

OM-1/CCC-01/BCC-01

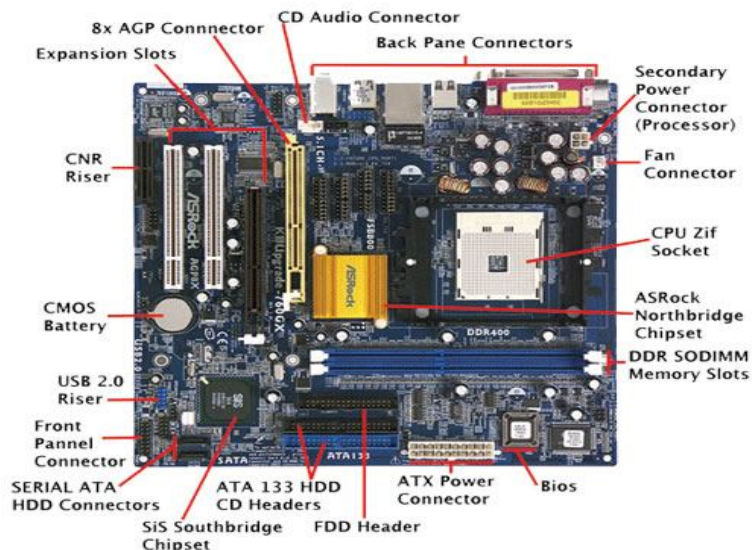
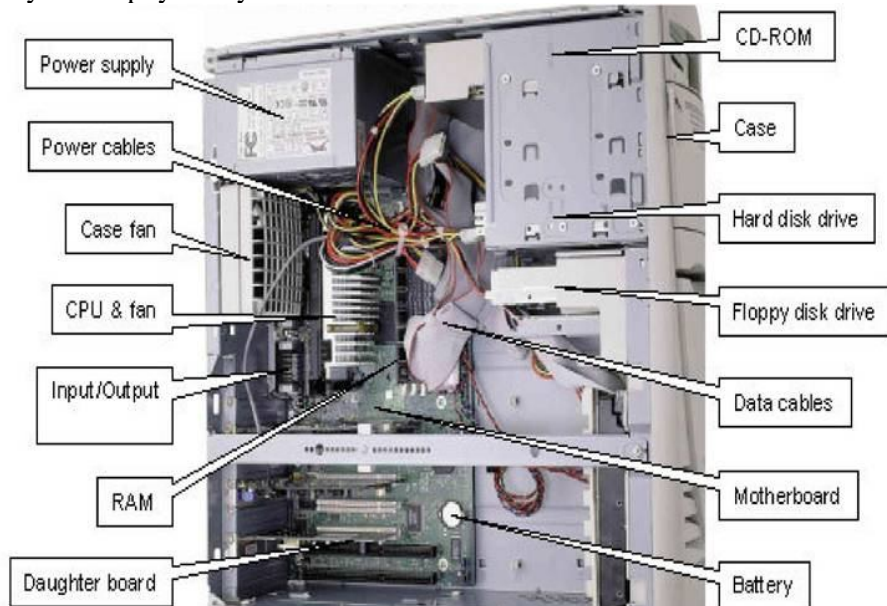
COMPUTER FUNDAMENTAL

Lecture - 1

Computer System= Hardware (H/W) + Software(S/W)

Common Operating Machine Purposely Used for Technological and Educational Research Or
Common Oriented Machine Particularly United and used under Technical and Educational Research.

Hardware :-Computer hardware is the collection of physical parts of a computer system. This includes the computer case, monitor, keyboard, and mouse. It also includes all the parts inside the computer case, such as the hard disk drive, motherboard, video card, and many others. Computer hardware is what you can physically touch.



Software :-Logical Components (We can or can not seen and do work something according to object/goal).

COMPUTER SYSTEM:-

❖ Hardware

- Input Devices (Ex:-Mouse,keyboard, Joystick,Light Pen,OMR,MICR,OBR etc)
- Processor(CPU).
- Output Devices(Ex Monitor,Speaker,Printer,Plotter, etc)

- Storage Devices(Ex Hard Disk,CD ROM,DVD ,Floppy Disk, Pen drive, Memory Chip)

❖ Software

Operating System Example :-MS WindowsXP,VISTA,MSDOS, LINUX,UNIX,Window 7 etc

Application S/W Example :- MS word, MS excel, MS Power Point etc

Development S/w Example:- C++, C#, Java, COBOL, PASCAL, BASIC etc

EXAMPLE OF HARDWARE (H/W):-

- Mouse (Left Button, Right Button and Scroll Button).

Name: Douglas Carl Engelbart

Born: January 30, 1925 in Portland, Oregon, USA

Death: July 2, 2013 (Age: 88)

Mouse Technique:-

- Click
- Double Click
- Drag
- Drag& Drop
- Point



- Keyboard

a) Cherry Keyboard (Costly and repairable).

b) Membrane (Cheaper & non repairable).

- CPU (Central Processing Unit)→It is the brain of computer.
- CPU Fan (It is used for cooling CPU).
- Motherboard/PCB (Printed Circuit Board)/Main Board).
- RAM (Random Access Memory).
- ROM (Read Only Memory).
- Hard Disk (It is used for storing programs/files/Images/Video/Graphics etc).
- CD ROM/DVD /Blu Ray Disk.
- CD Drive/DVD Drive/ Blu Ray Disk Drive.
- SMPS (Switched Mode Power Supply). It convert AC current into DC current.
- Monitor (CRT/LCD/LED/PLASMA).
- UPS (Uninterruptible Power Supply).
- Speaker. Etc

Software (S/W):-It is logical part of computer.

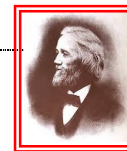
Example Software (S/W):-

- | | | | |
|---------------------|----------------------|----------------|------------|
| • MS word. | MS Excel. | MS PowerPoint. | MS Access. |
| • Tally. | Paint Brush. | Notepad. | Word Pad. |
| • Calculator. | Coral Draw. | PageMaker. | Photoshop. |
| • VLC media player. | Window Media Player. | Etc. | |

INTRODUCING THE COMPUTER KEYBOARD

Christopher Latham Sholes. Christopher Latham Sholes (February 14, 1819 – February 17, 1890) was an American inventor who invented the first practical typewriter and the QWERTY keyboard still in use today. The computer keyboard has lots of extra keys as well as letters and numbers. These keys will help you to use your computer and keyboard.

Move down this page to find out more about all these different keys.



ESSENTIAL KEYS

Space Bar. Press this to insert a space between words.

Enter Key This large key to the right of the letters is also sometimes called the Return Key. If you are keying in text you can press it once and the text cursor will move down to the next line. Press it twice to create a line space between paragraphs.

Backspace Key. This key deletes the last letter to the left of the cursor. You can use it to correct any mistakes as you type.

Delete Key. This key deletes the first letter to the right of the cursor.

Caps Lock. This is used for keying in capital letters. There's a light on the top of the keyboard to show whether the Caps Lock is on. It has often a letter A below it. Holding down the **Shift Key** at the same time as a letter key will also turn it into a capital letter.

NB Caps Lock does not give you the upper number key symbols. For these you need to use the **Shift Key**.

Shift Key. Hold this down to type capital letters and the symbols on the upper part of a key, e.g. the ! above 1. There is a Shift key on both sides of the keyboard.

Arrow Keys These move your text cursor around the screen. They can also move the page up or down, and left or right if it is wider than the screen.

USEFUL KEYS

Windows Key. This up the Start Menu and can also be used in combination with other keys for shortcuts.

Scroll keys. These are used to move the text cursor around words you are keying in or a web page you are viewing:

- **Home** takes the text cursor to the top of the page you are keying into or viewing
- **End** takes the text cursor to the bottom of the page you are keying in or viewing
- **Page Up** moves the text cursor up the screen
- **Page Down** moves the text cursor down the screen

Ctrl (Control) Keys. These are used for keyboard shortcuts, e.g. holding down Ctrl and pressing A (Ctrl-A) will select everything on a page. But take care! It's easy to press Ctrl by mistake for Shift - and then unexpected things may happen. If you think that you may have used a Ctrl key by accident, try using Ctrl-Z. This is the undo button, and will often get you back to where you were. There is a Ctrl key on both sides of the keyboard.

Alt Key. This is used in similar ways to Ctrl. If you have several windows open on your computer, you can press Alt and Tab together to switch between them.

Tab Key. This moves the text cursor to the next box in a table or a form.

Esc (Escape) Key. This clears any text that you have typed in a text box online.

Menu Key. This brings up a menu of commands, like clicking the right mouse button.

Number Key Pad. As well as the number row, the Number Key Pad also lets you type numbers. The Number Lock button must be pressed for this to work; there will be a light above it to show that it's on. There is also an Enter key in the Number Keys which works just like the one on the main keyboard.

List of Commands:-

Windows logo	Start
Windows logo + D	Display the desk top
Windows logo + M	Minimize all of the windows.
Windows logo + E	Open My Computer.
Ctrl + Windows logo + F	Search for a file or a folder.
Windows logo + F1	Display windows help.
Windows logo + R	Open the run dialog box.
Windows logo + U	Open utility manager.
Alt + Space + R	Restore size of open windows.
Alt + Space + X	Maximize Size of Windows.
Alt + Space + N	Minimize size of Windows.
Alt + Space + Tab	Minimize to maximize or minimize to restore.
Alt + Space	Open Control menu.

Alt/F10	Activate Menu Bar.
Tab	To select item.
F5	Refresh.
Alt+Underline Character	Open menu.
Ctrl+C	Copy.
Ctrl+X	Cut.
Ctrl+V	Paste.
Ctrl+Z	Undo.
Ctrl+Y	Redo/Repeat.
Ctrl+A	Select All.
Alt+-	Display the windows menu.
Shift+F10	Display the action shortcut menu for the selected item.
Ctrl+F10	Maximize the active consol windows.
Ctrl+F5	Restore the active consol windows.
F2	Rename The selected item.
Ctrl+F4	Close the active console windows.

Sl.No.	Short Cut Key	Effect
01.	Ctrl + B	Bold
02.	Ctrl + I	Italic
03.	Ctrl+U	Under Line
04.	Ctrl+Shift+D	Double Underline
05.	Ctrl+E	Center Align
06.	Ctrl+R	Right Align
07.	Ctrl+L	Left Align
08.	Ctrl+J	Justify
09.	Ctrl+1	Single Line Spacing
10.	Ctrl+2	Double Line Spacing
11.	Ctrl+5	1.5 Line Spacing
12.	Ctrl+C	Copy
13.	Ctrl+A	All Select
14.	Ctrl+V	Paste
15.	Ctrl+Insert	Copy
16.	Shift+Insert	Past
17.	Ctrl+X	Cut
18.	Ctrl+S	Save
19.	F12	Save As
20.	Ctrl+N	New Page
21.	Ctrl+Z	Undo
22.	Ctrl+Y	Redo
23.	Ctrl+[Decreasing Font Size
24.	Ctrl+]	Increasing Font Size
25.	Ctrl+Shift+>	Increasing Font Size
26.	Ctrl+Shift+<	Increasing Font Size
27.	Ctrl+P	Print
28.	Ctrl+Alt+I	Print Preveiw
29.	Ctrl+K	Insert Hyperlink

30.	Ctrl+D	Font Window
31.	Ctrl+Shift+F	Font Window
32.	Ctrl+Alt+N	View Normal
33.	Ctrl+Alt+O	Outline
34.	Ctrl+Alt+P	View Page
35.	Ctrl+=	Subscript
36.	Ctrl+Shift+=	Superscript
37.	Alt+Shift+D	Date
38.	Alt+Shift+T	Time
39.	Ctrl+Shift+W	Word Underline
40.	Ctrl+F3	Capitalize Word
41.	Ctrl+Shift+A	All Capital
42.	Ctrl+Shift+M	Indent Increase
43.	Ctrl+M	Indent Decrease
44.	Ctrl+Alt+L	Insert List Number
45.	Ctrl+Shift+L	Bullet
46.	Ctrl+W	Close
47.	Alt+F4	Close
48.	Ctrl+Alt+Z	Go Back
49.	F1	Help
50.	Shift+F5	Go Back
51.	Ctrl+G	Goto
52.	Ctrl+F	Find
53.	Ctrl+H	Replace
54.	Ctrl+Shift+L	Bullet
55.	F10	Menu
56.	Ctrl+O	Open
57.	Shift+F10	Short Cut Menu
58.	Alt+Space+N	Minimize Size of Windows
59.	Tab	To Select Item
60.	Ctrl+Enter	Break page/Enter New Page
61.	Alt +Ctrl+R	Register trademark Symbol
62.	Alt+ Ctrl +C	Copyright symbol
63.	Alt+Ctrl+T	The Trademark Symbol
64.	Shift+F1	Context sensitive help
65.	Alt+F+A	Save As
66.	Alt+V+H	Header & Footer
67.	Alt+V+Z	Zoom
68.	Alt+V+U	Full screen

BASIC PC SHORTCUT KEYS

Shortcut Keys	Description
Alt + F	File menu options in current program.
Alt + E	Edit options in current program
Alt + Tab	Switch between open programs

F1	Universal Help in almost every Windows program.
F2	Rename a selected file
F5	Refresh the current program window
Ctrl + N	Create a new, blank document in some software programs
Ctrl + O	<u>O</u> pen a file in current software program
Ctrl + A	Select all text.
Ctrl + B	Change selected text to be Bold
Ctrl + I	Change selected text to be in Italics
Ctrl + U	Change selected text to be Underlined
Ctrl + F	Open find window for current document or window.
Ctrl + S	<u>S</u> ave current document file.
Ctrl + X	<u>C</u> ut selected item.
Shift + Del	Cut selected item.
Ctrl + C	<u>C</u> opy selected item.
Ctrl + Ins	Copy selected item
Ctrl + V	<u>P</u> aste
Shift + Ins	Paste
Ctrl + K	Insert hyperlink for selected text
Ctrl + P	Print the current page or document.
Home	Goes to beginning of current line.
Ctrl + Home	Goes to beginning of document.
End	Goes to end of current line.
Ctrl + End	Goes to end of document.
Shift + Home	Highlights from current position to beginning of line.
Shift + End	Highlights from current position to end of line.
Ctrl + Left arrow	Moves one word to the left at a time.
Ctrl + Right arrow	Moves one word to the right at a time.
Ctrl + Esc	Opens the START menu
Ctrl + Shift + Esc	Opens Windows Task Manager
Alt + F4	Close the currently active program
Alt + Enter	Open the Properties for the selected item (file, folder, shortcut, etc.)

GENERAL WINDOWS KEYBOARD SHORTCUTS

Alt + Tab

Switch between open applications in all versions of Windows. Reverse the direction by pressing **Alt + Shift + Tab** at the same time.

Ctrl + Tab

Switches between program groups, tabs, or document windows in applications that support this feature. Reverse the direction by pressing **Ctrl + Shift + Tab** at the same time.

Alt + double-click

Display the properties of the object you double-click on in Windows 95 and later. For example, doing this on a file would display its properties.

Alt + Print Screen

Create a screen shot only for the active program window in all versions of Windows. For example, if you opened the calculator and did this only the calculator window would be created as a screen shot. If just the **Print Screen key** is pressed the whole screen will be made into a screen shot.

Ctrl + Alt + Del

Open the Windows option screen for locking computer, switching user, Task Manager, etc. in later versions of Windows. Pressing Ctrl+Alt+Del multiple times will reboot the computer.

Ctrl + Shift + Esc

Immediately bring up the Windows Task Manager in Windows 2000 and later.

Ctrl + Esc

Open the Windows Start menu in most versions of Windows. In Windows 8 this opens the Start screen and in Windows 3.x this would bring up the Task Manager.

Alt + Esc

Switch between open applications on Taskbar in Windows 95 and later.

Alt + Space bar

Drops down the window control menu for the currently open Windows program in Windows 95 and later.

Alt + Enter

Opens properties window of selected icon or program in Windows 95 and later.

Shift + Del

Will delete any file or other object without throwing it into the Recycle Bin in Windows 95 and later.

Hold down the Shift key

When putting in an audio or data CD that uses Autoplay, holding down the Shift key will prevent that CD from playing.

WINDOWS FUNCTION KEY SHORTCUTS

F1

Activates help for current open application. If you're at the Windows Desktop, this will activate the help for Windows.

F2

Renames a highlighted icon, file, or folder in all versions of Windows.

F3

Starts find or search when at the Windows Desktop in all versions of Windows.

F4

In Windows 95 and later this opens the drive selection or address bar when browsing files in Windows Explorer.

- Pressing **Alt + F4** closes the current open program window without a prompt in all versions of Windows.
- Pressing **Ctrl + F4** closes the open window within the current active window in Microsoft Windows. This only works in programs that support multiple windows or tabs in the same program window.

F6

While in Windows Explorer, this will move the cursor to different Windows Explorer pane or in Windows 7 browse available drives.

F8

Pressing F8 over and over as the computer is booting will start the computer in Safe Mode.

F10

Activates the File menu bar in all versions of Windows.

- Simulates a right-click on selected item. This is useful if right-click is difficult or impossible using the mouse.

WINDOWS KEYBOARD KEY SHORTCUTS

All versions of Windows

WINKEY

Pressing the Windows key alone opens or hides the Windows Start menu. In Windows 8, this opens or hides the Start screen.

WINKEY + F1

Open the Microsoft Windows help and support center.

WINKEY + Pause / Break key

Open the System Properties window.

WINKEY + D

Opens the Desktop to the top of all other windows.

WINKEY + E

Open Microsoft Windows Explorer.

WINKEY + F

Display the Windows Search or Find feature.

WINKEY + Ctrl + F

Display the search for computers window.

WINKEY + L

Lock the computer and switch users if needed (Windows XP and above only).

WINKEY + M

Minimizes all windows.

WINKEY + Shift + M

Undo the minimize done by WINKEY + M and WINKEY + D.

WINKEY + R

Open the run window.

WINKEY + U

Windows XP only

WINKEY + Tab

Cycle through open programs through the Taskbar.

Windows 7 and 8 only

WINKEY + 1-0

Pressing the Windows key and any of the top row number keys from 1 to 0 opens the program corresponding to the number of icon on the Taskbar. For example, if the first icon on the Taskbar was Internet Explorer, pressing WINKEY + 1 would open that program or switch to it if already open.

WINKEY + (Plus (+) or Minus (-))

Open Windows Magnifier and zoom in with the plus symbol (+) and zoom out with the minus symbol (-).

- Press the **WINKEY + ESC** to close the Magnifier

WINKEY + Home

Minimize all windows except the active window.

WINKEY + P

Change between the monitor and projection display types or how second screen displays computer screen.

WINKEY + T

Set the focus on the Taskbar icons

WINKEY + Left arrow

Shrinks the window to 1/2 screen on the left side for side by side viewing.

WINKEY + Right arrow

Shrinks the window to 1/2 screen on the right side for side by side viewing.

WINKEY + Up arrow

When in the side by side viewing mode, this shortcut takes the screen back to full size.

WINKEY + Down arrow

Minimizes the screen. Also, when in the side by side viewing mode, this shortcut takes the screen back to a minimized size.

Windows 8 only**WINKEY + ,**

Peek at the Windows Desktop.

WINKEY + .

Snap a Windows App to the sides of the screen. Pressing it multiple times will switch between the right and left-hand side of the screen or unsnap the app.

WINKEY + Enter

Open Windows Narrator

WINKEY + C

Open the Charms.

WINKEY + G

Cycle through Desktop gadgets.

WINKEY + H

Open Share in Charms.

WINKEY + I

Open the Settings in Charms.

WINKEY + J

Switch between snapped apps.

WINKEY + K

Open Devices in Charms.

WINKEY + O

Lock the screen orientation.

WINKEY + X

Open the power user menu, which gives you access to many of the features most power users would want to use such as Device Manager, Control Panel, Event Viewer, Command Prompt, and much more.

What Is Computer Lecture - 2

↓
Making for Calculations & Measurement.

↓
Based on Arithmetical and Logical.

↓
Arithmetic/Numeric Operation (+, -, *, /, ^, % (modulo operator/Remainder Operator)).
&

Logical Operation (True, False, Yes, No).

General Definition 1:-

It (Computer) can perform only those operations or calculations (Arithmetical and Logical), Measurement and controlling functions, which can be expressed there, result in terms of numerical or logical.

Program:-

The basic function/task/work of computer is the execution of program.

It is sequence of instructions, which operate on computer data to perform certain well-defined task or achieve a goal.

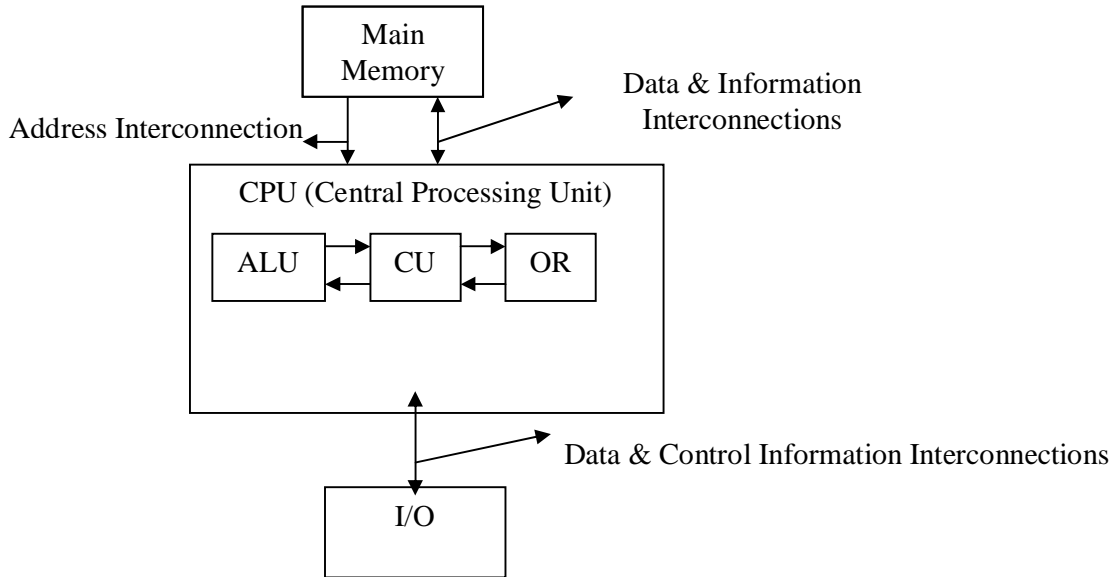
Data:- It is facts and figure that is represented in the form of 0 and 1. It is known as Bits (Binary Digits).

Modern Definition 2:-

It is an automatic electronic apparatus/Machine making for controlling operations and performing arithmetical and logical operations and can also perform measurement. Which can be expressed there result in terms of numerical or logical.

Structure of Computer

Structure of computer was given by **Von Neumann**. He was a British mathematician and physicist



Input Gives → instructions & data after Output → Produce Result (Numerical or Logical)

Explanation of Von Neumann Architecture:-

CPU:- It is the **brain** of computer which consist of following three components

- ❖ **ALU:-** By This unit it can perform all types of arithmetical and logical operations
- ❖ **CU:-** It is used for controlling operations inside CPU. It accept signal from out side & produce their corresponding signal. It is the **heart** of computer.
- ❖ **OR:-** It is a special type of temporary storage area where actual processing is to be performed by CPU. The size of register determines processing speed of CPU. Processing speed measured in MIPS. (Million Instruction Per Seconds) & Hertz unit.
ALU :- Arithmetic & Logic unit.
CU :- Control Unit.
OR :- Operational Register.

Main Memory:-

It is needed in a computer to store **instructions** and the **data** at the time of program execution. Computer data represented in the form of 0 and 1. It is known as **bits** (Binary digits).

0 Off/False/No/Black/Low.
1 On/True/Yes/White/High.

1	0	0	1	0	0	0	1
---	---	---	---	---	---	---	---

8 bits=One Byte.

One Nibble=1/2 of Byte Example:-1001

One Byte=One Character. Example:-VARANASI=8 Bytes=8*8=64 Bits.

- 1 Kilo Byte (KB) =1024 Bytes=2¹⁰ Bytes.
- 1 Mega Byte (MB) =1024 *1024 Bytes=2²⁰ Bytes.
- 1 Giga Byte (GB) =1024*1024*1024 Bytes=2³⁰ Bytes.
- 1 Tera Byte (TB) =1024*1024*1024 *1024 Bytes=2⁴⁰ Bytes.
- 1 Peta Byte (PB) =1024*1024*1024 *1024* 1024Bytes=2⁵⁰ Bytes.
- 1 Exabyte (EB) = 2⁶⁰ Bytes.

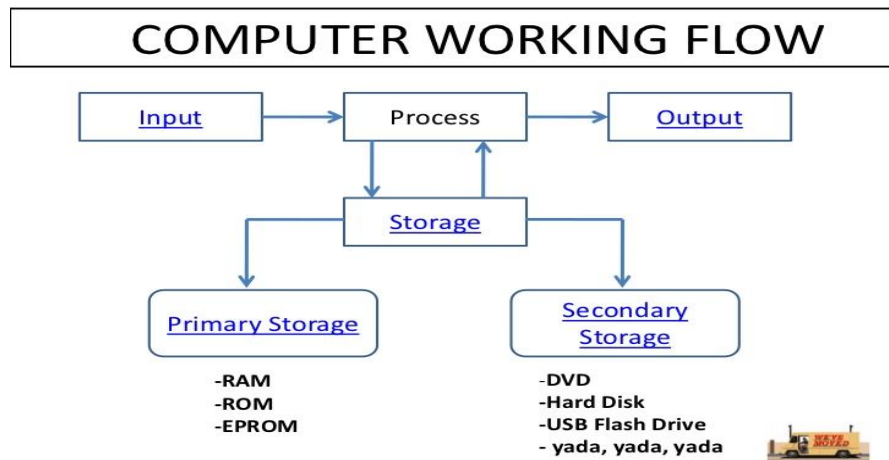
- 1 Zettabyte (ZB) = 2^{70} Bytes.
- 1 Yottabyte (YB) = 2^{80} Bytes.

Notes:- Bits was invented by Lady Ada. She had written First program of computer.

I/O Devices:- (Input/Output Devices)

Input → **Processing (CPU)** → **OUTPUT**

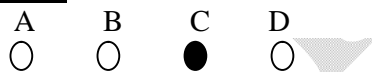
The term can also be used as part of an action; to "perform I/O" is to perform an **input** or **output** operation. I/O **devices** are used by a human (or other system) to communicate with a computer. For instance, a keyboard or mouse is an **input device** for a computer, while monitors and printers are **output devices**. **INPUT DEVICES.**



Input Devices:-

- ✓ Keyboard
 - Cherry Keyboard (Costly and repairable).
 - Membranes Keyboard (Cheaper & non repairable).
- ✓ Mouse
 - Trackball Mouse.
 - Optical Mouse.(Better Quality).
- ✓ Joystick. (It is used for playing game).
- ✓ Light pen.(It is used for drawing on screen directly).
- ✓ OMR. (Optical Mark Recognition/Reader).

Example:-



- ✓ OBR (Optical Bar Reader). It is used for identification of items. It interprets pencil marks on papers.



- ✓ MICR (Magnetic Ink Character recognition/Reader).→It is used in banking industry. **MICR** characters are printed on a document in either of the **MICR** fonts. The ink used in the printing is a magnetic ink or toner, usually containing iron oxide. The **MICR** text is passed before a **MICR** reader. The ink in the plane of the paper is first magnetized.



- ✓ **Scanner**:-It is used for scanning documents, graphics and images,signature in digital form.
- ✓ **Voice Speech Synthesizer**:-It is used for recognizing audio sound/voice.(Used in cockpit of airlines).



- ✓ **Mike.**
- ✓ **Gamepad, Joystick, Steering wheel.**
- ✓ **Pen / Stylus**
- ✓ **Webcam**
- ✓ **Biometrics (Thumb impression / Face detection)**
- ✓ **Digital cameras**
- ✓ **Electronic Whiteboard**
- ✓ **MIDI keyboard etc**

OUTPUT DEVICES:-

- ✓ **3D Printer**
- ✓ **Braille embosser:-**

Braille embossers are "printers" for Braille. Whereas a printer adds ink to a page to make visible characters, an embosser creates raised dots on a page to form braille characters.

- ✓ **Braille reader**

A **Braille reader**, also called a **Braille display**, is an electronic device that allows a blind person to read the text displayed on a computer monitor. The computer sends the text to the output device, where it is converted to Braille and "displayed" by raising rounded pins through a flat surface on the machine.

- ✓ **Flat panel**
- ✓ **GPS(Global Positioning System)**

GPS is a network of satellites that helps users determine a location on Earth

- ✓ **Headphones**

- ✓ **Computer Output Microfilm (COM):-**

Computer Output Microfilm is a system that converts stored data directly to microfilm or microfiche. Computer Output Microfilm systems are still used today, mostly by organizations who need to store payroll, accounting, insurance, inventory, or employee data

- ✓ **Monitor**

- ✓ **Plotter**:-A device that draws pictures on paper based on commands from a computer. Plotters differ from printers in that they draw lines using a pen. As a result, they can produce continuous lines, whereas printers can only simulate lines by printing a closely spaced series of dots. Multicolor plotters use different-colored pens to draw different colors.

- ✓ **Printer (Dot matrix printer, Inkjet printer, and Laser printer)**

- ✓ **Projector**

- ✓ **Sound card**:-A device which can be slotted into a computer to allow the use of audio components for multimedia applications.

- ✓ Speakers
- ✓ Speech-generating device (SGD):-
A **speech generating device** (SGD), also referred to as voice-output communication aids (VOCA), are electronic **devices** that allow the user to select messages to be spoken aloud, thereby assisting people who are unable to use natural **speech** to meet the majority of their communication needs.
- ✓ TV
- ✓ Video card:-A printed circuit board controlling output to a display screen.

VDU(Visual Display Unit)Produce Soft Copy/Electronic mode copy

- ✓ CRT Screen (Cathode Ray Tube)Pixels (.) are fundamental elements of images.
- ✓ LCD Screen (Liquid Crystal Display) Crystal rods are used for creating graphical object on screen.
- ✓ LED Screen (Light Emitting Diode)." An LED is an electronic device that emits light when an electrical current is passed through it. Early LEDs produced only red light, but modern LEDs can produce several different colors, including red, green, and blue (RGB) light. Recent advances in LED technology have made it possible for LEDs to produce white light as well.
- ✓ PLASMA Screen:-A plasma display is a computer video display in which each pixel on the screen is illuminated by a tiny bit of plasma or charged gas, somewhat like a tiny neon light.

Printer (Produce Hard Copy).

- ✓ **Impact Printer (Inked ribbon is used).**
 - Dot Matrix Printer (DMP). (It prints only mono /single color).
 - Daisy Wheel Printer.
 - Drum Printer.
 - Line Printer.
- ✓ **Non Impact Printer (Used chemical for printing).**
 - Inkjet printer (Cartridge is used).It print both types color and Mono color).
 - Laser Printer (Toner is used)It is the best printer in quality and speed.

Printing Speed measurement:-

- CPS (Character Per Second).
- PPM (Page Per Minute).
- ✓ Plotter.
It is used by architect engineer for graphical output on paper/Flex.
- ✓ Speaker (It produces Sound).
- Etc.

Both Input/Output devices:-

- ✓ MODEM (Modulator & Demodulator).
It is used for internet connection.

Analog Signal ↔ Digital Signal.



Analog Signal (Sine wave)

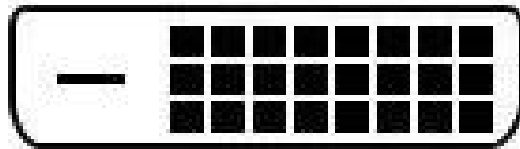


0 1 0 1 0 Digital Signal (Bit Trains).

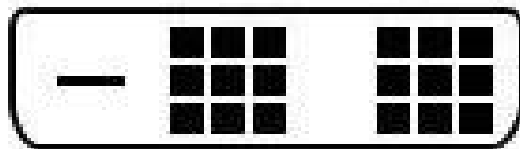
- ✓ Touch Screen.
- ✓ Communication Port.
- ✓ Network cards
- ✓ Headsets
- ✓ Facsimile Automated Xerox (FAX)
- ✓ Audio Cards / Sound Card etc

Connector:-Male and Female in computer System

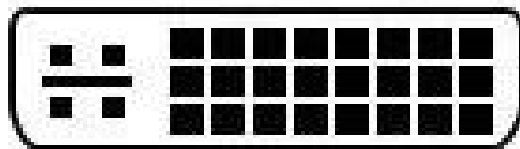
Male/Female Layout



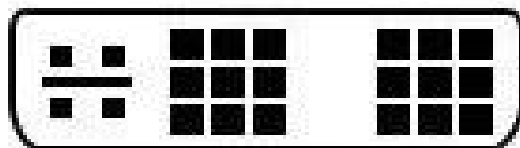
DVI-D (Dual Link)



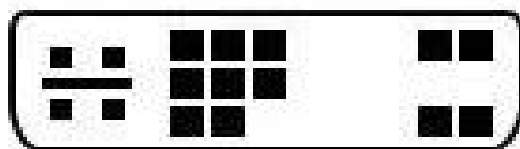
DVI-D (Single Link)



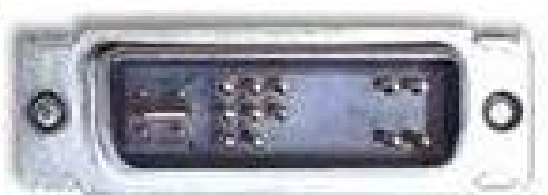
DVI-I (Dual Link)



DVI-I (Single Link)



DVI-A (Analog VGA)



Characteristics of Computer:-

- ✓ Speed.
- ✓ Accuracy.
- ✓ Memory.
- ✓ High Remembering power.
- ✓ Deligency.
- ✓ No Intelligency.
- ✓ Emotionless.
- ✓ Feeling less.
- ✓ Versatility.

Types of Computer:-

- ✓ Analog Computer (Consist of Analog Signal).
- ✓ Digital Computer(Consist of Digital Signal).
- ✓ Hybrid Computer (Consist of both types of signal).

Analog Computer:-

Such types of computers are used for measuring temperature, pressure, speed etc.

Example:-

- | | | |
|-------------|----|---|
| Thermometer | :- | It is used for measuring temperature. |
| Speedometer | :- | It is used for measuring speed. |
| Barometer | :- | It is used for measuring pressure of air. |

Digital Computer→ Classification Of computer:-

- ✓ Micro Computer.
- ✓ Mini Computer.
- ✓ Mainframe Computer.
- ✓ Super Computer.

Micro Computer:-

It is small computer, which is used for personal work.Or SOHO.

Example:-

- ✓ PC (Personal Computer)/Desktop PC.
- ✓ Laptop.
- ✓ Tablet.
- ✓ Palmtop.
- Etc.**

Mini Computer:-

Its configuration is larger than microcomputer which is used for small networking purpose. It may support 30 to 50 terminals simultaneously. Example:-PDP-8,Wi-Fi(Wire -Fidelity), Small networking system in bank.



Mini Computer System

Examples of Minicomputer would be:-MAI Basic4,DEC PDP and VAX Series,Prime Computer Prime 50,Wang Laboratories 2200 and VS Series,Data General Nova etc.

Mainframe Computer:-

It is also used for networking purpose. It is suited for big organization.

It may support above 500 terminals simultaneously.

Example:- MEDHA, DEC, Sperry etc.

Installation Arrangements Mainframe Computer:-

- ✓ Arrangements of Power.
- ✓ Arrangement of Special room and environment.
- ✓ Cost of Mainframes exists between 40000\$ to 1 Million dollar.
- ✓ Arrangement of LAN for making large network.
- ✓ Arrangement of computer professionals for working on terminal.

Super Computer:-

It is the fastest computing device, which is used for solving complex problems.

There are many CPU are used in Super Computer.

Example:-

PARAM PADMA.

CORAY.

INDIGINIOUS, Hitachi, EKKA.

Etc.

Application of Super Computer:-

- ✓ Airlines Controlling.
- ✓ Weather forecasting.
- ✓ Shuttle space controlling. (Atalantice, Colombia).
- ✓ Medical Science.
- ✓ Satellite controlling. Etc

Hybrid Computer:-

Hybrid computers are computers that exhibit features of analog computers and digital computers.

The digital component normally serves as the controller and provides logical and numerical operations, while the analog component often serves as a solver of differential equations and other mathematically complex equations..

It is used in Hospital, Nuclear controlling system, Hydrogenic System.

Lecture - 3

Section - A

Number System (Computer Data Representation Technique):-

When we type some letters or words, the computer translates them in numbers as computers can understand only numbers. A computer can understand positional number system where there are only a few symbols called digits and these symbols represent different values depending on the position they occupy in the number. There are different types of number system in computer.

- ✓ **Binary Number System**
 - 0 and 1Base /Radix=2.
- ✓ **Octal Number System**
 - Numbers/Symbol 0,1,2,3,4,5,6,7.Base/Radix=8.
- ✓ **Decimal Number System**
 - Numbers 0,1,2,3,4,5,6,7,8,9.Base/Radix=10.
- ✓ **Hexadecimal Number System**
 - Numbers 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15
 - 10=A,11=B,12=C,13=D,14=E,15=FBase/Radix=16/H.

Conversion:-

Decimal To Binary Numbers System

- ✓ Division Method
 - ✓ Tabular Method
- ... 2048 1024 512 256 128 64 32 16 8 4 2 1

Division Method:-

Example $(123)_{10} = (?)_2$

	2	123	Remainder
2	61	1	↑
2	30	1	
2	15	0	
2	7	1	
2	3	1	
2	1	1	
2	0	1	

$(123)_{10} = (1111011)_2$

Example $(209.45)_{10} = (?)_2$

	2	209	Remainder
2	104	1	↑
2	52	0	
2	26	0	
2	13	0	
2	6	1	
2	3	0	
2	1	1	
2	0	1	

.45*2	=0.90	=	0	
.90*2	=1.80	=	1	
.80*2	=1.60	=	1	
.60*2	=1.20	=	1	↓

$= (11010001.0111)_2$

Tabular Method

... 2048 1024 512 256 128 64 32 16 8 4 2 1

Example $(123)_{10} = (?)_2$

128 64 32 16 8 4 2 1
0 1 1 1 1 0 1 1

$(123)_{10} = (1111011)_2$

Example (17)₁₀ = (?)₂

16 8 4 2 1

1 0 0 0 1

$(17)_{10} = (10001)_2$

Example (27)₁₀ = (?)₂

16 8 4 2 1

1 1 0 1 1

$(27)_{10} = (11011)_2$

Example (81)₁₀ = (?)₂

64 32 16 8 4 2 1

1 0 1 0 0 0 1

$(81)_{10} = (1010001)_2$

Example (13)₁₀ = (?)₂

8 4 2 1

1 1 0 1

$(13)_{10} = (1101)_2$

Example (9)₁₀ = (?)₂

8 4 2 1

1 0 0 1

$$(9)_{10} = (1001)_2$$

Example (2)₁₀=(?)₂

$$\begin{array}{r} 2 \quad 1 \\ 1 \quad 0 \end{array}$$

$$(2)_{10} = (10)_2$$

Binary To Decimal:-

Example:- $(1111011)_2 = (?)_{10}$

$$\begin{aligned} & 1*2^6 + 1*2^5 + 1*2^4 + 1*2^3 + 0*2^2 + 1*2^1 + 1*2^0 \\ &= 64 + 32 + 16 + 8 + 0 + 2 + 1 \\ &= (123)_{10} \end{aligned}$$

Binary To Decimal:-

Example:- $(1111011.101)_2 = (?)_{10}$

$$\begin{aligned} & 1*2^6 + 1*2^5 + 1*2^4 + 1*2^3 + 0*2^2 + 1*2^1 + 1*2^0 + 1*2^{-1} + 0*2^{-2} + 1*2^{-3} \\ &= 64 + 32 + 16 + 8 + 0 + 2 + 1 + .5 + 0 + .125 \\ &= (123.625)_{10} \end{aligned}$$

Binary To Decimal(Using Tabular Method):-

Example:- $(1111011)_2 = (?)_{10}$

$$\begin{array}{r} 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \\ 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 1 \quad 1 \end{array}$$

$$64 + 32 + 16 + 8 + 0 + 2 + 1 = (123)_{10}$$

Arithmetic Operations:-

- ✓ Addition.(+)
- ✓ Subtraction.(-)
- ✓ Multiplication.(*)
- ✓ Division.(/)

Addition:-

Example:-1

$$\begin{array}{r} 111101 \\ + 111111 \\ \hline 1111100 \end{array}$$

Carry= ...16 8 4 2 1

Example:-2

$$\begin{array}{r} 111101 \\ 111101 \\ + 111111 \\ \hline 10111001 \end{array}$$

Carry= 101

Subtraction/Minus:-

$$\begin{array}{lcl} 0-0 & = & 0 \quad \text{Borrow}=0 \\ 1-0 & = & 1 \quad \text{Borrow}=0 \\ 1-1 & = & 0 \quad \text{Borrow}=0 \\ 0-1 & = & 1 \quad \text{Borrow}=1 \end{array}$$

Example1:-

$$\begin{array}{r} 111111 \\ - 111110 \\ \hline 000001 \end{array}$$

Example2:-

$$\begin{array}{r}
 1\ 1\ 0\ 0\ 1\ 0 \\
 -\ 1\ 1\ 1\ 1\ 1\ 1 \\
 \hline
 \rightarrow 1\ 1\ 1\ 0\ 0\ 1\ 1
 \end{array}$$

Negative result

Multiplication:-

$$\begin{array}{r}
 1\ 1\ 1\ 1\ 1\ 1 \\
 *111 \\
 \hline
 1\ 1\ 1\ 1\ 1 \\
 1\ 1\ 1\ 1\ 1 \\
 1\ 1\ 1\ 1\ 1 \\
 \hline
 1\ 1\ 0\ 1\ 1\ 0\ 0\ 1
 \end{array}$$

B=1

Division:-

$$(1101)_2 / (11)_2 = (?)_2$$

11	1 1 0 1	1 0.0101	Quotient
	1 1		
	0 00100		
	11		
	0 0 100		
	11		
	0 0 001		

Remainder

Section - B

Decimal to Octal:-

Example $(123)_{10} = (?)_8$

8	123	Remainder	↑
	15	3	
	1	7	
	0	1	

$= (123)_{10} = (173)_8$

Example $(523)_{10} = (?)_8$

8	523	Remainder	↑
8	65	3	
8	8	1	
8	1	0	
8	0	1	

$= (523)_{10} = (1013)_8$

Example $(503.66)_{10} = (?)_8$

8	503	Remainder	↑
8	62	7	
8	7	6	
8	0	7	

.66*8	=5.28	=5	↓
.28*8	=2.24	=2	
.24*8	=1.92	=1	
.92*8	=7.36	=7	

$$= (503.66)_{10} = (767.5217)_8$$

Octal to Decimal:-

Example:-1

$$(1013)_8 = (?)_{10}$$

$$1*8^3 + 0*8^2 + 1*8^1 + 3*8^0$$

$$512 + 0 + 8 + 3$$

$$=(523)_{10}$$

Example:-2

$$(313.35)_8 = (?)_{10}$$

$$3*8^2 + 1*8^1 + 3*8^0 + 3*8^{-1} + 5*8^{-2}$$

$$192 + 8 + 3 + .375 + .0789$$

$$=(203.4539)_{10}$$

Binary To Octal :-

Example

$$(11111111.110001)_2$$

$$\begin{array}{ccccccc} \overleftarrow{01} & \overleftarrow{11} & \overleftarrow{11} & \overleftarrow{11} & \overleftarrow{11} & \overleftarrow{00} & \overleftarrow{01} \\ 011 & 111 & 111 & 110 & 001 & & \end{array}$$

$$\begin{array}{l} 011=3 \\ 111=7 \\ 111=7 \\ 110=6 \\ 001=1 \\ (377.61)_8 \end{array}$$

Decimal To HexaDecimal :-

Example $(503)_{10} = (?)_{16}$

16	503	Remainder
16	31	7
16	1	15=F
16	0	1

$$=(1F7)_{16}$$

Example $(523.45)_{10} = (?)_{16}$

16	523	Remainder
16	32	11=B
16	2	0
16	0	2

$$.45*16 = 7.20 = 7$$

$$.2*16 = 3.2 = 3$$

$$.2*16 = 3.2 = 3$$

$$=(20B.733)_{16}$$

HexaDecimal To Decimal :-

$$(1F7)_{16} = (?)_{10}$$

$$=1*16^2 + F*16^1 + 7*16^0$$

$$=256 + 15*16 + 7$$

$$=256 + 240 + 7$$

$$=256 + 247$$

$$=(503)_{10}$$

Binary to HexaDecimal:-

$$(11111111.110001)_2$$

$$\begin{array}{ccccccc} \overleftarrow{1111} & \overleftarrow{1111} & \overleftarrow{11} & \overleftarrow{00} & \overleftarrow{01} & \overleftarrow{00} & \overleftarrow{01} \\ 1111 & 1111 & 11 & 00 & 01 & 00 & 01 \\ 1111=15=F & & & & & & \\ 1111=15=F & & & & & & \\ 1100=12=C & & & & & & \\ 0100=4 & & & & & & \\ (FF.C4)_{16} & & & & & & \end{array}$$

Compliments:-

1's Complement.

2's Complement.

Example:-1

1's Complement = $\begin{matrix} 1 & \longrightarrow & 0 \\ 0 & \longrightarrow & 1 \end{matrix}$

$(10001)_2 \longrightarrow 01110$

Example 1's

:-2

2's Complement = 1's Complement + 1

$(10001)_2 \longrightarrow 01110 + 1 = 01111$

Sign Magnitude:-

$\begin{matrix} + & 0 \\ - & 1 \end{matrix}$

Example:-

$(-17)_{10} \longrightarrow +17 \longrightarrow 010001 \xrightarrow{1's} 101110 \xrightarrow{2's} 101110 + 1 = 101111$

Lecture - 4

Logic Gates:-

It is used for making digital circuit. A logic gate is an electronic circuit which produces a typical output signals depending on its input signal.

Or

A **logic gate** is an elementary building block of a digital circuit. Most **logic gates** have two inputs and one output. At any given moment, every terminal is in one of the two binary conditions low (0) or high (1), represented by different voltage levels. There are many types of gates.

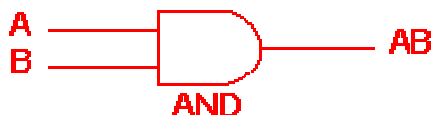
- ✓ AND Gate.
- ✓ OR Gate.
- ✓ NOT Gate.
- ✓ NAND Gate.
- ✓ NOR Gate.
- ✓ EX-OR Gate.
- ✓ EX-NOR Gate.

Input values in gates are used either or both Boolean numbers 0(F) and 1(T).

Logic gates

Digital systems are said to be constructed by using logic gates. These gates are the AND, OR, NOT, NAND, NOR, EXOR and EXNOR gates. The basic operations are described below with the aid of [truth tables](#).

AND gate



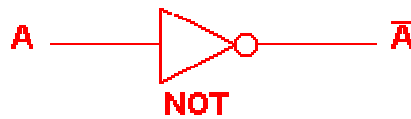
2 Input AND gate		
A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

OR gate

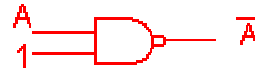
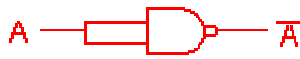


2 Input OR gate		
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

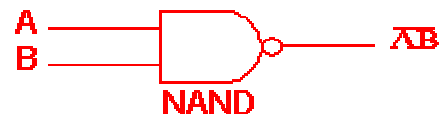
NOT gate



NOT gate	
A	\bar{A}
0	1
1	0

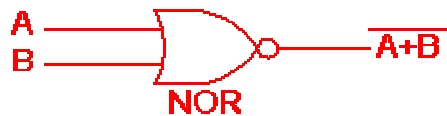


NAND gate



2 Input NAND gate		
A	B	$\bar{A} \cdot \bar{B}$
0	0	1
0	1	1
1	0	1
1	1	0

NOR gate



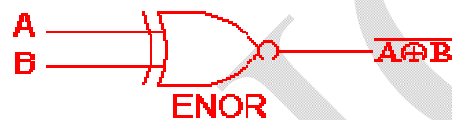
2 Input NOR gate		
A	B	$\bar{A} + \bar{B}$
0	0	1
0	1	0
1	0	0
1	1	0

EXOR gate



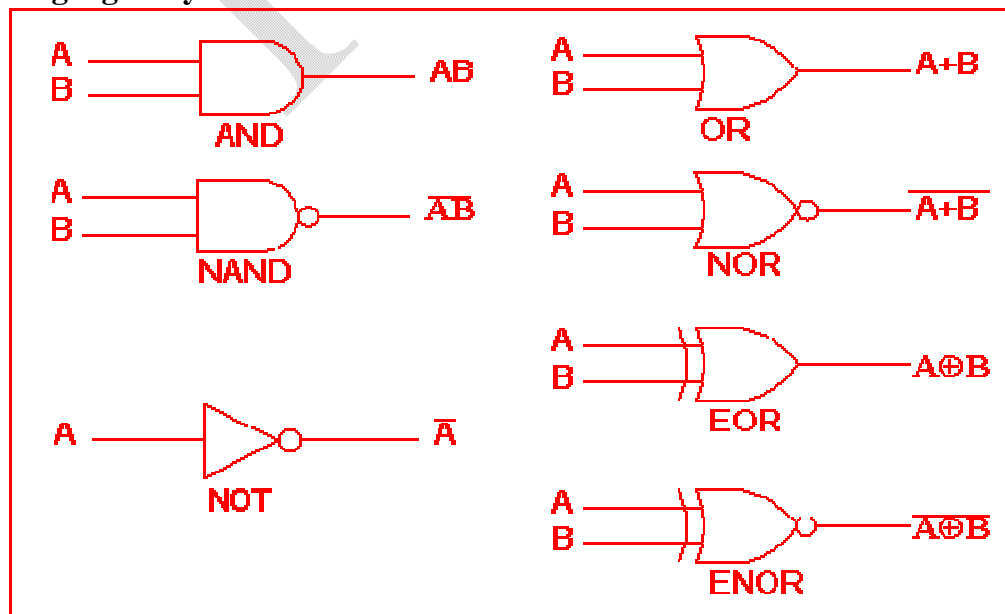
2 Input EXOR gate		
A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

EXNOR gate



2 Input EXNOR gate		
A	B	$\bar{A} \oplus \bar{B}$
0	0	1
0	1	0
1	0	0
1	1	1

Table 1: Logic gate symbols



Note:-

Functionally Complete set of gates:-

A set of gates by which any Boolean function can be implemented is called a functionally complete set. The functionally complete sets are:

[AND, NOT],[NOR],[NAND],[OR,NOT]

PARITY BITS:-

It is an additional bits, which is used for finding and correcting errors in system.

There are two types of parity bits.

Or

A parity bit, or check bit is a bit added to the end of a string of binary code that indicates whether the number of bits in the string with the value one is even or odd. Parity bits are used as the simplest form of error detecting code.

✓ Odd parity bit

✓ Even parity bit

Example:-

Find out odd and even parity bit of following numbers.

$(1000101)_2$

Solution:-

Odd parity bits of 1=0

Even parity bits of 1=1

Odd parity bits of 0=1

Even parity bits of 0=0

Example:-

Find out odd and even parity bit of following numbers.

$(00001)_2$

Solution:-

Odd parity bits of 1= 0

Even parity bits of 1= 1

Odd parity bits of 0= 1

Even parity bits of 0= 0

CODING SYSTEM:-

A coding system is the patterns of 0s and 1s combinations used to represent characters.

There are following coding system uses in computer.

BCD → (Binary Coded Decimal)

EBCDIC → (Extended Binary Coded Decimal Interchange Code)

ASCII → (American Standard Code for Information Interchange)

BCD (Binary Coded Decimal):-

It is four bits of coding

. It is also known as 8-4-2-1.

d1	d2	d3	d4
----	----	----	----

Weight of d1= $2^3=8$.

Weight of d2= $2^2=4$.

Weight of d3= $2^1=2$.

Weight of d4= $2^0=1$.

One nibble= $\frac{1}{2}$ of a byte=4 Bits.

EBCDIC (Extended Binary Coded Decimal Interchange):-

It is eight bits of coding system, which is used in only mainframe computer system.

The Extended Binary Coded Decimal Interchange Code is an 8-bit code which therefore permits $2^8 = 256$ distinct characters. This code allowed for the coding of international characters.

d1	d2	d3	d4	d5	d6	d7	d8
----	----	----	----	----	----	----	----

ASCII (American Standard Code For Information Interchange)

(Or Alpha Numeric Codes)

It is also eight bits of coding system. It is used in microcomputer system.

Its value exist between 0 to 255. There are two categories of ASCII codes.

a:-Standard ASCII codes → (0-127)

Non Printing ASCII Codes 0-31

Printing ASCII Codes 32-127

b:-Extended ASCII codes 128-255

It is used for making symbols.

Example:-

65-90 A-Z

97-122 a-z

⌘=204, Σ=228, Θ=239, ≡=240, √=251

⌘ Σ

Alt+ASCII codes (Numeric Key Pads)

Lecture - 5 HISTORY OF COMPUTER:-

Computer developed before 300BC at China. This computing device was known as abacus.

- ✓ Mechanical Computer.
- ✓ Electromechanical computer.
- ✓ Electronic Computer.

Mechanical Computer:-

It was very first attempt towards automatic computing device. Blaise Pascal designed a mechanical computer that was known as Pascaline. It consist of a lot of gears and chains. It can perform repeated addition and subtraction. After some time the grand father (Charles Babbage) of modern computer also designed following two mechanical computer.

- ✓ Difference Engine.
- ✓ Analytical engine by Babbage.

Above both kinds of mechanical computer can perform repeated addition, subtraction, multiply, division, solving polynomial equation and trigonometric problems.

Blaise Pascal → Date of Birth 19 June 1623 → France Date of Died 19 August 1662 → Paris

Charles Babbage → Date of Birth 26 Dec 1791 → London Date of Died 18 October 1871 → London

Electromechanical computer.

It was the next attempt towards automatic electronic apparatus that was afforded by Howard Aiken at Harvard University. He designed first electromechanical computer that was known as MARK-I. It was sponsored by IBM and UN Navy.

Date of Birth 8 March 1900 → Hoboken New Jersey → Died 14 March 1973

Electronic computer:-

Generation:-

- ✓ First generation → (1942 to 1955).
- ✓ Second Generation → (1955 to 1964).
- ✓ Third Generation → (1964 to 1975).
- ✓ Fourth Generation → (1975 to 1990).
- ✓ Fifth generation → (yet to come).

First generation:-

In this generation vacuum tube was used in processor (CPU) technology. There are many types of vacuum tubes.

- ✓ Diode (Cathode & Anode Plate)
- ✓ Triode (Cathode, Anode Plate & Suppressor Grid).
- ✓ Tetrode (Four plates).
- ✓ Pentode (Five plates).

Using vacuum tubes following types of electronic computers was designed.

- ✓ ENIAC (Electronic Numerical Integrator and calculator).

- ✓ EDVAC (Electronic Discrete Variable automatic Computer).
- ✓ UNIVAC (Universal Automatic Computer).

Characteristics of ENIAC:-

- ✓ It was Very Giant Machine.
- ✓ Its weight was 30 tones.
- ✓ It may perform 5000 addition or 500 multiplications per minute.
- ✓ It occupies a number of rooms.
- ✓ It needed a lot of electricity.
- ✓ It needed a lot of cooling requirements.
- ✓ It emitted a lot of heat.
- ✓ Portability is very complex task.
- ✓ There were 18000 vacuum tubes were used.
- ✓ Punched cards were used as input device.
- ✓ Magnetic tapes & magnetic drums were used as secondary memory.
- ✓ Binary codes or Machine language was used for programming.
- ✓ ENIAC was based on decimal arithmetic rather than binary arithmetic.

Second generation:-

In this generation vacuum tube was replaced by **transistor**. By using transistor IBM (International business Machine) designed **IBM 700** series of processors. It consumes less electricity and cooling requirement system. Its speed was faster than first generation computer.

Example of transistor:-

n-p-n	Transistor.
p-n-p	Transistor.
n-p	Transistor.
p-n	Transistor.

Transistor based processor much faster than vacuum-based processor.

Third generation:-

In this generation, integration technology known as **IC** (Integrated Circuit) was used. It consists of a lot of transistor, capacitor and other electronics components.

IC Technology:-

SSI	(Small Scale Integrator).
MSI	(Medium Scale Integrator).
LSI	(Large Scale Integrator).
VLSI	(Very Large Scale Integrator).
ULSI	(Ultra Large Scale Integrator).
<u>SSI</u>	Number of gates below 100.
<u>MSI</u>	Number of gates upto 100 or more.
<u>LSI</u>	Number of gates upto 1000.
<u>VLSI</u>	Number of gates upto 10^6 (Chips).
<u>ULSI</u>	Number of gates upto 10^8 (Micro Chips).

Transistors, capacitor and conductors are fabricated on a semiconductor material such as silicon, germanium.

Feature of IC:-

- ✓ Increase reliability.
- ✓ Low cost
- ✓ Greater operating speed
- ✓ Better portability
- ✓ Reduction in power and cooling requirements.

Fourth generation:-

In this generation, **VLSI** based technology used in processor (CPU) used.

Feature:-

- ❖ Smaller.
- ❖ Faster.

❖ GUI (Graphic User Interface) .

Fifth generation:-

In this generation, **ULSI** based technology used in processor.

Example:-

- ✓ ROBOT.
- ✓ Fighter Plane.
- ✓ Shuttle Space Plane (Its speed=40000KM/Hour).
- Etc.

List of Intel microprocessors. This generational and chronological list of Intel processors attempts to present all of Intel's processors from the pioneering 4-bit 4004 (1971) to the present high-end offerings, which include the 64-bit Itanium 2 (2002), Intel Core i7, and Xeon E3 and E5 series processors (2015).

Intel Company designed first microprocessor 4004 in 1971 .It was specific purpose processor.

Intel Company designed second microprocessor 8088 in 1974 .It was general purpose processor.

Intel Company designed Third microprocessor 8086 in 1978 .It was general purpose processor.

Intel Company designed Fourth microprocessor 80386 in 1985-1988.It was general purpose processor.

Intel Company designed Fifth microprocessor 80486 in 1989-1991 .It was general purpose processor.

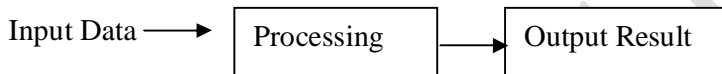
Intel Company designed Sixth microprocessor Pentium I in 1993-1995 .It was general purpose processor.

Intel Company designed Seventh microprocessor Pentium II in 1997 .It was general purpose processor.

Intel Company designed Eighth microprocessor Pentium III in 1999 .It was general purpose processor.

Intel Company designed Ninth microprocessor Pentium IV in 2000 .It was general purpose processor.

Working System of Computer System:-



Process:-

Running state of program is called process.

Process –State Transition Diagram:-

There are following four categories for process states

- 1:- Dormant State (Creation of jobs/threads/Processing Elements).
- 2:- Ready State (Processing elements are ready to acquire all resources except CPU).
- 3:- Running State (Execution of jobs in CPU).
- 4:- Suspended (Due to lack of resources).

Types of Processing:-

There are two types of processing in computer system

- ❖ On line processing/Real Time processing(A device directly connected with CPU).
- ❖ Off Line Processing/Batch Processing(A device not directly connected with CPU).

On line processing/Real Time processing:-

When processing takes place immediately as soon as the data is entered into the computer .It is called on line processing.It provide quick response.

Off Line Processing/Batch Processing:-

When processing takes place on the stored data to get an output it is called **off line processing**.

Example:- Data Stored and processed later stage.

Processing speed and performance determine by using technique of OR.

Block diagram of Processor:-

Feature of IBM 1401 PC XT:-

- ✓ It was announced in late 1950.
 - ✓ Memory capacity was 16000 characters/Bytes
 - ✓ SSI,MSI,LSI technology was used
 - ✓ Processing speed measured in MIPS
- Events Occur

Feature of IBM PC AT:-

- ✓ It was announced in 1984.
- ✓ Memory capacity was 200 times more characters than IBM 1401.
- ✓ VLSI technology was used in this processor.
- ✓ PC AT stand for personal computer advanced technology.
- ✓ Processing speed of PC AT is more than IBM 1401 PC.
- ✓ Size of operational register is more than IBM 1401 PC (Processing speed measured in MIPS).
- ✓ It is chips based processor.

Note:-Chips

Small components that contains a large amount of electronic circuitry. They are building blocks of A computer and perform various functions such as doing arithmetic, serving as computer memory or controlling other chips.

Lecture - 6

Memory System in Computer:-

It is used for storing instructions and data permanently or temporarily for further use. It may also store audio, video, images, graphics ,s/w etc.

Or

Memory in a computer system is required for storage and subsequent retrieval of the instructions and data.

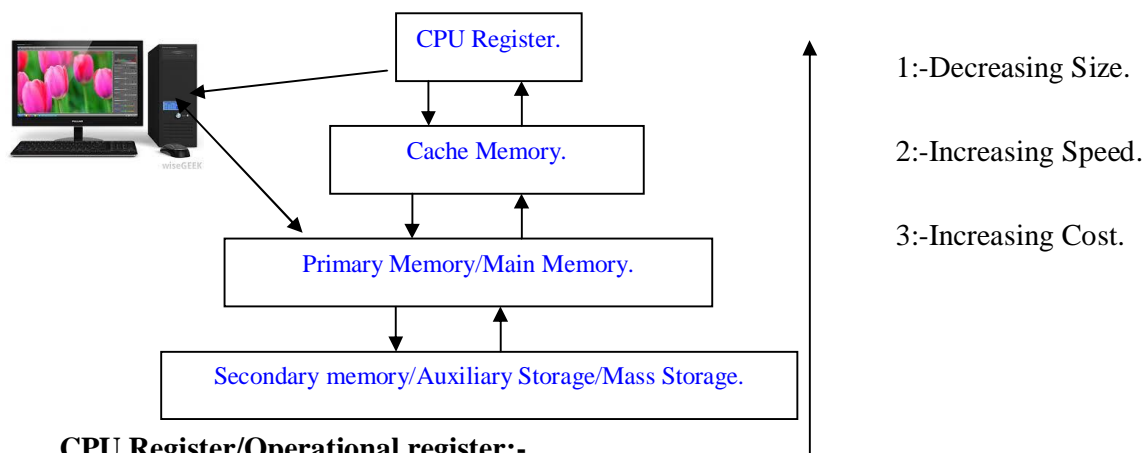
Or

Computer memory is any physical device capable of storing information temporarily or permanently. For example, Random Access Memory (RAM), is a volatile memory that stores information on an integrated circuit used by the operating system, software, and hardware.

Example:-

Hard Disk/Electromagnetic Disk.	CD ROM (Optical Memory).	DVD(Optical Memory).
BLU Ray Disk (Optical Memory).	Audio/Video Cassette (Magnetic tape)	
Pen Drive/Flash Memory.	Zip Disk.	
Floppy Disk (Magnetic Disk).	Memory Chips.	RAM, ROM Etc.

Memory Hierarchy:-



CPU Register/Operational register:-

It is the fastest memory in speed and smallest in size. It is very costly. It determines processing speed of CPU. Its speed measured in MIPS.

M Million
I Instruction
P Per
S Second

Larger the size of register faster may be the speed of CPU.

Example:-

32 bits register Size→Slower Speed.
64 bits register size→Relatively faster speed.

Cache memory/High Speed Memory:-

It is placed between CPU register and primary memory. It is used for increasing speed of CPU.

Primary Memory/Main Memory:-

It consists of semi conductor materials. Like Silicon(Si) and Germanium(Ge).

There are two types of primary memory.

- ✓ RAM(Random Access Memory).
 - SRAM(Static Random Access Memory).
 - DRAM(Dynamic Random Access Memory).
- ✓ ROM(Read Only Memory).
 - PROM(Programmable Read Only memory).
 - EPROM(Erasable PROM).
 - EEPROM(Electrically EPROM).

Example:- BIOS(Basic Input Output System)/Firmware.

Difference Between RAM and ROM

<u>RAM</u>	<u>ROM</u>
Volatile.	Non Volatile.
Uses by both users and System.	Only for System.
Consist of Si And Ge.	Consist of Si And Ge.

Difference Between SRAM and DRAM

<u>SRAM(Static Random Access Memory)</u>	<u>DRAM(Dynamic Random Access Memory)</u>
No loss of electrical Signal ($1 \leftrightarrow 1, 0 \leftrightarrow 0$).	loss of electrical Signal($1 \rightarrow 0, 0 \rightarrow 1$).
No need of refreshment.	Need of refreshment.
It is made with transistors.	It is made with cells that stores data as charge capacitors.

Difference between ROM, PROM, EPROM and EEPROM

<u>Name of Memory</u>	<u>Write Time</u>	<u>Access Time</u>	<u>Cycle</u>
ROM	Many Hours	Nano Second(10^{-9})	1
PROM	Less Hour	Nano Second(10^{-9})	10
EPROM	Minute	Nano Second(10^{-9})	100
EEPROM	Second	Nano Second(10^{-9})	1000

Secondary Memory/Auxiliary Memory/Backing Store:-

It is the largest storage device, which is used for storing data and information permanently.

Example:-

Hard Disk (Electro magnetic disk).

Pen Drive/(PD).

CD ROM(Optical Memory)/Compact Disk Read Only Memory.

DVD(Optical Memory)/Digital Video Disk/Digital Versatile Disk.

Blu Ray Disk(Optical Memory).

Audio/Video cassette (Magnetic tape).

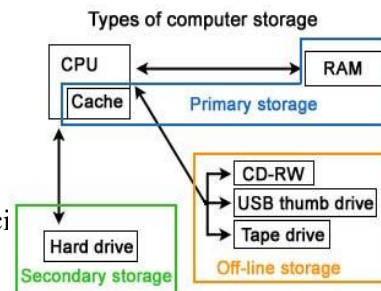
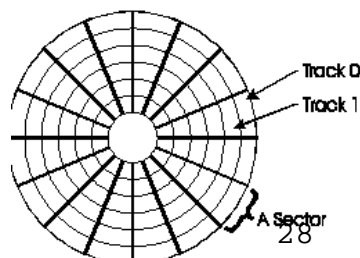
Zip Drive.

Floppy Disk (Magnetic Disk) .

Memory Chips.

Storage Mechanism In Magnetic Disk:-

In magnetic disk data stored in the form of logical ci



Circular Tracks and sectors.

One Sector=512 Bytes.

Access Time:-

Seek Time

Latency Time

For read and write, operation head is needed. There are two types of head

- ❖ Fixed head.
- ❖ Moveable head.

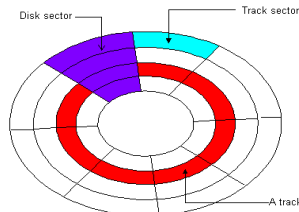
Seek Time:-

Time required to position the head on a specific track is called **seek time**.

