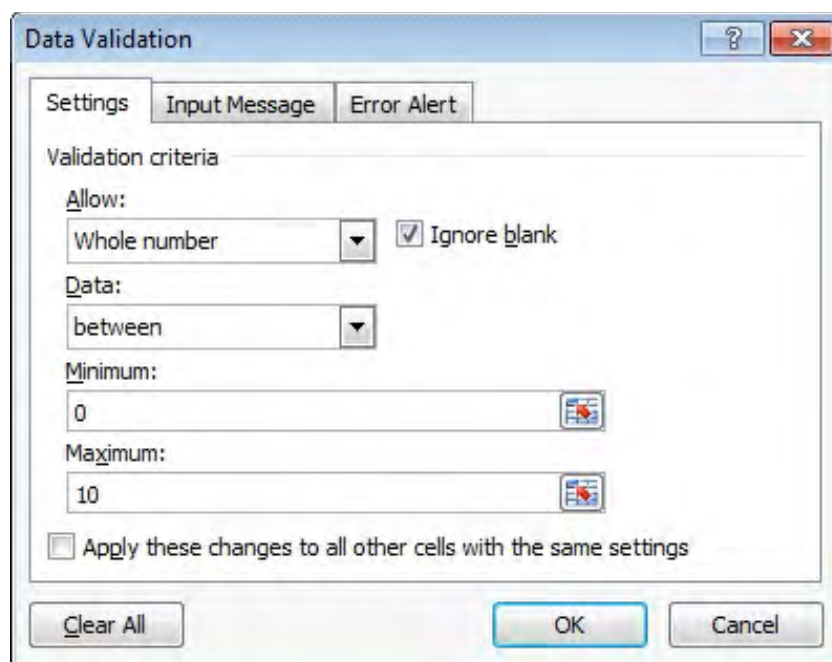


Fig. 2.12. Data Validation Settings

Input Message : Input messages appear when the user selects the cell and tell the user what to enter.

On the Input Message tabas shown in the figure 2.13 below do the following:

1. Check 'Show input message when cell is selected'.
2. Enter a title.

3. Enter an input message.

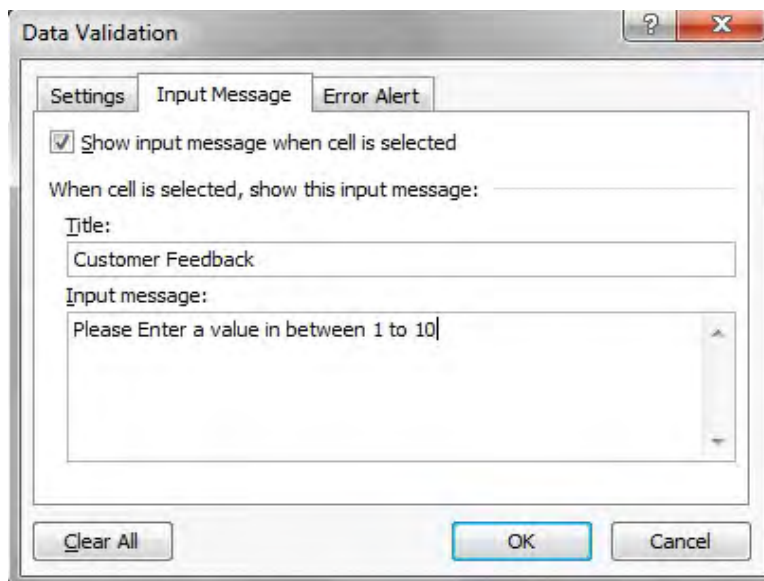


Fig. 2.13. Data Validation Input Message

Error Alert : If users ignore the input message and enter a number that is not valid, we can show them an error alert.

On the Error Alert tab as shown in the figure 2.14 below do the following:

1. Check 'Show error alert after invalid data is entered'.
2. Enter a title.
3. Enter an error message.
4. Click OK.



Fig. 2.14. Data Validation Error Alert

Data Validation Result : To check our Data Validation result follows the steps as below :

1. Select cell C2.
2. Try to enter a number higher than 10.

	A	B	C	D	E
1		Customer Feedback	Rating(1 to 10)		
2	1	How would you rate us for our service			
3	2	How would you rate us for your complaint rectification			
4	3	What would your give us regarding our Phone service			
5	4	Behaviour			
6					
7					

Fig. 2.15. Data Validation Result

Result :

	A	B	C	D	E	F	G
1		Customer Feedback	Rating(1 to 10)				
2	1	How would you rate us for our service	12				
3	2	How would you rate us for your complaint rectification					
4	3	What would your give us regarding our Phone service					
5	4	Behaviour					
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

Fig. 2.16. Data Validation Wrong Input Error

🔵 To remove data validation from a cell, select the cell, on the Data tab, click Data Validation, and then click Clear All.

2.3 Protection

In simple words Protection means to keep our stuff safe from misuse from an authorised person. In Excel we can protect our workbook/worksheet.

2.3.1 How to Protect Worksheet

While working in an organization, we need to keep our work safe from being

misused. Our data can be misused or tempered by anyone. So, when we share a file with other users, we may want to **protect a worksheet** to help prevent it from being changed. Let's learn how to do this :

Steps to Protect Worksheet :

1. Right click a worksheet tab

OR

Go to Review Tab

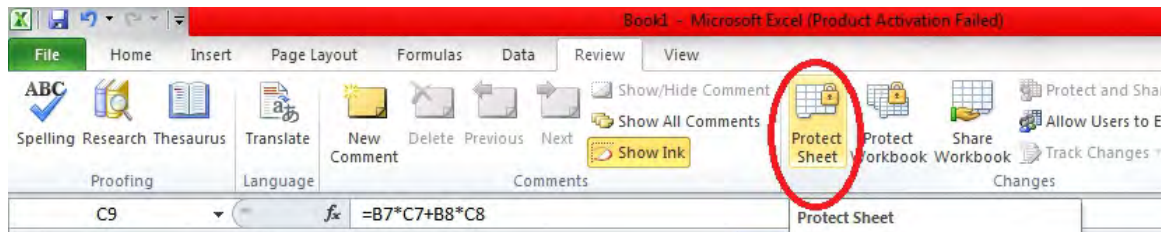


Fig. 2.17. Protect Sheet-Tab

2. Click Protect Sheet.

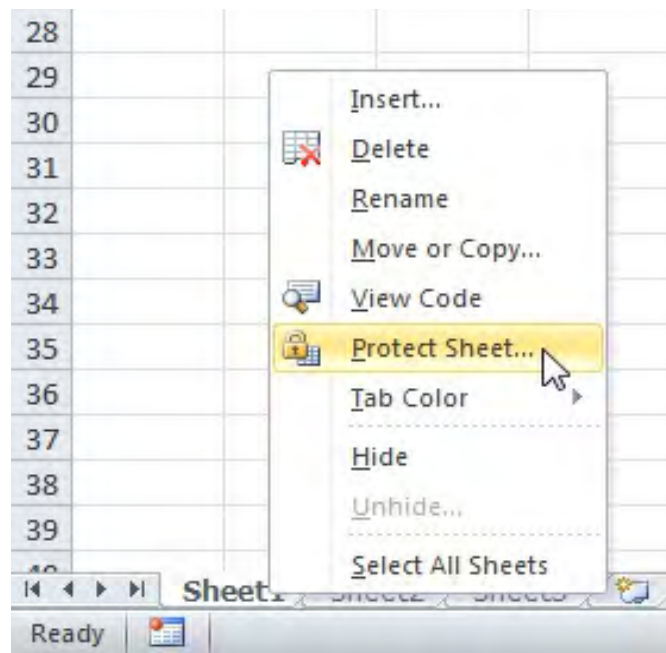


Fig. 2.18. Protect Sheet

3. Enter a password.
4. Check the actions we allow the users of our worksheet to perform.
5. Click OK.

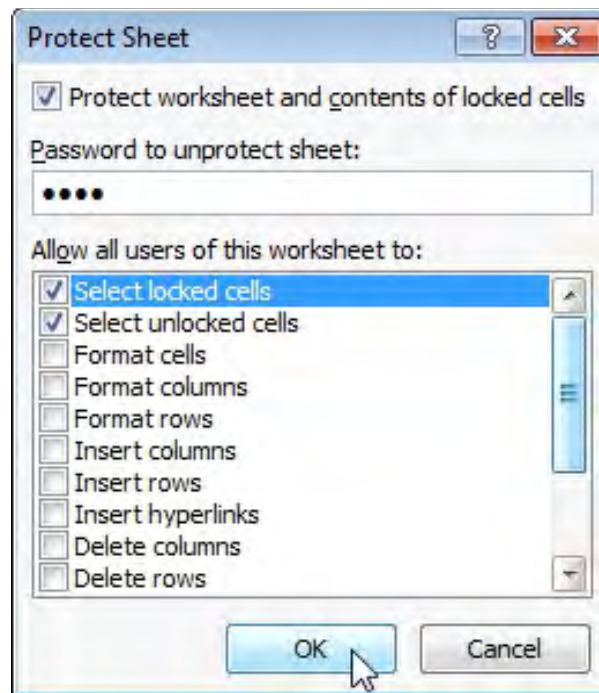


Fig. 2.19. Protect Sheet Dialog Box

• If we don't check any action, users can only view the Excel file.

6. Confirm the password and click OK.



Fig. 2.20. Confirming Password

Our worksheet is protected now. To unprotect a worksheet, right click on the worksheet tab and click Unprotect Sheet.

2.4.2 How to Protect Workbook?

A workbook can be protected easily as we have protected a worksheet. A workbook can be protected such as :

- ➔ Workbook Structure
- ➔ Workbook Windows

If we protect the workbook structure, users cannot insert, delete, rename, move, copy, hide or unhide worksheets anymore.

1. Open a workbook.
2. On the Review tab, click Protect Workbook.

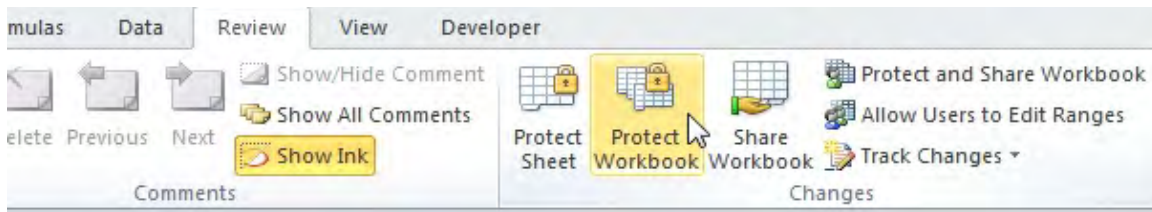


Fig. 2.21. Protect Workbook Tab

3. Check Structure, enter a password and click OK.

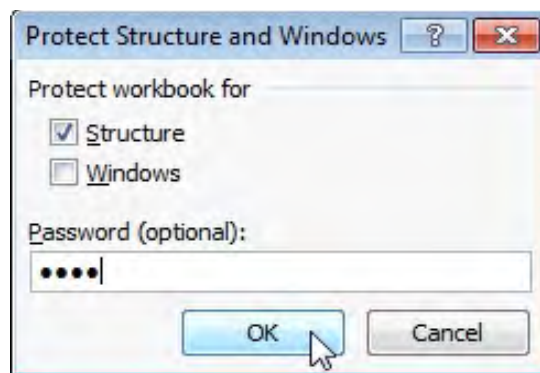


Fig. 2.22. Protect Structure Dialog Box

4. Re-enter the password and click on OK.



Fig. 2.23. Confirm Password-Protect Workbook

Users cannot insert, delete, rename, move, copy, hide or unhide worksheets anymore.

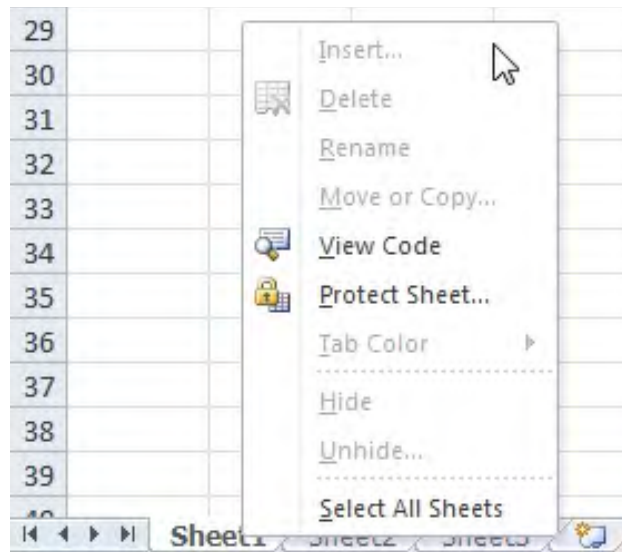


Fig. 2.24. Workbook Protected

Windows : If we protect the workbook windows, we cannot move, change the size and close windows anymore.

1. Open a workbook.
2. On the Review tab, click Protect Workbook.

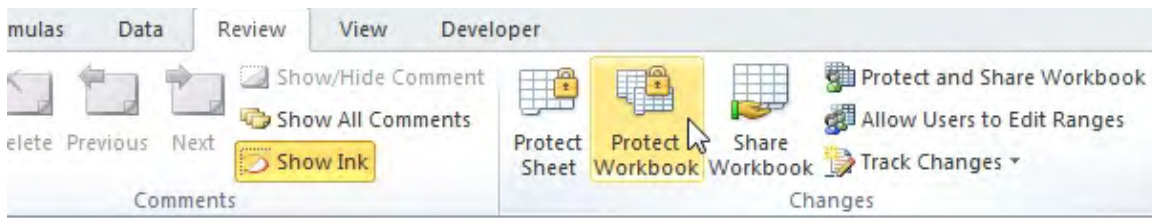


Fig. 2.25. Protect Workbook Tab

3. Check Windows enter a password and click OK.

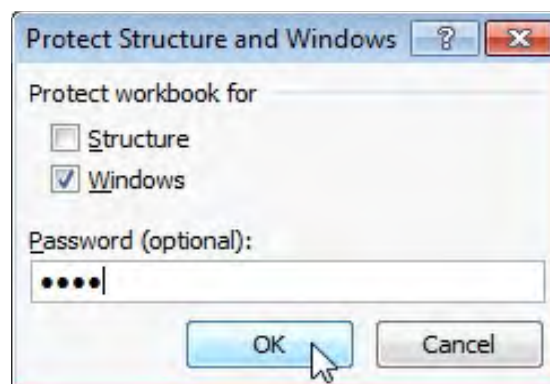


Fig. 2.26. Protect Windows Dialog Box

4. Re-enter the password and click on OK.



Fig 2.27 Confirm Password-Protect Workbook

We cannot move, change the size and close windows anymore.

- ➡ To unprotect the workbook, click Protect Workbook and enter the password.
The structure and window of this workbook are protected.

2.4. View Tab

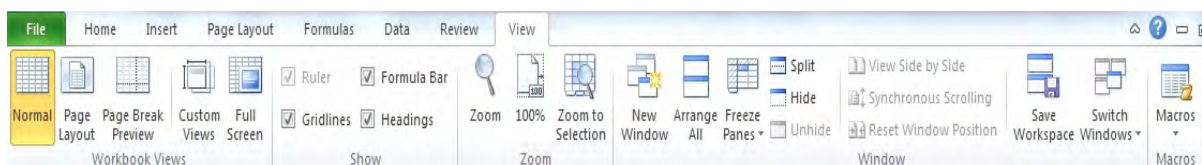


Fig. 2.28. View Tab

2.4.1 Split

In simple words Split means to break a large object into small parts so that the job is easy to do. In Excel we can split our worksheet that contains a large volume of data, so that we could compare it if necessary.

How to Split Worksheet : In Excel we can split the worksheet window into separate panes and scroll the worksheet in each pane so that we can easily compare data from two separate worksheet locations. We can make the panes in a workbook window disappear by double-clicking anywhere on the split bar that divides the window.

1. Click the split box above the vertical scroll bar as shown in fig. 2.53

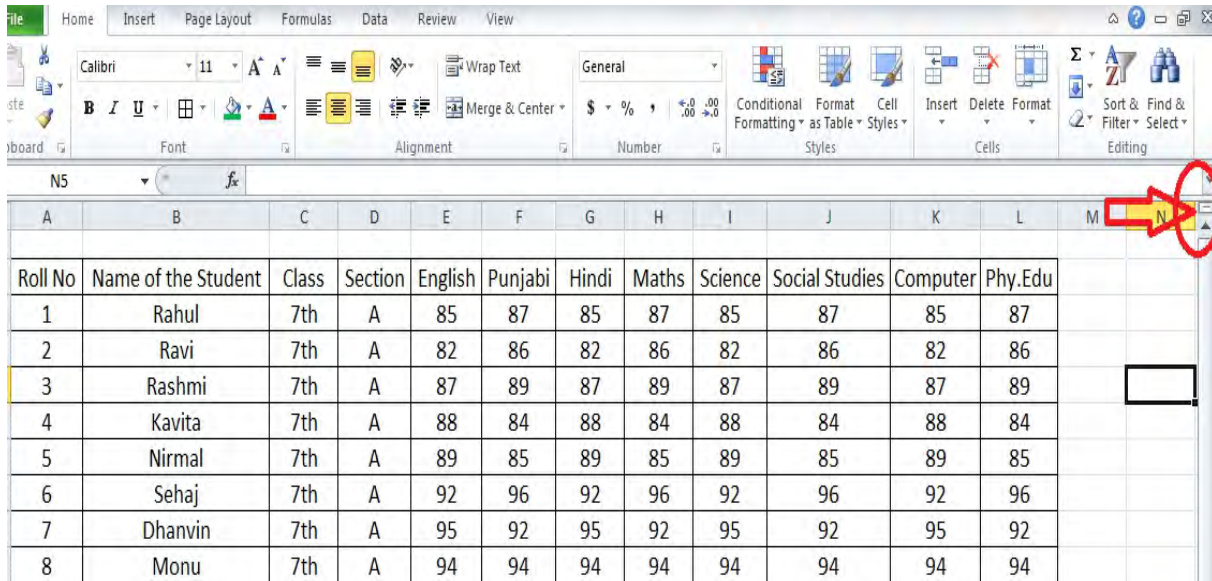


Fig. 2.29. Split box above the vertical scroll bar

2. Drag it down to split our window.

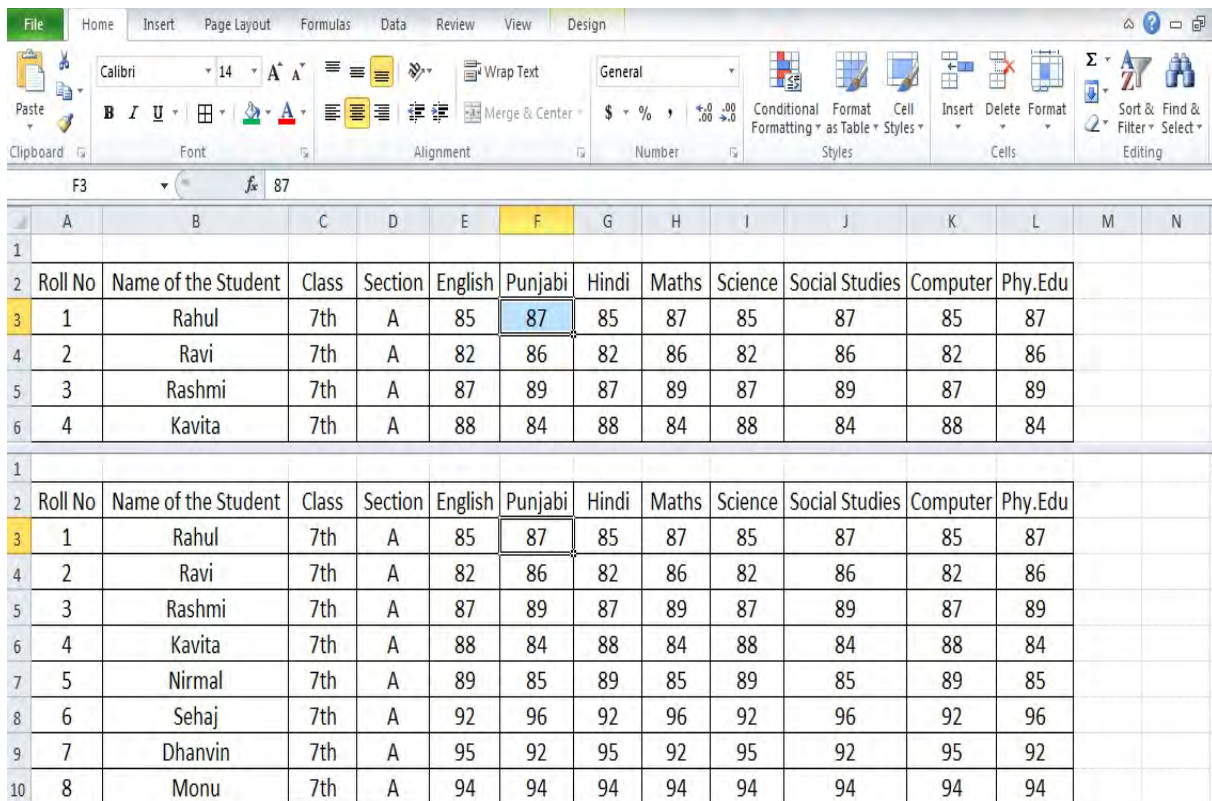


Fig. 2.30. Window split in two panes

3. Notice the two vertical scroll bars. For example, use the lower vertical scroll bar to move to row 12. As we can see, the first 12 rows remain visible.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2	Roll No	Name of the Student	Class	Section	English	Punjabi	Hindi	Maths	Science	Social Studies	Computer	Phy.Edu		
3	1	Rahul	7th	A	85	87	85	87	85	87	85	87		
4	2	Ravi	7th	A	82	86	82	86	82	86	82	86		
5	3	Rashmi	7th	A	87	89	87	89	87	89	87	89		
6	4	Kavita	7th	A	88	84	88	84	88	84	88	84		
7	5	Nirmal	7th	A	89	85	89	85	89	85	89	85		
8	6	Sehaj	7th	A	92	96	92	96	92	96	92	96		
9	7	Dhanvin	7th	A	95	92	95	92	95	92	95	92		
10	8	Monu	7th	A	94	94	94	94	94	94	94	94		
11	9	Urvashi	7th	A	91	93	91	93	91	93	91	93		
12	10	Manisha	7th	A	92	96	92	96	92	96	92	96		

Fig. 2.31. Window split adjustment

4. To remove the split, double click the horizontal split bar that divides the panes (or drag it up).

👉 In a similar way, we can use the split box to split our window into four panes.

2.4.2 Freeze

Freeze means to make a thing stable or stop the movement. In Excel Freeze means to stop the movement of a particular row or column while scrolling a spreadsheet.

How to Freeze Panes of a Worksheet ?

Freeze option is very useful in some cases when we have a long table and want to see all. We need to scroll it while looking all the data. We will see that the table headings are also scrolled during scrolling, so it becomes difficult to understand the meaning of data without having its heading name hidden. So we can use Freeze option if we have a large table of data in Excel. We can freeze either rows or

columns. This way we can keep rows or columns visible while scrolling through the rest of the worksheet. In this part we will learn how to freeze top row of your worksheet :

Freeze Top Row : To freeze the top row, execute the following steps.

1. On the View tab, click Freeze Panes, Freeze Top Row as shown in fig. 2.32

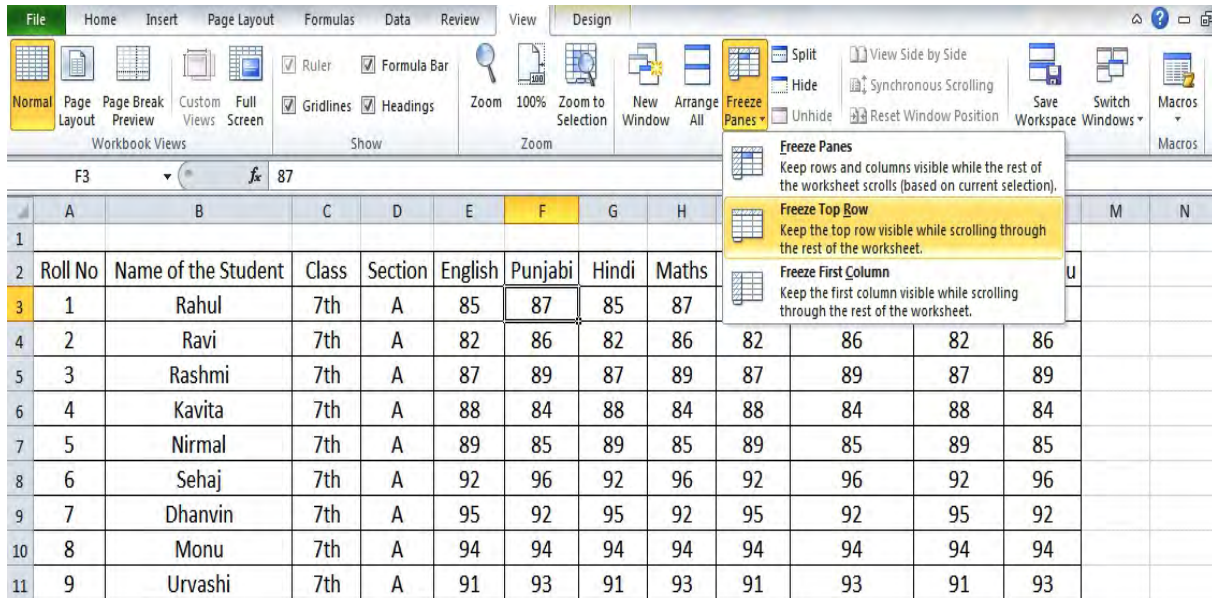


Fig. 2.32. Before Freeze Top Row

2. Scroll down to the rest of the worksheet.

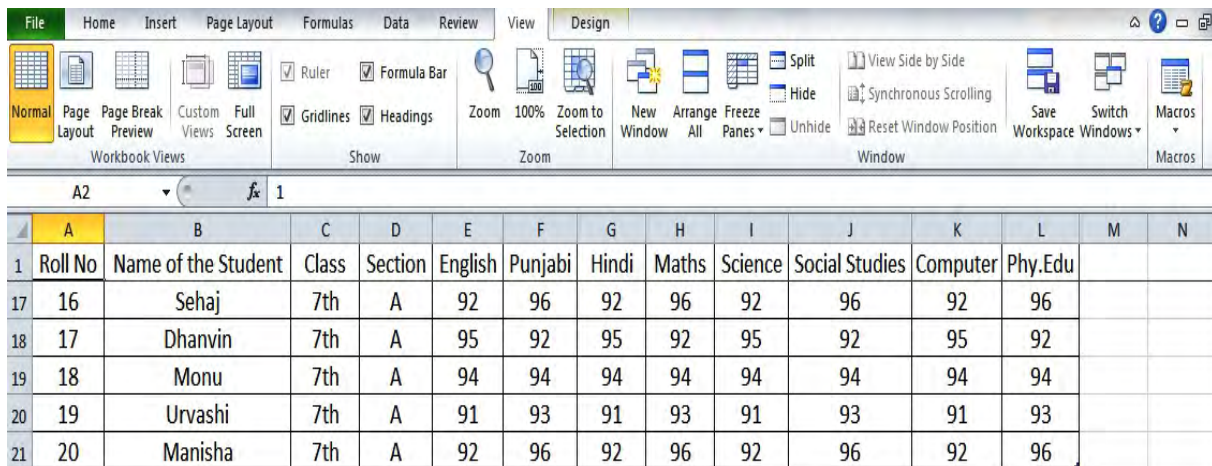


Fig. 2.33. After Freeze Top Row

Result : Excel automatically adds a black horizontal line to indicate that the top row is frozen.

How to Unfreeze Panes of your worksheet : To unlock all rows and columns, execute the following steps.

1. On the View tab, click Freeze Panes, Unfreeze Panes as shown in fig. 2.34

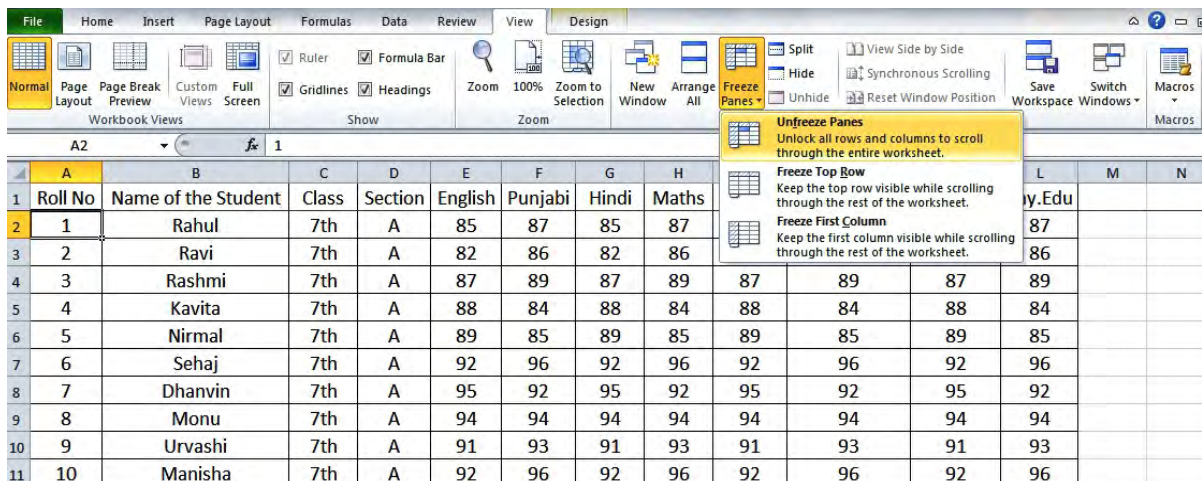


Fig. 2.34. Unfreeze Panes

We can freeze both row and column simultaneously using freeze panes option. We can easily read the data of rows column while scrolling.

How to Freeze Panes of a Worksheet : To freeze panes, execute the following steps.

1. Select row 3 as shown in fig. 2.35.
2. On the View tab, click Freeze Panes, Freeze Panes as shown in fig. 2.35

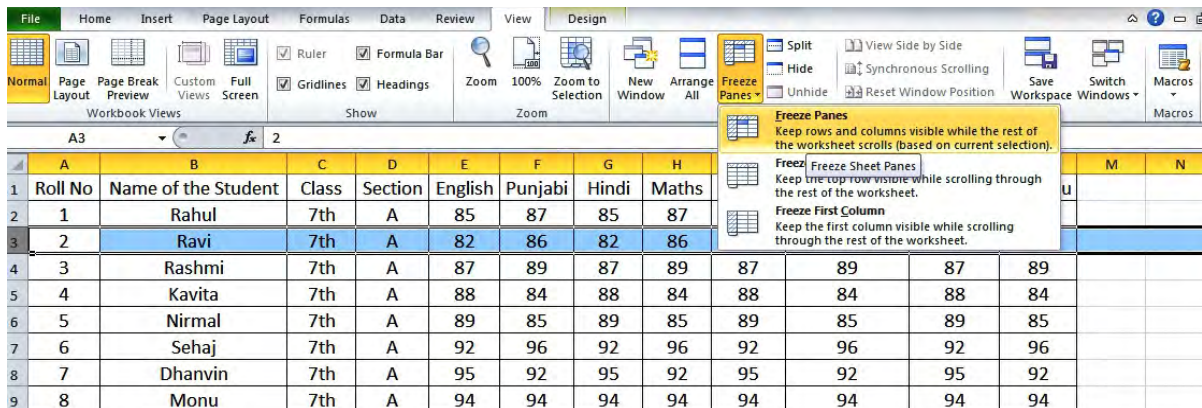


Fig. 2.35. Freeze Panes Tab

3. Scroll down to the rest of the worksheet.

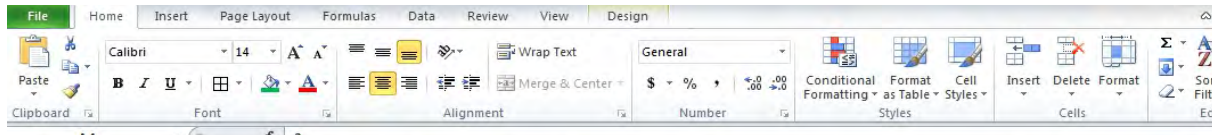
Result : All rows above row 3 are frozen.

👉 To keep columns visible while scrolling to the right of the worksheet, select a column and click Freeze panes.

2.4.3 How to Hide/Unhide Columns, Rows and Sheets

If we want to save our data not being misused from an un-authorised person then Excel has an excellent feature to hide the selected rows, columns, and sheets. This could be very handy especially when we want to protect specific content from any sort of misuse. Open our Excel workbook in which we want to hide rows, columns or sheets.

Hiding Rows : In desired spreadsheet select the rows (for multiple selection hold Ctrl key and keep selecting) we want to hide and navigate to Home tab.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Roll No	Name of the Student	Class	Section	English	Punjabi	Hindi	Maths	Science	Social Studies	Computer	Phy.Edu	
2	1	Rahul	7th	A	85	87	85	87	85	87	85	87	
3	2	Ravi	7th	A	82	86	82	86	82	86	82	86	
4	3	Rashmi	7th	A	87	89	87	89	87	89	87	89	
5	4	Kavita	7th	A	88	84	88	84	88	84	88	84	
6	5	Nirmal	7th	A	89	85	89	85	89	85	89	85	
7	6	Sehaj	7th	A	92	96	92	96	92	96	92	96	
8	7	Dhanvin	7th	A	95	92	95	92	95	92	95	92	
9	8	Monu	7th	A	94	94	94	94	94	94	94	94	
10	9	Urvashi	7th	A	91	93	91	93	91	93	91	93	
11	10	Manisha	7th	A	92	96	92	96	92	96	92	96	
12	11	Rahul	7th	A	85	87	85	87	85	87	85	87	
13	12	Ravi	7th	A	82	86	82	86	82	86	82	86	
14	13	Rashmi	7th	A	87	89	87	89	87	89	87	89	
15	14	Kavita	7th	A	88	84	88	84	88	84	88	84	

Fig. 2.36. Hide Rows

From Cells group, click Format button. Now from **Hide & Unhide** options, click **Hide Rows**.

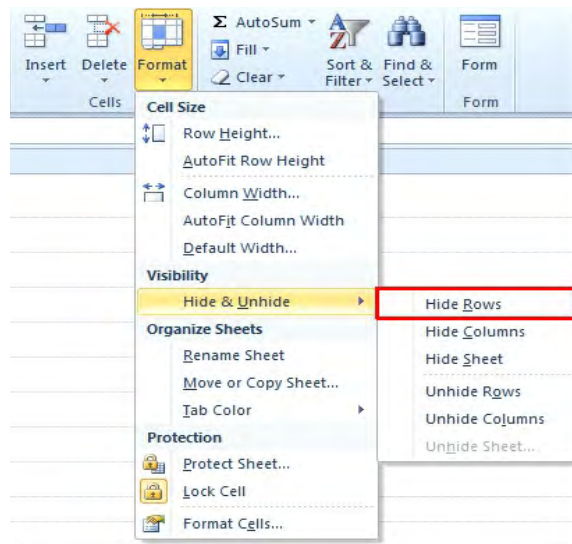
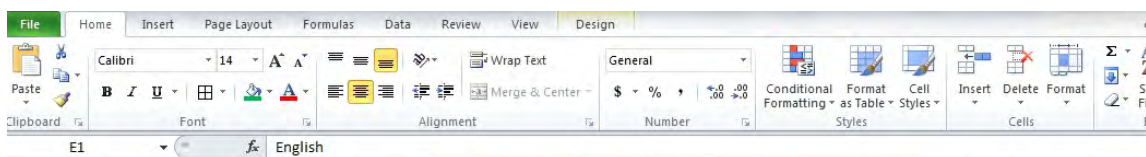


Fig. 2.37. Hide Row option

Upon click it will automatically hide the selected rows. The rows 4 to 12 numbers are now hidden.

Hiding Columns : For hiding the columns in specific sheet, following are the steps :

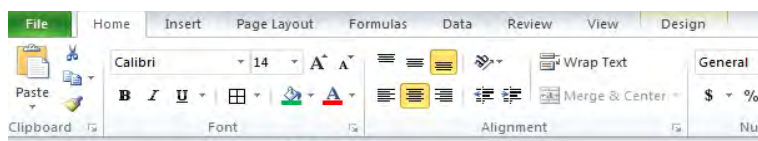
1. Select the columns we want to hide as shown in fig. 2.38 column E to Column J have been selected.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Roll No	Name of the Student	Class	Section	English	Punjabi	Hindi	Maths	Science	Social Studies	Computer	Phy.Edu	
2	1	Rahul	7th	A	85	87	85	87	85	87	85	87	
3	2	Ravi	7th	A	82	86	82	86	82	86	82	86	
4	3	Rashmi	7th	A	87	89	87	89	87	89	87	89	
5	4	Kavita	7th	A	88	84	88	84	88	84	88	84	
6	5	Nirmal	7th	A	89	85	89	85	89	85	89	85	
7	6	Sehaj	7th	A	92	96	92	96	92	96	92	96	
8	7	Dhanvin	7th	A	95	92	95	92	95	92	95	92	
9	8	Monu	7th	A	94	94	94	94	94	94	94	94	
10	9	Urvashi	7th	A	91	93	91	93	91	93	91	93	
11	10	Manisha	7th	A	92	96	92	96	92	96	92	96	
12	11	Rahul	7th	A	85	87	85	87	85	87	85	87	
13	12	Ravi	7th	A	82	86	82	86	82	86	82	86	
14	13	Rashmi	7th	A	87	89	87	89	87	89	87	89	
15	14	Kavita	7th	A	88	84	88	84	88	84	88	84	

Fig. 2.38. Hide Columns

2. Now click on Format button in Cells group. Now Click on ➔ Hide & Unhide options then click **Hide Columns**.



	A	B	C	D	K	L	M
1	Roll No	Name of the Student	Class	Section	Computer	Phy.Edu	
2	1	Rahul	7th	A	85	87	
3	2	Ravi	7th	A	82	86	
4	3	Rashmi	7th	A	87	89	
5	4	Kavita	7th	A	88	84	
6	5	Nirmal	7th	A	89	85	
7	6	Sehaj	7th	A	92	96	
8	7	Dhanvin	7th	A	95	92	
9	8	Monu	7th	A	94	94	
10	9	Urvashi	7th	A	91	93	
11	10	Manisha	7th	A	92	96	
12	11	Rahul	7th	A	85	87	
13	12	Ravi	7th	A	82	86	
14	13	Rashmi	7th	A	87	89	
15	14	Kavita	7th	A	88	84	
16	15	Nirmal	7th	A	89	85	

Fig. 2.39. Columns Hidden

3. We will notice that column from E to Column J have been hidden as shown in fig. 2.38. You will notice that the selected column are hidden in fig. 2.39.

How to Hide Worksheets : Likewise Rows/Columns We can also hide a worksheet. Following are the steps to do so :

1. Select the sheet which we want to hide as shown in fig. 2.40.

1	COMPUTER STORE		
2			
3	TOTAL COMPUTERS	% SOLD FOR HIGHEST PRICE	
4	50	60%	
5			
6		NUMBER OF COMPUTERS	UNIT PROFIT
7	HIGHEST PRICE	60	1500
8	LOWEST PRICE	20	1200
9		TOTAL PROFIT	114000
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

Ready | Data | **Comparison** | Scenario Summary | List |

Fig. 2.40. Worksheet Hide

2. Now Click **Hide Sheet** from **Hide & Unhide** options from Cell group in Home Tab as show in fig. 2.41.

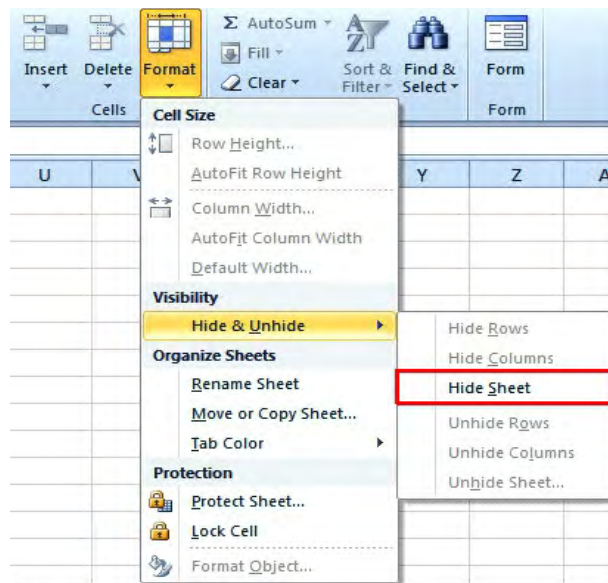


Fig. 3.41. Hide and Unhide

3. Click on Hide Sheet Option from Hide and Unhide as shown in fig. 2.41. We will notice that upon click the whole sheet will be hidden.

How to Unhide Rows, Columns, and Sheets : For getting back the hidden sheets, rows and columns, click **Format**, and click on Unhide Rows/Unhide Column/Unhide Sheet from **Hide & Unhide** options.

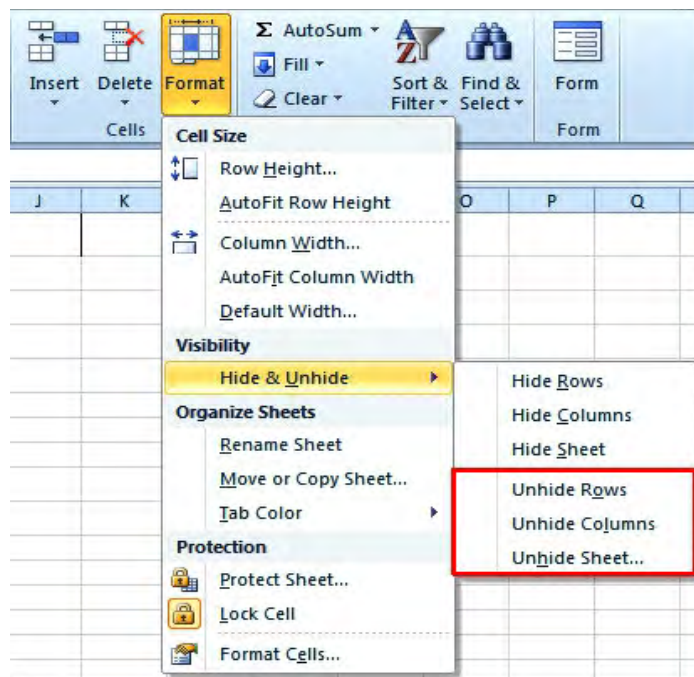


Fig 2.42. Unhide/Rows/Columns/Sheet

Things to Remember

1. A chart is a tool in MS Excel that is used to communicate our data graphically.
2. Data validation is a powerful feature that is used to set up certain rules to dictate what can be entered into a cell.
3. In Excel we can split the worksheet window into separate panes.
4. Excel automatically adds a black horizontal line to indicate that the top row is frozen.
5. Excel has an excellent feature to hide the selected rows, columns, and sheets.

Exercise

1. Fill in the Blanks :

1. contains everything inside the chart window.
(a) Data markers (b) Axis (c) Chart area (d) None of these
2. feature allows us to set up certain rules.
(a) Data validation (b) Pivot Table
(c) Char (d) None of these
3. We can the worksheet window into separate panes.
(a) Hide (b) Split (c) Arrange (d) None of these
4. By using we can keep rows or columns visible while scrolling.
(a) Hide (b) Split (c) Freeze Panes (d) None of these
5. By Data can be show graphically.
(a) Formula (b) Function (c) Filter (d) Chart

2. Short Answer Type Questions :

1. What is a data tools in MS Excel ?
2. Write down Any five elements of chart in MS Excel.
3. What do you mean by protection in MS Excel. ?
4. What do you mean by split in MS Excel ?
5. What do you mean by Freezing of worksheet ?

3. Long Answer Type Questions :

1. What is a Chart ? Write down the different types of charts in MS Excel.
2. What is Data Validation ? Explain with example?
3. What is Protection ? Write down the steps to protect a Worksheet.
4. Write steps to hide coloumn in Worksheet.



Objective of this Lesson

- 3.1 Networking
- 3.2 Need of Networking
- 3.3 Components of Computer Networks
- 3.4 Advantages and Disadvantages of Network
- 3.5 Network Topologies
- 3.6 Data Communication
- 3.7 Types of Networks

Introduction

The dynamic world today needs fast communication channels to move data frequently from one place to another, so data transmission over distances has become essential. To move the data quickly from one place to another, the concept of networking has been introduced. In networking the computers from different parts of the world are connected to each other to share data with each other.

3.1 Networking

A network is the group of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow communications.

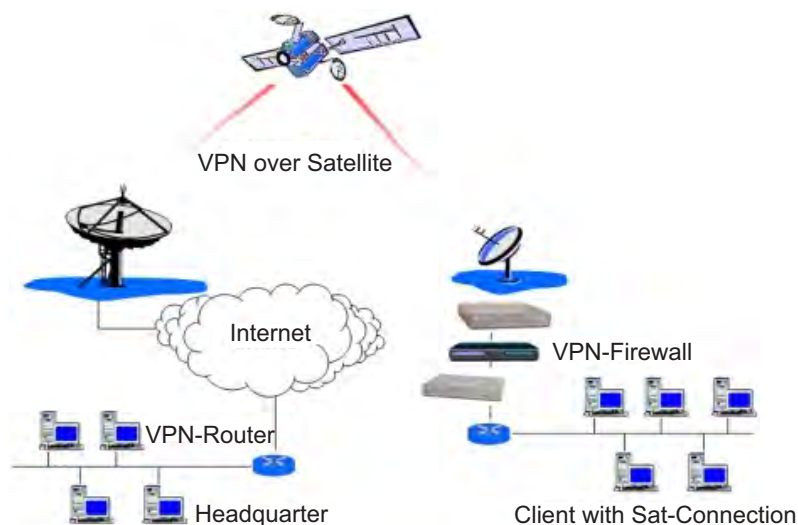


Fig. 3.1. Networking

The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams. Network is capable of sharing Software and Hardware resources between many users

Network connections between computers are typically created using cables (wires). However, connections can be created using radio signals (wireless/Wi-Fi), telephone lines (and modems) or even, for very long distances, via satellite links.

Note : A computer that is not connected to a network is known as a standalone computer.

3.2 Need for Networking

The ability to exchange data and communicate efficiently is the main purpose of networking computers. Some of common factors for Networking are :

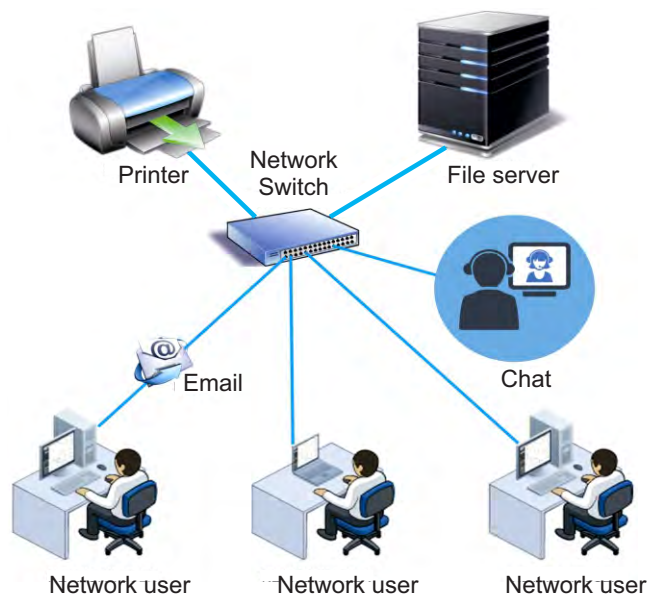


Fig. 3.2. Need for networking

Networks are used to :

1. Facilitate communication via email, video conferencing, instant messaging, etc.
2. Enable multiple users to share a single hardware device like a printer or scanner.
3. Enable file sharing across the network.
4. Allow for the sharing of software or operating programs on remote systems.
5. Make information easier to access and maintain among network users.
6. Allow Multi users to play game together from different locations.
7. Allow Multi users to access the Internet simultaneously without having to pay.
8. Store data centrally (using a file server) for ease of access and back-up.

3.3 Components of Computer Networks

Computer networks allow users to connect over distances. They also enable file sharing, hardware sharing and instant communication, making them a convenient tool for the home and a necessity for offices and organizations like universities. A computer network consists of several components, each of which is important to making the network function properly.

Computer network components include the major parts that are needed to install a network both at the office and home level. Before delving into the installation process, you should be familiar with each part so that you could choose and buy the right component that fits with your network system.

3.3.1 Computer

The purpose of a network is to join computers together. For this to work the first step in setting up a network is to identify computers and users who may wish to participate in the network. The computers will also need to include software that enables them to connect to the network.

There are two types of computers which are used for networking :

3.3.1.1 Client or Node

Client/Node is the normal computer system which is connected to network for sharing of resources.

3.3.1.2 Server

It is a **powerful** computer. It helps in sharing of resources or information. It controls all other nodes.

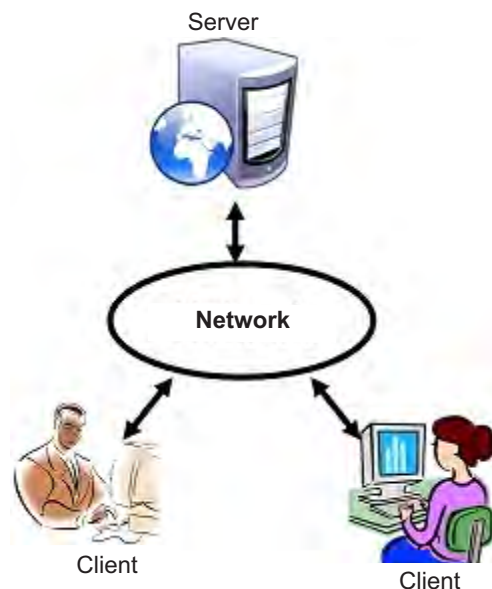
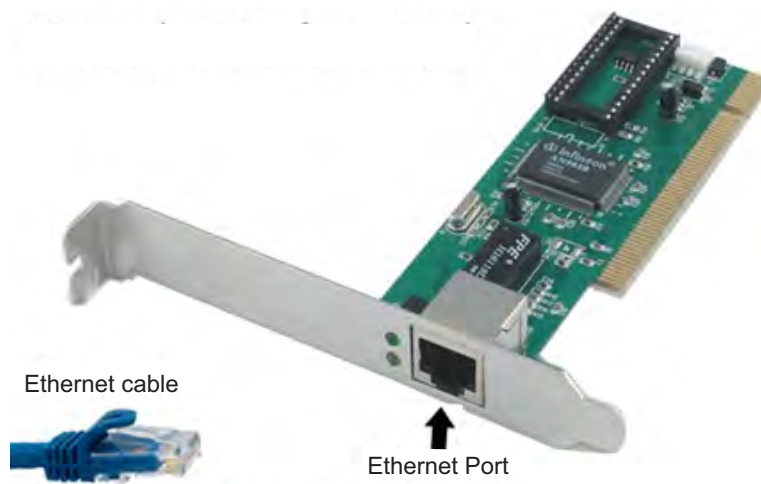


Fig 3.3. Client/Server

3.3.2 Network Interface Card

A *network interface card (NIC)* is a computer circuit board or card that is installed in a computer so that it can be connected to a network.. It should be fitted in each client and server computer. Actually it develops relationship between card, server and client. Every client linked to network interface card has its own specific number is called node address. There are **two types of network cards : wired and wireless**. The wired NIC uses cables and connectors as a medium to transfer data, whereas in the wireless card, the connection is made using antenna that employs radio wave technology.



3.4. Network Interface Card

3.3.3 HUB/Switch

A networking hub/Switch is a device that allows you to connect multiple computers to a single network device. In its simplest form a hub works by duplicating the data packets received via one port and making it available to all ports, therefore allowing data sharing between all devices connected to hub

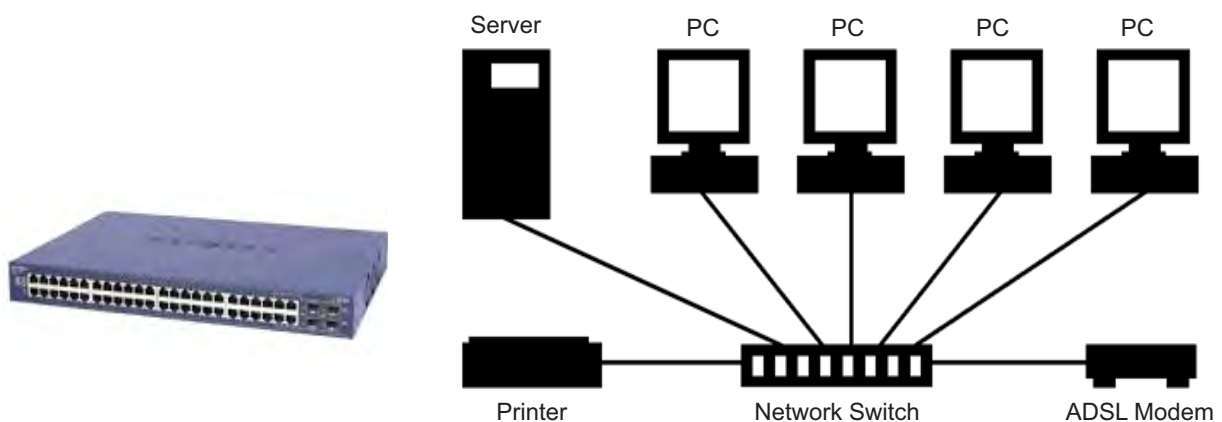


Fig. 3.5. Hub

Fig. 3.6. Switch

3.3.4 Router

A *router* is hardware device designed to receive, analyze and forward incoming data within a network or to another network.



Fig. 3.7. Router

3.4 Advantages and Disadvantages of Network

3.4.1 Advantages of Network

1. **Sharing files, data and information** : You can share data program and different resources with it. It is only possible because all the files are stored on server (Central computers, Server allows sharing of these files)
2. **Sharing Hardware and software** : you can share hardware and software within network easily. For example, a printer can be shared among the users in a network so that there's no need to have individual printers for each and every computer in the company.
3. **Communication Media** : Network provides a very fast communication media e.g. E-mail is used as a fast media in different offices.
4. **File Integrity** : File integrity remains continuous due to network. It saves much time. Network helps in fast saving and sharing of files.
5. **Cost effective** : We can share costly input and output devices like printer with network . It reduces the cost of system.
6. **Reliability** : Network ensures use of many resource to us e.g. when hardware fails, information can be recovered from other computer with the help of network.
7. **Flexibility** : It provides more flexibility because in it there is a possibility of connecting devices of different businessmen.
8. **Backup** : It is difficult to get back up of a file from different computers. But it is easy to take backup from server if we are linked with network.
9. **Security** : Network provides security to us. Network user can run a few files or applications.

10. **Speed** : Sharing and transferring files within networks is very rapid, depending on the type of network. This will save time while maintaining the integrity of files.

3.4.2 Disadvantages of Network

1. **Network Failure** : All the central facilities may fail due to network failure.
2. **Management** : Management of whole network is tough.
3. **Security** : Danger of security is always present on network. Data can be misused on network.
4. **Expensive to Build** : Building a network is a serious business in many occasions, especially for
5. **Large scale organizations** : Cables and other hardware are very pricey to buy and replace.

3.5 Networks Topologies

The term **Network Topology** defines the **geographic arrangement of computer networking devices**. The term **Topology** refers to the way in which the various nodes or computers of a network are linked together. It describes the actual layout of the computer network hardware. Two or more devices connect to a **link**; two or more links form a **topology**. Topology determines the data paths that may be used between any pair of devices of the network.

It may be depicted physically or logically. **Physical topology** is the placement of the various components of a network, including device location and cable installation, while **logical topology** illustrates how data flows within a network,

The selection of a **Network Topology** for a network cannot be done in isolation as it affects the choice of media and the access method used



Fig. 3.8. Link vs Topology

The following factors are considered while selecting a topology:

1. Cost
2. Reliability
3. Scalability
4. Bandwidth capacity
5. Ease of installation
6. Ease of troubleshooting
7. Delay involved in routing information from one node to another.