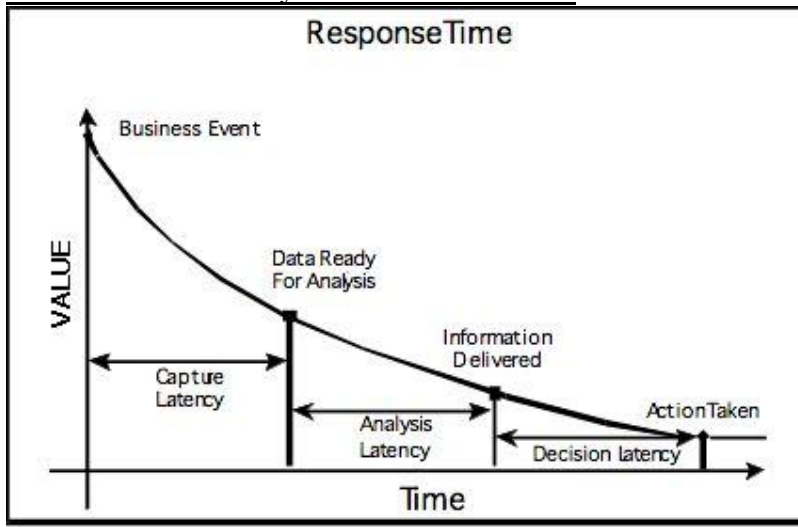


Latency Time:-

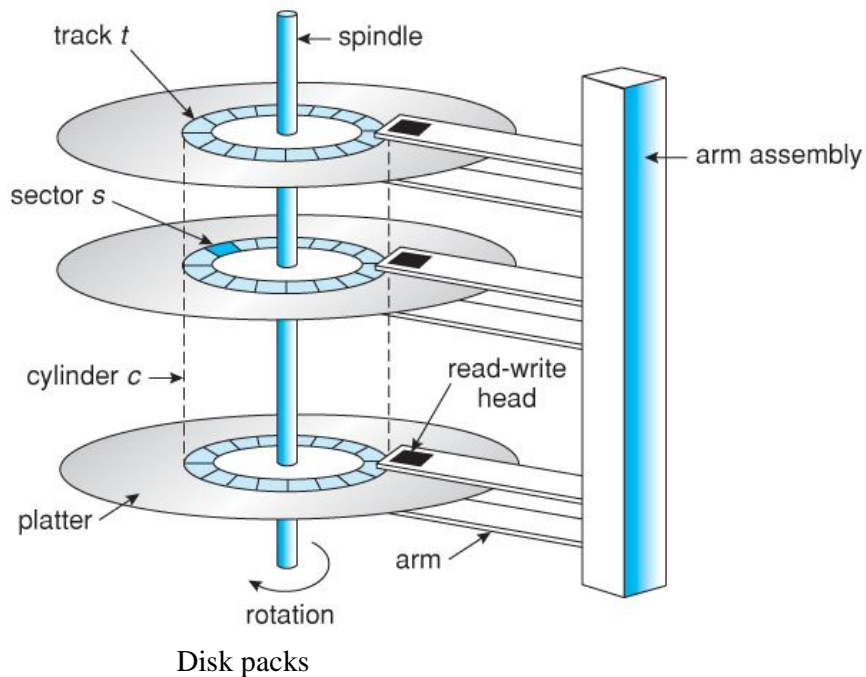
The time required by a sector to reach below the read/write head is called **latency time**.



Conclusion of Latency time and Seek Time:-



Storage Mechanism in hard disk:-



Access Speed Measurement:-

RPM (Rotation Per Minute) is used for measuring speed.
RPM may be 3600, 7200, above 10000.

Some Standard of Hard Disk

360 GB Hard Disk
500 GB Hard Disk
1 TB Hard Disk
2 TB Hard Disk
4 TB Hard Disk
Etc

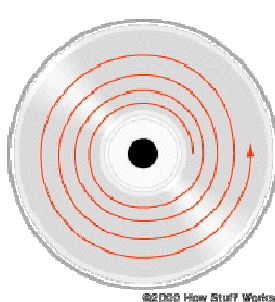
Name of Company:-

Samsung.	LG.	Philips.	Sony.	Moser Bear.
Lenovo.	Del.	Segate .	i-Ball	Compaq etc.
IBM (International Business Machine).				

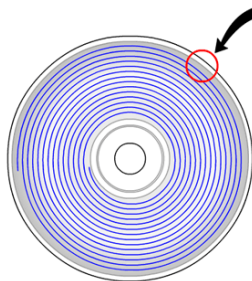
Optical memory:- In optical memory data and instructions are stored in the form of spiral tracks and sectors. For read and write operations laser beams are used.

Storage Mechanism in Optical memory(Spiral tracks & sectors are used for storage):-

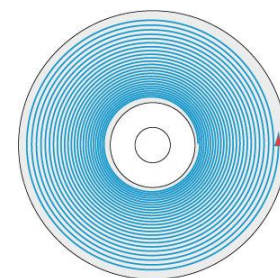
- ❖ CD ROM(Compact Disk read Only Memory) Low density
- ❖ DVD(Digital Video Disk) High Density
- ❖ (BRD)BLU RAY DISK Very Much High Density
- ❖ WORM(Write Once Read many)



CD ROM



DVD



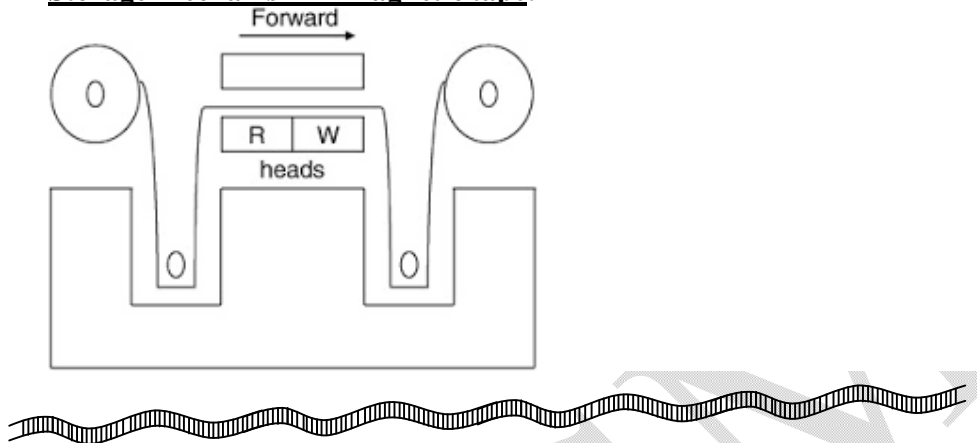
BLU RAY DISK

Read/Write Operations:-

Laser beams are needed.

For CD ROM Low Power of laser beams.
For DVD High Power of laser beams.
For BLU Ray Disk Very High Power of laser beams.
Data are stores in spiral tracks and sector type system/Organization.
Storage Capacity of CDROM (700 MB to 800 MB)
Storage Capacity of DVD (4 GB to 5 GB)
Storage Capacity of BLU Ray Disc (6 GB to 12 GB)

Storage Mechanism in Magnetic tape:-



Access Method:-

To retrieve (Read/Write operation) data from storage device by using following three technique.

- Sequential Access Method.
- Direct Access Method.
- Random Access Method.

Sequential Access Method.

To access data from storage system in sequential pattern. That is One by One.

Example:- Magnetic Tape.

Direct Access Method.

To access data from storage device by using key value and corresponding address.

Example:- Magnetic disk, CD ROM, DVD, BRD, Hard Disk.

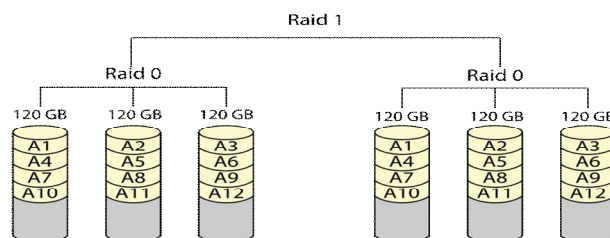
Random Access Method.

To access data from storage device in random manner.

Example:- Semiconductor Memories.

RAID:- (Redundant Array Of Independent Disks)

It is a technology to improve the secondary storage media by increasing the capacity, performance and reliability. Multiple –disks database schemes, is termed as RAID.



Chip Organization:-

Chip consists of semiconductor material. In chip it is an arrangement of decoder, bit line and word line. There are several technique used for a chip. Following two common technique uses mostly in chip.

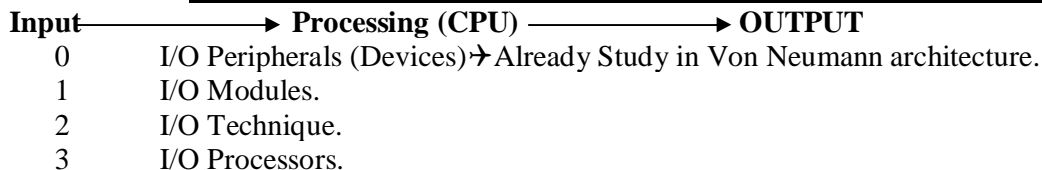
- 2D Chip organization
- 2 ½ D Chip Organization

Differences between 2D and 2 ½ D

<u>2D</u>	<u>2 ½ D</u>
It require more circuitry	It require less circuitry
Error detection and correction codes are not effectively used.	Error detection and correction codes are effectively used
16 bits or 32 bits input/output pins are used	Only one I/O pin is used.

Lecture - 7

I/O Organization or Input /Output System:-

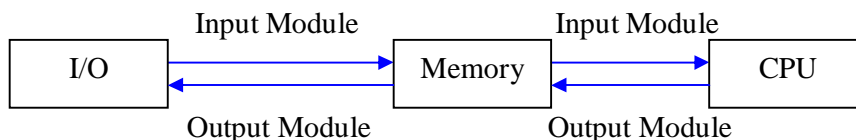


I/O Module:-

An I/O module is a mediator between the processor (CPU) and I/O devices.

Function/Task Of Module:-

- ✓ It should be able to provide control and timing signal.
- ✓ It should communicate with CPU.
- ✓ It should communicate with I/O devices.



Input/Output Technique:-

The I/O operations can be performed by three basic techniques. These are:

- ✓ Programmed I/O .
- ✓ Interrupt Driven I/O.
- ✓ Direct Memory Access(DMA).

Programmed I/O:-

It is useful I/O method for computers where hardware costs need to be minimized. It perform following functions.

- ✓ Transfer of data from I/O device to the CPU registers/OR.
- ✓ Transfer of data from CPU register/OR to Memory (RAM).

Interrupt (It is a program):-

It is a mechanism for transferring a **block of data from one memory** to **another memory**.It also perform following operation.

- ✓ Initiation of I/O operation.
- ✓ Completion of I/O operation.
- ✓ Occurrence of H/W or S/W errors.

Direct Memory Access (DMA):-

It is a module for transfer large amount of data from CPU to memory.DMA operate in the following way.

- ✓ Which operation to be performed.
- ✓ The address of I/O device which is to be used.

I/O Processors:-

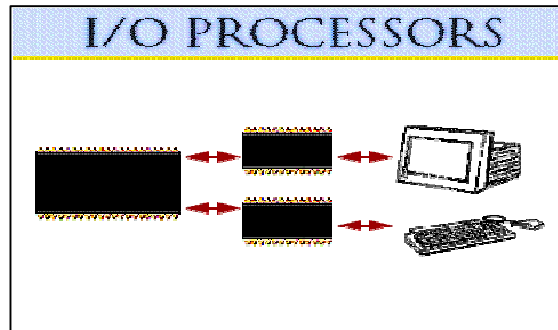
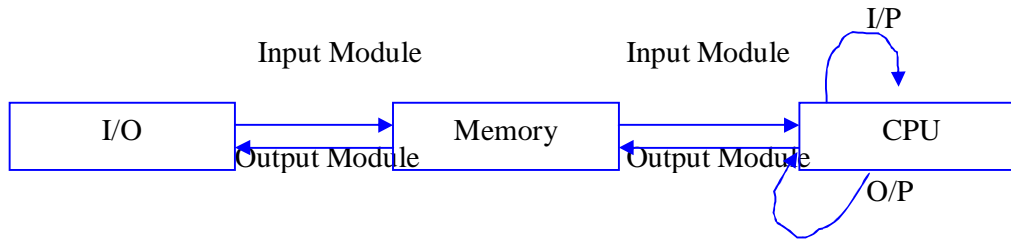
It include following steps.

Step 1:-Direct Control of CPU on I/O device.

Step 2:- Introduction of I/O module.

Step 3:-CPU need not wait for I/O operations to complete.

Step 4:- Direct access of I/O module to the memory via DMA.



What Is scanners:-

It is an input device that allows we to capture drawing or photographs or text from tangible source (Paper, slides etc) into electronic form. There are various types of scanners.

- ✓ Drum scanners.
- ✓ Hand scanners.
- ✓ Video scanners.



What Is SMPS:-

It convert AC current into DC current for computer. It is referred to as **Switched Mode Power Supply**.

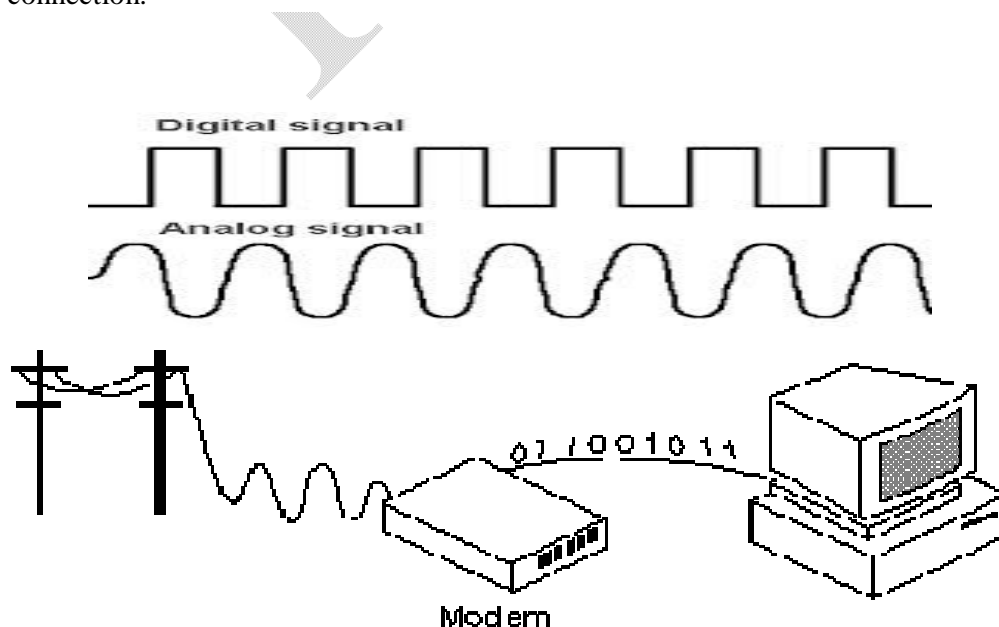
AC (Alternative Current) → DC (Direct Current)

Advantage of SMPS:-

- ❖ It generates less heat.
- ❖ It produces power range between 10 to 50 watts.
- ❖ It uses less expensive transformers and circuit.

What Is Modems:-

It is used for converting analog signal to digital signal and digital to analog signal. It is used for internet connection.



There are many types of MODEMS.

- ✓ Internal Modems.
- ✓ External Modems.
- ✓ Pocket Modem.
- ✓ PC Card Modems.

Modem understands a set of instructions called **Haves command set or AT command Set.**

Technology of LCD(nitrogen trifluoride (NF₃))

It is a technology for VDU. It consumes less electric power and produce less harmful radiation.

There are following three types of LCD technology.

- ✓ Reflective LCD.
- ✓ Backlit LCD.
- ✓ Edgelit LCD.

Instruction Execution Register in CPU(Temporary memory):-

- 1:-MAR (MEMORY ADDRESS REGISTER)
- 2:-MBR (MEMORY BUFFER REGISTER)
- 3:-PC (PROGRAM COUNTER)
- 4:-IR (INSTRUCTION REGISTER)

MAR:-

It specifies the address of memory location from which data or instruction is to be accessed (for read operation) or to which the data is to be stored (for write operation).

MBR:-

It is a register, which contains the data to be written in the memory (for write operation) or It receives the data from memory (for read operation).

PC:-

It keeps track of the instruction that is to be executed next, after the execution of an on-going instruction.

IR:-

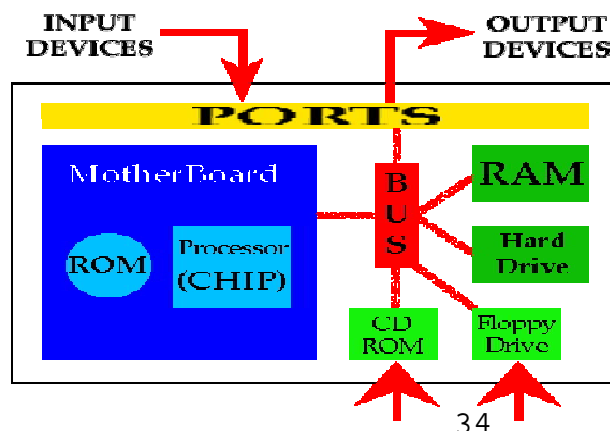
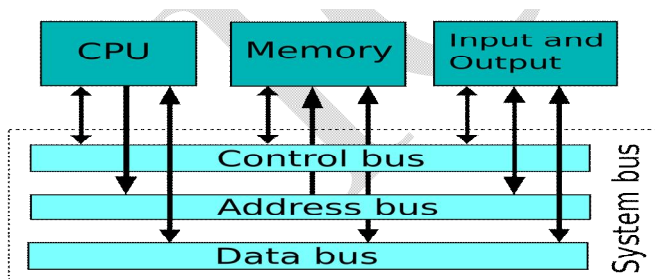
Here the instructions are loaded before the execution.

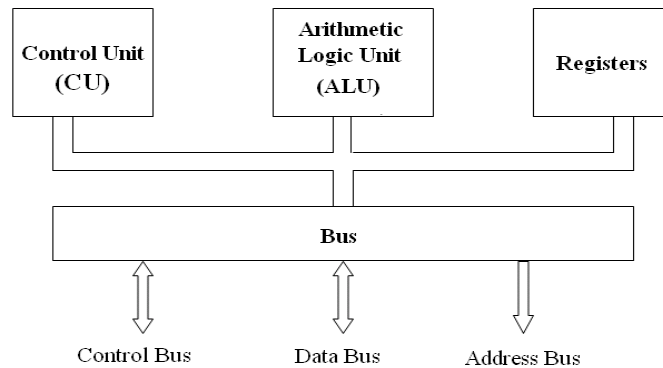
System Bus(Collection of wires or printed circuit on board):-

It is a circuit in which data transfer from:-

Input→Memory→CPU.

CPU→ Memory→Output.





Types of Buses:-

- ✓ Data Bus/Line Bus.
- ✓ Address Bus/Address line.
- ✓ Control Bus/Control Line.

Pipeline:- It provides a way to start a new task before an old one has been completed. This technique is called pipeline. There are following two types of pipelining technique.

- 1:-Instruction Pipeline 2:-Arithmetic pipeline
- Fetch/Load→Decode→Execute→Store (By means of pipelines)

Instruction Pipelines (Cycle):-

- Step1 Calculate the address for next instructions.
- Step2 Fetch the instruction.
- Step3 Decode the operation required by the instructions.
- Step4 Calculate the address for operand.
- Step5 Perform the operation on the data.
- Step6 Calculate the address of the operand.
- Step7 Store the operand.

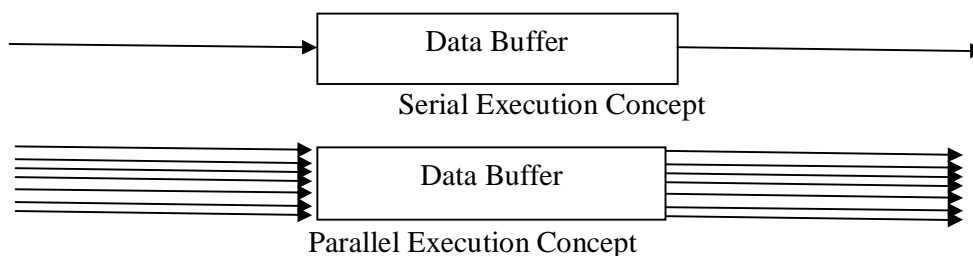
Interrupt:-

It is a program, which is generated by a number of sources, which may be either internal, or external to the cpu. It provides to number of sources. Some of the Internal with some event in which they may be occur.

Types of interrupt:-

- ✓ Program Interrupt(Traps)
- ✓ Time Interrupt
- ✓ I/O Interrupt
- ✓ H/W failure interrupt

Parallel Processing/Flynn's Classification of Computers:-



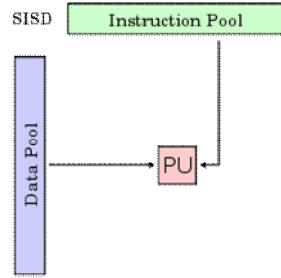
A technique that is used to provide simultaneous data processing tasks for the purpose of increasing the computational speed of computer.

According to M.J. Flynn's, Computers are classified four categories.

- ✓ SISD(Single Instruction Single data)
- ✓ SIMD(Single Instruction Multiple data)
- ✓ MISD(Multiple Instruction Single data)
- ✓ MIMD(Multiple Instruction Multiple data)

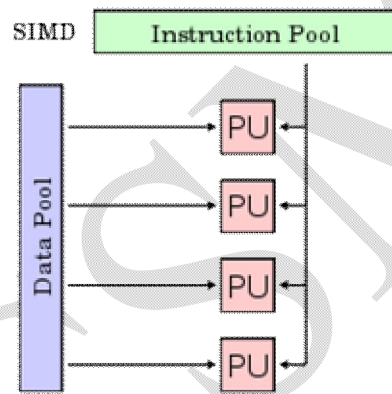
SISD:-

Using this technology, Single Instruction applies on single data stream through pipeline.
Example:-Conventional Von Neumann architecture.



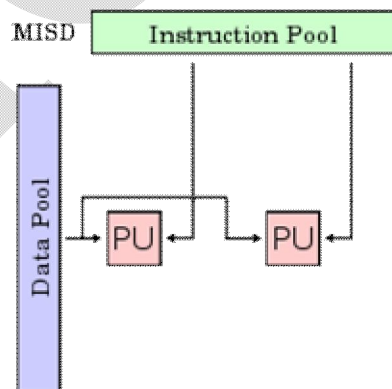
SIMD:-

Using this technology, Single Instruction applies multiple data stream or Instructions broadcast on multiple data stream.
Example:-Array Processors.



MISD:-

Using this technology, Multiple Instruction applies on single data stream.
Example:-Distributed architecture, Vector Processors.

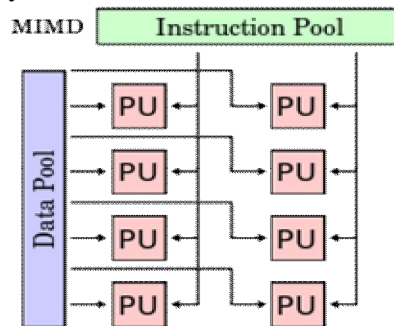


MIMD:-

Using this technology, Multiple Instruction applies on multiple data stream.

Example:-Multiprocessor System, Data Flow architecture.

Vector Processing:-



Such types of computing system basically used in following areas.

- Weather forecasting.
- Petroleum Explorations.
- Flight simulations.
- Artificial & Expert System.(Knowledge Based System).Example ROBOT.
- Image processing.

Concept of RISC & CISC Technology:-

RISC (Reduced Instruction Set Computer).

CISC (Complex Instruction Set Computer).

Above both types of technology used in Processors.

In both types of CPU technology instructions & data passes through pipelines.

Lecture - 8

Section - A

OM-2/CCC-2/BCC-2

(INTRODUCTION OF COMPUTER S/W (MS WINDOW & MS OFFICE))

Introduction of Computer Software:-

Computer can neither think nor take any decision itself. We instruct by means of commands or programs.

Program:-

It is sequence of **instructions**, which operate on computer **data** to perform certain well-defined task or achieve a goal.Data represented in the form of 0 and 1.Which is known as bits.

Software:-

A set of programs which run on hardware and govern the functioning of computer system.

Example of S/W:-

- ✓ MS Word
- ✓ MS Excel.
- ✓ MS PowerPoint.
- ✓ Notepad.
- ✓ Word Pad.
- ✓ Paint Brush.
- ✓ Window Media Player (It is used for playing video).
- ✓ VLC. (It is used for playing video).
- ✓ WIN AMP. (It is used for playing music).
- ✓ Coral Draw(It is used for making designing).
- ✓ Photoshop.(It is used for editing images).
- ✓ PageMaker.
- ✓ CAD(Computer Aided Design).
- ✓ CAM (Computer Aided Manufacturing).
- ✓ Oracle (It is database management system).
- ✓ MS Access(It is database management system).

✓ SQL server(Database management system).

Etc.

Program=Algorithm+Flowchart+ Computer Language+Translator+Operating System + Data Structure.

Algorithm:-Step by step, problem-solving technique is called algorithm.

Example:-1

$$S=a+b+c$$

Step:-1 Start/Begin
Step:-2 Read/Input a,b,c
Step:-3 Calculate $S=a+b+c$
Step:-4 Display/Output/Print S
Step:-5 Stop/End

Example:-2

$$Si=p*n*r/100$$

Where:-

Si Simple Interest
p Principal Amount
r Rate of interest
n Period
Step:-1 Start/Begin
Step:-2 Read/Input p, n, r
Step:-3 Calculate $Si = (p*n*r)/100$
Step:-4 Display/Output/Print Si
Step:-5 Stop/End

Example:-3 Write algorithm of following formula.

$$A=p*(1+r/100)^n$$

A Amount.
p Principal Amount.
r Rate of interest.
n Period.

Step:-1 Start/Begin
Step:-2 Read/Input p, n, r
Step:-3 Calculate $A = p*(1+r/100)^n$
Step:-4 Display/Output/Print A
Step:-5 Stop/End

Example:-4 Write algorithm for checking year is leap or Not Leap.

Step:-1 Start/Begin.
Step:-2 Read/Input year.
Step:-3 Calculate $y = \text{year Mod } 4$. // (= Assignment operator)
Step:-4 If $y = 0$. // (= equal operator)
Step:-5 Print "Leap Year".
Step:-6 If $y \neq 0$. // (! = not equal operator)
Step:-7 Print "Not Leap Year".
Step:-8 Stop/End.

Note:-Mod is used for calculating remainder.

Characteristics of Algorithm:-

1. Finiteness
2. Definiteness
3. Effectiveness
4. Input
5. Output

Finiteness :- Steps of algorithm must be finite.

Definiteness :- Every step must be defined.

Effectiveness :- Each step must be effective.

Input :- Algorithm must be associated inputation.












Output

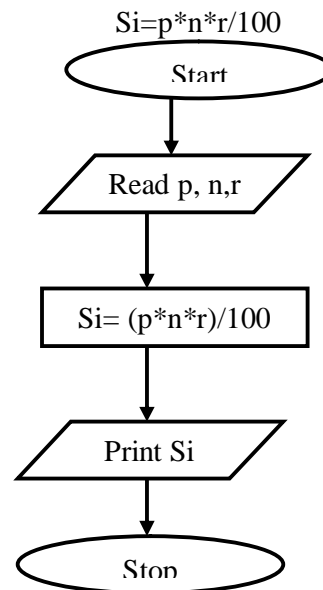
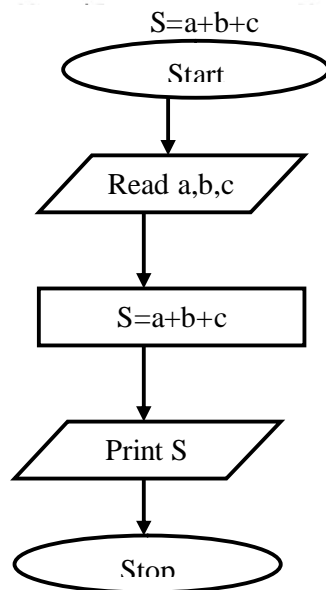
:- Algorithm must be associated with output components.

Flowchart:-

The diagrammatical/Graphical representation of any algorithm is called flow chart.

Following Symbols are used in flowchart.

Symbol	(Alternates)	Description
	Process	An operation or action step.
	Terminator	A start or stop point in a process.
	Decision	A question or branch in the process.
	Delay	A waiting period.
	Predefined Process	A formally defined sub-process.
	Alternate Process	An alternate to the normal process step.
	Data (I/O)	Indicates data inputs and outputs to and from a process.
	Document	A document or report.
	Multi-Document	Same as Document, except, well, multiple documents.
	Preparation	A preparation or set-up process step.
	Display	A machine display.



Computer Language:-

A programming language is a formal constructed language designed to communicate instructions to a machine, particularly a computer. Programming languages can be used to create programs to control the behavior of a machine or to express algorithms.

Computer languages are categorized into two types

1. **LLL**(Low Level Language)
 - 1.1 Machine language (0 and 1).
 - 1.2 Assembly Language(Symbols, codes are used instead of 0 and 1).
2. **HLL**(High Level Language)
 - 2.1 Natural English like language.

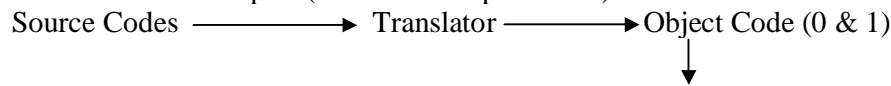
Example:-

- C, C++, JAVA, C#, VC++, COBOL, PASCAL, FORTRAN, BASIC, LISP, PROLOG, Smalltalk, Python, Beta Etc.

TRANSLATOR:-

It is used for converting source (Program) code into object codes. (Machine Codes). There are following three types of translator.

- ✓ Assembler(Only for assembly language).
- ✓ Interpreter(Only for BASIC Language).
- ✓ Compiler(All HLL except BASIC).



No any error (bug) in source code

Debug: -To remove error from source codes.

Advantage of HLL:-

- ✓ Easy To understand.
- ✓ Fast S/w Development.
- ✓ Fast debugging (To remove error).
- ✓ Natural English like language.
- ✓ Better portability.

Difference between Interpreter and compiler:-

Interpreter(System S/w)	Compiler(System S/w)
1:-Convert source code into object code line by line.	1:-Convert entire source code into object code at a time.
2:-Debugging is very fast.	2:-Debugging is slow.
3:-More Execution time.	3:-Less execution Time.
4:-Used only in QBASIC/BASIC.	4:-Used in all HLL. Except QBASIC/BASIC.

Types of Software:-

- ✓ Application S/W(MS WORD, MS EXCEL,MS Power POINT, Coral Draw, Photoshop etc).
- ✓ System S/W. (Translator, Operating System, Loader, Linker).
- ✓ Utilities S/W (Driver of Motherboard, Monitor, Modem, Sound card etc).
- ✓ Development S/w Example:- C++, C#, Java, COBOL, PASCAL, BASIC etc

Operating System :-(OS)

It is collection of s/w which is used for managing computer resources such as

- ✓ Memory System.
- ✓ File System.
- ✓ I/O System.
- ✓ CPU/Processor.
- ✓ Protection.
- ✓ Networking management.
- ✓ Command Interpretation.
- ✓ Process Management.

OS provides a platform for any application s/w. That is, It is soul of computer. without OS, user never interact with computer hardware to do some work.

Example:-Category Based OS.

CUI (Command User Interface) Based OS:-

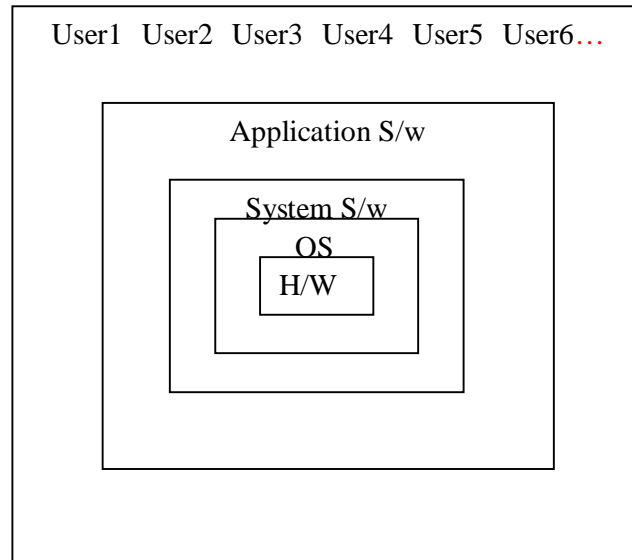
- ✓ MS DOS (Microsoft Disk Operating system).→Single user.
- ✓ LINUX→Multiuser.
- ✓ UNIX→Multiuser.

GUI (Graphical User Interface) Based OS:-

- ✓ MS Windows NT (New Technology).
- ✓ MS Windows 2000 Professional.

- ✓ MS Windows XP.
- ✓ MS Windows VISTA.
- ✓ MS Windows 2007.
- ✓ MS Windows 2008 , MS Windows 2010 etc.

Organization of Computer system with OS



There are two ways by which user interface with OS.

- ✓ By System Call
- ✓ By Commands

System call:-It provides interface with running program and OS.

Command:- It is another way by which user interact with OS.

MS DOS Commands

1:-Internal Commands (Already Available in system).

Date →(It is used for display system date).
 Time → (It is used for display time).
 CLS → (It is used for clear screen).
 Etc.

2-External Commands (We Load by means CD/DVD/PEN Drive)

XCOPY→ (It is used for copying files and folders both)
 SCANDISK→ (It is used for checking disk It also repair of disk)
 Etc.
 C:\> or D:\>,E:\> etc \ Root Directory,>Prompt.

Linux is clone of Unix OS:-

UNIX is CUI based powerful OS.Linux is the clone of Unix OS.

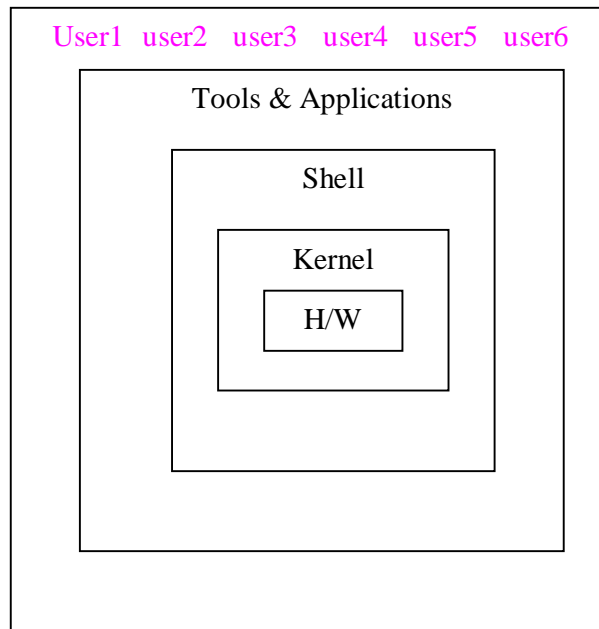
Feature:-

- ✓ Robust.
- ✓ Network facility.
- ✓ Resource sharing.
- ✓ Communication.
- ✓ Portability.
- ✓ Multiuser capability
- ✓ Multitasking Capability
- ✓ High security

Minimum H/W requirement for installation:-

- ✓ 80286/80386/80486 processor.
- ✓ 40 GB Hard disk.
- ✓ 64 MB RAM.

UNIX System Organization:-



Kernel provide interface between user's command and H/W. It control overall activity of UNIX OS.

Function of Kernel:-

- It manages files.
- Carries out all the data transfer between the file system and H/W.
- Allocation of CPU time to all running programs.
- It also handles interrupts.

Shell:-

It is a prompt to receive commands given by user and then provide corresponding response of commands. There are three types of shells.

- ✓ Bourn Shell. (\$):-It is given by Steve Bourne's.
- ✓ C shell. (%):-It is given Bill Joy.
- ✓ Korn Shell. (\$):-It is given by David korne. It is very powerful shell and superset of Bourne shell.

Introduction to Unix/Linux OS:-

Linux is clone of Unix OS:-

It is CUI based OS. Linux is the clone of Unix OS. It was offered by Sun Microsystems and free of cost downloaded from website of Sun microsystem. It was very popular in the late 1980. Linux may run on Intel 386 microprocessors.

Feature:-

- ❖ Linux is Fast.
- ❖ Linux is stable.
- ❖ It is open Source S/w.

Drawbacks of Linux:-

- ❖ Security
- ❖ Lack of Support:-It support and documentation for Linux can be spotty and best. A customer who downloads Linux from a server may receive only electronic manuals and access to online help pages.
- ❖ Limited S/w selection choice:-It choice StarOffice rather than MS Office.
- ❖ Limited H/W support:-It needed driver for related H/W such as printer, MODEM, Speaker etc.
- ❖ Complexity:-Commands used in linux is same as to unix. It is predecessor of Linux. Commands are case sensitive.

Components of Linux:-

- ❖ **Memory management subsystem:-It includes**
 - Large Address spaces
 - Protection
 - Memory mapping
 - Fair physical memory allocation
 - Shared virtual memory
- ❖ **Linux Process and Thread management:-**Processors carry out tasks within the OS. A running state of program is called process. A program is a set of machine codes instructions and data stored in an executable image on disk. Linux is multiprocessing OS which support many processes running in parallel. Functional area of process
 - State
 - Running
 - Waiting
 - Stopped
 - Zombine:-It is halted process.
 - Scheduling information:-The scheduler needs to select next job for process
 - Identifiers:-Every process in the system has process identifier.
 - Links:-Every process in Linux must be associated with pointer.
 - File System:-Processes can open and close files as they includes pointers to any files opened by this process
 - Virtual memory:-This memory needed for allocating large program into small size of memory for processing
- ❖ **File management Subsystem:-**Linux must manage of files of LINUX OS.
- ❖ **Device drivers:-**It is the major part of the Linux kernel. (It provides interface between shell and H/W).

Commands Used In Linux:-

login : <login_name>
password: <password_name>

who:-

This command displays all logins users.

who am i:-

This command displays information about us.

cal:- This command display calendar.

```
$cal 2012↵
```

```
$cal 3 2012↵
```

date:-

This command display date of system

```
$date↵
```

time:-

This command display time of system

```
$time↵
```

touch:-

This command is used for creating empty files

```
$touch <file_names>↵
```

```
$touch file1 file2 file3 file4↵
```

cat:-it is used for adding contents into file and reading existing file.

```
$cat > file1↵
```

```
.....
```

```
.....
```

```
.....
```

```
ctrl+d
```

note:-ctrl+d is used for save.

```
$cat file1↵
```

To see the contents of file.

cat:-It is also used for concatenating two or more files.

```
$cat file1 file2 file3>file4↵
```

ls:-This command is used for displaying list of files and commands.

```
$ls↵
```

```
$ls-a↵ It is used for display only hidden files.
```

ls command using wild card:-

* Remaining all characters

? Only one character

\$ls a*↵ It display list of only those files which must begin with character 'a'

\$ls ?a*↵ It display list of only those files which first character begin with any character and second must be character 'a' and remaining are any characters.

\$ls a*d↵ It display list of all those files which begin with character 'a' and ended with character 'd'.

\$ls [aeiou]*↵ It display list of all those files which must begin with vowel character

`$ls [!aeiou]*` ↵ It display list of all those files which must not begin with vowel character.

`$ls [a-f][a-m][c-k]*` ↵ It display list of all those files which first character begin any one from 'a' to 'f', second character begin any one from 'a' to 'm', third character begin any one from 'c' to 'k' and remaining are any characters.

`$ls-l` ↵ This command display all the details about the files and directories under a particular directory.

chmod command:-

This command is used for setting attributes of files and folders. There are three types of attributes.

r	read	4
w	write	2
x	execute	1

owner member

group member

other member

Example1:-

`$chmod 741 /home/office/file1` ↵

or

`$chmod rwxr__ __x /home/office/file1` ↵

Example2:-

`$chmod 777 /home/office/file1` ↵

or

`$chmod rwx rwx rwx /home/office/file1` ↵

passwd command:-

This command is used for changing password.

`$passwd` ↵

Enter Old password *****

Enter New password *****

Retype password *****

cp command:-

This command is used for copy file and files from one location to another location. It is also used for renaming file

`$cp <source_file> <target_file>` ↵

Example:-1

`$cp /home/d1/Jitendra /home/d1/d2/Jitendra` ↵

Example:-2

`$cp /home/d1/Jitendra /home/d1/d2/Meeta` ↵

rm command:-

This command is used for removing file

```
$rm <file_name>↵
```

Example:-1

```
$rm /home/d1/Jitendra ↵
```

Example:-2

```
$rm -i /home/d1/Jitendra ↵ (File remove interactively)
```

Example:-3

```
$rm -f /home/d1/Jitendra ↵ (File remove forcibly)
```

mv command:-

This command is used for renaming file and folder

```
$mv <Old_file_name> <new_file_Name>↵
```

Example:-1

```
$mv /home/d1/Jitendra Amrita↵
```

Example:-2

```
$mv /home/d1/ office↵
```

pwd command:-

This command is used for displaying current working directory.

Example:-1

```
$pwd↵
```

```
/home/d1/d2
```

mkdir/md command:-

This command is used for creating directory.

```
$mkdir/md <Directory_name>↵
```

Example:-1

```
$mkdir/md office↵
```

rmdir/md command:-

This command is used for removing directory.

Example:-1

```
$rmdir office↵
```

cd command:-

This command is used for entering existing directory.

```
$cd <Directory_name>↵
```

Example:-1

```
$/home/cd office↵
```

```
$/home/office
```

cd.. command:-

This command is used for exit from directory.

```
$/home/office/cd..↵
```

```
$/home/
```

grep command:- *“Globally search a regular expression and print it”*

This command is used searching a text or text string.

Example:-1

```
$greap "varanasi" /home/d1/d2/file1↵
```

Example:-2

```
$greap a* /home/d1/d2/file2↵
```

Example:-3

```
$greap [Aa]* /home/d1/d2/file3↵
```

lp command:-

This command is used for printing file.

```
$lp /home/d1/file1↵
```

man command:-

This command is used for provide help of any linux command

```
$man <command_name>↵
```

Example:-1

```
$man lp↵
```

Example:-2

```
$man chmod↵
```

kill command:-

This command is used for stopping running process.

```
$kill <PID>↵
```

Example:-1

```
$ps ↵ (It display process ID)
```

```
$kill 1240↵
```

write command:-

This command can be used by any user to write something on someone else's terminal.

Example:-1

```
$write /home/user1↵
```

How are you.

It is very hot today.

```
ctrl+d
```

wall command:-

This command is used by superuser to send any message for all logged user.

Example:-1

```
$/etc/wall↵
```

System shutting down in 20 minutes.

You are advised to take the required backups

```
ctrl+d
```

mail command:-

It is pretty command to send message various users.

```
$mail user1 user2 user3 user4↵
```

```
.....  
.....  
.....  
.....
```

```
Ctrl+d
```

vi command:- **most important**

It is text editor, which is used for writing program in linux environment. It displays a windows we can enter and edit text.

\$vi <file_name>↵

Example:-1

\$vi file1↵

Modes of Operation:-

a:-Command Mode

In this mode all the keys pressed by the user are interpreted to the editor commands.

b:-Insert Mode

This modes permits insertion of new text, editing of existing text or replacement of existing text.

c:-The ex command mode

This mode permits us to give commands at the command line.

Text edit Commands:-

h moves the cursor one character to the left
i moves the cursor one character to the right
j moves the cursor down one line
k moves the cursor up one line

How to delete text:-

x Delete one character
nx Delete n characters., Where n is number of characters.

How to quit from Linux:-

In ex mode type :wq Quit and save textual informations.

In ex mode type : q! Quit and without save textual informations.

Scrolling in Linux:-

ctrl f Scroll the screen forward a full window.
ctrl b Scroll the screen back a full window.

File system in Linux:-

- ❖ dev Device related files.
- ❖ bin Binary executable files.
- ❖ lib Library functions.
- ❖ etc Binary executable files usually required for system administration.
- ❖ tmp Temporary files created by linux or users.
- ❖ home Home directory of all users.
- ❖ /home/bin Additional binary executable files.

Section - B

Concept of GUI (Graphical User Interface) Based OS:-

It works on the principal of **WYSIWYG** (What You See Is What You Get).

It includes following features.

- ✓ Common Look And feel.
- ✓ It facilitates **user-friendly** environment.
- ✓ It manages **resources** of computer.
- ✓ It supports MS Dos. (Microsoft Disk Operating System).
- ✓ It provides **windows** environment.

Common Graphical user Interface:-

✓ **Pointing devices.**

- Mouse.
- Track ball.
- Light Pen.
- ✓ Pointer.
- ✓ Windows.
- ✓ Menus.
- ✓ Dialog Boxes.
- ✓ Icons.
- ✓ Desktop Metaphor (The idea of metaphors has brought the computer closure to natural environment of the end user).
- ✓ It facilitates object oriented features.

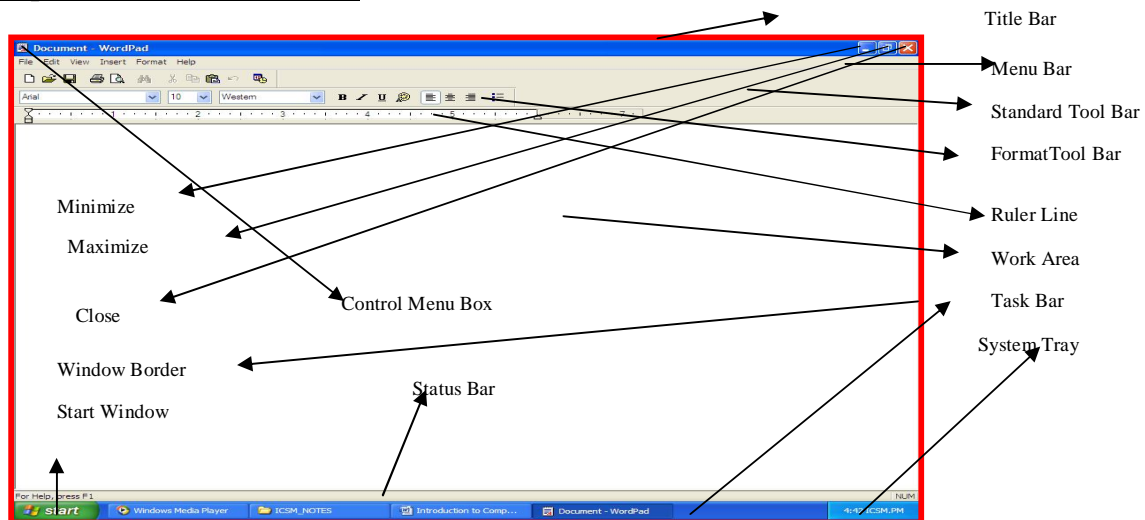
What is Windows:-

It is rectangular portion of screen where one can work in **user-friendly** environment. Windows appear on desktop screen. Which is handled by mouse technique, keyboard technique & touch screen technique.

Elements of Windows:-

- ✓ Icons.
- ✓ Title Bar.
- ✓ Maximize.
- ✓ Minimize.
- ✓ Close.
- ✓ Menu bar.
- ✓ Status Bar.
- ✓ Control Menu Box.
- ✓ Window Border.
- ✓ Work area.
- ✓ Desktop.
- ✓ Cursor/Insertion Point.
- ✓ Pointer (↔).
- ✓ Tiled format of Windows.
- ✓ Cascade format of Windows.

Simple Structure of Windows:-



Types of Windows:-

A:-Applications Windows.

B:-Document windows.

Application Windows:-

- ✓ It consist of its own title bar and menu bar such as MS Word.

- ✓ MS EXCEL.
- ✓ MS Power Point.
- ✓ Notepad.
- ✓ Word Pad.
- ✓ Window Media Player.
- Etc.

Document Windows:-

It appear inside an application windows which contain files informations, folder information, s/w information etc. It has own title bar but share menu bar with application windows.

Icon:- It is small graphical picture associated with files, folders, images, s/w etc.



Control Menu Box:-

It appears upper left corner in each windows. Which consist of following six options?

Restore. Maximize Minimize. Close. Move. Size.

Desktop:-

It is background portion, where windows appear is called desktop.

Menu bar:-

It consists of list of available menus.

Menu:-

It consists of commands and options.

Title Bar:-

It indicate name of application s/w.

Working Technique With Windows:-

1:- Mouse technique

- a) Click b) Double Click c) Drag d) Drag & Drop e) Point

2:- Keyboard Technique:-

- | | |
|---------------------------------|--|
| Alt+Space+R | Restore Size of Windows. |
| Alt+Space+X | Maximize Size of Windows. |
| Alt+Space+N | Minimize Size of Windows. |
| Alt+Space+Tab | Minimize To Maximize/ Minimize To Restore. |
| Alt+ F4 | Close Windows. |
| F1 | Help of related Windows. |
| Alt+Underline Character/Hot Key | Open Menu. |
| Tab | To Select Item. |
| Alt/F10 | To Select Menu. |
| Alt+Space | Open Control Menu Box. |

Concept of Files and Folders/Directories:-

File:-

It is collection of related information. File is the **heart** of any application s/w. Computer file name must be associated with two parts.

- a) Primary File name (Given by user).

- b) Secondary file name (Extension name given by user & System both).

Rule for primary File name:-

- c) File name should start with alphabet characters. (A to Z or a to z).
d) File name should be small and logical.
e) Files should be kept in proper manner, using folders and disk drives.

Secondary File Name/Extension Name:-

It is used for specific purpose. Such as searching a group of files, deleting a group of files, copying a group of files, renaming a group of files. Some of reserved extension names are given below.

.doc	→→→	document files (MS Word/Word Pad).
.xls	→→→	work sheet files (MS Excel).
.ppt	→→→	PowerPoint files.
.mdb	→→→	ms access files.
.bmp	→→→	bitmap picture files/Paintbrush.
.gif	→→→	graphics files.
.jpg	→→→	image files.
.html	→→→	web page files.
.txt	→→→	Text files (Note Pad).
.sys	→→→	System files.
.prg	→→→	Program files.
.tmp	→→→	Temporary files.
.cdr	→→→	Coral draw files.
.pdf	→→→	Adobe file.
.mp3	→→→	Audio Files.

Etc.

Wild Cards:-

- * It represent all characters.
? It represent any one character.

Example based on searching:-

- ✓ To search all files of MS Word in system.
*.doc
- ✓ To search all files of MS PowerPoint in system
*.ppt
- ✓ To search all files of MS Excel in system
*.xls
- ✓ To search all files of Web page in system
*.htm
- ✓ To search all files of database(MS Access) in system
*.mdb
- ✓ To search only those file which begin with character 'a' & rest are any characters of word.
a*.doc

- ✓ To search all files which first character is any character followed by 'a' and rest are any character of ms excel.

?a*.xls

- ✓ To search all images in system.

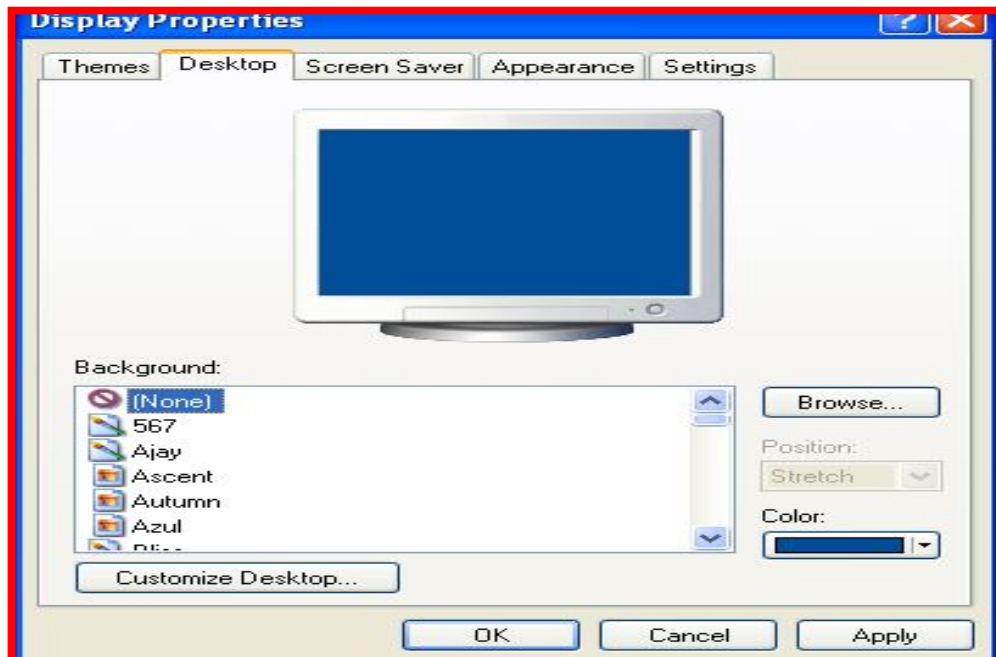
*.jpg

- ✓ To search all graphics in system.

*.gif

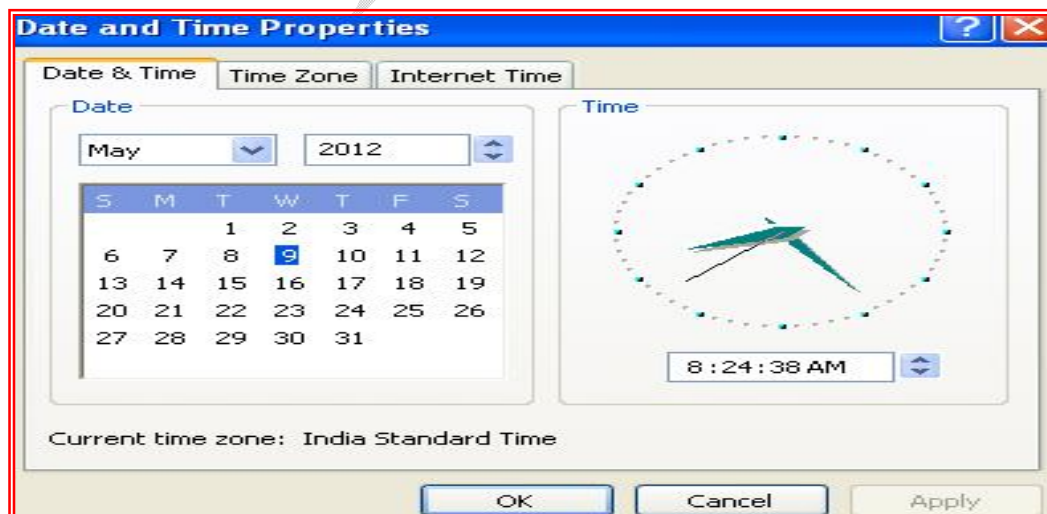
Application of MS Windows:-

1. Desk Top Setting:-Press Right Button On Desktop Screen→ Click Properties



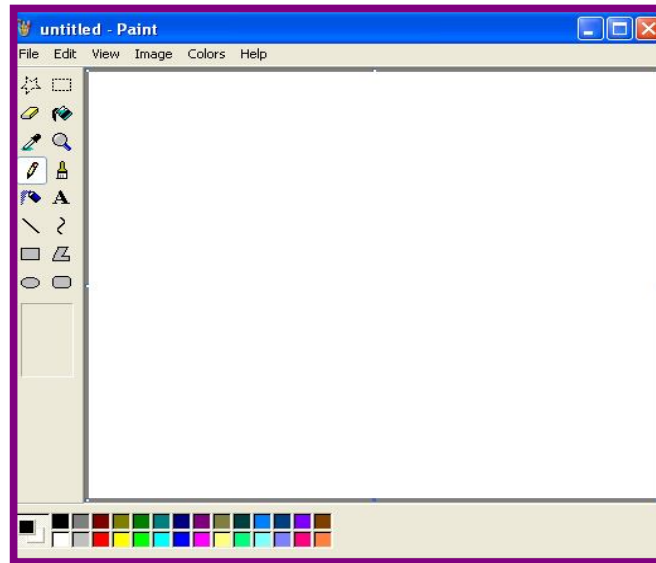
- 1.1. Screen saver.
- 1.2. Background Setting.
- 1.3. Appearance.
- 1.4. Themes.

2. Date And Time Setting:-Start→ControlPannel→Date & Time Setting



3. Accessories

3.1. Paint Brush S/w:-Start→Program→Accessories→Paintbrush



3.2. Notepad S/W:-Start→Program→Accessories→Notepad

3.3. Word Pad S/W:-Start→Program→Accessories→Wordpad

3.4. Calculator:-Start→Program→Accessories→Calculator

3.5. Games(Entertainment) :-Start→Program→Game→Select Game

3.6. Windows Media Player:-

Start→Program→Accessories→Entertainment→Windows media Player

3.7. System Tools(It is used for troubleshooting of system)

Start→Program→Accessories→System Tool→

3.7.1. Scandisk → (Check error and remove Hard disk problems)

3.7.2. Disk clean up→ (Remove unnecessary files)

3.7.3. Character Map → (Contain symbols and special characters)

3.7.4. Backup → (Make an additional copy)

3.7.5. Disk defragmentation→ (Consolidate Unused memory)

4. Creation of Folders(We can create folder any where in system)

5. Desktop Items

5.1. My Documents.

5.2. Recycles Bin/Trash Bin.

5.3. My Computer.

5.4. Internet Explorer(For accessing Internet Service)

6. How to play music.

6.1. Through Media Player.

6.2. Through WIN AMP/Jet Audio Media Player/VLC Media Player.

7. How to copy files and folders from one location to another.

7.1. CD to CD.

7.2. CD to Hard disk.

7.3. Hard disk to CD.

7.4. CD/Hard Disk To Pen Drive.

8. Control panel.

8.1. Mouse Setting Property:- Start→Control Pannel→ Mouse Setting.

8.2. System Checking:- Start→Control Pannel→System.

8.3. Font Loading: - Start→Control Pannel→Font.

8.4. Add/Remove H/W:- Start→Control Pannel→Add/Remove H/W.

8.5. Add/Remove S/W:- Start→Control Pannel→Add/Remove S/W.

8.6. User's Account(Creation and deletion) :- Start→ Control Pannel→User's Account

9. Log off/Log On. (Close/Open All→ Open/Closed internal files →but computer remain on)

10. Shutdown/Turn off & Restart.

Booting Process/Starting up system:-

It is the process of loading operating system in to main memory of computer.

During booting session, OS checks following components.

- a) Memory Checking/RAM.
- b) I/O system Checking.
- c) CPU checking.
- d) Files System checking.

Types of Booting:-

Cold Booting (Initial Starting of Computer System).

Warm Booting (Alt+Ctrl+Del/Direct Restart)/Press Reset Button.

1) Cold Booting :-

When the System Starts from the Starting or from initial State Means when we Starts our System this is called as cold Booting. In the cold Booting the System will be Started from its beginning State means first of all, the user will press the Power Button , then this will read all the instructions from the ROM and the Operating System will b Automatically gets loaded into the System.

2) Warm Booting:-

The warm Booting is that in which System Automatically Starts when we are Running the System, For Example due to Light Fluctuation the system will Automatically Restarts So that in this Chances Damaging of system are More. and the System will no be start from its initial State So May Some Files will be Damaged because they are not Properly Stored into the System.

Clipboard:-

It is temporary buffer (Temporary Memory), which is used for containing cut/copies matters/Contents.

Or

A clipboard is a temporary storage area for data that the user wants to copy from one place to another.

Control Panel:-

The Control Panel is a part of the Microsoft Windows graphical user interface which allows users to view and manipulate basic system settings and controls via applets, such as adding hardware, adding and removing software, controlling user accounts, and changing accessibility options. It helps in the setting of H/W and S/W components according to our need.

Work/Function in Control Pannel:-

Display/Background.	Date & Time.	Mouse Setting.
System information.	User Account.	Font Installation
H/W and S/W Installation and Uninstallation.		
Sound and VGA Installation & Uninstalation.		

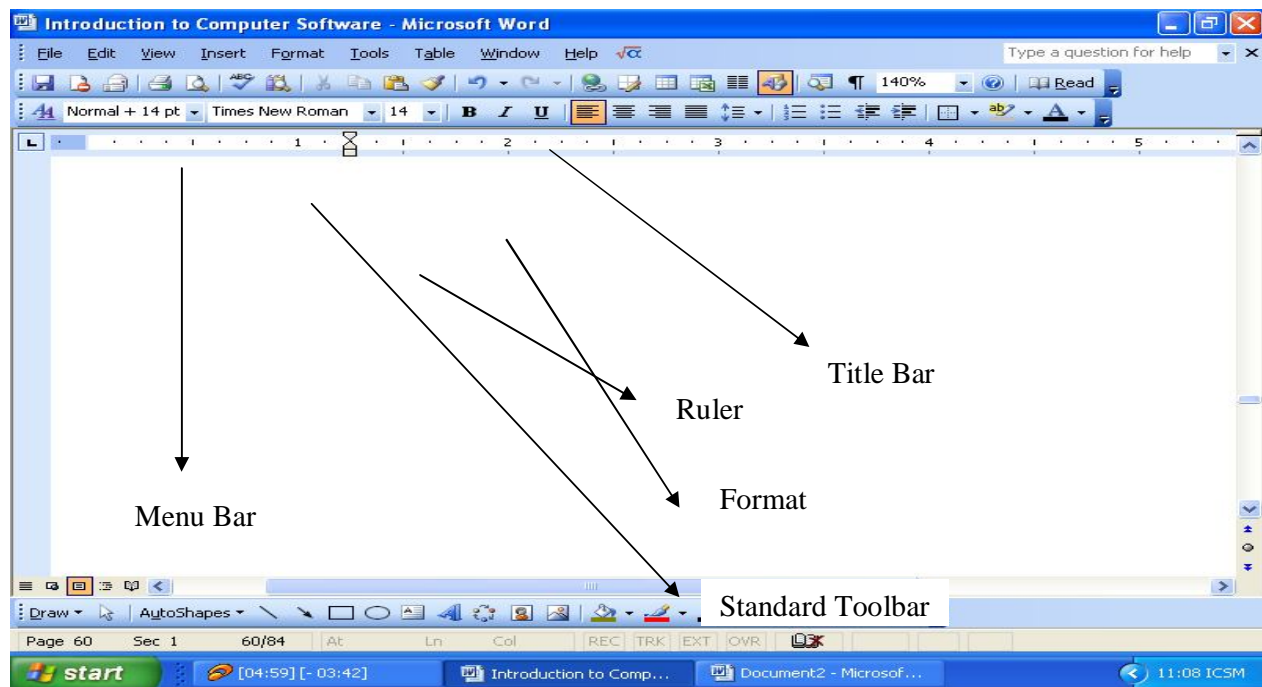
Lecture - 9

Introduction of MS Word: - (Extension/Secondary File name .doc/.docx)

It is a word processing s/w which is used for performing following tasks. or

Microsoft Word is the word processing component of the Microsoft Office Suite. It is used primarily to enter, edit, format, save, retrieve and print documents.

- (a). Creation of document.
- (b). Deletion of document.
- (c). Creation of template/Blue Print.
- (d). Creation of table.
- (e). Creation of macros.
- (f). Creation of Mail merge.
- (g). Spelling and grammar checking.
- (h). It provides OLE features.
- (i). It provides finding and replacing
- (j). It provides bullets and numbering.
- (k). Autocorrect feature.
- (l). It facilitates equation editors.
- (m). Border facility.
- (n). We can set password in document.
- (o). It facilitates different types of fonts and their effects.
- (p). MS word provides facilities of drawing features.
- (q). Setting indents features (Increase and decrease).
- (r). It facilitates Zoom in and Zoom out features.etc.



Commands Used in MS WORD:-

Ctrl+Shift+*	Display non-printing character.
Ctrl+Shift+>	Increase font Size.
Ctrl+Shift+<	Decrease font size.
Ctrl+]	Increase font.
Ctrl+[Decrease font.
Ctrl+Enter	Break page/Enter New Page.
Alt +Ctrl+R	Register trademark Symbol.®
Alt+Ctrl +.	Make ellipsis.(...)
Alt+ Ctrl +C	Copyright symbol. ©
Alt+Ctrl+T	The Trademark Symbol. ™
Shift+F1	Context sensitive help.
Shift+ F2	Copy text.
Shift+f3	Change Case.
Shift+F4	Repeat a find or goto action.
Shift+F7	Choose Thesaurus commands.
Shift+F8	Shrinking documents.
Shift+F10	Display a shortcut menu.
Shift+F12	Choose the save as commands.
Alt+Ctrl+M	Insert a comment.
Alt+Ctrl+1	Apply the leading 1 style.
Alt+Ctrl+2	Apply the leading 2 style.
F7	Open Spelling and grammer checking.
Ctrl+K	Hyperlink.
Ctrl+W	Close file.
Alt+F+A	Save As.
Ctrl+F2	print.
Alt+F+U	Page Setup.
Alt+F+D	Mail Recipients.
Ctrl+F	Find Dialog Box.
Ctrl+G	Replace.
Alt+V+T	Toolbar.
Alt+V+H	Header & Footer.
Alt+V+Z	Zoom.
Alt+V+U	Full screen.
Etc.	

Microsoft Word shortcut keys

Shortcut	Description
Ctrl + 0	Adds or removes 6pts of spacing before a paragraph.
Ctrl + A	Select all contents of the page.
Ctrl + B	Bold highlighted selection.
Ctrl + C	<u>C</u> opy selected text.
Ctrl + D	Open the <u>f</u> ont preferences window.
Ctrl + E	Aligns the line or selected text to the center of the screen.
Ctrl + F	Open find box.
Ctrl + I	<i>I</i> talics highlighted selection.
Ctrl + J	Aligns the selected text or line to justify the screen.
Ctrl + K	Insert link.
Ctrl + L	Aligns the line or selected text to the left of the screen.
Ctrl + M	Indent the paragraph.
Ctrl + P	Open the print window.
Ctrl + R	Aligns the line or selected text to the right of the screen.
Ctrl + S	Save the open document. Just like Shift + F12.
Ctrl + T	Create a hanging indent.
Ctrl + U	<u>U</u> nderline the selected text.
Ctrl + V	<u>P</u> aste.
Ctrl + X	<u>C</u> ut selected text.
Ctrl + Y	Redo the last action performed.
Ctrl + Z	Undo last action.
Ctrl + Shift + L	Quickly create a <u>b</u> ullet <u>p</u> oint.
Ctrl + Shift + F	Change the font.
Ctrl + Shift + >	Increase selected font +1pts up to 12pt and then increase font +2pts.
Ctrl +]	Increase selected font +1pts.
Ctrl + Shift + <	Decrease selected font -1pts if 12pt or lower; if above 12, decreases font by +2pt.
Ctrl + [Decrease selected font -1pts.
Ctrl + / + c	Insert a cent sign (¢).
Ctrl + ' + <char>	Insert a character with an accent (grave) mark, where <char> is the character you want. For example, if you wanted an accented è you would use Ctrl + ' + e as your shortcut key. To reverse the accent mark use the opposite accent mark, often on the <u>t</u> ilde key.
Ctrl + Shift + *	View or hide non printing characters.
Ctrl + <left arrow>	Moves one word to the left.
Ctrl + <right arrow>	Moves one word to the right.
Ctrl + <up arrow>	Moves to the beginning of the line or paragraph.
Ctrl + <down arrow>	Moves to the end of the paragraph.
Ctrl + Del	Deletes word to right of cursor.
Ctrl + Backspace	Deletes word to left of cursor.
Ctrl + End	Moves the cursor to the end of the document.
Ctrl + Home	Moves the cursor to the beginning of the document.
Ctrl + Spacebar	Reset highlighted text to the default font.
Ctrl + 1	Single-space lines.
Ctrl + 2	Double-space lines.
Ctrl + 5	1.5-line spacing.
Ctrl + Alt + 1	Changes text to heading 1.

Ctrl + Alt + 2	Changes text to heading 2.
Ctrl + Alt + 3	Changes text to heading 3.
Alt + Ctrl + F2	Open new document.
Ctrl + F1	Open the <u>Task Pane</u> .
Ctrl + F2	Display the <u>print preview</u> .
Ctrl + Shift + >	Increases the selected text size by one.
Ctrl + Shift + <	Decreases the selected text size by one.
Ctrl + Shift + F6	Switches to another open Microsoft Word document.
Ctrl + Shift + F12	Prints the document.
F1	Open Help.
F4	Repeat the last action performed (Word 2000+)
F5	Open the Find, Replace, and Go To window in Microsoft Word.
F7	Spellcheck and grammar check selected text or document.
F12	Save As.
Shift + F3	Change the text in Microsoft Word from <u>uppercase</u> to <u>lowercase</u> or a capital letter at the beginning of every word.
Shift + F7	Runs a Thesaurus check on the selected word.
Shift + F12	Save the open document. Just like Ctrl + S.
Shift + Enter	Create a <u>soft break</u> instead of a new paragraph.
Shift + Insert	Paste.
Shift + Alt + D	Insert the current date.
Shift + Alt + T	Insert the current time.

Mouse shortcuts	Description
Click, hold, and drag	Selects text from where you click and hold to the point you drag and let go.
Double-click	If double-clicking a word, selects the complete word.
Double-click	Double-clicking on the left, center, or right of a blank line makes the alignment of the text left, center, or right aligned.
Double-click	Double-clicking anywhere after text on a line will set a <u>tab stop</u> .
Triple-click	Selects the line or paragraph of the text that the mouse triple-clicked on.
Ctrl + Mouse wheel	Zooms in and out of document.

Concept of Headers & Footers:-

Headers:-

It appears **top of each page** is called headers.

Headers may be:-

- ✓ Page Numbers.
- ✓ Number of pages.
- ✓ Date & Time.
- ✓ Drawing object.
- ✓ File name.
- ✓ Images. Etc.

Footers:-

It appears **bottom of each page** is called footers.

Footers may be:-

- ✓ Page Numbers.
- ✓ Number of pages.
- ✓ Date & Time.
- ✓ Drawing object.

- ✓ File name.
- ✓ Images.
- Etc.

OLE (Object Linking and Embedding):-

It is a way of attachment of word file in the form of linked object or embedded object. In case linked object original file must be change or affected and in the case of embedded object, original file does not change or affected.

Steps for Linking:-

Insert→Object→Create New File→Check Link & Icon→Browse→Select & Open File.

Steps For Embedded:-

Insert→Object→Create New File→Check Icon→Browse→Select & Open File.

Bullets & Numbering:-

Bullets:- Bullets are symbols, graphics, and images for displaying unordered items.

Numbering:- It is used for displaying ordered list of items.

It may be

1. Numbers.
2. Romans.
3. Alphabets (Upper case and Lower case).

Change case(Press F3):-

It Is Used For Changing Cases. There are many types of cases.

- ✓ Upper case.
- ✓ Lower case.
- ✓ Title case.
- ✓ Senetence Case.
- ✓ Toggle case.

Format→Change Case.

Example of Uppercase:-

RAM IS A GOOD BOY

Example of Lowercase:-

ram is a good boy

Example of Title case:-

Ram Is A Good Boy

Example of Sentence case:-

Ram is a good boy

Example of Toggle case:-

rAM iS a gOOD bOY

Mail Merge:-

Mail merge feature is a quick and easy way for mass/Bulk producing letters, forms, envelopes, mailing labels etc.

Tools→Mail Merge.

Macros:-

It is a sequence of actions that is named and stored. When we run a macro, word performs all the assigned actions in a sequence. It provides faster editing and formatting.

Tools→Macros→Record New Macro(Assigned Into Commands/Tool).

Tools→Macros→Stop Macro Commands.

Tools→Macros→Run→Macro_Name (For running Macros).

Templates(Designed by User):-

A standard design or page format is used over and over again to give a consistent appearance to a series of documents.

Templates Wizards (Already Made in system):-

A technique used by some applications to guide the inexperienced or infrequent user through a complex set of steps by asking questions about the document they are in the process of creating as they are actually creating it. Wizard can take the form of dialog boxes containing a set of choices for each stage of creation process or they can also appear as animated on screen assistant who offer help from time to time.

Table:-

It consists of rows and columns.

Number of rows=2.

Number Of columns=5.

Hyperlink:-

It is used for linking one document with other document.

Drop caps:-

It is used for writing first character in highlighted form or big size corresponding many lines.



Font:-

It is a way of writing contents or matters by different ways.

Example:-

Times New Roman,
Showcard Gothic.
Algerian Etc.



Paragraph:-

It consists of a lot amount of sentences. After pressing enter key a new paragraph created.

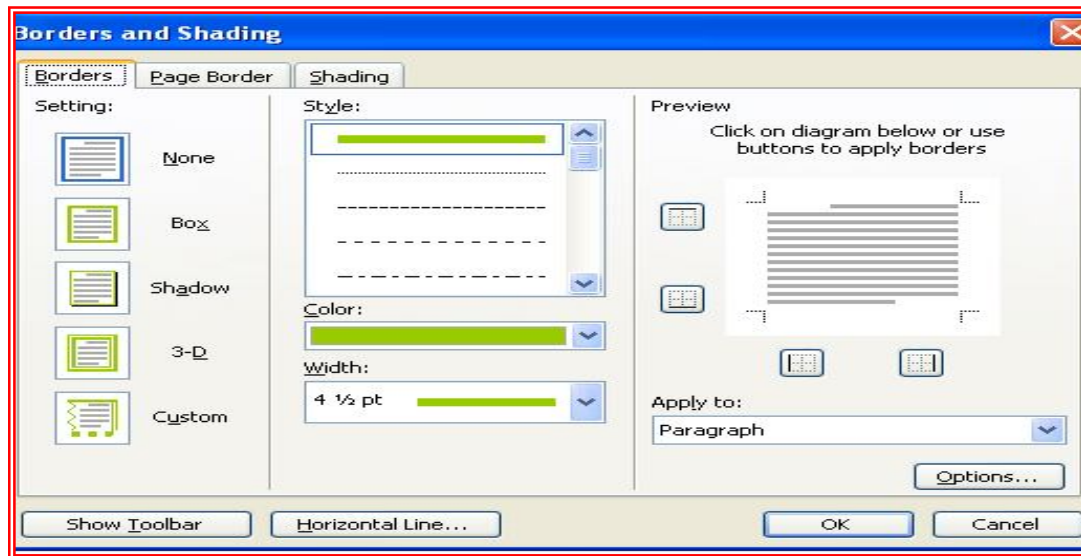
Pattern 1 paragraph (Hanging Style)

.....
.....
.....
.....

Pattern 2 paragraph (First Line Style)

.....
.....
.....
.....

Border & Shading:-



Spelling & Grammer Checking:- (It is editing & proofing tool)



Customize-

BY using, this feature of MS word, we can create own toolbar and menu. This option available in tools menu.
Tools→Customize→Command→New Menu.

Equation editor:-

This option facilitates for writing mathematical based symbols, equations etc.

Tools→Customize→Command→Insert→Equation Editor.

Example :-1

$$\sqrt{3x + 6y} \xrightarrow{y=9.2}$$

Example :-2 $\int_{x=1}^n x dx$

Tab

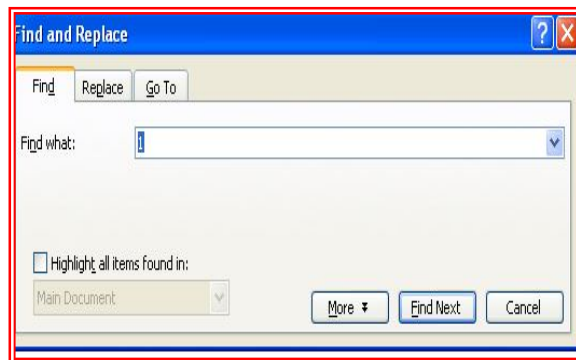
It is used for setting stop position of cursor. Default tab stop is .5 inch. There are following types of tab stop.

- ✓ Left Tab
- ✓ Right Tab
- ✓ Center Tab
- ✓ Decimal tab
- ✓ Bar tab

Dialog Box:-It contains information about respective terms.Such as Print dialog box,Font dialog box,Pagesetup dialog box etc.

Find & Replacing:-

It is used for finding character, word in a given document and replaces it by desired characters or words.



Printing In MS Word:-

It produces out put on paper. It is called hard copy. Before printing of document we follow following steps.

Step1:- Page Setup. Alt+F+U

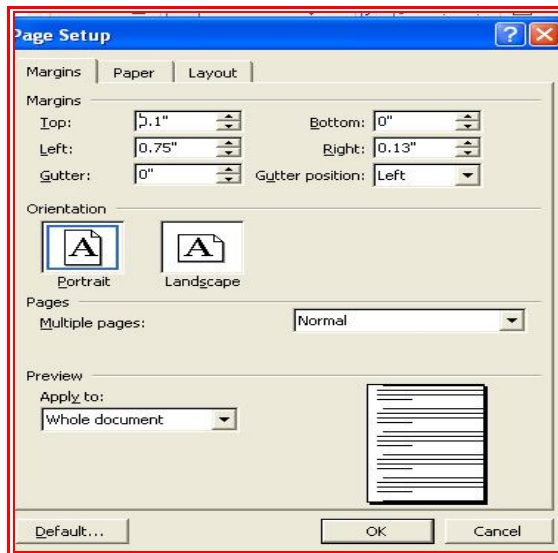
Step2:- Print Preview. Ctrl+F2

Step3:- Printing of document. Ctrl+P

Page Setup:-

Margin:-

- a) Left Margin.
- b) Right Margin.
- c) Top Margin.
- d) Bottom Margin.
- e) Gutter Margin (For Binding Space).
- f) Header & Footer Margin.

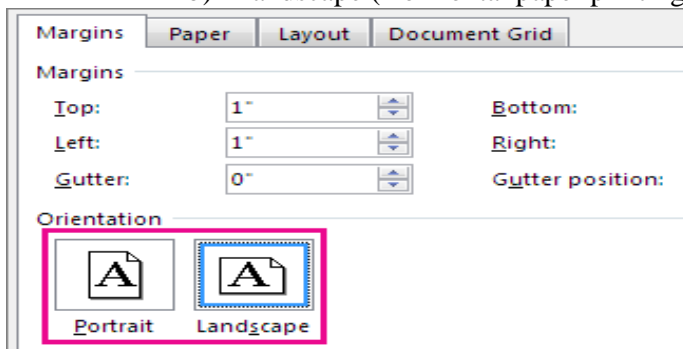


Paper Size:-

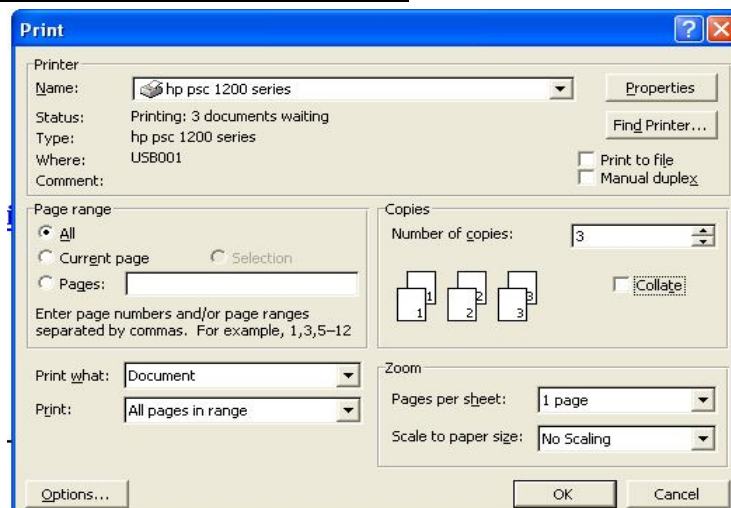
- | | L | W |
|-------------------------------------|--------------|---|
| a) A4 Size | 210*227 mm. | |
| b) Letter Size | 8.5*11 inch. | |
| c) Legal Size | 8.5*14 inch. | |
| d) A5 Size | 148*210mm. | |
| e) B5 Size | 182*257mm. | |
| f) Photo Size | 4*6 inch. | |
| g) Hagaki Size | 100*148mm. | |
| h) Custom Size (user defined size). | | |

Page Orientation:-

- Portrait (Vertical paper printing).
- Landscape (Horizontal paper printing).



Print Dialog Box:-



Microsoft Word 2010 Tutorial

Microsoft Word 2010 is a word-processing program, designed to help you create professional-quality documents. With the finest document-formatting tools, Word helps you organize and write your documents more efficiently. Word also includes powerful editing and revising tools so that you can collaborate with others easily.

The Ribbon

Understanding the Ribbon is a great way to help understand the changes between Microsoft 2003 to Microsoft 2010. The ribbon holds all of the information in previous versions of Microsoft Office in a more visual stream line manner through a series of tabs that include an immense variety of program features.

Home Tab

This is the most used tab; it incorporates all text formatting features such as font and paragraph changes.



Insert Tab

This tab allows you to insert a variety of items into a document from pictures, clip art, tables and headers and footers.



Page Layout Tab

This tab has commands to adjust page elements such as margins, orientation, inserting columns, page backgrounds and themes.



Reference Tab

This tab has commands to use when creating a Table of Contents and citation page for a paper. It provides you with many simple solutions to create these typically difficult to produce documents.



Mailing Tab

This tab allows you to create documents to help when sending out mailings such as printing envelopes, labels and processing mail merges.



Review Tab

This tab allows you to make any changes to your document due to spelling and grammar issues. It also holds the track changes feature which provides people with the ability to make notes and changes to a document of another person.



View Tab

This tab allows you to change the view of your document to a different two page document or zoom.



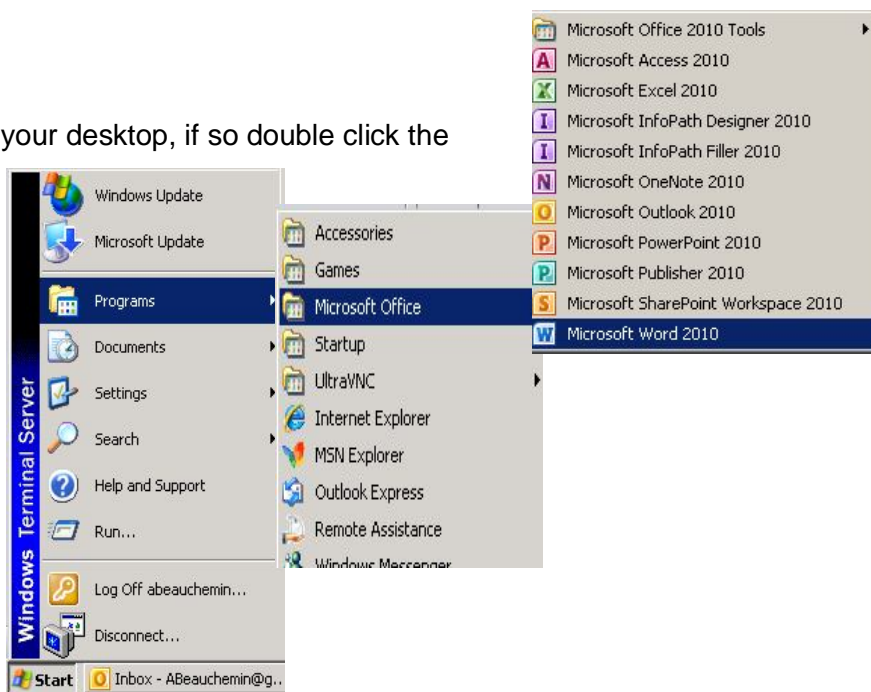
Getting Started

Now that you have an understanding of where things are located, let's look at the steps needed to create a document.

Opening Outlook

You may have a shortcut to Word on your desktop, if so double click the icon and Word will open. If not follow the steps below:

1. Click on the Start button
2. Highlight Programs
3. Highlight Microsoft Office
4. Click on Microsoft Word 2010



Create a New Document

1. Click the **File** tab and then click **New**.
2. Under **Available Templates**, click **Blank Document**.
3. Click **Create**.

Using Templates

Word 2010 allows you to apply built-in templates from a wide selection of popular Word templates, including resumes, agendas, business cards, and faxes.

To find and apply a template in Word, do the following:

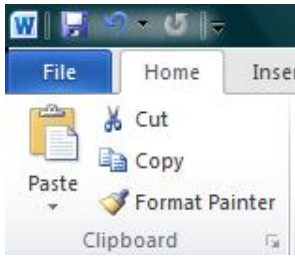
1. On the **File** tab, click **New**.
2. Under **Available Templates**, do one of the following:
 - To use one of the built-in templates, click **Sample Templates**, click the template that you want, and then click **Create**.
 - To reuse a template that you've recently used, click **Recent Templates**, click the template that you want, and then click **Create**.
 - To find a template on Office.com, under **Office.com Templates**, click the template category that you want, click the template that you want, and click **Download** to download the template from Office.com to your computer.
3. Once you have selected your template you can modify it in any way to create the document you want.

NOTE: You can also search for templates on Office.com from within Word. In the **Search Office.com for templates** box, type one or more search terms, and then click the arrow button to search.

Opening a document

1. Click the **File** tab, and then click **Open**.
2. In the left pane of the **Open** dialog box, click the drive or folder that contains the document.
3. In the right pane of the **Open** dialog box, open the folder that contains the document that you want.
4. Click the document and then click **Open**.

Cut, Copy and Paste



If you would like to remove text from your document you can copy or cut the text from the document. Simply highlight the text and go to the **Home** tab in the **Clipboard** group and click **Cut** or **Copy**. You can also right click on your mouse and select **Cut** or **Copy**.

Pasting Text

If you **Copy** text, you typically need to **Paste** it somewhere. The **Paste** feature in 2010 is much more detailed than in previous versions of Word. When you paste content, the **Paste Options** button provides different options, depending on the source of the content.



Keep Source Formatting: This option preserves the look of the original text.



Keep Text Only: This option removes all the original formatting from the text.



Link & Keep Source Formatting: This option preserves the look of the original text, and it maintains a link to the source file and updates the pasted text with any changes that are made to the source file.



Link & Use Destination Styles: This option formats the text to match the style that's applied where the text is pasted. It also maintains a link to the source file and updates the pasted text with any changes that are made to the source file.



Merge Formatting: This option changes the formatting so that it matches the text that surrounds it.



Picture: This option inserts the text as an image.



Use Destination Styles: This option formats the text to match the style that's applied where the text is pasted.



Use Destination Theme: This option formats the text to match the theme that's applied to the document where the text is pasted.

To Paste, click on the area you want your information to be inserted and either go to the **Home** tab in the **Clipboard** group and click **Paste** or right click on your mouse and select **Paste**.

Undo

The **Quick Access Toolbar** holds a variety of commands right at your finger tips. It is located in the top left of the document above the **File** and **Home** tab.

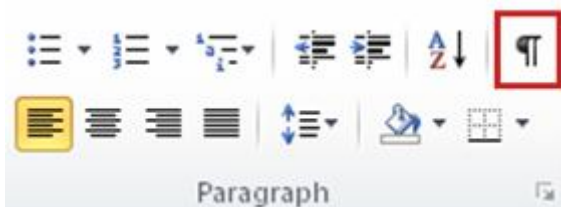
- You can add or remove command by clicking on the arrow to the right of the **Quick Access Toolbar**.
- If you make an error in your document click on the **Undo** command and it will remove the last thing you did.



arrow

Show/Hide Formatting Marks

The Show/Hide command allows you to see every time you hit the space bar, hit enter or tab. This feature can be quite useful when creating documents to understand where everything is placed within your document and see if any errors have been made.



On the **Home** tab, in the **Paragraph** group, click **Show/Hide**.

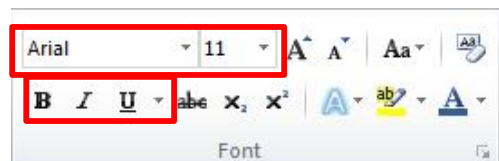
Formatting Text

Formatting a document can range from modifying text size to adding graphics. It is easy to add creative touches to any document with the options Microsoft Word has to offer.

Modifying Fonts

The **Font** Group allows you to change your text font style, size, color and many other elements.

1. Highlight the text you would like to modify.
2. Click on the drop down arrow of font style and font size and select the changes you would like to make.
3. While text is highlighted you can also click on the color, bold, italics or underline commands to modify the text even more.



Change Text Case

You can change the case of selected text in a document by clicking a single button called **Change Case** on the ribbon.



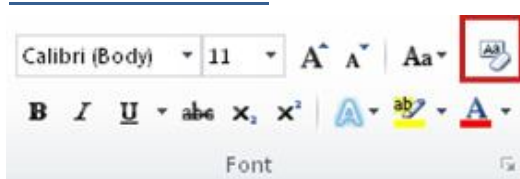
1. Highlight the text for which you want to change the case.
2. On the **Home** tab, in the **Font** group, click **Change Case**.
3. Choose an option from the dropdown list, which includes **Sentence case**, **lowercase**, **UPPERCASE**, **Capitalize Each Word**, and **tOGGLE cASE**.

Adding text effects

1. Select the text that you want to add an effect to.
2. On the **Home** tab, in the **Font** group, click **Text Effect**.
3. Click the effect that you want.
 - For more choices, point to **Outline**, **Shadow**, **Reflection**, or **Glow**, and then click the effect that you want to add.



Remove text effects



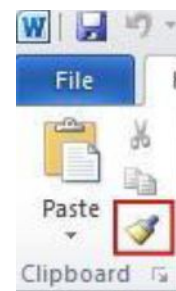
1. Select the text that you want to remove an effect from.
2. On the **Home** tab, in the **Font** group, click **Clear Formatting**.

Format Painter

The **Format Painter** feature allows you to quickly copy a format that you have applied to text already in your document.

1. Select the text or graphic that has the formatting that you want to copy.
2. On the **Home** tab, in the **Clipboard** group, single click **Format Painter**. The pointer will change to a paintbrush icon.
3. Bring your cursor to the text or graphic that you want to format and click on the text.
4. To stop formatting, press ESC or click on the **Format Painter** command again.

NOTE: Double-click the Format Painter button if you want to change the format of multiple selections in your document.



Clear Formatting

To get rid of all the styles, text effects, and font formatting in your document, do the following:

1. Select the text that you want to clear the formatting from. Or press CTRL+A to select everything in the document.
2. On the **Home** tab, in the **Font** group, click **Clear Formatting**.



NOTE: The **Clear Formatting** command will not remove highlighting from your text. To clear highlighting, select the highlighted text, and then click the arrow next to **Text Highlight Color** and click **No Color**.

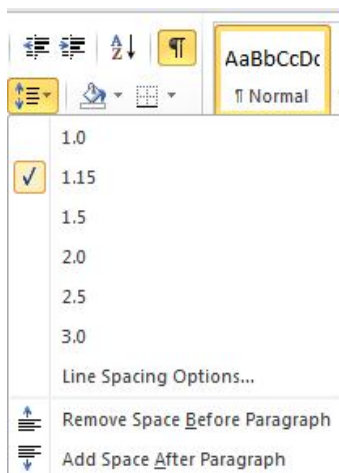
Formatting Documents

Adjusting Line Spacing

The default spacing is 1.15 line spacing and 10 points after each paragraph. The default spacing in Office Word 2003 documents is 1.0 between lines and no blank line between paragraphs.

The easiest way to change the line spacing for an entire document is to highlight the paragraphs or entire document that you want to change the line spacing on.

1. On the **Home** tab, in the **Paragraph** group, click **Line Spacing**.
2. Do one of the following:



- Click the number of line spaces that you want.

For example, click **1.0** to single-space with the spacing that is used in earlier versions of Word. Click **2.0** to double-space the selected paragraph. Click **1.15** to single-space with the spacing that is used in Word 2010.

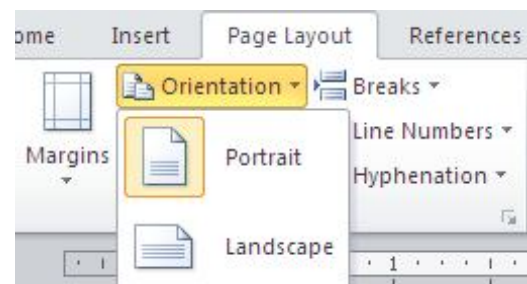
- Click **Remove Space Before Paragraph** to remove any additional lines added after each paragraph as a default

NOTE: If a line contains a large text character, graphic, or formula, Word increases the spacing for that line. To space all lines evenly within a paragraph, use exact spacing and specify an amount of space that is large enough to fit the largest character or graphic in the line. If items appear cut off, increase the amount of spacing.

Page Orientation You can choose either portrait (vertical) or landscape (horizontal) orientation for all or part of your document.

Change Page Orientation

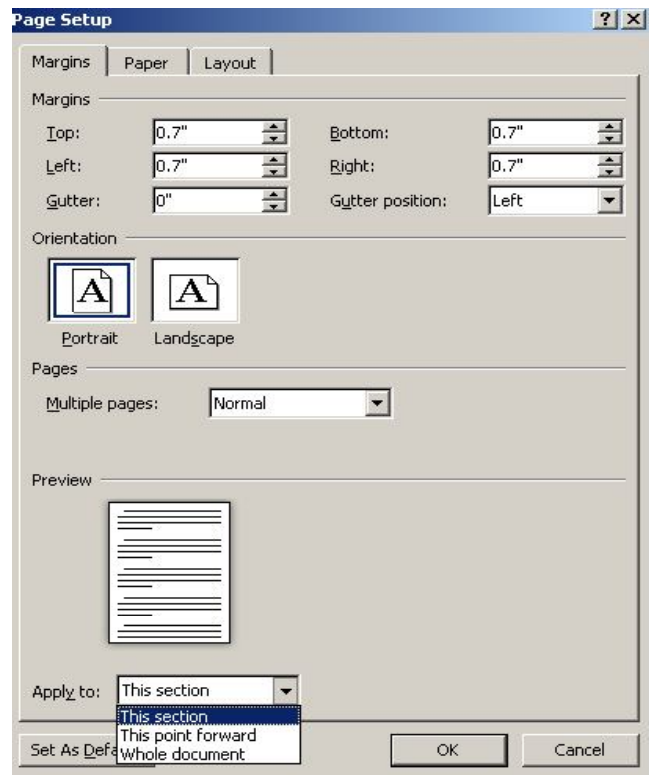
1. On the **Page Layout** tab, in the **Page Setup** group, click **Orientation**.
2. Click **Portrait** or **Landscape**.



Different Page Orientations on Same Document

1. Highlight the pages or paragraphs that you want to change to portrait or landscape orientation.
2. On the **Page Layout** tab, in the **Page Setup** group, click **Margins**.
3. Click **Custom Margins** at the bottom of the drop down menu.
4. A **Page Setup** dialog box will appear.
5. On the **Margins** tab, click **Portrait** or **Landscape**.
6. In the **Apply to** list, click **Selected text** or **This point forward**.

NOTE: If you select some but not all of the text on a page to change to portrait or landscape orientation, Word places the selected text on its own page, and the surrounding text on separate pages.



Page Margins

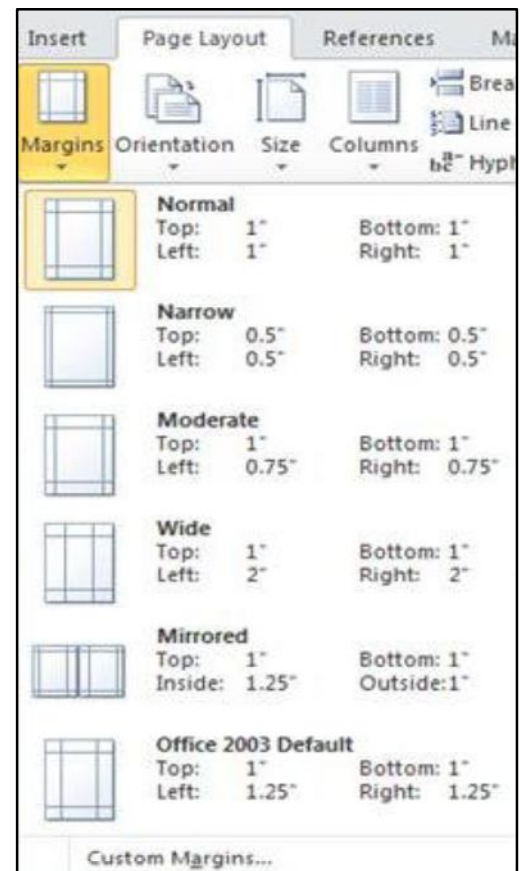
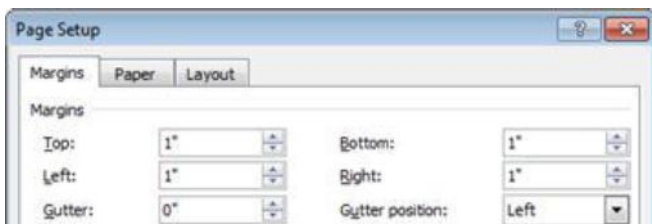
Page margins are the blank space around the edges of the page. In general, you insert text and graphics in the printable area inside the margins. When you change a document's page margins, you change where text and graphics appear on each page. You can change the page margins either by choosing from one of Word's predefined settings in the Margins gallery or by creating custom margins.

Setting Predefined Page Margins

1. On the **Page Layout** tab, in the **Page Setup** group, click **Margins**. The Margins gallery drop down menu will appear.
2. Click the margin type that you want to apply.

Create Custom Margins

1. On the **Page Layout** tab, in the **Page Setup** group, click **Margins**.
2. At the bottom of the Margins gallery drop down menu, click **Custom Margins**.
3. The **Page Setup** dialog box will appear.
4. Enter new values for the margins in all or some of the Top, Bottom, Left or Right text boxes.
5. Click **OK**



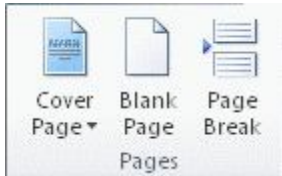
- **NOTE:** Most printers require a minimum width for margin settings, because they can't print all the way to the edge of the page. If you try to set margins that are too narrow, Microsoft Word displays the message **One or more margins are set outside the printable area of the page.**

Page Breaks

Word automatically inserts a page break when you reach the end of a page. If you want the page to break in a different place, you can insert a manual page break.

Inserting a Page Break

1. Click where you want to start a new page.
2. On the **Insert** tab, in the **Pages** group, click **Page Break**.



NOTE: You can also insert breaks into your document by going to the **Page Layout** tab, **Page Setup** group and clicking on the **Breaks** command to view a variety of page and section breaks you can insert into your document.

Deleting a Page Break

You cannot delete the page breaks that Word inserts automatically; you can only delete a page break that you insert manually.

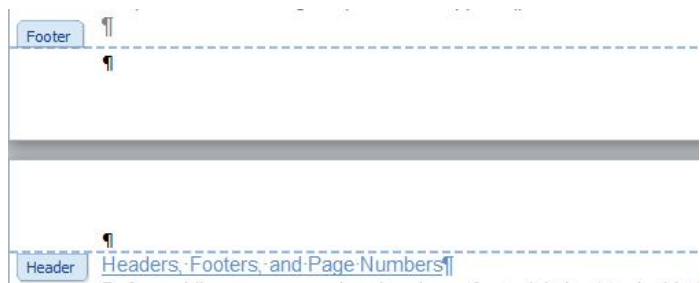
1. Go to the page break you would like to remove.
2. Select the page break by clicking in the margin next to the dotted line.



3. Press the DELETE key on your keyboard.

Headers, Footers, and Page Numbers

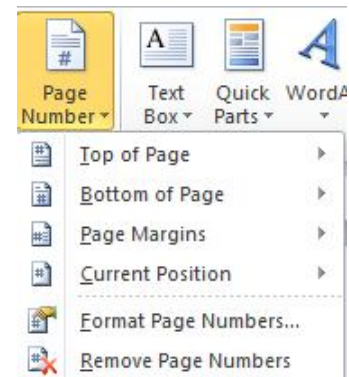
You can add headers, footers and page numbers numerous ways. The simplest way is to double click on the top or bottom of the page and the header and footer area will appear. Enter the text you wish to be displayed at the top or bottom of every page.



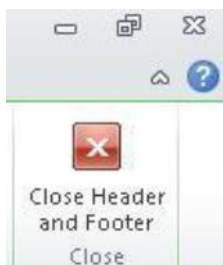
Add Page Numbers

If you want a page number on each page, you can quickly add a page number from the gallery.

1. On the **Insert** tab, in the **Header & Footer** group, click **Page Number**.
2. Click the page number location that you want.
3. In the gallery, scroll through the options, and then click the page number format that you want.



4. To return to the body of your document, click **Close Header and Footer** on the **Design** tab (under **Header & Footer Tools**).



Add Header or Footer

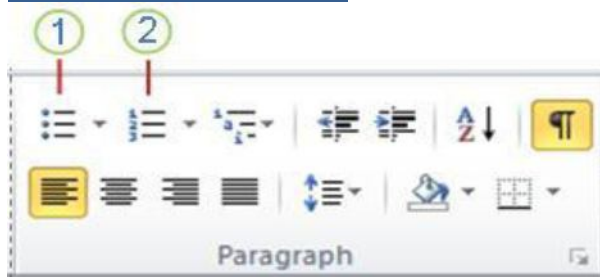
1. On the **Insert** tab, in the **Header & Footer** group, click **Header** or **Footer**.
2. Click the header or footer that you want to add to your document and your header or footer area will open.
3. Type text in the header or footer area.
4. To return to the body of your document, click **Close Header and Footer** on the **Design** tab (under **Header & Footer Tools**).




Remove page numbers, headers, and footers

1. Click on the Header, Footer or Page Number Command.
2. A drop down menu will appear.
3. Click Remove at the bottom of the menu.

Bulleted or Numbered List



You can quickly add bullets or numbers to existing lines of text, or Word can automatically create lists as you type. By default, if you start a paragraph with an asterisk or a number 1., Word recognizes that you are trying to start a bulleted or numbered list. If you don't want your text turned into a list, you can click the **AutoCorrect Options** button  that appears.

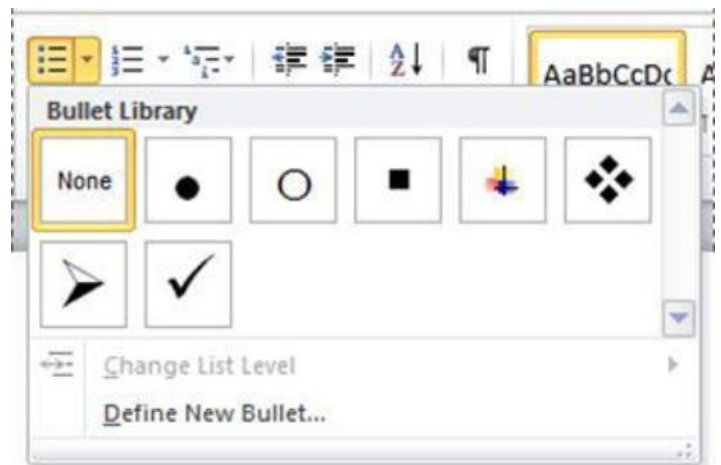
- 1 Bullets Command
- 2 Numbering Command

Insert Bulleted or Numbered List

1. Click on the area where you would like your list to appear or highlight the text you would like to be in a list.
2. Go to the **Home** tab, in the **Paragraph** group, click **Bullets** or **Numbering**.
3. A bullet(s) or number(s) will be inserted.

Select Bullets or Numbering Style

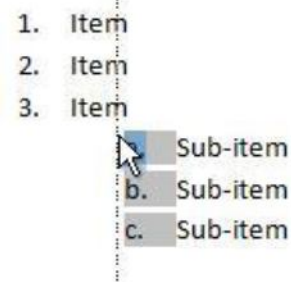
1. Select the items that you want to add bullets or numbering to.
2. On the **Home** tab, in the **Paragraph** group, click the arrow next to the **Bullets** or **Numbering** command.
3. Select the bullet or number format you would like to be inserted.



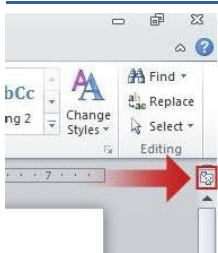
Move a List Left or Right

If you do not like the location of your bullets or numbers you can easily move them to a preferred location.

1. Click a bullet or number in the list to highlight the list.
2. Drag the list to a new location. The entire list moves as you drag. The numbering levels do not change.



Document Ruler




You can use the horizontal and vertical rulers in Word to align text, graphics, tables, and other elements in your document. To view the horizontal ruler across the top of your Word document and the vertical ruler along the left edge of your document, you must be in Print Layout view.

1. To show or hide the horizontal and vertical rulers, click **View Ruler** at the top of the vertical scroll bar.






Tab Stops

Creating tab stops can be helpful when creating a large number of documents such as flyers, table of contents or even when creating a resume. They help you to display and line up information correctly.

Setting Manual Tab Stops

1. Click the tab selector at the left end of the ruler  until it displays the type of tab that you want.
2. Then click in the ruler at the top of your page, where you want to set the tab stop.

The different types of tab stops found on the ruler are:

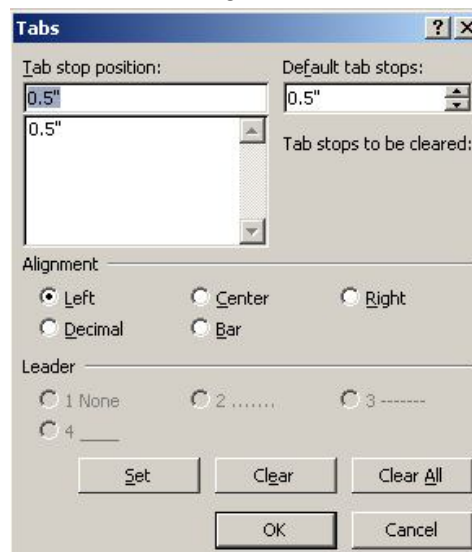
-  A **Left Tab** stop sets the start position of text that will then run to the right as you type.
-  A **Center Tab** stop sets the position of the middle of the text. The text centers on this position as you type.
-  A **Right Tab** stop sets the right end of the text. As you type, the text moves to the left.
-  A **Decimal Tab** stop aligns numbers around a decimal point. Independent of the number of digits, the decimal point will be in the same position. (You can align numbers around a decimal character only)
-  A **Bar Tab** stop doesn't position text. It inserts a vertical bar at the tab position.

NOTE: You can drag existing tab stops left or right along the ruler to a different position. Just Click and hold on the tab stop on the ruler then drag it to where ever you would like it to be.

Setting Detailed Tab Stops

If you want your tab stops at precise positions that you can't get by clicking the ruler, or if you want to insert a specific character (leader) before the tab, you can use the **Tabs** dialog box.

1. Click the **Home** tab, click the **Paragraph Dialog Box Launcher**
2. A **Paragraph** box will appear, click on the **Tabs** button at the bottom left of the dialog box.
3. A **Tabs** dialog box will appear.
4. Under **Tab stop position** area, type the location where you want to set the tab stop. Hit enter.
5. Under **Alignment**, click the type of tab stop that you want. See the table above for an explanation of the different types of tab stops.
6. To add dots with your tab stop, or to add another type of leader, click the option that you want under **Leader**.
7. Click **Set**.
8. Repeat steps 4-5 to add another tab stop, or click **OK**.
9. The **Tabs** dialog box will disappear and you should see your tabs set on the document ruler.



Clear Tab Stops

You can clear tab stops in a variety of ways, the simplest is going to the ruler, click and hold on the tab stop and drag in down towards the document. The tab stop will disappear. To quickly clear multiple tab stops and start fresh:

1. Click the **Home** tab, click the **Paragraph Dialog Box Launcher**
2. A **Paragraph** box will appear, click on the **Tabs** button at the bottom left of the dialog box.
3. A **Tabs** dialog box will appear.
4. In the list under **Tab stop position**, click the tab stop position that you want to clear, and then click **Clear**. To remove the spacing from all manual tab stops, click **Clear All**.
5. Click **OK**.

Working with Graphics

Inserting Shapes

You can add one shape to your file or combine multiple shapes to make a drawing or a more complex shape. Available shapes include lines, basic geometric shapes, arrows, equation shapes, flowchart shapes, stars, banners, and callouts. After you add one or more shapes, you can add text, bullets, numbering, and Quick Styles to them.

1. On the **Insert** tab, in the **Illustrations** group, click **Shapes**.
2. A drop down menu will appear, click the shape that you want.
3. Click anywhere in the document, and then drag to place the shape.

Insert Text to Shapes

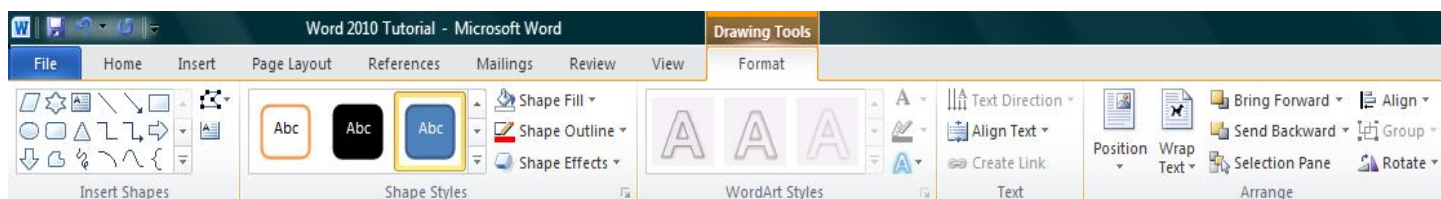
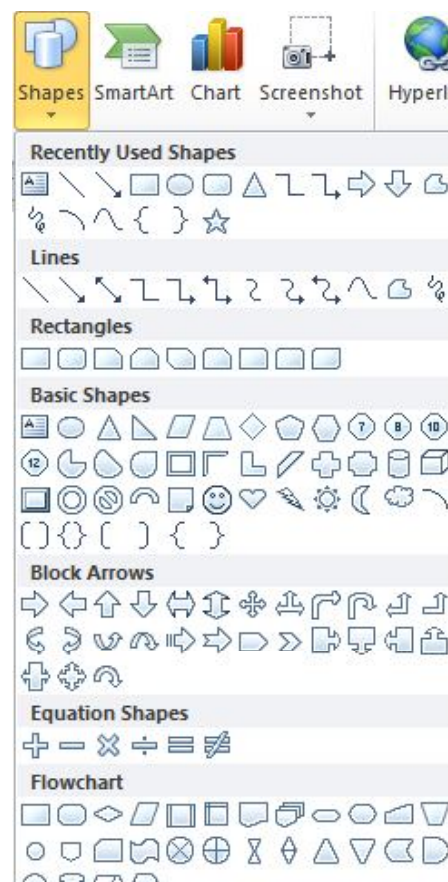
Once you have added a shape, you may want to add text inside the shape. All you have to do is click on the inside of the shape and start typing.

NOTE: The text that you add becomes part of the shape — if you rotate or flip the shape, the text rotates or flips also.

Format Shapes

After you insert a shape a new tab called **Drawing Tools Format** will appear every time you click on the shape.

1. Click the shape that you want to apply a new or different Quick Style to.
2. Go to the **Drawing Tools Format** tab, in the **Shape Styles** group, click the style that you want to be applied.



3. To see more Quick Styles, click the **More** button .

The **Drawing Tools Format** Tab also allows you to change the shape fill, outline, effects and select how the text in your document is wrapped around the shape.

Delete Shapes

If you decide you no longer want the shape in your document then click on the shape and then press DELETE.

Inserting Text Boxes

A text box is an object that lets you put and type text anywhere in your file.

1. On the **Insert** tab, in the **Text** group, click **Text Box** and a drop down menu will appear.
2. Click on a text box template or click **Draw Text Box** at the bottom of the drop down menu to draw your own text box.
3. If you elect to draw your own text box you need to click in the document, and then drag to draw the text box the size that you want.
4. To add text to a text box, click inside the text box, and then type or paste text.
 - To format text in the text box, select the text, and then use the formatting options in the **Font** group on the **Home** tab.
 - To position the text box, click it, and then when the pointer becomes a ⦿ , drag the text box to a new location.

NOTE: If you have problems printing text boxes, make sure that the **Print drawings created in Word** check box is selected. To do this, click the **File** tab, click **Options**, click **Display**, and then under **Printing Options**, select the **Print drawings created in Word** check box.

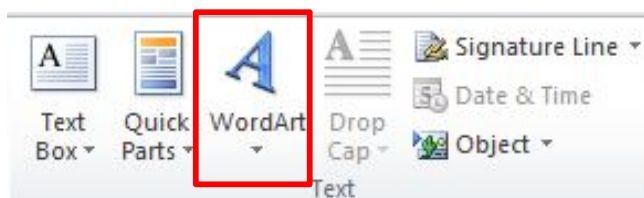
Deleting Text Boxes

To remove a text box just click the border of the text box that you want to delete, and then press DELETE. Make sure that the pointer is not inside the text box, but rather on the border of the text box. If the pointer is not on the border, pressing DELETE will delete the text inside the text box and not the text box.

WordArt

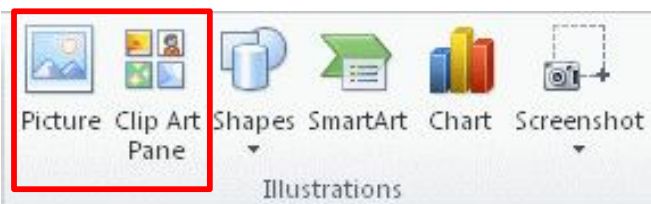
WordArt can be used to add special text effects to your document. For example, you can stretch a title, skew text, make text fit a preset shape, or apply a gradient fill. This WordArt becomes an object that you can move or position in your document to add decoration or emphasis. You can modify or add to the text in an existing WordArt object whenever you want. To add WordArt to text in your document, complete the following steps:

1. On the **Insert** tab, in the **Text** group, click **WordArt**,
2. A Drop down menu will appear, click the WordArt style that you want.
3. A Text Box will appear with the words "Enter your text here", Enter your text.



Insert Picture/Clip Art

Pictures and clip art can be inserted or copied into a document from many different sources, including downloaded from a clip art Web site provider, copied from a Web page, or inserted from a folder where you save pictures.



Insert Clip Art

1. On the **Insert** tab, in the **Illustrations** group, click **Clip Art**.
2. A **Clip Art** task pane will appear on the right of your screen, in the **Search for** box, type a word or phrase that describes the clip art that you want.
3. Click **Go**.
4. In the list of results, double click on the clip art to insert it into your document.

Insert Picture from Web

1. Open the document.
2. From the Web page, drag the picture that you want into the Word document.

Insert Picture from File

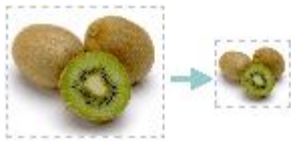
To insert a picture saved in your computer, insert it by following these steps.

1. Click where you want to insert the picture in your document.
2. On the **Insert** tab, in the **Illustrations** group, click **Picture**.
3. Locate the picture that you want to insert. For example, you might have a picture file located in **My Documents**.
4. Double-click the picture that you want to insert and it will appear in your document.

NOTE: To resize a picture, select the picture you've inserted in the document. To increase or decrease the size in one or more directions, drag a sizing handle away from or toward the center, while you do one of the following:

Sizing Graphics

You can easily resize pictures, text boxes, shapes, and WordArt in your file. You can also crop pictures or return them to their original size.

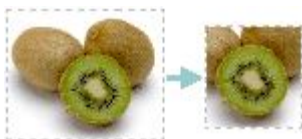


Manually Resize Graphics

1. Click the picture, shape, text box or WordArt that you want to resize.
2. Small circles or squares, also known as sizing handles, will appear at the corners and sides of a selected object.
3. Click and hold on a sizing handle away from or toward the center to increase or decrease the size of the picture.

Cropping a Picture

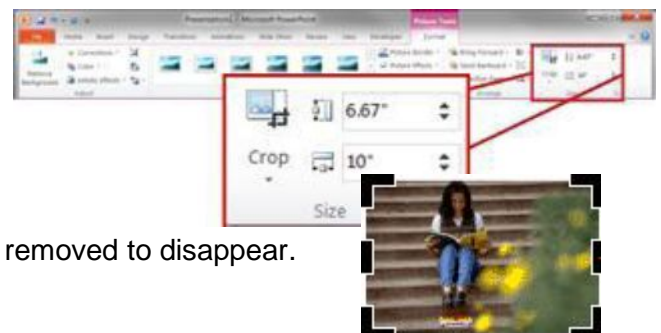
Cropping reduces the size of a picture by removing vertical or horizontal edges. Cropping is often used to hide or trim a part of a picture, either for emphasis or to remove unwanted portions.



1. Click on the picture that you want to crop.
2. Go to **Picture Tools**, on the **Format** tab, in the **Size** group, click **Crop**.
3. Black dotted lines will appear around your picture. Then drag the center

cropping handle on that side inward.

4. As you drag the cropping handle you will notice the area of your graphic you want removed will become gray.
5. Once you have cropped out everything you want, click outside of the graphic for the gray area you want removed to disappear.



Uncrop a Picture

You can always restore a resized or a cropped picture to its original appearance.

1. Click on your picture
2. Go to **Picture Tools**, on the **Format** tab, in the **Size** group, click **Crop**.
3. Black dotted lines will appear around your picture. Drag the black lines away from the center of the picture and the original picture will appear.

Advanced Formatting Techniques

Create Columns

Columns can be used in documents such as brochures, newsletters or to save space when creating lists.

Add columns before entering text:

1. Go to the **Page Layout** tab, in the **Page Setup** group, click **Columns**.
2. Click the layout that you want. Your document will be formatted in columns.

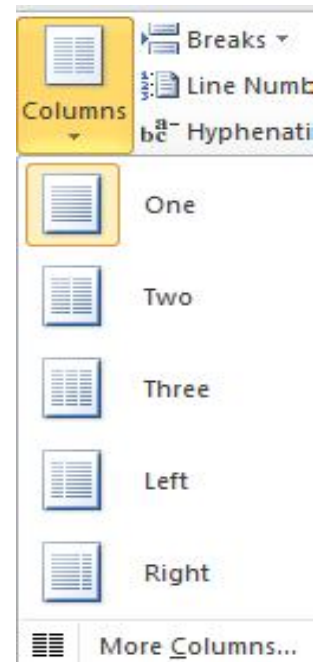
NOTE: To add a vertical line between the columns, click **Columns** again, click **More Columns**, and then select the **Line between** check box. You can also adjust the column width and spacing.

Add columns to part of a document

To do that highlight the text you want formatted in columns, or place your cursor where you want columns to begin.

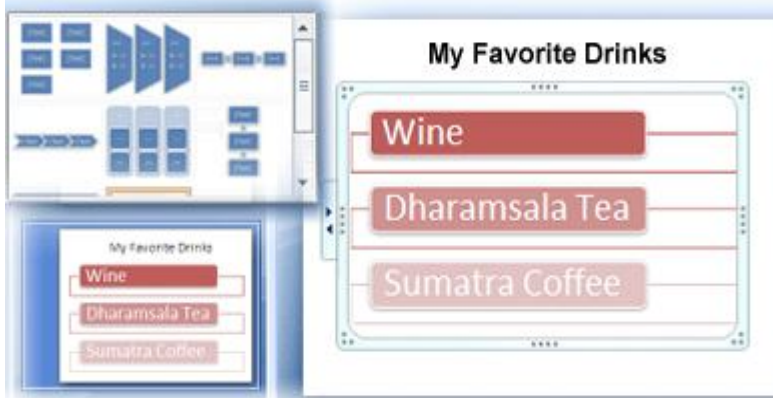
1. On the **Page Layout** tab, in the **Page Setup** group, click **Columns**.
2. Click **More Columns**.
3. Click the number of columns that you want.
4. In the **Apply to** list, click **Selected text** or **This point forward**.

NOTE: To change the layout again further on in your document, select text or click where you want to change the layout, and then follow the same steps. For example, you can change from one column to a two-column layout, and then you can change back to the single-column layout on a later page.



SmartArt Graphic

A SmartArt graphic is a visual representation of your information that you can quickly and easily create, choosing from among many different layouts, to effectively communicate your message or ideas. You can create SmartArt graphics in Excel, Outlook, PowerPoint, and Word.



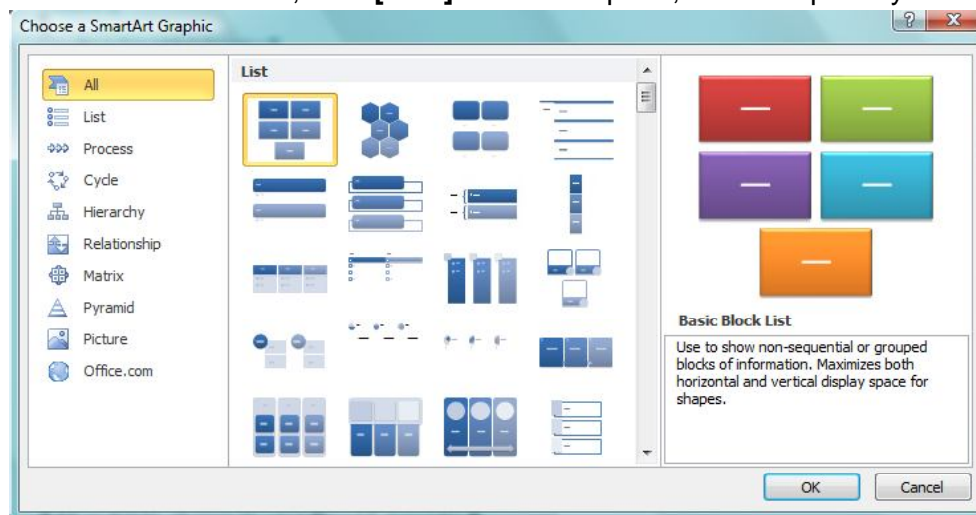
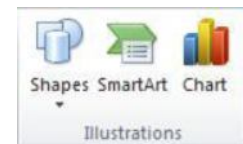
SmartArt graphics enables you to create designer-quality illustrations with only a few clicks of your mouse. When you create a SmartArt graphic, you are prompted to choose a type of SmartArt graphic, such as **Process**, **Hierarchy**, **Cycle**, or **Relationship**. Each type of SmartArt graphics contains several different layouts. After you choose a layout, it is easy to switch the layout or

type of a SmartArt graphic. Most of your text and other content, colors, styles, effects, and text formatting are automatically carried over to the new layout.

When you select a layout, placeholder text (such as **[Text]**) is displayed, so that you can see how your SmartArt graphic looks, nor is it displayed during a slide show. However, the shapes are always displayed and printed, unless you delete them. You can replace the placeholder text with your own content.

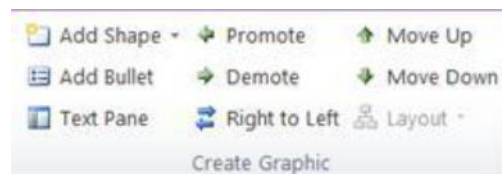
Create a SmartArt Graphic

1. On the **Insert** tab, in the **Illustrations** group, click **SmartArt**.
2. In the **Choose a SmartArt Graphic** dialog box, click the type and layout that you want.
3. Enter your text by doing one of the following:
 - Click **[Text]** in the Text pane, and then type your text.
 - Copy text from another location, click **[Text]** in the Text pane, and then paste your text.



Add or Delete Shapes in SmartArt Graphic

1. Click the SmartArt graphic that you want to add another shape to.
2. Click the existing shape that is located closest to where you want to add the new shape.
3. Under **SmartArt Tools**, on the **Design** tab, in the **Create Graphic** group, click the arrow under **Add Shape**.
4. Do one of the following:
 - To insert a shape after the selected shape, click **Add Shape After**.
 - To insert a shape before the selected shape, click **Add Shape Before**.



NOTE: To delete a shape from your SmartArt graphic, click the shape you want to delete, and then press DELETE. To delete your entire SmartArt graphic, click the border of your SmartArt graphic, and then press DELETE.

Format SmartArt Graphic

You can apply color variations to the shapes in your SmartArt graphic.

1. Click your SmartArt graphic.
2. Under **SmartArt Tools**, on the **Design** tab, in the **SmartArt Styles** group,
3. Select the SmartArt Style you wish to apply to add line styles, bevels or 3-D effects.
4. In the **SmartArt Styles** group you can also click **Change Colors** to further modify your SmartArt graphic.



NOTE: If you don't see the **SmartArt Tools** or **Design** tabs, make sure that you've selected a SmartArt graphic. You may have to double-click the SmartArt graphic to open the **Design** tab.

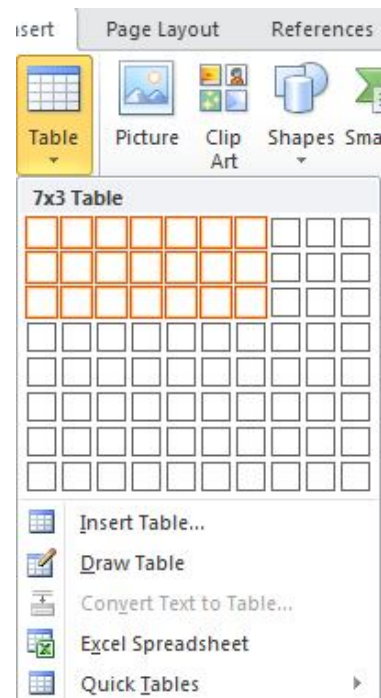
5. Click the color variation that you want.

Tables

Using tables in Word can provide you with additional elements to any document. Tables can be used to create lists or format text in an organized fashion.

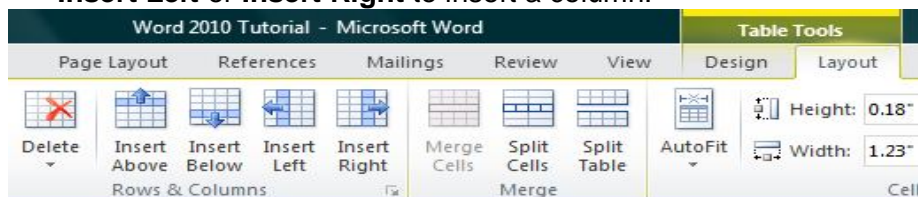
Inserting a Table

1. Click where you want to insert a table.
2. On the **Insert** tab, in the **Tables** group, click **Table**
3. A drop down box will appear; click and hold your mouse then drag to select the number of rows and columns that you want inserted into your document. You will see your table appearing in your document as you drag on the grid.
4. Once you have highlighted the rows and columns you would like let go of your mouse and the table will be in your document




Add Row/Column to Table

1. Click on the table.
2. Under **Table Tools**, go to the **Layout** tab
3. Click on the **Insert Above** or **Insert Below** to add a row, Click on **Insert Left** or **Insert Right** to insert a column.



4. Click on **Delete** to remove a column, row or cell.





Delete a Table

1. Rest the pointer on the table until the table move handle  appears, and then click the table move handle.
2. Press BACKSPACE on your keyboard.

Delete Table Contents.

You can delete the contents of a cell, a row, a column, or the whole table. When you delete the contents of a table, the table's rows and columns remain in your document.

1. Select the contents that you want to clear by following the table below:

TO SELECT	DO THIS
The entire table	In Print Layout view, rest the pointer over the table until the table move handle  appears, and then click the table move handle.
A row or rows	Click to the left of the row. 
A column or columns	Click the column's top gridline or border. 
A cell	Click the left edge of the cell. 

2. Press DELETE.

Finalizing a Document

Using the "Spell Check" Feature

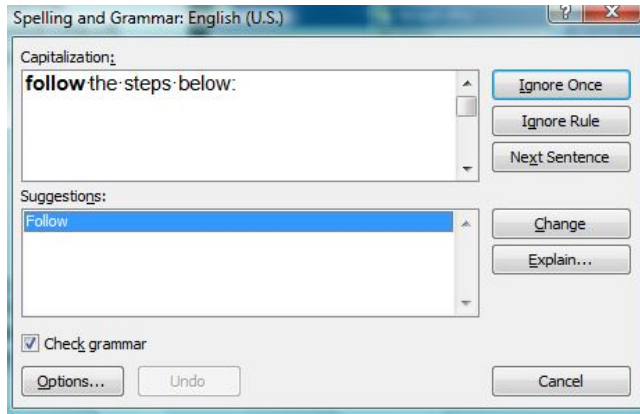
As you type your document, red wavy lines will appear under any word that is spelled incorrectly. The fastest way to fix spelling errors is to:

1. Put your cursor over the misspelled word and right click.
2. A drop down box will appear with correct spellings of the word.
3. Highlight and left click the word you want to replace the incorrect word with.



To complete a more comprehensive Spelling and Grammar check, you can use the Spelling and Grammar feature.

1. Click on the **Review** tab
2. Click on the **Spelling & Grammar** command (a blue check mark with ABC above it).
3. A **Spelling and Grammar** box will appear.
4. You can correct any Spelling or Grammar issue within the box.



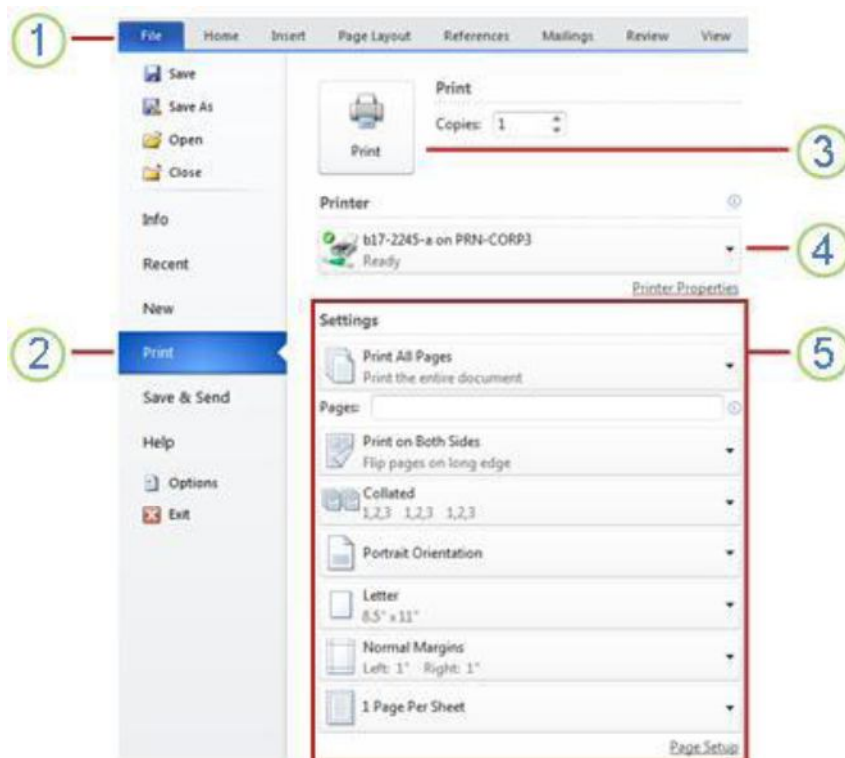
Print Preview

Print Preview automatically displays when you click on the **Print** tab. Whenever you make a change to a print-related setting, the preview is automatically updated.

1. Click the **File** tab, and then click **Print**. To go back to your document, click the **File** tab.
2. A preview of your document automatically appears. To view each page, click the arrows below the preview.

Print

The **Print** tab is the place to go to make sure you are printing what you want.



- 1 Click the **File** tab.
- 2 Click the **Print** command to print a document.
- 3 Click the **Print** button to print your document.
- 4 This dropdown shows the currently selected printer. Clicking the dropdown will display other available printers.
- 5 These dropdown menus show currently selected **Settings**. Rather than just showing you the name of a feature, these dropdown menus show you what the status of a feature is and describes it. This can help you figure out if you want to change the setting from what you have.

TIP: To go back to your document and make changes before you print it, click the **File** tab.

2.

Save a document

To save a document in the format used by Word 2010 and Word 2007, do the following:

1. Click the **File** tab.
2. Click **Save As**.
3. In the **File name** box, enter a name for your document.
4. Click **Save**.

To save a document so that it is compatible with Word 2003 or earlier, do the following:

1. Click the **File** tab.
2. Click **Save As**.
3. In the **Save as type** list, click **Word 97-2003 Document**. This changes the file format to .doc.
4. In the **File name** box, type a name for the document.
5. Click **Save**.

Help

If you need additional assistance when completing your document you can use the help feature.

1. Click on the blue circle with the white question mark command
2. A **Help** box will appear.
3. Click in the **Search Help** textbox and type what you need help
4. Click the magnifying glass next to the text box and the possible



with solutions will appear.

For additional information Microsoft Office has a great online resource that provides you with step by step instructions in a variety of topics. This link will bring you directly to the Word 2010 Help and How-To page: <http://office.microsoft.com/en-us/word-help/CL010256357.aspx>

Lecture - 10

MS POWERPOINT: - (EXTENSION NAME .ppt/.pptx)

It is graphics s/w which is used for making effective and interesting presentation. Various categories of slides are helpful for making presentation.

Description of Power Point:- PowerPoint is often used to create business presentations, but can also be used for educational or informal purposes. The presentations are comprised of slides, which may contain text, images, and other media, such as audio clips and movies. Sound effects and animated transitions can also be included to add extra appeal to the presentation. However, overusing sound effects and transitions will probably do more to annoy your audience than draw their attention. (Yes, we have all heard the car screeching noise enough times for one lifetime.) Example of Slides:

Title Slide.	Title Only Slide.	Title & Text Slide.
Title & Two column text.	Blank Slide.	Content Slide.
Title & Content Slide.	Title & Two content.	Title, Content & Two Content.
Title, Text & Content.	Title & Chart.	Title & Organization chart.
Title, Media clip & Text. Etc.		

Slide:- It is an individual page, where we put our ideas or views.

How To Make an Effective Presentation:-

- ✓ Collect whole information.
- ✓ Organized this information step by step.
- ✓ Use appropriate font size & colors.
- ✓ Use maximum graphics and images rather than textual information.
- ✓ Use judiciously animation effect and transition.
- ✓ Use already made template/Design/Model. Etc.

Steps For Making Presentation:-

- ✓ Put all information on various slides systematically.
- ✓ Apply suitable background.
- ✓ Apply suitable built in Animation or Custom animation.
- ✓ Apply suitable transition.
- ✓ Slide Show (Press F5).

COMMANDS TO CONTROL POWERPOINT WINDOWS	
To do this	Press these shortcut keys
Go to previous presentation window	CTRL+SHIFT+F6
Go to next presentation window	CTRL+F6
Maximize PowerPoint application window	ALT+F10
Maximize presentation window	CTRL+F10
Restore presentation window to previous size	CTRL+F5
COMMANDS TO USE IN AN OUTLINE	
Promote paragraph	ALT+SHIFT+LEFT ARROW
Demote paragraph	ALT+SHIFT+RIGHT ARROW
Move selected paragraphs up	ALT+SHIFT+UP ARROW
Move selected paragraphs down	ALT+SHIFT+DOWN ARROW
Show heading level 1	ALT+SHIFT+1
Expand text under a heading	ALT+SHIFT+PLUS
Collapse text under a heading	ALT+SHIFT+MINUS
Show all text and headings	ALT+SHIFT+A
Turn character formatting on/off	Keypad /

Viruses:-Artificial Viruses(Vital Information Resource Under Seize)

“Virus” was invented by Len Adleman in 1983 It is computer program, which is used for performing unwanted task. Example:-WORM, Time Bomb, Trojan horse, Laden Mara Gaya, 28 Ferb Happy Birthday Etc.

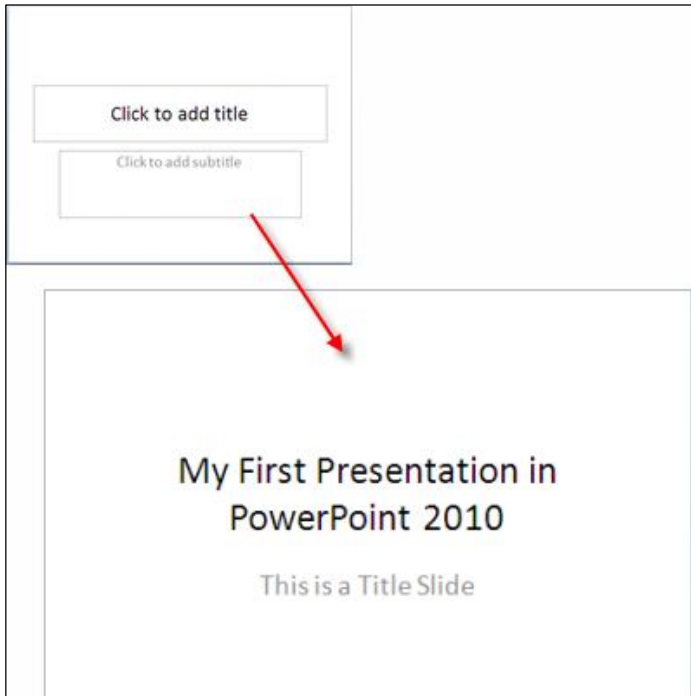
Antivirus:- It is used for protecting and killing viruses.

Example:-Norton Antivirus, Spyware,Kasper,K7 ,Kaspersky, Webroot, ESET, McAfee and G-DATA. ,AVG, BitDefender , Avira, Panda Security, F-Secure, alwarebytes' Anti Malware, Trend Micro, ZoneAlarm, eScan, Quick Heal, Comodo, Guardian AntiVirus etc

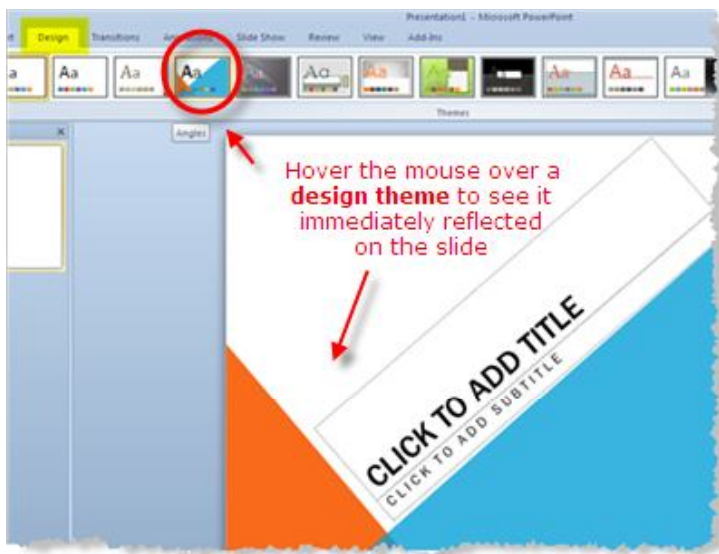
Source of Viruses:- Internet, Pen Drive, Floppy,Downloadable Programs,Cracked Software, Email Attachments,Booting From CD.etc

II. The Title Slide

When you open a new presentation in PowerPoint 2010, the program assumes that you will begin your slide show with a **Title slide**. Adding a title and subtitle to this slide layout is as easy as clicking in the text boxes provided and typing.