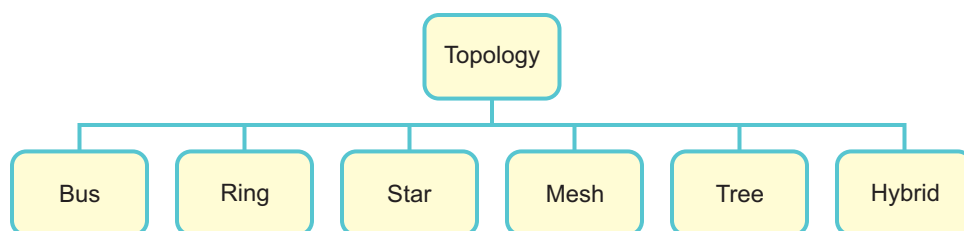
3.5.1 Topologies

While making a selection of a particular topology we consider the relative status of different devices that are to be linked.

The nodes in a network can have following two relationships :

1. **Peer to Peer** : In this relationship, all the devices in the network have equal status in sharing the link. For example, Ring & Mesh topology.
2. **Client-Server (Primary-Secondary)** : In this, one device controls the traffic (called Server) and all other devices (Called Clients) transmit through primary device. *e.g.* Star topology.

3.5.2 Types of Network Topology



3.9. Networks Topologies

3.5.2.1 Bus Topology

Bus Topology is the simplest of network topologies. In this type of topology, all the nodes (computers as well as servers) are connected to the single cable (called bus), by the help of T- connectors. This central cable is the backbone of the network and is known as Bus (thus the name). Every workstation communicates with the other device through this Bus.

A signal from the source is broadcasted and it travels to all workstations connected to bus cable. Although the message is broadcasted but only the intended

recipient, whose MAC address or IP address matches, accepts it. If the MAC /IP address of machine doesn't match with the intended address, machine discards the signal.



Fig. 3.10. Bus Topology

Advantages of Bus Topology :

- Any new computer can be attached easily.
- It is a cheaper topology.
- If one computer fails, others are not affected.
- Cable required is least compared to other network topology.
- Used in small networks.
- It is easy to understand & connect

Disadvantages of Bus Topology :

- More wire is needed to connect more nodes.
- If the main central line fails the entire network collapses.
- The efficiency of network is reduced with the increase in number of computers.
- Cable has a limited length.
- It is slower than the ring topology.
- Terminators are required at both ends of the backbone cable
- Difficult to identify the problem if the entire network shuts down

3.5.2.2 Ring Topology

In it all the computers are logically linked in the form of a ring. In it each node is connected to two other nodes. Rings can be unidirectional, with all traffic travelling

either clockwise or anticlockwise around the ring. At the time of accepting data, each node checks its address. If data is for that node only then it is received, otherwise not.

There are two kinds of ring topologies :

1. Single Ring

2. Dual Ring

1. Single ring : In single ring network, a single cable is shared by all the devices and data travel only in one direction.

Each device waits for its turn and then transmits. When the data reaches its destination, another device can transmit.

2. Dual ring : This topology uses two rings to send the data, each in different direction. Thus allowing more packets to be sent over the network.

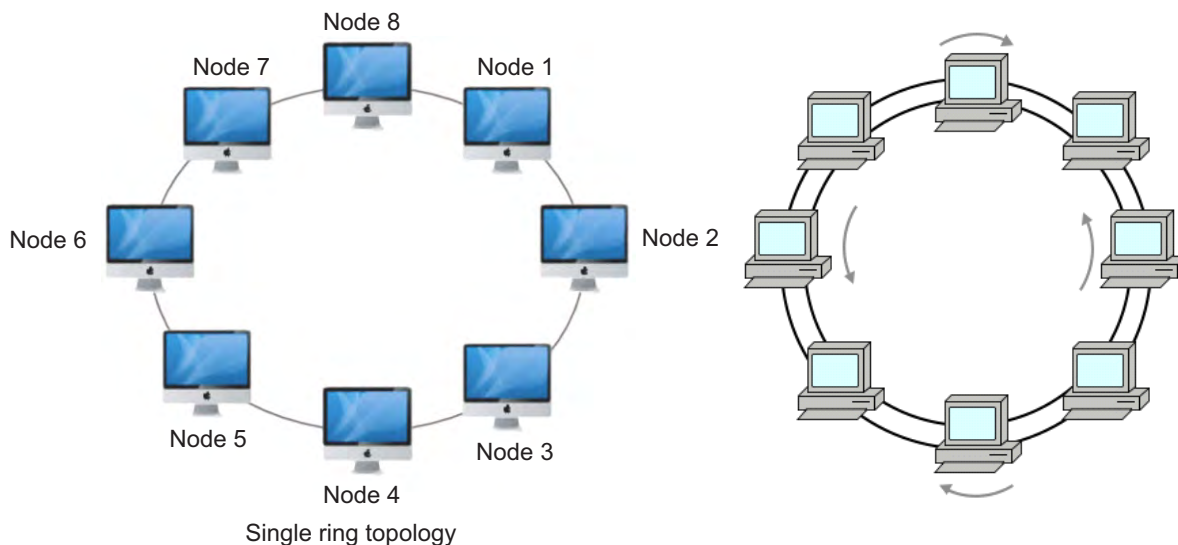


Fig. 3.11. Ring Topology

Advantages of Ring Topology :

- ➡ Very orderly network where every device has access to the token and the opportunity to transmit
- ➡ Performs better than a bus topology under heavy network load
- ➡ Does not require a central node to manage the connectivity between the computers
- ➡ It is easier to locate the problems with device and cable i.e. fault isolation is simplified. If one device does not receive a signal within a specified time, it can issue an alarm.

Disadvantage of Ring Topology :

- ➡ Failure of one computer can affect the total network
- ➡ Difficult to troubleshoot
- ➡ Adding or removing Computers disrupts the network
- ➡ A ring network requires more cable than a bus network.

3.5.2.3 Star Topology

In this type of topology all the computers are connected to a central device called “hub” which may be a hub, a router or a switch. . This hub/switch is the central node and all others nodes are connected to the central node. The computers present in star topology cannot have a direct relation with each other. They have to be linked via hub. In it minimum distance between node and hub is 100 meter.

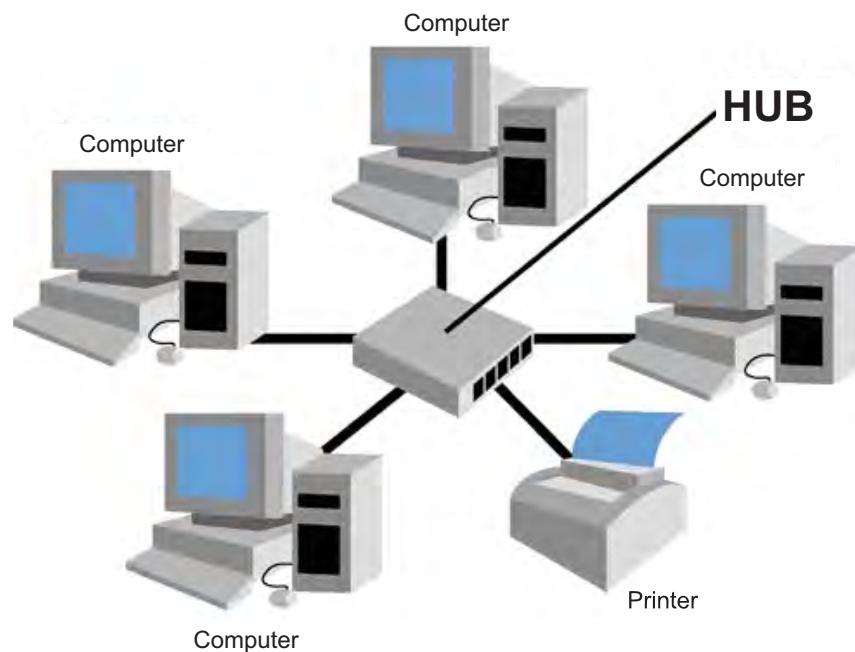


Fig. 3.12. Star Topology

Advantages of Star Topology :

- ➡ It is easily to prepare and connect.
- ➡ Failure of one computer does not effect the other.
- ➡ More nodes can be connected in it. With it propagation delay does not increase.
- ➡ It is easier to find faults in network.
- ➡ Easy to troubleshoot.
- ➡ Easy to setup and modify.

Disadvantages of Star Topology :

- ➔ Failure of hub results in failure of complete network.
- ➔ Cost of installation is high
- ➔ Performance and as well number of nodes which can be added in such topology is depended on capacity of central device.

3.5.2.4 Mesh Topology

In mesh topology, each node is connected to every other node in the network each computer and network device is interconnected with one another

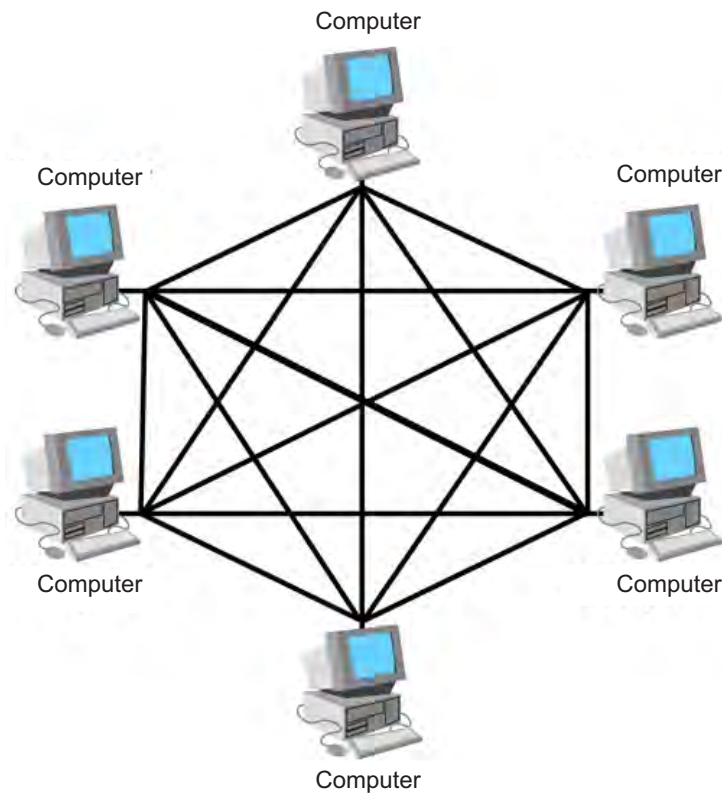


Fig. 3.13. Mesh Topology

A mesh topology can be a *full mesh topology* or a *partially connected mesh topology*.

In a *full mesh topology*, every computer in the network has a connection to each of the other computers in that network.

In a *partially connected mesh topology*, at least two of the computers in the network have connections to multiple other computers in that network.

Advantages of Mesh Topology :

- ➡ Data can be transmitted from different devices simultaneously. This topology can withstand high traffic.
- ➡ Even if one of the components fails there is always an alternative present. So data transfer doesn't get affected.
- ➡ In the event that one of those nodes fails, network traffic can be directed to any of the other nodes.
- ➡ Expansion and modification in topology can be done without disrupting other nodes.

Disadvantages of Mesh Topology :

1. Installation and configuration is difficult.
2. Cabling cost is more.

3.5.2.5 Tree Topology

A tree network is a combination of two or more **star networks** connected together which involve a variety of single nodes connected to a central node. Multiple stars involve either a series or tertiary nodes attached to two or more secondary nodes, which are attached to the tree's primary trunk node. Experts may define a tree topology as a combination of star and bus topologies, where multiple elements are connected through a single lateral connection.

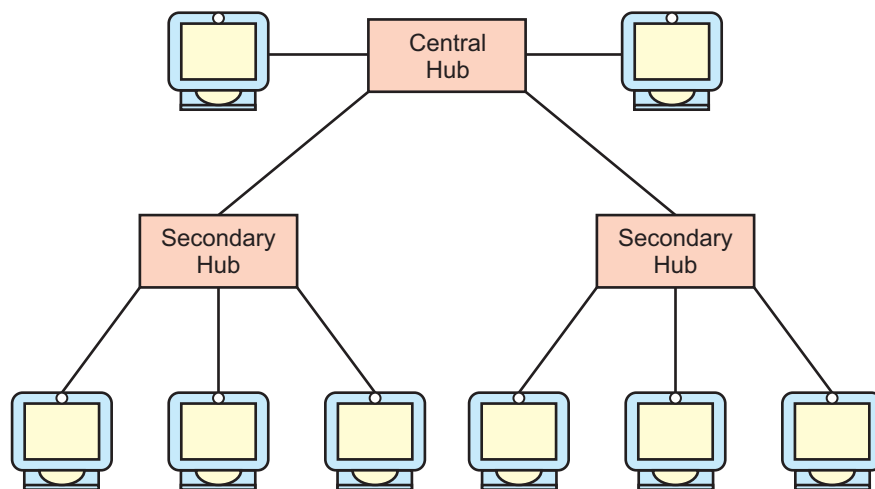


Fig. 3.14. Tree Topology

Advantages of Tree Topology :

1. It is an extension of Star and bus Topologies, so in networks where these topologies can't be implemented individually for reasons related to scalability, tree topology is the best alternative.

2. Expansion of Network is possible and easy.
3. Here, we divide the whole network into segments (star networks), which can be easily managed and maintained.
4. Error detection and correction is easy.
6. If one segment is damaged, other segments are not affected

Disadvantages of Tree Topology :

- ➡ Because of its basic structure, tree topology, relies heavily on the main bus cable, if it breaks whole network is crippled.
- ➡ As more and more nodes and segments are added, the maintenance becomes difficult.
- ➡ Scalability of the network depends on the type of cable used.
- ➡ It has higher cabling cost in setting up a tree structure.

3.5.2.6 Hybrid Topology

A **hybrid topology** is a type of network topology that uses two or more other network topologies, including bus topology, mesh topology, ring topology, star topology, and tree topology.

It is two different types of topologies which is a mixture of two or more topologies.

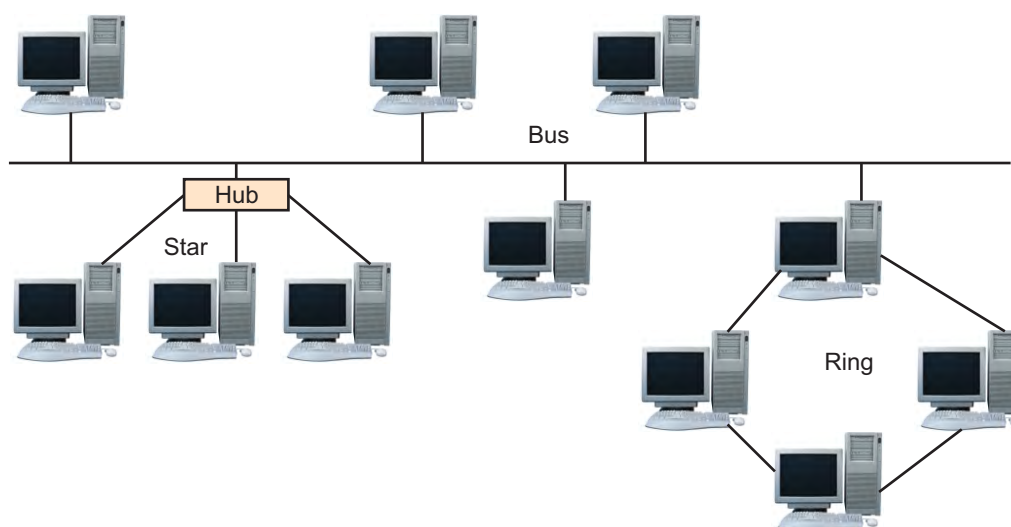


Fig. 3.15. Hybrid Topology

Advantages of Hybrid Topology :

1. Reliable as Error detecting and troubleshooting is easy.
2. Effective.
3. Scalable as size can be increased easily.

Disadvantages of Hybrid Topology :

1. Complex in design.
2. Costly.

3.6 Data Communication?

Data communication is exchange of data between two or more computers (a sender/source and a receiver) with the help of communication medium. The device that transmits the data is known as sender/source and the device that receives the transmitted data is known as receiver.

Data communication must fulfil/obey following three conditions :

Delivery : Network should deliver the data at proper place.

Accuracy : Data communication should be free from fault.

Time limit : Data should reach destination without any delay

3.6.1 Components of Data Communication

Sender : Sender prepares information (data) and sends it

Medium : It carries the information from sender to receiver

Receivers : Receiver receives the information.

Protocol : There are rules under which data transmission takes place between sender and receiver.

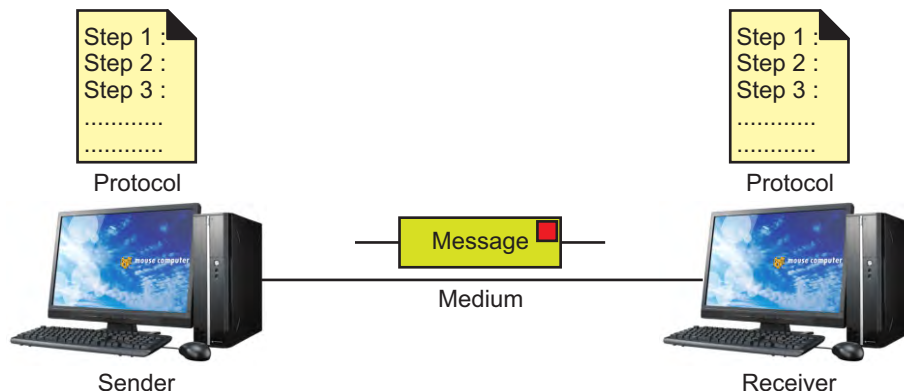


Fig. 3.16. Data Communication

3.6.2 Methods of data transmission

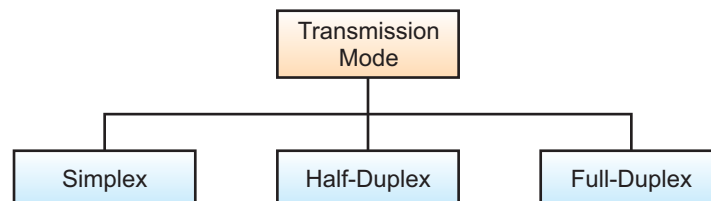


Fig. 3.17. Transmission Mode

Methods of data transmissions means direction of flow of data between sender and receiver. Three methods of data transmission are given below :

1. **Simplex** : In it communication is one direction. So information can flow only in one direction its reverse is not possible. The message source works as the transmitter. It sends the message over the data channel to the receiver. The receiver is the destination of the message. Example : television communication.

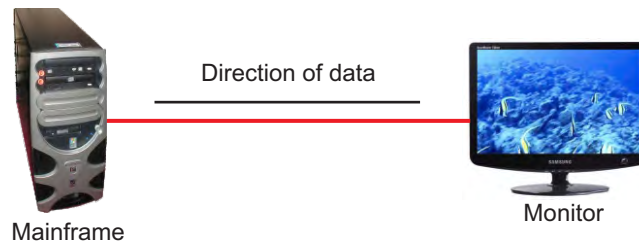


Fig. 3.18. Simplex Mode

2. **Half duplex** : In it information can flow in both directions but not at the same time. In other words if information is sent by one system then second can only receive it or vice versa as shown in figure 3.19. Example : walky-talky system used by police and force.

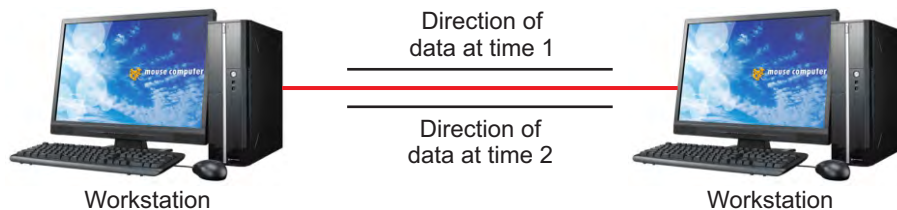


Fig. 3.19. Half-duplex Mode

3. **Full duplex** : In it information can move in both directions at same time. It provides fast communication as shown diagram 3.20. Example : telephone system :

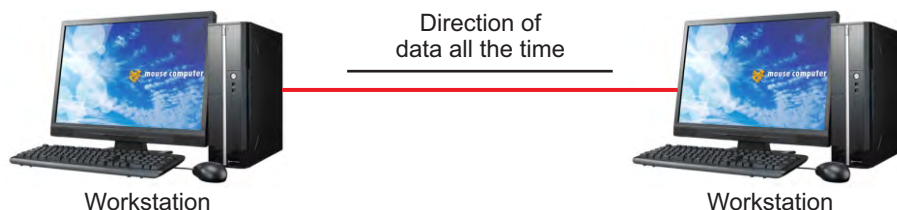


Fig. 3.20. Full-Duplex Mode

3.6.3 Communication Channel

Communicating data from one location to another requires some form of pathway or medium. These pathways, called communication channels, use two types of media: cable (twisted-pair wire, cable, and fiber-optic cable) and broadcast (microwave, satellite, radio, and infrared).

3.7 Types of Networks

There are several different types of computer networks. Computer networks can be characterized by their size as well as their purpose.

The size of a network can be expressed by the geographic area they occupy and the number of computers that are part of the network. Networks can cover anything from a handful of devices within a single room to millions of devices spread across the entire globe.

Network may be small or large based on its size, complexity and Distribution area. On the basis of its area of distribution, network is divided into three parts :

1. PAN(Personal Area Network)
2. LAN (Local Area Network)
3. MAN (Metropolitan Area Network)
4. WAN (Wide Area network)

3.7.1 Personal Area Network

A **personal area network**, or **PAN**, is a computer network organized around an individual person within a single building. This could be inside a small office or residence. Personal area networks can be constructed with cables or be wireless. It refers to the interconnection of information technology devices or gadgets (include laptop computers, PDAs, cellphones, printers) within the environment of an individual user (typically within 10 meters).



Fig. 3.21. PAN

3.7.2 Local Area Network (LAN)

A LAN is a network that is used for communicating among computer devices, usually within an office building or home. LAN's enable the sharing of resources

such as files or hardware devices that may be needed by multiple users. It is limited in size, typically spanning a few hundred meters, and no more than a mile. It is fast, with speeds from 10 Mbps to 10 Gbps. It requires little wiring, typically a single cable connecting to each device. It has lower cost compared to MAN's or WAN's. LAN's can be either wired or wireless. Twisted pair, coax or fiber optic cable can be used in wired LAN's. It is suitable to bus, ring or star topology. In it generally coaxial Cable, twisted pair and optical fiber etc. transmission media is used.

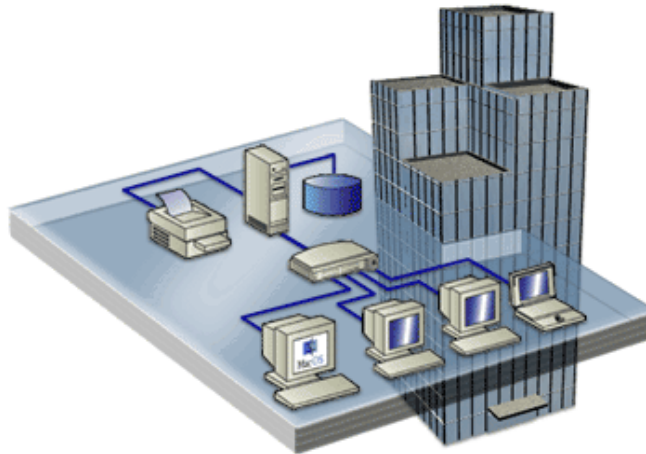


Fig. 3.22. LAN

3.7.3 Metropolitan Area Network (MAN) :

It is distributed to a city, college campus or large area just like Cable TV network it is also single. In it many LANs are connected. A MAN is optimized for a larger geographical area than a LAN, ranging from several blocks of buildings to entire cities. A MAN might be owned and operated by a single organization, but it usually

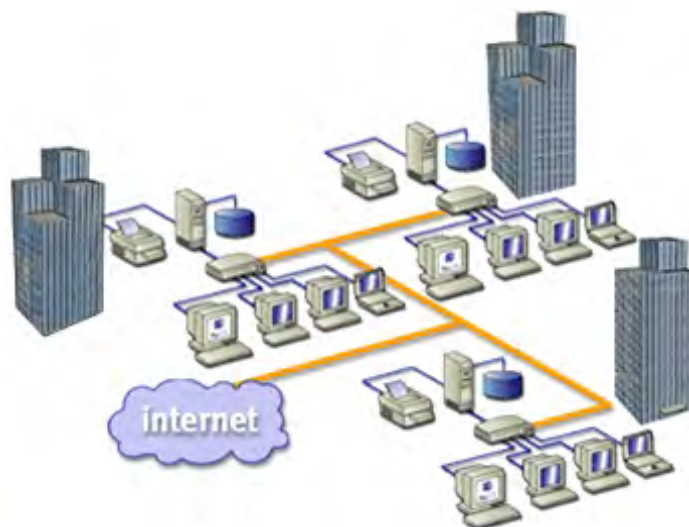


Fig. 3.23. MAN

will be used by many individuals and organizations. A MAN often acts as a high speed network to allow sharing of regional resources. A MAN typically covers an area of between 5 and 50 km diameter. Examples of MAN: Telephone company network that provides a high speed DSL to customers and cable TV network

3.7.4. Wide Area Network (WAN)

WAN covers a large geographic area such as country, continent or even whole of the world. WAN can contain multiple smaller networks, such as LANs or MANs. In this network telephone lines, satellite, microwave etc. media are used. These transmission media are linked with Router. Router is a device which determines the route of information from sender to receiver. The world's most popular WAN is the Internet.

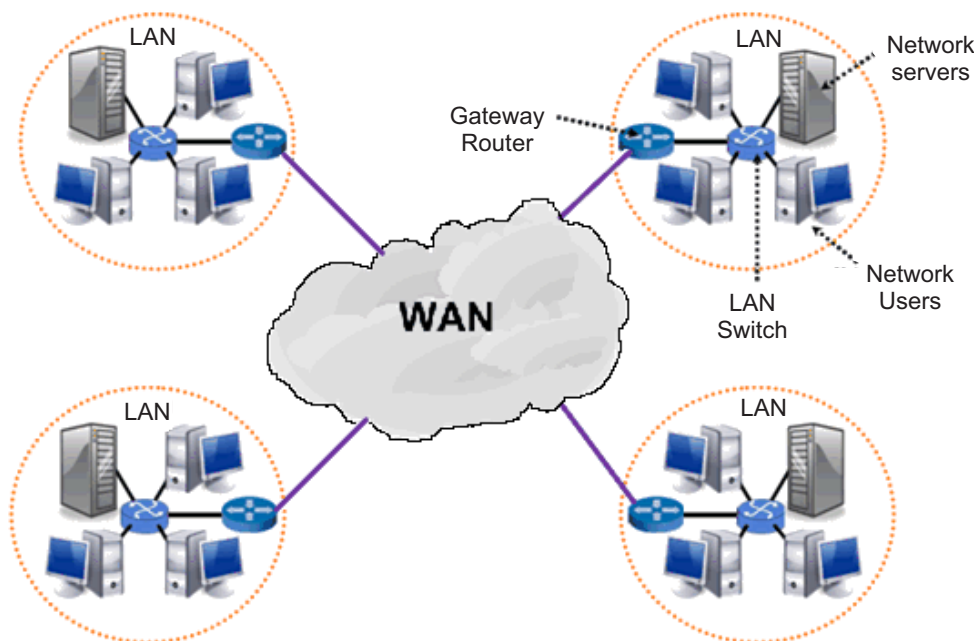


Fig. 3.24. WAN

Things to Remember

1. A network is the group of two or more computers.
2. Client/nodes is the normal computer system which is connected to network for sharing of resources.
3. Hub is a device that allows you to connect multiple computers to a single network device.
4. The term network topology defines the geographic arrangement of computer networking devices.

5. Mainly topology is of six types.
6. Sender, Medium, Receiver and protocol are parts of data communication.
7. Computer Networking has four parts PAN, LAN, MAN, WAN..

Exercise

1. Fill in the Blanks :

1. is s the group of two or more computers.
 (a) Network (b) Internet (c) Wireless (d) Topology
2. is the normal computer system which is connected to network for sharing of resources.
 (a) Server (b) Client/Node (c) LAN (d) WAN
3. is a device that allow you to connect multiple computers to a single network device
 (a) HUB (b) BUS (c) Ring (d) Star
4. In network, a single cable is shared by all the devices and data travel only in one direction
 (a) Single Ring (b) Dual ring (c) MAN (d) LAN
5. prepares information and sends it
 (a) Protocol (b) Receiver (c) Sender (d) Hub

2. True/False :

1. LAN covers a large geographic area.
2. In full duplex, information can move in both directions
3. Protocol are rules under which data transmission takes palace
4. Network does not provide security to us.
5. The efficiency of network is increased with increase of computers.

3. Short Answer Type Questions :

1. Name any four Network Topology.
2. What is Star Topology?
3. Write a short note on Router.



4. Write a note on Hub.
5. What are the two types of ring topologies ?

4. Long Answer Type Questions :

1. What is Network ? Explain its advantages and disadvantages.
2. Write information about the parts of computer network.
3. Write about the types of networks.
4. What are the methods of data transmission ?

Objective of this Lesson

- 4.1 Terminology used in Database
- 4.2 Data and Information
- 4.3 What is Database?
 - 4.3.1 Some Necessary instruction for designing a good database
- 4.4 Uses of Database Application
- 4.5 File Processing System
 - 4.5.1 Drawback of file processing system
- 4.6 Dbms, advantages and disadvantages
- 4.7 DBA
- 4.8 Data Redundancy and Entity
 - 4.8.1 Entities and their Attributes in DBMS
 - 4.8.2 Types of Entities
 - 4.8.3 Entity-Relationship Diagram
- 4.9 Keys in Database
- 4.10 Normalisation
- 4.11 Relationships
- 4.12 ORACLE, SQL, DB2
 - 4.12.1 SQL
 - 4.12.2 DB2
- 4.13 Data Model

Introduction

DBMS is Database Management System. It is used to create and to take care of data base.



4.1 Terminology used in Databases

In databases many technical terms are used. Some of the important terms are as follows :

- ➡ **Attribute or Data item** : In general, an attribute is a characteristic. In a database management system (DBMS), an attribute refers to a database component, such a table. It also may refer to a database field. Attributes describe the instances in the row of a database.

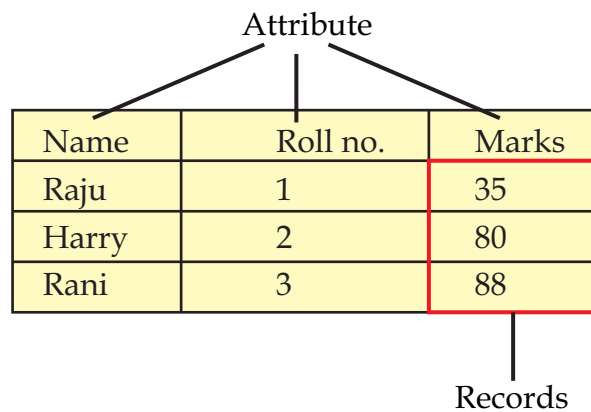


Fig 4.1

- ➡ **Record** : In databases, a record is a group of related data held within the same structure. Specifically, a record is a group of fields within a table that reference one particular object. The term record is frequently used synonymously with row. A record is also known as a tuple.

For example : a Student record may include items, such as first name, roll no, address, email address, date of birth and gender.

- ➡ **File** : A file is a container in a computer system for storing information. Files in computers fields are very similar in features to that of paper documents used in library and office files. There are many kind of files such as text files, data files, directory files, binary and graphic files, and these different types of files store different types of information. Here we are giving our view on a database file. It is a combination of records which are interrelate with each other. For example Student File of 9th class. In this file we can store students recast as serial number, student name, father's name, date of birth etc.

4.2 Data and Information

Data and information are the words which we used in our routine life. Both the words are used to increase our knowledge. Both words looks same but lot of difference in these words in real manner.



Data are small raw materials such as character, numbers, pictures etc. |after processing on these raw materials we get a meaningful information |useful Information provides the answer to some of our questions of us like why, How, where ?



Fig. 4.2. Data & Information

Suppose we collect any of our school data like your name, roll no, class, number address, phone number etc. This is only data but when we do processing on this according to our need it will become information. Let's get understand it with an example which is as follows :

Name : Maninder Singh, Rajni, Manpreet Kaur	Father Name : Narinder kumar, Harjinder Singh, Hari Chand
Roll No. : 1,2,3	Class 9
Phone Numbers 9898989898, 9797979797, 9030909080	Address : Mohali, Mohali , Mohali

Fig. 4.3. Collected Data

Name	Name Father	Roll no.	Class	Phone Numbers	Address
Maninder Singh	Harjinder Singh	2	9	9787878787	Mohali
Rajni	Hari Chand	3	9	9111111111	Mohali
Manpreet Kaur	Narinder Kumar	4	9	090909090	Mohali

Fig. 4.4. Information Based on Data

4.3 What is Database

Database is a place where not only your data get store as well as relationship between data and information also been stored. The primary basis of the database is Information associates with the problem is used by many users or even by a single

user. Users don't need to worry about the various type of data how it could be store on their computer.

Database is prepared from Information related to each other. It is expressed in tabular form. Database is a proper arrangement of information. There is no use of unarranged information. Database is a collection of a large amount of data. Dictionary is the best example of data in which all words are arranged in an alphabetical sequence which makes it easier for any word to search.

Computer database is collection of well-arranged records that is stored in the computer. User can obtain the required information from the database. The decision can be taken on the basis of this information. Software called database management system is used to prepare database.

4.3.1 Some Necessary instructions for designing a good database

These days all the commercial areas nearly depends upon the database. Means all the business activities done by the computer which are very accurate and up to date.

So it becomes necessary when designing a database that takes care of certain things that are as follows :

1. The data which is going to store in database must be accurate ,well arranged and complete so it could be easily fetch when required by someone.
2. While creating database system we have to keep in mind that whether database application is going to use on any website or any other local area network or on both the result must be able to get very fast and accurate.
3. The database design is the main aspect of the database we can't ignore it if the database design is not planned well a good program cannot get rid of facing problems to run on it.
4. Database should be design while thinking about the future problem.

4.4 Uses OF Database System Application

Database application systems have been used at so many places around us some of the main are as follows :

1. In banking sector to look after of the account of the customer.
2. For airline reservation and making schedule of the information.
3. In universities to fetch information of the students and about the courses.

4. To create the monthly statement of an organization .
5. For telecommunication
6. In finance to store the information of sales and purchase.
7. In sales to store the information of customers purchased products.
8. In Manufacturing management to store the information of warehouses orders and supply of the product.
9. In human resource to store the employee's salary bills, payrolls, taxes etc.

4.5. File Processing System

In old approach, before to computer, all information's were stored on papers. When we need information, we used to search through the papers. If we remember that particular date or category of information that we are searching for, we go to that particular session in the papers. If the data is limited, then all these tasks are very easy to do. Imagine if we have to use this kind of paper work for library information or information about a students in School, or baking system! How do we search for single required record on papers? It is a never ending task. But, Computers solved our problems.

When computers came, all these jobs become very easy to do so. But initial days, these records were stored in the form of files. That's why this system is Called FILE PROCESING SYSTEM. This is the way we stored data or record in files is similar to papers, in the form of flat files to be simpler, in notepad. The information's stores all in the notepads with each fields of information separated by space, tab comma, semicolon or any other symbol.

All files were grouped according to their categories; files uses only related information's and each file is named properly. For example a Student information. Student files for each class were bundled inside different folders to identify it quickly. Now, if we want to see a specific Student detail from a file, what do we do ? We must have to know which file will have the data, we open that file and search for his details. Fine, here we see the files; we can open it and search for it. But imagine if we want to display student details what we will do. It is really a difficult work to do.. Now how will we open a file, read or update it ? These kind of problems were arise in file processing system. Now we are going to discuss the drawbacks of file processing system as follows :

4.5.1 Drawback of file processing system

1. **Data Mapping and Access** : Although all the related information's are grouped and stored in different files, there is no mapping between any two files.
2. **Data Redundancy** : There were no methods to validate the insertion of duplicate data in file system. Any user can enter any data. File system does not validate for the kind of data being entered. Duplicate data in the system is not appreciated as it is a waste of space, and always lead to confusion and mishandling of data. SO the purpose of storing the data is lost.
3. **Data Dependence** : In the files, data are stored in specific format, say tab, comma or semicolon. If the format of any of the file is changed, then the program for processing this file needs to be changed. But so many program also using this file so whole data get upset. That is smallest change in the file affect all the programs and need changes in all them.
4. **Data inconsistency** : This mismatch in different copies of same data is called data inconsistency. This has occurred here, because there is no proper listing of files which has same copies of data.
5. **Security** : Each file can be password protected. But what if we have to give access to only few records in the file? For example, user has to be given access to view only their result information in the file. This is very difficult in the file system.
6. **Integrity** : If we need to check for insertion criteria while entering the data into file it is not possible directly. We can do it by writing programs. There is no direct checking facility in the file system. Hence these kinds of integrity checks are not easy in file system.
7. **Concurrent Access** : Accessing the same data from the same file is called concurrent access. In the file processing system, concurrent access leads to incorrect data.

4.6 DBMS

The full name of DBMS is data management system. To overcome all drawbacks of file processing system, a new system called database management system was developed. A database management system (DBMS) is software for creating and managing databases. The DBMS provides users and programmers a systematic way to create, retrieve, update and manage data. A DBMS makes it possible for end users



to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and end users or application programs ensuring that data is consistently organized and remains easily accessible. The main function of a DBMS is to provide efficient and reliable methods of data retrieval to many users.

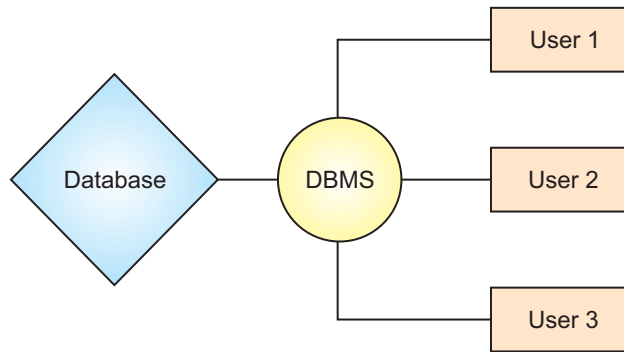


Fig. 4.5. DBMS relation with database & users

4.6.1 Advantages and disadvantages of DBMS

Advantages of DBMS :

- Redundancy is being controlled in DBMS. By having centralized database most of the redundancy can be avoided.
- When the same data is duplicated and changes are made at one site, which is not propagated to the other site, it gives rise to inconsistency these kind of situations will controls in DBMS.
- Data is shared by multiple applications or by multiple users in DBMS.
- We don't have to worry about the loss of data because DBMS Providing Backup and Recovery.
- In DBMS there is Restricting unauthorized access to the database.
- DBMS Solves Enterprise Requirement than Individual Requirement but it can also solve some individual requirement
- DBMS is a central system, so standard can be enforced easily may be at Company level, Department level, National level or International level.
- In DBMS ,Data Model can be developed
- DBMS systems provide mechanisms to provide concurrent access of data to multiple users.

Disadvantages of DBMS :

- ➡ It is Complex you must have to get training to use the database
- ➡ However, the DBMS is written to be more general, to cater for many applications rather than just one. The effect is that some applications may not run as fast as they used to.
- ➡ Higher impact of a failure so there is every possibility of damaging the data
- ➡ The cost of DBMS varies significantly, depending on the environment and functionality provided. There is also the recurrent annual maintenance cost.
- ➡ An extra hardware is needed.
- ➡ Conversion cost is very high of the DBMS. its not easy to move it here and there.
- ➡ The complexity and breadth of functionality makes the DBMS an extremely large piece of software, occupying many megabytes of disk space and requiring substantial amounts of memory to run efficiently.

4.7 DBA

DBA stands for database administrator. DBA should be a person or bunch of persons. Database administrator (DBA) directs or performs all activities related to maintaining a successful **database** environment. Responsibilities include designing, implementing, and maintaining the database system; establishing policies and procedures pertaining to the management, security, maintenance, and use of the database management system. In the end we can say that all the functions of database are controlled by DBA.

Different types of DBA's according to their responsibilities are as follows :

1. Administrative DBA
2. Development DBA
3. Architect DBA
4. Data Warehouse DBA

Main Responsibilities of DBA are the following :

1. DBA has to take care of the Database design and implementation.
2. DBA will Implement and maintain database security .
3. DBA is responsible for the Database and application tuning and performance monitoring too.
4. DBA is responsible to Setup and maintain documentation and standards.



5. DBA will look upon the plan growth and changes.
6. DBA have to establish and maintain sound backup and recovery policies and procedures.
7. DBA decides about which kind of hardware will be in use.
8. DBA have right to change data according to the needs of user.
9. DBA fix data validation for the users.

4.8 Redundancy

A very large amount of duplicate data stores frequently in database in duplicate form again and again and when same duplicate data stores again and again in database it produce lot of problem so it is very tough experience to manage the data. To frequently store an identical data again and again in database is called data redundancy.

4.9 Keys in DBMS

Keys are very important part of database management system. They are used to establish and identify relation between tables. They also ensure that each record within a table can be uniquely identified by combination of one or more fields within a table.

1. **Super Key** : Super key is defined as a set of attributes within a table that uniquely identifies each record within a table. Super Key is a superset of Candidate key.
2. **Candidate Key** : Candidate keys are defined as the set of fields from which primary key can be selected. It is an attribute or set of attribute that can act as a primary key for a table to uniquely identify each record in that table.
3. **Primary Key** : Primary key is a candidate key that is most appropriate to become main key of the table. It is a key that uniquely identify each record in a table.
4. **Composite Key** : Composite Key is the key which consists of two or more attributes that uniquely identify an entity occurrence is called Composite key. But any attribute that makes up the Composite key is not a simple key in its own.
5. **Foreign key** : Foreign key is the key in relational database that provide link between two tables because it references the primary key of the another table and it established a link between them. Foreign keys are more difficult to

implement than primary key. SO we can say primary key of a first table is called foreign key of other table.

Primary Key
↓

Student ID	Name	marks	Roll no.
1	Sukhwinder	50	2
2	Monika	60	5
3	Raju	90	7
4	Harry	75	9

Fig. 4.6. Student Table

Foreign Key
↓

Roll no	age	Address
2	19	Roopnagar
5	21	Ludhiana
7	22	Mohali
9	20	Khanna

Fig. 4.7. Main Table

In student table roll number is primary key. In main table it is foreign key.

4.10 Normalization

Without Normalization, it becomes difficult to handle and update the database, without facing data loss if data is not normalized, Insertion, Updating and Deletion Differences are very frequent.

Normalization is a scientific way in which difficult table is make quite simple in terms of understandable by user. To reduce Redundancy from tables and to reduce database Inconsistency or to remove and to make database strong. we should adopt some rules written as follows but it should also keep in mind that at time of normalization not any damage been done to information :

1. There should be an identifier in each table.
2. In each table single type of entity should be stored
3. Null value should store at minimum
4. Same Values that should take place use less frequently in database.

Normalization Concept:- To implement Normalization concept various normal forms are used. Tables are always is in normal form. commonly used Normal forms are written as follows :

1. First Normal Form (1NF)
2. Second Normal Form (2NF)
3. Third Normal Form (3NF)



4. Fourth Normal Form (4NF)
5. Boyce Coded Normal Form

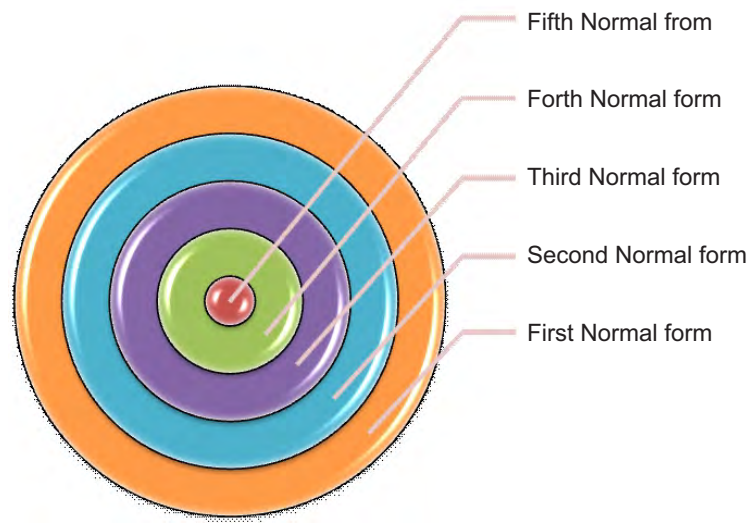


Fig. 4.8. Picture of Normal forms

4.11 Relationships

Relationship allow relational database to split and store data in different tables.it is a situation between two relational databases tables when one table has a foreign key which was referred from the other tables primary key

Types of relationship are as under

One-to-One : One to one is implemented using single table by establishing relationship between same type of column in table. Here one entity is associated with many other entities.

One-to-many : One to many is implemented while using two tables with primary and foreign key relationship . Here one entity is associated with many other entities .

Many-to-Many : Many to Many implemented using a junction table. The keys from both the tables form composite primary key of the junction table. Many entities are related with many other entities.

4.12 What is Oracle?

Oracle is world's largest software company. it was founded in 1977 with the name of **Relational Software Corporation**, and **This Company developed first Relational Database Management Software (RDBMS) Oracle in the world**. The main reason to make it is that database is to be compatible with the newly founded SQL language



and the second reason was to build database software in C language so the database soft wares can run with ease.

4.12.1 SQL (Structure Query Language)

Structure query language is a high level language which is used to store, control and amend the database. It is based on the concept that how much data is needed by a programmer .SQL is based on relational database management system.



Fig 4.9

SQL Advantages :

1. SQL is not only a high level language even we have to use it for maintain the data, update data and controlling the data.
2. SQL provides the facility to a user to do work simultaneously in different databases
3. Program build in SQL is portable means it is very easy to a user to move it anywhere
4. SQL is an easy and simple language to learn and it use to make tough programs.

4.13 Data Models

Data model means it is a way to give us information about the structure of database. Means it is used to describe data, relationship to data, consistency of data etc. It has been divided into mainly three parts that are as follows :

1. **Object Oriented logically model** : It is used to describe data line by line. It is of five type :
 1. Binary model
 2. Functional Model
 3. Entity relationship model
 4. Object oriented model
 5. Semantic data model

- 2. Record Base Logical Model :** It is also used to describe data line by line but a format is used in it permanently. Each record has its own attributes and fields that are used under fixed access. It is of three types :
1. Network model
 2. Relational Model
 3. Heirarchical Model
- 3. Physical Data Model :** It has been used to describe data at lowest level of the database. Some parts of it as follows
1. Entity : Tells about different kind of entities of the database.
 2. Attributes : It tells about the entity of users Name, Address etc.
 3. Entity set : It is the mixture of entity and attributes. Different kind of entity and attributes are store here.
 4. Relationship : It describes about the relationship of the entity which we are using.
 5. Relationship set : Many kind of relationships are used in database but when same kind of relationship bring together at a place it is called relationship set.

Things to Remember

1. DBMS is a relational database management System.
2. Data are small raw materials such as character, numbers, pictures etc.
3. Database is a place where your data get store
4. DBA is the person or group of person who control the database system
5. To frequently store an identical data again and again in database is called data redundancy.
6. In ancient times to store Different set of records in different-2 files is called file processing system.
7. Many Kinds of keys are use in relational database.
8. Normalization makes tables effective and structured.
9. SQL is a high level language which is used to store, control and amend the database.

Exercise

1. Fill in the Blanks :



Introduction to MS-Access

Objective of this Lesson

- 5.1 Introduction to MS-ACCESS
- 5.2. Introduction To Relational Database
- 5.3. Guidelines to designing a Database
- 5.4. Some Technical Words of Access
- 5.5. Components of MS Access
- 5.6. Data types
- 5.7. Advantages of MS Access
- 5.8. Starting Access
- 5.9. Working with Tables
- 5.10. Creating And .Modifying Tables
- 5.11. Creating And Modifying Forms
- 5.12. Sorting Of Data
- 5.13. Filtering of Data
- 5.14. Creating Reports

5.1 Introduction to MS-ACCESS

Access 2010 is a Relational Database Management System (RDBMS). It is used for **database creation and management**. A relation is setup between different types of data which Provides a powerful environment to the user for building database. It can be used to track, Share and report Information. MS-Access Allow user to perform basic tasks such as opening and closing database, Creating tables, Forms , queries and Reports. If we Want to understand Access, First we must have to understand **database**.

In this lesson, we will get familiarize with the Access environment. we will learn about databases and how they are used with Access.

MS Access is the world's most popular desktop database. It is a part of the MS Office software suite. It is used in millions of corporate firms across the globe and in homes also.

MS Access is used to store and retrieve large amount of data. It can be used for something simple such as keeping a record of your books collection or for something larger such as invoicing/stock management.

Some people get confuse between a spread sheet such as Excel and MS Access. A spread sheet is used to manipulate financial information. MS Access can also do this, but primarily it is a data storage system.

Out of all the programs in the MS Office suite it is MS Access which has proven to be the stumbling block for many. But we can work on Access easily after a good training of MS Access.

5.2 Introduction to Relational Database

Relational database was proposed by Edgar Codd (of IBM Research) around 1969. Since then it become the dominant database model for commercial applications (in comparison with other database models such as hierarchical, network and object models).

A relational database organizes data in *tables* (or *relations*). A table is made up of rows and columns. A row is also called a *record* (or *tuple*). A column is also called a *field* (or *attribute*). A database table is similar to a spreadsheet. However, the relationships that can be created among the tables enable a relational database to efficiently store huge amount of data, and effectively retrieve selected data.

MS-ACCESS is a relational database management system. Relational databases allow you to organize your data into tables; each table focuses on a specific topic; the various tables can then be linked to each other for inquiry and reporting purposes.

5.3 Guidelines to design a Database

Before designing a database you must have to follow some guidelines. These guidelines will help you to create a great database.



1. Identify all the fields needed by you to produce the required information
2. Organize each piece of data into its smallest useful part to make the design perfect.
3. Make group related fields into tables
4. Determine each table's primary key which will be uniquely identified.
5. You will have to Include a common field in related tables.

5.4 Some Technical Words of Access

Many technical terms are used in Access. Access arranges and divides database as under :

1. **Database file :** The database file is the main file of database which consists the whole data of the document. First of all you will ask to creat a database file in the beginning of the access document. The database file would be stored either on a hard disk or any other mean of storage devices.
2. **Table :** A table is the basic element of a Database and contains the data entered by users. Each row (or record) contains information about a particular item. The record is made up of several fields; each field contains one piece of information relating to the item (e.g., Student's name, roll no., address, phone, etc.). A database has many stored tables.
3. **Fields :** A field is an individual set of data items that are of the same type. If we were to take an example of a class record to demonstrate this, the Class as a whole would be your database. It will have three fields. The roll no. is one field, the name is another and the marks is the third one. Each as a unit would be a record, as a record it is a set of fields with data related to each other. You would have a field for each piece of data that you want to store as part of the record. A table consists of many fields.

Example :

1. Student Name
2. Student Address



4. **Data Types :** Databases consist of tables, tables consist of fields and fields are of a certain **data type**. A field's data type determines what kind of data it can hold. Every database has data types for text, integers (integers are whole numbers, i.e. numbers without a fraction) and decimal numbers and so does Access. But Access also has some data types that are specific to Access, like the Hyperlink, Attachment and Calculated data type. We will use different kind of data types for the desired field.

Example :

1. The data type of Student Name is Text.
2. The data type of Student Roll no is number.

5.5 Components of MSAccess

While creating database file, a file format box is opened. To the left hand corner of this box the following file format are seen :

1. **Table :** Tables are the data storage facilities in MS Access. As much as possible of a table design should be done in advance on paper. Here, however, you will be creating the table on the screen so that you can see the stages as they are implemented. Each table contains rows called records and columns called fields. A record is a collection of facts about a particular person or an organization. Each record in a table should be unique.. A field is a single kind of fact that may apply to a person or to an organization
2. **Queries :** A query that copies or changes data. Queries include append, delete, make-table, and update queries. They are identified by an exclamation point (!) next to their names in the Database window
Crosstab query: A query is that calculates a sum, average, count, or other type of total on records, and then groups the result by two types of information : one down the left side of the datasheet and the other across the top Database window. A query that asks a question about the data stored in your tables and returns a result set in the form of a datasheet, without changing the data
3. **Forms :** Forms provides us friendly environment to view the data in which it shows a single record at a time. Forms can also be used to display results from queries. They are also used to facilitate data input. In forms we change our



data too. We can update or delete our data easily while using forms. It is the best way for the user to connect them with their tables.

4. **Reports** : Reports provide a means of organizing and summarizing data. Reports are often used to present an overview highlighting main points and trends. A report can be a simple list, a student's report or a school report. With reports, one can prepare : Mailing labels for various producers - Produce a directory - Prepare invoices - Present data summaries. A report is made from the data available. There are several ways of preparing a report.
6. **Macros** : Macro is an automatic action that should be performed to an object of the data. It allow users to save their work automatically. Access allows users to do an easy and visual mechanism to make and manage macros.
7. **Modules** : A module is collection of procedure statement and declaration which are stored as unit. Module are very similar to macros. Generally modules are of two types. They are used to do the advanced functions of database, for example to examine the data in complicated situations.

5.6 Data Types

One important setting for fields is the data type, which could be a number, text, currency, and date/time. The data type limits and describes the kind of information in the field. The data type also determines the actions one can perform on a field and how much memory the data will use. Fields also have properties that control the details of information inside them, including a character length, a default value, and a validation rule that makes sure the data meets certain criteria

In access many types of data types can be used . the data type is decided before creating a table. We know there are different data types of table. Some of the important data types of access are given below :

Data types	Size/Format	Storage Capacity	Functions
Text	Up to 255 characters	Text - including numeric text (eg phone numbers)	Text consists of digits/ numbers, letters or their combination. It can have maximum of 255 letters. Numbers also been use as text only those numbers which are not used in mathematical calculations are included in text.

Data types	Size/Format	Storage Capacity	Functions
Number	Long Integer Integer Single and double bytes	Whole numbers	Numbers been used only from the prescribed size which we will declare in document. For e.g. If it is a byte we will use only whole positive numbers between 0 to 255.
Date/time	General	Both date & time - e . g . 25 / 12 / 15 15:35:10	It is used for date and time. The data can vary from 100 to 9999. it is 8 byte long
Yes/no	Yes/No True/False On/Off	N.A	For data with only 2 possible values. It is used for logical values.
Currency	Currency Scientific, percentage	Up to 15 figures	It can also be use in mathematics or scientific functions. You can type only currency value in this type of fields. But you don't have to enter currency value manually into your field.
Auto Number	N.A	Automatic counter - incremented by 1 for each record	It is used in all numeric programs it automatically give increment to a number
Memo	Up to 65535 characters	Longer pieces of text	Memo is used in where we have to enter a longer text
OLE Object	N.A	For pictures, sound, video, Word/Excel documents or any other docs.	It is been used to insert picture, sound, videos, word/excel, documents and any other type of files which are supported by our system
Hyperlink	N.A	N.A	It is used For links to the WWW or e-mail
Calculated	N.A	N.A	This data type allow you to create a field that is based on a calculation of other fields in the same table

5.7 Advantages of Access

1. **Easy installation and work** : Access gives data managers a fully functional, relational database management system. Like any other Microsoft applications, Access contains Wizards that helps you through each step of the program.
2. **Easy to participate** : Access works well with many of the developing software programs based in Windows like Microsoft SQL Server and non-Microsoft products like Oracle and Sybase. You can easily participate in these programs with the help of ACCESS.
3. **Popular RDBMS** : Microsoft Access is the most popular desktop Relational database system in the world. Data can be viewed and sorted in many ways in Access.
4. **Saves your money** : Microsoft Access is more economical than other larger systems; offering the same functions and usage.
5. **Convenient storage capacity** : A Microsoft Access database can hold up to 2 GB of data. Which is very convenient than to use the large storing capacity database software's.
6. **Multi-user support** : More About ten users in a network can use an Access application. It is a multiuser concept it helps to save our time. Data can be shared and edited by several users simultaneously
7. **Importing data** : Microsoft Access allow user to import their important data .Access makes it easy to import data from other sources.
8. **Secure Database** : MS access is secure database system information is secured which you have saved on it. It minimizes the duplication of data. It increase accuracy and consistency.

5.8. Starting access

You can start access 2010 from the start menu (in windows 7) or by penning an existing access file. When you start the program without opening a specific file, the backstage view opens, prompting you to create a new database or open an existing database.

To start access 2010 from the start menu :

1. Click the start button, click all programs, click Microsoft office, and then click Microsoft access 2010. The new page of the backstage view opens, displaying thumbnails of the available templates and template categories.