- III. One of the first things you will want to think about is the “look” or design theme of your slides. PowerPoint has a number of built in themes you can choose from. Design themes were first introduced in PowerPoint 2007. They work in a similar way as the design templates in earlier versions of PowerPoint. A really nice feature of the design themes is that you can immediately see the effect reflected on your slides, before making your decision.



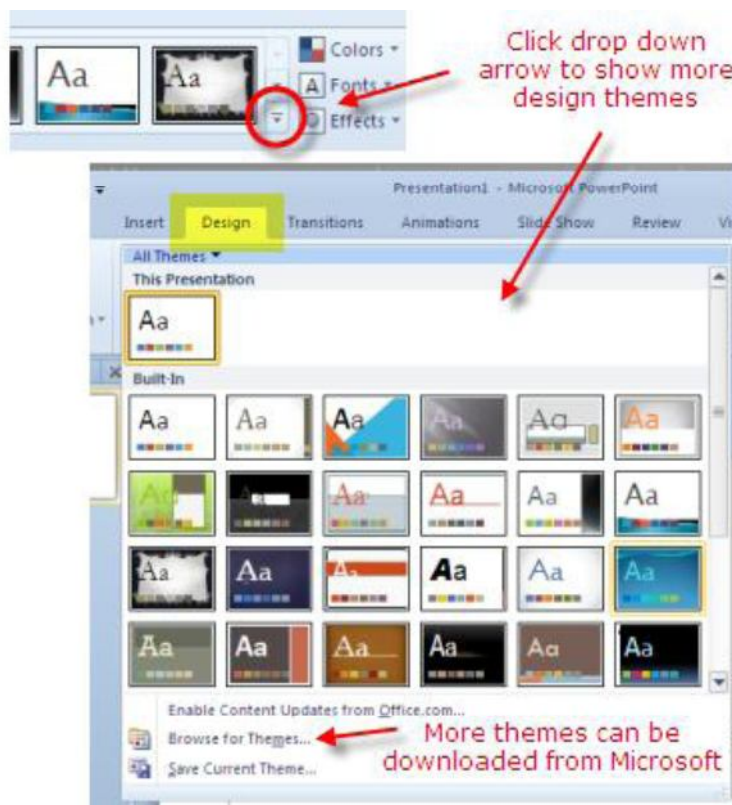
IV. Apply a Design Theme

- a. Click on the *Design* tab of the ribbon.
- b. Hover your mouse over any of the design theme icons shown.
- c. The design is reflected immediately on your slide, so you can see how it will look if you apply this design theme to your presentation.
- d. Click the design theme icon when you find one that suits your needs. This will apply that theme to your presentation.

V. Test Out More Design Themes

The design themes that are immediately visible on the *Design* tab of the ribbon are not all the themes available. You can scroll through the existing design themes by clicking on the up or down arrows to the right of the themes shown, or click the drop down arrow to reveal all of the available design themes at one time.

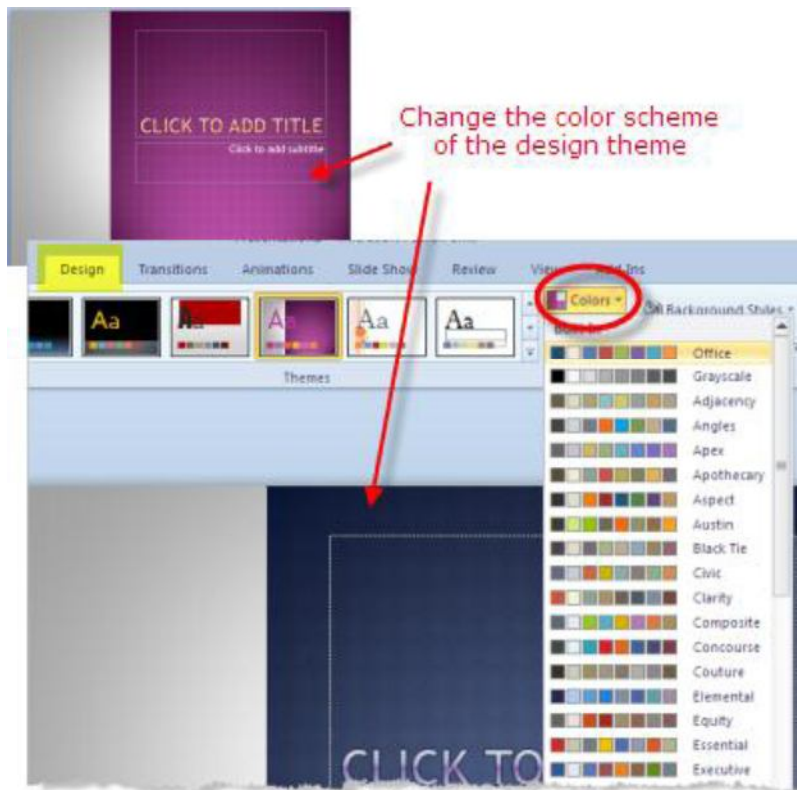
More design themes are available to download from the Microsoft site, by clicking on that link.



VI. Design Theme Color Schemes

Once you have selected a style of design theme that you like for your PowerPoint presentation, you are not limited to the color of the theme as it is currently applied.

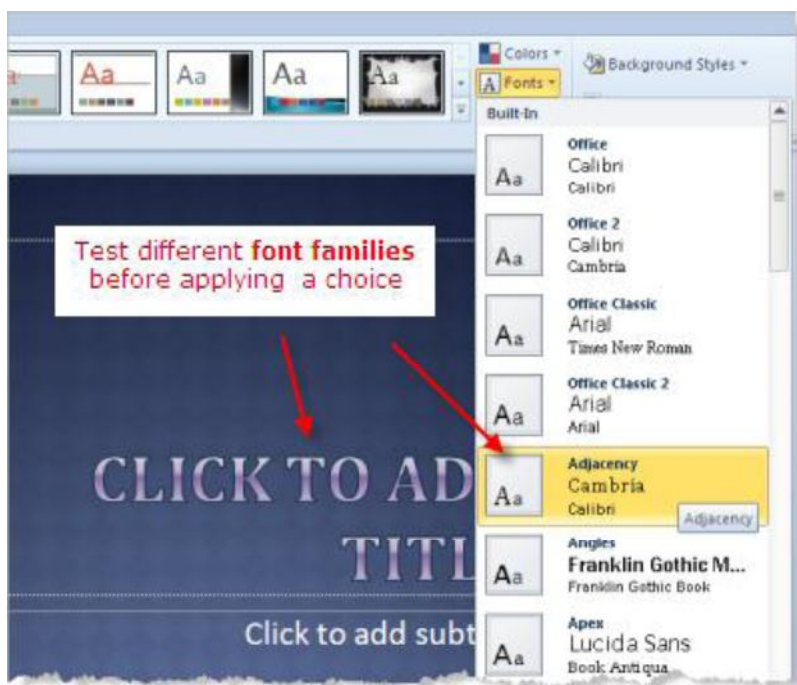
1. Click on the Colors button at the right end of the design themes on the Design tab of the ribbon.
2. Hover your mouse over the various color schemes shown in the drop down list. The current choice will be reflected on the slide.
3. Click the mouse when you find the right color scheme.



VII. Select a Font Family

Each design theme is assigned a font family. Once you have selected the design theme for your PowerPoint presentation, you can change the font family to one of the many groupings within PowerPoint 2010.

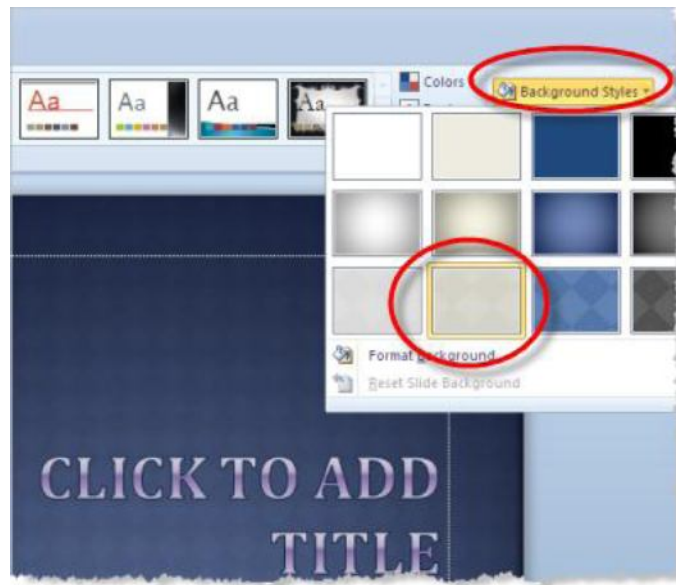
1. Click the *Fonts* button at the right end of the design themes shown on the *Design* tab of the ribbon.
2. Hover your mouse over any of the font families to see how this group of fonts will look in your presentation.
3. Click the mouse when you have made your selection. This font family will be applied to your presentation.



VIII. Change the PowerPoint Background Style

Just as you were able to change the background on a plain PowerPoint slide, you can do the same while using one of the many design themes.

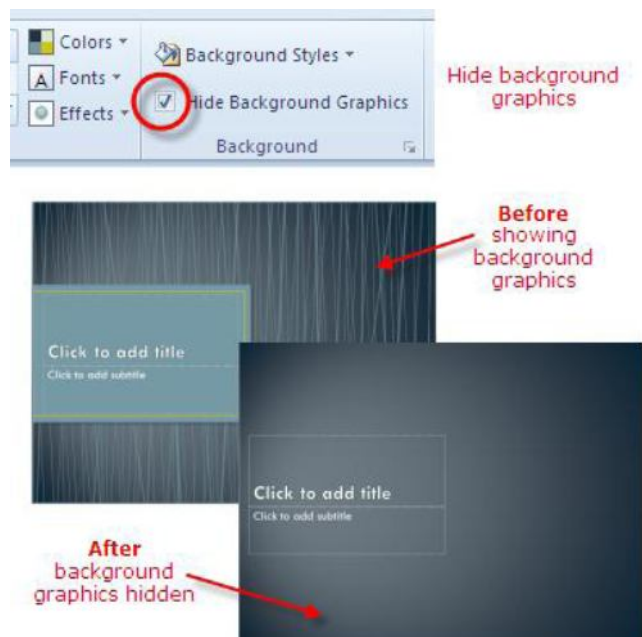
1. Click the *Background Styles* button on the Design tab of the ribbon.
2. Hover your mouse over any of the background styles.
3. The background style will be reflected on the slide for you to evaluate.
4. Click the mouse when you find a background style that you like.



IX. Background Graphics Can Be Hidden

Sometimes you want to show your slides with no background graphics. This is often the case for printing purposes. The background graphics will remain with the design theme, but can be hidden from view.

1. Check the *Hide Background Graphics* box on the Design tab of the ribbon.
2. The background graphics will disappear from your slides, but can be turned back on at any later time, by simply removing the check mark in the box.



X. Font Size and Color

A number of factors, such as room lighting and room size, can affect the readability of your slides during a presentation. Therefore, when creating your slides, choose font colors, styles and a font size that will make it easy for your audience to read what is on the screen, no matter where they are seated.

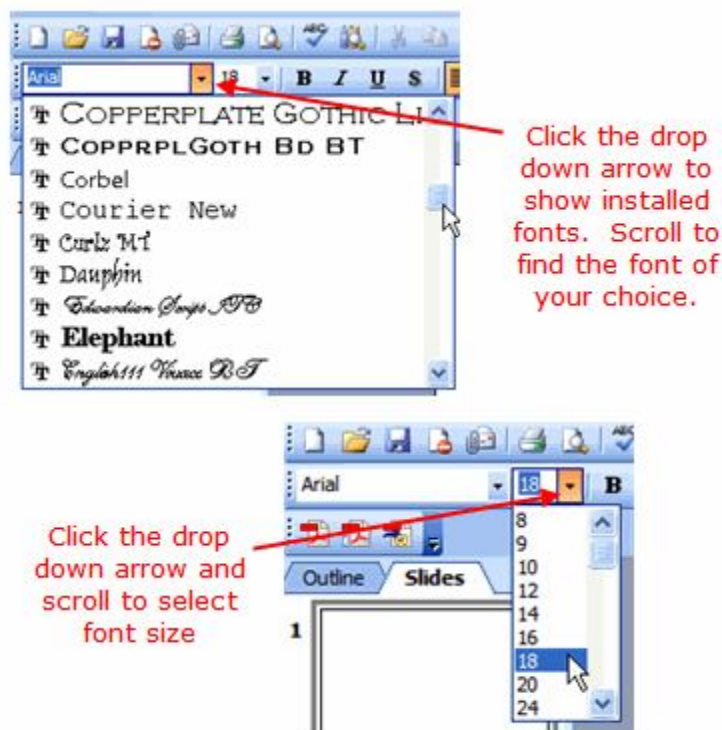
When changing font colors, choose ones that contrast strongly with your background. When choosing a font / background color combination, you might also want to consider the room you will be presenting in. Light color fonts on a dark background are often easier to read in a very dark room. Dark color fonts on light backgrounds, on the other hand, work better in rooms with some light.

In the case of font styles, avoid fancy fonts such as script styles. Difficult to read at the best of times on a computer screen, these fonts are almost impossible to decipher when projected on to a screen. Stick to standard fonts such as Arial, Times New Roman or Verdana.

The default sizes of fonts used in a PowerPoint presentation - 44 point text for titles and 32 point text for subtitles and bullets - should be the minimum sizes you use. If the room you are presenting in is very large you might need to increase the font size. Font sizes may be smaller if the presentation is meant to be viewed on a computer screen.

XI. Steps to changing the font style and size

1. Select the text you wish to change by dragging your mouse over the text to highlight it.
2. Click the font drop-down list. Scroll through the available fonts to make your selection.
3. While the text is still selected, choose a new size for the font from the font size drop-down list.



XII. Steps to change the font color -

1. Select the text.
2. Locate the **Font Color** button on the toolbar. It is the letter **A** button to the left of the *Design* button. The colored line under the letter A on the button indicates the current color. If this is the color you want to use, simply click the button.
3. To change to a different font color, click the drop-down arrow beside the button to display other color choices. You may choose a standard color shown, or click the **More Colors...** button to see other options.
4. De-select the text to see the effect.

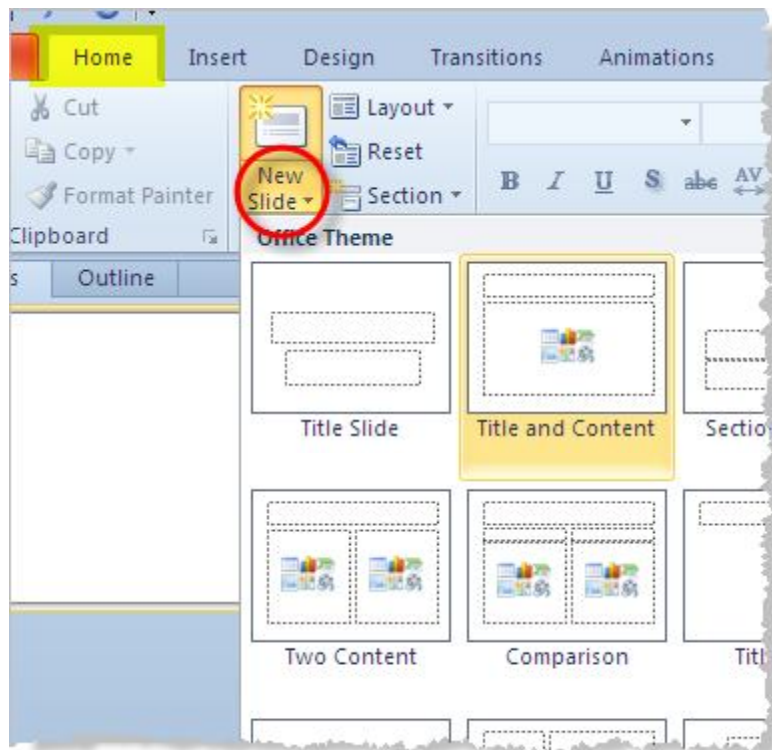
XIII. Adding Media to Your Slides

1. Add Clip Art and Pictures Using a Content Slide Layout

PowerPoint 2010 offers you a number of different ways to add clip art and pictures to a presentation. Perhaps the easiest way to do so is to select a slide layout that contains a placeholder for content such as clip art and pictures.

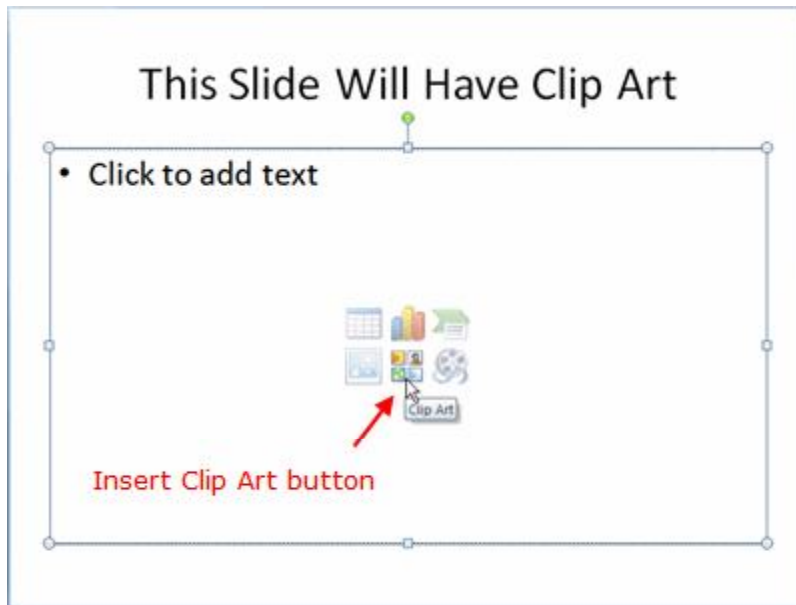
On the *Home* tab of the ribbon either click on the *New Slide* button or change the current slide layout by clicking on the drop down arrow beside **Layout**.

There are a number of different *Content* slide layouts available for you to choose from. To add a single picture or a piece of clip art, click on a simple layout such as *Title and Content* and the layout of your current slide will change to match your choice.



If you have chosen one of the simple content layouts, your PowerPoint 2010 slide should resemble the graphic below. The content icon in the middle of the slide contains links to six different types of content that you can add to the slide. The clip art button is in the middle of the bottom row of icons.

Tip - If in doubt about which button to use, simply place your mouse over a button until the little help balloon appears. These balloons or *Tool Tips* will identify what the button is used for.



2. Resize Clip Art

Clip art comes in different sizes. Some will be larger than your slide while others will be tiny. Either way you may need to resize the image you want to include in your presentation.

When you click on a clip art image, a border and tiny white circles appear on the edges of the image. These circles are called *resizing handles* (or selection handles). Dragging one of these handles allows you to enlarge or shrink your picture.

The best way to resize clip art or any picture, is to use the resizing handles located on **corners** of the picture, rather than the ones at the top, bottom or sides of the picture. Using the corner handles will keep your image in proportion as you resize it. If you don't maintain your image's proportion it is likely to end up looking distorted or fuzzy in your presentation.

3. Inserting Photos

Like clip art, photographs and other pictures can be added to a slide by choosing a *Content Layout* slide and clicking on the appropriate icon (for pictures it's the mountain icon).

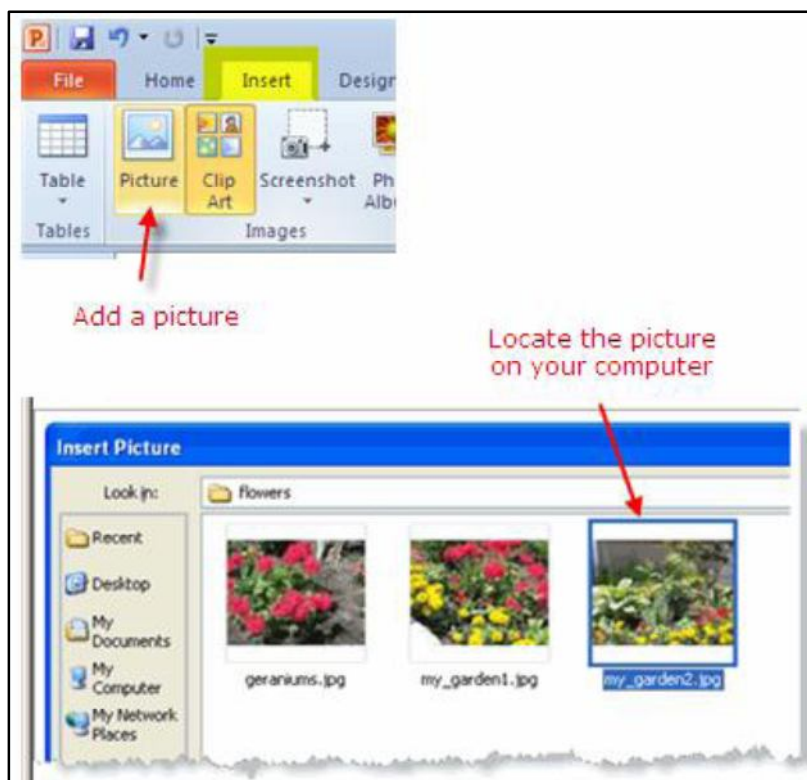
An alternative to this method is to select the **Insert** tab on the ribbon and click on the *Picture* icon, as shown in the image at the top of this page.

An advantage of using this approach for either pictures or clip art is that you do not need to use one of the preset slide layouts containing a content icon to insert an image into your slide. The example shown in the following pages, inserts the picture into a *Title* slide layout.

Search Your Computer for the Photos

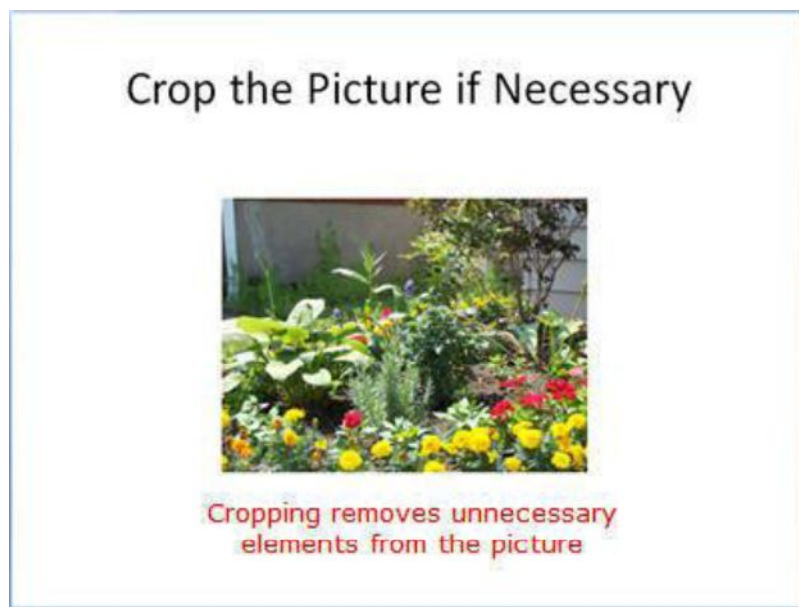
If you have made no changes to the settings in PowerPoint 2010 since the original install, PowerPoint will default to the **My Pictures** folder to look for your pictures. If this is where you have stored them, then select the correct picture and click on the **Insert** button.

If your pictures are located elsewhere on your computer, use the drop-down arrow at the end of the **Look in** box and find the folder containing your pictures.



4. Crop Unnecessary Elements from the Photos

Once the photo has been inserted into the PowerPoint 2010 slide, you may wish to remove extra elements from the picture. Most photos can be made just a little better by cropping unnecessary elements, such as background walls, floors, shoes or other unnecessary objects that do not enhance the photo.



Here's How to Crop your Image:

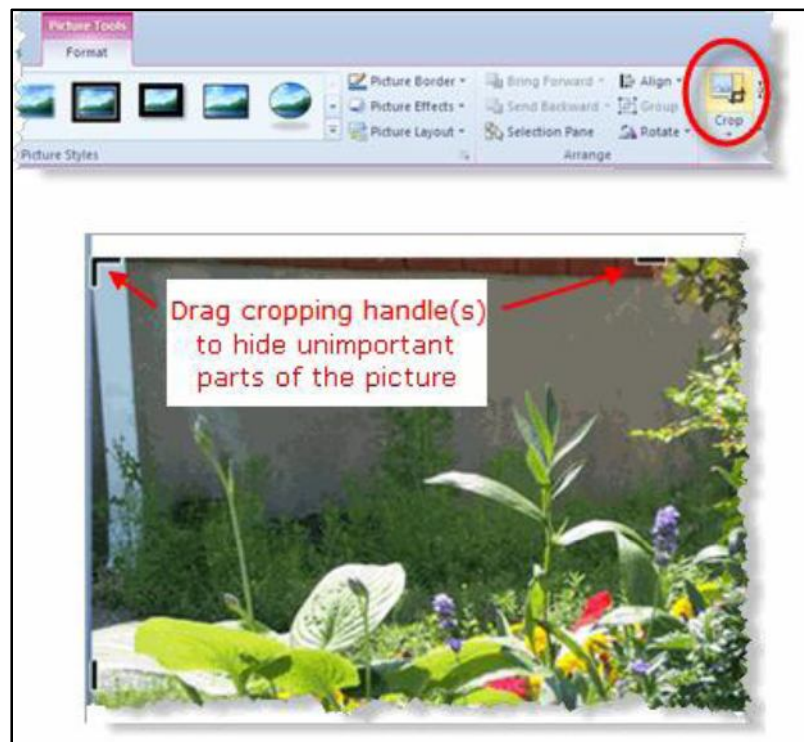
Picture Tools

Click on the picture to select it. This will activate the Picture Tools link above the ribbon. Click the Picture Tools link to reveal all the options relating to pictures.

Crop Tool

The Crop tool is located on the right side of the Picture Tools. Click the crop tool and you will notice that there are black "crop" handles around the border of the picture. Drag these handles to remove the excess elements that are unnecessary to the picture.

Note - It is important to note that even though the picture has been modified by cropping, these extra elements are simply hidden from view and are still part of the picture. Think in terms of a piece of paper that you rolled partly up, like a scroll. The items on the rolled part are still there, but simply hidden from view.

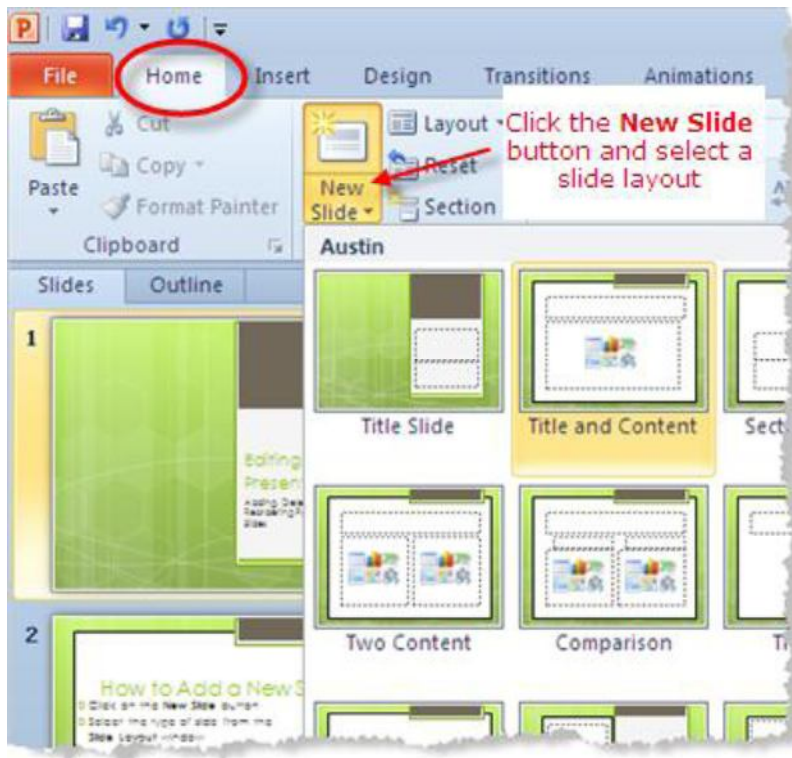


XIV. Slide Management – Adding, Rearranging and Deleting Slides

So far we have looked at creating only one slide, but you will actually want to create a number of them to develop a slide show. And once you have several slides, you may find you want to reorder them or delete some of them altogether. Here is how to do that.

1. Use the New Slide Button

Click on the **New Slide** button on the *Home* tab of the ribbon to add a new slide to your presentation. Any new slides created will retain the design theme you set for your slideshow in the first slide.



2. Deleting a Slide in the Slide tab

Slide Views: Use the Slide View That is Right for the Task

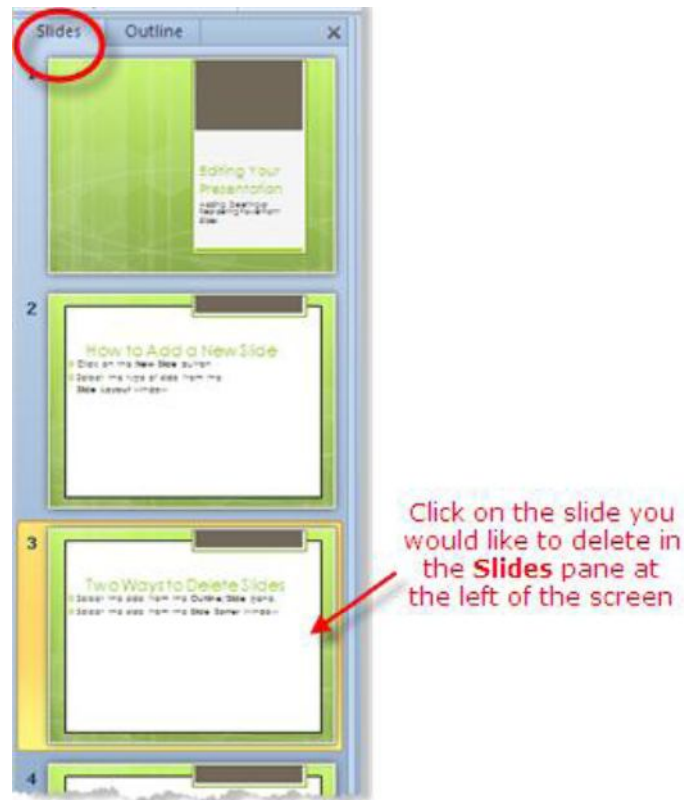
Slides in any PowerPoint presentation can be viewed in a variety of ways depending on the task at hand.

To access all the different slide views, click on the View tab of the ribbon at the top of the PowerPoint screen. On the left end of the ribbon you will see buttons with the different options to view your slides.

Deleting Slides

Select the Slide to be Deleted

On the *Slides* tab of the **Slides / Outline** task pane on the left of your screen, click on the thumbnail of the slide you wish to delete. Press the *Delete* key on your keyboard.



3. Move Slides Using the Slides / Outline Pane

- Click on the slide you wish to move, to select it.
- Drag the slide to the new location.
- A horizontal line appears as you drag the slide. When the horizontal line is in the correct location, release the mouse.
- The slide moves to the new location.

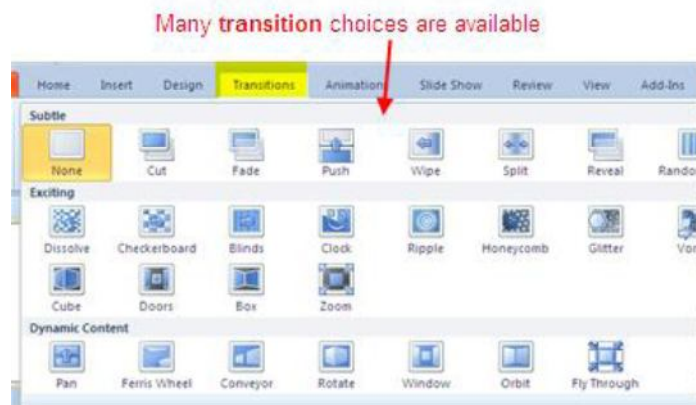


XV. Setting up the PowerPoint Slide Show

1. Slide Transitions - Choose a Slide Transition

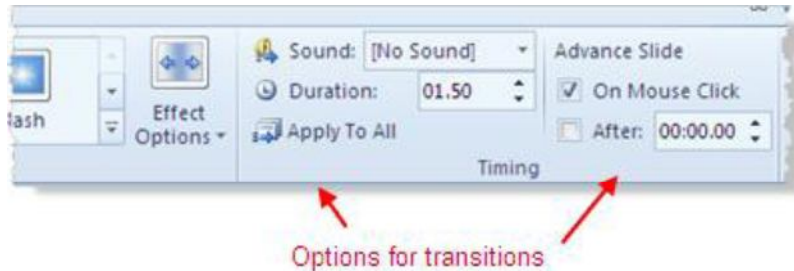
1. Click on the Transitions tab of the ribbon to access the slide transition options. The most common slide transitions are shown as icons on the ribbon.
2. Click the drop down arrow to see the complete list of transitions available, or scroll through the list, one row at a time.

With PowerPoint 2010, you have the ability to see the transition effect on the slide by hovering the mouse over the transition choice, prior to making your selection.



There are several options that you can choose to add to your PowerPoint 2010 slides.

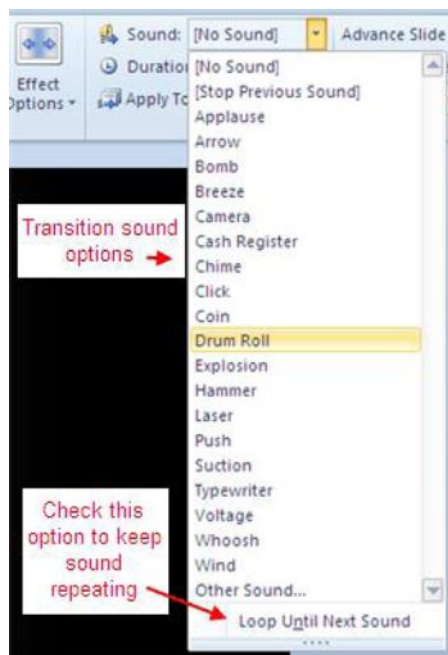
- Sound
- Duration
- Whether to apply to this slide or Apply to All
- How to advance the slide
- on mouse click
- or automatically after a set number of seconds



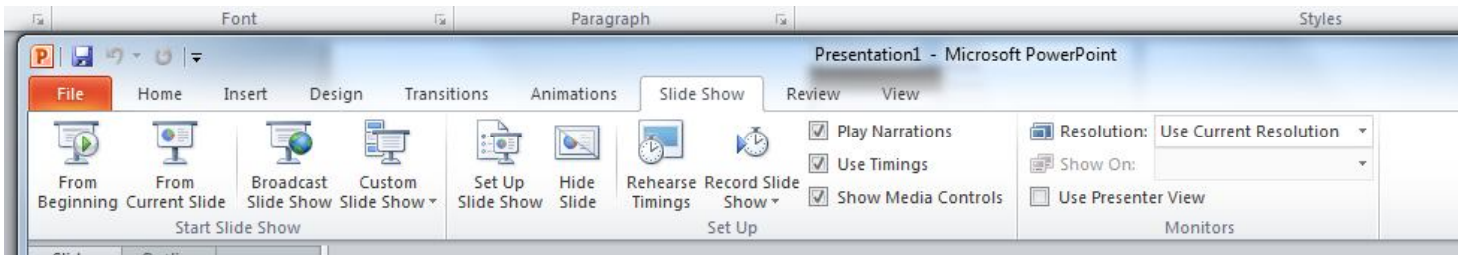
There are Many Sound Effects to Choose From

Sound effects can be effective if applied wisely to PowerPoint slide transitions. For example -- a presentation that is about the increasing sales figures might be effective with a cash register sound effect on a slide transition.

There is also an option to Loop Until Next Sound which you can apply to the slide transition. In my opinion, this should be used only sparingly, and only in certain situations (such as a presentation for small children). The sound effect will keep repeating until another sound effect is reached, and could be very distracting to the audience. A single sound effect will certainly make your point.



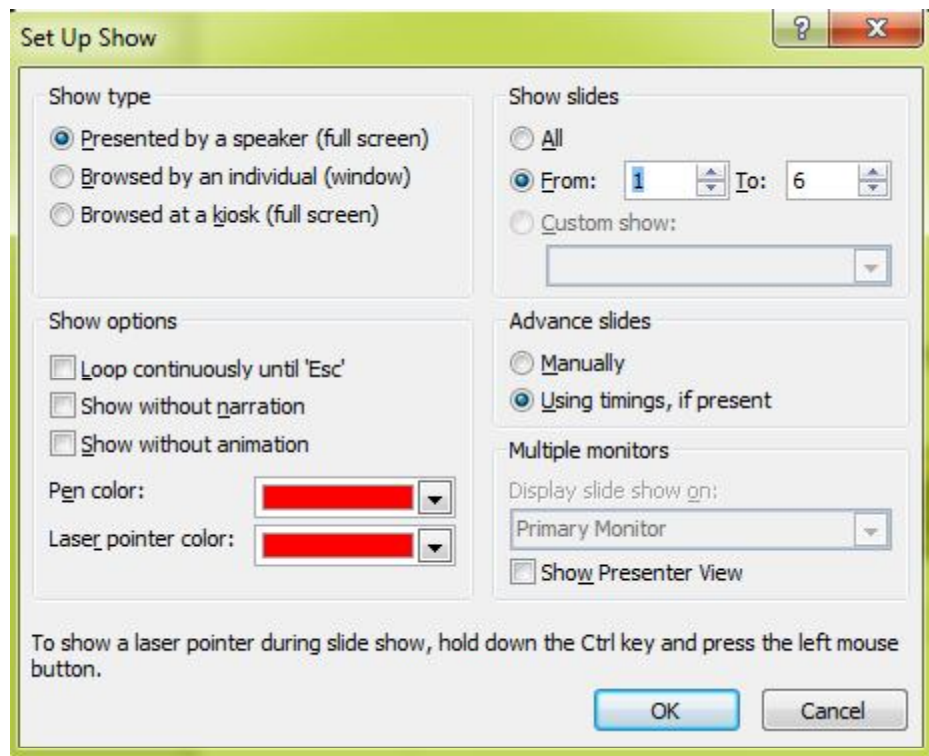
2. Previewing your Show



The Slideshow tab will let you set up how your show will progress. First you may want to preview your raw show to see if the slides seem in the proper order and if you like the transitions.

To preview, click the Slideshow tab and select either From Beginning (to see show from the first slide on) or From Current Slide (to see show from a slide selected in the Slide Pane onwards).

3. Using the Set Up Show feature to create the delivery of your show



Note that timings for your slides were supposed to be set up in the Slide Transitions step. You can always go back and adjust them.

The easiest way to set the slide timings is to rehearse and time your PowerPoint presentation by progressing through the slides as if you were seeing them for the first time. As you click the mouse to advance the slides, PowerPoint can record the timings on the slides for you.

XVI. Saving and Distributing your PowerPoint Show

1. Name and save your presentation

As with any software program, it is a good idea to name and save your presentation immediately and then to save your changes frequently while you work:

- Click the File tab.
- Click Save As, and then do one of the following:
- For a presentation that can be opened only in PowerPoint 2010 or PowerPoint 2007, in the Save as type list, select PowerPoint Presentation (*.pptx).
- For a presentation that can be opened in either PowerPoint 2010 or earlier versions of PowerPoint, select PowerPoint 97-2003 Presentation (*.ppt).
- On the left-hand pane in the Save As dialog box, click the folder or other location where you want to save your presentation.
- In the File name box, type a name for your presentation, or do nothing to accept the default file name, and then click Save.
- There are other formats to which you can save if you are not sure whether your end users have access to PowerPoint. These include PDF and video.

2. Printing your show for handouts

To set your printing options (including number of copies, printer, slides to print, number of slides per page, color options, and more) and then print your slides, do the following:

- Click the File tab.
- Click Print, and then under Print, in the Copies box, enter the number of copies that you want to print.
- Under Printer, select the printer that you want to use.

Tip If you want to print in color, be sure to select a color printer.

- Under Settings, do one of the following:

To print all slides, click Print All Slides.

To print one or more slides that you selected, click Print Selection.

Note: It is always a good idea to set your printing to more than 1 slide per page to save paper.

Tip To select multiple slides to print, click the File tab, and then in Normal view, in the left-hand pane that contains the Outline and Slides tabs, click the Slides tab, and then press and hold CTRL while you select the slides that you want.

3. Follow these steps to create a CD to present your slide show on another computer.

- Open the presentation that you want to copy, or, if you are working with a new presentation that has not been saved, save the presentation.
- If you want to save your presentation to a CD, rather than to a network or to a local disk drive on your computer, insert a CD into the CD drive.

- Click the File tab.
 - Click Save & Send, click Package Presentation for CD, and then in the right pane, click Package for CD.
 - To choose the presentations that you want to copy and the order in which you want them to play, do the following:
 - To add a presentation, in the Package for CD dialog box, click Add, and then in the Add Files dialog box, select the presentation that you want to add and click Add. Repeat this step for each presentation that you want to add. Repeat this step also if you want to add other related, non-PowerPoint files to the package.
 - If you add more than one presentation, the presentations will appear on a Web page that lets you navigate to the contents of the CD in the order in which they are listed in the Files to be copied list in the Package for CD dialog box. To change the order, select a presentation that you want to move, and then click the arrow buttons to move the presentation up or down in the list.
 - To remove a presentation or file from the Files to be copied list, select the presentation or file, and then click Remove.
 - Click Options, and then under Include these files, do one or both of the following:
 1. To ensure that files that are linked to your presentation are included in the package, select the Linked files check box. Files that are linked to your presentation can include Microsoft Office Excel worksheets that are linked to charts, sound files, movie clips, and more.
 2. To use embedded (embedded object: Information (object) contained in a source file and inserted into a destination file. Once embedded, the object becomes part of the destination file. Changes you make to the embedded object are reflected in the destination file.) TrueType fonts (TrueType font: A font (typeface) that appears on a printed document exactly the way it appears on the screen. TrueType fonts are scalable to any font size. Several of these fonts are installed
- Notes**
1. If your presentation does not currently include embedded fonts, checking the Embedded TrueType fonts check box includes the fonts when packaged. The Embedded TrueType fonts check box applies to all presentations that are copied, including linked ones.
 2. If your presentation already includes embedded fonts, PowerPoint automatically honors the setting of the presentation to include the embedded fonts. automatically when you install Windows.), select the Embedded TrueType fonts check box.
- Click OK to close the Options dialog box.
 - Next o one of the following:
 1. If you are copying your presentation to a network or to a local disk drive on your computer, click Copy to Folder, enter a folder name and location, and then click OK.
 2. If you are copying your presentation to a CD, click Copy to CD.

4. Save your presentation as a video

Why turn your presentation into a video?

When you want to give a high-fidelity version of your presentation to colleagues or customers (either as an e-mail attachment, published to the web, on a CD or DVD), save it and let it play as a video. It is also an excellent format to include in Blackboard or post on YouTube.

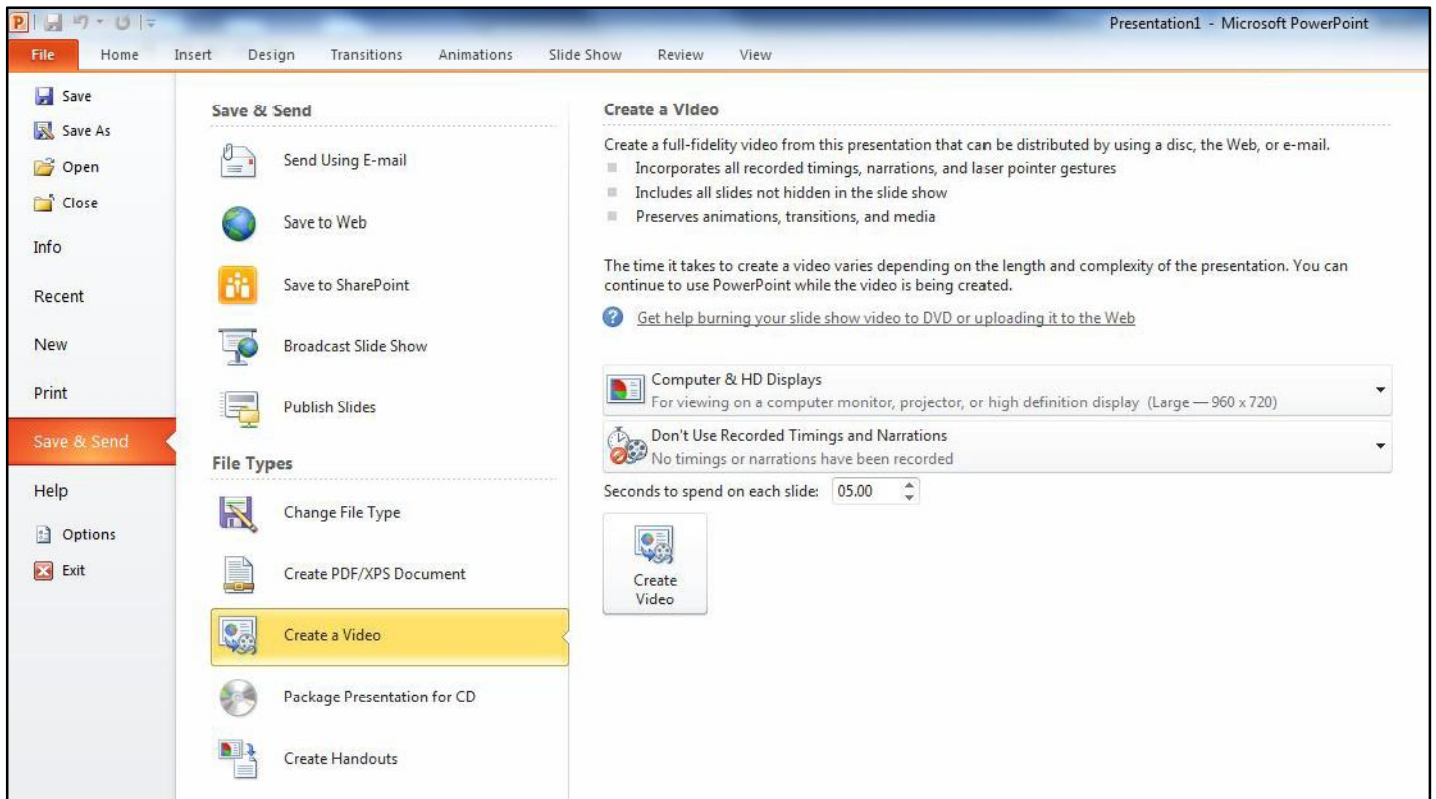
In PowerPoint 2010, you can now save your presentation as a Windows Media Video (.wmv) file, and distribute it confidently, knowing that your animated, narrated, multimedia presentation will play without a glitch. If you do not want to use the .wmv file format, you can use a preferred third party utility to convert your file to another format (.avi, .mov, etc).

Some tips to remember when recording your presentation as a video:

- You can record and time voice narration and laser pointer movements in your video.
- You can control the size of the multimedia file and the quality of your video.
- You can include animations and transitions in your movie.
- Viewers do not need to have PowerPoint installed on their computers to watch it.
- If your presentation contains an embedded video, the video will play correctly without your needing to control it.
- Depending on the size your presentation, creating a video can take a long time to create. The longer the presentation and the more animations, transitions, and other media that you include, the longer it will take. However, you can continue to use PowerPoint while you wait.

Here's how to do it:

2. Create your presentation.
3. (Optional) Record and time narration in a slide show and Turn your mouse into a laser pointer.
4. Save the presentation.
5. On the File menu, click Save & Send.
6. Under Save & Send, click Create a video.
7. To display all video quality and size options, under Create a video, click the Computer & HD Displays down arrow.
8. Do one of the following:
 - To create a video with very high quality, yet a large file size, click Computer & HD Displays.
 - To create a video with a moderate file size and medium quality, click Internet & DVD.
 - To create a video with the smallest file size, yet low quality, click Portable Devices.Click the Don't Use Recorded Timings and Narrations down arrow and then, do one of the following:
9. If you did not record and time voice narration and laser pointer movements , click Don't Use Recorded Timings and Narration.
 - Tip The default time spent on each slide is set to 5 seconds. To change that, to the right of Seconds to spend on each slide, click the up arrow to increase, or the down arrow to decrease the seconds.
10. If you recorded and timed narration and pointer movements , click Use Recorded Timings and Narrations.
11. Click Create Video.
12. In the File name box, enter a file name for the video, browse for folder that will contain this file, and then click Save. You can track the progress of the video creation by looking at the status bar at the bottom of your screen. The video creation process can take up to several hours depending on the length of the video and the complexity of the presentation.
 - Tip For longer videos, you can set it up so that they create overnight. That way, they'll be ready for you the following morning.
13. To play your newly-created video, go to the designated folder location, and then double-click the file.



Lecture - 11

MS EXCEL: - (EXTENSION .XLS)

Microsoft Excel is a software program produced by Microsoft Corp. that allow users to organize, format and calculate data with formulas using a spreadsheet system. This software as part of the Microsoft office suite and is compatible with other applications in the office suite.

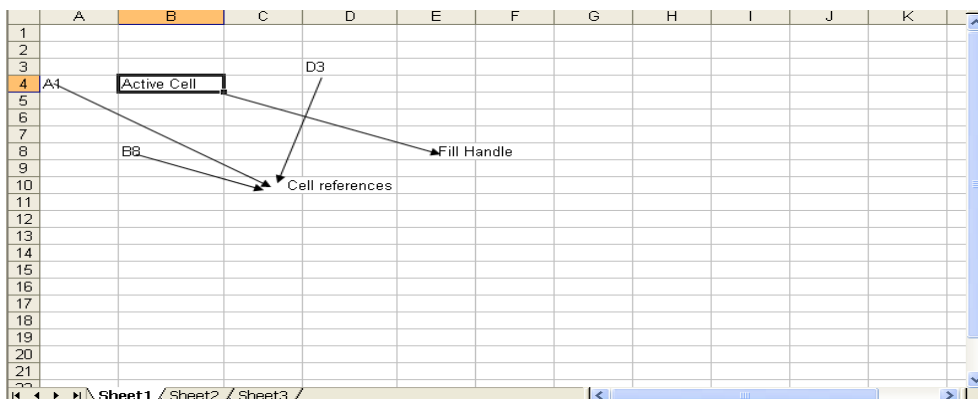
MS. EXCEL is a software for performing following tasks/Functions/Works.

- ✓ Solving Mathematical problems.
 - ✓ Making invoice/Bill.
 - ✓ Making Reports.
 - ✓ Solving goal-seeking problems.
 - ✓ Solving scenario based problems.
 - ✓ Creation of macros.
 - ✓ Plotting Graphs/Charts.
 - ✓ Sketching trend lines/regression analysis for prediction.
 - ✓ Making marks sheet and class lists.
 - ✓ Creation of Templates (Like a blue print).
 - ✓ Making forms.
 - ✓ It also provides facilities for managing database (Collection of related records).
 - ✓ Accessing of records in MS excel database is called filtering.
- Etc.

Above tasks may perform on sheet/spreadsheet/work sheet. A work sheet may exist inside workbook. Spreadsheet consist of **65536** rows and **256** columns (MS EXEL 2003). And number of rows and columns in MS excel **2007/2010**. are **1048576** and **16384** respectively.

Number of worksheet may depend upon capacity of memory.

Rows represented by **numbers** and columns are represented by **alphabets**.



A1, A2, A3, A4..., B1, B2, B3... are called cell references.

TYPES OF CELL REFERENCE:-

1. RELATIVE CELL REFERENCE.
2. ABSOLUTE CELL REFERENCE.
3. MIXED CELL REFERENCE.

EXAMPLE OF CELL REFERENCES:-

- ✓ RELATIVE CELL REFERENCE.
 - A1, A6, B122, D1, D10...
- ✓ ABSOLUTE CELL REFERENCE
 - \$A\$1, \$A\$6, \$B\$122...
- ✓ MIXED CELL REFERENCE
 - \$A1, \$A6, \$B122...

Microsoft Excel shortcut keys

Shortcut	Description
F2	Edit the selected <u>cell</u> .
F3	After a <u>name</u> has been created, F3 will <u>paste</u> names.
F4	Repeat last action. For example, if you changed the color of text in another cell, pressing F4 will change the text in cell to the same color.
F5	Go to a specific cell. For example, C6.
F7	Spell check selected text or document.
F11	Create <u>chart</u> from selected data.
Ctrl + Shift + ;	Enter the current time.
Ctrl + ;	Enter the current date.
Alt + Shift + F1	Insert New <u>Worksheet</u> .
Alt + Enter	While typing text in a cell, pressing Alt + Enter will move to the next line, allowing for multiple lines of text in one cell.
Shift + F3	Open the Excel <u>formula</u> window.
Shift + F5	Bring up search box.
Ctrl + 1	Open the Format Cells window.
Ctrl + A	Select all contents of the worksheet.
Ctrl + B	Bold highlighted selection.
Ctrl + I	Italic highlighted selection.
Ctrl + K	Insert <u>link</u> .
Ctrl + S	Save the open worksheet.
Ctrl + U	Underline highlighted selection.
Ctrl + 1	Change the format of selected cells.
Ctrl + 5	<u>Strikethrough</u> highlighted selection.
Ctrl + P	Bring up the print dialog box to begin the printing process.
Ctrl + Z	Undo last action.
Ctrl + F3	Open Excel <u>Name Manager</u> .
Ctrl + F9	<u>Minimize</u> current window.
Ctrl + F10	<u>Maximize</u> currently selected window.
Ctrl + F6	Switch between open workbooks or windows.
Ctrl + Page up	Move between work sheets in the same document.
Ctrl + Page down	Move between work sheets in the same document.
Ctrl + Tab	Move between Two or more open Excel files.
Alt + =	Create a formula to sum all of the above cells.
Ctrl + '	Insert the value of the above cell into the cell currently selected.
Ctrl + Shift + 1	Format number in comma format.
Ctrl + Shift + 4	Format number in currency format.
Ctrl + Shift + 3	Format number in date format.
Ctrl + Shift + 5	Format number in percentage format.
Ctrl + Shift + 6	Format number in scientific format.
Ctrl + Shift + 2	Format number in time format.
Ctrl + Arrow key	Move to next section of text.
Ctrl + Space	Select entire <u>column</u> .
Shift + Space	Select entire <u>row</u> .
Ctrl + -	Delete the selected column or row.
Ctrl + Shift + =	Insert a new column or row.
Ctrl + Home	Move to cell A1.
Ctrl + ~	Switch between showing Excel formulas or their values in cells.

HOW TO PERFORM CALCULATION ON SHEET:-

1. OPERATORS:-

- 1.1. ARITHMETIC OPERATORS (+, -, *, /, ^)*(product),/(Division),^(Exponent).
- 1.2. RELATIONAL OPERATORS (>, >=, <, <=, <>, =). <>(Not equal).
- 1.3. CONCATENATION OPERATORS(&).
- 1.4. LOGICAL OPERATORS (AND, OR, NOT).
- 1.5. RANGE OPERATOR (:)Example:-A1:A50

2. BASIC PROPERTIES OF FORMULA:-

- 1.6. Formula always starts with equal (=) sign.
- 1.7. A formula may consist of text, numbers, ranges, cell references etc.
- 1.8. When entered formula into cell it return only result.

Example:-

Let cell

A1=12

B1=4

C1=2

IN ACTIVE CELL

FOR ADDITION in cell D2

=A1+B1+C1

18

FOR MULTIPLICATION in cell F3

= A1*B1*C1

96

FOR EXPONENTIATION in cell K10

=A1^C1

144

FOR DIVISION in cell A7

=A1/ (B1+C1)

2

SHEET LINKING AND BOOK LINKING:-

SHEET LINKING

IN BOOK1 (ON SHEET2)

=Sheet1!A1*Sheet1!B1+Sheet1!C1

IN BOOK1 (ON SHEET3)

=Sheet1! A2*Sheet1! B2+Sheet2! A2

BOOK LINKING

OPEN BOOK1 ,BOOK2 and BOOK3

SHEET 1 ON BOOK3

=[Book2]Sheet2!A1*[Book1]Sheet1!B1*[Book1]Sheet1!A1

FUNCTIONS IN MS EXCEL:-

It is sub program which is used for performing well-defined specific tasks.

There are many types of functions.

- 1. Arithmetic functions (MATH & TRIG FUNCTIONS).
- 2. Logical Functions.
- 3. String Functions.
- 4. Date and time functions.
- 5. Statistical Functions.
- 6. Financial Functions.
- 7. Lookup reference Functions.

Notation: - f() A function with no arguments/Parameters.
f(x,y) A function with arguments/Parameters x and y.
f(x1,x2,x3,x4...) A function with n arguments.

Arithmetic functions (Math and Trig Functions).

There are following types of arithmetic functions.

SUM()	SUMIF()	PRODUCT()	ABS()	FACT()
LOG10()	LN()	LOG()	ROUND()	TRUNC()
CEILING()	FLOOR()	SQRT()	SUMPRODUCT()	SUMSQ()
SIN()	COS()	TAN()	PI()	MOD()
EVEN()	ODD()	RAND()	EXP()	POWER()
ROMAN()				

SUM (N1, N2, N3...):-

This function is used for performing addition of given n arguments.

Example:-

=SUM (2, 3, 4, 5, 6, 7)
27

=SUM (A1:A22, B1:B22, C1:C22)

SUMIF (RANGE, CRITERIA, RANGE_SUM)

This function return conditional sum.

Example:-

A	B
5	7
9	12
13	17
17	22
21	27
25	32
29	37
33	42
37	47

=SUMIF (A1:A9, ">=20", B1:B9)
185

PRODUCT (N1, N2, N3...):-

This function is used for performing multiply of given n arguments.

Example:-

=product(2,3,4)
24

=PRODUCT (A1:A4)

ABS (NUMBER):-

It returns absolute value.

Example:-

=ABS (-9) or |-9|
9

Note:- $|x|=x$ when $x \geq 0$
 $|x|=-x$ when $x < 0$

FACT (Number):-

It returns factorial values. Number must be positive and integer.

Example

=fact (4) $\rightarrow 4*3*2*1$
24

=fact (5) $\rightarrow 5*4*3*2*1$
120

LOG10 (NUMBER):-

This function returns log value to the base 10.

Example

=LOG10 (14)
1.14612804

LN (NUMBER):-

This function returns log value to the base e. The Value of e exists between 2 and 3.

Example

=Ln (14)

2.63905733

LOG (NUMBER, ANY_BASE):-

This function returns log of any number to any base.

Example

=LOG (14, 16)

0.95183873

ROUND (NUMBER, SPECIFY_DIGITS):-

It is used for rounding any number to specify_digits.

=round (342.5678, 2)

342.57

=round (342.5673, 3)

342.567

TRUNC (NUMBER, SPECIFY_DIGITS):-

It is used for truncating any number upto specify_digits.

Example:-

=trunc (342.5678, 2)

342.56

CEILING (NUMBER, SIGNIFICANT_DIGITS):-

This function return a number up to, nearest integer multiple of significant_digits.

Example:-

=ceiling (67.45, 13)

78

FLOOR (NUMBER, SIGNIFICANT_DIGITS):-

This function return a number down to, nearest integer multiple of significant digits.

Example:-

=floor (67.45, 13)

65

SQRT (NUMBER):-

This function return square root of any positive number.

Example:-

=sqrt (25)

5

SUMSQ (n1, n2, n3...):-

This function return sum of square.

Example:-

=SUMSQ (2, 4, 5)

45

=SUMSQ (A1:A9, B1:B9)

SIN (NUMBER):-

This function return sine of any angle.

Example:-

=SIN (90*PI ()/180)

1

Cos (NUMBER):-

This function return cosine of any angle.

Example:-

=COS (45*PI ()/180)

0.707107

Tan (NUMBER):-

This function return tangent of any angle.

Example:-

=Tan (45*PI ()/180)
1

Pi ():-

This function returns value of 22/7.

Example:-

=PI ()
3.141593.

MOD (number, divisor):-

This function returns remainder value.

Example:-

=MOD (15, 4)
3

EVEN (Number):-

This function returns upto nearest even integer value.

Example:-

=even (4.2)
6

ODD (Number):-

This function returns upto nearest odd integer value.

Example:-

=odd (4.2)
5

RAND ():-

This function returns random numbers between 0 and 1.

Example:-

=RAND ()
0.4632

EXP (Number):-

This function returns exponential value of any number.

=exp (4)

54.59815

Note:- $2 < e < 3$

POWER (m, n):-

This function returns power of m to n.

=power (2, 3)
8

Roman (number):-

This function converts any number into roman value.

=roman (23)
XXIII

Sumproduct (n1, n2,n3,n4...):-

It return sum of product.

Example:- =SUMPRODUCT (A1:A16,B1:B16)

Logical Function:-

This category of function returns logical values. Either **True** or **False**.

There are following types of logical functions.

AND() OR() NOT() If() TRUE() FALSE()

AND (Logical1, Logical2, Logical3...):-

This function return true when all logical expressions are true. In addition, return false if any one logical expression is false.

Example:-

=and (4>3, 6<3, 9>77)

False

=and (4>3, 6>3, 9<77)

True

OR (Logical1, Logical2, Logical3...):-

This function return true when any one logical expression is true. In addition, return false if all logical expressions are false.

Example:-

=or (4>3, 6<3, 9>77)

True

=or (4<3, 6<3, 9>77)

False

NOT (Logical):-

It reverses logical value.

Example:-

=not (6>4)

False

Example:-

=not (and (4>3, 8>9, 76>6))

True

if (Condition, "True_Expression", "False_expression")

Example:-

=if (9>4, 6*2, 9*3)

12.

=if (9<4, 6*2, 9*3)

27.

Lecture - 12

Make a payroll system.

SNO	ENAME	BASIC	HRA	DA	TA	GS	IT	LIC	NET_SAL

HRA=IF (C2>=25000, C2*50%, IF (C2>=20000, C2*30%, IF (C2>=15000, C2*20%, C2*15%)))

DA=IF (C2>=25000, C2*40%, IF (C2>=20000, C2*25%, IF (C2>=15000, C2*15%, C2*10%)))

TA=IF (C2>=25000, C2*30%, IF (C2>=20000, C2*15%, IF (C2>=15000, C2*10%, C2*8%)))

GS=BASIC+HRA+DA+TA

IT=IF(G2>=50000,G2*25%,IF(G2>=35000,G2*20%,IF(G2>=25000,G2*15%,IF(G2>=15000,G2*10%,0))))

LIC=IF(G2>=50000,G2*15%,IF(G2>=35000,G2*12%,IF(G2>=25000,G2*9%,IF(G2>=15000,G2*7%,G2*6%)))

NET_SAL= GS- IT- LIC

EXAMPLE 2:-**CLASS LIST:-**

CLASS LIST											
Sno	Name	Hindi	English	Phy	Math	Che	Tot	Per	Div	Grade	Status

Tot=SUM(C4:G4)

Per=H4/5

Div=IF(I4>=60,"I",IF(I4>=45,"II",IF(I4>=33,"III","NC")))

Grade=IF(I4>=85,"A",IF(I4>=75,"B",IF(I4>=65,"C",IF(I4>=55,"D",IF(I4>=45,"E",IF(I4>=33,"F", " "))))))

Status=IF(AND(C4>=33,D4>=33,E4>=33,F4>=33,G4>=33),"SC","F")

EXAMPLE 3:

Marks Sheet:-

INSTITUTE OF COMPUTER SCIENCES& MANAGEMENT							
Enroll				Session			
Name				Mode	Private	Regular	
Fname							
Mname				Certificate			
Cname Office Management							
P_Code	Paper's name	Max_Marks	Min_Marks	OBT_Marks	Total	Per	Div
OM1	Computer Fundamental	70	25		0	0	
OM2	MS OFFICE	70	25				
OM3	DBMS	70	25				
OM4	WEBPAGE DESIGNING	70	25		Status	Behavior	Attendance
OM5	TALLY	100	45				
OM6	ASSIGNMENT	120	55		Result		Character
Aggregate_Total		500	200	0			
Signature of Director		Checked By		Seal of Institution			

Total=SUM (G11:G16)

Per =H11/5

Div =IF (I11>=60,"I", IF (I11>=45,"II", IF (I11>=33,"III", IF (I11>0,"NC", " "))))

Status =IF (AND (G11>=F11, G12>=F12, G13>=F13, G14>=F14, G15>=F15, G16>=F16), "Passed", "Failed")

Behavior =IF(I11>=85,"Best",IF(I11>=75,"Better",IF(I11>=60,"Good",IF (I11>=45,"Normal",IF (I11>=33,"Poor", "Very Poor")))))

Attendance =IF (I11>=85,"95%", IF (I11>=75,"85%", IF (I11>=65,"75%", IF (I11>=45,"50%", IF (I11>=33,"40%", IF (I11>0,"20%", " "))))))

UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY ALLAHABAD						
P_Code	Name of Papers	Max_Marks	Min_Marks	Obt_marks	Per	Status
CCC-01	MS OFFICE & INTERNET	100	35	56	66.33	SC
CCC-02	FOXPRO	100	35	66	Div	SC
CCC-03	THE TECHNOLOGY	100	35	77	Passed With I	SC
TOTAL		300	105	199		

Per=ROUND(H6/3,2)

Div=IF(AND(H3>=G3,H4>=G4,H5>=G5,I3>=60),"Passed With I",IF(AND(H3>=G3,H4>=G4,H5>=G5,I3>=45)," Passed With II",IF(AND(H3>=G3,H4>=G4,H5>=G5,I3>=35)," Passed With III","F")))
 Status=IF(AND(H3>=G3),"SC","NC")

EXAMPLE 4:-

INVOICE/CASH MEMO:-

ABC Drugs & Medicine						
Name Of Customer						
Address						
Contact Number						
Sno	Particular	Qty	Rate	Amount	VAT	Net_Amt
1	M1	12	45	\$ 540.00	\$27.00	\$ 567.00
2	M2	15	80	1,200.00	60.00	1,260.00
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
				-	-	-
Aggregate_Total						1,827.00
Authorized signature			Received By			
Note:-Sold of goods never return.						

Amount=C7*D7

VAT=IF(E7>=50000,E7*20%,IF(E7>=35000,E7*15%,IF(E7>=25000,E7*10%,IF(E7>=15000,E7*8%,E7*5%))))

NET_Amt=E7+F7

Aggregate_total=SUM (G7:G18)

3:-String Function/Text Functions:-

Sequence of characters is called string. It encloses within double quotes.

Example:-

“RAM is a student”

String

“Mahesh Kumar Singh”

String

“1324344589463”

String.

Types of String functions/Text Functions:-

char()

code()

concatenate()

exact()

find()

left()

len()

lower()

mid()

proper()

replace()

right()

search()

substitute()

trim()

upper()

Char(number):-

This function returns character of corresponding ASCII code.

Example:-

=CHAR (69)
E

Code (text):-

This function returns ASCII code of corresponding text.

Example:-

=Code ("A")
65
=Code ("ICSM")
73

Concatenate (text1, text2,...):-

This function is used for joining two or more text string into one text string.

Example:-

=Concatenate ("Ram", " ", "Kumar", " ", "Singh")
Ram Kumar Singh.

Example:-

=CONCATENATE (A1, " ", D3, " ", B5) → A1=Manoj, D3=Kumar, B5=Singh
Manoj Kumar Singh.

Exact (Text1, Text2):-

This function is used for comparing two text string, and return true if both are exactly same otherwise false.

Example:-

=Exact("RAM", "ram")
False

Example:-

=Exact("RAM", "RAM")
True

Find (Find text, Within text, start num):-

This function return starting position of one text string within another text string.

Example:-

=FIND ("R", "VARANASI", 1)
3
=FIND ("A", "VARANASI", 5)
6

Left (Text, number_Char)

It return left most number of characters. Specified by number_char

Example:-

=Left ("VARANASI", 4)
VARA

Len (Text)

It counts number of characters of given text string.

Example:-

=Len ("VARANASI")
8

Lower (Text)

It converts upper text string into lower text string.

Example:-

=Lower ("RAM")
ram

Mid (text, start_num, num_chars):-

It returns character middle from text string.