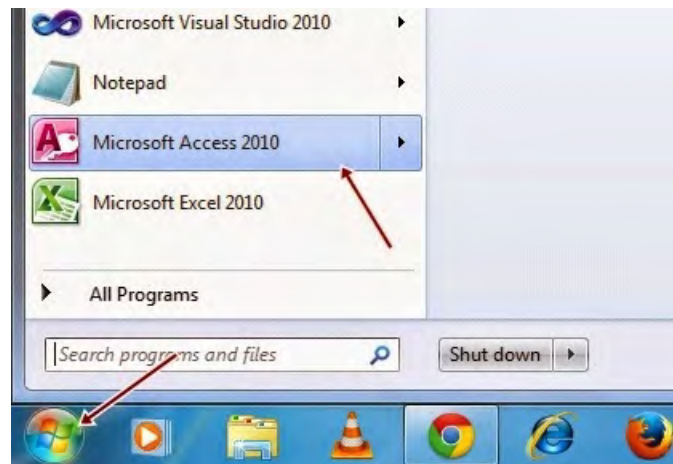


Fig. 5.1

2. Another shortcut way to open access is Press windows key with R it will open run command window as shown in the figure on Run command type MS access is blank box.

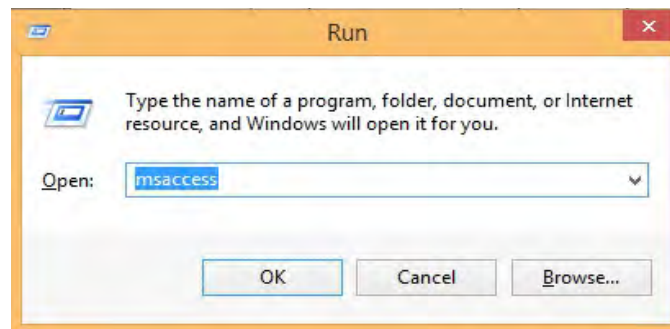


Fig. 5.2

After opening of MS access you have to click on the blank database available Under templates.

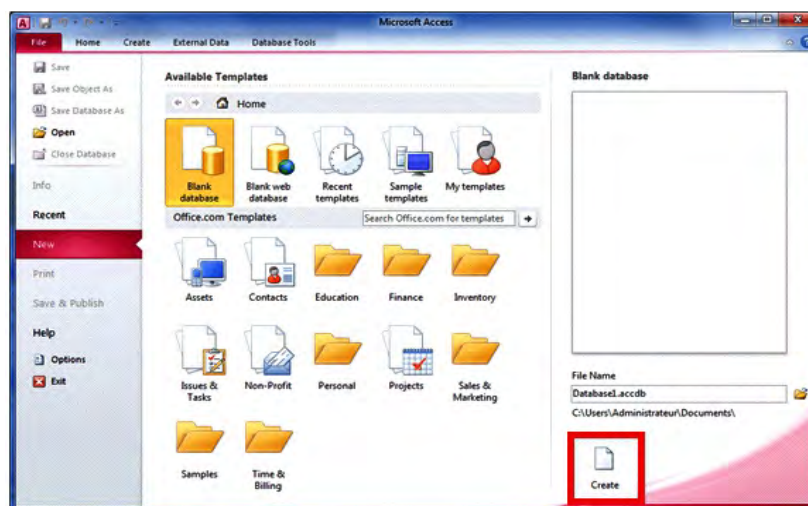


Fig. 5.3

Click the create button. A blank database opens in the program window and a blank table named table1 opens in datasheet view.

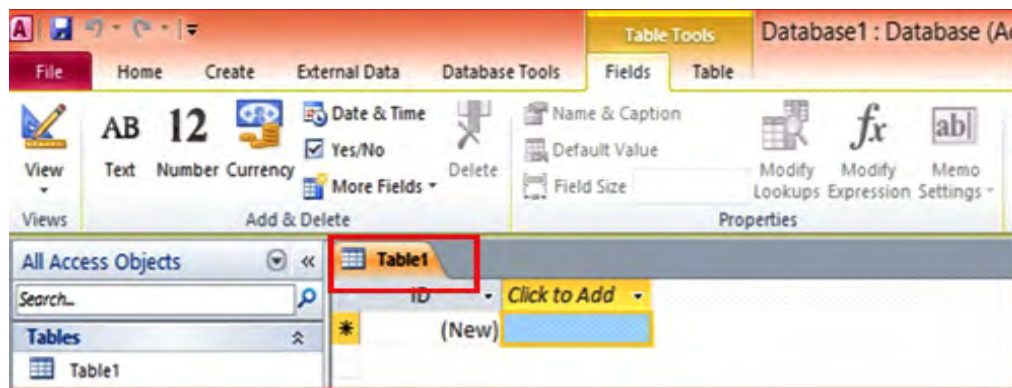


Fig. 5.4 New table in a new database

5.9 Working with Tables

A table is a database object that you define and use to store and update DATA. A table consists of records and fields. Every record contains data about one instance of the subject. EVERY RECORD consist of one or more fields. Each field contains data about one table subject because other database objects depend so heavily on tables

In datasheet view, a table looks similar to an excel worksheet in that data is stored in ROWS (records) and COLUMNS (field) as shown in the following diagram

ID	Roll no	Name	Class	Total Marks	Marks Obtained	Result	Field Name
51		Akash	9	100	80	Pass	
62		Manisha	9	100	75	Pass	
73		Gurpreet kaur	9	100	82	Pass	Record
84		Harjinder singh	9	100	85	Pass	
95		Lovepreet	9	100	50	Pass	
106		Raj	9	100	75	Pass	
117		Manpreet	9	100	35	Pass	

Field

Fig. 5.5

When the active object is a table, the table tools contextual tabs (fields and table) become available on the ribbon so that you can work the table (see figures 5.6, 5.7).

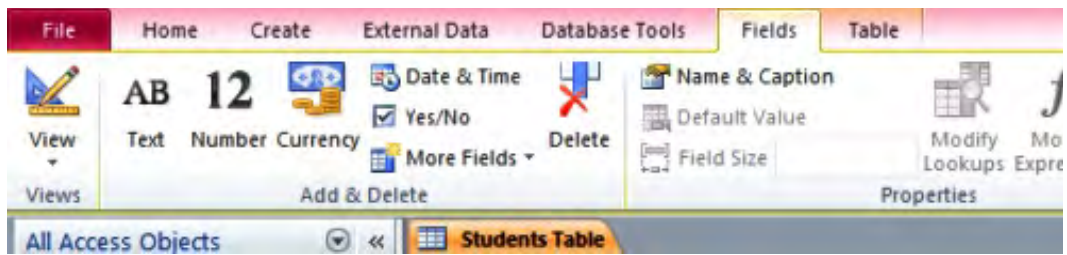


Fig. 5.6. Table tools field tab

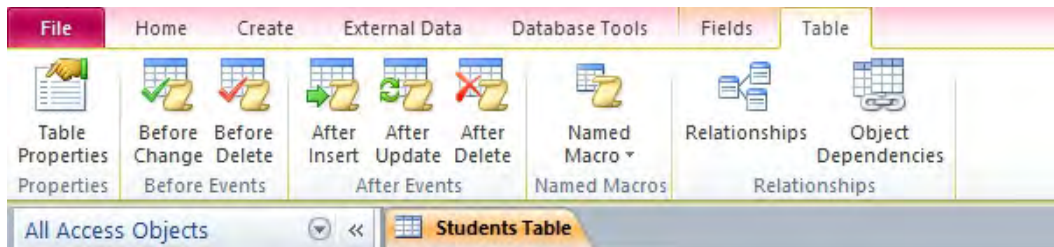


Fig. 5.7. Table tools table tab

5.10 Creating and Modifying tables

When you create a new table, you have complete control over the number of fields, the names of the fields, and what sort of data they can store. You can create a new table in the either datasheet view or design view by using the commands in the tables group on the ribbon (see figure 5.8). which view you want to start in, you can always switch to the other view by using the view button on the ribbon.

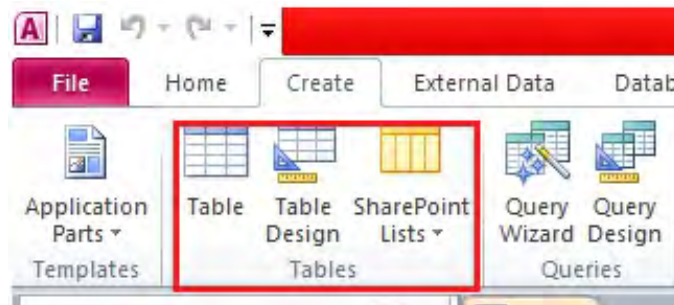


Fig. 5.8. Table group on the create tab

5.10.1 Creating tables in datasheet view

In datasheet view, you can enter data into a new table without first defining the table's structure. To create a table in datasheet view :

1. On the create tab, in the tables group, click the table button. A new blank table opens in the object window in datasheet view (see figure 5.9).

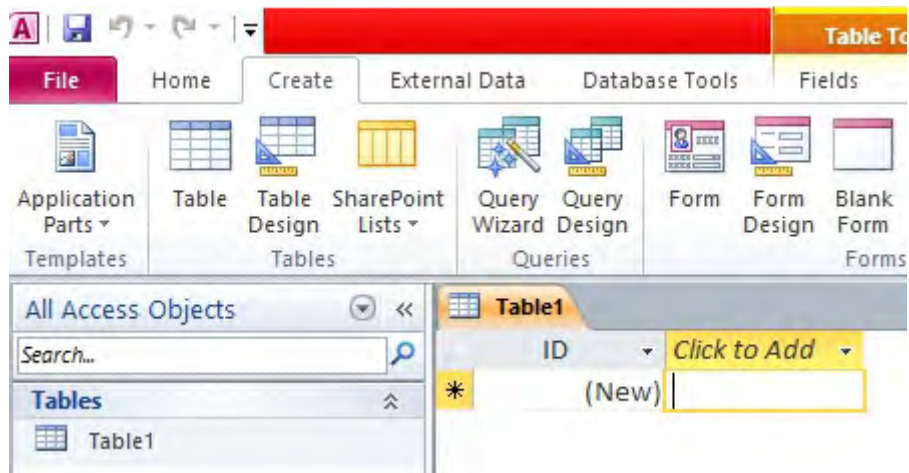


Fig. 5.9. Blank Table object window

Adding fields by entering data : Entering data in datasheet view is very similar to entering data in an excel worksheet. The main restriction is that data must be entered in contiguous rows and columns, click on the upper- left corner of the datasheet. The table structure is created while you enter data. whenever you add a new column to the datasheet, a new field is defined in the table.

In every new table created in datasheet view, access automatically creates the first fields which is called id in the left column of the datasheet (see figure 7). By default, this field is designated as the table's primary key . You can add a new field to the table by entering data in the click to add click to add column (the last COLUMN) of the datasheet.

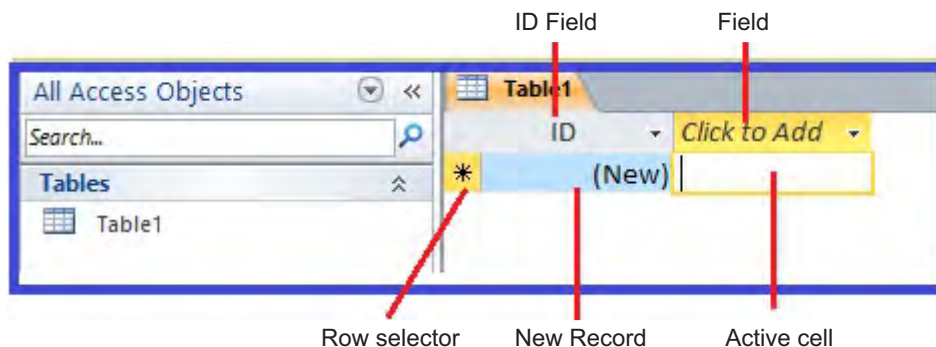


Fig. 5.10. First record in a new table before Data is entered

To add a field by entering data

1. Click in the first cell in the click to add COLUMN, ENTER the first item of data for the new record, and then press the tab or enter key to move the first cell in the column to the right. Access AUTOMATICALLY ASSIGNS the value 1 to the id field. The icon on the row selector changes every time to a pencil

WHEN THE record has been changed, but has not yet been saved (see figure 5.11).

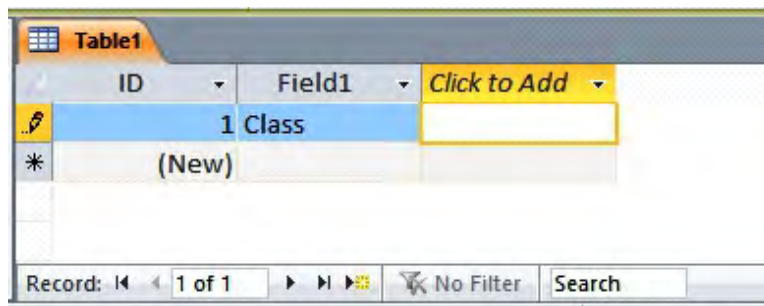


Fig. 5.11. First record in a new table after Entering Data

2. Click the pencil icon in the row selector. This saves the first record with the value 1 assigned to the id field; subsequent records will be numbered sequentially.
3. Continue entering items of data in consecutive cells, and pressing the tab or enter key.
4. When you finish entering all the data for the first record, click anywhere in the row below to save the record.

After entering so many records as per your requirement you have to save the table

5.10.2 Creating Tables in design view

When you create a table in Design view, you have more control over the databases design. You first create the table's structure in Design view, and then you switch to Datasheet view to enter data.

In Design view, the Object window consists of two panes (see Figure 5.12). The field Entry pane, located at the top of the window, is used to enter each field's name, data type, and description. The field properties pane, located at the bottom of the window, is used to specify the field's properties. The properties available in the Field properties pane depend on the data type assigned.

To create a table in Design view :

1. On the create tab, in the Table Design button. A New, blank table opens in the object window in Design view (see figure 5.12).

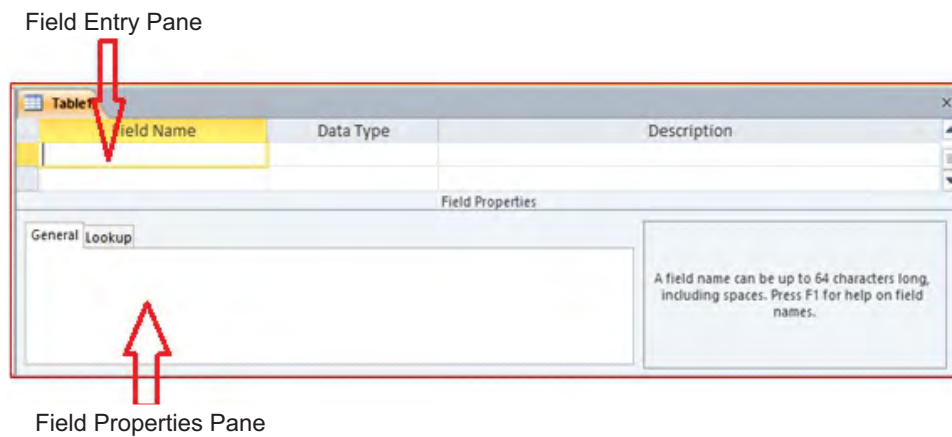


Fig. 5.12. New table in design view

2. In the field name column, type a name for the first field. Field names can be up to 64 characters long. They can include any combination of letters, numbers, spaces, and brackets etc.
3. In the data type column click the down arrow and select a data type from the list (see figure 5.13).

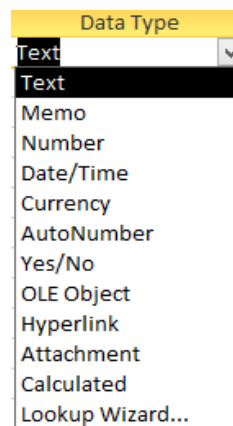


Fig. 5.13. Data type list

Field Properties	
General	
Field Size	255
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Smart Tags	

Fig. 5.14

4. In the description column, type a description for the field.
5. Repeat steps 2 through 4 to add additional fields to the table. After entering the all fields save the table.

5.10.3 Setting a primary key

A primary key consists of one or more fields that uniquely identify each record in the table there are several advantages to setting a primary key. First, the primary key automatically indexed, which makes information retrieval faster. Second, when you open a table, the records are automatically sorted in order by the primary key. Finally, a primary key prevents the entry of duplicate data.

Access automatically creates a primary key for you and assigns it a field name of ID and the auto number data type. In design view, you can change or remove the primary key, or set the primary key for a table that does not already have one.

To set a primary key follow these steps :

1. Click the row selector of the field you want to designate as the primary key.
2. In the design tab, in the tools group, click the primary key button (see figure 5.15). A key icon appears to the left of the field that you specify as the primary key.



Fig. 5.15. Tools group on the Design tab

Table1		
Field Name	Data Type	Description
Employee Name	Text	
Employee Address	Text	
Employee Phone Number	Number	
Employee Adhar card number	Number	

Fig. 5.16. Table after settings a primary key

5.10.4 Saving tables

After you create or modify a table, you should save it. When you save a table for the first time, you should it a name that describes the data that it contains.

To save a table for the first time :

1. On the quick access toolbar, click the save button. The save as dialog box opens (see figure 5.17)
2. In the table name box, type a name for the table.



3. Click the ok button. The table appears in the tables list in the navigation pane.

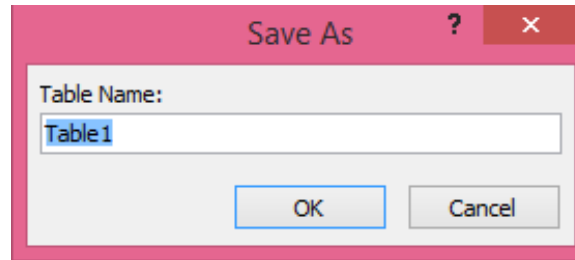


Fig. 5.17. Save As dialogue box

5.10.5 Closing database

When you finish working on a database, you should close the file. If the database contains any unsaved object, you will be prompted to save the object before closing the file.

To close a database :

1. Click the file tab, and then click close database.

5.10.6 Exiting access

When you finish using access 2010, you should exit the program to free up system resources.

To exit access 2010 :

1. Click the file tab, and then click exit. Or, click the close button in the upper-right corner of the program window.
2. Another option is to exit Access is Press ALT+F4 key together. With this option you will exit from access in very easy way

5.11 Creating And Modifying Forms

Forms are used for entering, modifying, and viewing records. You probably have had to fill out forms on many occasions, like when visiting a doctor's office, applying for a job, or registering for school. The reason forms are used so often is that they're an easy way to guide people into entering data correctly. When you enter information into a form in Access, the data goes exactly where the database designer wants it to go: into one or more related tables.

5.11.1 Creating forms

Forms is a graphical representation of a table, in which we used can insert new data , change the present data or even can delete it. Forms and tables use similar data. Whenever we change any record in form, it will automatically change in table. The forms are most useful when we enter data according to field number. It is always very



convenient to work in forms. It is more comfortable easier and popular way to enter data by forms than by datasheet view. Forms can be prepared by following two methods.

5.11.2 Create a form to display your data

Although it is possible to keep entering data into your table via the datasheet or table view, it is better to do it via a nice looking screen.

To create a quick screen in MS Access 2010 simply go to the navigation pane and click to highlight the table you wish to base the form on. For example here I have clicked on the Students table.

Now head up to the ribbon and click on the create tab.

In the forms section click on the button named 'Form'. (See figure 5.18)

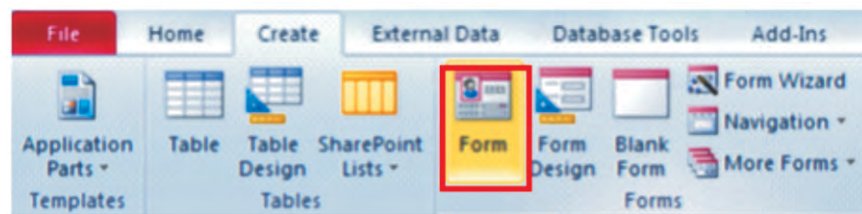


Fig. 5.18

MS Access creates a nice simple form. Click on any of the text boxes to position the cursor and edit the data.

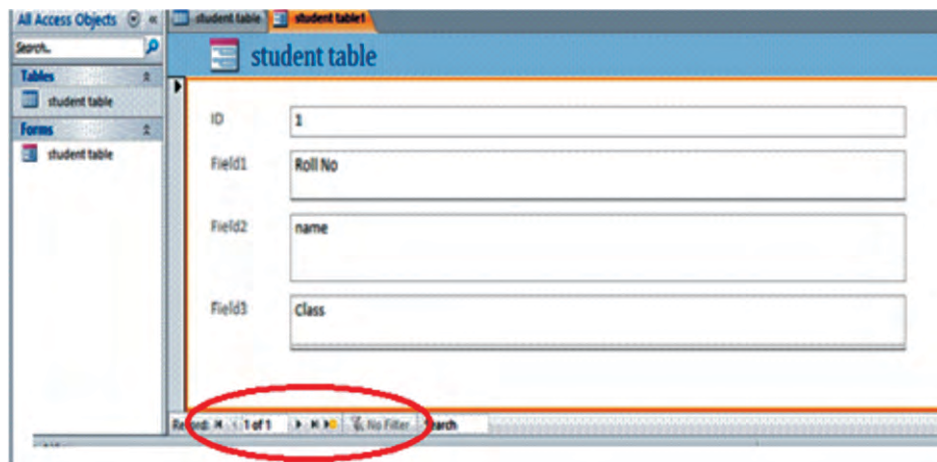


Fig. 5.19

At the bottom you have navigation buttons to move you from one record to another record

5.12 Sorting

The records, as you have seen them so far, are shown in the order that they were first entered into the database . For this reason, it wouldn't have been easy to search a

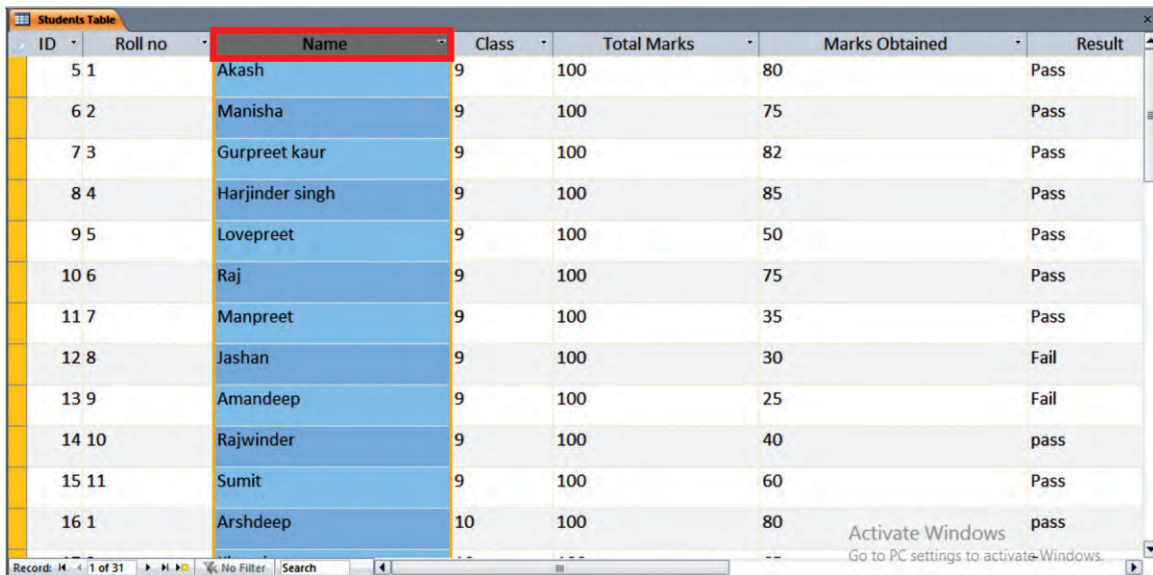
record you simply done it by scrolling through the records . Access sorts records by their ID numbers. However, there are many other ways records can be sorted. For example, the information in a database belonging to a Class could be sorted in several ways :

- Result could be sorted by Name or by the marks of the students who were appeared in exam
- Students could be sorted by name or by the roll no.
- Students could be sorted by class.

You can sort both text and numbers in two ways: in ascending order and descending order. Ascending means going up, so an ascending sort will arrange numbers from smallest to largest and text from A to Z. Descending means going down, or largest to smallest for numbers and Z to A for text. The default ID number sort that appears in your tables is an ascending sort, which is why the lowest ID numbers appear first.

Steps to sort student table are as follows :

1. Select a field in the cell you want to sort by. In student table, we will sort by student name.



ID	Roll no	Name	Class	Total Marks	Marks Obtained	Result
5	1	Akash	9	100	80	Pass
6	2	Manisha	9	100	75	Pass
7	3	Gurpreet kaur	9	100	82	Pass
8	4	Harjinder singh	9	100	85	Pass
9	5	Lovepreet	9	100	50	Pass
10	6	Raj	9	100	75	Pass
11	7	Manpreet	9	100	35	Pass
12	8	Jashan	9	100	30	Fail
13	9	Amandeep	9	100	25	Fail
14	10	Rajwinder	9	100	40	pass
15	11	Sumit	9	100	60	Pass
16	1	Arshdeep	10	100	80	pass

Fig. 5.20

2. Click the Home tab on the Ribbon, and locate the Sort & Filter group.
3. Sort the field by selecting the Ascending or Descending command.
 - (a) Select Ascending to sort text A to Z or to sort numbers from smallest to largest. We will select this in our example because we want the names to be in A-to-Z order.

- (b) Select Descending to sort text Z to A or to sort numbers from largest to smallest.

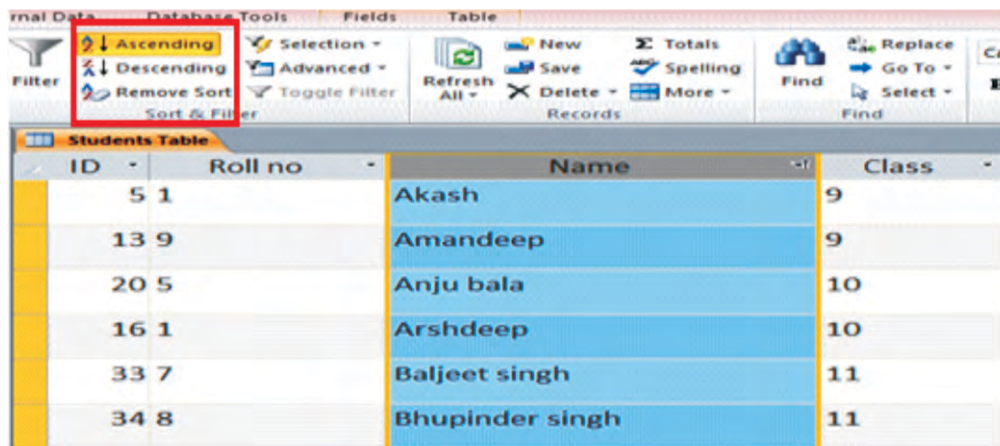


Fig. 5.21

- The table will now be sorted by the selected field.
- To save the new sort, click the Save command on the Quick Access toolbar.

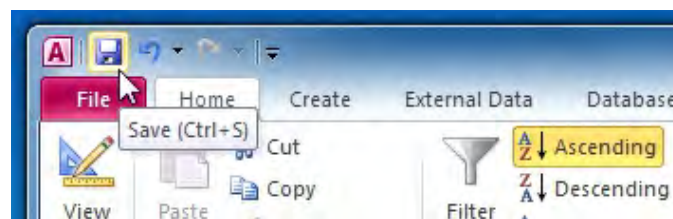


Fig. 5.22. Save

After you save the sort, the records will stay sorted that way until you perform another sort or remove the current one. To remove a sort, simply click the Remove Sort command.

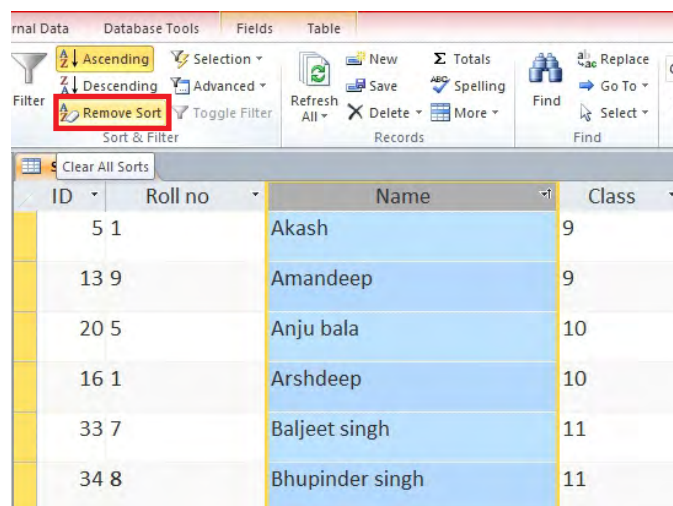


Fig. 5.23. Remove Sort Command

5.13 Filtering Data

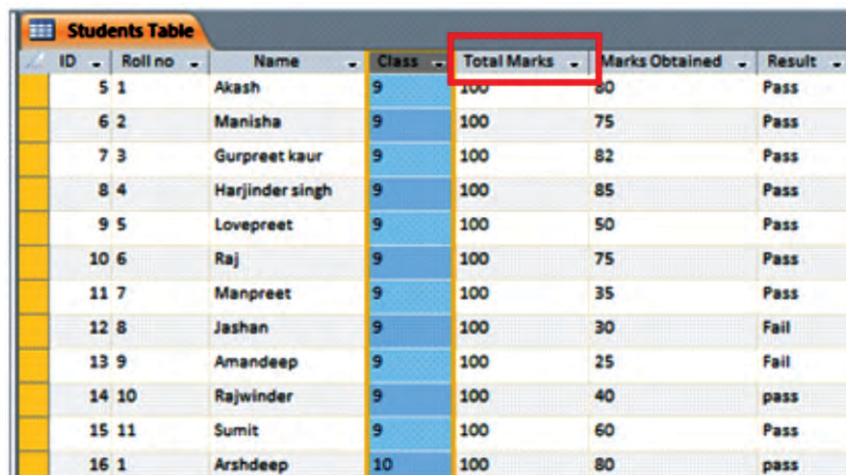
Filters is the concept in MS-Access which allow you to view only the data you want to see. When you want to create a filter, you have to set criteria for the data you want to display. The filter then searches all of the records in the table, finds the ones that meets your search criteria, and temporarily hides the other data.

Filters are useful because they allow you to look upon on specific records without any distraction by the uninterested data. For instance, if you had a database that included Students and Results information, you could create a filter to display only students pass within a certain class or only students of a particular class. Viewing this data with a filter would be far more convenient than searching for it in a large table.

Follow these steps to apply filter:

5.13.1 To create a filter

1. Click the drop-down arrow next to the field you want to filter by. We will filter by class because we want to see a list of students who were pass or fail in the desired class by you



ID	Roll no	Name	Class	Total Marks	Marks Obtained	Result
5	1	Akash	9	100	80	Pass
6	2	Manisha	9	100	75	Pass
7	3	Gurpreet kaur	9	100	82	Pass
8	4	Harjinder singh	9	100	85	Pass
9	5	Lovepreet	9	100	50	Pass
10	6	Raj	9	100	75	Pass
11	7	Manpreet	9	100	35	Pass
12	8	Jashan	9	100	30	Fail
13	9	Amandeep	9	100	25	Fail
14	10	Rajwinder	9	100	40	pass
15	11	Sumit	9	100	60	Pass
16	1	Arshdeep	10	100	80	pass

Fig. 5.24

2. A drop-down menu with a checklist will appear. Only checked items will be included in the filtered results. Use the following options to determine which items will be included in your filter :
 - ➡ Select and deselect items one at a time by clicking their check boxes. Here, we will deselect all of the options except for Class .
 - ➡ Click Select All to include every item in the filter. Clicking Select All a second time will deselect all items.

- Click Blank to set the filter to find only the records with no data in the selected field.

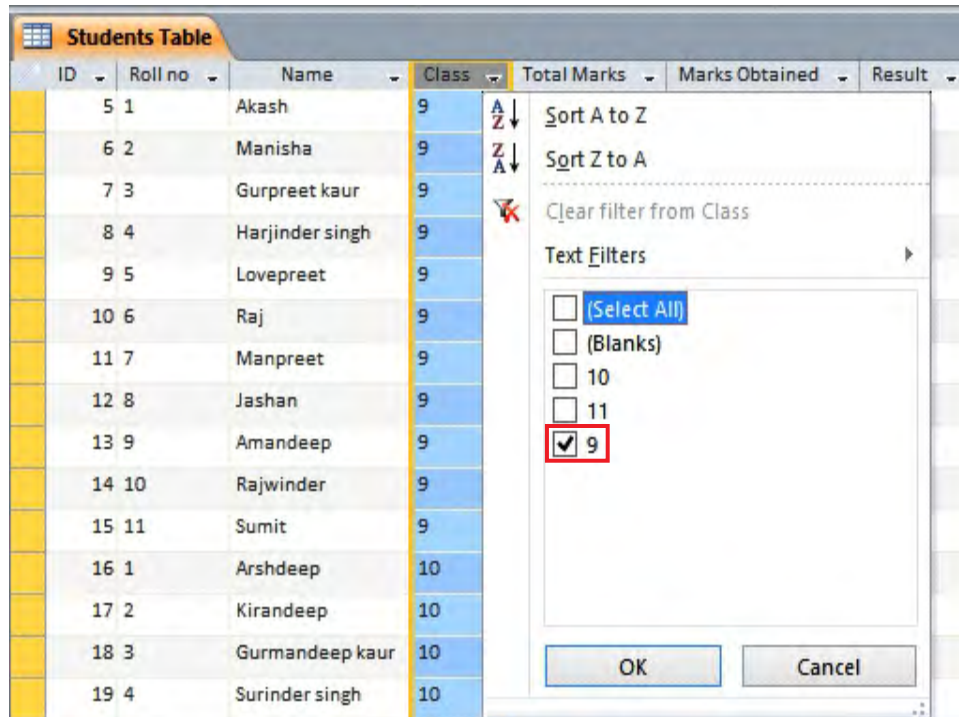


Fig. 5.25

- Click OK. The filter will be applied. Our Student table now displays only class 9 record.

5.14 Creating Reports

Reports : Reports in Access allow you to print assembled data in a custom layout. You can create reports based on tables and/or queries.

There are several methods for creating a report. We will focus on the Reports wizard.

To create a report :

- Click on the Create tab and then select Report Wizard from the Reports group.

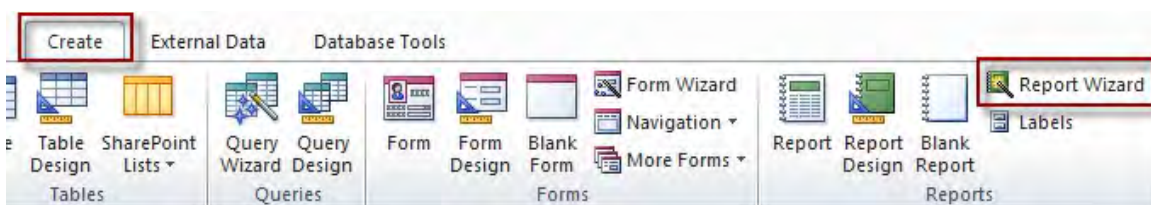


Fig. 5.26

2. The Report wizard launches.

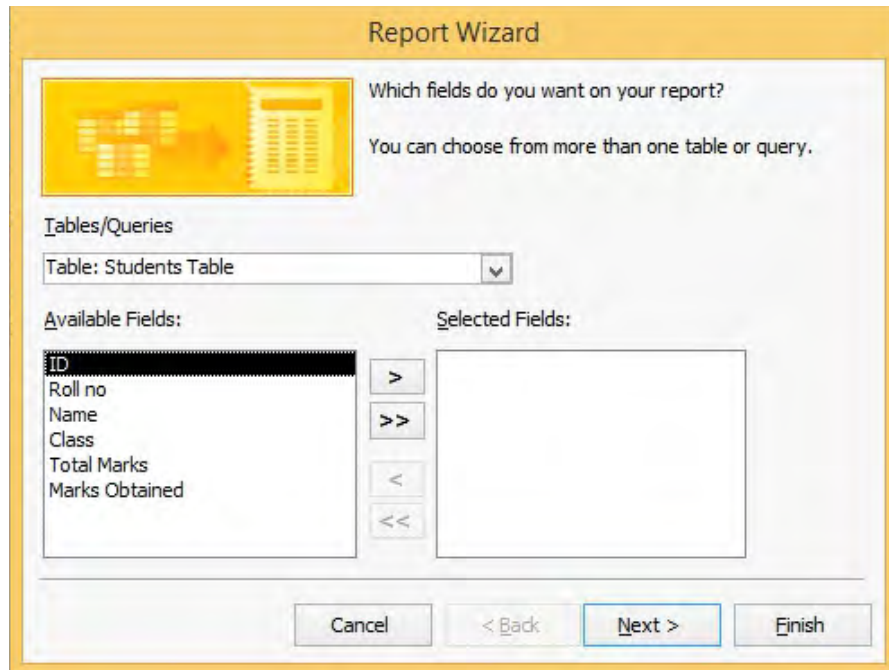


Fig. 5.27

3. Click on the down arrow beside the Tables/Queries selection window and choose the table or query you're basing your report on. (NOTE : You can select more than one table/queries. Repeat the step to add any additional table/queries.

4. Add fields –

All the fields from your selected tables/queries appear in the Available Fields: window.

- ➡ Use the button  to add fields to the Selected Fields window, one-at-a-time.
- ➡ Use the button  to move all available fields into the Selected Fields window at once.
- ➡ To remove individual fields from Selected Fields, click on each field and press .
- ➡ To remove all fields, press .

Note : The order in which you add fields to the Selected Fields window determines their default order in the report.

- ➡ When done, click Next.

5.14.1 Create grouping levels

If desired, use the right arrow button to create grouping levels (group your report listing by a category or categories), and use the up and down arrow buttons to promote or demote a field's position. The left arrow button removes selected fields from grouping levels.

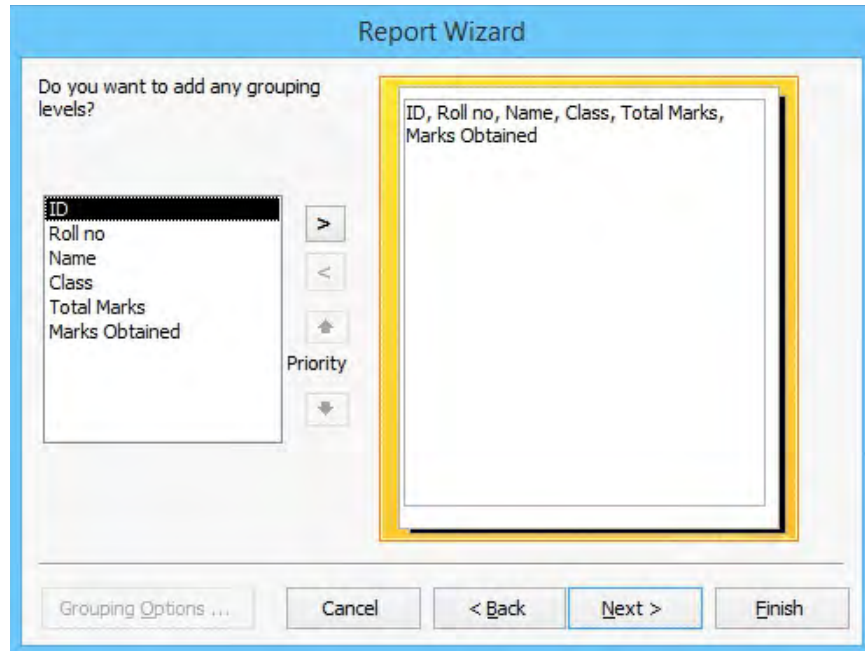


Fig. 5.28

When done, click Next.

5.14.2 Sort by category (field)

You can select a sort order for up to four fields. Click on the down arrow to select a field and then choose ascending or descending order.

When done, click Next.

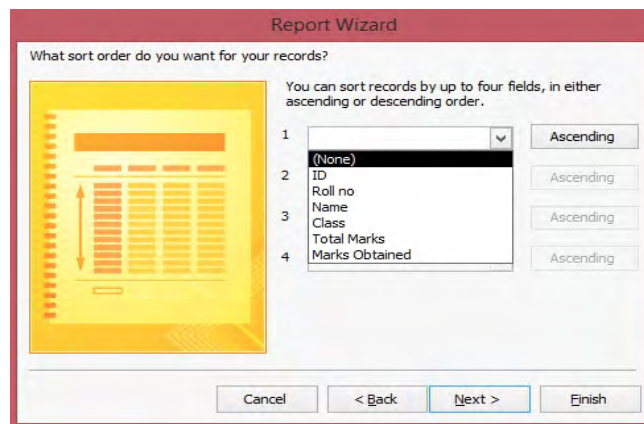
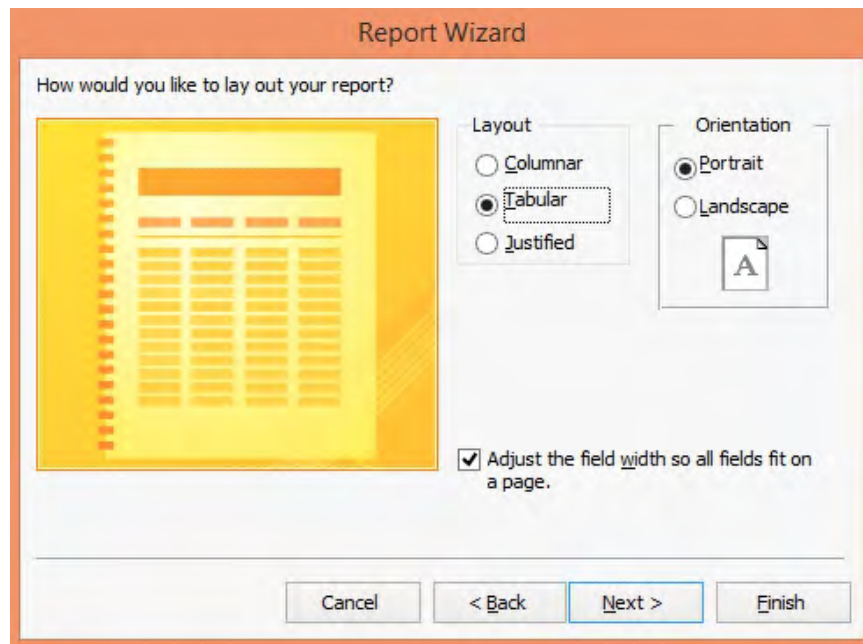


Fig. 5.29

5.14.3 Choose a layout

Choose from the various layout options and click Next.

Choose a page orientation – portrait or landscape.

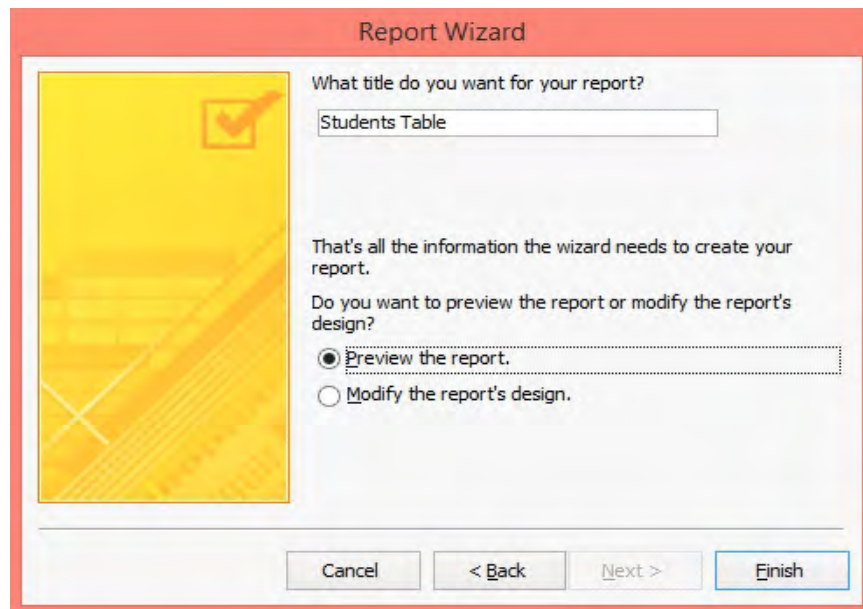


The 'Report Wizard' dialog box is shown with the title 'How would you like to lay out your report?'. On the left is a preview of a report with a yellow background and a table. To the right, under 'Layout', are three radio buttons: 'Columnar' (unselected), 'Tabular' (selected), and 'Justified' (unselected). Under 'Orientation', there are two radio buttons: 'Portrait' (selected) and 'Landscape' (unselected). Below these is a checkbox labeled 'Adjust the field width so all fields fit on a page.' which is checked. At the bottom are four buttons: 'Cancel', '< Back', 'Next >', and 'Finish'.

Fig. 5.30

5.14.4 Assign a title

Enter a title for your report, or stick with the default title assigned by Access. Make sure that Preview the report is selected and click Finish.



The 'Report Wizard' dialog box is shown with the title 'What title do you want for your report?'. On the left is a preview of a report with a yellow background and a table. To the right, there is a text box containing 'Students Table'. Below this, it says 'That's all the information the wizard needs to create your report.' and 'Do you want to preview the report or modify the report's design?'. There are two radio buttons: 'Preview the report.' (selected) and 'Modify the report's design.' (unselected). At the bottom are four buttons: 'Cancel', '< Back', 'Next >', and 'Finish'.

Fig. 5.31

The report appears in Print Preview.

Note : Any changes to data in the source tables/queries are automatically updated in your report.

Students Table				
ID Roll no	Name	Class	Total Marks	Marks Obtained
4 Roll no.	Name	Class	Total Marks	Marks Obtained
5 1	Akash	9	100	80
6 2	Manisha	9	100	75
7 3	Gurpreet kaur	9	100	82
8 4	Harjinder singh	9	100	85
9 5	Lovepreet	9	100	50

Fig. 5.32

Things to Remember

1. Access 2010 is a Relational Database Management System (RDBMS).It is used for **database creation and management**.
2. The database file is the main file of database which consists the whole data of the document.
3. A table is the basic element of a Database and contains the data entered by users.
4. A field is an individual set of data items that are of the same type.
5. A query that copies or changes data. Queries include append, delete, make-table, and update queries.
6. One important setting for fields is the data type, which could be a number, text, currency, and date/time.
7. Forms are used for entering, modifying, and viewing records.
8. You can sort both text and numbers in two ways: in ascending order and descending order.
9. Filters is the concept in MS access which allow you to view only the data you want to see
10. Reports in Access allow you to print assembled data in a custom layout.

Exercise

1. Fill in the Blanks :

- is a relational database management system.
(a) Excel (b) Word (c) Power point (d) Access
- is the main part of the database
(a) Query (b) Table (c) Form (d) Module
- One field is the collection set of
(a) Database (b) Tables (c) Data items (d) Forms
- Queries are used for tables to convert,, and
(a) Store, Forms, Update
(b) For delete, Create table, Update
(c) For Store, Paste, Copy
(d) Copy Queries, Make modules, create reports
- Important setting for a field is called
(a) Database (b) Macro (c) Data types (d) Reports

2. Short Answer Type Questions :

- Write the name of components of M-S Access.
- Write datatypes that used in MS-Access.
- What do you mean by record ?
- What is table ? Name the different ways to create table.
- What do you mean by Form ?
- What is report ?

3. Long Answer Type Questions :

- What are the instructions to design database ? Explain it.
- Write different types of components of MS. Access.
- What are the filters ? Write steps to implement it.
- What is sorting ? How do you implement it on your document ?



Objective of this Lesson

- 6.1 E-mail
 - 6.1.1 Gmail
 - 6.1.1.1 Creating New Account
 - 6.1.2 CAPTCHA Code
 - 6.1.3 How to send and receive mail?
 - 6.1.4 How to attach File?
- 6.2 Google Apps
 - 6.2.1 Google calendar
 - 6.2.2 Google maps
 - 6.2.3 Translate
 - 6.2.4 Google +
 - 6.2.5 Google Docs
 - 6.2.6 Google Sheets
 - 6.2.7 Google Slides
 - 6.2.8 Play Store
 - 6.2.9 Google Drive
- 6.3 How to download software?
- 6.4 Internet in Media
 - 6.4.1 On Line Newspaper
 - 6.4.2 Online TV Channels, Radio, Live programs(Streaming Media)
- 6.5 Cloud networking
 - 6.5.1 Unique IP Address
 - 6.5.2 Cloud Printing
- 6.6 Internet Security
 - 6.6.1 Virus/Anti-Virus
 - 6.6.2 Spyware
 - 6.6.3 Trojan
 - 6.6.4 Phishing Scams
 - 6.6.5 Digital Signature

Introduction of Internet Application

As we know that Internet is a worldwide collection of computer networks, cooperating with each other to exchange data using a common software standard. Through telephone wires and satellite links, Internet users can share information in a variety of forms. One can surf for any kind of information over the internet. Information regarding various topics such as Technology, Health & Science, Social Studies, Geographical Information, Information Technology, Products etc. can be surfed with help of a search engine.

Apart from communication and source of information, internet also serves a medium for entertainment. For example Online Games, Songs Videos, Social Networking Apps etc.

Internet allows us to use many services like Internet Banking, Online Shopping, Online Ticket Booking, Online Bill Payment, email etc.

Internet provides concept of **electronic commerce** that allows the business deals to be conducted on electronic systems

6.1 E-mail

Email, short form "electronic mail," is one of the most widely used features of the Internet, along with the web. It allows us to send and receive messages to and from anyone with an email address, anywhere in the world.

Email uses multiple protocols within the TCP/IP suite. For example, SMTP is used to send messages, while the POP or IMAP protocols are used to retrieve messages from a mail server. When we configure an email account, we must define our email address, password, and the mail servers used to send and receive messages. Fortunately, most webmail services configure our account automatically, so we only need to enter our email address and password. Some of the webmail services are Gmail (Google Mail), Yahoo mail, Rediff mail, Hotmail etc.



Fig. 6.1. E-mail

6.1.1 Gmail

'Google Mail' or 'Gmail' is a free email service provided by Google. In many ways, Gmail is like any other email service: You can **send and receive emails**, **block spam**, create an **address book**, and perform other basic email tasks. But it also has some more unique features that help to make it one of the most popular email services on the Web.

6.1.1.1 Creating new account

In this , we'll study about how to get started with email by creating an account in Gmail.

Note : We are using Chrome as our browser, however other browsers such as Internet Explorer and Firefox will look similar.

Follow these step-by-step instructions to create a Gmail account

- ➡ Open up the internet browser.
- ➡ Type address.



Fig. 6.2. Gmail

Note : Or Click on “Gmail” link at the top right corner of the google home page.

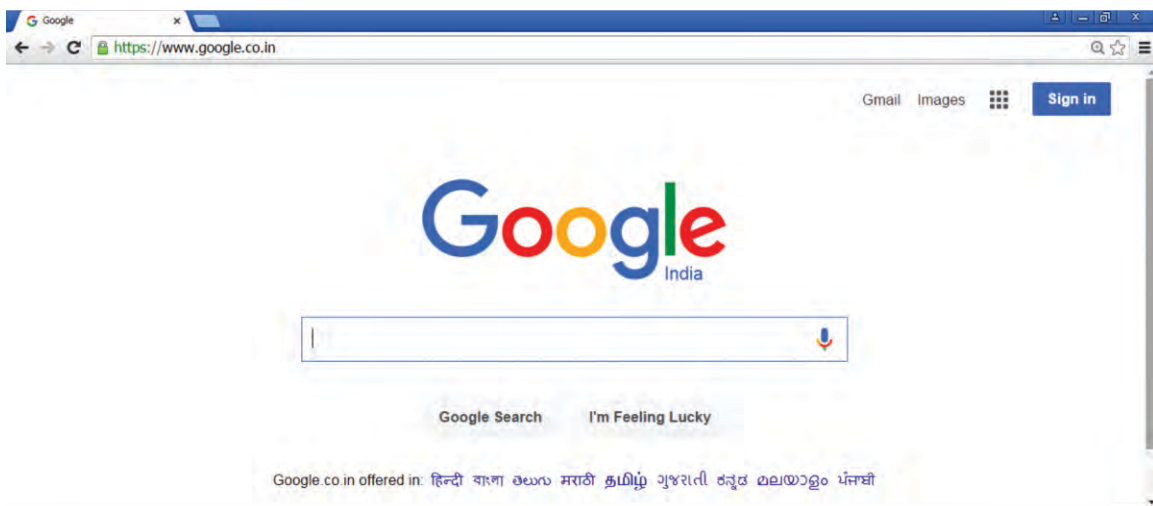


Fig. 6.3. Google Home Page



We'll now be in the 'Sign in' section.

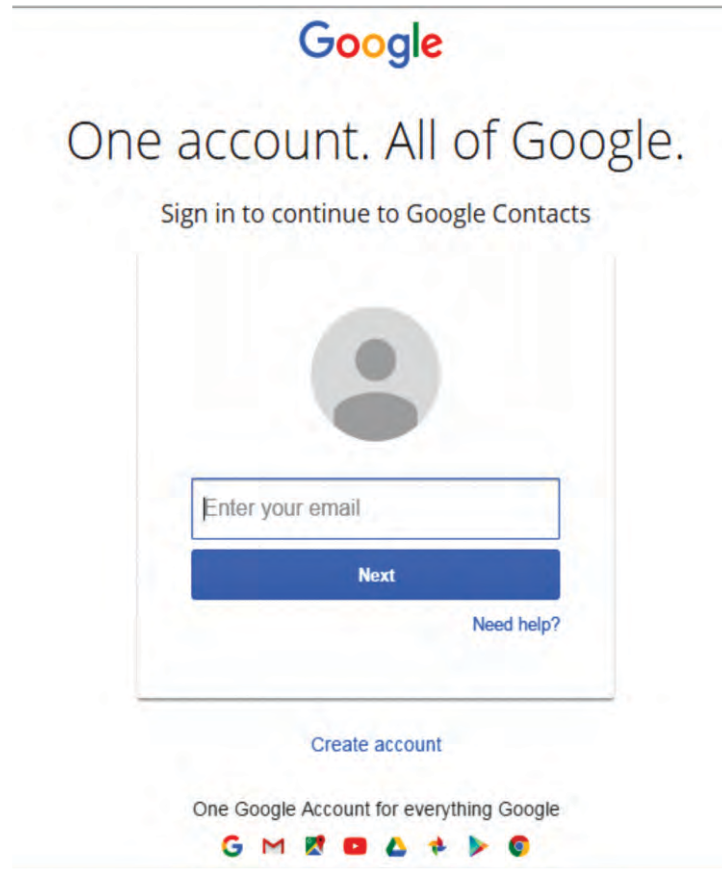


Fig. 6.4. Create New Account and Sign In

As we don't have a Google account yet, we need to create one. Click **Create an account**.

To set up our new account, Google needs some information about us

- ➡ Our first and last names.
- ➡ The 'choose our username' is the unique email address that we wish to use, which will be placed before '@gmail.com'. Because it needs to be unique, Google may have to check the availability of any name that we decide on to make sure that no one already has it. Type an email name into the 'choose our username' box. Once we finalise our email address, it's a good idea to make a note of it so that we can refer to it until we remember it.

The image shows a Google account creation form. It includes fields for Name (First and Last), Choose your username (with a @gmail.com suffix), Create a password, Confirm your password, Birthday (Month, Day, Year), Gender (I am...), Mobile phone (+91), Your current email address, and a CAPTCHA section. The CAPTCHA section shows a black image with the text '1 2 3 4' highlighted in a red box, and a text input field labeled 'Type the text:'. Below the CAPTCHA is a Location dropdown menu set to 'India (RRRT)' and a checkbox for 'I agree to the Google Terms of Service and Privacy Policy'. A 'Next step' button is at the bottom right.

Fig. 6.5. Set Up Our New Account

- ➡ We'll need to give a password so that we can log in securely to our account. Google may explain that we should try one with at least 8 characters long to be secure. Use letters and numbers to make the password more secure and difficult to guess. We'll need to re-enter our password to ensure that it's we choosing it and not a hacker's robot. This is why it also asks us to insert two random words at the bottom of the page this is a CAPTCHA code. We can

skip this step if we don't want to type in the CAPTCHA code but we will need to verify via a mobile phone if we don't.(Captcha Code is described ahead in section 6.1.2)

- ➡ Then fill your birth date (Month, Day, Year)
- ➡ Fill your Gender(Male/Female)
- ➡ Mobile phone number and any other e-mail address(if exist)

Once we have completed this page fully, clicking **Next Step** will take us to the next Page.