Example:-

=mid("varanasi", 3, 4)
rana

Proper (Text):-

This function capitalizes first character into upper case and remaining characters are lower case.

Example:-

```
=PROPER ("manoj is a good boy")
      Manoj Is A Good Boy
```

Replace(Old_text,Start_Num,Num_Char,New_Char):-

This function replaces a part of text by new string.

Example:-

```
=REPLACE ("varanasi", 2, 4,"ICSM")
      vICSMasi
```

Right (Text, num_Char)

It returns right most number of characters. Specified by num_char

Example:-

```
=right ("VARANASI",4)
      NASI
```

Search(Find_Text, Within_Text,Start_Num):-

This function is used for searching text in given text string.

Example:-

```
=SEARCH("n","varanasi",1)
      5
```

Substitute (text,old text,new text,instance num):-

This function replaces old text_string by new_text string.

EXAMPLE:-

```
=SUBSTITUTE ("RAM SHYAM SITA GITA RAM MOHAN","RAM","RAVI", 2)
      RAM SHYAM SITA GITA RAVI MOHAN
```

TRIM (TEXT):-

This Function Remove many spaces into single space.

EXAMPLE:-

```
=Trim ("hellow   how   are   you")
      hellow how are you
```

Upper (TEXT):-

It converts lower text string into upper text string.

EXAMPLE:-

```
=Upper("welcome")
      WELCOME
```

4:-Date & Time Functions:-

now()	today()	date()	weekday()	year()
month()	day()	hour()	minute()	second()

Now ():-

This function return current date and time of system.

```
=Now()
      2/1/2013 16:25
```

Today ():- This function return current date of system.

```
=today ()
      2/1/2013          Format      mm/dd/yy
```

Date (year, month, day):-

This function returns given arguments as date format.

Example:-

```
=Date(2012,12,8)
      12/8/2012
```


Weekday (serial_Number):-

This function returns code of the day.
1=sunday,2=Monday...7=Saturday.

Example:-

=WEEKDAY ("1/2/2013")
4

Year("Serial_Number"):-

This function return year of corresponding serial numbers.

Example:-

=year("3/2/2012")
2012

Month("Serial_Number"):-

This function returns Month of corresponding serial numbers.

Example:-

=month("3/2/2012")
3

Day ("Serial_Number"):-

This function return day of corresponding serial numbers.

Example:-

=day("3/2/2012")
2

Hour ("Serial_Number"):-

This function return hour of corresponding serial numbers.

Example:-

=Hour ("12:20:23")
12

Minute ("Serial_Number"):-

This function return minute of corresponding serial numbers.

Example:-

=Minute ("12:20:23")
20

Second ("Serial_Number"):-

This function return second of corresponding serial numbers.

Example:-

=Second ("12:20:23")
23

5:-Statistical Function:-

This categories of function perform statistical task. There are following types of functions including.

max()	min()	average()	count()	countif()
mode()	median()			

max(n1,n2,n3,n4...):-

This function returns the largest value.

Example:-

=max (2, 4, 3, 7, 6, 5, 4, 99, 2,3,4)
99

min (n1, n2,n3,n4...):-

This function returns the smallest value.

Example:-

=min (2, 4, 3, 7, 6, 5, 4, 99, 1, 2, 3, 4, 5)
1

Average (n1, n2, n3, n4...):-

This function return average value.

Example:-

=average (2, 4, 3, 7, 6, 5, 4, 99)
16.25

count(n1, n2,n3,n4...):-

This function count number of cells.

Example:-

=count (3, 2, 5, 4, 3)
5

countif (range, criteria):-

This function count number according criteria.

Example:-

A	
1	8
2	15
3	22
4	29
5	36
6	43
7	50
8	57
9	64

=COUNTIF (A1:A9,">=30")
5

Mode (n1, n2, n3...)

This function is used for display most frequently used numbers.

Example:-

=mode(2,2,2,3,3,2,2,2,2,5,5)
2

Median (n1, n2, n3, n4,...):-

This function is used for finding mid values.

Example 1:-

=median (3, 2, 5, 4, 7)
4

Example 2:-

=median (3, 2, 5, 4, 7, 9)
4.5

6:-Financial Function:-

DB() DDB() FV() PV() SLN() PMT()

DB (COST, SALVAGE, LIFE, PERIOD):-

This function is used for calculating depreciation of assets using fixed declining balance method.

Example:-

Purchase cost of an asset (Say Fridge)=10000/-
After 4 years its values (salvage) =7000/-

Life=4

What will be depreciation for next 1 year?

=db(10000, 7000, 4, 1)

850.00

DDB (COST, SALVAGE, LIFE, PERIOD):-

This function is used for calculating depreciation of assets using double declining balance method. Example:-

=ddb (10000, 7000, 4, 1)

3,000.00

FV (rate, nper, pmt):-

It returns the future value of an investment. Based on periodic constants payments and constant interest rate.

Example:-

Suppose we want to deposit 12000/- per year in RD(recurring Deposit) account.

PMT=12000/-

Rate of interest=7.5% per annum.

Number of periode (nper) =5 years.

=FV (7.5%, 5, 12000).

69,700.69.

PV (rate, nper, pmt):-

It returns the present value of an investment. The total amount of that a series of future Payment is worth now.

Example:- =PV (7.5%, 5, 12000).

48,550.62

SLN (cost, salvage, Period):-

This function calculates straight-line depreciation of an asset.

Example:-

Purchase cost of an asset (Say Fridge)=10000/-

After 4 years its values (salvage)=7000/-

Period=4

=SLN (10000, 7000, 4)

Rs 750

PMT (rate, nper, pv):-

It calculates premium value of loan amount.

Example:-

Loan Amount(PV)=200000/-

Rate=12%

nper=10 Years

=PMT(12%,10,200000)

Rs.35,396.83

7:-Lookupreference Function:-

This categories of function is used for searching. There are following two functions are used.

❖ hlookup()

❖ vlookup()

Hlookup (lookup_value, Range, row_number, false)→ for horizontal searching

Vlookup (lookup_value, Range, Col_number, false) →for vertical searching

Example:-

Name	Basic	HRA	DA	TA	GS
Amit	5678	1200	800	567	8245
Ajay	8765	1300	897	543	11505
Vijay	4456	1700	678	456	7290
Sanjay	3467	800	879	765	5911
Rakesh	8877	900	890	434	11101
Ratan	8976	1600	875	654	12105

=HLOOKUP (A1, A1:F7, 4, FALSE)
 Vijay
 =VLOOKUP (Vijay, A1:F7, 6, FALSE)
 7290

Lecture - 13

Chart (Graph):- Most Important

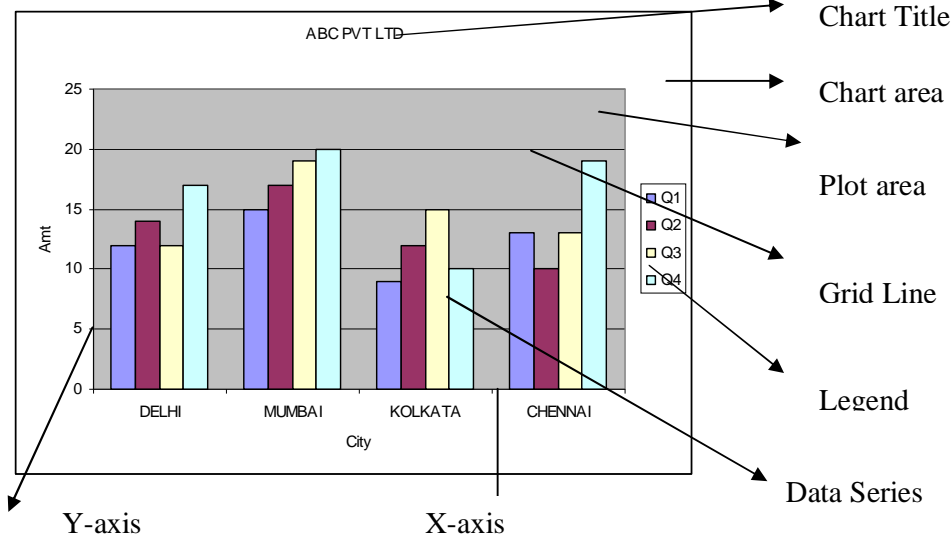
It is a graphic component of data series in MS Excel. It is an effective way for representing and understanding data series in Excel. There are many types of charts.

- ❖ Column Chart.
- ❖ Bar Chart.
- ❖ Line Chart.
- ❖ Area Chart.
- ❖ X,Y Scattered chart.
- ❖ Radar Chart.
- ❖ Pie Chart.
- ❖ Doughnut Chart.
- ❖ Cone Chart.
- ❖ Cylinder Chart.
- ❖ Pyramidal chart.
- ❖ Bubble Chart.
- ❖ Stock Chart.

Components of chart:-

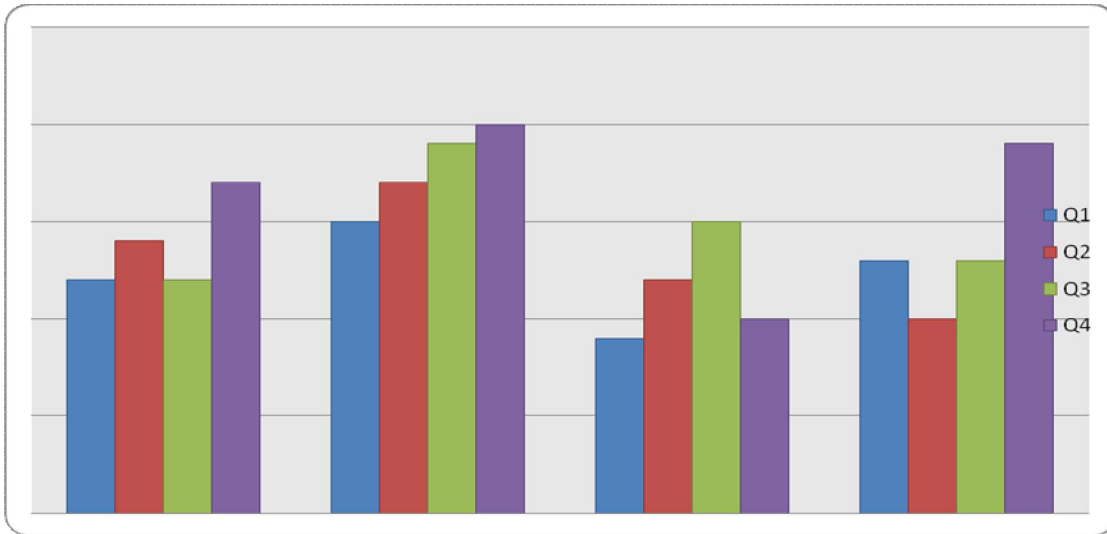
Chart Title. Chart area. Plot area. Legends. X-axis Title.
 Y-Axis Title. Z-Axis Title. Data series. Grid Lines. Data Markers.

ABC Pvt Ltd(Sales In Crore)				
	DELHI	MUMBAI	KOLKATA	CHENNAI
Q1	12	15	9	13
Q2	14	17	12	10
Q3	12	19	15	13
Q4	17	20	10	19



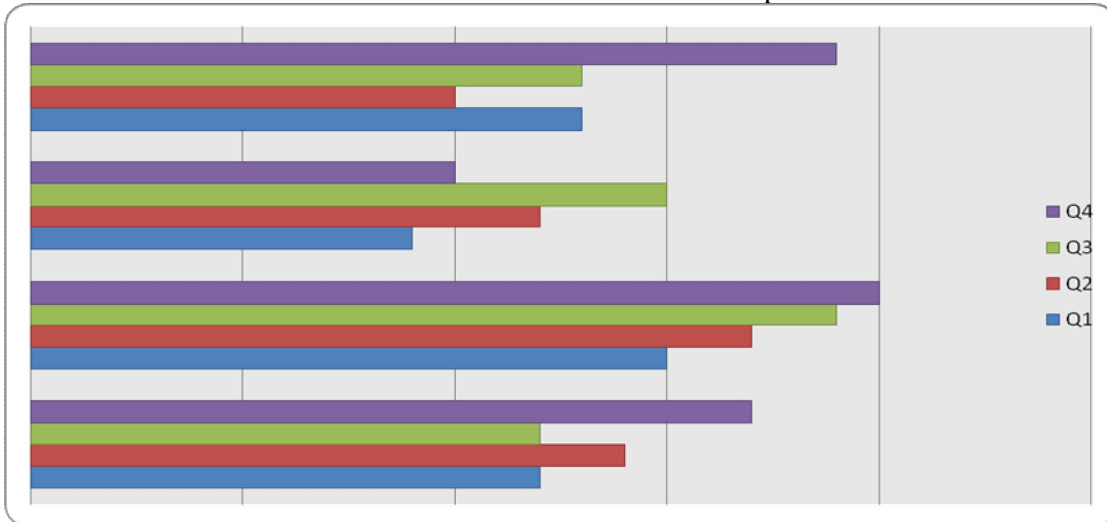
Column Charts :-

It consists of a series of vertical columns. That allows comparison of two or more Data series.



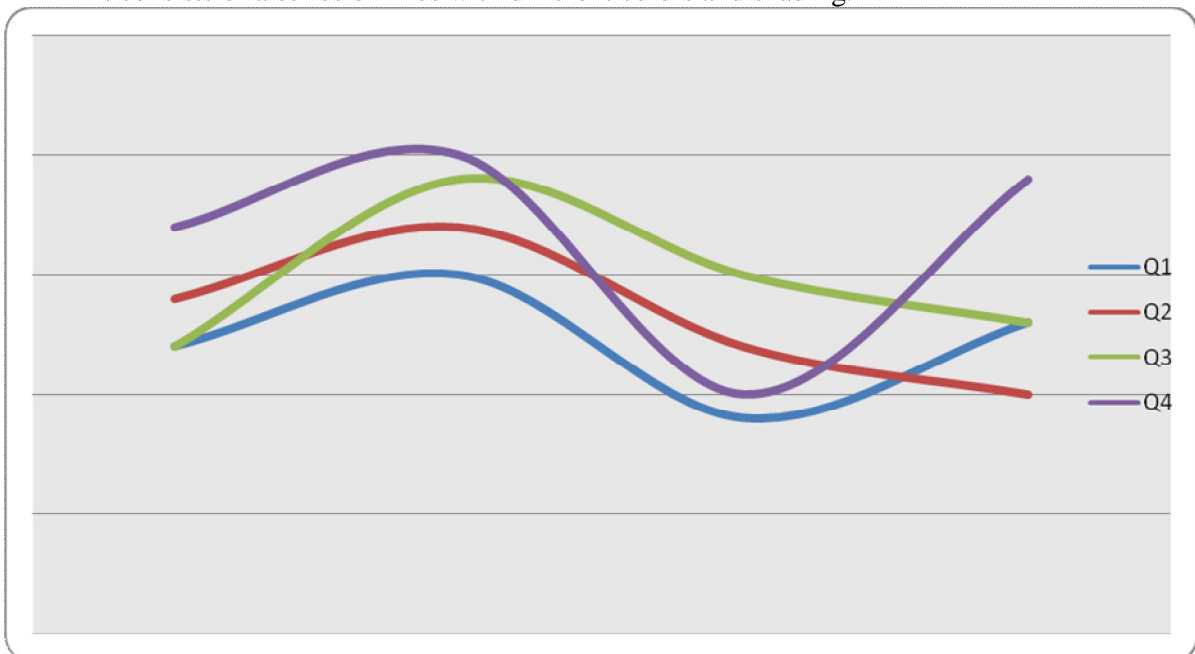
Bar Chart:-

It consists of a series of horizontal bars. It allows comparisons of two or more data series.



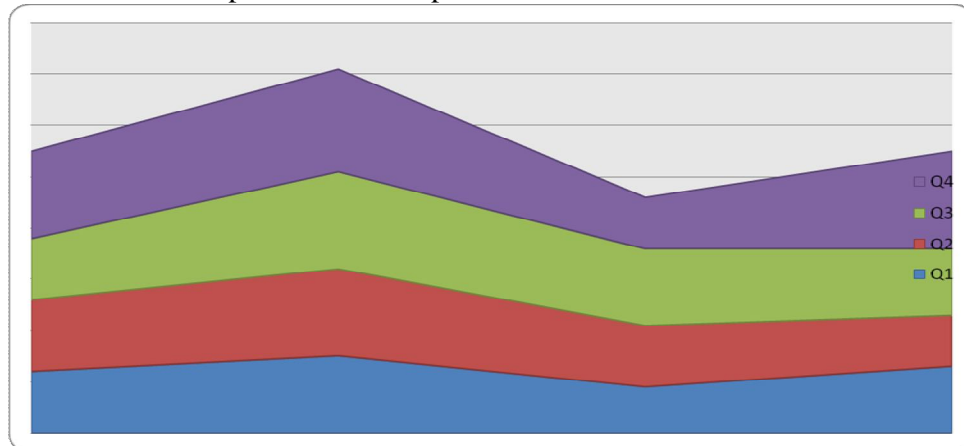
Line Chart:-

It consists of a series of lines with different colors and shading.



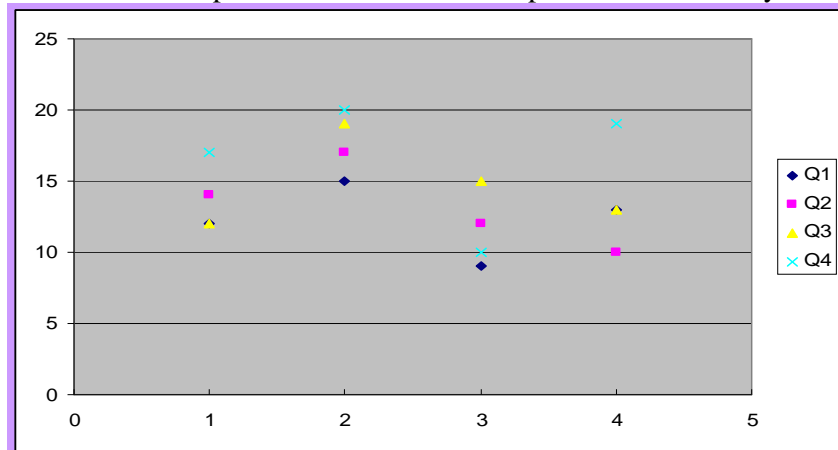
Area Chart:-

It is stacked line chart, with the area between the lines filled with color and shading. Data series are plotted one on top of other.



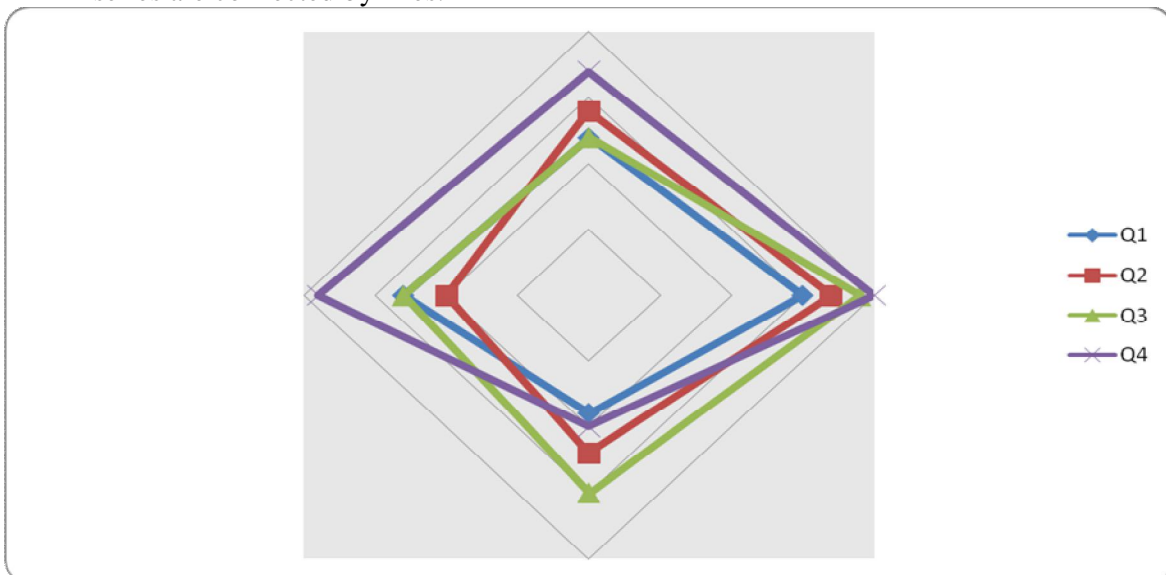
X-Y Scattered Chart:-

The value of data series is plotted as the intersection point of x-axis and y-axis.



Radar Chart:-

It allows the data values in relation to the center point and to each other. Data of the same data series are connected by lines.



Pie Chart:-

It is the best way for representing data series in percent form.

DELHI	
Q1	12
Q2	14
Q3	12
Q4	17

Total Amount=12+14+12+17= 55.

% of Q1 = $12/55 \times 100$ = 21.81818%.

% of Q2 = $14/55 \times 100$ = 25.45455%.

% of Q3 = $12/55 \times 100$ = 21.81818%.

% of Q4 = $17/55 \times 100$ = 30.90909%.

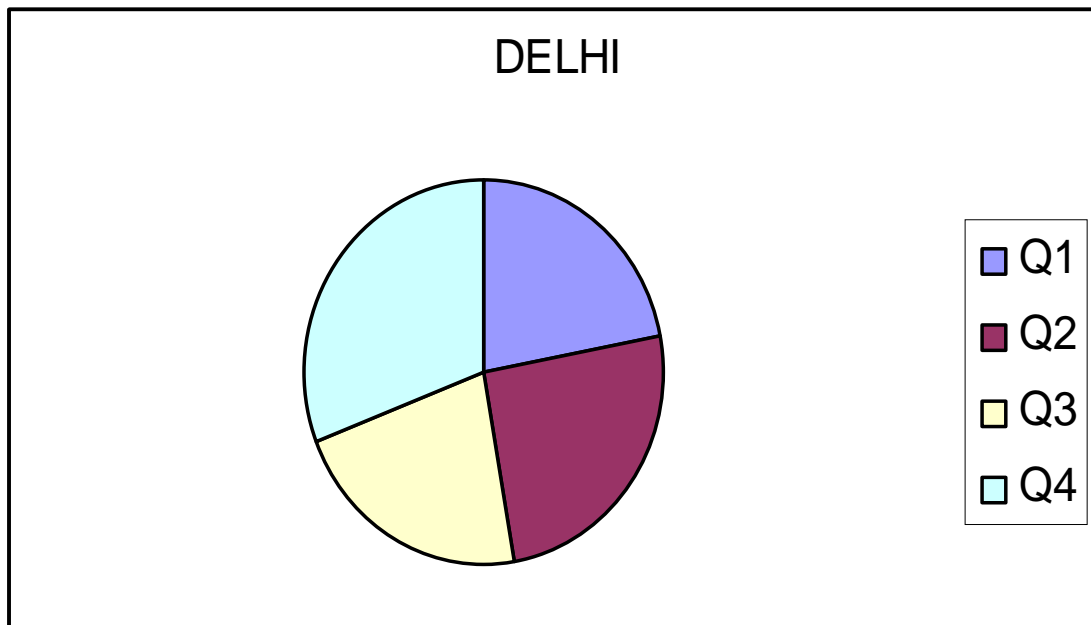
Calculation of Angle:-

Angle for Q1 = $360 \times 21.81818\%$ = 78.54545 Degree.

Angle for Q2 = $360 \times 25.45455\%$ = 91.63636 Degree.

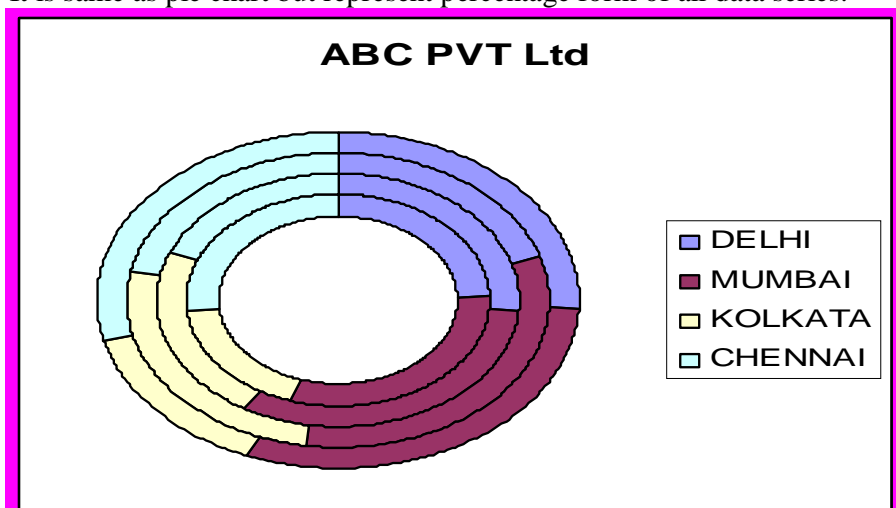
Angle for Q3 = $360 \times 21.81818\%$ = 78.54545 Degree.

Angle for Q4 = $360 \times 30.90909\%$ = 111.2727 Degree.



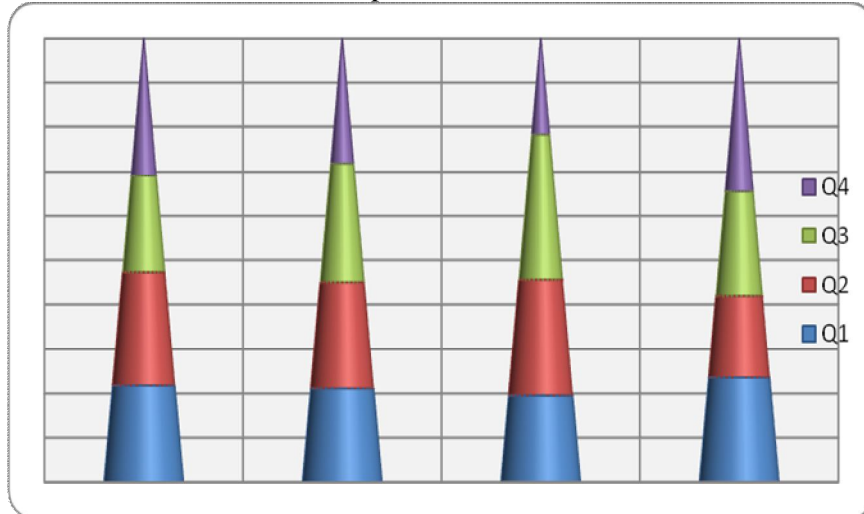
Doughnut Chart:-

It is same as pie chart but represent percentage form of all data series.



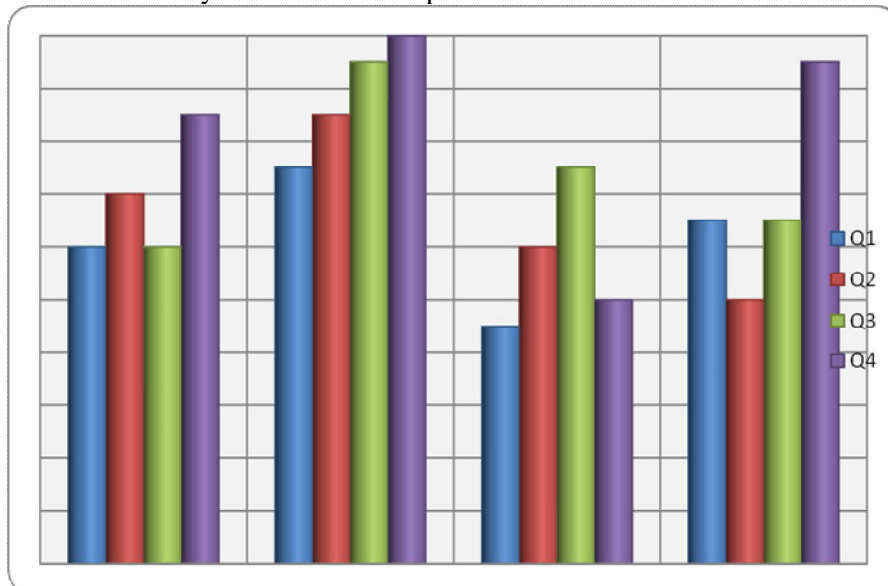
Cone Chart:-

It consists of series of cones. That compares data series.



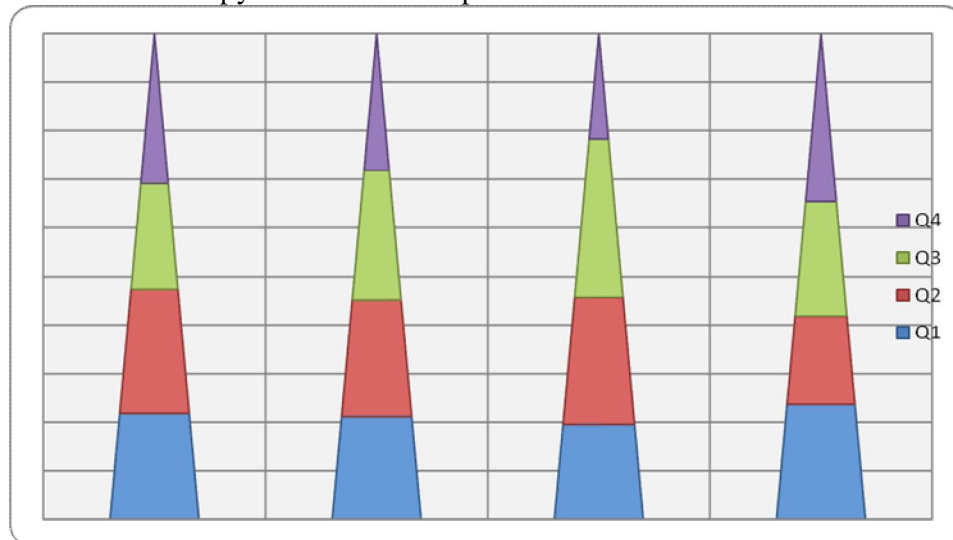
Cylinder Chart:-

It consists of series of cylinders. That compares data series.



Pyramid Chart:-

It consists of series of pyramids. That compares data series.



Trend Lines/Regression Analysis:-

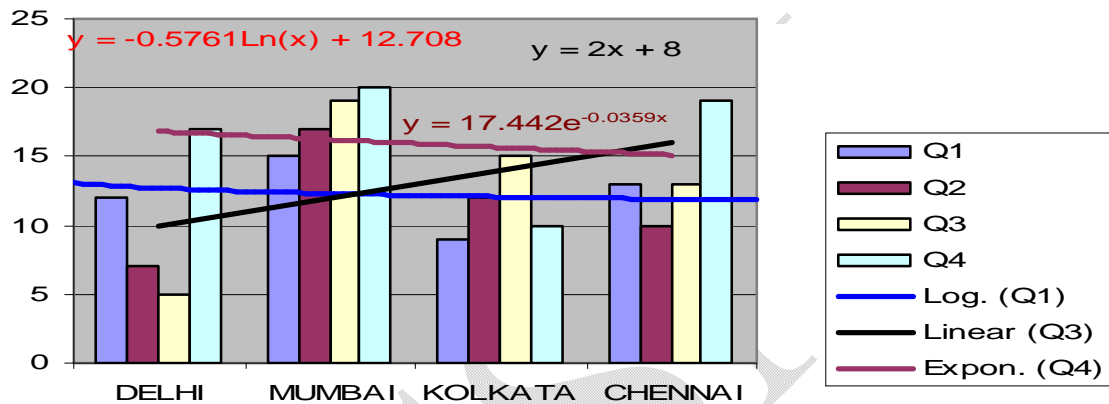
It is also known as regression analysis, which is used for prediction (Forecasting) of growth. It may be either positive (Forward) or negative (backward).

There are many types of trend lines.

- ✓ Linear Trend Lines.
- ✓ Logarithmic Trend lines.
- ✓ Polynomial trend lines.
- ✓ Power Trend Lines.
- ✓ Exponential Trend Lines.
- ✓ Moving Trend Lines.

Note:-Regression analysis provides relationship between practical values/actual Values and theoretical values.

Note:-Trend line may be sketching only in column chart, Bar chart, Line chart.



Lecture 14

Database Power of MS Excel:-

It is collection of related records organized into tabular form. A table may consist of rows and columns. Rows are known as tuples and columns are known as attributes.

- Example:-
- ✓ Employee records.
 - ✓ Student Records.
 - ✓ Patients Records.
 - ✓ Telephone Directory.
 - ✓ Voter ID Records. Etc

DBMS (Database Management System):-

It is an efficient system or s/w by which we manage database.

Example:-

Oracle.	SQL server.	MS Access.	DB-2.
Ingress.	FoxPro.		
Etc.			

Employee

Name	Basic	HRA	DA	TA	GS
Amit	5678	1200	800	567	8245
Ajay	8765	1300	897	543	11505
Vijay	4456	1700	678	456	7290
Sanjay	3467	800	879	765	5911
Rakesh	8877	900	890	434	11101
Ratan	8976	1600	875	654	12105

Number of attributes=6(Six)

Number of Tuples=6(Six)

EMP (Table):-

Eno	Ename	Job	Sal	Deptno
101	Ajay	Steno	12000	10
102	Vijay	Manager	22000	20
103	Mukesh	Clerk	10000	10

Eno, Ename, Job, Sal, Deptno→

Fields Name/Attributes Name/Column Name

Number of Attributes=5

Number of Tuples=3

Cardinality of EMP table=3

Degree/Arity of EMP=5

Filter/Questionaries on database/Query:-

To access records from excel database is called filtering.

Element for Filtering:-**Operator**

1. Arithmetic Operator(+,-,*,/,^)
2. Relational Operator(>,<,>=,<=,<>)
3. Logical Operator(and,or,not)
4. Predicate Operator
 - a. begin with
 - b. not begin with
 - c. end with
 - d. not end with
 - e. between
 - f. not between
 - g. greater than or equal to
 - h. not greater than or equal to
 - i. less than or equal to
 - j. not less than or equal to
 - k. exist
 - l. not exist

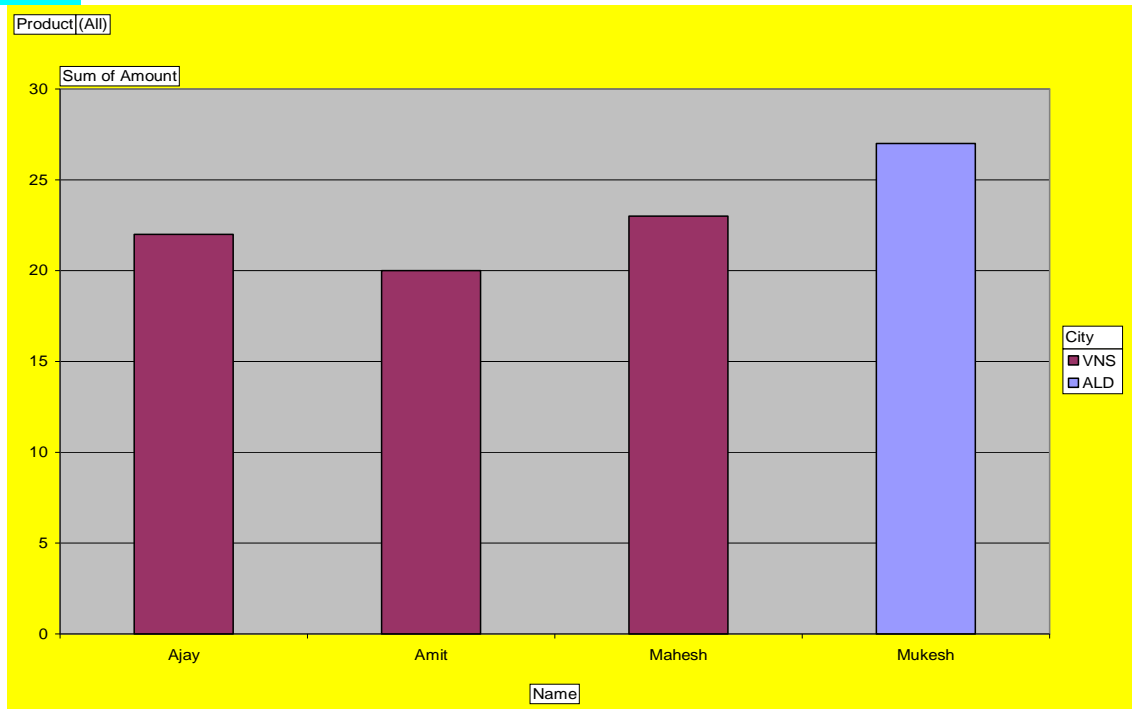
Pivot Table:-

It is an interactive table for analyzing excel database. It facilitate comparative analysis using charts, data series.A pivot table may also be updated when data series updated.

Example:-

SALES REPORT(Sales Amount in Crore)			
Name	Product	City	Amount
Amit	TV	VNS	20
Ajay	TV	VNS	22
Mahesh	AC	VNS	23
Neeraj	AC	VNS	25
Mukesh	AC	ALD	27
Neeraj	AC	ALD	27
Suresh	TV	VNS	23
Suresh	TV	ALD	27

Pivot Chart



Lecture - 15

Focus on Analysis:-

Goal Seek:-

It determines the input required to produce the desired result.

Or

In computing, **goal seeking** is the ability to calculate backward to obtain an input that would result in a given output. This can also be called what-if analysis or back-solving. It can either be attempted through trial and improvement or more logical means.

Example:-

Subject	Marks
HINDI	56
ENGLISH	67
MATHS	78
PHYSICS	55
CHEMISTRY	
TOTAL	256
PER	51.2

TOTAL
=SUM(B2:B6)
PER =B7/5
CHEMISTRY=?
PER=63%
SELECT%
CELL→TOOLS→G
OAL SEEK

PRESS OK

Subject	Marks
HINDI	56
ENGLISH	67
MATHS	78
PHYSICS	55
CHEMISTRY	<u>59</u>
TOTAL	315
PER	63

Scenario Manager:-

Scenarios are part of a suite of commands sometimes called what-if analysis tools. A scenario is a set of values that Microsoft Excel saves and can substitute automatically in your worksheet. You can use scenarios to forecast the outcome of a worksheet model.

Loan	Rate	Period	Premium
200000	10%	5	(\$52,759.50)

Premium=PMT (B2, C2, A2).

Now we make a scenario for following amounts.

Loan	Rate	Period	Premium
200000	10%	5	(\$52,759.50)
200000	10.5%	10	
200000	11%	15	
300000	10%	5	
300000	10.5%	10	
300000	11%	15	
400000	10%	5	
400000	10.5%	10	
400000	11%	15	

Step1:-Select Premium Cell.

Step2:-Select And Click Scenario from Tools menu.

Step3:-Click **Add** Option from Scenario Manager.

Step4:-Scenario Name=200k & 5yrs.

Changing Cell=\$A\$2, \$B\$2, \$C\$2.

Step5:-Press Ok.

Step6:-Click Add.

Step7:-After feeding above Values Scenario Manager Look Like below.



Scenario Summary

	200k & 5yrs	200k & 10yrs	200k & 15yrs	300k & 5yrs	300k & 10yrs	300k & 15yrs	400k & 5yrs	400k & 10yrs
Amount	200000	200000	200000	300000	300000	300000	400000	400000
Rate	10%	15%	11%	10%	15%	11%	10%	15%
Period	5	10	15	5	10	15	5	10
Premium	\$52,759.50	\$39,850.41	\$27,813.05	\$79,139.24	\$59,775.62	\$41,719.57	\$105,518.99	\$79,700.83

Step 8:-Click Summary

TEMPLATE:-

It is a blue print, which is used for making similar types of worksheet such as Invoice.Mark sheet. Class List.Balance sheet.Expense Statement.Loan amortization.Sales Invoice. Time CardEtc.

There are two categories of templates

1. User Defined Template.
2. Built in Template/System Defined Template.

EXAMPLE User Defined Template:-

INSTITUTE OF COMPUTER SCIENCES & MANAGEMENT								
Class List								
Sno	Sname	Hindi	Eng	Maths	Physics	Chem	Tot	Per
							0	0

TOT=SUM(C4:G4)

PER=H4/5

Built in Template (PREDEFINED TEMPLATE).

- ❖ Balance sheet.
- ❖ Expense Statement.
- ❖ Loan amortization.
- ❖ Sales Invoice.
- ❖ Time Card.

Example Of balance Sheet:-

Balance Sheet

Description

Apex health care

Starting Balance

\$1,000.00

Date	Item Description	Received	Payment	Balance
1/3/2012	Amount received	\$3,000.00		\$4,000.00
1/3/2012	wages to Ravi		\$450.00	\$3,550.00
2/3/2012	Telephone Bill		\$950.00	\$2,600.00
4/5/2012	Electricity Bill		\$1,700.00	\$900.00

Receivable \$3,000.00
Payables \$3,100.00
Current Balance \$900.00

Example of Expense Statement.

[illegible]

Example Of Loan Amortization:-

Enter Values		Loan Summary	
Loan Amount	\$ 100,000.00	Scheduled Payment	\$ 28,859.15
Annual Interest Rate	12.00 %	Scheduled Number of Payments	4
Loan Period in Years	2	Actual Number of Payments	4
Number of Payments Per Year	2	Total Early Payments	\$ -
Start Date of Loan	1/3/2012	Total Interest	\$ 15,436.60
Optional Extra Payments			

Lender Name:

Pmt No.	Payment Date	Beginning Balance	Scheduled Payment	Extra Payment	Total Payment	Principal	Interest	Ending Balance
1	7/3/2012	\$ 100,000.00	\$ 28,859.15	\$ -	\$ 28,859.15	\$ 22,859.15	\$ 6,000.00	\$ 77,140.85
2	1/3/2013	77,140.85	28,859.15	-	28,859.15	24,230.70	4,628.45	52,910.15
3	7/3/2013	52,910.15	28,859.15	-	28,859.15	25,684.54	3,174.61	27,225.61
4	1/3/2014	27,225.61	28,859.15	-	27,225.61	25,592.08	1,633.54	0.00

Lecture - 16

Digital Financial Services

PPF	Public Providend Fund
EPF	Employee Provided Fund
NSC	National Saving Certificate
KVP	Kisan Vikas Patra
NEFT	National Electronic Funds Transfer
RTGS	Real Time Gross Settlement
IFSC	Indian Financial System Code
CFMS	Centralized Funds Management System
PMJDY	Pradhan Mantri Jan-Dhan Yojana
PMSBY	Pradhan Mantri Suraksha Bima Yojana
PMMY	Pradhan Mantri Mudra Yojana
NPS	National Pension Scheme
KYC	Know Your Customer
Financial Year Commencement Date	1 April of Current year
Financial Year Closing Date	31 March of Next Year

Description of IFSC in brief:-

IFSC: Indian Financial System Code. The Payment Systems such as National Electronic Funds Transfer (NEFT), Real Time Gross Settlement (RTGS) & Centralized Funds Management System (CFMS) used IFSC Codes. IFSC developed by the Reserve Bank of India.

The code consists of 11 Characters : (e.g ICIC0000438)
First 4 characters represent the entity (ICIC0000438)
Fifth position has been defaulted with a '0' (Zero) for future use (ICIC0000438)
Last 6 character denotes the branch identity (ICIC0000438)
IFSC is being identified by the RBI as the code to be used for various payment system projects within the country

Describe PPF in brief:-

PPF account can be extended after the completion of 15 years, subscriber doesn't need to put any amount after the maturity. This is the default option meaning if subscriber doesn't take any action with in one year of his PPF account maturity this option activates automatically. Any amount can be withdrawn from the PPF account if the option of extension with no contribution is chosen. Only restriction is only one withdrawal is permitted in a financial year. Rest of the amount keeps earning interest.

Note:-

- 1:-Any person can open PPF account.
- 2:-Total Period of PPF a/c 15 years.
- 3:-Minimum amount deposited into PPF a/c is Rs.500/-
- 4:-Maximum amount deposited into PPF a/c is Rs.150000/-
- 5:-12 times can be deposited into PPF a/c in a financial year.
- 6:- Annual contributions qualify for tax rebate under Section

80C of income tax

Define Atal Pension Yojna (APY) in brief:-

The Government of India has announced a new scheme called Atal Pension Yojana (APY). APY is a guaranteed pension scheme and is administered by the Pension Fund Regulatory and Development Authority (PFRDA).

Features:-

- Guaranteed monthly pension for subscribers, ranging from Rs. 1,000 to Rs. 5,000 per month.
- Government of India (GoI) will also co-contribute 50% of the subscriber's contribution or Rs. 1,000 per annum, whichever is lower. The Government co-contribution is available for those who are not covered by any Statutory Social Security Schemes and is not an Income Tax payer.
-
- GoI will co-contribute to each eligible subscriber, for a period of 5 years who joins the scheme in the period June 1 to December 31, 2015. The benefit of five years of Government co-contribution under APY (ATAL PANSION YOJNA) would not exceed 5 years for all subscribers including migrated Swavalamban beneficiaries.

Indicative APY Contribution Chart (Age wise)

Age of Entry	Years of Contribution	Monthly pension of Rs. 1000.	Monthly pension of Rs. 2000.	Monthly pension of Rs. 3000.	Monthly pension of Rs. 4000.	Monthly pension of Rs. 5000.
18	42	42	84	126	168	210
19	41	46	92	138	183	228
20	40	50	100	150	198	248
21	39	54	108	162	215	269
22	38	59	117	177	234	292
23	37	64	127	192	254	318
24	36	70	139	208	277	346
25	35	76	151	226	301	376
26	34	82	164	246	327	409
27	33	90	178	268	356	446
28	32	97	194	292	388	485
29	31	106	212	318	423	529
30	30	116	231	347	462	577
31	29	126	252	379	504	630
32	28	138	276	414	551	689
33	27	151	302	453	602	752
34	26	165	330	495	659	824
35	25	181	362	543	722	902
36	24	198	396	594	792	990
37	23	218	436	654	870	1,087
38	22	240	480	720	957	1,196
39	21	264	528	792	1,054	1,318
40	20	291	582	873	1,164	1,454

Penalty for default

Under APY, the individual subscribers have to make the contribution on a monthly basis. Banks are required to collect additional amount for delayed payments, such amount will vary from minimum Rs. 1 per month to Rs. 10 per month as shown below:

- Rs. 1 per month for contribution up to Rs. 100 per month.
- Rs. 2 per month for contribution up to Rs. 101 to 500 per month.
- Rs. 5 per month for contribution between Rs. 501 to Rs. 1,000 per month.
- Rs. 10 per month for contribution beyond Rs. 1,001 per month.

National Pension Scheme (NPS)

NPS (National Pension System) is a defined contribution based Pension Scheme launched by Government of India with the following objectives

- To provide old age income.
- Reasonable market based returns over long run.
- Extending old age security coverage to all citizens.

It is based on a unique Permanent Retirement Account Number (PRAN) which is allotted to each Subscriber upon joining NPS. The Government of India in exercise of their executive powers adopted '**National Pension System**' (NPS) based on defined contributions in respect of all new entrants to Central Government services, excepting the Armed Forces, with effect from 1st January 2004. Most of the State Governments have since notified a similar pension system for their new entrants. NPS accumulates savings into subscribers PRA while he is working and use the accumulations at retirement to procure a pension for the rest of his life.



Pradhan Mantri Mudra Yojana (PMMY):-

PRADHAN MANTRI MUDRA YOJANA (PMMY), a flagship scheme of Government of India, was launched on 8th April, 2015 by the Hon'ble Prime Minister to "fund the unfunded" by bringing such enterprises to the formal financial system and extending affordable credit to them.

Eligibility	<ul style="list-style-type: none"> ➤ Any Individual, Proprietor, Partner, SHG, JLG etc. ➤ Engaged in non-farm activity ➤ For starting/extending business activity such as Manufacturing, Trading and Services etc..
Loan Amount	<ul style="list-style-type: none"> ➤ Maximum upto ₹10.00 Lakh ➤ 3 category named as under:- 1. Shishu – Loans upto ₹50,000/- 2. Kishore– Loans above ₹50,000/- to ₹5.00 Lakh 3. Tarun – Loans Above ₹5.00 lakh to ₹10.00 Lakh
Type of Loan	<ul style="list-style-type: none"> ➤ Cash Credit ➤ Overdraft ➤ Term Loan
Security	Hypothecation of Assets created out of Bank finance.
Process Fee	<ul style="list-style-type: none"> ➤ Upto ₹5.00 lakh – Nil ➤ Above ₹5.00 lakh to ₹10.00 lakh - ₹300/- per lakh or part thereof
MUDRA Card	For working capital requirement maximum upto ₹20,000/- MUDRA Card may be issued for cash withdrawal.

PRADHAN MANTRI JEEVAN JYOTI BIMA YOJANA DETAILS OF THE SCHEME:

The scheme will be a one year cover, renewable from year to year, Insurance Scheme offering life insurance cover for death due to any reason. The scheme would be offered / administered through LIC and other Life Insurance companies willing to offer the product on similar terms with necessary approvals and tie ups with Banks for this purpose. Participating banks will be free to engage any such life insurance company for implementing the scheme for their subscribers.

Scope of coverage:

All savings bank account holders in the age 18 to 50 years in participating banks will be entitled to join. In case of multiple saving bank accounts held by an individual in one or different banks, the person would be eligible to join the scheme through one savings bank account only. Aadhar would be the primary KYC for the bank account.

Benefits:

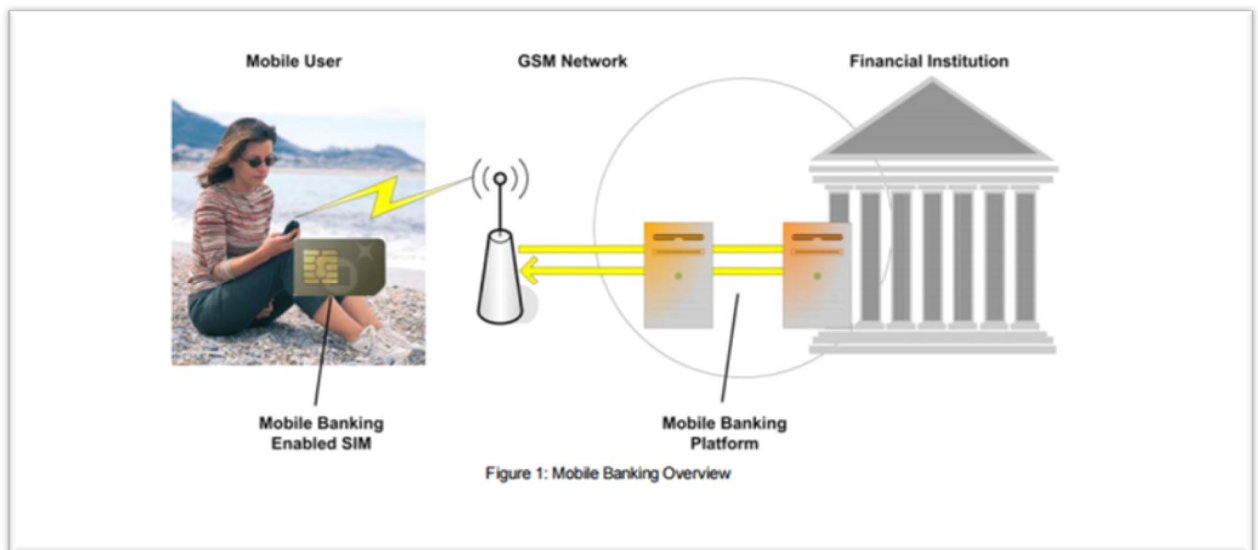
Rs.2 lakh is payable on member's death due to any reason

Premium:

Rs.330/- per annum per member. The premium will be deducted from the account holder's savings bank account through auto debit facility in one installment, as per the option given, on or before 31 st May of each annual coverage period under the scheme. Delayed enrollment for prospective cover after 31st May will be possible with full payment of annual premium and submission of a self-certificate of good health. The premium would be reviewed based on annual claims experience. However, barring unforeseen adverse outcomes of extreme nature, efforts would be made to ensure that there is no upward revision of premium in the first three years.

Mobile Banking:-

Mobile banking is a service provided by a bank or other financial institution that allows its customers to conduct some financial transactions remotely using a mobile device such as a mobile phone or tablet.



Mobile wallet :-

Mobile wallet is a very young concept in India that has taken on consumer psyche rapidly. Everyone is loving mobile wallets and embracing them with open arms. Today, mobile wallet is one of the successful business ideas for start-ups.

What is insurance:-

An arrangement by which a company or the state undertakes to provide a guarantee of compensation for specified loss, damage, illness, or death in return for payment of a specified premium.

Here's a list of the investment plans you can benefit from:

1:-Term Plans

Term Insurance helps the customers in safeguarding their families from financial worries that arise due to unfortunate circumstances. Term plans are pure risk cover plans with or without maturity benefits. These pure risk plans cover your life at a nominal cost

2:-Health insurance

The purpose of health insurance is to help you overcome unforeseen emergencies without compromising on any other financial goal. Health insurance helps you pay for all your medical expenses. A health insurance policy also gives you the benefit of covering your loved ones under one plan to avoid any financial constraints arising on account of a medical emergency.

The benefits:

- Cashless hospitalization in all major hospitals pan India
- Coverage of pre and post hospitalization expense
- Coverage of all major day care treatments

3:-Endowment Plans

Endowment Plans are an ideal choice for the risk-averse customer. Endowments are long-term, regular savings plans with a built-in life cover. Provided you have paid all your premiums, at the end of the term the policyholder receives the sum assured plus accrued /guaranteed bonuses that have been declared over the years, as a lump sum. In case of the unfortunate death during the term of your plan, the sum assured, will be paid out as a lump sum with the bonuses that the policy is entitled to.

The benefits of Endowment Plans are as follows:

- Available as money back plans also
- Option to avail a host of additional rider benefits
- Cover your life for a longer period of time
- Loan facility can be availed against most of the plans.

4:-Whole Life Insurance

Whole Life Insurance plans provide cover throughout your lifetime. The premium could be paid for as long as a lifetime or for a limited period.

5:-Group Insurance

Group insurance covers a group of people, usually members of societies, employees of a common employer, or professionals.

6:-Retirement Plans

Retirement Plans make sure that you have support in the twilight years of your life. The savings you set aside today become your wealth and support in the years to come.

6:-Children Plans

Insurance today offers a very simple assurance in terms of monetary support to a child and family in case of death or disability of parent and helps ensure that the shortage of fund never hampers dreams or aspirations of your child. In short, Children's Plans ensure a secured financial future for your child.

7:-Wealth Plans

Wealth plans invest the premium in to the equity, debt and cash markets by allocating units, which like any other mutual fund have a NAV.

Term Insurance helps the customers in safeguarding their families from financial worries that arise due to unfortunate circumstances. Term plans are pure risk cover plans with or without maturity benefits. These pure risk plans cover your life at a nominal cost.

Term plans also let you avail the benefit to cover your outstanding debts like mortgage, home loan etc. In case of something happens to you, the financial burden is borne by the insurance company and not your loved ones.

Term Plan offers you the following benefits:

- High insurance Cover at lower costs
- Financial security against loans and mortgages,
- Single premium payment option available
- Available with host of Additional rider benefits

Lecture - 17

Introduction of Computer Network and Internet

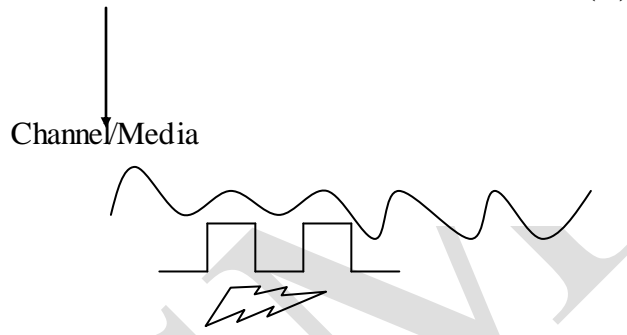
What is communication Signal and Technology:-

DATA COMMUNICATION AND COMPUTER NETWORK

Data communications refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media. The best-known computer network is the Internet.

Transmission of electrical signal/Optical signal by means of communication channel/media from one node to another node is called communication.

Sender(S) ----- **Receiver (R)**



Types of signal for network:-

- ✓ Analog Signal
- ✓ Digital Signal
- ✓ Light Signal

Note:- Transmission speed measured in bits per second/baud rate/Bandwidth.

For performing transmission a protocol must be needed. Set of formalized access rule is called protocol.

Example:-

- ✓ TCP/IP Protocol (Transmission Control protocol /Internet protocol).
- ✓ UDP (User data Gram Protocol)

Role/Function/Task of Protocol:-

- ✓ It transfer error free message.
- ✓ It identifies destination address.
- ✓ It also identifies/Search idle channel for communication.
- ✓ Error recoveries.
- ✓ Retransmission control.
- ✓ Interface management.

Concept of Computer Network:-

Before discussion the internet first of all we should discuss about the network, because if our concept will not be clear about the network then we cannot understand concept of internet. So let us start the discussion of the network. *Network word made-up with two words.*

Net/work
Net + Work
Web/cobweb + task/function

It means like the spider web (cobweb) some task/function/work is happening so on this concept something is running.

Network

"In information technology a network is a series of points or nodes interconnected by communication path/channel."

Note: A device, generally the computer that is directly attached to the network, is called a node

Computer Network

A **computer network** is a collection of two or more than two where components interconnected by communication channels that allow sharing of resources and information.

What is computer network:-

A network consist of two or more computers connected together on desk or it can consist of many LAN connected together to form a wide area network (WAN) across continent.

OR

Network:-The shairing of resources between two or more people.

OR

A network with which you might be familiar is the school computer lab. Consider resources that can be shared on a network. For example, the school computer lab may share a single printer. Think of advantages of sharing resources. Why are most business computers part of a network?

What is internet:-

It is interconnected computer network by which Communication must be possible through global interconnected computer network. **Tim Berner Lee at MIT/LCS**(Massatutes Institutes of Technology/Laboratory of Computer science) gives the concept of internet.It is a very large network of interconnected computers across the world.

What is Intranet:-

Intranet is the use of internet technologies within an organization (or company) to achieve better results than the conventional means of data access and transfer. Information page of intranet coded into HTML/DHTML, Dot net/Java etc.

TCP/IP protocol is responsible for intranet services.

Internet:-A lots of network all over worlds are connected to make the internet.

Intranet:- Lots of networks connected within an organization (locations could be geographically distant) such as bank network, Maruti udyog limited etc.

Difference between Internet & Intranet:-

❖ Intranet is network within the organization where as internet is a worldwide network. Intranet has access to internet but not vice-versa

Types of computer Network:-

- ✓ Point-To-Point Computer Network. (By Means Wires).
- ✓ Broadcast computer network. (By means of microwaves).

Classification Computer network

There are three different types of network for different purpose

- 1- LANWAN
- 2-
- 3- MAN

LAN (Local Area Network)

A Local Area Network is a network that connects computers and devices in a limited geographical area such as home, school, computer laboratory, office building, or closely positioned group of buildings.

Characteristics:

- (i) A diameter not more than a few kms.
- (ii) A total data rate of at least several Mbps.
- (iii) Complete ownership by a single organization.

MAN (Metropolitan Area Network)

A Metropolitan area network is a large computer network that usually spans a city or a large campus.

Characteristics:

- (i) Covers entire city, but uses LAN technology.
- (ii) Have data rates below 1 Mbps.
- (iii) Owned by multiple organizations.

WAN (Wide Area Network)

A (WAN) is a computer network that covers a large geographic area such as a city, country, or spans even intercontinental distances, using a communications channel that combines many types of media such as telephone lines, cables, and air waves.

Characteristics:

- (iv) More scalable than LAN and MAN.
- (v) Connects many sites spread across large geographic distances with many computers at each site.
- (vi) Provides sufficient capacity to permit the computers to communicate simultaneously.

Why Computer network:-

- ❖ Communication medium/Channel
- ❖ Resource sharing
- ❖ Higher reliability
- ❖ Cost minimize

Network Topology:-

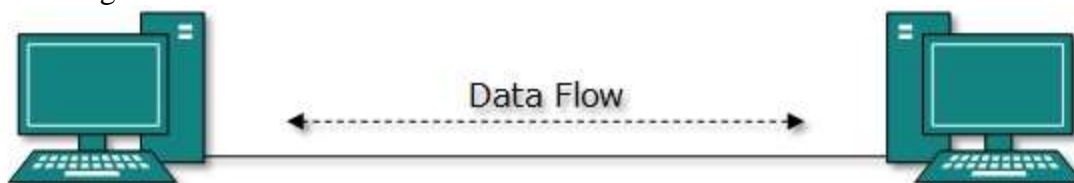
It is the layout of computer network. There are following types of network topology.

- ✓ Star topology.
- ✓ Ring topology.
- ✓ Bus Topology.
- ✓ Tree Topology.
- ✓ Mesh Topology.
 - Fully Mesh Topology
 - Partially Mesh Topology
- ✓ Combined Topology
 - Star-Bus Topology.
 - Star-Ring Topology.

A Network Topology is the way computer systems or network equipment connected to each other. Topologies may define both physical and logical aspect of the network. Both logical and physical topologies could be same or different in a same network.

POINT-TO-POINT

Point-to-point networks contains exactly two hosts (computer or switches or routers or servers) connected back to back using a single piece of cable. Often, the receiving end of one host is connected to sending end of the other end and vice-versa.

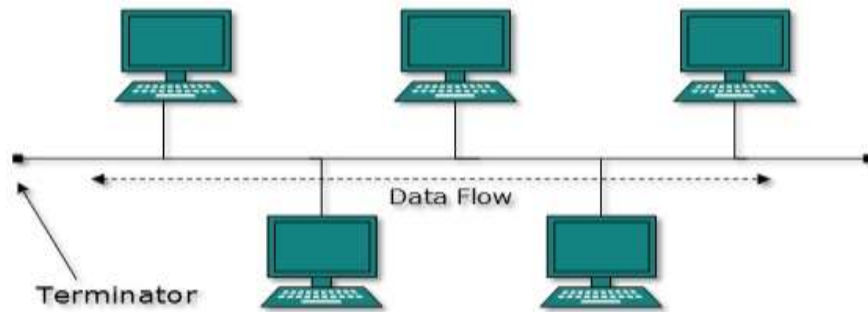


[Image: Point-to-point Topology]

If the hosts are connected point-to-point logically, then may have multiple intermediate devices. But the end hosts are unaware of underlying network and see each other as if they are connected directly.

BUS TOPOLOGY

In contrast to point-to-point, in bus topology all device share single communication line or cable. All devices are connected to this shared line. Bus topology may have problem while more than one hosts sending data at the same time. Therefore, the bus topology either uses CSMA/CD technology or recognizes one host has Bus Master to solve the issue. It is one of the simple forms of networking where a failure of a device does not affect the others. But failure of the shared communication line make all other devices fail.

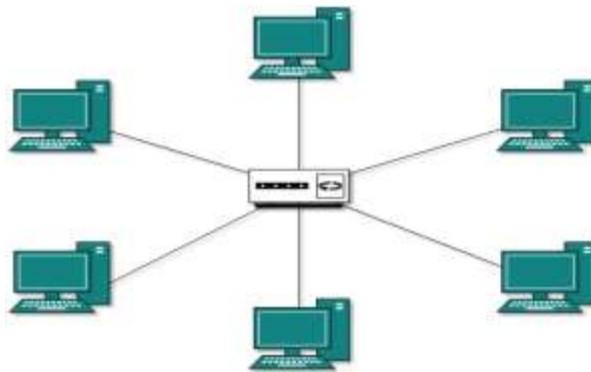


[Image: Bus Topology]

Both ends of the shared channel have line terminator. The data is sent in only one direction and as soon as it reaches the extreme end, the terminator removes the data from the line.

STAR TOPOLOGY

All hosts in star topology are connected to a central device, known as Hub device, using a point-to-point connection. That is, there exists a point to point connection between hosts and Hub. The hub device can be Layer-1 device (Hub / repeater) or Layer-2 device (Switch / Bridge) or Layer-3 device (Router / Gateway).

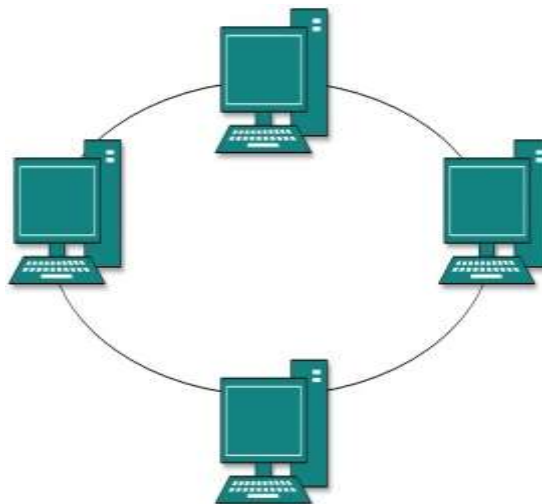


[Image: Star Topology]

As in bus topology, hub acts as single point of failure. If hub fails, connectivity of all hosts to all other hosts fails. Every communication happens between hosts, goes through Hub only. Star topology is not expensive as to connect one more host, only one cable is required and configuration is simple.

RING TOPOLOGY

In ring topology, each host machine connects to exactly two other machines, creating a circular network structure. When one host tries to communicate or send message to a host which is not adjacent to it, the data travels through all intermediate hosts. To connect one more host in the existing structure administrator may need only one more extra cable.

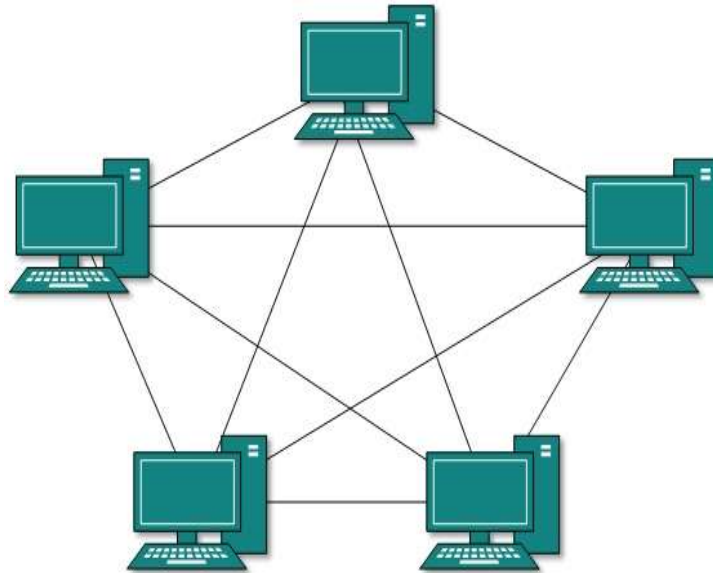


[Image: Ring Topology]

Failure of any host results in failure of the whole ring. Thus every connection in the ring is point of failure. There exists methods which employs one more backup ring.

MESH TOPOLOGY

In this type of topology, a host is connected to one or two or more than two hosts. This topology may have hosts having point-to-point connection to every other hosts or may also have hosts which are having point to point connection to few hosts only.

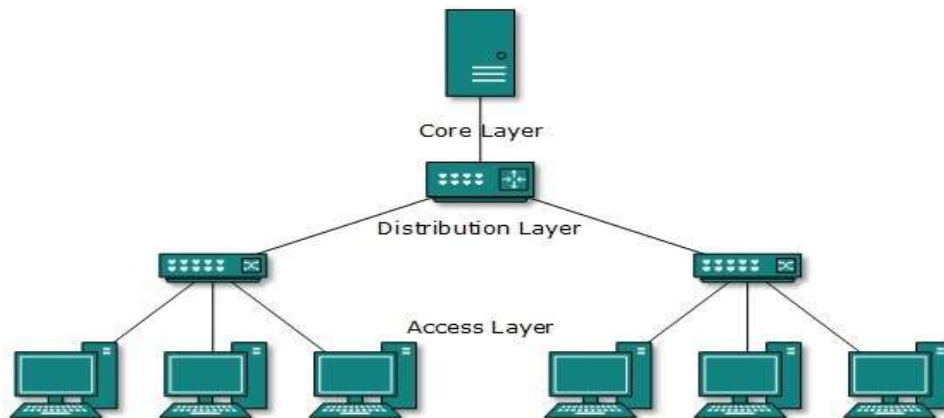


[Image: Full Mesh Topology]

Hosts in Mesh topology also work as relay for other hosts which do not have direct point-to-point links. Mesh technology comes into two flavors:

TREE TOPOLOGY

Also known as Hierarchical Topology is the most common form of network topology in use present day. This topology divides the network in to multiple levels/layers of network. The highest most layer is known as Core layer, and is central point of the network, i.e. root of the tree from which all nodes fork.