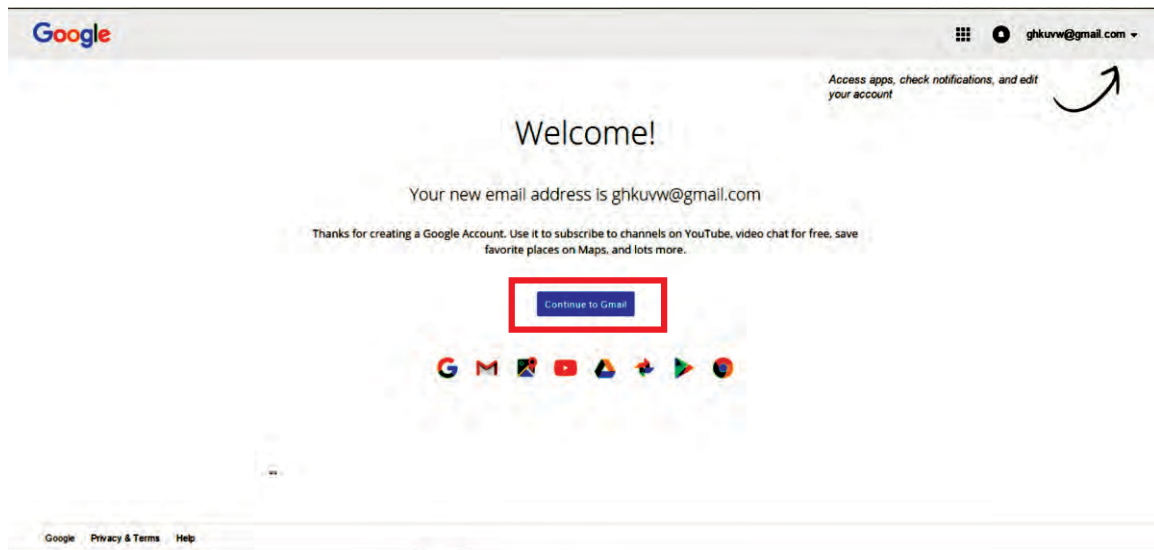


Fig. 6.6. Continue to Gmail

We will now have set up our account.

Click "Continue to Gmail" to go to our inbox and get started.

6.1.2 Captcha Code

A **CAPTCHA** (an acronym for "Completely Automated Public Turing test to tell Computers and Humans Apart") is a type of test used in computing to determine whether or not the user is human.

A CAPTCHA is a program that protects websites by generating and grading tests that humans can pass but current computer programs cannot. For example, humans can read distorted text as the one shown below, but current computer programs can't.

~~CAPTCHA~~



6.1.3 How to send and receive E-mail?

To send an email, click "Compose Mail" located above the folder list. An entry form appears in the Gmail interface.

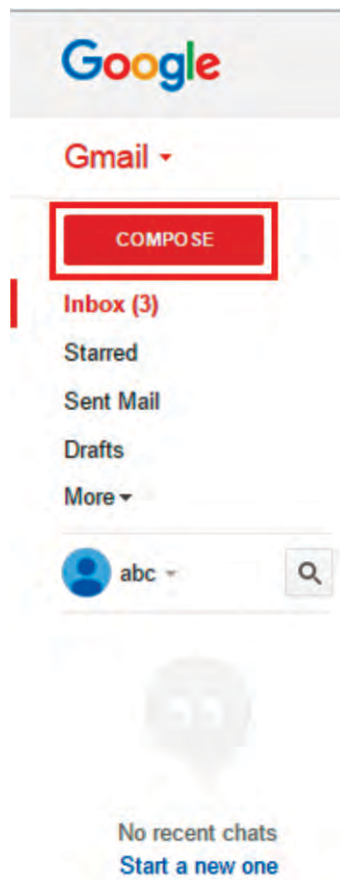


Fig. 6.7. Compose Mail

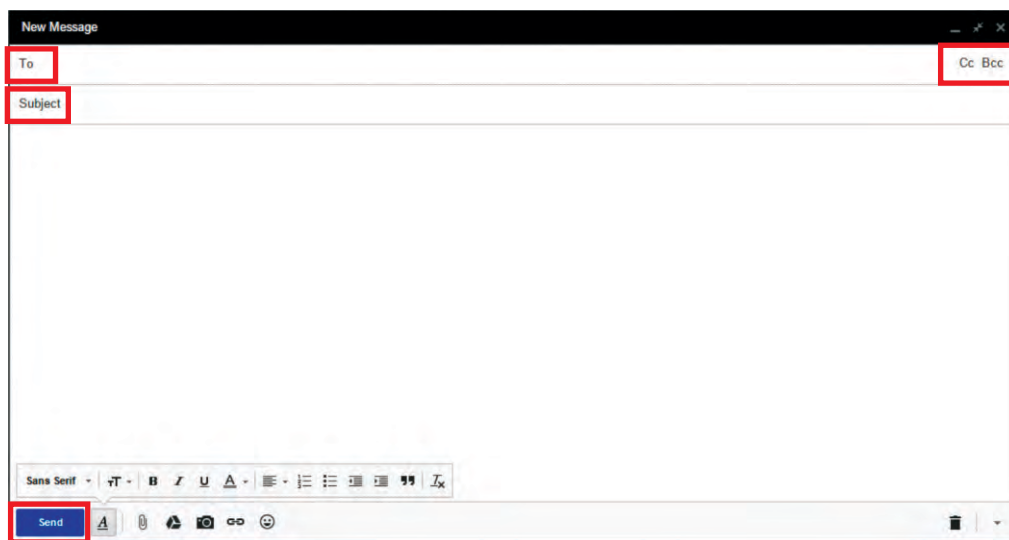


Fig. 6.8. Send Mail

The recipients : In the "To:" box, type the address of the person we want to write to. For multiple recipients, separate the addresses with commas.

To view the "Cc:" tab click "Add Cc". Cc means "carbon copy", type here the addresses of people who are not the main recipients of the message, but we still want to send a copy to.

To view the "Bcc:" tab click "Add Bcc". Bcc stands for "Blind carbon copy", type here the addresses of people we want to send a copy of the mail to, without the other recipients knowing.

The subject

In "Subject:", enter the subject of the email. Enter the text itself. By default, Gmail will send a message in HTML format.

When we finish typing our mail, click the "Send" button to send it immediately or on the "Save" button to save as draft.

We'll see that sending emails is a really easy process.

Reading our mails : All emails received are stored in the inbox. The number of unread messages is indicated in brackets to the right of the "Inbox" folder. Gmail automatically checks every two minutes when new messages arrive.

By default, a single message is summed up in one line :

- ➡ Dispatcher
- ➡ Subject
- ➡ The first words in the text
- ➡ The date (or time) to dispatch

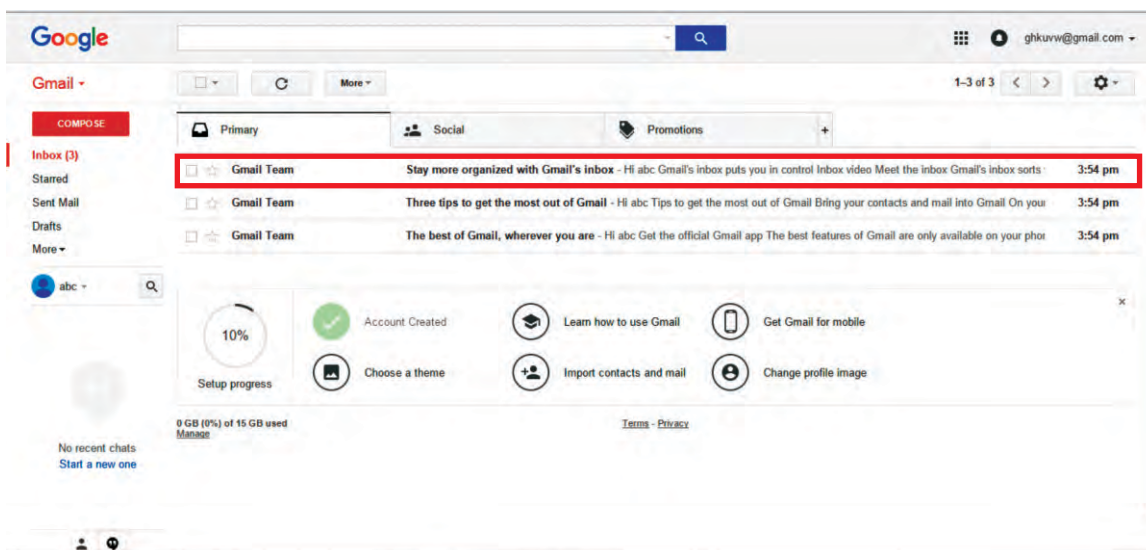


Fig. 6.9. Reading our mails

6.1.4 How to attach file(s)with email message

In the new message window, click the paperclip icon to **add** an **attachment**. Find and click on the folder or files we wish to attach, then click "Open" and we should see the attachment added to our message. In the most recent versions of browsers like Chrome and Firefox, we can also simply drag and drop files into Gmail's Compose window to upload an attachment.

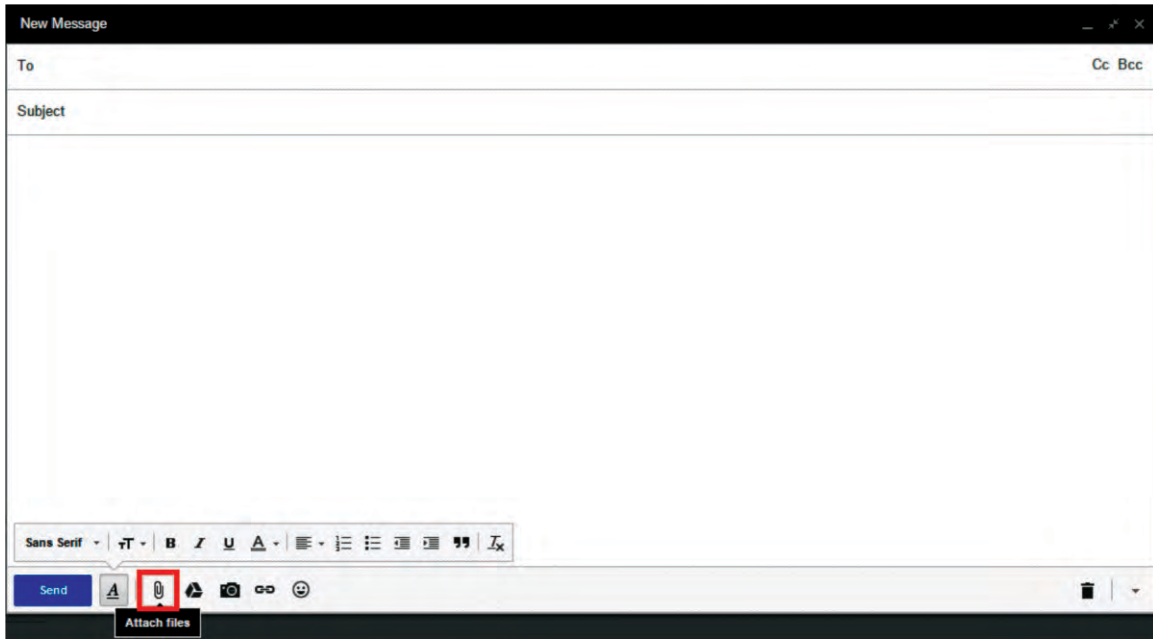


Fig 6.10. Window To Upload An Attachment

6.2. Google Apps

Apps is an abbreviation for *application*. An app is a piece of software. It can run on the Internet, on our computer, or on our phone or other electronic device. The word "app" is a more modern usage, but this is really the same thing as a program.

Google refers to their online services as apps, but they also sell a specific suite of services known as Google Apps



Fig. 6.11. Google App Link

Google Apps is a suite of Web-based applications from Google that includes e-mail, calendar, word processing, spreadsheet and presentations.

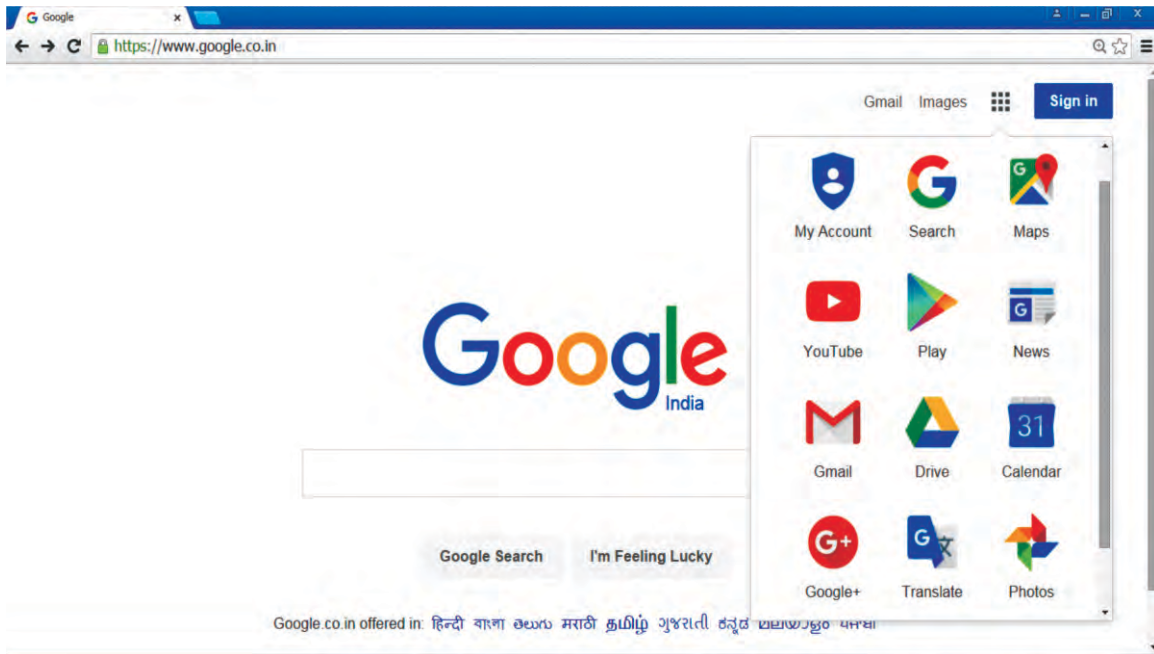


Fig. 6.12. Google Apps

6.2.1 Google Calendar

Google Calendar is a time-management web application and mobile app created by **Google**. Users are required to have a **Google** Account in order to use the app. Google Calendar allows multiple calendars to be created and shown in the same view. Each can be shared, either read-only or with full edit control, and either with specified people or with everyone (public calendars).

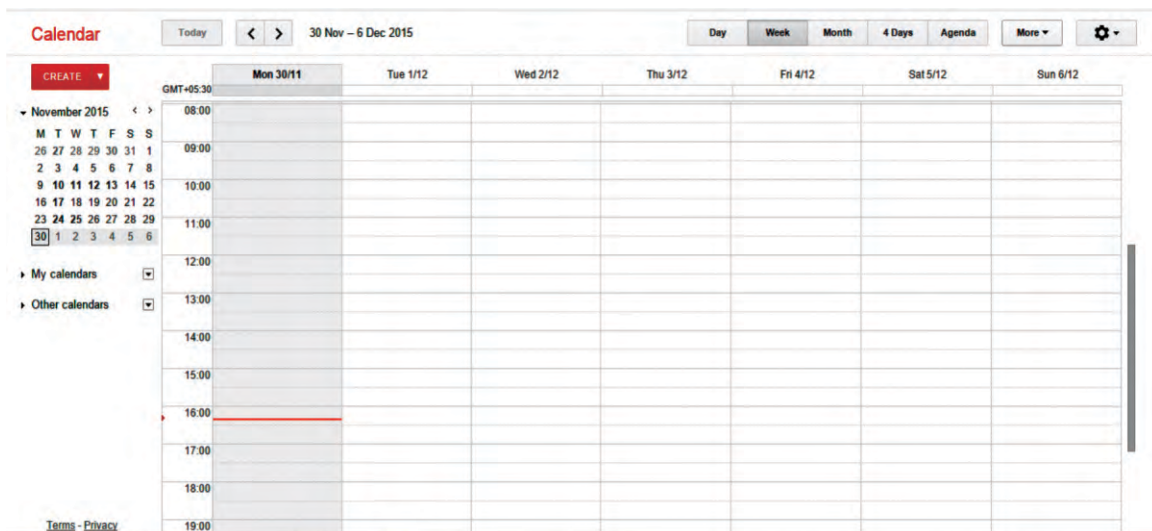


Fig. 6.13. Google Calendar

6.2.2 Google Maps

Google Maps is a desktop web **mapping** service developed by **Google**. It offers satellite imagery, street **maps**, 360° panoramic views of streets (Street View), real-time traffic conditions (**Google Traffic**), and route planning for traveling by foot, car, bicycle (in beta), or public transportation.

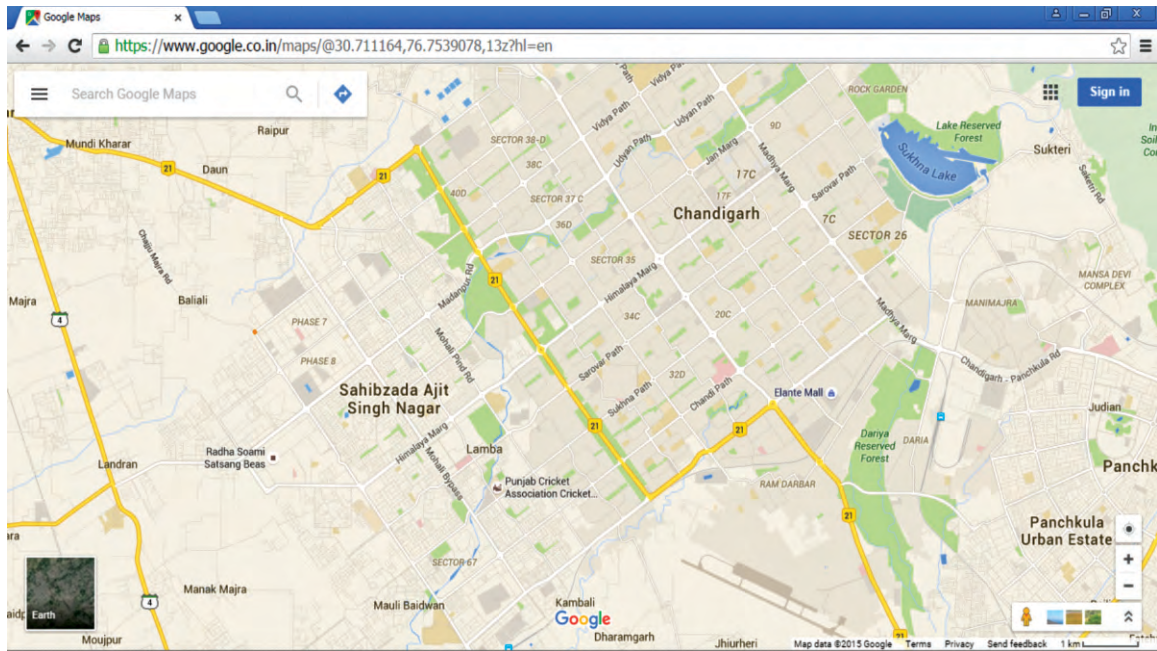


Fig. 6.14. Google Maps

6.2.3 Translate

Google Translate is a free multilingual statistical machine **translation** provided by **Google** to **translate** text, speech, images, or real-time video from one language into another.

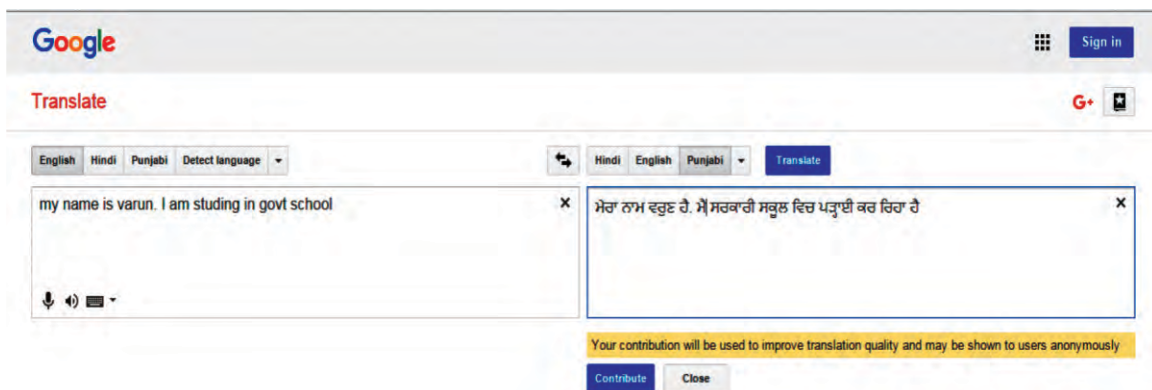


Fig. 6.15. Google Translate

6.2.4 Google+

Google+ (Google Plus) is Google's attempt at social networking. The Google+ service that delivers functionality and many features similar to those of Facebook.

Features in Google+ include "Posts" for posting status updates, "Circles" for sharing information with different groups of people (like Facebook Groups), "Sparks" for offering videos and articles users might like, and "Hangouts" and "Huddles" for video chatting with a friend or group of friends.



Fig. 6.16. Google +

6.2.5 Google Docs

Google Docs is an online word processor that lets you create and format text documents and collaborate with other people in real time



Fig. 6.17. Google Docs

6.2.6 Google Sheets

Google Sheets is an online spreadsheet app that lets you create and format spreadsheets and simultaneously work with other people.



Fig. 6.18. Google Sheets

6.2.7 Google Slides

Google Slides is an online presentations app that allows you to show off your work in a visual way.



Fig. 6.19. Google Slides

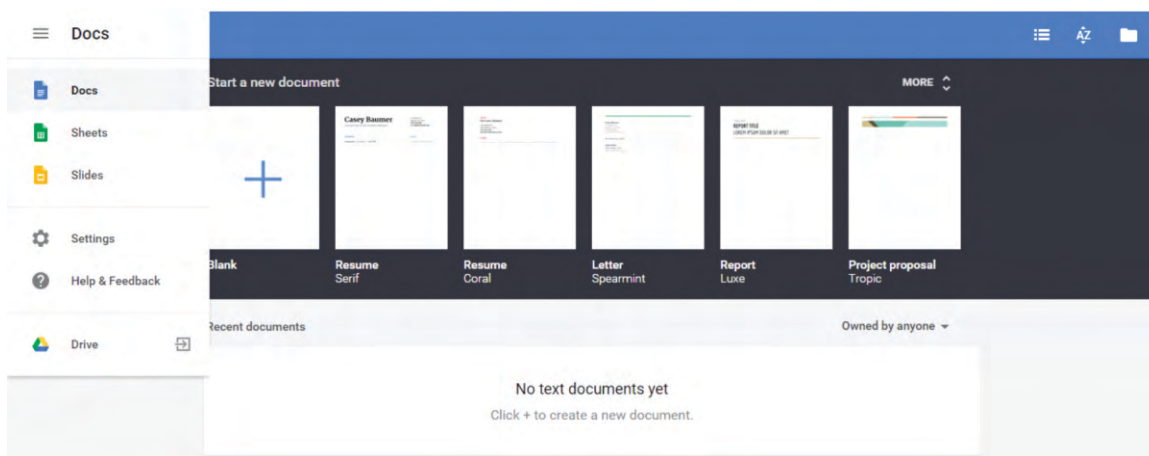


Fig. 6.20. Google Docs

6.2.8 Play Store

Google Play is Google's online store for purchasing and downloading apps, music, books, movies and similar content for use on Android-powered smartphones, tablets, Google TV and similar devices. The Google Play store, which comes pre-installed on Android devices, allows users to purchase, download and install applications from Google and third-party developers.



Fig. 6.21. Play Store

6.2.9 Google Drive

Google Drive is a service offered by Google that allows us to store and share files online. The service was launched on April 24, 2012 and provides 5 GB of free storage. Additional storage can be purchased for a monthly fee.



Fig. 6.22. Google Drive

6.2.9.1 Benefits of Google Drive

1. **Google Drive lets us send large files to our colleagues, clients and friends directly from our Gmail account.**
2. **Google Drive allows us to access our files remotely.** With Drive, all our files become available on the web.
3. **Google Drive has its own mobile application** which gives us access to our files on our iPhone or smartphone, no matter where we are!
4. **Google Drive has an efficient built-in search engine** which allows us to find content easily with a keyword search. We can also look for files by owner or by file type.
5. **Google Drive is equipped with an OCR (optical character recognition) function**, which allows us to search for words or expressions in scanned documents. For example, finding someone's name in an old newspaper article that was scanned and saved on Google Drive is possible .
6. **Google Drive allows users to open various types of files**, like.ai (Adobe Illustrator) and even .psd (Photoshop) files.
7. **Main Benefit- All the facilities described above are free.**

Note : On Google Drive, our data can't get lost, no matter what we do to our computer?

6.2.9.2 How to share file(s)?

1. Open Drive, or a file or folder we want to share.
2. Open the sharing box :
 - ➡ **While we have a file open** : Click **Share** in the top-right corner.
 - ➡ **While we have a folder open** : Click the share icon in the top-right.



From our file list in Drive : Select the name of a file or folder and click the share icon at the top .

3. Under “People” in the sharing box, type the email addresses of the people or Google Groups we want to share with. We can also search for contacts by typing them into the box.
4. Choose the type of access we want to give these users by clicking the dropdown arrow to the right of the text box:
 - ➡ **Can edit** : Users can edit the file or folder and share it with others
 - ➡ **Can comment** : Users can view and add comments to the file, but can't edit it. Folders can't be given comment access.
 - ➡ **Can view** : Users can see the file or folder but can't edit or comment on it
5. Click **Done**. The users will receive an email letting them know we've shared the file or folder with them.

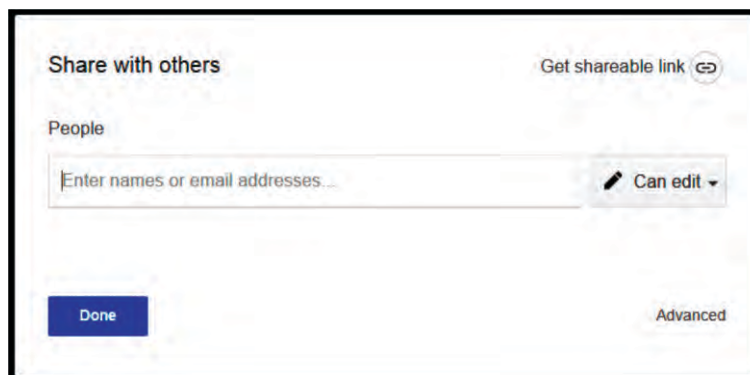


Fig. 6.23. Share file

6. If we want to share multiple files at once, add the files to a folder in Drive and then share the entire folder with the people we want to see the files.

6.3 How to download software's

Downloading is how we copy a file from a website to our computer, tablet, or device. An upload is when we send a file to a website. Downloads are mostly used for program installations, apps, documents, and anything else that we need a local copy of. Uploads are mostly used for sending documents.

The same basic steps apply to most downloads :

- ➡ Click the link.
- ➡ Choose open or save.
- ➡ Confirm the download.
- ➡ run or open the download.



6.4 Internet in Media

TV, radio, and the **Internet** used to be completely separate things, but that's no longer true with today's technology. We can now watch TV shows on our computer, and we can connect to the Internet on many TVs and DVD/Blu-ray players. In addition, radio stations from around the world allow us to listen online, and many online radio stations now exist.

6.4.1 On Line Newspaper

Online newspaper is the **online** version of a **newspaper**, either as a stand-alone publication or as the **online** version of a printed periodical. Going **online** created more opportunities for **newspapers**, such as competing with broadcast journalism in presenting breaking **news** in a more timely manner.



Fig. 6.24 On Line Newspaper

6.4.2 Online TV channels, Radio, Live programs(Streaming Media)

TV and radio on the Internet are examples of **streaming media**, which means the media **downloads while it's playing** so we don't have to wait for it to download first. Our smartphone or computer.