[Image: Tree Topology]

All neighboring hosts have point-to-point connection between them. Like bus topology, if the root goes down, the entire network suffers. Though it is not the single point of failure. Every connection serves as point of failure, failing of which divides the network into unreachable segment and so on.

DAISY CHAIN

This topology connects all its hosts in a linear fashion. Similar to Ring topology, all hosts in this topology are connected to two hosts only, except the end hosts. That is if the end hosts in Daisy Chain are connected then it represents Ring topology.

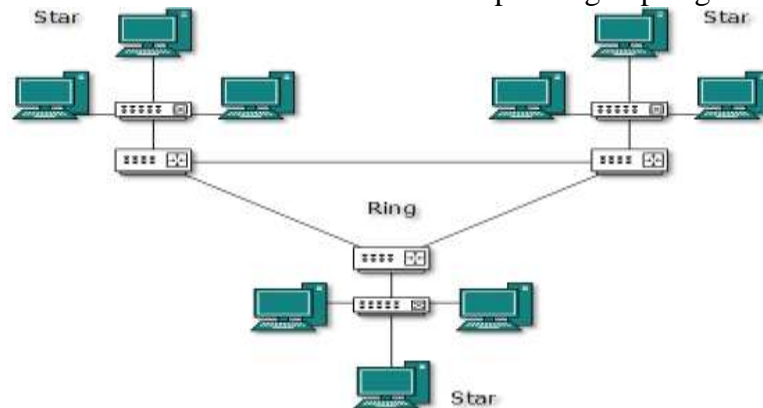


[Image: Daisy Chain Topology]

Each link in Daisy chain topology represents single point of failure. Every link failure splits the network into two segment. Every intermediate host works as relay for its immediate hosts.

HYBRID TOPOLOGY

A network structure whose design contains more than one topology is said to be Hybrid Topology. Hybrid topology inherits merits and demerits of all the incorporating topologies.



[Image: Hybrid Topology]

The above picture represents an arbitrarily Hybrid topology. The combining topologies may contain attributes of Star, Ring, Bus and Daisy-chain topologies. Most WANs are connected by means of dual Ring topology and networks connected to them are mostly Star topology networks. Internet is the best example of largest Hybrid topology.

Protocol:-Set of formalized access rule is called protocol.

- ❖ TCP/IP (Transmission Control Protocol/Internet protocol)
- ❖ Ftp (File Transfer Protocol).
- ❖ Http (Hypertext Transfer Protocol).
- ❖ SLIP (Serial Line Internet Protocol).
- ❖ PPP (Point to Point Protocol).

A protocols defines the following three aspects of communications

- ❖ Syntax:-The format of data being exchanged, character set used, type error correction used, type of coding scheme being used.
- ❖ Semantics:-Type and order of messages used to ensures reliable and error free information transfer.
- ❖ Timing:-Define data rate selection and correct timing for various events during data transfer.

Who Govern Internet:-

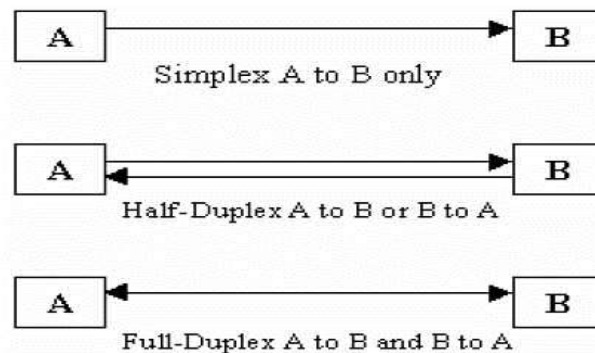
- ISOC (Internet Society).
- IAB (Internet Architecture Board).
- IETF (Internet Engineering Task Force).

How Connect Internet:-

1. Broad Band Connection.
2. VSAT (Very Small Aperture terminal).
3. Mobile Phone.
4. Wi-Fi System.
5. USB Modem.

Data Communication Modes/Data Flow:-

1. Simplex Communication Modes.
2. Half-Duplex communication Modes.
3. Full Duplex Communication Modes.



Synchronous and Asynchronous communication Modes:-

Synchronous communication Modes:-

It performs communication between two nodes or among many nodes on same clock of pulse.

Example:-

Sender-----	Receiver
Clock Pulse	Clock Pulse
$T_S = t_1$	$T_R = t_1$
Message= $M_1 = 10010101$	Message= $M_1 = 10010101$

Asynchronous communication Modes:-

It perform communication between two nodes or among many nodes on different clock of pulse or Bits transmitted different clock of pulse

Example:-

Sender-----	Receiver
Clock Pulse	Clock Pulse
$T_S = t_1$	$T_R = t_1 + t_2 + \dots + t_8$
Message= $M_1 = 10010101$	$t_1=1, t_2=0, t_3=0, t_4=1, t_5=0, t_6=1, t_7=0, t_8=1,$

Communication H/w:-

Basic data communication processs, the following H/W are required

- Sender & Receiver H/w
 - Nodes and Work Station It is done using various communication devices and s/w interconnected for information exchange (Such as Router, Bridge, Gateway, Switch etc).
 - Multiplexer:- It is a form data transfer in which communication channels are used for several transmissions. There are following two types of multiplexers
 - TDM (Time Division Multiplexing)
 - FDM (Frequency Division Multiplexing)
- Communication Device:-
 - Bluetooth devices.
 - Infrared devices.
 - Modem (over phone line).
 - Network card (using Ethernet)/LAN CARD.
 - Smartphone.
 - Wi-Fi devices (using a router).

Communication Channels:-

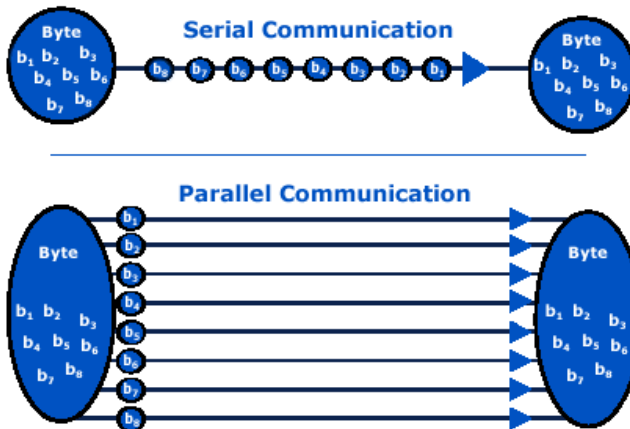
Communication channels refer to the way this information flows within the organization and with other organizations. In this web known as communication, a manager becomes a link. Decisions and directions flow upwards or downwards or sideways depending on the position of the manager in the communication web.

Physical Connections

It determines how many bits can be transmitted in a single instance of time.

If only 1 bit of information can be transmitted over the data transmission medium at a time then it is considered a serial transmission.

If more than 1 bit of information's are transmitted over the data transmission medium at a time then it is considered a parallel communications.

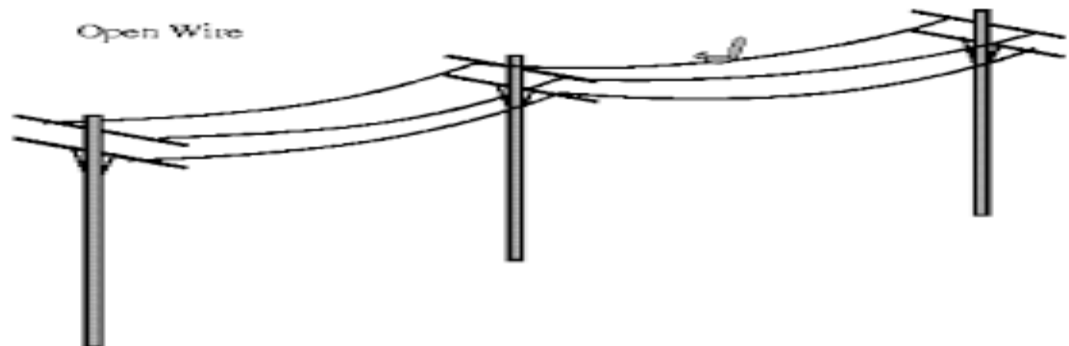


Types of physical connection/Transmission Media/Channel:-

There are two categories of transmission media/Channel

- ❖ **Guided Transmission Media:-** It uses a cabling system that guided the data signals among a specific path. There are many types of guided transmission media.

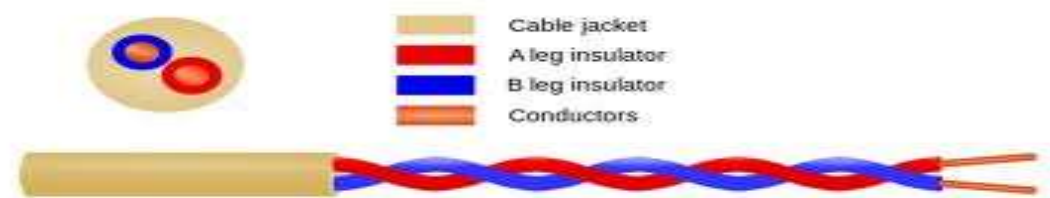
Open Wire:- It is used to describe the electrical wire strung along power poles. It is suited for short distances of less than 40 ft.



Twisted Pair:- It is used in telephone line. It consists of wire used for the +ve data signal and a wire used for -ve data signal. It minimizes electromagnetic interference between pairs. Transmission speed up to 9600 bits per seconds are possible up to distance 100 meters.

Or

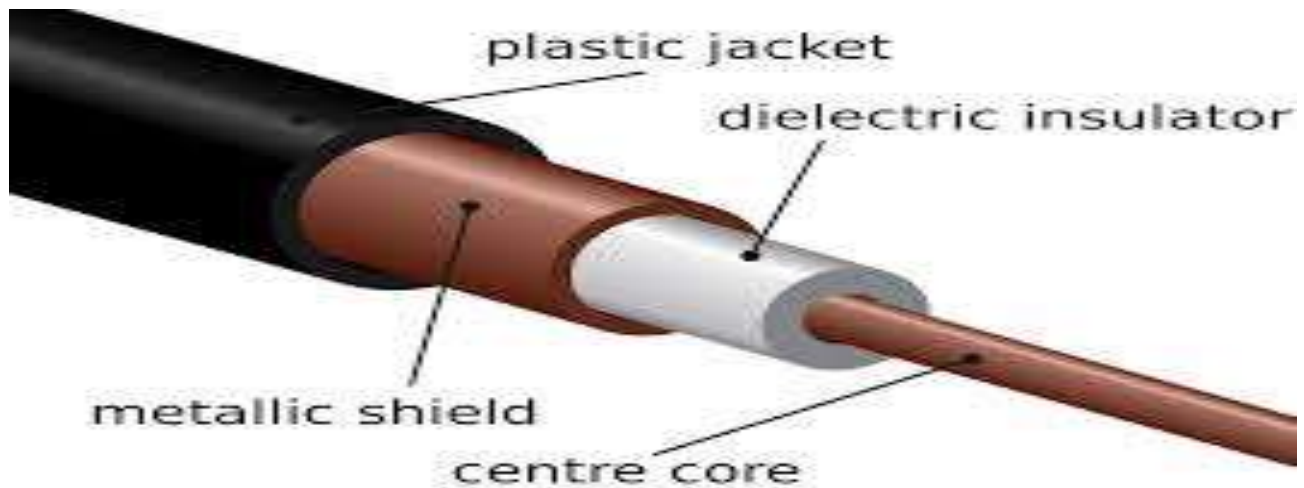
Twisted pair is the ordinary copper wire that connects home and many business computers to the telephone company. To reduce crosstalk or electromagnetic induction between **pairs** of wires, two insulated copper wires are **twisted** around each other.



Coaxial cable:- A coaxial cable has a stiff copper wire as the core surrounded by insulating material.

There are two types of coaxial cable.

- 50 Ohm:- It is used for cable TV network.
- 75 Ohm:- It is used for broadband connection.



Optical Fiber Cable (OFC):-It is the latest transmission media, superior than other transmission media. Data are transmitted in the form of light. There are two types of light sources. It works on the principal of total internal and reflection theory of light.

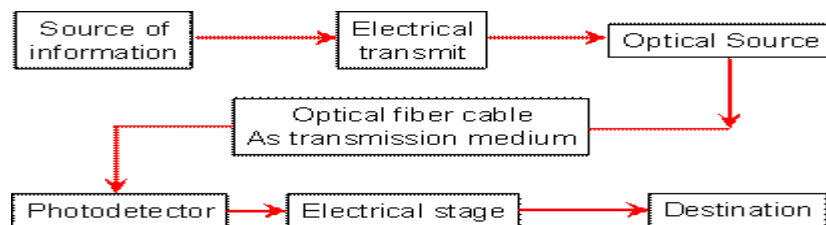


FIGURE 9.

- LED (Light Emitting Diode).
- LASER(Light Amplification by Stimulated Emission Radiation)

There are many types of OFC:-

- a:-8.3 micron core/125 micron cladding.
- b:-62.5 micron core/125 micron cladding.
- c:-50 micron core/125 micron cladding.
- d:-100 micron core /140 micron cladding.

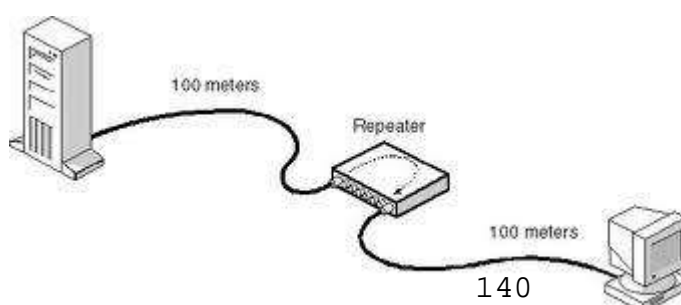
Unguided Transmission Media/Channel:- It uses wireless communication consists of a means for the data signals to travel but nothing to guide them along a specific path.It is commonly used for WAN network.

Above 100 MHz the waves travel in straight lines and can therefore be narrowly focused. Concentrating all the energy into small beam using parabolic antenna gives a much higher signals to noise ratio.There are two types of microwaves signals.Radio, Microwave and satellite channels use electromagnetic propagation in space. These channels line in their capability to cover large geographical areas and inexpensive than wired installation.

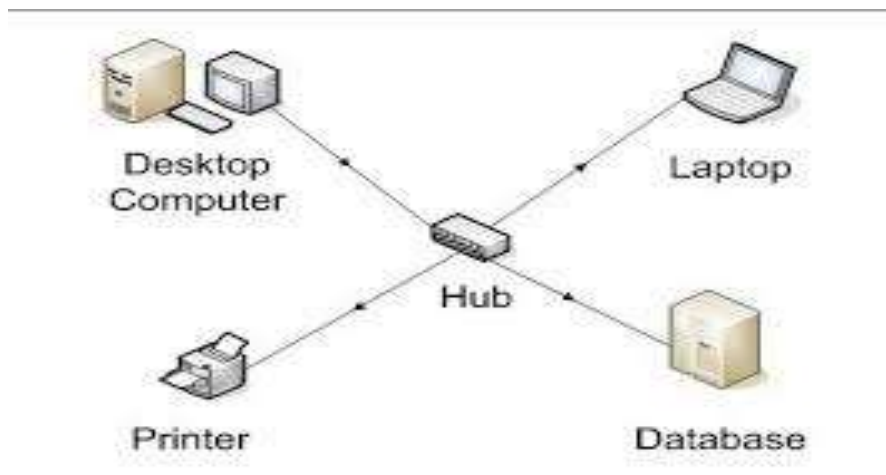
- **Terrestrial Microwaves.**(Frequency Range 4 to 6 Ghz & 21 to 23 Ghz).
- **Satellite Microwaves.** It is suited for 36000 KM area.Frequency range 4GHz to 6 GHz.

Connection Devices for network:-

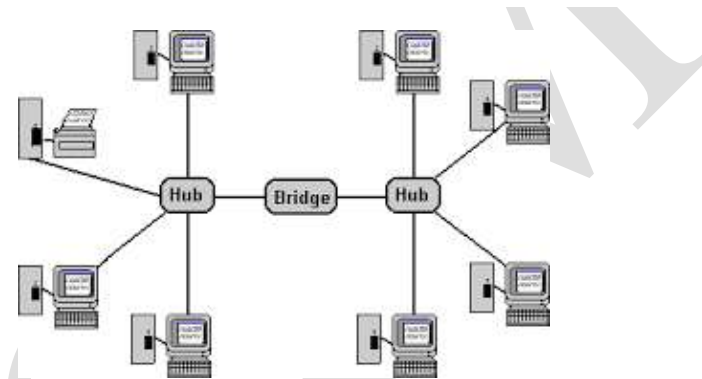
- ❖ **Repeaters:-**It is also called regenerator, It boosted up weakened signal.



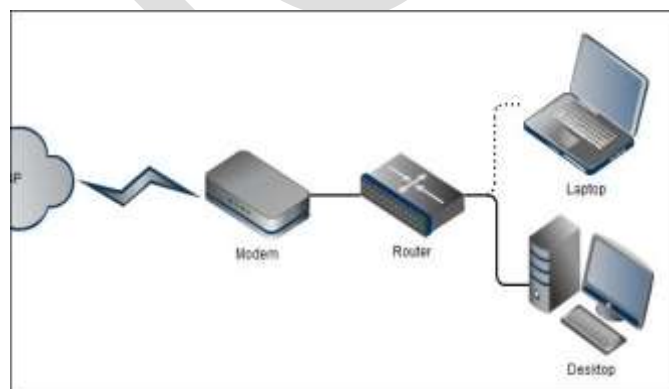
- ❖ Hubs:-It is also called multiport repeaters or concentrators. It is similar to repeater, except that it broadcasts data received by any ports to all other ports on the hubs.



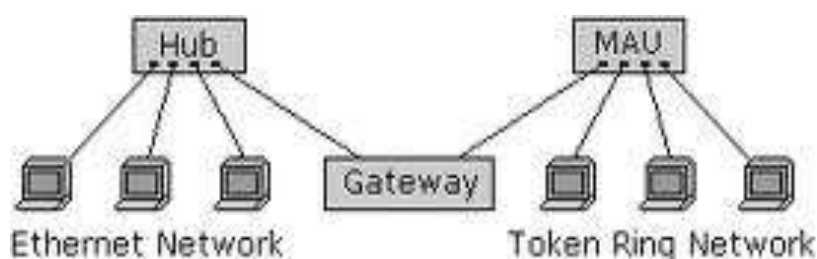
- ❖ Bridges:-It has all features of repeaters. It is used to connect dissimilar networks like Ethernet system.



- ❖ Routers:-It is used for connecting dissimilar communication protocols for wide area network.



- ❖ Gateways:-It is much more complex and powerful than routers. There are very expensive.



Lecture - 18

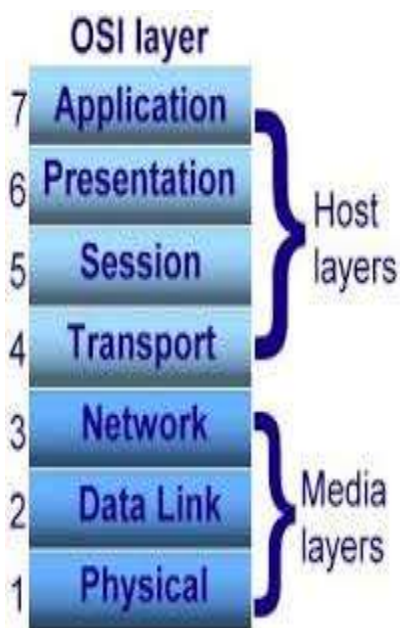
Communication architecture Network /Network Model:-

The communication architecture specifies independent layers that contain modules for performing defined functions. The architecture defines the functions of the module & relationship between them. There are two Models.

- 1) OSI Model (Open System Interconnection)
- 2) TCP/IP Model (Transmission Control Protocol/Internet Protocol)

❖ **OSI Model(Open System Interconnection)**

- It consists of hierarchy of 7 layers



- **Physical Layer**→ Bits Orientation Layer
- **Data Link Layer**→ Frames (Collection of bits) Orientation Layer.
- **Network Layer**→ Addressing Layer (Put address on each frame).
- **Transport Layer**→ It transmits frames from source to destination.
- **Session Layer**→ Accumulate all incoming frames in specific session.
- **Presentation Layer**→ Resembled all frames into original message.
- **Application Layer**→ It is a layer where user access service of network.

layer is responsible for providing interface to the application user. This layer passes protocols which directly interact with the user.

Presentation Layer:

This layer defines how data in the native format of remote host should be presented in the native format of host.

Session Layer:

This layer maintains sessions between remote hosts. For example, once user/password authentication is done, the remote host maintains this session for a while and does not ask for authentication again in that time span.

Transport Layer:

This layer is responsible for end-to-end delivery between hosts.

Network Layer:

This layer is responsible for address assignment and uniquely addressing hosts in a network.

Data Link Layer:

This layer is responsible for reading and writing data from and onto the line. Link errors are detected at this layer.

Physical Layer:

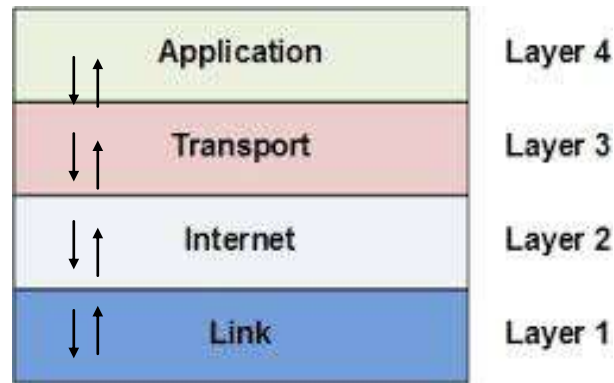
This layer defines the hardware, cabling and wiring, power output, pulse rate etc.

❖ **TCP/IP Model(Transmission Control/Internet Protocol)**

- It consists of Four layers used in wireless media.

- **Physical Layer**→ Bits Orientation Layers.
- **DLL**→ Packets (Discrete messages) orientation Layers.
- **Network Layers/Internet Layer**→ Addressing on each packet.
- **Transport Layers**→ Transmission of packets from source to destination.

- **Application Layers**→ It is a layer where user access service of network.



Application Layer:

This layer defines the protocol which enables user to internet with the network such as FTP, HTTP etc.

Transport Layer:

This layer defines how data should flow between hosts. Major protocol at this layer is Transmission Control Protocol. This layer ensures data delivered between hosts is in-order and is responsible for end to end delivery.

Internet Layer:

IP works on this layer. This layer facilitates host addressing and recognition. This layer defines routing.

Link Layer:

This layer provides mechanism of sending and receiving actual data. But unlike its OSI Model's counterpart, this layer is independent of underlying network architecture and hardware.

Note:-

Network Switching Technique:-

There are three types of switching technique.

- ❖ Circuit switching technique.
- ❖ Message switching technique.
- ❖ Packet switching technique.

Circuit switching technique:-

A physical permanent & dedicated connection established between sender to receiver.
Example:-PSTN, Cable TV Connection

Message switching technique:-

A physical connection established between sender and receiver during communication session only.

Example:-E-mail through dialup connection, Telegram Service

Packet switching technique:-

Data transmitted in the form of packet. It is also called small message. There are two types of packet switching technique.

- ❖ Virtual circuit technique:-A logical and dedicated path established between sender and receiver during communication session.

Sender-----Receiver.

- ❖ Datagram Circuit technique:-Many logical paths established from sender to receiver during transmission of packets.



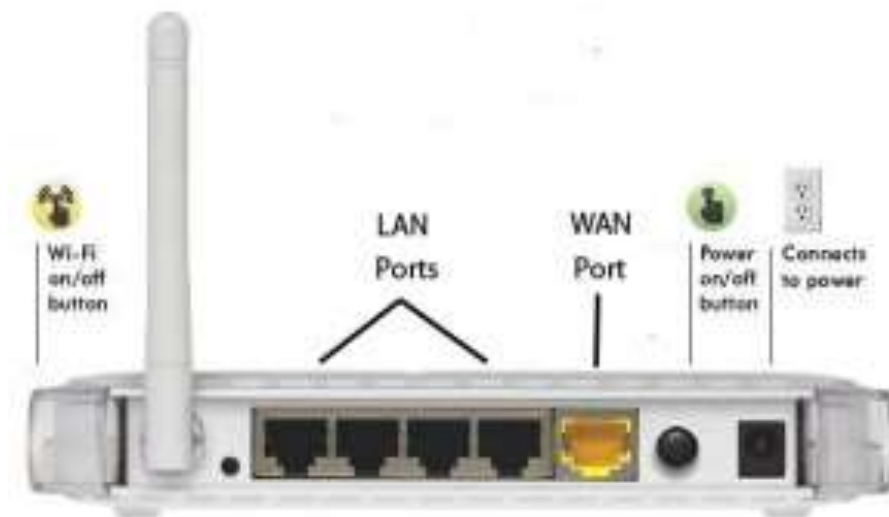
LAN H/W and S/w:-

LAN H/W :-

- ✓ Server
- ✓ Terminal
- ✓ Channel/Media
- ✓ LAN card/Network Interface Unit(NIU)

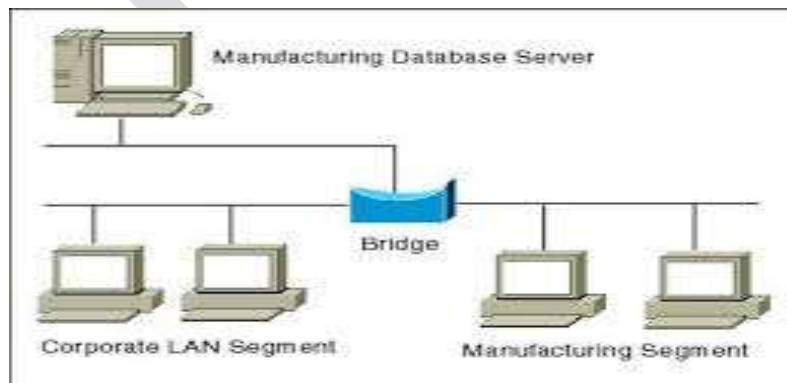
LAN S/W :-

- ✓ LINUX and Unix OS.
- ✓ Windows NT.
- ✓ Windows XP.
- ✓ Windows Vista.
- ✓ Windows7.
- ✓ Windows8.
- ✓ Windows10.
- ✓ Server S/W.
- ✓ Terminal/Work station S/w.
- ✓ Antivirus.

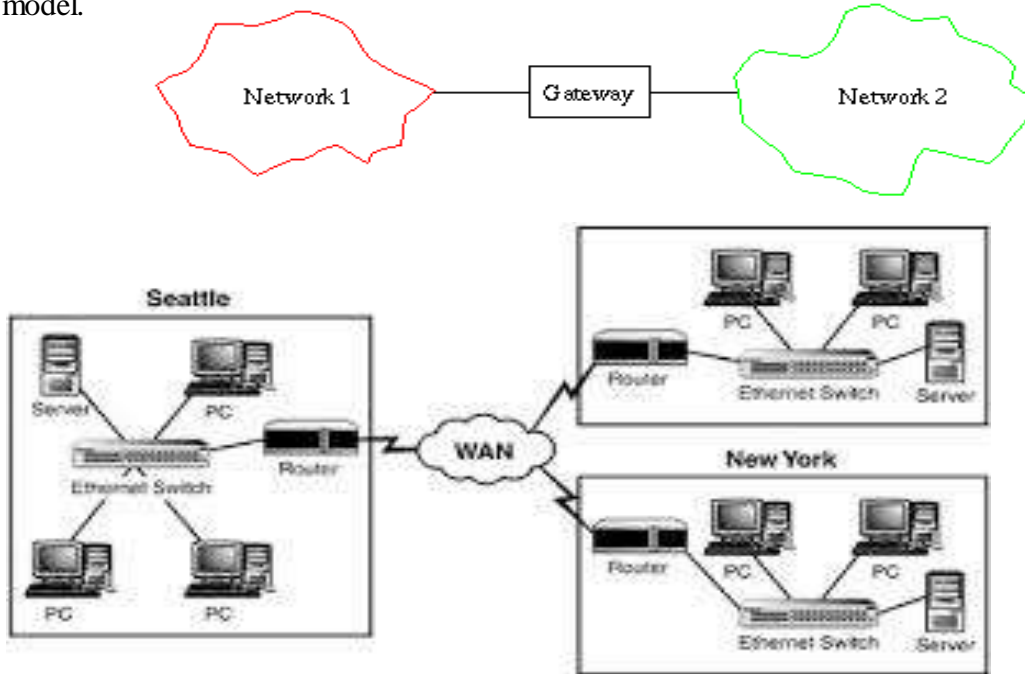


WAN H/W :-

- ✓ **Bridges:-** It is used to connect two LANs which are associated identical LAN protocols. It operate at DLL(Data Link Layer) of OSI model.



- ✓ **Routers:-** It is used to connect networks that may not be similar. It operates network layer of OSI model.



- ✓ **Gateways:-** It is used to connect two dissimilar LANs. It operates application layer of OSI model. It converts data packets from one protocol format to another protocol format.

Example of WAN:-

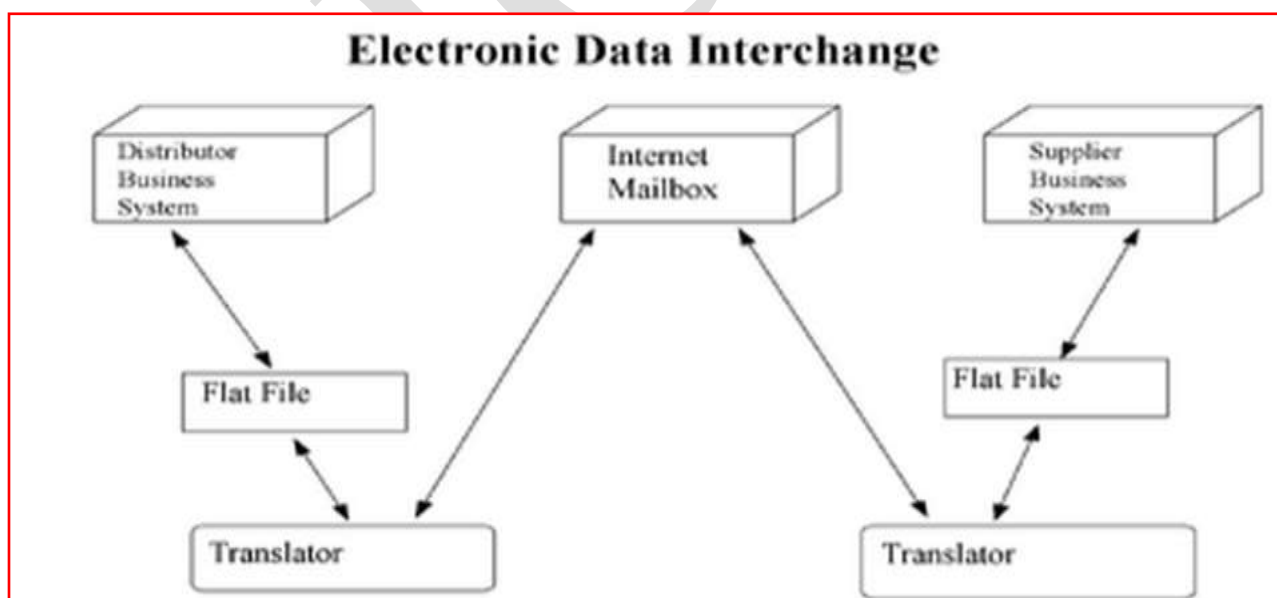
- ✓ PSTN (Public Switched Telephone Network).
- ✓ ISDN (Integrated Service Digital Network).
- ✓ PSDN (Public Switched Data Network).

Application of Network:-

- ✓ E-Mail (Electronic Mail). **Inventor of Email is VA Shiva Ayyadurai**
- ✓ EDI (Electronic Data Interchange).

EDI:-

It is another technique of transferring large amount of textual information from one organization to another organization.



Some problem based on traditional system:-

- ✓ Increased time.
- ✓ Low accuracy.
- ✓ High labour charges.

- ✓ Increased Uncertainty.

EDI has become a major means of business communications among large companies in U.S.

EDI can do

- ✓ EFT (Electronic fund transfer).
- ✓ Communication between unrelated companies(Cos).
- ✓ It is used for performing paperless task.

Benefit of EDI:-

- ✓ It handles large volume of repetitive standard actions.
- ✓ It operates on very tight margin.
- ✓ It operates under time constraints (Validation).
- ✓ It improve activity of companies performance.

Networking Scenario/Computer Network Scenario:-

1:-Services of Internet:-

A:- Global E-mail:-

It is used for transferring messages from one terminal to another terminal. by using E-mail ID.

B:-USENET-Views and news

It is used by BBS of internet.

C:-Telnet(Telephone Network)-Remote Login:-

It allows an internet user to access a remote host.

D:-ftp(File Transfer Protocol):-

It permits an internet user to transfer a file from one computer to another computer.

E:-Navigators

Accessing of information by using URL from web./cyberspace.

2:-BITNET (Because Its Time Network):-

It is a network of New York and University of Yale established by BITNET.

Function:-

A:-Exchange of data file

B:-Electronic Admission of student

C:-Remote job search

3:-Compuserve

It is commercial network based in US.

Services /Function

A:-Message transfer

B:-Bulletin board services

C:-News report, Sports and weather

D:-Information on computer hardware and software

4:-ISDN

ISDN: - (Integrated Services Digital Networks)

It is special type of communication channel through which ability to deliver digital signal of data, voice, Video and Fax.It supports 64 kbps data transfer rate.

Types of ISDN

- B-channel (Bearer Channels) → Data Transfer rates are 16Kbps or 64 Kbps
- D-Channel (Data Channel) → Data Transfer rates are 128 Kbps

ISDN services:-

There are two types of ISDN services

- BRI (Basic rate Interface)
- PRI (Primary rate Interface)

It is the fastest transmission network through which we can transmit data in digital format. It was launched in Singapore in 1990.

Feature of ISDN:-

- Transmission and processing of digital data
- It process of voice, video, animation etc.
- Teleconferencing

- Telefax, Videofax etc.

NICNET:- (National Information Center Network)

It is a satellite based nationwide network. It contains information about each village, district and city of India. The basic objectives of NICNET are:

- It helps government in better planning administration.
- To help government maintain communication in times of national emergencies and natural disasters

Security:-

Unauthorized access, destruction/revelation of data can violate individual privacy.

Lecture - 19

Security threats and Goals:-

Following major security threats perceived by users and provided by computer based system includes.

- Unauthorized disclosure of information.
- Unauthorized alteration or destruction of information.
- Unauthorized use of service.
- Denial of service to legitimate users.

Security Policies:-

Security policies specify what is desired in terms of protection and security.

Security Mechanism:-

It specifies how to affect the security policies and enforce them in a given system.

Penetration Attempts:-

- Hit & Trial error Attempts.
- Logged on Terminal.
- Password
- Trapdoors:- These are the secret points of entry without access authorization
- Trojan horse:- It is a program to steal user password. More sophisticated version of Trojan horse programs can make themselves harder to detect by fully emulating the utility that they are impersonating.
- Computer Worms:- It is a program to hack information via network and produce itself propagation.
- Computer viruses (Vital Information Resources Under Seize).

Classification of security:-

Physical security:-

- A:- Physically bolt down the PC to a table so that it can be casually lifted and taken away.
- B:- Kept records by using pen drive, CD ROM/DVD/Blu ray disk.
- C:- Use Keyboard and PC locking system.
- D:- Use lockable rooms.
- E:- Protect against environmental conditions

Software security

- A:- Use original s/w for OS.
- B:- Use correct procedures for shutting down.

Network Security

Password Security

Services of Internet:-

- ❖ E-Mail
- ❖ Telnet
- ❖ ftp

Concept of URL (Uniform Resource Locator):-

It is used for accessing internet/intranet services.

OR

The most widely used service on the Internet is the World Wide Web. The **World Wide Web (WWW or Web)** consists of a worldwide collection of electronic documents called **Web pages**. A **browser** is a software program used to access and view Web pages. Each Web page has a unique address, called a **URL (Uniform Resource Locator)**, that tells a browser where to locate the Web page. A URL consists of a protocol, domain name, and sometimes the path to a specific Web page or location on a Web page. Most URLs begin with **http://**, which stands for **hypertext transfer protocol**, the communications standard that enables pages to transfer on the Web.

Example:-

<http://www.uprtou.ac.in>
<http://www.bhu.ac.in>
<http://www.nic.in>
<http://www.google.com> (Larry Page and Sergey Brin invented Google)
<http://www.rediffmail.com>
<http://www.yahoo.com>
<http://www.altavista.com>
<http://www.timesofindia.com>
<http://www.bseindia.com>
<http://www.icsm.org.in>
etc.

www : -World Wide Web. → It is huge virtual storage area where all URL are stored. Web page written into HTML, DHTML, PHP, JAVA Script, VB Script Etc.

// It indicate URL is valid or not valid.

http:- It is a protocol which is used for accessing valid host from www.

host:- It is a part of URL about which information uploaded into cyberspace.

Browser:-

It is software by which we access internet services.

Example: - Internet explorer.
Netscape navigator.
NCSA mosaic.
Chimera.
Net cruiser.
Mozilla.
Opera Mini, googlechrome etc.

Services of Internet:-

Surfing (Clicking and accessing services of internet).
Searching.
E-mail.
E-commerce (Business through internet). (B2B, B2C, C2C)
Etc.

Search Engine:-

It is URL, which is used for searching information through internet or intranet.

Surfing:-

Click and access information through cyberspace (Internet or intranet) is called surfing.

ftp:-

It is a protocol which is used for transferring a large amount of textual information, graphical informations and any types of audio, video informations transmitted smoothly and efficiently. Ftp works performed in CUI environment.

ftp> Ftp prompt ready for accept commands.

Telnet:- It is remote service for accessing web information from web server using intranet network. It establish packet based connection Following s/w are used for telnet.

- ❖ NetTerm
- ❖ Hyperterminal

- ❖ Secure CRT
- ❖ EWAN
- ❖ Kermit
- ❖ Anzio Lite

Concept of Domain Name System (DNS):-

DNS categorized into two types

1. Geographical DNS.
2. Non-Geographical DNS.

Example of Geographical DNS:-

.in→India.
 .au→Australia.
 .cn→China.
 .de→Germany.
 .uk→United Kingdom.
 .us→United State.

Example of Non-Geographical DNS :-

.com→Commercial purpose.
 .org →Non-profit organizations.
 .edu→Educational purpose.
 .ac→ academic purpose.

Example:- www.bhu.ac.in

Concept of IP Address:-

IP address consists of four decimal digits. Which values exist between 0 to 255.

IP address must be unique in computer network.

d1.d2.d3.d4

d1→0 to 255 First Octet.

d2→0 to 255 Second Octet.

d3→0 to 255 Third Octet.

d4→0 to 255 Fourth Octet.

Total bit Values of IP=8+8+8+8=32 Bits

Role OF TCP/IP Protocol:-

TCP:-This protocol splits messages into discrete form and resembled at destination/Target.

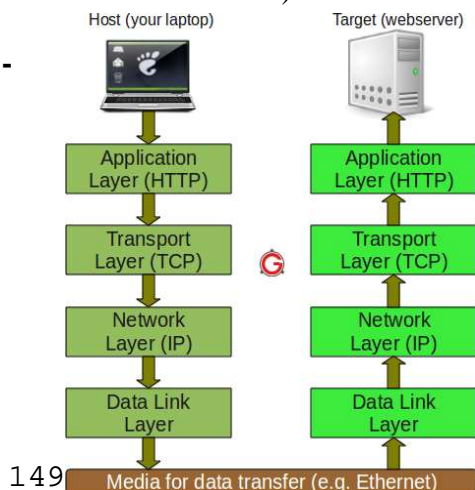
Encoding →M → TCP →m1m2m3m4m5m6m7m8...(Packets).

(Destination) →Decoding→ m1+m2+m3+m4+m5+m6+m7+m8...(Packets).=M

IP → It puts address of destination at each packet. There are two version of IP

1. ipv4 (It takes 32 bits numbers currently used)
2. ipv6(It takes 128 bits numbers came in 1995)

Working of TCP/IP System:-



Classification of IP Address:-

Class A for 16581375 host address. If the first bit of address is 0, It is address of A. Next 7 bits identify the network and 24 bits identify the hosts.

Class B for 256 to 65536 host address. If the first 2 bits of the addresses are 10, it is class B. The next 14 bits identify the address and last 16 bits identify the hosts.

Class C for less than 254 hosts address. If the first three bits of the address are 110, It is a class C network. The first 3 bits identify class. Next 21 bits are network address and last 8 bits identify host.

Class D For Multicast address. If first four bits of the address are 1110, it is a multicast address. Multicast identifies a group of computers that share a common application.

CLASS A	Octet 0	Decimal Values Ranges	0 To 127
CLASS B	Octet 10	Decimal Values Ranges	128 To 191
CLASS C	Octet 110	Decimal Values Ranges	192 To 223
CLASS D	Octet 1110	Decimal Values Ranges	224 To 239
CLASS E	Octet 1111	Decimal Values Ranges	240 To 255

IP address Structure:-

Class A Range 0-127

0	7bits	Local Address(24 Bits)
---	-------	------------------------

Class B Range 128-191

10	14 bits	Local Address(16 Bits)
----	---------	------------------------

Class C Range 192-223

110	21bits	Local Address(8 Bits)
-----	--------	-----------------------

Class D Range 224-239

1110	28bits multicast Address
------	--------------------------

Class E(For future purposes) Range 240-255

1111	28bits multicast Address
------	--------------------------

Examples of IP address are

Example 1:- 22.231.113.64 Class A

Example 2:- 194.66.82.11. Class C

Application of Internet:-

1. Railway reservation.
2. Airlines reservation.
3. On Line Business.
4. On line Share trading.
5. On Line Education.
6. Scientific research and development.
7. On Line banking System.
8. ATM (Automatic Teller machine).
9. Searching of jobs and desired information.
10. Speed Post.

11. On Line Library System.
 12. Video conferencing.
 13. On Line Chatting.
 14. Teleconferencing.
- Etc.

Full form:-

GPRS	→	Global Packet Radio Services.
MMS	→	Multimedia Services.
Http	→	Hypertext Transfer protocol.
FAQ	→	Frequently asked question.
WILL	→	Wireless In Local Loop.
OFC	→	Optical Fiber Cabel.
CSMA	→	Carrier Sense Multiple access
ISOC	→	(Internet Society).
IAB	→	(Internet Architecture Board).
IETF	→	(Internet Engineering Task Force).
PSTN	→	Public Switched Telephone Network.
VSAT	→	Very Small Aperture Terminal.
ISDN	→	Integrated Services digital Network.
LAN	→	Local Area Network.
MAN	→	Metropolitan Area Network.
WAN	→	Wide Area Network.
WWW	→	World wide web.
TCP/IP	→	Transmission control Protocol/Internet protocol.
SLIP	→	Serial Line Internet Protocol.
PPP	→	Point to Point Protocol.
DNS	→	Domain Name System.
SIM	→	Subscriber Identity Module
TELNET	→	Telephone Network
PSU	→	Power Supply Unit
VGA	→	Video Graphics Array
ISP	→	Internet Service Provider
ANSI	→	American National Standard Institute
WIFI	→	Wireless Fidelity
GSM	→	Global System for Mobile Communications
CCTV	→	Closed Circuit Television
TFT	→	Thin Film Transistor
CMOS	→	Complementary Metal Oxide Semiconductor
PCO	→	Public Call Office
ATM	→	Automatic Teller Machine
ISD	→	International Subscriber Dialing
AVI	→	Audio Video Interleave
RADAR	→	Radio Detection And Ranging
STD	→	Subscriber Trunk Dialing
PNG	→	Portable Network Graphics
WAP	→	Wireless Application Protocol
IRC	→	Internet Relay Chat
POST	→	Power On Self Test
BMP	→	Bit Map Picture
Gif	→	Graphics Interchange Format
Pdf	→	Portable Data File
POS	→	Point of Sales Terminal

ARP	→	Address Resolution Protocol
JPEG	→	Joint Picture Expert Group
DBMS	→	Database Management System
RDBMS	→	Relational Database Management System
IEEE	→	Institute of Electrical and Electronic Engineering
PCI	→	Peripheral Component Interconnect
ISA	→	Industry Standard Architecture
SIMM	→	Single In-line Memory Module
DIMM	→	Dual in-line memory module
SATA	→	Serial Advanced Technology Attachment
PATA/ATA	→	Parallel Advanced Technology Attachment/ Advanced Technology Attachment

Advantages of Computer Network

Communication	Data sharing
Internet Service.	Video conferencing.
Instant and multiple accesses.	Resource Sharing.
Speed.	Centralized Software Management.

Disadvantages of Computer Networks

Security Issues:	Rapid Spread of Computer Viruses:
Expensive Set Up;	Dependency on the Main File Server:
Network faults can cause loss of data.	Network fault could lead to loss of resources
User work dependent upon network	

History of Internet

In 1969, the Department of Defense (DOD) of United States of America started a network called ARPANET (**Advanced Research Projects Administration Network**). It was started with one computer in California and three in Utah

Later, the military allowed universities to join the network for sharing the hardware and software resources, a number of other networks were developed during the late 1970 and early 1980, with BITNET and CSNET among them. BITNET which is acronym for Because It's Time Network began at the City University of New York. It was provide electronic mail and file transfers. CSNET, which is an acronym for Computer Science Network, Its initial purpose was to provide electronic mail. for a variety of reasons, neither BITNET nor CSNET became a dominant national network.

A new national network, NSFnet, was created in 1986. National Science Foundation (NSF) initially connected the NSF-funded supercomputer centers at five universities. By 1990, NSFnet had replaced ARPAnet for most nonmilitary uses and wide variety of organizations had established nodes on this network. By 1992, NSFnet connected more than 1 million computers around the world. In 1995 a small part of NSFnet returned to being a research network. Then it grew bigger and gave birth to the present-day very popular Internet.

Internet

Internet is a network of networks.

or

It is an interconnection between several computers of different types belonging to various networks all over the world..

How does internet work?

When information is passed from one computer system to another it is broken up into pieces called packets using the **TCP and IP** protocol. a message consisting of not more than 1500 bytes or characters is put into a packet. Each packet has the address of sender and the destination. These addresses are called IP addresses.

The packets are passed from one network to another until they reach their destination. At the destination the TCP software reassembles the packets into a complete message, if packets are lost or damaged, a request is sent to resend them. it is not necessary for all packets in a single message to take the same route through the internet or for the same message o take the same route each time it is sent.

Lecture-20

A brief study on Cyber Crime and Cyber Law's of India

Abstract - As we all know that this is the era where most of the things are done usually over the internet starting from online dealing to the online transaction. Since the web is considered as worldwide stage, anyone can access the resources of the internet from anywhere. The internet technology has been using by the few people for criminal activities like unauthorized access to other's network, scams etc. These criminal activities or the offense/crime related to the internet is termed as cyber crime. In order to stop or to punish the cyber criminals the term "Cyber Law" was introduced. We can define cyber law as it is the part of the legal systems that deals with the Internet, cyberspace, and with the legal issues. It covers a broad area, encompassing many subtopics as well as freedom of expressions, access to and utilization of the Internet, and online security or online privacy. Generically, it is alluded as the law of the web.

Key Words: Internet, Unauthorized access, Cyber crime, Cyber law, Cyberspace, Punish, Network

1. INTRODUCTION

The invention of Computer has made the life of humans easier, it has been using for various purposes starting from the individual to large organizations across the globe. In simple term we can define computer as the machine that can stores and manipulate/process information or instruction that are instructed by the user. Most computer users are utilizing the computer for the erroneous purposes either for their personal benefits or for other's benefit since decades [1]. This gave birth to "Cyber Crime". This had led to the engagement in activities which are illegal to the society. We can define Cyber Crime as the crimes committed using computers or computer network and are usually take place over the cyber space especially the Internet [2]. Now comes the term "Cyber Law". It doesn't have a fixed definition, but in a simple term we can defined it as the law that governs the cyberspace. Cyber laws are the laws that govern cyber area. Cyber Crimes, digital and electronic signatures, data protections and privacies etc are comprehended by the Cyber Law [3]. The UN's General Assembly recommended the first IT Act of India which was based on the "United Nations Model Law on Electronic Commerce" (UNCITRAL) Model [4].

2. OBJECTIVE

The principle target of our paper is to spread the knowledge of the crimes or offences that take place

through the internet or the cyberspace, along with the laws that are imposed against those crimes and criminals. We are additionally trying to focus on the safety in cyberspace.

3. CYBER CRIME AND CYBER LAW

We can define "Cyber Crime" as any malefactor or other offences where electronic communications or information systems, including any device or the Internet or both or more of them are involved [5].

We can define "Cyber law" as the legal issues that are related to utilize of communications technology, concretely "cyberspace", i.e. the Internet. It is an endeavor to integrate the challenges presented by human action on the Internet with legacy system of laws applicable to the physical world [6].

Cyber Crime

Sussman and Heuston first proposed the term "Cyber Crime" in the year 1995. Cybercrime cannot be described as a single definition, it is best considered as a collection of acts or conducts. These acts are based on the material offence object that affects the computer data or systems. These are the illegal acts where a digital device or information system is a tool or a target or it can be the combination of both. The cybercrime is also known as electronic crimes, computer-related crimes, e-crime, high-technology crime, information age crime etc.

In simple term we can describe "Cyber Crime" are the offences or crimes that takes place over electronic communications or information systems. These types of crimes are basically the illegal activities in which a computer and a network are involved. Due of the development of the internet, the volumes of the cybercrime activities are also increasing because when committing a crime there is no longer a need for the physical present of the criminal.

The unusual characteristic of cybercrime is that the victim and the offender may never come into direct contact. Cybercriminals often opt to operate from countries with nonexistent or weak cybercrime laws in order to reduce the chances of detection and prosecution.

There is a myth among the people that cyber crimes can only be committed over the cyberspace or the internet. In

fact cyber crimes can also be committed without ones involvement in the cyber space, it is not necessary that the cyber criminal should remain present online. Software privacy can be taken as an example.

History of Cyber Crime

The first Cyber Crime was recorded within the year 1820. The primeval type of computer has been in Japan, China and India since 3500 B.C, but Charles Babbage's analytical engine is considered as the time of present day computers. In the year 1820, in France a textile manufacturer named Joseph-Marie Jacquard created the loom. This device allowed a series of steps that was continual within the weaving of special fabrics or materials. This resulted in an exceeding concern among the Jacquard's workers that their livelihoods as well as their traditional employment were being threatened, and prefer to sabotage so as to discourage Jacquard so that the new technology cannot be utilized in the future [7].

Evolution of Cyber Crime

The cyber crime is evolved from Morris Worm to the ransomware. Many countries including India are working to stop such crimes or attacks, but these attacks are continuously changing and affecting our nation.

Table-1: Evolution of Cyber Crime

Years	Types of Attacks
1997	Cyber crimes and viruses initiated, that includes Morris Code worm and other.
2004	Malicious code, Torjan, Advanced worm etc.
2007	Identifying thief, Phishing etc.
2010	DNS Attack, Rise of Botnets, SQL attacks etc
2013	Social Engineering, DOS Attack, BotNets, Malicious Emails, Ransomware attack etc.
Present	Banking Malware, Keylogger, Bitcoin wallet, Phone hijacking, Anroid hack, Cyber warfare etc.

Classifications of Cyber Crime

Cyber Crime can be classified into four major categories. They are as follows:

a) Cyber Crime against individuals: Crimes that are committed by the cyber criminals against an individual or a person. A few cyber crime against individuals are:

- **Email spoofing:** This technique is a forgery of an email header. This means that the message appears to have received from someone or somewhere other than the genuine or actual source. These tactics are usually used

in spam campaigns or in phishing, because people are probably going to open an electronic mail or an email when they think that the email has been sent by a legitimate source [8].

- **Spamming:** Email spam which is otherwise called as junk email. It is unsought mass message sent through email. The uses of spam have become popular in the mid 1990s and it is a problem faced by most email users now a days. Recipient's email addresses are obtained by spam bots, which are automated programs that crawls the internet in search of email addresses. The spammers use spam bots to create email distribution lists. With the expectation of receiving a few number of respond a spammer typically sends an email to millions of email addresses.
- **Cyber defamation:** Cyber defamation means the harm that is brought on the reputation of an individual in the eyes of other individual through the cyber space [9]. The purpose of making defamatory statement is to bring down the reputation of the individual.
- **IRC Crime (Internet Relay Chat):** IRC servers allow the people around the world to come together under a single platform which is sometime called as rooms and they chat to each other.
 - Cyber Criminals basically uses it for meeting.
 - Hacker uses it for discussing their techniques.
 - Paedophiles use it to allure small children.

A few reasons behind IRC Crime:

- Chat to win ones confidence and later starts to harass sexually, and then blackmail people for ransom, and if the victim denied paying the amount, criminal starts threatening to upload victim's nude photographs or video on the internet.
- A few are paedophiles, they harass children for their own benefits.
- A few uses IRC by offering fake jobs and sometime fake lottery and earns money [10].

- **Phishing:** In this type of crimes or fraud the attackers tries to gain information such as login information or account's information by masquerading as a reputable individual or entity in various communication channels or in email.

Some other cyber crimes against individuals includes- Net extortion, Hacking, Indecent exposure, Trafficking, Distribution, Posting, Credit Card, Malicious code etc. The potential harm of such a malefaction to an individual person can scarcely be bigger.

- b) Cyber Crime against property:** These types of crimes includes vandalism of computers, Intellectual (Copyright, patented, trademark etc) Property Crimes,

Online threatening etc. Intellectual property crime includes:

- **Software piracy:** It can be describes as the copying of software unauthorizedly.
- **Copyright infringement:** It can be described as the infringements of an individual or organization's copyright. In simple term it can also be describes as the using of copyright materials unauthorizedly such as music, software, text etc.
- **Trademark infringement:** It can be described as the using of a service mark or trademark unauthorizedly.

c) **Cyber Crime against organization:** Cyber Crimes against organization are as follows:

- Unauthorized changing or deleting of data.
- Reading or copying of confidential information unauthorizedly, but the data are neither being change nor deleted.
- **DOS attack:** In this attack, the attacker floods the servers, systems or networks with traffic in order to overwhelm the victim resources and make it infeasible or difficult for the users to use them [11].
- **Email bombing:** It is a type of Net Abuse, where huge numbers of emails are sent to an email address in order to overflow or flood the mailbox with mails or to flood the server where the email address is.
- **Salami attack:** The other name of Salami attack is Salami slicing. In this attack, the attackers use an online database in order to seize the customer's information like bank details, credit card details etc. Attacker deduces very little amounts from every account over a period of time. In this attack, no complaint is file and the hackers remain free from detection as the clients remain unaware of the slicing.

Some other cyber crimes against organization includes- Logical bomb, Torjan horse, Data diddling etc.

d) **Cyber Crime against society:** Cyber Crime against society includes:

- **Forgery:** Forgery means making of false document, signature, currency, revenue stamp etc.
- **Web jacking:** The term Web jacking has been derived from hi jacking. In this offence the attacker creates a fake website and when the victim opens the link a new page appears with the message and they need to click another link. If the victim clicks the link that looks real he will redirected to a fake page. These types of attacks are done to get entrance or to get access and controls the site of another. The attacker may also change the information of the victim's webpage.

Safety in cyberspace

List are some points, one should keep in mind while surfing the internet:

- If possible always use a strong password and enable 2 steps or Two-step authentication in the webmail. It is very important in order to make your webmail or your social media account secured.

Guideline of strong password:

- Password should be of minimum eight characters.
- One or more than one of lower case letter, upper case letter, number, and symbol should be included.
- Replace the alike character.

Example- instead of O we can use 0, instead of lower case l we can use I etc.

Example of strong password: Hell0 (%there %);

Thing need to avoid while setting the password:

- Never use a simple password that can easily be decrypt
Example- password
- Personal information should never set as a password.
- Repeating characters should be avoided.
Example- aaaacc
- Using of same password in multiple sites should be avoided.

What is 2 step or Two-step authentication?

This is an additional layer of security that requires your user name and the password also a verification code that is sent via SMS to the registered phone number. A hacker may crack your password but without the temporary and unique verification code should not be able to access your account.

- Never share your password to anyone.
- Never send or share any personal information like bank account number, ATM pin, password etc over an unencrypted connection including unencrypted mail. Websites that doesn't have the lock icon and https on the address bar of the browser are the unencrypted site. The "s" stands for secure and it indicates that the website is secure.
- Don't sign to any social networking site until and unless one is not old enough.
- Don't forget to update the operating system.
- Firewalls, anti-virus and anti-spyware software should be installed in ones PC and should be regularly updated.
- Visiting to un-trusted website or following a link send by an unknown or by an un-trusted site should be avoided.
- Don't respond to spam.
- Make sure while storing sensitive data in the cloud is encrypted.
- Try to avoid pop-ups: Pop-ups sometimes comes with malicious software. When we accept or follow the pop-ups a download is performed in the background and

that downloaded file contains the malware or malicious software. This is called drive-by download. Ignore the pop-ups that offer site survey on ecommerce sites or similar things as they may contain the malicious code.

Cyber Crime's scenario in India(A Few Case study)

a) The Bank NSP Case

In this case a management trainee of a bank got engaged to a marriage. The couple used to exchange many emails using the company's computers. After some time they had broken up their marriage and the young lady created some fake email ids such as "Indian bar associations" and sent mails to the boy's foreign clients. She used the bank's computer to do this. The boy's company lost a huge number of clients and took the bank to court. The bank was held liable for the emails sent using the bank's system.

b) Bazee.com case

In December 2004 the Chief Executive Officer of Bazee.com was arrested because he was selling a compact disk (CD) with offensive material on the website, and even CD was also conjointly sold-out in the market of Delhi. The Delhi police and therefore the Mumbai Police got into action and later the CEO was free on bail.

c) Parliament Attack Case

The Bureau of Police Research and Development, Hyderabad had handled this case. A laptop was recovered from the terrorist who attacked the Parliament. The laptop which was detained from the two terrorists, who were gunned down on 13th December 2001 when the Parliament was under siege, was sent to Computer Forensics Division of BPRD. The laptop contained several proofs that affirmed the two terrorist's motives, mainly the sticker of the Ministry of Home that they had created on the laptop and affixed on their ambassador car to achieve entry into Parliament House and the fake ID card that one of the two terrorists was carrying with a Government of India emblem and seal. The emblems (of the 3 lions) were carefully scanned and additionally the seal was also craftily created together with a residential address of Jammu and Kashmir. However careful detection proved that it was all forged and made on the laptop.

Andhra Pradesh Tax Case

The owner of the plastics firm in Andhra Pradesh was arrested and cash of Rs. 22 was recovered from his house by the Vigilance Department. They wanted evidence from him concerning the unaccounted cash. The suspected person submitted 6,000 vouchers to prove the legitimacy of trade, however when careful scrutiny the vouchers and contents of his computers it unconcealed that every one of

them were made after the raids were conducted. It had been concealed that the suspect was running 5 businesses beneath the presence of 1 company and used fake and computerized vouchers to show sales records and save tax. So the dubious techniques of the businessman from the state were exposed when officials of the department got hold of computers utilized by the suspected person.

f) SONY.SAMBANDH.COM CASE

India saw its 1st cybercrime conviction. This is the case where Sony India Private Limited filed a complaint that runs a website referred to as www.sony-sambandh.com targeting the NRIs. The website allows NRIs to send Sony products to their friends and relatives in India after they pay for it online. The company undertakes to deliver the products to the involved recipients. In May 2002, somebody logged onto the web site underneath the identity of Barbara Campa and ordered a Sony colour television set and a cordless head phone. She requested to deliver the product to Arif Azim in Noida and gave the number of her credit card for payment. The payment was accordingly cleared by the credit card agency and the transaction processed. After the related procedures of due diligence and checking, the items were delivered to Arif Azim by the company. When the product was delivered, the company took digital pictures so as to indicate the delivery being accepted by Arif Azim. The transaction closed at that, but after one and a half months the credit card agency informed the company that this was an unauthorized transaction as the real owner had denied having made the purchase. The company had filed a complaint for online cheating at the CBI that registered a case under the Section 418, Section 419 and Section 420 of the IPC (Indian Penal Code). Arif Azim was arrested after the matter was investigated. Investigations discovered that Arif Azim, whereas acting at a call centre in Noida did gain access to the number of the credit card of an American national which he misused on the company's site. The CBI recovered the color television along with the cordless head phone. In this matter, the CBI had proof to prove their case so the accused admitted his guilt. The court had convicted Arif Azim under the Section 418, Section 419 and Section 420 of the IPC, this being the first time that a cybercrime has been convicted. The court, felt that since the defendant was a boy of 24 years and a first-time convict, a compassionate view needed to be taken. Thus, the court discharged the defendant on the probation for one year.

Some, Section 67 and Section 70 of the IT Act are also applied. In this case the hackers hack one's webpage and replace the homepage with pornographic or defamatory page.

- **Introducing Viruses, Worms, Trojan etc**

Anyone who introduce any sort of malicious programs that can gain access to other's electronic device without victim's permissions, provisions applicable for such offences are under Section 63, Section 66, Section 66A of the IT Act and Section 426 of the IPC.

- **Cyber Pornography**

Though pornography is banned in some countries, it is can be considered as the largest business on the internet. Provisions Applicable for such crimes are under Section 67, Section 64A and Section 67B of the IT Act.

- **Source Code Theft**

Provisions applicable for such crimes are under Section 43, Section 66 and Section 66B of the IT Act [12].

2 CYBER LAW

Cyber Law took birth in order to take control over the crimes committed through the internet or the cyberspace or through the uses of computer resources.

Description of the lawful issues that are related to the uses of communication or computer technology can be termed as Cyber Law.

What is the importance of Cyber Law?

Cyber law plays a very important role in this new epoch of technology. It is important as it is concerned to almost all aspects of activities and transactions that take place either on the internet or other communication devices. Whether we are aware of it or not, but each action and each reaction in Cyberspace has some legal and Cyber legal views [13].

Cyber Law awareness program

Once should have the following knowledge in order to stay aware about the cyber crime:

- One should read the cyber law thoroughly.
- Basic knowledge of Internet and Internet's security.
- Read cyber crime's cases. By reading those cases one can be aware from such crimes.
- Trusted application from trusted site can be used for protection of one's sensitive information or data.
- Technology's impact on crime.

The Information Technology Act of India, 2000

According to Wikipedia "The Information Technology Act, 2000 (also known as ITA-2000, or the IT Act) is an act of the Indian Parliament (no 21 of 2000), it was notified on

17th October 2000. It is the most important law in India that deals with the digital crimes or cyber crimes and electronic commerce. It is based on the United Nations Model Law on Electronic Commerce 1996 (UNCITRAL Model) recommended by the General Assembly of United Nations by a resolution dated 30 January 1997" [14].

Some key points of the Information Technology (IT) Act 2000 are as follows:

- E-mail is now considered as a valid and legal form of communication.
- Digital signatures are given legal validity within the Act.
- Act has given birth to new business to companies to issue digital certificates by becoming the Certifying Authorities.
- This Act allows the government to issue notices on internet through e-governance.
- The communication between the companies or between the company and the government can be done through internet.
- Addressing the issue of security is the most important feature of this Act. It introduced the construct of digital signatures that verifies the identity of an individual on internet.
- In case of any harm or loss done to the company by criminals, the Act provides a remedy in the form of money to the company [15].

Cyber Law in India

Following are the sections under IT Act, 2000

1. Section 65- Tempering with the computers source documents

Whoever intentionally or knowingly destroy, conceal or change any computer's source code that is used for a computer, computer program, and computer system or computer network.

Punishment:

Any person who involves in such crimes could be sentenced upto 3 years imprisonment or with a fine of Rs.2 lakhs or with both.

2. Section 66- Hacking with computer system, data alteration etc

Whoever with the purpose or intention to cause any loss, damage or to destroy, delete or to alter any information that resides in a public or any person's computer. Diminish its utility, values or affects it injuriously by any means, commits hacking.

Punishment:

Any person who involves in such crimes could be sentenced upto 3 years imprisonment, or with a fine that may extend upto 2 lakhs rupees, or both [16].

3. Section 66A- Sending offensive messages through any communication services

- Any information or message sent through any communication services this is offensive or has threatening characters.
- Any information that is not true or is not valid and is sent with the end goal of annoying, inconvenience, danger, insult, obstruction, injury, criminal intention, enmity, hatred or ill will.
- Any electronic mail or email sent with the end goal of causing anger, difficulty or mislead or to deceive the address about the origin of the messages.

Punishment:

Any individual found to commit such crimes under this section could be sentenced upto 3 years of imprisonment along with a fine.

4. Section 66B- Receiving stolen computer's resources or communication devices dishonestly

Receiving or retaining any stolen computer, computer's resources or any communication devices knowingly or having the reason to believe the same.

Punishment:

Any person who involves in such crimes could be sentenced either description for a term that may extend upto 3 years of imprisonment or with a fine of rupee 1 lakh or both.

5. Section 66C- Identify theft

Using of one's digital or electronic signature or one's password or any other unique identification of any person is a crime.

Punishment:

Any person who involve in such crimes could be sentenced either with a description for a term which may extend upto 3 years of imprisonment along with a fine that may extend upto rupee 1 lakh.

6. Section 66D- Cheating by personation by the use of computer's resources

Whoever tries to cheats someone by personating through any communication devices or computer's resources shall

be sentenced either with a description for a term that may extend upto 3 years of imprisonment along with a fine that may extend upto rupee 1 lakh.

7. Section 66E- Privacy or violation

Whoever knowingly or with an intention of publishing, transmitting or capturing images of private areas or private parts of any individual without his/her consent, that violets the privacy of the individual shall be shall be sentenced to 3 years of imprisonment or with a fine not exceeding more than 2 lakhs rupees or both.

8. Section 66F- Cyber terrorism

- A. Whoever intentionally threatened the integrity, unity, sovereignty or security or strike terror among the people or among any group of people by-
- I. Deny to any people to access computer's resources.
 - II. Attempting to break in or access a computer resource without any authorization or to exceed authorized access.
 - III. Introducing any computer's contaminant, and through such conducts causes or is probable to cause any death or injury to any individual or damage or any destruction of properties or disrupt or it is known that by such conduct it is probable to cause damage or disruptions of supply or services that are essential to the life of people or unfavorably affect the critical information's infrastructure specified under the section 70 of the IT Act.
- B. By intention or by knowingly tries to go through or tries to gain access to computer's resources without the authorization or exceeding authorized access, and by such conducts obtains access to the data, information or computer's database which is limited or restricted for certain reason because of the security of the state or foreign relations, or any restricted database, data or any information with the reason to believe that those data or information or the computer's database obtained may use to cause or probably use to cause injury to the interest of the independence and integrity of our country India.

Punishment:

Whoever conspires or commits such cyber crime or cyber terrorism shall be sentenced to life time imprisonment.

9. Section 67- Transmitting or publishing obscene materials in electronic form

Whoever transmits or publishes or cause to publish any obscene materials in electronics form. Any material that is

vulgar or appeal to be lubricious or if its effect is for instance to tends to corrupt any individual who are likely to have regard to all relevant circumstances to read or to see or to hear the matter that contained in it, shall be sentenced on the first convict with either description for a term that may extend upto five years of imprisonment along with a fine which may extend upto 1 lakh rupee and in the second or subsequent convict it can be sentenced either description for a term that may extend upto ten years along with a fine that may perhaps extend to two lakhs rupees.

10. Section 67A- Transmitting or publishing of materials that contains sexually explicit contents, acts etc in electronics form

Whoever transmits or publishes materials that contains sexually explicit contents or acts shall be sentences for either description for a term which may extend upto 5 years or imprisonment along with a fine that could extend to 10 lakhs rupees in the first convict. And in the event of the second convict criminal could be sentenced for either description for a term that could extend upto 7 years of imprisonment along with a fine that may extend upto 20 lakhs rupees.

11. Section 67B- Transmitting or publishing of materials that depicts children in sexually explicit act etc in electronics form

Whoever transmits or publishes any materials that depict children in sexually explicit act or conduct in any electronics form shall be sentenced for either description for a term which may extend to 5 years of imprisonment with a fine that could extend to rupees 10 lakhs on the first conviction. And in the event of second conviction criminals could be sentenced for either description for a term that could extend to 7 years along with a fine that could extend to rupees 10 lakhs.