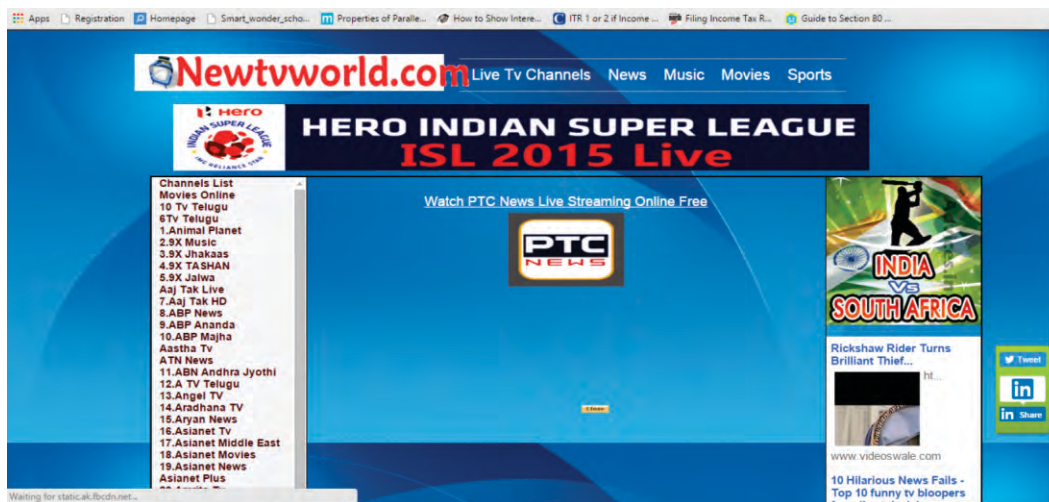


Fig. 6.25. Online TV channels, Radio, Live programs(Streaming Media)

Online radio is the distribution of audio broadcasts over the Internet. There are thousands of Internet radio stations that can be streamed to a software media player in a computer, mobile device, stand-alone Internet radio, media hub or media server. Often called "Webcasts," they come from several organizations as well as traditional AM and FM radio stations. If an Internet radio has built-in wireless connectivity, it may be called a "Wi-Fi radio."

The number of online TV services is growing by the day, and every time we wake up there seems to be dozens more ways to enjoy our favorite programs. For example we can listen live kirtan from Harmandir Sahib (Amritsar Punjab) on our smartphone or computer



Fig. 6.26. Live TV services

6.5 Cloud Networking

What is Cloud ?

The term Cloud refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location. Cloud can provide services over public and private networks, i.e., WAN, LAN or VPN.

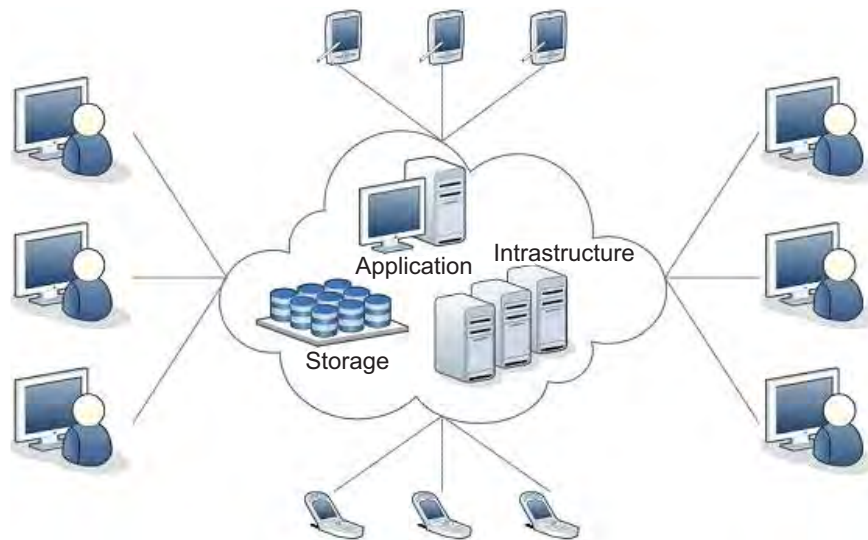


Fig. 6.27 Cloud Networking

Applications such as e-mail, web conferencing, customer relationship management (CRM) are executed on cloud.

Cloud networking refers to manipulating, configuring, and accessing the hardware and software resources remotely. It offers online data storage, infrastructure, and application.

Cloud networking offers platform independency, as the software is not required to be installed locally on the PC. In cloud networking it is simple to add more stuff. Cloud networking provides the ability to scale up and down when additional users are added and when the application requirements change.

6.5.1 Unique IP Address

Every machine on the Internet has a unique number assigned to it, called an IP address. Without a unique IP address on our machine, we will not be able to communicate with other devices, users, and computers on the Internet. We can look at our IP address as if it were a telephone number, each one being unique and used to identify a way to reach us and only us.

An IP address always consists of 4 numbers separated by periods, with the numbers having a possible range of 0 through 255. An example of how an IP address appears is : **192.168.1.10**

This representation of an IP address is called decimal notation and is what is generally used by humans to refer to an IP address for readability purposes. With the ranges for each number being between 0 and 255 there are a total 4,294,967,296 possible IP addresses.

Out of these addresses there are 3 special ranges that are reserved for special purposes. The first is the 0.0.0.0 address and refers to the default network and the 255.255.255.255 address which is called the broadcast address. These addresses are used for routing. The third address, 127.0.0.1, is the loopback address, and refers to our machine. Whenever we see, 127.0.0.1, we are actually referring to our own machine.

6.5.2 Cloud Printing

Wouldn't it be easier if we can **connect all our devices** including our tablets and phones **to one particular printer** and **print straight from any one of the devices**, from anywhere, as long as we're connected to the Internet?

Cloud Printing enable users to print documents and other materials on any device associated with the cloud(network). Users create content with any software



tool they want and transfer the file to a cloud printing service provider via whatever device they choose, which then routes the file to a cloud-attached printer at a location selected by the user.



Fig. 6.28. Cloud Printing

6.6 Internet Security

The Internet provides a wealth of information and services. Many activities in our daily lives now rely on the Internet, including various forms of communication, shopping, financial services, entertainment and many others. The growth in the use of the Internet, however, also presents certain risks. Just think about all the information we send over the Internet, such as personal messages, bank account information, photographs, etc.

As a typical Internet user, we have the reasonable expectation that our communications and transactions are private and secure. When we make a video call to a family member, we expect that nobody else is watching. When we buy something online with a credit card, we expect that nobody else can get access to our credit card details.

The Internet is indeed private and secure, but there are a number of serious security risks.

6.6.1 Virus/Anti-virus

A **computer virus** is a computer program that replicates itself into other computer programs and can cause damage to a computer's software, hardware or data. Once a

virus is present on a computer, it typically performs some type of harmful action, such as corrupting data or obtaining sensitive information.



Fig. 6.29. Virus

The best way to deal with the threat of a computer virus is to use antivirus software. Antivirus software helps to protect a computer system from viruses and other harmful programs. One of the most common ways to get a virus on our computer is to download a file from the Internet that is infected. Antivirus software scans our online activity to make sure we are not downloading infected files. Antivirus software also helps to detect and remove viruses from our computer system if we do get infected.

6.6.2 Spyware

Spyware is a program installed on our computer that sends information about us and how we use our computer to a third party, typically without being aware this is happening. Spyware often enters our system when we install some type of free software from an untrusted source. Since we authorized the installation, conventional protection methods, such as antivirus software, do not prevent spyware from getting installed in this manner.

Once the spyware program is installed, it starts collecting information. Some spyware programs are relatively harmless and collect very generic information that does not personally identify us. Other spyware programs may record our actual keystrokes, including any passwords, and may search through any of our files looking for something that looks like a credit card number. These types of spyware programs can definitely be harmful.

Once spyware has collected its information, it sends this to whoever created the program. Again, this happens without any notice. Removing the spyware can be

difficult - often the program installs itself again as quickly as we can delete it. To counter spyware, we need to use a dedicated spyware management tool. Some antivirus software are bundled with spyware management tools, but they are separate functions.

6.6.3 Trojan

A Trojan horse, often shortened to Trojan, is a type of malware designed to provide unauthorized, remote access to a user's computer. Trojan horses do not have the ability to replicate themselves like viruses; however, they can lead to viruses being installed on a machine since they allow the computer to be controlled by the Trojan creator. The term gets its name from the Greek story of the Trojan War, when the Greeks offered the Trojans a peace offering in the form of a large wooden horse. However, once the Trojans wheeled the horse behind their closed gates and night fell, the soldiers hidden inside the horse climbed out and opened the city gates, allowing the Greek army to infiltrate Troy and capture the city.



Fig. 6.30. Trojan

Trojan horse software operates the same way, where Trojan is our computer and the horse is the benign-seeming application.

6.6.4 Phishing Scams

Phishing is an e-mail fraud method in which the wrongdoer sends out legitimate-looking email in an attempt to gather personal and financial information from recipients. Typically, the messages appear to come from well-known and trustworthy Web sites. The message tricks people into providing sensitive information, such as their login details. A typical scam consists of a message that describes some issue with our account and requires us to login to our account to confirm something. The message looks very official, using logos and formal language, just like we would expect from a genuine source. When we follow the



link, the webpage looks very real - but if we look closely, the Internet address is actually not the official one.



Fig. 6.31. Phishing Scams

Financial institutions don't send out these types of messages. Don't follow the link.

6.6.5 Digital Signature

The centuries-old means of documenting transactions and creating signatures are changing fundamentally. Documents continue to be written on paper, but sometimes merely to satisfy the need for a legally recognized form. In many instances, the information exchanged to effect a transaction never takes paper form. It also no longer moves as paper do; it is not physically carried from place to place but rather streams along digital channels at a speed impossible for paper. Paper documents can be read efficiently only by human eyes, but computers can also read digital information. The basic nature of the transaction has not changed; however, the transaction's form, the means by which it is represented and affected, is changing. Digital signature technology generally surpasses paper technology.

Digital Signature is a digital code which is attached to an electronically transmitted document to verify its contents and the sender's identity.



Fig. 6.32. Digital Signature

Digital signatures are created and verified by means of cryptography, the branch of applied mathematics that concerns itself with transforming messages into

seemingly jumbled or meaningless forms and back again. For digital signatures, two different keys are generally used, one for creating a digital signature and another key for verifying a digital signature.

Things to Remember

1. E-mail allows us to send and receive messages to and from anyone with an email address, anywhere in the world.
2. A CAPTCHA is a type of test used in computing to determine whether or not the user is human.
3. All emails received are stored in the inbox.
4. Google Apps is a suite of Web-based applications from Google that includes e-mail, calendar, word processing, spreadsheet and presentations.
5. Every machine on the Internet has a unique number assigned to it, called an IP address.
6. Cloud networking refers to manipulating, configuring, and accessing the hardware and software resources remotely.
7. Cloud Printing enable users to print documents and other materials on any device associated with the cloud(network).
8. The Internet is indeed private and secure, but there are a number of serious security risks.
9. Phishing is an e-mail fraud method in which the wrongdoer sends out legitimate-looking email in an attempt to gather personal and financial information from recipients.
10. Digital Signature is a digital code which is attached to an electronically transmitted document to verify its contents and the sender's identity.

Exercise

1. Fill in the Blanks :

1. 'Gmail' is a free email service provided by
(a) Yahoo (b) Google (c) Rediffmail (d) Hotmail
2. Every machine on the Internet has a unique number assigned to it, called an
(a) Address (b) E-mail (c) ID (d) IP Address



3. A is a type of test used in computing to determine whether or not the user is human.
(a) CAPTCHA (b) DERTSA (c) HEPTCHA (d) NEPHCA
4. is a type of malware designed to provide unauthorized, remote access to a user's computer.
(a) Spyware (b) Trojan (c) Malware (d) Horse
5. TV and radio on the Internet are examples of media.
(a) Streaming (b) Limited (c) Online (d) Offline

2. True/False :

1. Spyware is an e-mail fraud method in which the wrongdoer sends out legitimate-looking email in an attempt to gather personal and financial information from recipients.
2. Google Drive does not allow us to store and share files online.
3. The best way to deal with the threat of a computer virus is to use antivirus software.
4. In BCC we type the addresses of people we want to send a copy of the mail to, without the other recipients knowing.
5. Digital signatures are created and verified by means of biography.

3. Short Answer Type Questions :

1. What is a CAPTCHA code ?
2. What do you mean by Google Apps ?
3. What is Digital Signature ?
4. Write the process of sending an e-mail.
5. Write the basic steps of downloading.
6. What is cloud printing ?
7. Name four anti virus software.

4. Long Answer Type Questions :

1. What is IP Address ? Explain.
2. Explain any three Google Apps.
3. Explain the process of creating an e-mail account in Gmail.
4. What are the benefits of google drive ?

Objective of this Lesson

- 7.1 Introduction
- 7.2 Main characteristics of Good Governance
- 7.3 History and development of E - governance
- 7.4 E - governance
- 7.5 Objectives of E governance
- 7.6 E - governance Models
 - 7.6.1 Government to citizens (G2C)
 - 7.6.2 Government to government (G2G)
 - 7.6.3 Government to employees (G2E)
 - 7.6.4 Government to businessman (G2B)
- 7.7 Areas of E - governance
 - 7.7.1 E- Governance in urban areas
 - 7.7.1.1 Transportation
 - 7.7.1.2 Online payment of bills and taxes
 - 7.7.1.3 Information and public relation key services
 - 7.7.1.4 Municipal services
 - 7.7.1.5 Roads and traffic management
 - 7.7.2 E- Governance in rural areas
 - 7.7.2.1 Agriculture
 - 7.7.2.2 Local information
 - 7.7.2.3 Disaster management
 - 7.7.2.4 Land record management
 - 7.7.2.5 Panchayat
 - 7.7.3 E - Governance in Health
 - 7.7.4 E - Governance in Education

7.1 Introduction

Before we start learning e-governance, we must know about meaning of governance. The concept of "governance" is not new. It is as old as human civilization. "Governance" means : the process of decision-making and the process by

which decisions are implemented. Various actors are involved in governance. An analysis of governance focuses on the formal and informal actors involved in decision-making and implementing the decisions. Government is one of the actors in governance. Other actors involved in governance vary depending on the level of government.

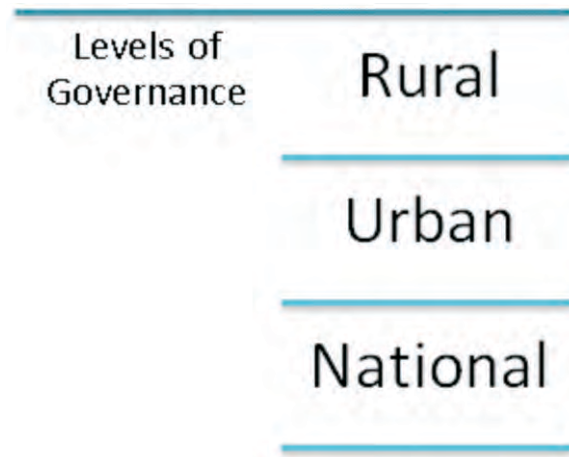


Fig. 7.1. Levels of Governance

Good governance is the processes of making and implementing decisions. It's not about making 'correct' decisions, but about the best possible process for making and implementing those decisions.

7.2 Main characteristics of Good Governance

1. Good governance is answerable to the community, for the consequences of decisions it has made.
2. Good governance is transparent which means that people are able to clearly see how and why a decision was made.
3. Good governance follows the rule of law.
4. Good governance is responsive which means that government always tries to serve the needs of the entire community timely and appropriately.
5. Good governance is effective and efficient in implementing decisions and follows processes that make the best use of the available people, resources and produce results that meet the needs of society.
6. Good governance is participatory. Anyone affected by or interested in a decision have the opportunity to participate in the process for making that decision. This can be done in several ways such as by providing community members with information, ask for their opinion, given the opportunity to

make recommendations or, in some cases, be part of the actual decision-making process.

7.3 History and development of E – governance

In India E-Governance originated during the seventies. At that time government adopted its applications in the areas of defense, economic monitoring and planning. The ICT was used to manage data related to elections, census, tax administration etc. After that, with the efforts of the National Informatics Center (NIC) all the district headquarters were connected during the eighties. From the early nineties, e-governance has used IT for wider sectoral applications with emphasis on reaching out to rural areas.

Earlier, a talk between a citizen and the Government takes place in a government office. But with the advancement of Information and Communication technologies, work culture of government offices has enhanced. Information and Communication Technologies has made it possible to locate service centers near to clients. Such centers may consist of an unattended kiosk in the government agency, a service kiosk located close to the client outside the government agency, or the use of a personal computer at home or office.

In all the cases public traditionally look for information and services addressing his/her needs. In both cases quality and efficiency are of great importance. Therefore, the establishment of e-Governance requires a good knowledge of the needs that exist in the society and that can be offered using ICT.

Due to widespread demand of E-governance and exponentially increasing size of data, new technologies like Open source solutions and cloud computing need to be used in working of government. Today, electricity, water, phone and all kinds of bills can be paid over the internet. All these work is what government and citizens are using and doing. All this depends on internet and when citizens depends on government internet services all that come is E-Governance.

7.4 E – governance:

Online working of a government or providing its services online to its citizens at their door step is known as E-Governance. In other words, E-Governance means online availability of government services.

In today's world the development of any country depends on the uses of E-Governance. E-Governance has made the working of government more efficient and



more transparent to its citizens. Success or failure of any government depends on three things :

1. The way the government works.
2. Transparency in its working and information.
3. Communication to its citizen.

In E-Governance, government makes best possible use of internet technology to communicate and provide information to common peoples and businessman.

There are four pillars of E-Governance :

1. **CONNECTIVITY** : Connectivity is required to connect the people to the services of the government.
2. **KNOWLEDGE** : The knowledge here is referred to as IT knowledge. Government employs skilled engineers who can make it possible to work e-governance in an efficient way.
3. **DATA CONTENT** : To share information over the internet, government possesses its database which should have the data content related to government services.
4. **CAPITAL** : Capital is referred to money used by government to provide their services.

7.5 Objectives of E – governance

The objective of e-governance is to support and simplify governance for all parties - government, citizens and businesses. In other words, in e-governance uses electronic means to support and encourage good governance. Therefore the objectives of e-governance are similar to the objectives of good governance.

The two main objectives of e-governance are :

1. To satisfactorily fulfil the public's needs and expectations by simplifying their interaction with various online services.
2. To facilitate a speedy, transparent, accountable, efficient and effective process for performing government administration activities.

Here we can say that e-governance is more than just a Government website on the Internet. Political, social, economic and technological aspects are determined in e-governance.



7.6 E-governance models

E-GOVERNANCE services can be shared between citizens, businessman, government and employees.

These four models of e-governance are as :

1. Government to citizens (G2C)
2. Government to government (G2G)
3. Government to employees (G2E)
4. Government to businessman (G2B)

7.6.1 Government to citizens (G2C)

This model of e-governance refers to the government services which are shared by citizens. In this model, citizens visit to the links of services that they want to use. This model strengthens the bond between government and its citizen. Type of services which are provided by this model includes:-

1. Payment of online bills such as electricity, water, telephone bills etc.
2. Online registration of applications.
3. Copies of land-record.
4. Online filling of complaints.
5. Availability of any kind of online information.

7.6.2 Government to government (G2G)

This model refers to the services which are shared between the governments. There is lots of information that need to be shared between various government agencies, department and organizations. These types of services or information are as :

1. Sharing of information between police department of various state.
2. Government document exchange which includes preparation, approval, distribution, and storage of all governmental documents, is also done through e-governance.
3. Most of the finance and budget works are also done through e-governance.



7.6.3 Government to businessmen (G2B)

Through this model, bond between private sector and government is strengthened. It is used by businessmen to communicate to the government. Type of services which are provided by this model includes:-

- 1 Collection of taxes.
- 2 Rejection and approval of patent is done by this model.
- 3 Payment of all kind of bills and penalty.
- 4 Sharing of all kind of information, rules and data.
- 5 Complaints or any kind of dissatisfaction can be shown by this.

7.6.4 Government to employees (G2E)

This model increases the transparency between government and its employee. Here, employee can keep a check on the functioning and working of government and government can keep track on its employees. Information that can be shared by this model :

1. All kind of data submission (attendance record, employee record etc.) from various government offices is done by this model.
2. Employee can file all kinds of complaints and dissatisfaction by this model.
3. All kind of rule- regulation and information for employees can be shared by this.
4. Employees can check their payment and working record.
5. Employees can register all kind of working forms online.

7.7 Areas of E governance

Today area of e-governance is very wide. E-Governance is implemented by government in almost every field. From urban states to rural areas, e-Governance has spread its root everywhere. Either its public or private sector, common man or businessman all is largely dependent on e-governance. Here we will go through different areas where e-governance is widely used. In the following section, the projects used in urban and rural areas of India are stated :

7.7.1 E-Governance in urban areas

7.7.1.1 Transportation

Services provided by e-governance in this area are :

1. Issue of learner licences, Issue of driving licenses, Renewal of driving licenses etc.



2. To provide transport related facilities online.
3. For online bookings, cancellation of seats, for enquiry about departure of buses, availability of seats and buses etc.
4. Issuance of Time Table of buses.
5. Provision of booking facility for Interstate transport.
6. Transportation Improvement Program.
7. Regional Transportation Plans.
8. Congestion Management Process.
9. Transportation Demand Management.

➡ Various projects such as

1. IRCTC (Indian Railway Catering and tourism Cooperation Ltd.) Offers online rail ticket booking, and checking of ticket reservation status.
2. HRTC (Himachal Road Transport Corporation project) is for online bookings, cancellation of seats, for enquiry about departure of buses, availability of seats and buses etc.

7.7.1.2 Online payment of bills and taxes

Services provided by e-governance in this area are :

1. Online Transactions such as payment of license fees, university fees, etc.
2. Payment of Bill such as online payment of electricity and water bills, utility bills, to avail of trade licenses and transact on government matters at these facilities.
3. Payment of taxes such as online payment of motor vehicle taxes, revenue taxes,
4. Payment of house EMIs.

➡ Various Projects such as

1. SAMPARK by Chandigarh government.
2. E-Suvidha by the government of Uttar Pradesh.
3. E-SEVA (Electronic seva) by Andhra Pradesh.
4. E-Mitra by the Government of Rajasthan



7.7.1.3 Information and public relation key services

With these kinds of projects people can get any kind of information with just a single click are as under :

1. Information about vacancies, tenders and market rates etc.
2. Village e-mail etc.

➡ Various projects such as

1. LokMitra by the government of Himachal Pradesh.

7.7.1.4 Municipal services

Services provided are as :

1. House Tax Assessment, Billing and Collection.
2. Maintaining records of Land & property. Certificates like Land sale Permission, Legal heir certificate.
3. Issue of Passport Verification Certificate.
4. Issue of Death and Birth Certificates.
5. Registration & Attorneys of properties such as computerization of the Document registration work at Sub Registrar Office.
6. Provide services such as issuance of certificates, issuance of orders in respect of Social Security Schemes such as old age pension, widow pension, freedom fighter pension etc.
7. Review and approval authority for site plans

➡ Various projects such as

1. SDO Suite by Assam government.
2. Rural Digital Services.

7.7.1.5 Roads and traffic management

Services provided by this type of e-governance is :

1. Network of Roads & Bridges.
2. Road construction and their maintenance.
3. Traffic Management.
4. Safety, Accident and pollution control.



➡ Various projects such as

1. RSPCB (Rajasthan State Pollution Control Board) by Govt. of Rajasthan.

7.7.2 Areas of e-governance in rural areas

In rural areas e-governance has its very powerful impact. Here, from agriculture to local information everything is done through e-governance.

7.7.2.1 Agriculture

Following are the projects used in Agriculture.

1. AGMARKNET : It is a project approved by Department of Marketing & Inspection (DMI), Ministry of Agriculture, and Government of India.
2. SEEDNET : It is a SEED informatics network under ministry of Agriculture, Government of India.

7.7.2.2 Local information

For local information such as personal information, prices of seeds, fertilizers, loan rates etc. government has started e-governance service in this area also.

➡ Various projects such as

1. E-Aadhar is a 12 digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India. This number serve as a proof of identity and address, anywhere in India. Aadhaar letter received via India Post and e-Aadhaar downloaded from UIDAI website are equally valid.
2. E-JanSampark : Services & Information accessible to the common man in his locality to meet his basic need. This project is started by Chandigarh.

7.7.2.3 Disaster management

To manage disaster, is a very big challenge for the government as these are natural phenomena and are unpredictable. To deal with these disasters, many state government have started e-governance service for this.

➡ Project in this area are :

1. Chetana by the state of Bihar is a Disaster management system which has been started to deal with natural disasters such as flood and earthquake.



7.7.2.4 Land record management

By facilitating e-governance service in this area, millions of land records can be maintain in a very short time span.

➡ Projects in this area are :

1. Land Records Management System State Government of Punjab.
2. Devbhoomi State Government of Uttarakhand.
3. Bhu-Lekh UP State Government of Uttar Pradesh.
4. E-Dhara State Government of Gujarat.

7.7.2.5 Panchayat

Services provided by e-governance in this area are :

1. Issue of Birth/Death certificate.
2. Application for inclusion of name in Voter list.
3. Conducting various welfare schemes for the poor and needy sections of the society.
4. Preparing district wise planning, implementing those plan, and review for success.
5. To provide wage employment to the needy from amongst the poorest section of the rural society.
6. Rural water supply and sanitation.

➡ Various projects :

1. E-GramViswa Gram Project by Gujarat.

7.7.3 E-governance in Health

Service provided by these projects are as :

1. Availability of medicines.
2. Special health camps.
3. Facilities at Anganwadi centers.

➡ Various projects are :

1. Hospital OPD Appointment : Hospital OPD Appointment System is welfare measure undertaken by Chandigarh Administration to make life of citizens simpler.



2. Another step taken ahead by PGI through its web portal for online registration and appointment with concerned doctors.
3. Online Vaccination Appointment for International Traveler : Citizen centric application for the purpose of vaccination of the persons proceeding abroad and issuance of International Health Certificate.

7.7.4 E-governance in Education

Providing basic education (elementary, primary, and secondary) to children.

1. Providing computer education to children.
2. Results for 10th & 12th classes.
3. Information on eligibility for “Distribution of books” scheme.

➡ Various projects are :

1. Online Scholarship Management System such as Ashirwad portal by Punjab Government : It is meant for the purpose of distribution of scholarships and fees reimbursement.

Things to Remember

1. "Governance" means : the process of decision-making and the process by which decisions are implemented.
2. Good governance is the processes of making and implementing decisions.
3. Good governance follows the rule of law.
4. The establishment of e-Governance requires a good knowledge of the needs that exist in the society and that can be offered using ICT.
5. In E-Governance, government makes best possible use of internet technology to communicate and provide information to common peoples and businessman.
6. E-GOVERNANCE services can be shared between citizens, businessman, government and employees.
7. IRCTC (Indian Railway Catering and tourism Cooperation Ltd.) Offers online rail ticket booking, and checking of ticket reservation status.
8. Online Scholarship Management System such as Ashirwad portal by Punjab Government is the purpose of distribution of scholarships and fees reimbursement.

‘ਸਮਾਜਿਕ ਨਿਆਂ, ਅਧਿਕਾਰਤਾ ਅਤੇ ਘੱਟ ਗਿਣਤੀ ਵਿਭਾਗ’ ਪੰਜਾਬ



Exercise

1. Multiple Choices :

1. G2C stands for
(a) Government to cooperation (b) Grievances to cooperation
(c) Government to citizen (d) None of these
2. G2G stands for
(a) Government to Government (b) Get to Go
(c) Gather to Go (d) None of these
3. G2E stands for
(a) Grievance to employee (b) Government to employee
(c) Government to environment (d) None of these
4. G2B stands for
(a) Government to Banks (b) Government to Businessmen
(c) Government to Business (d) None of these
5. IRCTC stands for
(a) Indian Railway Catering and tourism Cooperation ltd.
(b) Indian Runway Catering and tourism Cooperation ltd.
(c) Indian Railway Catering and travelling Cooperation ltd.
(d) Indian Railway Cargo and tourism Cooperation ltd.

2. Short Answer Type Questions :

1. What is E governance ?
2. What are the two main objectives of e-governance ?
3. Write the area of E-governance in urban ?
4. Write the area of E-governance in rural ?

3. Long Answer Type Questions :

1. Write the main characteristics of Good Governance
2. Explain the four pillars of E-Governance
3. Explain the four models of e-governance
4. Write about E-GOVERNANCE IN HEALTH and EDUCATION
5. Describe the history and development of E governance.