12. Section 67C- Retention and preservation of information by intermediaries

- I. Intermediaries shall retain and preserve such information that might specify for such period and in such a format and manner that the Central Government may prescribe.
- II. Any intermediaries knowingly or intentionally contravene the provision of the sub-section.

Punishment:

Whoever commits such crimes shall be sentenced for a period that may extend upto 3 years of imprisonment and also liable to fine.

13. Section 69- Power to issue direction for monitor, decryption or interception of any information through computer's resources

- I. Where the Central government's or State government's authorized officers, as the case may be in this behalf, if fulfilled that it is required or expedient to do in the interest of the integrity or the sovereignty, the security defence of our country India, state's security, friendly relations with the foreign states for preventing any incident to the commission of any cognizable offences that is related to above or investigation of any offences that is subjected to the provision of sub-section (II). For reasons to be recorded writing, direct any agency of the appropriate government, by order, decrypt or monitor or cause to be intercept any information that is generated or received or transmitted or is stored in any computer's resources.
- II. The safeguard and the procedure that is subjected to such decryption, monitoring or interception may carried out, shall be such as may be prescribed.
- III. The intermediaries, the subscribers or any individual who is in the charge of the computer's resources shall call upon by any agencies referred to the sub-section (I), extends all services and technical assistances to:
 - a) Providing safe access or access to computer's resources receiving, transmitting, generating or to store such information or
 - b) Decrypting, intercepting or monitoring the information, as the case might be or
 - c) Providing information that is stored in computer.
- IV. The intermediaries, the subscribes or any individual who fails to help the agency referred in the sub-section (III), *shall be sentenced for a term that could extend to 7 years of imprisonment and also could be legally responsible to fine [17].*

There are many other sections in the IT Act, 2000 among them a few important sections one should know are as follows:

Table-2: A few important sections one should know

Offences	Sec. under IT Act, 2000
Damage to Computer, Computer System etc.	Section 43
Power to issue direction for blocking from public access of any information through any computer's resources.	Section 69A
Power to authorize to collect traffic information or data and	Section 69B

to monitor through any computer's resources for cyber security.	
Un-authorized access to protected system.	Section 70
Penalty for misrepresentation.	Section 71
Breach of confidentiality and privacy.	Section 72
Publishing False digital signature certificates.	Section 73
Publication for fraudulent purpose.	Section 74
Act to apply for contravention or offence that is committed outside India.	Section 75
Compensation, confiscation or penalties for not to interfere with other punishment.	Section 77
Compounding of Offences.	Section 77A
Offences by Companies.	Section 85
Sending threatening messages by e-mail.	Section 503 IPC
Sending defamatory messages by e-mail.	Section 499 IPC
Bogus websites, Cyber Frauds.	Section 420 IPC
E-mail Spoofing.	Section 463 IPC
Web Jacking.	Section 383 IPC
E-mail Abuse.	Section 500 IPC
Criminal intimidation by anonymous communications.	Section 507 IPC
Online sale of Drugs.	NDPS Act
Online sale of Arms	Arm Act

4. CONCLUSIONS

The rise and proliferation of newly developed technologies begin star to operate many cybercrimes in recent years. Cybercrime has become great threats to mankind. Protection against cybercrime is a vital part for

cybercrimes. The Act further revise the IPC, 1860, the IEA (Indian Evidence Act), 1872, the Banker's Books Evidence Act 1891 and the Reserve Bank of India Act, 1934. Any part of the world cyber crime could be originated passing national boundaries over the internet creating both technical and legal complexities of investigating and prosecuting these crimes. The international harmonizing efforts, coordination and co-operation among various nations are required to take action towards the cyber crimes.

Our main purpose of writing this paper is to spread the content of cyber crime among the common people. At the end of this paper "A brief study on Cyber Crime and Cyber Law's of India" we want to say cyber crimes can never be acknowledged. If anyone falls in the prey of cyber attack, please come forward and register a case in your nearest police station. If the criminals won't get punishment for their deed, they will never stop.

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social, cultural and security aspect of a country. The Government of India has enacted IT Act, 2000 to deal with

Lecture-21

Cyber Laws

Cyber crime is unlawful act wherein the computer is either a tool or a target or both Cyber crimes can involve criminal activities that are traditional in nature, such as theft, fraud, forgery, defamation and mischief, all of which are subjects to the Indian Penal Code. The abuse of computers has also given birth to a range of modern crimes that are addressed by the Information Technology Act, 2000.

Type of Cyber crimes

- i) The Computer as a Target :-using a computer to attack other computers. e.g. Hacking, Virus/Worm attacks, DOS attack etc.
- ii) The computer as a weapon :- using a computer to commit real world crimes. e.g. Cyber Terrorism, IPR violations, Credit card frauds, EFT frauds, Pornography etc. Cyber crimes are regulated by Cyber Laws or Internet Laws.

Technical Aspects

Technological advancements have created new possibilities for criminal activity, in particular the criminal misuse of information technologies such as

A. Unauthorized access & Hacking

Access means gaining entry into, instructing or communicating with the logical, arithmetical, or memory function resources of a computer, computer system or computer network.

Unauthorized access would therefore mean any kind of access without the permission of either the rightful owner or the person in charge of a computer, computer system or computer network.

Every act committed towards breaking into a computer and/or network is *hacking*. Hackers write or use ready-made computer programs to attack the target computer. They possess the desire to destruct and they get the kick out of such destruction. Some hackers hack for personal monetary gains, such as

to stealing the credit card information, transferring money from various bank accounts to their own account followed by withdrawal of money.

By hacking web server taking control on another persons website called as web hijacking

B. Trojan Attack

The program that acts like something useful but do the things that are quiet damping. The programs of this kind are called as Trojans. The name Trojan Horse is popular.

Trojans come in two parts, a Client part and a Server part. When the victim (unknowingly) runs the server on its machine, the attacker will then use the Client to connect to the Server and start using the trojan.

TCP/IP protocol is the usual protocol type used for communications, but some functions of the trojans use the UDP protocol as well.

C. Virus and Worm attack

A program that has capability to infect other programs and make copies of itself and spread into other programs is called *virus*.

Programs that multiply like viruses but spread from computer to computer are called as *worms*.

D. E-mail & IRC related crimes

1. Email spoofing

Email spoofing refers to email that appears to have been originated from one source when it was actually sent from another source.

2. Email Spamming

Email “spamming” refers to sending email to thousands and thousands of users - similar to a chain letter.

3 Sending malicious codes through email

E-mails are used to send viruses, Trojans etc through emails as an attachment or by sending a link of website which on visiting downloads malicious code.

4. Email bombing

E-mail “bombing” is characterized by abusers repeatedly sending an identical email message to a particular address.

5. Sending threatening emails

6. Defamatory emails

7. Email frauds

8. IRC related

Three main ways to attack IRC are: “verbal abuse”; attacks, clone attacks, and flood attacks.

E. Denial of Service attacks

Flooding a computer resource with more requests than it can handle. This causes the resource to crash thereby denying access of service to authorized users.

Distributed DOS

A distributed denial of service (DoS) attack is accomplished by using the Internet to break into computers and using them to attack a network.

Hundreds or thousands of computer systems across the Internet can be turned into “zombies” and used to attack another system or website.

Types of DOS

There are three basic types of attack:

- a. Consumption of scarce, limited, or non-renewable resources like NW bandwidth, RAM, CPU time. Even power, cool air, or water can affect.
- b. Destruction or Alteration of Configuration Information
- c. Physical Destruction or Alteration of Network Components

F. Pornography

The literal meaning of the term ‘Pornography’ is “describing or showing sexual acts in order to cause sexual excitement through books, films, etc.”

This would include pornographic websites; pornographic material produced using computers and use of internet to download and transmit pornographic videos, pictures, photos, writings etc.

Adult entertainment is largest industry on internet. There are more than 420 million individual

pornographic webpages today.

Research shows that 50% of the web-sites containing potentially illegal contents relating to child abuse were ‘Pay-Per-View’. This indicates that abusive images of children over Internet have been highly commercialized.

Pornography delivered over mobile phones is now a burgeoning business, “driven by the increase in sophisticated services that deliver video clips and streaming video, in addition to text and images.”

Effects of Pornography

Research has shown that pornography and its messages are involved in shaping attitudes and encouraging behavior that can harm individual users and their families.

Pornography is often viewed in secret, which creates deception within marriages that can lead to divorce in some cases.

In addition, pornography promotes the allure of adultery, prostitution and unreal expectations that can result in dangerous promiscuous behavior.

Some of the common, but false messages sent by sexualized culture are :

Sex with anyone, under any circumstances, any way it is desired, is beneficial and does not have negative consequences.

Women have one value - to meet the sexual demands of men.

Marriage and children are obstacles to sexual fulfillment.

Everyone is involved in promiscuous sexual activity, infidelity and premarital sex.

Pornography Addiction

Dr. Victor Cline, an expert on Sexual Addiction, found that there is a four-step progression among many who consume pornography.

1. *Addiction:* Pornography provides a powerful sexual stimulant or aphrodisiac effect, followed by sexual release, most often through masturbation.
2. *Escalation:* Over time addicts require more explicit and deviant material to meet their sexual “needs.”
3. *Desensitization:* What was first perceived as gross, shocking and disturbing, in time becomes common and acceptable.
4. *Acting out sexually:* There is an increasing

tendency to act out behaviors viewed in pornography.

G. Forgery

Counterfeit currency notes, postage and revenue stamps, mark sheets etc can be forged using sophisticated computers, printers and scanners.

Also impersonate another person is considered forgery.

H. IPR Violations

These include software piracy, copyright infringement, trademarks violations, theft of computer source code, patent violations. etc.

Cyber Squatting- Domain names are also trademarks and protected by ICANN's domain dispute resolution policy and also under trademark laws.

Cyber Squatters registers domain name identical to popular service provider's domain so as to attract their users and get benefit from it.

I. Cyber Terrorism

Targeted attacks on military installations, power plants, air traffic control, banks, rail traffic control, telecommunication networks are the most likely targets. Others like police, medical, fire and rescue systems etc.

Cyberterrorism is an attractive option for modern terrorists for several reasons.

1. It is cheaper than traditional terrorist methods.
2. Cyberterrorism is more anonymous than traditional terrorist methods.
3. The variety and number of targets are enormous.
4. Cyberterrorism can be conducted remotely, a feature that is especially appealing to terrorists.
5. Cyberterrorism has the potential to affect directly a larger number of people.

J. Banking/Credit card Related crimes

In the corporate world, Internet hackers are continually looking for opportunities to compromise a company's security in order to gain access to confidential banking and financial information.

Use of stolen card information or fake credit/debit cards are common.

Bank employee can grab money using programs to deduce small amount of money from all customer accounts and adding it to own account

also called as salami.

K. E-commerce/ Investment Frauds

Sales and Investment frauds. An offering that uses false or fraudulent claims to solicit investments or loans, or that provides for the purchase, use, or trade of forged or counterfeit securities.

Merchandise or services that were purchased or contracted by individuals online are never delivered.

The fraud attributable to the misrepresentation of a product advertised for sale through an Internet auction site or the non-delivery of products purchased through an Internet auction site.

Investors are enticed to invest in this fraudulent scheme by the promises of abnormally high profits.

L. Sale of illegal articles

This would include trade of narcotics, weapons and wildlife etc., by posting information on websites, auction websites, and bulletin boards or simply by using email communication.

Research shows that number of people employed in this criminal area. Daily peoples receiving so many emails with offer of banned or illegal products for sale.

M. Online gambling

There are millions of websites hosted on servers abroad, that offer online gambling. In fact, it is believed that many of these websites are actually fronts for money laundering.

N. Defamation

Defamation can be understood as the intentional infringement of another person's right to his good name.

Cyber Defamation occurs when defamation takes place with the help of computers and / or the Internet. e.g. someone publishes defamatory matter about someone on a website or sends emails containing defamatory information to all of that person's friends. Information posted to a bulletin board can be accessed by anyone. This means that anyone can place

Cyber defamation is also called as Cyber smearing.

Cyber Stalking

Cyber stalking involves following a persons

movements across the Internet by posting messages (sometimes threatening) on the bulletin boards frequented by the victim, entering the chat-rooms frequented by the victim, constantly bombarding the victim with emails etc.

In general, the harasser intends to cause emotional distress and has no legitimate purpose to his communications.

P. Pedophiles

Also there are persons who intentionally prey upon children. Specially with a teen they will let the teen know that fully understand the feelings towards adult and in particular teen parents.

They earn teens trust and gradually seduce them into sexual or indecent acts.

Pedophiles lure the children by distributing pornographic material, then they try to meet them for sex or to take their nude photographs including their engagement in sexual positions.

Q. Identity Theft

Identity theft is the fastest growing crime in countries like America.

Identity theft occurs when someone appropriates another's personal information without their knowledge to commit theft or fraud.

Identity theft is a vehicle for perpetrating other types of fraud schemes.

R. Data diddling

Data diddling involves changing data prior or during input into a computer.

In other words, information is changed from the way it should be entered by a person typing in the data, a virus that changes data, the programmer of the database or application, or anyone else involved in the process of having information stored in a computer file.

It also includes automatic changing the financial information for some time before processing and then restoring original information.

S. Theft of Internet Hours

Unauthorized use of Internet hours paid for by another person.

By gaining access to an organisation's telephone switchboard (PBX) individuals or criminal organizations can obtain access to dial-in/dial-out circuits and then make their own calls or sell call

time to third parties.

Additional forms of service theft include capturing 'calling card' details and on-selling calls charged to the calling card account, and counterfeiting or illicit reprogramming of stored value telephone cards.

T. Theft of computer system (Hardware)

This type of offence involves the theft of a computer, some part(s) of a computer or a peripheral attached to the computer.

U. Physically damaging a computer system

Physically damaging a computer or its peripheral either by shock, fire or excess electric supply etc.

V. Breach of Privacy and Confidentiality

Privacy

Privacy refers to the right of an individual/s to determine when, how and to what extent his or her personal data will be shared with others.

Breach of privacy means unauthorized use or distribution or disclosure of personal information like medical records, sexual preferences, financial status etc.

Confidentiality

It means non disclosure of information to unauthorized or unwanted persons.

In addition to Personal information some other type of information which is useful for business and leakage of such information to other persons may cause damage to business or person, such information should be protected.

Generally for protecting secrecy of such information, parties while sharing information form an agreement about the procedure of handling of information and to not to disclose such information to third parties or use it in such a way that it will be disclosed to third parties.

Many times parties or their employees leak such valuable information for monetary gains and causes breach of contract of confidentiality.

Special techniques such as Social Engineering are commonly used to obtain confidential information.

Cyberlaw is a term that encapsulates the legal issues related to use of *communicative*,

transactional, and *distributive* aspects of networked information devices and technologies. It is less a distinct field of law in the way that *property* or *contract* are, as it is a domain covering many areas of law and regulation. Some leading topics include *intellectual property*, *privacy*, *freedom of expression*, and *jurisdiction*.

Jurisdiction and sovereignty

Issues of *jurisdiction* and *sovereignty* have quickly come to the fore in the era of the Internet. The Internet does not tend to make geographical and jurisdictional boundaries clear, but Internet users remain in physical jurisdictions and are subject to laws independent of their presence on the Internet.¹ As such, a single transaction may involve the laws of at least three jurisdictions:

1. the laws of the state/nation in which the user resides,
2. the laws of the state/nation that apply where the server hosting the transaction is located, and
3. the laws of the state/nation which apply to the person or business with whom the transaction takes place. So a user in one of the United States conducting a transaction with another user in Britain through a server in Canada could theoretically be subject to the laws of all three countries as they relate to the transaction at hand.²

Jurisdiction is an aspect of state *sovereignty* and it refers to judicial, legislative and administrative competence. Although jurisdiction is an aspect of sovereignty, it is not coextensive with it. The laws of a nation may have extraterritorial impact extending the jurisdiction beyond the sovereign and territorial limits of that nation. This is particularly problematic as the medium of the Internet does not explicitly recognize sovereignty and territorial limitations. There is no uniform, international jurisdictional law of universal application, and such questions are generally a matter of *conflict of laws*, particularly private international law. An example would be where the contents of a web site are legal in one country and illegal in another. In the absence of a uniform jurisdictional code, legal practitioners are generally left with a conflict of law issue.

Another major problem of cyberlaw lies in whether to treat the Internet as if it were physical

space (and thus subject to a given jurisdiction's laws) or to act as if the Internet is a world unto itself (and therefore free of such restraints). Those who favor the latter view often feel that government should leave the Internet community to self-regulate. John Perry Barlow, for example, has addressed the governments of the world and stated, "Where there are real conflicts, where there are wrongs, we will identify them and address them by our means. We are forming our own Social Contract. This governance will arise according to the conditions of our world, not yours. Our world is different".³ A more balanced alternative is the Declaration of Cybersecession: "Human beings possess a mind, which they are absolutely free to inhabit with no legal constraints. Human civilization is developing its own (collective) mind. All we want is to be free to inhabit it with no legal constraints. Since you make sure we cannot harm you, you have no ethical right to intrude our lives. So stop intruding!"⁴ Other scholars argue for more of a compromise between the two notions, such as Lawrence Lessig's argument that "The problem for law is to work out how the norms of the two communities are to apply given that the subject to whom they apply may be in both places at once" (Lessig, Code 190).

Though rhetorically attractive, cybersecession initiatives have had little real impact on the Internet or the laws governing it. In practical terms, a user of the Internet is subject to the laws of the state or nation within which he or she goes online. Thus, in the U.S., Jake Baker faced criminal charges for his e-conduct (see Free Speech), and numerous users of peer-to-peer file-sharing software were subject to civil lawsuits for *copyright infringement*. This system runs into conflicts, however, when these suits are international in nature. Simply put, legal conduct in one nation may be decidedly illegal in another. In fact, even different standards concerning the *burden of proof* in a civil case can cause jurisdictional problems. For example, an American celebrity, claiming to be insulted by an online American magazine, faces a difficult task of winning a lawsuit against that magazine for *libel*. But if the celebrity has ties, economic or otherwise, to England, he or she can sue for libel in the British court system, where the standard of "libelous speech" is far lower.

Net neutrality

Another major area of interest is *net neutrality*, which affects the regulation of the infrastructure of the Internet. Though not obvious to most Internet users, every packet of data sent and received by every user on the Internet passes through routers and transmission infrastructure owned by a collection of private and public entities, including telecommunications companies, universities, and governments, suggesting that the Internet is not as independent as *Barlow* and others would like to believe. This is turning into one of the most critical aspects of cyberlaw and has immediate jurisdictional implications, as laws in force in one jurisdiction have the potential to have dramatic effects in other jurisdictions when host servers or telecommunications companies are affected.

Free speech in cyberspace

In comparison to traditional print-based media, the accessibility and relative anonymity of cyber space has torn down traditional barriers between an individual and his or her ability to publish. Any person with an internet connection has the potential to reach an audience of millions with little-to-no distribution costs. Yet this new form of highly-accessible authorship in cyber space raises questions and perhaps magnifies legal complexities relating to the freedom and regulation of speech in cyberspace.

Recently, these complexities have taken many forms, three notable examples being the *Jake Baker* incident, in which the limits of obscene Internet postings were at issue, the controversial distribution of the *DeCSS* code, and *Gutnick v Dow Jones*, in which libel laws were considered in the context of online publishing. The last example was particularly significant because it epitomized the complexities inherent to applying one country's laws (nation-specific by definition) to the internet (international by nature). In 2003, *Jonathan Zittrain* considered this issue in his paper, "Be Careful What You Ask For: Reconciling a Global Internet and Local Law"⁵.

In many countries, speech through cyberspace has proven to be another means of communication which has been regulated by the government. The *Open Net Initiative*, whose mission statement is "to investigate and challenge state filtration and

surveillance practices" in order to "...generate a credible picture of these practices," has released numerous reports documenting the filtration of internet-speech in various countries. While *China* has thus far proven to be the most rigorous in its attempts to filter unwanted parts of the internet from its citizens,⁶ many other countries - including *Australia*, *Singapore*, *Iran*, *Saudi Arabia*, and *Tunisia* - have engaged in similar practices of *internet censorship*. In one of the most vivid examples of information-control, the Chinese government for a short time transparently forwarded requests to the Google search engine to its own, state-controlled search engines⁷. These examples of filtration bring to light many underlying questions concerning the freedom of speech, namely, does the government have a legitimate role in limiting access to information? And if so, what forms of regulation are acceptable? The recent blocking of "blogspot" and other websites in India failed to reconcile the conflicting interests of speech and expression on the one hand and legitimate government concerns on the other hand.

In the UK the case of *Keith-Smith v Williams* confirmed that existing *libel* laws applied to internet discussions.⁸

Governance

The unique structure of the Internet has raised several judicial concerns. While grounded in physical computers and other electronic devices, the Internet is independent of any geographic location. While real individuals connect to the Internet and interact with others, it is possible for them to withhold personal information and make their real identities anonymous. If there are laws that could govern the Internet, then it appears that such laws would be fundamentally different from laws that geographic nations use today.

In their essay "Law and Borders — The Rise of Law in Cyberspace",⁹ *David Johnson* and *David Post* offer a solution to the problem of Internet governance. Given the Internet's unique situation, with respect to geography and identity, Johnson and Post believe that it becomes necessary for the Internet to govern itself. Instead of obeying the laws of a particular country, Internet citizens will obey the laws of electronic entities like service providers. Instead of identifying as a physical person, Internet

citizens will be known by their usernames or email addresses. Since the Internet defies geographical boundaries, national laws will no longer apply. Instead, an entirely new set of laws will be created to address concerns like *intellectual property* and individual rights. In effect, the Internet will exist as its own sovereign nation.

Even if the Internet represents a legal paradigm shift, Johnson and Post do not make clear exactly how or by whom the law of the Internet will be enforced. Instead, the authors see market mechanisms, like those that Medieval merchants used, guiding Internet citizens' actions like Adam Smith's invisible hand. Yet, as more physical locations go online, the greater the potential for physical manifestation of electronic misdeeds. What do we do when someone electronically turns off the hospital lights?

However, there is also substantial literature and commentary that the internet is not only "regulable," but is already subject to substantial regulation, both public and private, by many parties and at many different levels. Leaving aside the most obvious examples of internet filtering in nations like *China* or *Saudi Arabia* (that monitor content), there are four primary modes of regulation of the internet described by *Lawrence Lessig* in his book, *Code and Other Laws of Cyberspace*:

1. **Law:** Standard East Coast Code, and the most self-evident of the four modes of regulation. As the numerous statutes, evolving case law and precedents make clear, many actions on the internet are already subject to conventional legislation (both with regard to transactions conducted on the internet and images posted). Areas like gambling, child pornography, and fraud are regulated in very similar ways online as off-line. While one of the most controversial and unclear areas of evolving laws is the determination of what forum has subject matter jurisdiction over activity (economic and other) conducted on the internet, particularly as cross border transactions affect local jurisdictions, it is certainly clear that substantial portions of internet activity are subject to traditional regulation, and that conduct that is unlawful off-line is presumptively unlawful online,

and subject to similar laws and regulations. Scandals with major corporations led to US legislation rethinking corporate *governance* regulations such as the *Sarbanes-Oxley Act*.

2. **Architecture:** West Coast Code: these mechanisms concern the parameters of how information can and cannot be transmitted across the internet. Everything from internet filtering software (which searches for keywords or specific URLs and blocks them before they can even appear on the computer requesting them), to encryption programs, to the very basic architecture of TCP/IP protocol, falls within this category of regulation. It is arguable that all other modes of regulation either rely on, or are significantly supported by, regulation via West Coast Code.
3. **Norms:** As in all other modes of social interaction, conduct is regulated by social norms and conventions in significant ways. While certain activities or kinds of conduct online may not be specifically prohibited by the code architecture of the internet, or expressly prohibited by applicable law, nevertheless these activities or conduct will be invisibly regulated by the inherent standards of the community, in this case the internet "users." And just as certain patterns of conduct will cause an individual to be ostracised from our real world society, so too certain actions will be censored or self-regulated by the norms of whatever community one chooses to associate with on the internet.
4. **Markets:** Closely allied with regulation by virtue of social norms, markets also regulate certain patterns of conduct on the internet. While economic markets will have limited influence over non-commercial portions of the internet, the internet also creates a virtual marketplace for information, and such information affects everything from the comparative valuation of services to the traditional valuation of stocks. In addition, the increase in popularity of the internet as a means for transacting all forms of commercial activity, and as a forum for advertisement,

has brought the laws of supply and demand in cyberspace.

Internet regulation in other countries

While there is some United States law that does restrict access to materials on the *internet*, it does not truly filter the internet. Many Asian and Middle Eastern nations use any number of combinations of code-based regulation (one of Lessig's four methods of net regulation) to block material that their governments have deemed inappropriate for their citizens to view. China and Saudi Arabia are two excellent examples of nations that have achieved high degrees of success in regulating their citizens access to the internet.^{[10][6]}

Pavan Duggal^[11], Advocate, Supreme Court and Cyberlaw expert has also been vocal about India's Information Technology Act 2000, and did not find it adequate due to various flaws in it.^[12] He has been critical of the efficacy of new Amendments to IT Act 2000 in India. He believes that new amendments, passed by Indian Parliament in Dec 2008, are not at all sufficient in the context of the emerging needs of India and there are various glaring loopholes.^{[13][14]}

Lecture – 22

Libre Office

What is Writer?

Writer is the word processor component of LibreOffice. In addition to the usual features of a word processor (spelling check, thesaurus, hyphenation, autocorrect, find and replace, automatic generation of tables of contents and indexes, mail merge and others), Writer provides these important features:

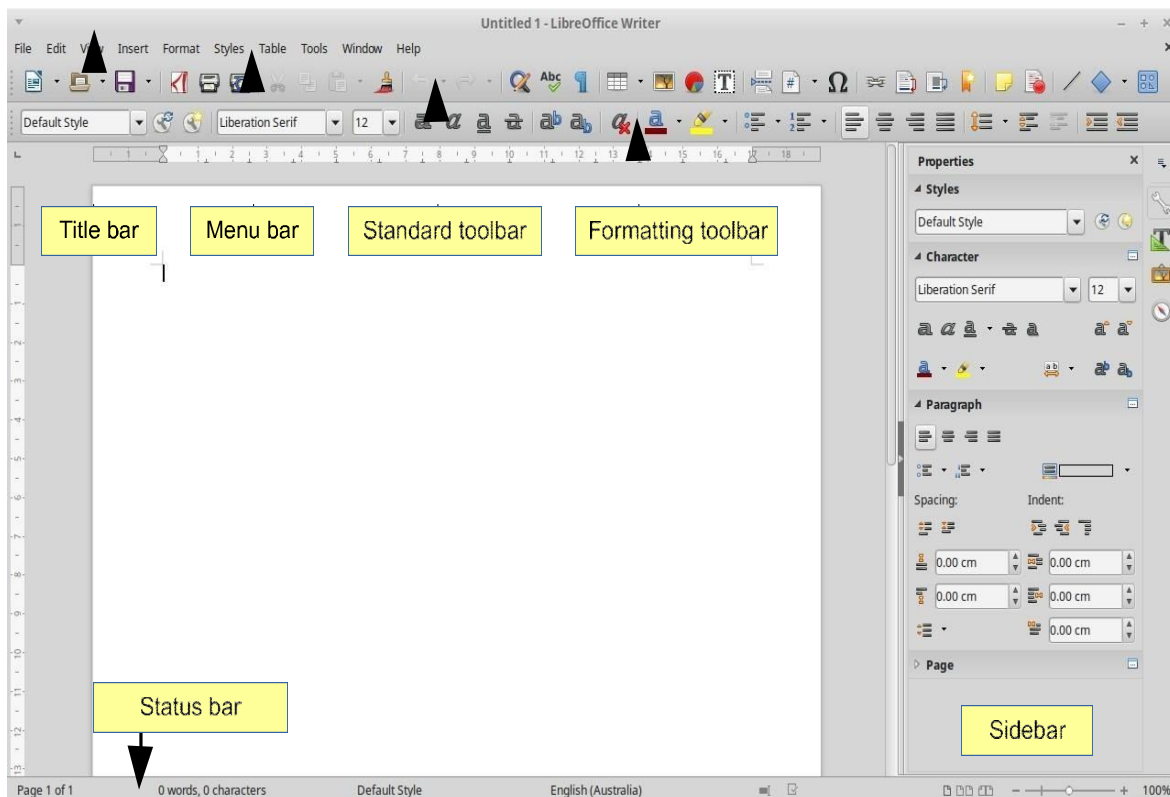
- Templates and styles (see Chapter 3)
- Page layout methods, including frames, columns, and tables
- Automated tables of contents and indexes
- Embedding or linking of graphics, spreadsheets, and other objects
- Built-in drawing tools
- Master documents—to group a collection of documents into a single document
- Change tracking during revisions
- Database integration, including a bibliography database
- Mail merge
- Export to PDF, including bookmarks (see Chapter 10)
- Document digital signature
- Form design and filling
- And many more

These features are covered in detail in the *Writer Guide*.

The Writer interface

The main Writer workspace is shown in Figure 62. The menus and toolbars are described in Chapter 1, Introducing LibreOffice. Some other features of the Writer interface are covered in this chapter.

Figure 62: The main Writer workspace



Status Bar

The Writer Status Bar provides information about the document and convenient ways to change some document features quickly.

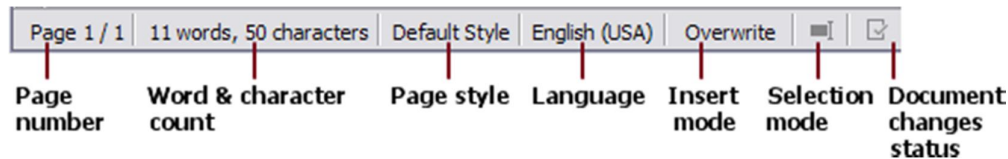


Figure 63: Left end of Status Bar

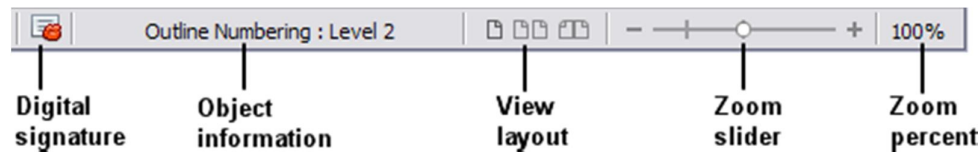


Figure 64: Right end of Status Bar

Page number

Shows the current page number, the sequence number of the current page (if different), and the total number of pages in the document. For example, if you restarted page numbering at 1 on the third page, its page number is 1 and its sequence number is 3.

If any bookmarks have been defined in the document, a right-click on this field pops up a list of bookmarks; click on the required one.

To jump to a specific page in the document, double-click on this field. The Navigator opens. Click in the Page Number field and type the *sequence* number of the required page and press *Enter*.

Word and character count

The word and character count of the document is shown in the Status Bar, and is kept up to date as you edit. Any text selected in the document will be counted and this count will replace the displayed count.



To display extended statistics such as character counts excluding spaces, double-click the word count in the Status Bar, or choose **Tools > Word Count**.

Page style

Shows the style of the current page. To change the page style, right-click on this field. A list of page styles pops up; choose a different style by clicking on it.

To edit the current page style, double-click on this field. The Page Style dialog opens.

Language

Shows the language at the cursor position, or for the selected text, that is used for checking spelling and for hyphenation and thesaurus.

Click to open a menu where you can choose another language for the selected text or for the paragraph where the cursor is located. You can also choose **None (Do not check spelling)** to exclude the text from a spelling check or choose **More** to open the Character dialog. Any directly formatted language settings can be reset to the default language from this menu.

Insert mode

This area is blank when in Insert mode. Double-click to change to *Overwrite* mode; single-click to return to Insert mode. In Insert mode, any text after the cursor position moves forward to make room for the text you type; in Overwrite mode, text after the cursor position is replaced by the text you type. This feature is disabled when in **Edit > Changes > Record** mode.

Selection mode



Click to choose different selection modes. The icon does not change, but when you hover the mouse pointer over this field, a tooltip indicates which mode is active.

When you click in the field, a context menu displays the available options.


Mode	Effect
Standard selection	Click in the text where you want to position the cursor; click in a cell to make it the active cell. Any other selection is deselected.
Extending selection (<i>F8</i>)	Clicking in the text extends or crops the current selection.
Adding selection (<i>Shift+F8</i>)	A new selection is added to an existing selection. The result is a multiple selection.
Block selection (<i>Ctrl+Shift+F8</i>)	A block of text can be selected.

On Windows systems, you can hold down the *Alt* key while dragging to select a block of text. You do not need to enter the block selection mode.

Document changes status

The icon that is displayed here changes from this one () if the document has no unsaved changes, to this one () if it has been edited and the changes have not been saved. Click on the unsaved changes icon to save the document.

Digital signature

If the document has been digitally signed, this icon () is displayed here; otherwise, it is blank. To view the certificate, double-click the icon.

Section or object information

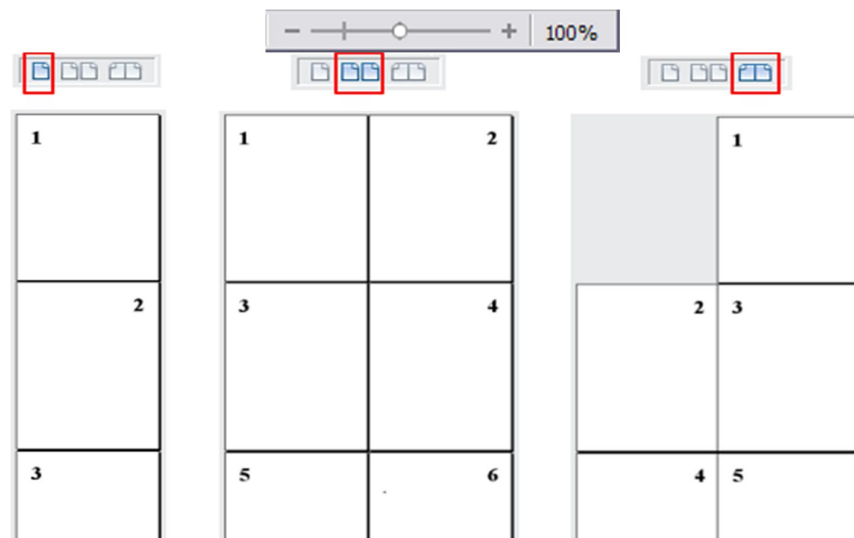
When the cursor is on a section, heading, or list item, or when an object (such as a picture or table) is selected, information about that item appears in this field. Double-clicking in this area opens a relevant dialog. For details, consult the Help or the *Writer Guide*.

View layout

Click an icon to change between single page, side-by-side, and book layout views. The effect varies with the combination of window width and zoom factor in use. You can edit the document in any view. See Figure 65.

Zoom

To change the view magnification, drag the Zoom slider, or click on the + and – signs, or right-click on the zoom level percent to pop up a list of magnification values from which to choose. Zoom interacts with the selected view layout to determine how many pages are visible in the document window.



View layouts: single, side-by-side, book.

Sidebar

The Writer sidebar (**View > Sidebar**), shown in Figure 66, is located on the right side of the edit view. It is a mixture of toolbar and dialog and consists of five decks: Properties, Styles and Formatting, Gallery, Navigator, and Manage Changes. Each deck has a corresponding icon on the Tab panel to the right of the sidebar, allowing you to switch between them.

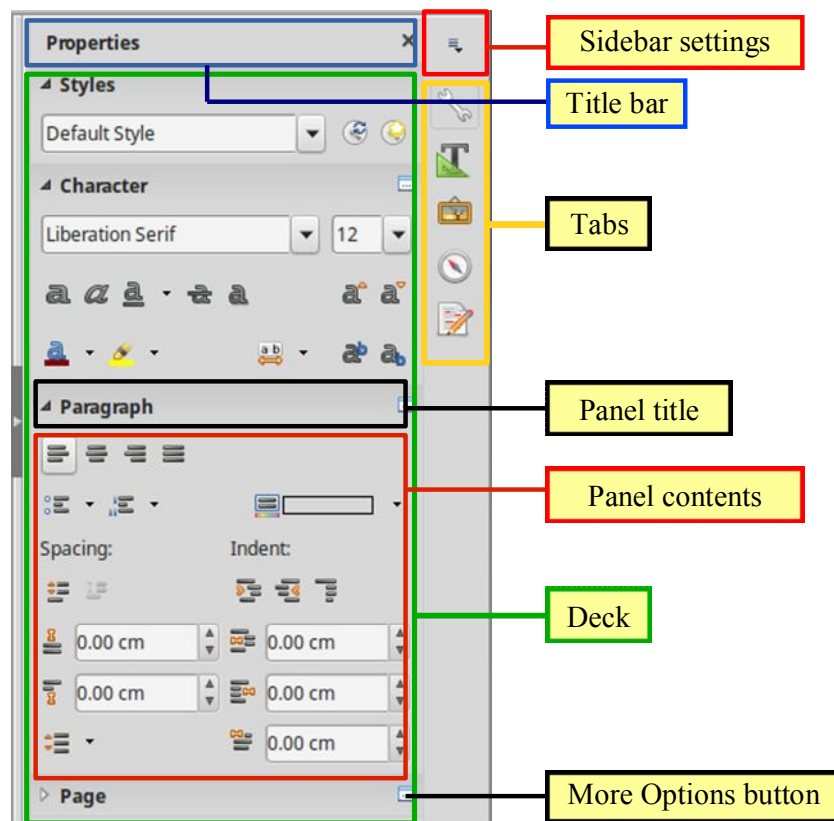



Figure 66: Sidebar Properties deck and text content panels

Each deck consists of a title bar and one or more content panels. Toolbars and sidebar panels share many functions. For example, the buttons for making text bold or italic exist in both the Formatting toolbar and the Character panel of the Properties deck.

Some panels contain a **More Options** button () which when clicked opens a dialog to give greater choice of editing controls. The dialog that opens locks the document for editing until the dialog is closed.

The decks are described below.

- **Properties:** Contains tools for direct formatting within the document. By default, the tools are separated into the following four panels for text editing:
 - **Styles:** Display or apply a paragraph style at the cursor position. Create or update a style.
 - **Character:** Modify text by the font type, size, color, weight, style and spacing.
 - **Paragraph:** Style the paragraph by alignment, lists or bullets, background color, indent, and spacing.
 - **Page:** Format the page by orientation, margin, size, and number of columns.If a graphic is selected, then the following panels open:
 - **Area:** Modify the graphic background area fill mode and transparency.
 - **Graphic:** Modify the graphic's brightness, contrast, color mode and transparency.
 - **Position:** Modifications to width and height.
 - **Wrap:** Permits wrap modifications where these are available.If a drawing object is selected, then the following panels are available:

- Area: Fill and transparency edits are available.
 - Line: Permits edits to the line style, width, color, arrows, corners and cap styles.
 - Position and Size: Enables edits to width, height, rotation and flip attributes.
- If a frame is selected, then the wrap panel opens but may be grayed-out if frame wrap is not available.



Caution

Be aware that by changing the options on the Page panel, you will change the page style in use, modifying not only the current page but all pages using the same page style.

- **Styles and Formatting:** Manage the styles used in the document, apply existing styles, create new ones or modify them. This deck is also a floating toolbar that can be opened from **Format > Styles and Formatting** on the Menu bar.
- **Gallery:** Add images and diagrams included in the Gallery themes. The Gallery displays as two sections; the first lists the themes by name (Arrows, Background, Diagrams, etc.) and the second displays the images in the selected category. Select the **New Theme** button to create new categories. To insert an image into a file, or add a new image to the new category, just drag and drop the selected image using the file manager. This deck is also a docked toolbar that can be opened from **Tools > Gallery** or the **Gallery** button on the Standard Toolbar.
- **Navigator:** Browse the document and reorganize its content by selecting different content categories, such as headings, tables, frames, graphics, etc. This deck is similar to the floating toolbar that can be opened from **View > Navigator** on the Menu bar or the **Navigator** button on the Standard Toolbar. However, the Sidebar Navigator does not contain a **List Box On/Off** button.
- **Manage Changes:** Lists all changes done in the document since the Track Changes mode was activated. This deck is an alternate view of the Manage Changes dialog that can be opened from **Edit > Track Changes > Manage Changes** on the Menu bar. This tab is available only when **Enable experimental features** has been selected in **Tools > Options > LibreOffice > Advanced**.

Changing document views

Writer has several ways to view a document: Print Layout, Web Layout, and Full Screen. To access these and other choices, go to the **View** menu and click on the required view. (When in Full Screen view, press the *Esc* key to return to either Print or Web Layout view.)

Print Layout is the default view in Writer. In this view, you can use the Zoom slider and the View Layout icons on the Status Bar to change the magnification.

You can also choose **View > Zoom > Zoom** from the menu bar to display the Zoom & View Layout dialog, where you can set the same options as on the Status Bar. In Web Layout view, most of the choices are not available.

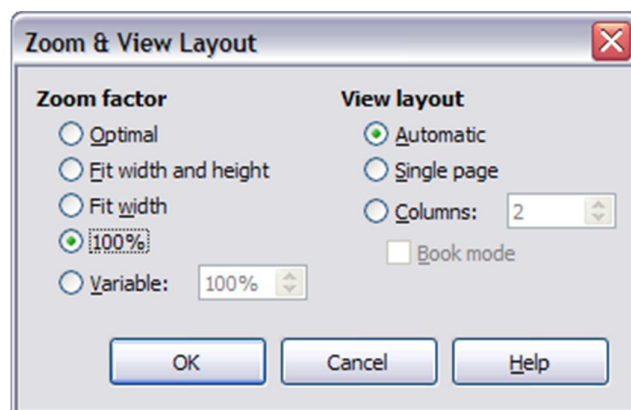


Figure 67: Choosing Zoom and View Layout options.

Moving quickly through a document

In addition to the navigation features of the Status Bar (described above), you can use the Navigator window and the Navigation toolbar, either from the Standard toolbar or from the Sidebar, as described in Chapter 1, Introducing LibreOffice.

The Navigation toolbar (Figure 68) shows buttons for all the object types shown in the Navigator, plus some extras (for example, the **Find** command).

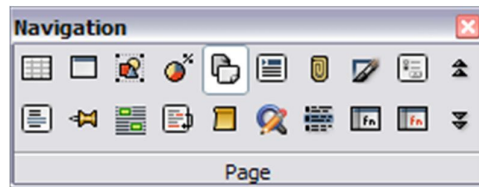


Figure 68: Navigation toolbar

Click a button to select that object type. Now all the **Previous** and **Next** button presses (in the Navigator itself, in the Navigation Toolbar, and on the scroll bar) will jump to the next object of the selected type. This is particularly helpful for finding items like index entries, which can be difficult to see in the text. The names of the buttons (shown in the tooltips) change to match the selected category; for example, **Next Graphic**, **Next Bookmark**, or **Continue search forward**.

For more uses of the Navigator in Writer, see the *Writer Guide*.

Working with documents

Chapter 1, Introducing LibreOffice, includes instructions on starting new documents, opening existing documents, saving documents, and password-protecting documents. Chapter 3, Using Styles and Templates, covers how to create a document from a template.

By default, LibreOffice loads and saves files in the OpenDocument file format (ODF), a standardized file format (ISO-IEC 26300) used by many software applications.

Tip

Wherever choice of the document file format is possible, choose the default ODF format when working with LibreOffice.

Saving as a Microsoft Word file

If you need to exchange documents with users of Microsoft Word who are unwilling or unable to receive ODT files, you can open, edit, and save documents in Microsoft Word formats.

You can also create and edit ODT files and then save them as DOC or DOCX files. To do this:

- 1) **Important**—First save your document in the file format used by LibreOffice Writer (ODT). If you do not, any changes you made since the last time you saved will appear only in the Microsoft Word version of the document.
- 2) Then choose **File > Save As**. On the Save As dialog (Figure 69), in the **File type** (or **Save as type**) drop-down menu, select the type of Word format you need. Files cannot be saved to the Word version 6.0/95 file format. Click **Save**.

From this point on, *all changes you make to the document will occur only in the new document*.

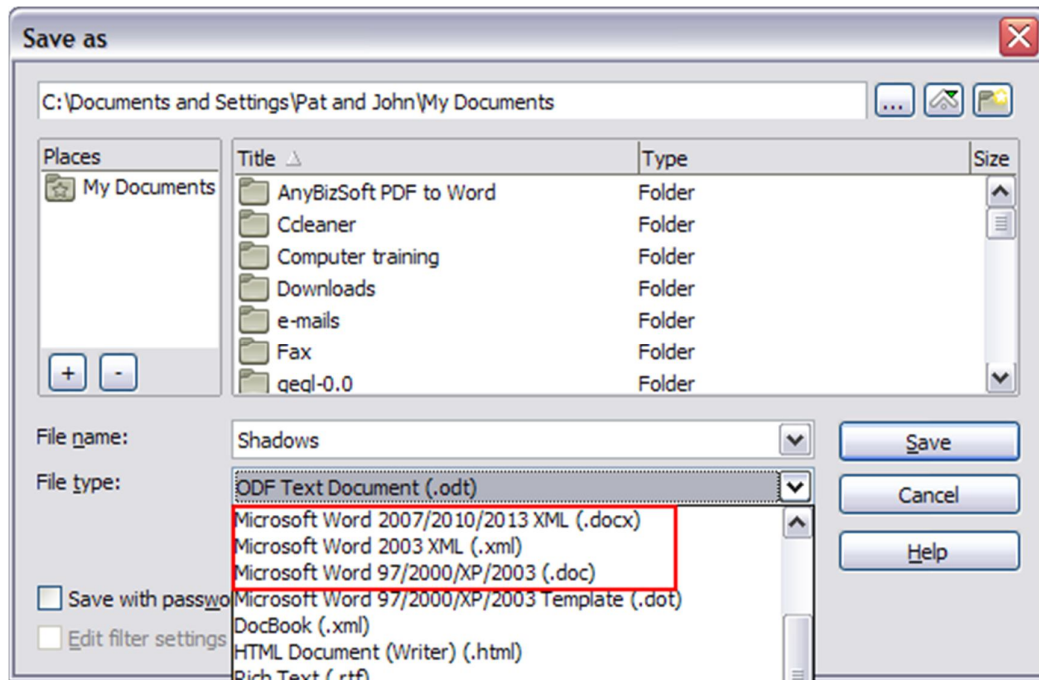
You have changed the name and file type of your document. If you want to go back to working with the ODT version of your document, you must open it again.

Tip

Saving in ODF format gives you the option to redo the document if the recipient of your document experiences trouble with the Microsoft format.

Tip

To have Writer save documents by default in the Microsoft Word file format, go to **Tools > Options > Load/Save > General**. In the section named *Default file format and ODF settings*, under **Document type**, select **Text document**, then under *Always save as*, select your preferred file format. See Figure 70.



Saving a file in Microsoft Word format

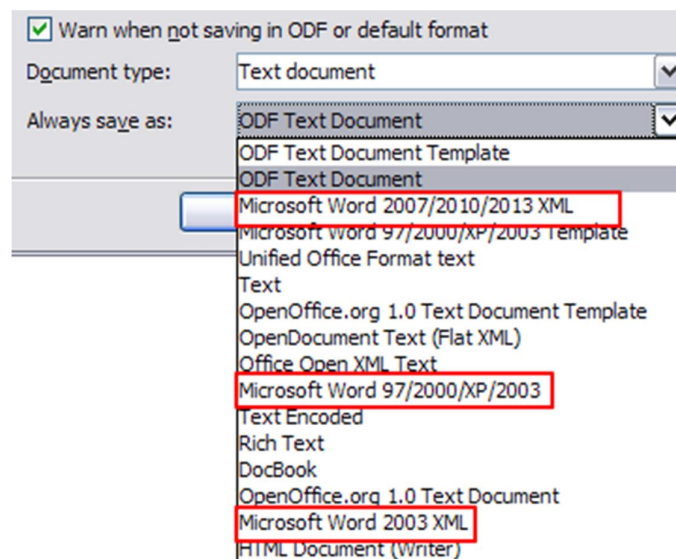


Figure 70: Tools > Options > Load/Save > General page

Working with text

Working with text (selecting, copying, pasting, moving) in Writer is similar to working with text in any other program. LibreOffice also has some convenient ways to select items that are not next to each other, select a vertical block of text, and paste unformatted text.

Selecting items that are not consecutive

To select nonconsecutive items (as shown in Figure 71) using the mouse:

- 1) Select the first piece of text.
- 2) Hold down the *Ctrl* key and use the mouse to select the next piece of text.
- 3) Repeat as often as needed.

Now you can work with the selected text (copy it, delete it, change the style, or whatever).

Macintosh users: substitute the *Command* key when instructions in this chapter say to use the *Ctrl* key.

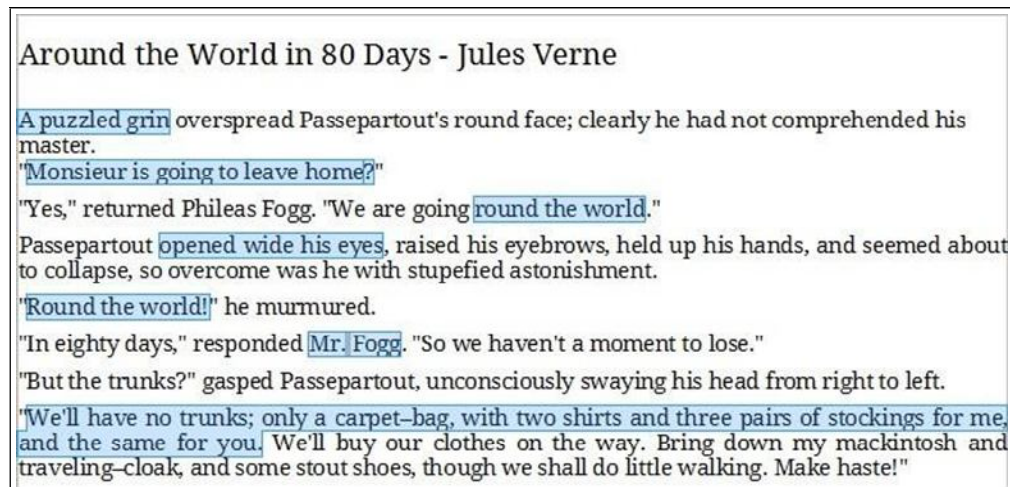


Figure 71: Selecting items that are not next to each other

To select nonconsecutive items using the keyboard:

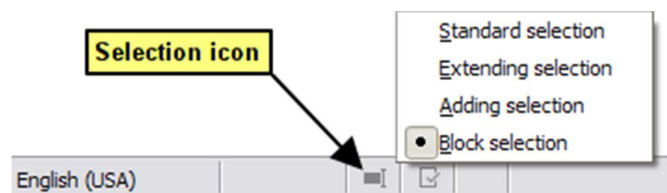
- 1) Select the first piece of text. (For more information about keyboard selection of text, see the topic "Navigating and selecting with the keyboard" in the Help.)
- 2) Press **Shift+F8**. This puts Writer in "Adding selection" mode.
- 3) Use the arrow keys to move to the start of the next piece of text to be selected. Hold down the **Shift** key and select the next piece of text.
- 4) Repeat as often as required.

Now you can work with the selected text.

Press **Esc** to exit from this mode.

Selecting a vertical block of text

You can select a vertical block or "column" of text that is separated by spaces or tabs (as you might see in text pasted from e-mails, program listings, or other sources), using LibreOffice's block selection mode. To change to block selection mode, use **Edit > Selection Mode > Block Area**, or press **Ctrl+F8**, or click on the **Selection** icon in the Status Bar and select **Block selection** from the list.



Now highlight the selection, using mouse or keyboard, as shown below.

January	February	March
April	May	June
July	August	September
October	November	December

Figure 72: Selecting a vertical block of text

Cutting, copying, and pasting text

Cutting and copying text in Writer is similar to cutting and copying text in other applications. You can use the mouse or the keyboard for these operations. You can copy or move text within a document, or between documents, by dragging or by using menu selections, toolbar buttons, or keyboard shortcuts. You can also copy text from other sources such as Web pages and paste it into a Writer document.

To *move* (drag and drop) selected text using the mouse, drag it to the new location and release it. To *copy* selected text, hold down the *Ctrl* key while dragging. The text retains the formatting it had before dragging.

To *move* (cut and paste) selected text, use *Ctrl+X* to cut the text, insert the cursor at the paste-in point and use *Ctrl+V* to paste. Alternatively, use the buttons on the **Standard** toolbar.

When you paste text, the result depends on the source of the text and how you paste it. If you click on the **Paste** button, any formatting the text has (such as bold or italics) is retained. Text pasted from Web sites and other sources may also be placed into frames or tables. If you do not like the results, click the **Undo** button or press *Ctrl+Z*.

To make the pasted text inherit the paragraph style at the insertion point:

- Choose **Edit > Paste Special**, or
- Click the arrow button of the combination **Paste** button, or
- Click the **Paste** button without releasing the left mouse button.

Then select **Unformatted text** from the resulting menu.

The range of choices on the Paste Special menu varies depending on the origin and formatting of the text (or other object) to be pasted. See Figure 73 for an example with text on the clipboard.

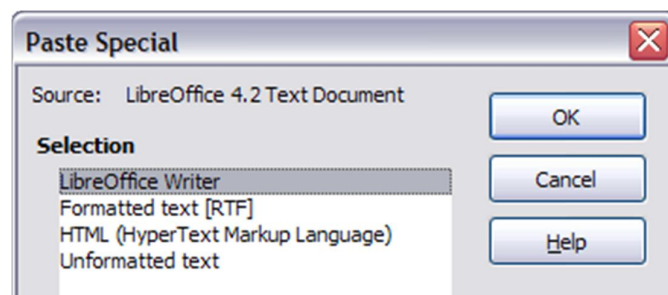


Figure 73: Paste Special menu

Finding and replacing text and formatting

Writer has two ways to find text within a document: the Find toolbar for fast searching and the Find & Replace dialog. In the dialog, you can:

- Find and replace words and phrases
- Use wildcards and regular expressions to fine-tune a search
- Find and replace specific attributes or formatting
- Find and replace paragraph styles

Using the Find toolbar

If the Find toolbar is not visible, you can display it by choosing **View > Toolbars > Find** from the Menu bar or by pressing *Ctrl+F*. The Find toolbar is shown docked at the bottom of the LibreOffice window (just above the Status Bar) in Figure 74, but you can float it or dock it in another location. For more information on floating and docking toolbars, see Chapter 1, Introducing LibreOffice.

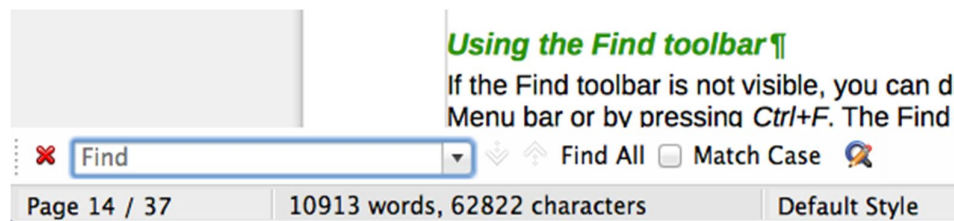


Figure 74: Docked position of Find toolbar


To use the Find toolbar, click in the box and type your search text, then press *Enter* to find the next

occurrence of that term from the current cursor position. Click the **Find Next** or **Find Previous** buttons as needed.

Click the **Find All** button to select all instances of the search term within the document. Select **Match Case** to find only the instances that exactly match the search term. Select the button to the right of Match Case to open the Find & Replace dialog.

The Find toolbar can be closed by clicking the red X button on the left, or by pressing *Esc* on the keyboard when the text cursor is in the search box.

Using the Find & Replace dialog

To display the Find & Replace dialog, use the keyboard shortcut *Ctrl+H* or choose **Edit > Find & Replace** from the Menu bar. If the Find toolbar is open, click the Find and Replace button () on the toolbar. Once opened, optionally click the **Other Options** symbol to expand the dialog. Click the button again to reduce the dialog options.

To use the Find & Replace dialog:

- 1) Type the text you want to find in the **Search for** box.
- 2) To replace the text with different text, type the new text in the **Replace with** box.
- 3) You can select various options such as matching the case, matching whole words only, or doing a search for similar words.
- 4) When you have set up your search, click **Find**. To replace the found text, click **Replace**.

For more information on using Find & Replace, see the *Writer Guide*.



Tip

If you click **Find All**, LibreOffice selects all instances of the search text in the document. Similarly, if you click **Replace All**, LibreOffice replaces all matches.



Caution

Use **Replace All** with caution; otherwise, you may end up with some hilarious (and highly embarrassing) mistakes. A mistake with **Replace All** might require a manual, word-by-word, search to fix.

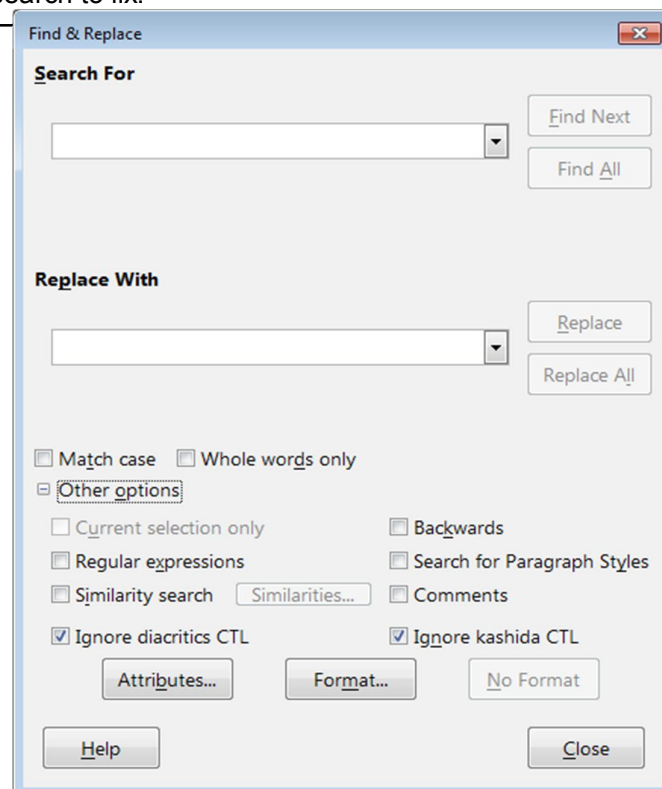


Figure 75: Expanded Find & Replace dialog

Inserting special characters

A *special character* is one not found on a standard English keyboard. For example, © ¼ æ ç ñ ö ø ¢ are all special characters. To insert a special character:

- 1) Place the cursor where you want the character to appear.
- 2) Choose **Insert > Special Character** or click on the Special Character icon in the main toolbar to open the Special Characters dialog.
- 3) Select the characters (from any font or mixture of fonts) you wish to insert, in order, then click **OK**. The characters selected for insertion are shown in the lower left of the dialog. As you select a character, it is shown on the right, along with its numerical code.

Note

Different fonts include different special characters. If you do not find a particular special character, try changing the *Font* selection.

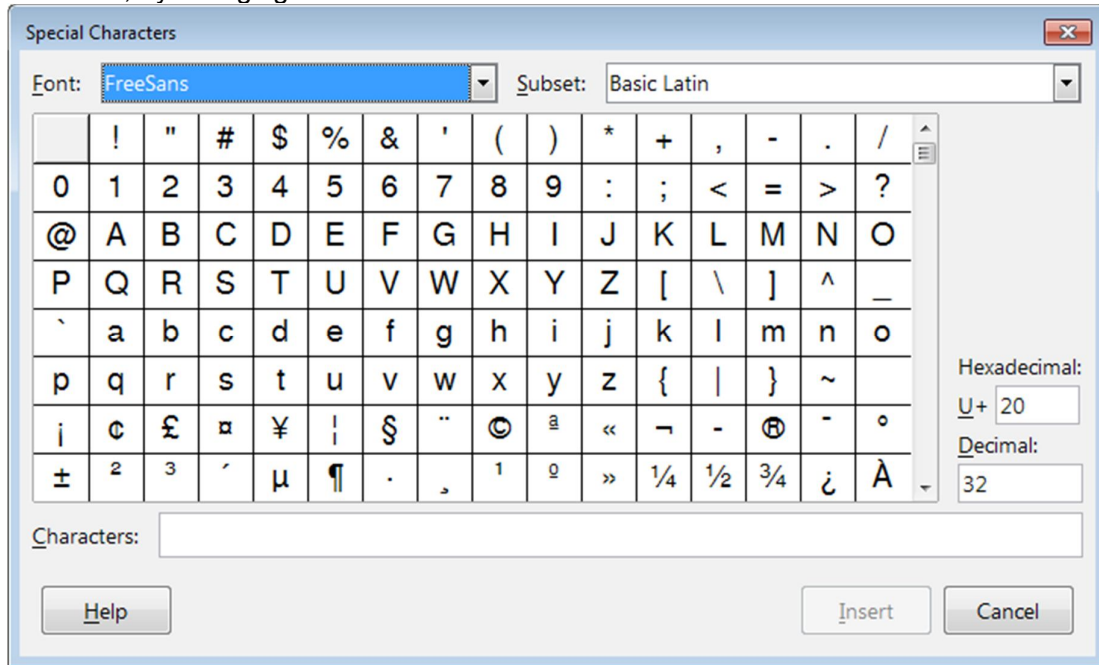


Figure 76: The Special Characters dialog, where you can insert special characters

Inserting dashes and non-breaking spaces and hyphens

To prevent two words from being separated at the end of a line, press **Ctrl+Shift** when you type the space between the two words. This inserts a non-breaking space.

In cases where you do not want the hyphen to appear at the end of a line, for example in a number such as 123-4567, you can press **Shift+Ctrl+minus sign** to insert a non-breaking hyphen.

To enter en and em dashes, you can use the *Replace dashes* option on the Options tab under **Tools > AutoCorrect Options**. This option replaces two hyphens, under certain conditions, with the corresponding dash.

- is an en-dash; that is, a dash the width of the letter “n” in the font you are using. Type at least one character, a space, one or two hyphens, another space, and at least one more letter. The one or two hyphens will be replaced by an en-dash.
- is an em-dash; that is, a dash the width of the letter “m” in the font you are using. Type at least one character, two hyphens, and at least one more character. The two hyphens will be replaced by an em-dash.

See the Help for more details. For other methods of inserting dashes, see *Chapter 3, Working with Text* in the *Writer Guide*.

Setting tab stops and indents

The horizontal ruler shows the tab stops. Any tab stops that you have defined will overwrite the default tab stops. Tab settings affect indentation of full paragraphs (using the **Increase Indent** and **Decrease Indent** buttons on the Formatting toolbar) as well as indentation of parts of a paragraph

(by pressing the *Tab* key on the keyboard).

Using the default tab spacing can cause formatting problems if you share documents with other people. If you use the default tab spacing and then send the document to someone else who has chosen a different default tab spacing, tabbed material will change to use the other person's settings. Instead of using the defaults, define your own tab settings, as described in this section.

To define indents and tab settings for one or more selected paragraphs, double-click on a part of the ruler that is not between the left and right indent icons to open the *Indents & Spacing* page of the Paragraph dialog. Double-click anywhere between the left and right indent icons on the ruler to open the *Tabs* page of the Paragraph dialog.

A better strategy is to define tabs for the paragraph *style*. See Chapters 6 and 7 in the *Writer Guide* for more information.



Tip

Using tabs to space out material on a page is not recommended. Depending on what you are trying to accomplish, a table is usually a better choice.

Changing the default tab stop interval



Caution

Any changes to the default tab setting will affect the existing default tab stops in any document you open afterward, as well as tab stops you insert after making the change.

To set the measurement unit and the spacing of default tab stop intervals, go to **Tools > Options > LibreOffice Writer > General**.



Figure 77: Selecting a default tab stop interval

You can also set or change the measurement unit for rulers in the current document by right-clicking on the ruler to open a list of units. Click on one of them to change the ruler to that unit. The selected setting applies only to that ruler.

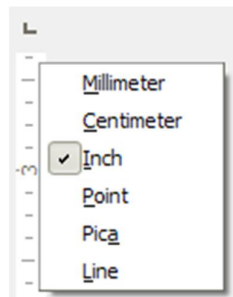


Figure 78: Changing the measurement unit for a ruler

Checking spelling and grammar

Writer provides a spelling checker, which can be used in two ways.



Automatic Spell Check checks each word as it is typed and displays a wavy red line under any unrecognized words. When the word is corrected, the line disappears.



To perform a combined spelling and grammar check on the document (or a text selection) click the **Spelling and Grammar** button. This checks the document or selection and opens the Spelling and Grammar dialog if any unrecognized words are found. In order to use this, the appropriate dictionaries must be installed. By default, four dictionaries are installed: a spelling checker, a grammar checker, a hyphenation dictionary, and a thesaurus.

Here are some more features of the spelling checker:

- You can right-click on a word with a wavy underline to open a context menu. If you select from the suggested words on the menu, the selection will replace the unrecognized word in your text. Other menu options are discussed below.
- You can change the dictionary language (for example, Spanish, French or German) on the Spelling and Grammar dialog.
- You can add a word to the dictionary. Click **Add to Dictionary** in the Spelling and Grammar dialog or in the context menu.
- Click the **Options** button on the Spelling and Grammar dialog to open a dialog similar to the one in **Tools > Options > Language Settings > Writing Aids** described in Chapter 2. There you can choose whether to check uppercase words and words with numbers, and you can manage custom dictionaries, that is, add or delete dictionaries and add or delete words in a dictionary.
- There are a number of different methods by which you can set paragraphs to be checked in a specific language (different from the rest of the document). For example by clicking on the Language button on the Status Bar. See Chapter 7, Working with Styles, in the *Writer Guide* for more information.

See Chapter 3, Working with Text, in the *Writer Guide*, for a detailed explanation of the spelling and grammar checking facility.

Using built-in language tools

Writer provides some tools that make your work easier if you mix multiple languages within the same document or if you write documents in various languages.


The main advantage of changing the language for a text selection is that you can then use the correct dictionaries to check spelling and apply the localized versions of Autocorrect replacement tables, thesaurus, grammar, and hyphenation rules.

You can also set the language for a paragraph or a group of characters as **None (Do not check spelling)**. This option is especially useful when you insert text such as web addresses or programming language snippets that you do not want to check for spelling.

Specifying the language in character and paragraph styles can be problematic unless you use a particular style for a different language. Changing the Language on the Font tab of the Paragraph Styles dialog, will change the language for all paragraphs that use that paragraph style. You can set certain paragraphs be checked in a language that is different from the language of the rest of the document by putting the cursor in the paragraph and changing the language on the Status Bar. See Chapter 7, Working with Styles, in the *Writer Guide* for information on how to manage the language settings of a style.

You can also set the language for the whole document, for individual paragraphs, or even for individual words and characters, from **Tools > Language** on the Menu bar.

Another way to change the language of a whole document is to use **Tools > Options > Language Settings > Languages**. In the *Default languages for documents* section, you can choose a different language for all the text that is not explicitly marked as a different language.

The spelling checker works only for those languages in the list that have the symbol () next to them. If you do not see the symbol next to your preferred language, you can install the additional dictionary using **Tools > Language > More Dictionaries Online**.

The language used for checking spelling is also shown in the Status Bar, next to the page style in use.

Using AutoCorrect

Writer's AutoCorrect function has a long list of common misspellings and typing errors, which it corrects automatically. For example, "hte" will be changed to "the".

AutoCorrect is turned on when Writer is installed. To turn it off, uncheck **Tools > AutoCorrect > While Typing**.

Choose **Tools > AutoCorrect > AutoCorrect Options** to open the AutoCorrect dialog. There you can define which strings of text are corrected and how. In most cases, the defaults are fine.

To stop Writer replacing a specific spelling, go to the **Replace** tab, highlight the word pair, and click

Delete.

To add a new spelling to the list, type it into the *Replace* and *With* boxes on the Replace tab, and click **New**.

See the different tabs of the dialog for the wide variety of other options available to fine-tune AutoCorrect.



Tip

AutoCorrect can be used as a quick way to insert special characters. For example, (c) will be changed to ©. You can add your own special characters.

LibreOffice has an extensive list of special characters accessible with AutoCorrect. For example, type *:smiling:* and AutoCorrect will replace it by ☺.

Using word completion

If Word Completion is enabled, Writer tries to guess which word you are typing and offers to complete the word for you. To accept the suggestion, press *Enter*. Otherwise, continue typing. To turn off Word Completion, select **Tools > AutoCorrect > AutoCorrect Options > Word Completion** and deselect **Enable word completion**.

You can customize word completion from the *Word Completion* page of the AutoCorrect dialog:

- Add (append) a space automatically after an accepted word
- Show the suggested word as a tip (hovering over the word) rather than completing the text as you type
- Collect words when working on a document, and then either save them for later use in other documents or select the option to remove them from the list when closing the document.
- Change the maximum number of words remembered for word completion and the length of the smallest words to be remembered
- Delete specific entries from the word completion list
- Change the key that accepts a suggested entry—the options are *Right arrow*, *Endkey*, *Return (Enter)*, and *Space bar*

Note



Automatic word completion only occurs after you type a word for the second time in a document.

Using AutoText

Use AutoText to store text, tables, graphics and other items for reuse and assign them to a key combination for easy retrieval. For example, rather than typing “Senior Management” every time you use that phrase, you can set up an AutoText entry to insert those words when you type “sm” and press *F3*.

AutoText is especially powerful when assigned to fields. See Chapter 14, Working with Fields, in the *Writer Guide* for more information.

Creating AutoText

To store some text as AutoText:

- 1) Type the text into your document.
- 2) Select the text.
- 3) Choose **Tools > AutoText** (or press *Ctrl+F3*).
- 4) In the AutoText dialog, type a name for the AutoText in the *Name* box. Writer will suggest a one-letter shortcut, which you can change.
- 5) In the large box to the left, choose the category for the AutoText entry, for example *My AutoText*.
- 6) Click the **AutoText** button on the right and select **New (text only)** from the menu.
- 7) Click **Close** to return to your document.



Tip

If the only option under the AutoText button is Import, either you have not entered a name for your AutoText or there is no text selected in the document.

To insert AutoText, type the shortcut and press *F3*.

Formatting text

Using styles is recommended

Styles are central to using Writer. Styles enable you to easily format your document consistently, and to change the format with minimal effort. A style is a named set of formatting options. When you apply a style, you apply a whole group of formats at the same time. In addition, styles are used by LibreOffice for many processes, even if you are not aware of them. For example, Writer relies on heading styles (or other styles you specify) when it compiles a table of contents.



Caution

Manual formatting (also called *direct formatting*) overrides styles, and you cannot get rid of the manual formatting by applying a style to it.



Tip

To remove manual formatting, select the text and choose **Format > Clear Direct Formatting** from the Menu bar, or right-click and choose **Clear Direct Formatting** from the context menu, or click the **Clear Direct Formatting** button on the Formatting toolbar, or use *Ctrl+M* from the keyboard.

Note



When clearing direct formatting, the text formatting will return to the applied paragraph style and not the default paragraph style.

Writer defines several types of styles, for different types of elements: characters, paragraphs, pages, frames, and lists. See Chapter 3, Using Styles and Templates, in this book and Chapters 6 and 7 in the *Writer Guide*.

Formatting paragraphs

You can apply many formats to paragraphs using the buttons on the Formatting toolbar and by using the Paragraph panel of the Sidebar's Properties deck. Not all buttons are visible in a standard installation, but you can customize the toolbar to include those you use regularly. These buttons and formats include:

- Apply Style
- Bullets On/Off (with a palette of bullet styles)
- Numbering On/Off (with a palette of numbering styles)
- Align Left, Center Horizontally, Align Right, or Justified
- Align Top, Center Vertically, Align Bottom
- Line Spacing (choose from 1, 1.15, 1.5, 2, or custom spacing)
- Increase Paragraph Spacing, Decrease Paragraph Spacing
- Increase Indent, Decrease Indent
- Paragraph (to open the Paragraph dialog)

Formatting characters

You can apply many formats to characters using the buttons on the Formatting toolbar and by using the Character panel of the Sidebar's Properties deck. Not all buttons are visible in a standard installation, but you can customize the toolbar to include those you use regularly. These buttons and formats include:

- Font Name, Font Size
- Bold, Italic, Underline, Double Underline, Overline, Strikethrough, Outline
- Superscript, Subscript
- Uppercase, Lowercase
- Increase Font Size, Decrease Font Size
- Font Color (with a palette of colors)
- Background Color (with a palette of colors)

- Highlighting (with a palette of colors)
- Character (to open the Character dialog)

Autoformatting

You can set Writer to format parts of a document automatically according to the choices made on the Options page of the AutoCorrect dialog (**Tools > AutoCorrect > AutoCorrect Options**).



Tip

If you notice unexpected formatting changes occurring in your document, this is the first place to look for the cause. In most cases Undo (**Ctrl+Z**) fixes the issue.

The Help describes each of these choices and how to activate the autoformats. Some common unwanted or unexpected formatting changes include:

- Horizontal lines. If you type three or more hyphens (---), underscores (____) or equal signs (===) on a line and then press *Enter*, the paragraph is replaced by a horizontal line as wide as the page. The line is actually the lower border of the preceding paragraph.
- Bulleted and numbered lists. A bulleted list is created when you type a hyphen (-), star (*), or plus sign (+), followed by a space or tab at the beginning of a paragraph. A numbered list is created when you type a number followed by a period (.), followed by a space or tab at the beginning of a paragraph. Automatic numbering is only applied to paragraphs formatted with the *Default*, *Text body* or *Text body indent* paragraph styles.

To turn autoformatting on or off, choose **Format > AutoCorrect** and select or deselect the items on the list.

Creating numbered or bulleted lists

There are several ways to create numbered or bulleted lists:

- Use autoformatting, as described above.
- Use list (numbering) styles, as described in Chapter 6, Introduction to Styles, and Chapter 7, Working with Styles, in the *Writer Guide*.
- Use the Numbering and Bullets buttons on the Formatting toolbar or on the Paragraph panel of the Sidebar's Properties deck: select the paragraphs for the list, and then click the appropriate button on the toolbar or in the Sidebar.

Note

It is a matter of personal preference whether you type your information first, then apply numbering/bullets, or apply them as you type.

Using the Bullets and Numbering toolbar

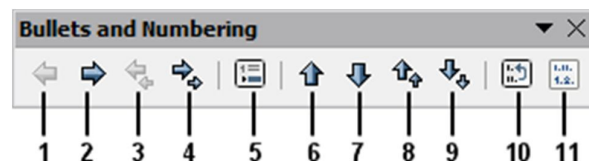
You can create nested lists (where one or more list items has a sub-list under it, as in an outline) by using the buttons on the Bullets and Numbering toolbar (Figure 79). You can move items up or down the list, create sub-points, change the style of bullets, and access the Bullets and Numbering dialog, which contains more detailed controls. Use **View > Toolbars > Bullets and Numbering** to see the toolbar.

Note

If numbering or bullets are being applied automatically in a way that you find inappropriate, you can switch them off temporarily by unchecking **Format > AutoCorrect > While Typing**.

Using the Sidebar for Bullets and Numbering

The Bullets and Numbering features (drop-down palettes of tools) on the Paragraph panel on the Properties deck of the Sidebar can also be used to create nested lists and access the Bullets and Numbering dialog. However, the Sidebar does not include tools for promoting and demoting items in the list, as found on the Bullets and Numbering toolbar.



- | | | |
|------------------------------------|---------------------------|----------------------------|
| 1 Promote One Level | 5 Insert Unnumbered Entry | 8 Move Up with Subpoints |
| 2 Demote One Level | | 9 Move Down with Subpoints |
| 3 Promote One Level with Subpoints | 6 Move Up | 10 Restart Numbering |
| 4 Demote One Level with Subpoints | 7 Move Down | 11 Bullets and Numbering |

Figure 79: Bullets and Numbering toolbar

Hyphenating words

You have several choices regarding hyphenation: let Writer do it automatically (using its hyphenation dictionaries), insert conditional hyphens manually where necessary, or don't hyphenate at all.

Automatic hyphenation

To turn automatic hyphenation of words on or off:

- 1) Press **F11** (⌘+T on Mac) to open the Styles and Formatting window, or, if the Sidebar is open, click on the **Styles and Formatting** tab to open the Styles and Formatting deck.
- 2) On the Paragraph Styles page (Figure 80), right-click on **Default Style** and select **Modify**.

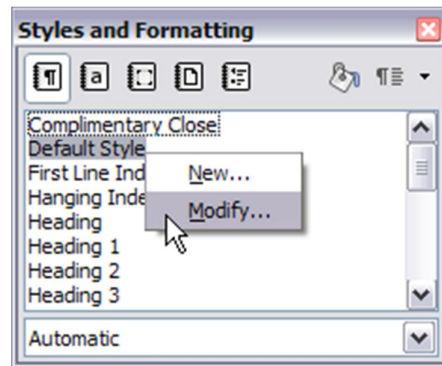


Figure 80: Modifying a style

- 3) On the Paragraph Style dialog (Figure 81), go to the *Text Flow* page.
- 4) Under Hyphenation, select or deselect the **Automatically** option. Click **OK** to save.



Note

Turning on hyphenation for paragraph Default Style affects all other paragraph styles that are based on Default Style. You can individually change other styles so that hyphenation is not active; for example, you might not want headings to be hyphenated. Any styles that are not based on Default Style are not affected. See Chapter 3, Using Styles and Templates, for more about styles based on other styles.

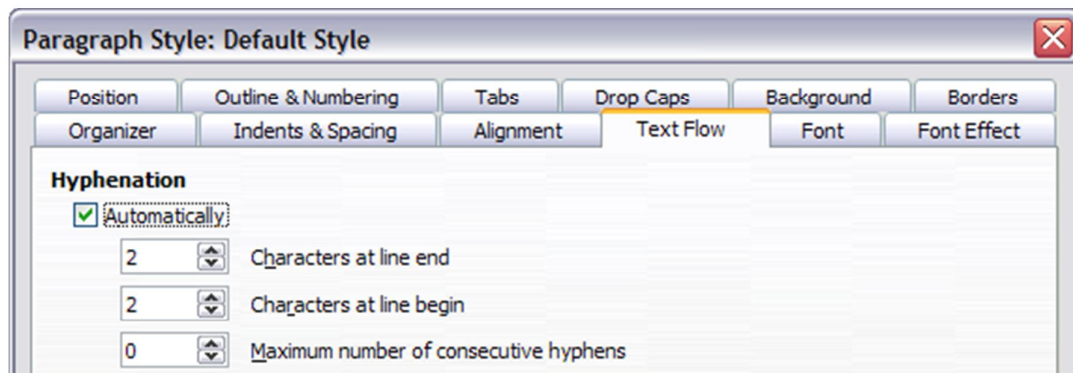


Figure 81: Turning on automatic hyphenation

You can also set hyphenation choices through **Tools > Options > Language Settings > Writing Aids**. In Options, near the bottom of the dialog, scroll down to find the hyphenation settings.

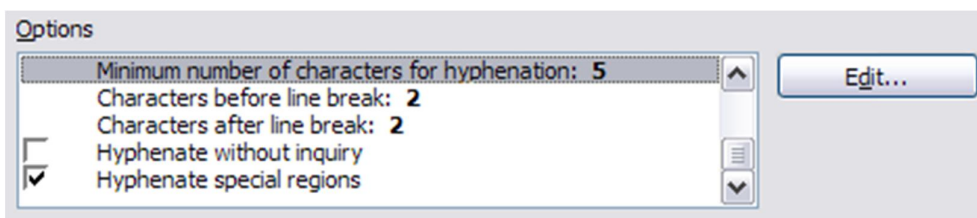


Figure 82: Setting hyphenation options

To change the minimum number of characters for hyphenation, the minimum number of characters before a line break, or the minimum number of characters after a line break, select the item, and then click the **Edit** button in the Options section.

Hyphenation options set on the Writing Aids dialog are effective only if hyphenation is turned on through paragraph styles.

Manual hyphenation

To manually hyphenate words, do not use a normal hyphen, which will remain visible even if the word is no longer at the end of a line when you add or delete text or change margins or font size. Instead, use a conditional hyphen, which is visible only when required.

To insert a conditional hyphen inside a word, click where you want the hyphen to appear and press **Ctrl+hyphen**. The word will be hyphenated at this position when it is at the end of the line, even if automatic hyphenation for this paragraph is switched off.

Formatting pages

Writer provides several ways for you to control page layouts: page styles, columns, frames, tables, and sections. For more information, see Chapter 4, Formatting Pages, in the *Writer Guide*.



Tip

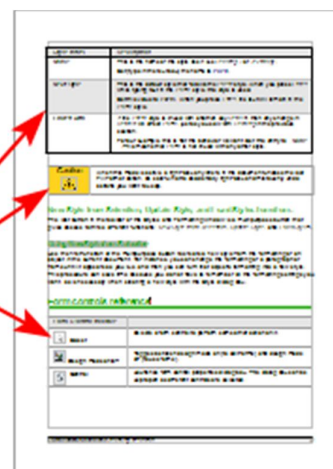
Page layout is usually easier if you show text, object, table, and section boundaries in **Tools > Options > LibreOffice > Appearance**, and paragraph end, tabs, breaks, and other items in **Tools > Options > LibreOffice Writer > Formatting Aids**.

Which layout method to choose?

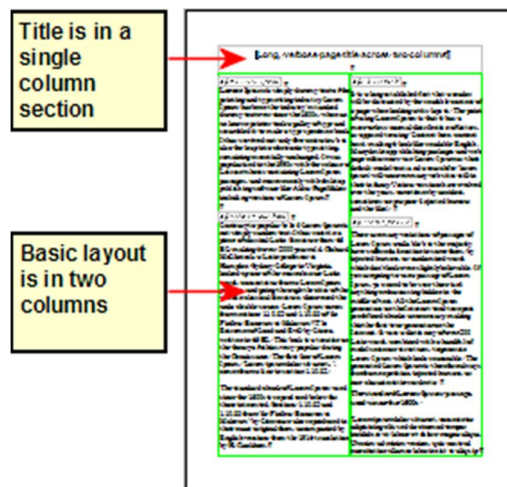
The best layout method depends on what the final document should look like and what sort of information will be in the document. Here are some examples.

For a book similar to this user guide, with one column of text, some figures without text beside them, and some other figures with descriptive text, use page styles for basic layout, and tables to place figures beside descriptive text when necessary.

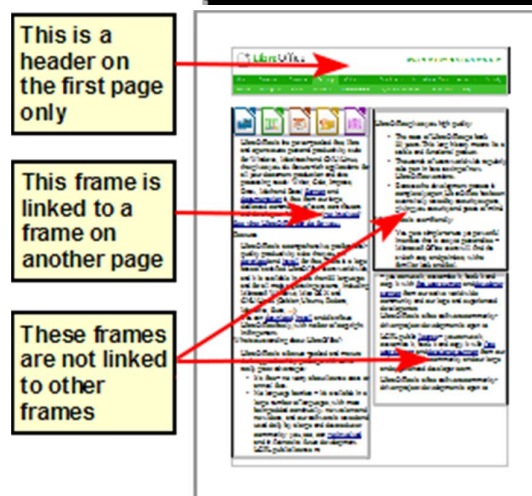
Items
formatted as
a table



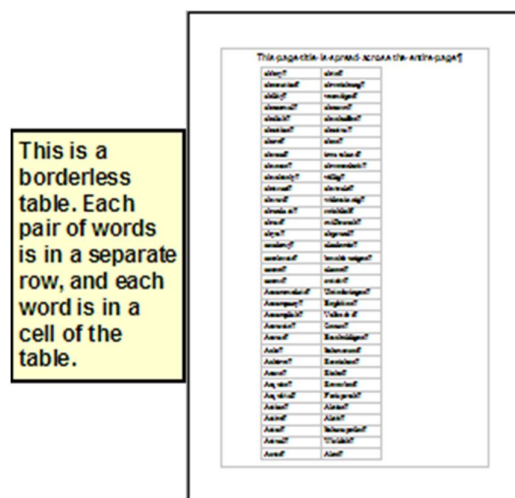
For an index or other document with two columns of text, where the text continues from the left-hand column to the right-hand column and then to the next page, all in sequence (also known as “snaking columns” of text), use page styles (with two columns). If the title of the document (on the first page) is full-page width, put it in a single-column section.



For a newsletter with complex layout, two or three columns on the page, and some articles that continue from one page to some place several pages later, use page styles for basic layout. Place articles in linked frames and anchor graphics to fixed positions on the page if necessary.



For a document with terms and translations to appear side-by-side in what appear to be columns, use a table to keep items lined up, and so you can type in both “columns”.



Creating headers and footers

A header is an area that appears at the top of a page above the margin. A footer appears at the bottom of the page below the margin. Information such as page numbers inserted into a header or footer displays on every page of the document with that page style.

A header and a footer are properties of the page style. Set or unset headers and footers of all page styles in use in your document.

Inserting a header or footer

To insert a header, you can either:

- Choose **Insert > Header and Footer > Header > Default Style** (or some other page style, if not Default Style), or
- Click above the top margin to make the Header marker appear (Figure 83), and then click on the +.

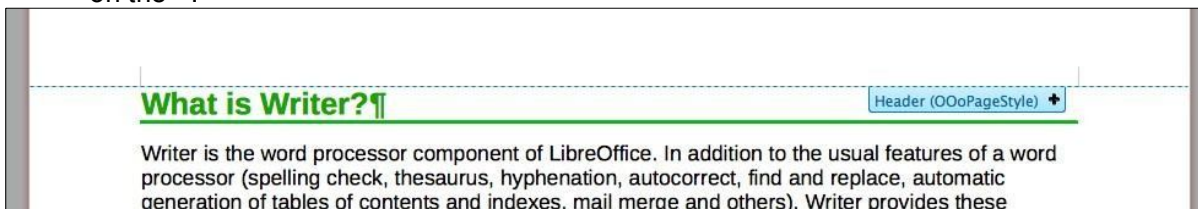
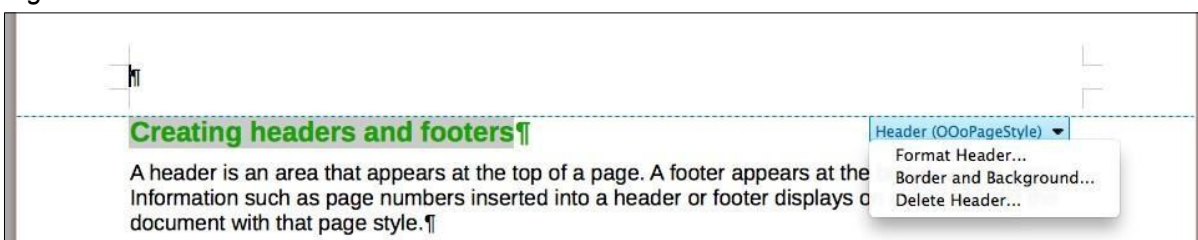


Figure 83: Header marker at top of text area

After a header has been created, a down-arrow appears on the header marker. Click on this arrow to drop down a menu of choices for working with the header (Figure 84).

Figure 84: Header menu



To format a header, you can use either the menu item shown in Figure 84 or **Format > Page > Header**. Both methods take you to the same tab on the Page Style dialog.

Inserting header and footer contents

Other information such as document titles and chapter titles is often put into the header or footer. These items are best added as fields. That way, if something changes, the headers and footers are updated automatically. Here is one common example.

To insert the document title into the header:

- 1) Choose **File > Properties > Description** and type a title for your document.
- 2) Add a header (**Insert > Header and Footer > Header > Default**).
- 3) Place the cursor in the header part of the page.
- 4) Choose **Insert > Fields > Title**. The title should appear on a gray background (which does not show when printed and can be turned off).
- 5) To change the title for the whole document, go back to **File > Properties > Description**.

Fields are covered in detail in Chapter 14, Working with Fields, in the *Writer Guide*.

For more about headers and footers, see Chapter 4, Formatting Pages, and Chapter 6, Introduction to Styles, in the *Writer Guide*.

Numbering pages

Displaying the page number

To display page numbers automatically:

- 1) Insert a header or footer, as described in “Creating headers and footers” above.
- 2) Place the cursor in the header or footer where you want the page number to appear and choose **Insert > Fields > Page Number**.

Including the total number of pages

To include the total number of pages (as in “page 1 of 12”):

- 1) Type the word “page” and a space, then insert the page number as above.
- 2) Press the space bar once, type the word “of” and a space, then choose **Insert > Fields > Page Count**.



Note

The Page Count field inserts the total number of pages in the document, as shown on the Statistics tab of the document's Properties window (**File > Properties**). If you restart page numbering anywhere in the document, then the total page count may not be what you want. See Chapter 4, Formatting Pages, in the *Writer Guide* for more information.

Restarting page numbering

Often you will want to restart the page numbering at 1, for example on the page following a title page or a table of contents. In addition, many documents have the “front matter” (such as the table of contents) numbered with Roman numerals and the main body of the document numbered in Arabic numerals, starting with 1.

You can restart page numbering in two ways.

Method 1:

- 1) Place the cursor in the first paragraph of the new page.
- 2) Choose **Format > Paragraph**.
- 3) On the Text Flow tab of the Paragraph dialog (Figure 81 on page 102), select **Breaks**.
- 4) Select **Insert** and then **With Page Style** and specify the page style to use.
- 5) Specify the page number to start from, and then click **OK**.



Tip

Method 1 is also useful for numbering the first page of a document with a page number greater than 1. For example, you may be writing a book, with each chapter in a separate file. Chapter 1 may start with page 1, but Chapter 2 could begin with page 25 and Chapter 3 with page 51.

Method 2:

- 1) **Insert > Manual break**.
- 2) By default, **Page break** is selected on the Insert Break dialog (Figure 85).
- 3) Choose the required page **Style**.
- 4) Select **Change page number**.
- 5) Specify the page number to start from, and then click **OK**.

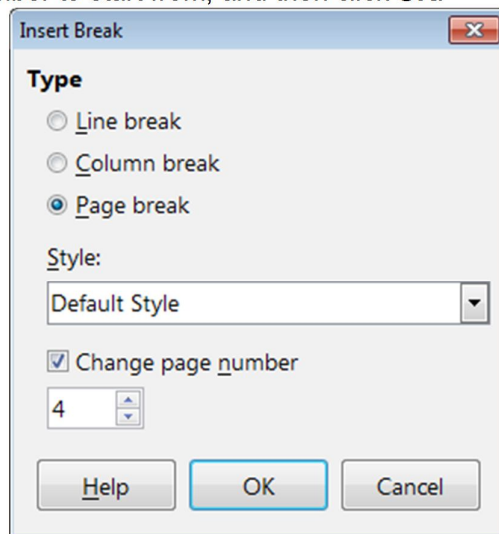


Figure 85: Restarting page numbering after a manual page break

Changing page margins

You can change page margins in three ways:

- Using the page rulers—quick and easy, but does not have fine control
- Using the Page Style dialog—can specify margins to two decimal places
- Using the Page panel on the Properties deck of the Sidebar



Caution

If you change the margins, the new margins affect the page style and will be shown in the Page Style dialog the next time you open it.

Because the page style is affected, the changed margins apply to **all** pages using that style.

To change margins using the rulers:

- 1) The gray sections of the rulers are the margins. Put the mouse cursor over the line between the gray and white sections. The pointer turns into a double-headed arrow and displays the current setting in a tool-tip.
- 2) Hold down the left mouse button and drag the mouse to move the margin.

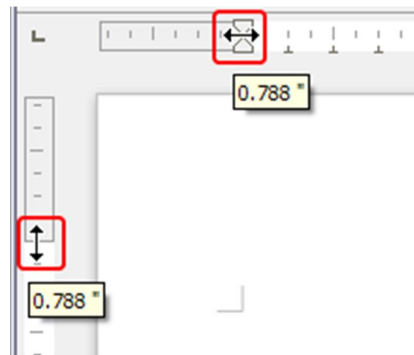


Figure 86: Moving the margins

The small arrowheads (gray triangles) on the ruler are used for indenting paragraphs. They are often in the same place as the page margins, so you need to be careful to move the margin marker, not the arrows. The double-headed arrows shown in Figure 86 are mouse cursors shown in the correct position for moving the margin markers.

To change margins using the Page Style dialog:

- 1) Right-click anywhere in the text area on the page and select **Page** from the context menu.
- 2) On the **Page** tab of the dialog, type the required distances in the Margins boxes.

To change margins using the Page panel of the Properties deck of the Sidebar:

- 1) On the open Sidebar (**View > Sidebar**) select the **Properties** tab.
- 2) Open the Page panel if is not open by clicking the plus (+) symbol in the panel title
- 3) Click the **Margin** button to open the sub-panel and enter the required dimensions in the **Custom** size boxes (clicking the **More Options** button will open the Page Style dialog).

Adding comments to a document

Authors and reviewers often use comments to exchange ideas, ask for suggestions, or mark items needing attention.

You can select a contiguous block of text, which may be multiple paragraphs, for a comment; or you can select a single point at which the comment will be inserted.

To insert a comment, select the text, or place the cursor in the place the comment refers to, and choose **Insert > Comment** or press *Ctrl+Alt+C*. The anchor point of the comment is connected by a dotted line to a box on the right-hand side of the page where you can type the text of the comment. A Comments button is also added to the right of the horizontal ruler; you can click this button to toggle the display of the comments.

Writer automatically adds at the bottom of the comment the author's name and a time stamp indicating when the comment was created. Figure 87 shows an example of text with comments from two different authors.

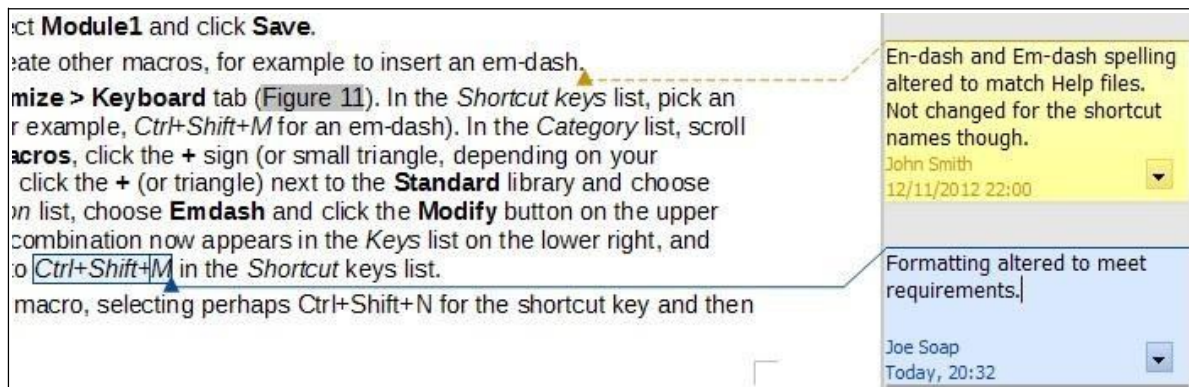


Figure 87: Example of comments

Choose **Tools > Options > LibreOffice > User Data** to configure the name you want to appear in the Author field of the comment, or to change it.

If more than one person edits the document, each author is automatically allocated a different background color.

Right-click on a comment to open a context menu where you can delete the current comment, all the comments from the same author, or all the comments in the document. From this menu, you can also open a dialog to apply some basic formatting to the text of comments. You can paste saved text using the Paste button in the menu. You can also change the font type, size, and alignment in the usual editing manner.

To navigate from one comment to another, open the Navigator (*F5*), expand the Comments section, and click on the comment text to move the cursor to the anchor point of the comment in the document. Right-click on the comment to quickly edit or delete it.

You can also navigate through the comments using the keyboard. Use *Ctrl+Alt+Page Down* to move to the next comment and *Ctrl+Alt+Page Up* to move to the previous comment.

Comments can be printed next to the text in the right margin as they appear on screen. Each page is scaled down in order to make space for the comments to fit on the underlying paper size.

Creating a table of contents

Writer's table of contents feature lets you build an automated table of contents from the headings in your document. Before you start, make sure that the headings are styled consistently. For example, you can use the *Heading 1* style for chapter titles and the *Heading 2* and *Heading 3* styles for chapter subheadings.

Although tables of contents can be customized extensively in Writer, often the default settings are all you need. Creating a quick table of contents is simple:

- 1) When you create your document, use the following paragraph styles for different heading levels (such as chapter and section headings): *Heading 1*, *Heading 2*, *Heading 3*, and so on. These are what will appear in your table of contents.
- 2) Place the cursor where you want the table of contents to appear.
- 3) Choose **Insert > Table of Contents and Index > Table of contents, Index or Bibliography**.
- 4) Change nothing in the Insert Index/Table dialog. Click **OK**.

If you add or delete text (so that headings move to different pages) or you add, delete, or change headings, you need to update the table of contents.

To do this:

- 1) Place the cursor within the table of contents.
- 2) Right-click and choose **Update Index or Table of Contents** from the context menu.



Note

If you cannot place the cursor in the table of contents, choose **Tools > Options > LibreOffice Writer > Formatting Aids**, and then select **Enable** in the **Cursor in protected areas** section.

You can customize an existing table of contents at any time. Right-click anywhere in it and choose **Edit Index or Table of Contents** from the context menu. Chapter 12, Creating Tables of Contents, Indexes and Bibliographies, of the *Writer Guide* describes in detail all the customizations you can choose.

Creating indexes and bibliographies

Indexes and bibliographies work in a similar way to tables of contents. Chapter 12, Creating Tables of Contents, Indexes, and Bibliographies, in the *Writer Guide* describes the process in detail.

In addition to alphabetical indexes, other types of indexes supplied with Writer include those for illustrations, tables, and objects, and you can even create a user-defined index. For example, you might want an index containing only the scientific names of species mentioned in the text, and a separate index containing only the common names of species. Before creating some types of indexes, you first need to create index entries embedded in your Writer document.

Working with graphics

Graphics in Writer are of three basic types:

- Image files, including photos, drawings, scanned images, and others
- Diagrams created using LibreOffice's drawing tools
- Charts created using LibreOffice's Chart component

See Chapter 11, Graphics, the Gallery, and Fontwork, in this book and Chapter 8, Working with Graphics, in the *Writer Guide*.

Printing

See Chapter 10, Printing, Exporting, and E-mailing, in this book and Chapter 5, Printing, Exporting, Faxing, and E-mailing, in the *Writer Guide* for details on previewing pages before printing, selecting print options, printing in black and white on a color printer, printing brochures, and other printing features.

Using mail merge

Writer provides very useful features to create and print:

- Multiple copies of a document to send to a list of different recipients (form letters)
- Mailing labels
- Envelopes

All these facilities use a registered data source (a spreadsheet or database containing the name and address records and other information). Chapter 11, Using Mail Merge, in the *Writer Guide* describes the process.

Tracking changes to a document

You can use several methods to keep track of changes made to a document.

- 1) Make your changes to a copy of the document (stored in a different folder, or under a different name, or both), then use Writer to combine the two files and show the differences. Choose **Edit > Track Changes > Compare Document**. This technique is particularly useful if you are the only person working on the document, as it avoids the increase in file size and complexity caused by the other methods.
- 2) Save versions that are stored as part of the original file. However, this method can cause problems with documents of non-trivial size or complexity, especially if you save a lot of versions. Avoid this method if you can.
- 3) Use Writer's change marks (often called "redlines" or "revision marks") to show where you have added or deleted material, or changed formatting. Choose **Edit > Track Changes > Record Changes** before starting to edit. Later, you or another person can review and accept or reject each change. Choose **Edit > Track Changes > Show Changes**. Right-click on an individual change and choose **Accept Change** or **Reject Change** from the context menu, or choose **Edit > Track Changes > Manage Changes** to view the list of changes and accept or reject them. Details are in the *Writer Guide*.



Tip

Not all changes are recorded. For example, changing a tab stop from align left to align right, and changes in formulas (equations) or linked graphics are not recorded.



Caution

A document with active track changes and changes hidden carries the document editing history that may not be noticed by the current user. Contents deleted or modified can be recovered. While this is a feature, it is also a security exposure of the document history.

Using fields

Fields are extremely useful features of Writer. They are used for data that changes in a document (such as the current date or the total number of pages) and for inserting document properties such as name, author, and date of last update. Fields are the basis of cross-referencing (see below); automatic numbering of figures, tables, headings, and other elements; and a wide range of other functions—far too many to describe here. See Chapter 14, Working with Fields, in the *Writer Guide* for details.

Linking to another part of a document

If you type in cross-references to other parts of a document, those references can easily get out of date if you reorganize the order of topics, add or remove material, or reword a heading. Writer provides two ways to ensure that your references are up to date, by inserting links to other parts of the same document or to a different document: hyperlinks and cross-references.

The two methods have the same result if you **Ctrl+click** the link when the document is open in Writer: you are taken directly to the cross-referenced item. However, they also have major differences:

- The text in a hyperlink does **not** automatically update if you change the text of the linked

item (although you can change it manually), but changed text does automatically update in a cross-reference.

- When using a hyperlink, you do not have a choice of the content of the link (for example text or page number), but when using a cross-reference, you have several choices, including bookmarks.
- To hyperlink to an object such as a graphic, and have the hyperlink show useful text such as *Figure 6*, you need to give such an object a useful name (instead of a default name like *Graphics6*), or use the Hyperlink dialog to modify the visible text. In contrast, cross-references to figures with captions automatically show useful text, and you have a choice of several variations of the name.
- If you save a Writer document to HTML, hyperlinks remain active but cross-references do not. (Both remain active when the document is exported to PDF.)

Using hyperlinks

The easiest way to insert a hyperlink to another part of the same document is by using the Navigator:

- 1) Open the document containing the items you want to cross-reference.
- 2) Open the Navigator by clicking its button, choosing **View > Navigator**, pressing *F5*, or opening it in the Sidebar.
- 3) Click the arrow part of the combination **Drag Mode** button, and choose **Insert as Hyperlink**.
- 4) In the list at the bottom of the Navigator, select the document containing the item that you want to cross-reference.
- 5) In the Navigator list, select the item that you want to insert as a hyperlink.
- 6) Drag the item to where you want to insert the hyperlink in the document. The name of the item is inserted in the document as an active hyperlink.

You can also use the Hyperlink dialog to insert and modify hyperlinks within and between documents. See Chapter 12, Creating Web Pages.

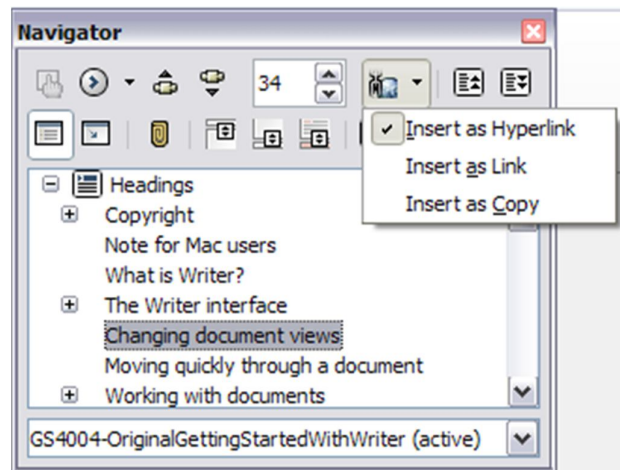


Figure 88: Inserting a hyperlink using the Navigator

Using cross-references

Replace any typed cross-references with automatic ones and, when you update fields, all the references will update automatically to show the current wording or page numbers. The *Cross-references* tab of the Fields dialog lists some items, such as headings, bookmarks, figures, tables, and numbered items such as steps in a procedure. You can also create your own reference items; see “Setting References” in Chapter 14, Working with Fields, in the *Writer Guide* for instructions.

To insert a cross-reference to a heading, figure, bookmark, or other item:

- 1) In your document, place the cursor where you want the cross-reference to appear.
- 2) If the Fields dialog is not open, click **Insert > Cross-reference**. On the *Cross-references* tab (Figure 89), in the *Type* list, select the type of item to be referenced (for example, *Heading* or *Figure*). You can leave this page open while you insert many cross-references.

- 3) Click on the required item in the *Selection* list, which shows all the items of the selected type. In the *Insert reference to* list, choose the format required. The list varies according to the Type. The most commonly used options are **Reference** (to insert the full text of a heading or caption), **Category and Number** (to insert a figure number preceded by the word *Figure* or *Table*, but without the caption text), **Numbering** (to insert only the figure or table number, without the word “Figure” or “Table”), or **Page** (to insert the number of the page the referenced text is on). Click **Insert**.

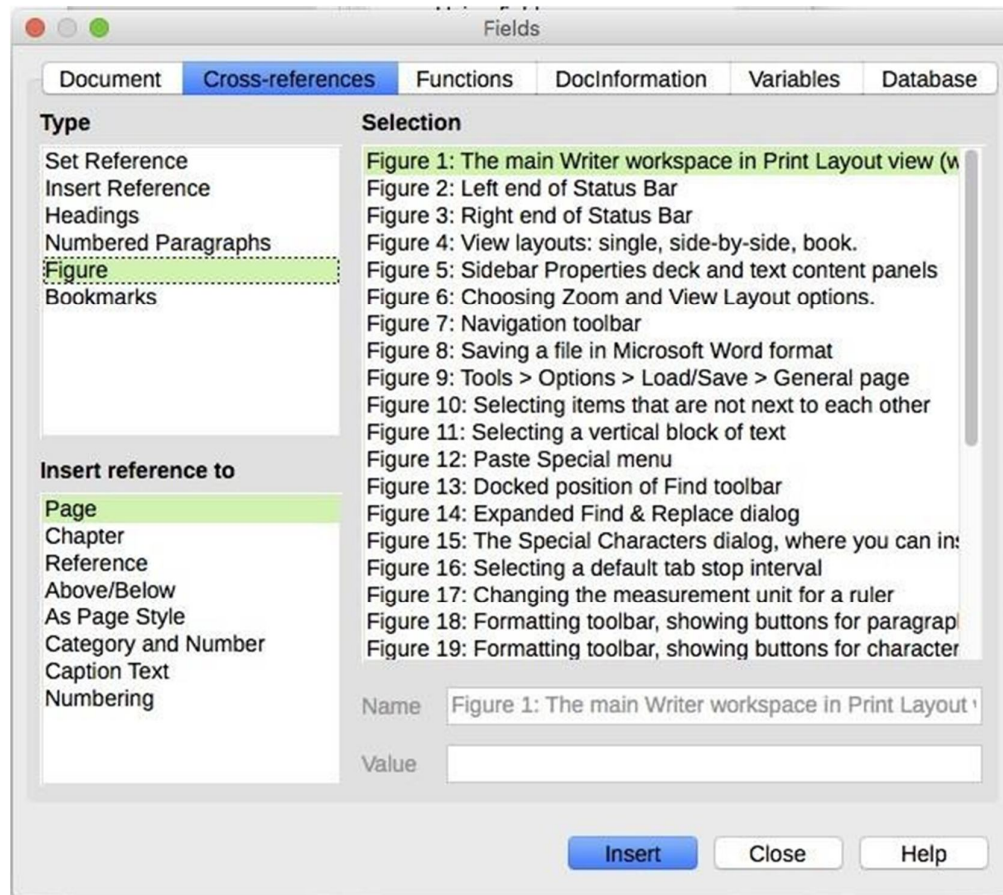


Figure 89: The Cross-references tab of the Fields dialog

Using bookmarks

Bookmarks are listed in the Navigator and can be accessed directly from there with a single mouse click. You can cross-reference to bookmarks and create hyperlinks to bookmarks, as described above.

- 1) Select the text you want to bookmark. Click **Insert > Bookmark**.
- 2) On the Insert Bookmark dialog, the larger box lists any previously defined bookmarks. Type a name for this bookmark in the top box, and then click **OK**.

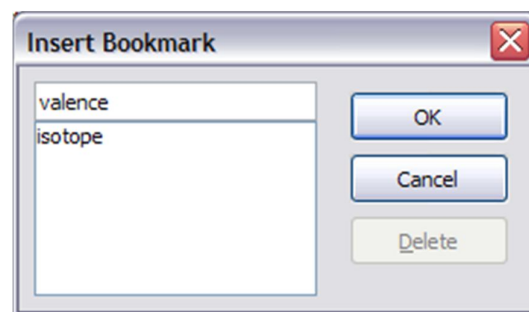


Figure 90: Inserting a bookmark

Using master documents

Master documents are typically used for producing long documents such as a book, a thesis, or a long report; or when different people are writing different chapters or other parts of the full document, so you don't need to share files. A master document joins separate text documents into one larger document, and unifies the formatting, table of contents (TOC), bibliography, index, and other tables or lists.

Since LibreOffice version 4.4, Master Document Templates can be added to the Template Manager and creating a new document based on a Master Document Template creates a Master Document with the same initial content as the template it is based upon. See Chapter 3, Styles and Templates, for more about creating and using templates.

Yes, master documents do work in Writer. However, until you become familiar with them, you may think that master documents are unreliable or difficult to use. See Chapter 13, Working with Master Documents, in the *Writer Guide*.

Creating fill-in forms

A standard text document displays information: a letter, report, or brochure, for example. Typically the reader may either edit everything or nothing in any way. A form has sections that are not to be edited, and other sections that are designed for the reader to make changes. For example, a questionnaire has an introduction and questions (which do not change) and spaces for the reader to enter answers.

Forms are used in three ways:

- To create a simple document for the recipient to complete, such as a questionnaire sent out to a group of people who fill it in and return it.
- To link into a database or data source and allow the user to enter information. Someone taking orders might enter the information for each order into a database using a form.
- To view information held in a database or data source. A librarian might call up information about books.

What is Calc?

Calc is the spreadsheet component of LibreOffice. You can enter data (usually numerical) in a spreadsheet and then manipulate this data to produce certain results.

Alternatively, you can enter data and then use Calc in a “What if...” manner by changing some of the data and observing the results without having to retype the entire spreadsheet or sheet.

Other features provided by Calc include:

- Functions, which can be used to create formulas to perform complex calculations on data.
- Database functions, to arrange, store, and filter data.
- Dynamic charts; a wide range of 2D and 3D charts.
- Macros, for recording and executing repetitive tasks; scripting languages supported include LibreOffice Basic, Python, BeanShell, and JavaScript.
- Ability to open, edit, and save Microsoft Excel spreadsheets.
- Import and export of spreadsheets in multiple formats, including HTML, CSV, PDF, and PostScript.

 **Note**

If you want to use macros written in Microsoft Excel using the VBA macro code in LibreOffice, you must first edit the code in the LibreOffice Basic IDE editor. See *Chapter 13 Getting Started with Macros* and *Calc Guide Chapter 12 Calc Macros*.

Spreadsheets, sheets, and cells

Calc works with elements called *spreadsheets*. Spreadsheets consist of a number of individual *sheets*, each sheet containing cells arranged in rows and columns. A particular cell is identified by its row number and column letter.

Cells hold the individual elements – text, numbers, formulas, and so on – that make up the data to display and manipulate.

Each spreadsheet can have several sheets, and each sheet can have many individual cells. In Calc, each sheet can have a maximum of 1,048,576 rows (65,536 rows in Calc 3.2 and earlier) and a maximum of 1024 columns. LibreOffice Calc can hold up to 32,000 sheets.

Calc main window

When Calc is started, the main window opens (Figure 91). The parts of this window are described below.

Title bar

The Title bar, located at the top, shows the name of the current spreadsheet. When a spreadsheet is newly created from a template or a blank document, its name is *Untitled X*, where X is a number. When you save a spreadsheet for the first time, you are prompted to enter a name of your choice.

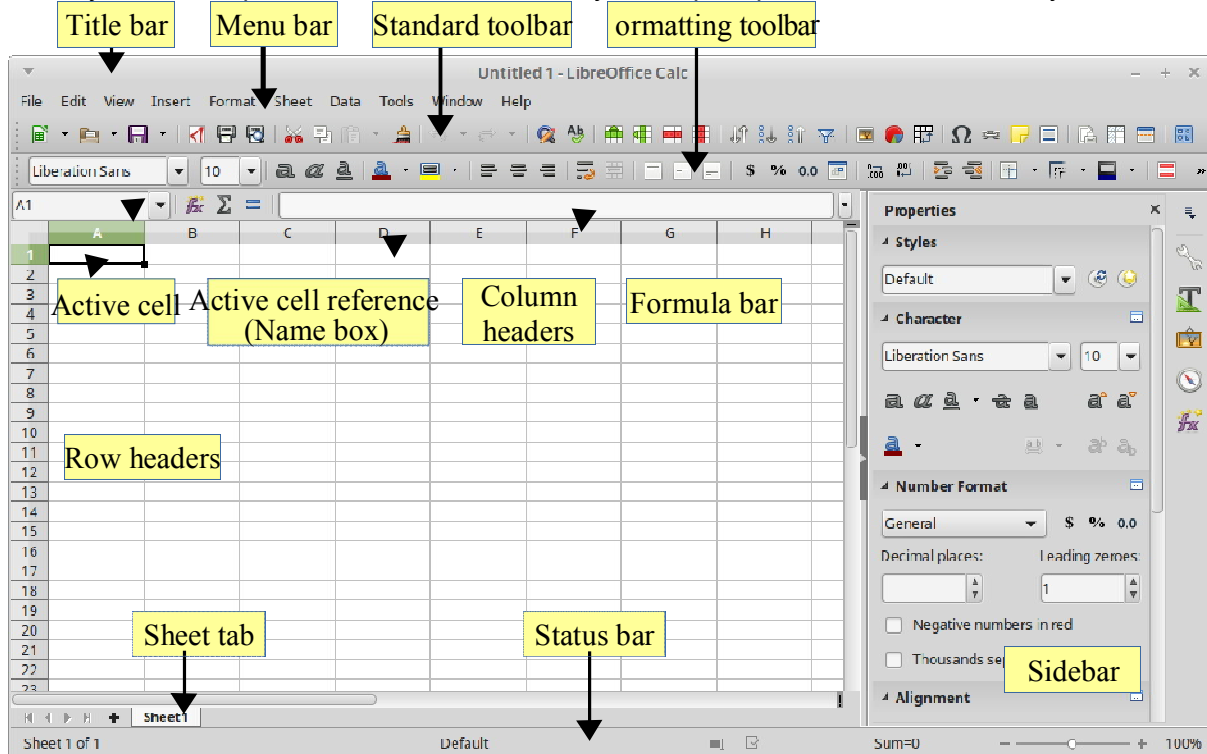


Figure 91: Calc main dialog

Menu bar

When you select an item on the Menu bar, a sub-menu drops down to show commands. You can also customize the Menu bar; see *Chapter 14 Customizing LibreOffice* for more information.

- **File** – contains commands that apply to the entire document; for example, *Open*, *Save*, *Wizards*, *Export as PDF*, *Print*, *Digital Signatures*.
- **Edit** – contains commands for editing the document; for example, *Undo*, *Copy*, *Changes*, *Fill*, *Plug-in*.
- **View** – contains commands for modifying how the Calc user interface looks; for example, *Toolbars*, *Column & Row Headers*, *Full Screen*, *Zoom*.
- **Insert** – contains commands for inserting elements into a spreadsheet; for example, *Pictures*, *Frames*, *Special Characters*, *Charts*, *Functions*.
- **Format** – contains commands for modifying the layout of a spreadsheet; for example, *Cells*, *Page*, *Styles and Formatting*, *Alignment*.
- **Sheet** – contains the most often used commands for table handling, such as *Insert and Delete Cells*, *Columns*, *Rows*, and *Sheets*, as well as *Comments* and *Cell fill*.
- **Tools** – contains various functions to help you check and customize the spreadsheet; for

example, *Spelling*, *Share Document*, *Gallery*, *Macros*.

- **Data** – contains commands for manipulating data in the spreadsheet; for example, *Define Database Range*, *Sort*, *Statistics*, *Pivot Tables*, *Consolidate*.
- **Window** – contains commands for the display window; for example, *New Window*, *Split*.
- **Help** – contains links to the LibreOffice help system and other miscellaneous functions; for example, *Help*, *License Information*, and *Check for Updates*.

Toolbars

The default setting when Calc opens is for the Standard and Formatting toolbars to be docked at the top of the workspace (Figure 91).

Calc toolbars can be either docked and fixed in place, or floating; you can move a toolbar into a more convenient position on the workspace. Docked toolbars can be undocked and either moved to different docked position on the workspace, or left as a floating toolbar. Toolbars that are floating when opened can be docked into a fixed position on the workspace.

The default set of icons (sometimes called buttons) on toolbars provides a wide range of common commands and functions. You can also remove or add icons to toolbars; see *Chapter 14 Customizing LibreOffice* for more information.






Formula bar

The Formula Bar is located at the top of the sheet in the Calc workspace. The Formula Bar is permanently docked in this position and cannot be used as a floating toolbar. If the Formula Bar is not visible, go to **View** on the Menu bar and select **Formula Bar**.



Figure 92: Formula bar

Going from left to right and referring to Figure 92, the Formula Bar consists of the following:

- **Name Box** – gives the current active cell reference using a combination of a letter and number, for example A1. The letter indicates the column and the number indicates the row of the selected cell. If you have selected a range of cells that is also a named range, the name of the range is shown in this box. You can also type a cell reference in the Name Box to jump to the referenced cell. If you type the name of a named range and press the *Enter* key, the named range is selected and displayed.
- **Function Wizard**  – opens a dialog from which you can search through a list of available functions. This can be very useful because it also shows how the functions are formatted.
- **Sum**  – clicking on the Sum icon totals the numbers in the cells above the selected cell and then places the total in the selected cell. If there are no numbers above the selected cell, then the cells to the left are totaled.
- **Function**  – clicking on the Function icon inserts an equals (=) sign into the selected cell and the **Input line**, allowing a formula to be entered.
- **Input line** – displays the contents of the selected cell (data, formula, or function) and allows you to edit the cell contents. To turn the Input line into a multiline input area for very long formulas, click the dropdown button on the right.
- You can also edit the contents of a cell directly in the cell itself by double-clicking on the cell. When you enter new data into a cell, the Sum and Function icons change to **Cancel** and **Accept** icons  .

Not



In a spreadsheet the term “function” covers much more than just mathematical functions. See the *Calc Guide Chapter 7 Using Formulas and Functions* for more information.

Spreadsheet layout

Individual cells

The main section of the workspace in Calc displays the cells in the form of a grid. Each cell is formed by the intersection of one column and one row in the spreadsheet.

At the top of the columns and the left end of the rows are a series of header boxes containing letters and numbers. The column headers use an alpha character starting at A and go on to the right. The row headers use a numerical character starting at 1 and go down.

These column and row headers form the cell references that appear in the Name Box on the Formula Bar (Figure 92). If the headers are not visible on the spreadsheet, go to **View** on the Menu bar and select **Column & Row Headers**.

Sheet tabs

In Calc, you can have more than one sheet in a spreadsheet. At the bottom of the grid of cells in a spreadsheet are sheet tabs indicating how many sheets there are in the spreadsheet. Clicking on a tab enables access to each individual sheet and displays that sheet. An active sheet is indicated with a white tab (default Calc setup). You can also select multiple sheets by holding down the **Ctrl** key while clicking on the sheet tabs.

To change the default name for a sheet (Sheet1, Sheet2, and so on), right-click on a sheet tab and select **Rename Sheet** from the context menu. A dialog opens, in which you can type a new name for the sheet. Click **OK** when finished to close the dialog.

To change the color of a sheet tab, right-click on the tab and select **Tab Color** from the context menu to open the **Tab Color** dialog (Figure 93). Select a color and click **OK** when finished to close the dialog. To add new colors to this color palette, see *Chapter 14 Customizing LibreOffice*.

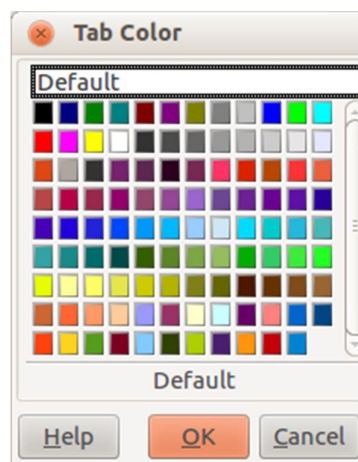


Figure 93: Tab color dialog

Status bar

The Calc status bar (Figure 94) provides information about the spreadsheet as well as quick and convenient ways to change some of its features. Most of the fields are similar to those in other components of LibreOffice; see *Chapter 1 Introducing LibreOffice* in this guide and the *Calc Guide Chapter 1 Introducing Calc* for more information.

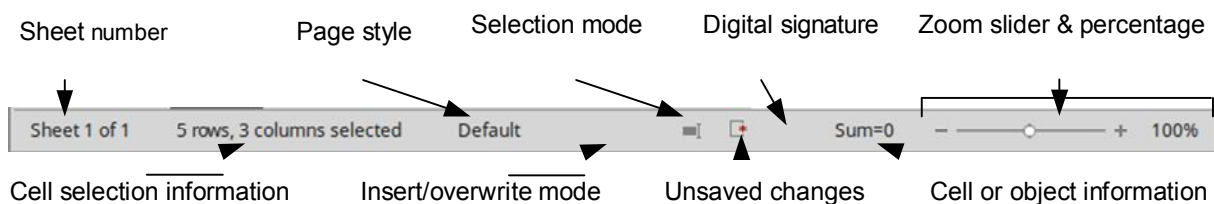


Figure 94: Calc status bar

Sidebar

The Calc Sidebar (**View > Sidebar**) is located on the right side of the window. It is a mixture of toolbar and dialog. It is similar to the sidebar in Writer (shown in Chapter 1 and Chapter 4 of this

book) and consists of five decks: Properties, Styles and Formatting, Gallery, Navigator, and Functions. Each deck has a corresponding icon on the Tab panel to the right of the sidebar, allowing you to switch between them.

The decks are described below.

- **Properties:** This deck includes four content panels.
 - **Styles:** Access to the available cell styles, update cell styles, and new cell styles.
 - **Character:** Controls for formatting the text, such as font family, size, and color. Some controls, such as superscript, only become active when the text cursor is active in the Input line of the Formula bar or the cell.
 - **Alignment:** Controls to align the text in various ways, including horizontal and vertical alignment, wrapping, indenting, merging, text orientation, and vertical stacking.
 - **Cell Appearance:** Controls to set the appearance options, including cell background color, cell border formats including line color and style, and grid lines.
 - **Number Format:** Quickly change the format of numbers including decimals, currency, dates, or numeric text. Numerical and label field controls for Forms are also available. Each of these panels has a **More Options** button, which opens a dialog giving a greater number of options. These dialogs lock the document for editing until they are closed.
- **Styles and Formatting:** This deck contains a single panel, which is the same as that opened by selecting the **Styles and Formatting** button (*F11*) from the Text Formatting toolbar.
- **Gallery:** This deck contains a single panel, which is the same as that opened by selecting **Gallery** from the Standard toolbar or **Tools > Gallery** from the Menu bar.
- **Navigator:** This deck contains a single panel, which is essentially the same as the Navigator window opened by clicking the **Navigator** button on the Standard toolbar or selecting **View > Navigator** (*F5*) from the Menu bar. Only the **Contents** button is absent in the Sidebar's Navigator panel.
- **Functions:** This deck contains a single panel, which is the same as the window opened by selecting **Insert > Function...** from the Menu bar.

To the right side of the title bar of each open deck is a **Close** button (**X**), which closes the deck to leave only the Tab bar open. Clicking on any Tab button reopens the deck.

To hide the Sidebar, or reveal it if already hidden, click on the edge Hide/Show button. To adjust the deck width, drag on the left edge of the sidebar.

Opening a CSV file

Comma-separated-values (CSV) files are spreadsheet files in a text format where cell contents are separated by a character, for example a comma or semicolon. Each line in a CSV text file represents a row in a spreadsheet. Text is entered between quotation marks; numbers are entered without quotation marks.



Tip

Most CSV files come from databases tables, queries, or reports, where further calculations and charting are required. On Microsoft Windows, CSV files often have the XLS file name extension to look like an Excel file, but they are still CSV files internally.

To open a CSV file in Calc:

- 1) Choose **File > Open** on the Menu bar and locate the CSV file that you want to open.
- 2) Select the file and click **Open**. By default, a CSV file has the extension `.csv`. However, some CSV files may have a `.txt` extension.
- 3) The **Text Import** dialog (Figure 95) opens. Here you can select the various options available when importing a CSV file into a Calc spreadsheet.
- 4) Click **OK** to open and import the file.

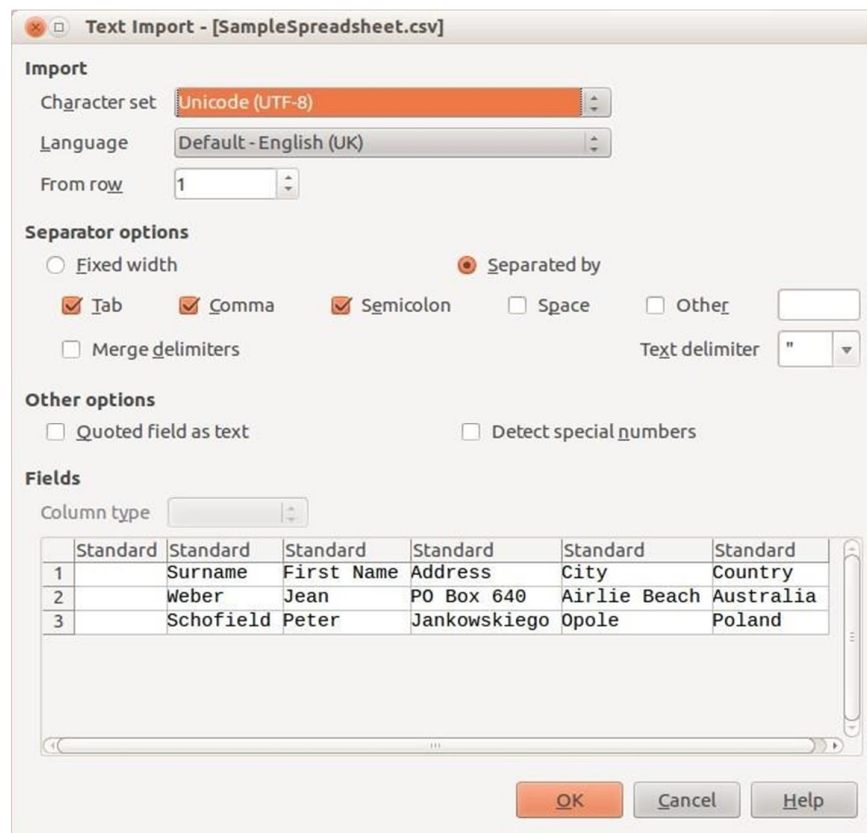


Figure 95: Text Import dialog

The options for importing CSV files into a Calc spreadsheet are as follows:

- **Import**
 - *Character Set* – specifies the character set to be used in the imported file.
 - *Language* – determines how the number strings are imported.
If Language is set to Default for CSV import, Calc will use the globally set language. If Language is set to a specific language, that language will be used when importing numbers.
 - *From Row* – specifies the row where you want to start the import. The rows are visible in the preview window at the bottom of the dialog.
- **Separator Options** – specifies whether the data uses separators or fixed widths as

delimiters.

- *Fixed width* – separates fixed-width data (equal number of characters) into columns. Click on the ruler in the preview window to set the width.
- *Separated by* – select the separator used in the data to delimit the data into columns. If you select *Other*, specify the character used to separate data into columns. This custom separator must also be contained in the data.
- *Merge delimiters* – combines consecutive delimiters and removes blank data fields.
- *Text delimiter* – select a character to delimit text data.

· **Other options**

- *Quoted fields as text* – when this option is enabled, fields or cells whose values are quoted in their entirety (the first and last characters of the value equal the text delimiter) are imported as text.
- *Detect special numbers* – when this option is enabled, Calc will automatically detect all number formats, including special number formats such as dates, time, and scientific notation. The selected language also influences how such special numbers are detected, since different languages and regions may have different conventions for such special numbers.
When this option is disabled, Calc will detect and convert only decimal numbers. The rest, including numbers formatted in scientific notation, will be imported as text. A decimal number string can have digits 0-9, thousands separators, and a decimal separator. Thousands separators and decimal separators may vary with the selected language and region.

· **Fields** – shows how the data will look when it is separated into columns.

- *Column type* – select a column in the preview window and select the data type to be applied to the imported data.
- *Standard* – Calc determines the type of data.
- *Text* – imported data are treated as text.
- *US English* – numbers formatted in US English are searched for and included regardless of the system language. A number format is not applied. If there are no US English entries, the *Standard* format is applied.
- *Hide* – the data in the column are not imported.

Saving spreadsheets

To save a spreadsheet, see *Chapter 1 Introducing LibreOffice* for more details on how to save files manually or automatically. Calc can also save spreadsheets in a range of formats and also export spreadsheets to PDF, HTML, and XHTML file formats; see the *Calc Guide Chapter 6 Printing, Exporting, and E-mailing* for more information.

Saving in other spreadsheet formats

If you need to exchange files with users who are unable to receive spreadsheet files in Open Document Format (ODF) (*.ods), which Calc uses as default format, you can save a spreadsheet in another format.

- 1) Save the spreadsheet in Calc spreadsheet file format (*.ods).
- 2) Select **File > Save As** on the Menu bar to open the **Save As** dialog (Figure 96).

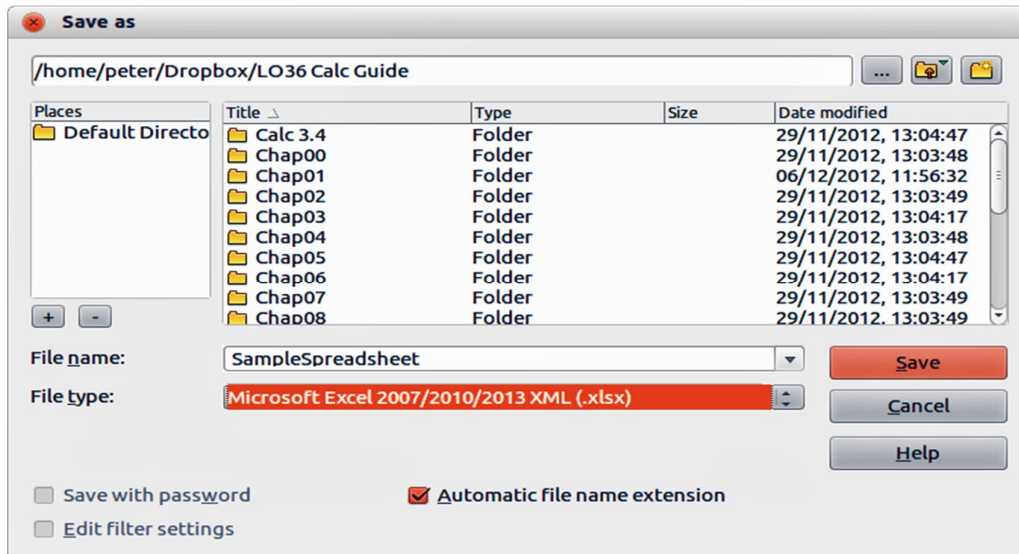


Figure 96: Save As dialog

- 3) In **File name**, you can enter a new file name for the spreadsheet.
- 4) In **File type** drop-down menu, select the type of spreadsheet format you want to use.
- 5) If **Automatic file name extension** is selected, the correct file extension for the spreadsheet format you have selected will be added to the file name.
- 6) Click **Save**.
- 7) Each time you click **Save**, the **Confirm File Format** dialog opens (Figure 97). Click **Use [xxx] Format** to continue saving in your selected spreadsheet format or click **Use ODF Format** to save the spreadsheet in Calc ODS format.
- 8) If you select **Text CSV** format (*.csv) for your spreadsheet, the **Export Text File** dialog (Figure 98) opens. Here you can select the character set, field delimiter, text delimiter, and so on to be used for the CSV file.



Figure 97: Confirm File Format dialog

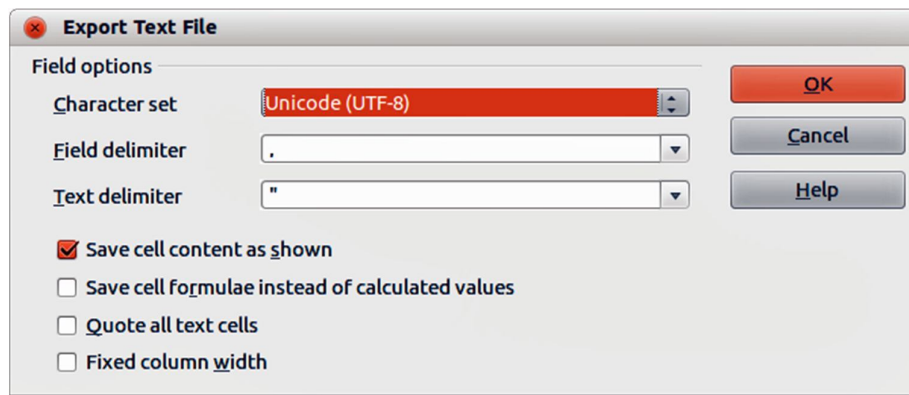


Figure 98: Export Text File dialog for CSV files



Tip

To have Calc save documents by default in a file format other than the default ODF format, go to **Tools > Options > Load/Save > General**. In **Default file format** and **ODF settings > Document type**, select **Spreadsheet**, then in **Always save as**, select your preferred file format.

Navigating within spreadsheets

Calc provides many ways to navigate within a spreadsheet from cell to cell and sheet to sheet. You can generally use the method you prefer.

Cell navigation

When a cell is selected or in focus, the cell borders are emphasized. When a group of cells is selected, the cell area is colored. The color of the cell border emphasis and the color of a group of selected cells depends on the operating system being used and how you have set up LibreOffice.

- **Using the mouse** – place the mouse pointer over the cell and click the left mouse button. To move the focus to another cell using the mouse, simply move the mouse pointer to the cell where you want the focus to be and click the left mouse button.
- **Using a cell reference** – highlight or delete the existing cell reference in the Name Box on the Formula Bar (Figure 92 on page 118). Type the new cell reference of the cell you want to move to and press *Enter* key. Cell references are case-insensitive: for example, typing either a3 or A3 will move the focus to cell A3.
- **Using the Navigator** – press the *F5* key to open the **Navigator** dialog (Figure 99) or click the **Navigator Tab** button in the open Sidebar. Type the cell reference into the Column and Row fields and press the *Enter* key.
- **Using the Enter key** – pressing *Enter* moves the cell focus down in a column to the next row. Pressing *Shift+Enter* moves the focus up in a column to the previous row.
- **Using the Tab key** – pressing *Tab* moves the cell focus right in a row to the next column. Pressing *Shift+Tab* moves the focus to the left in a row to the previous column.
- **Using the arrow keys** – pressing the arrow keys on the keyboard moves the cell focus in the direction of the arrow pressed.
- **Using Home, End, Page Up and Page Down**
 - *Home* moves the cell focus to the start of a row.
 - *End* moves the cell focus to the last cell on the right in the row that contains data.
 - *Page Down* moves the cell focus down one complete screen display.
 - *Page Up* moves the cell focus up one complete screen display.

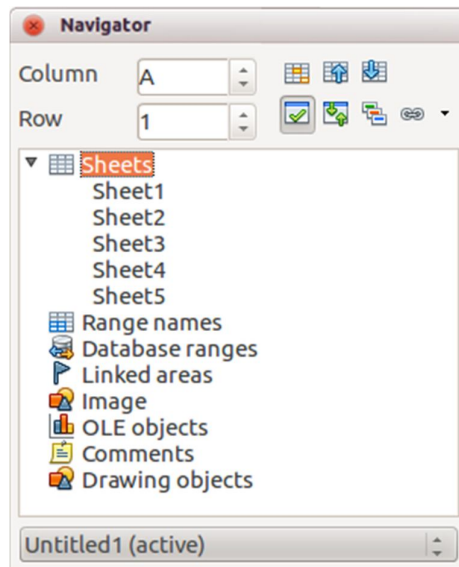


Figure 99: Navigator dialog in Calc

Sheet navigation

Each sheet in a spreadsheet is independent of the other sheets, though references can be linked from one sheet to another. There are three ways to navigate between sheets in a spreadsheet:

- **Using the Navigator** – when the Navigator is open (Figure 99), double-click on any of the listed sheets to select the sheet.
- **Using the keyboard** – use key combinations *Ctrl+Page Down* to move one sheet to the right and *Ctrl+Page Up* to move one sheet to the left.
- **Using the mouse** – click on one of the sheet tabs at the bottom of the spreadsheet to select that sheet.

If your spreadsheet contains a lot of sheets, then some of the sheet tabs may be hidden behind the horizontal scroll bar at the bottom of the screen. If this is the case:

- Using the four buttons to the left of the sheet tabs can move the tabs into view (Figure 100).
- Dragging the scroll bar edge to the right may reveal all the tabs.
- Right-clicking on any of the arrows opens a context menu where you can select a sheet (see Figure 101).

Note

When you insert a new sheet into a spreadsheet, Calc automatically uses the next number in the numeric sequence as a name. Depending on which sheet is open when you insert a new sheet, and the method you use to insert a new sheet, the new sheet may not be in numerical order. It is recommended to rename sheets in a spreadsheet to make them more recognizable.

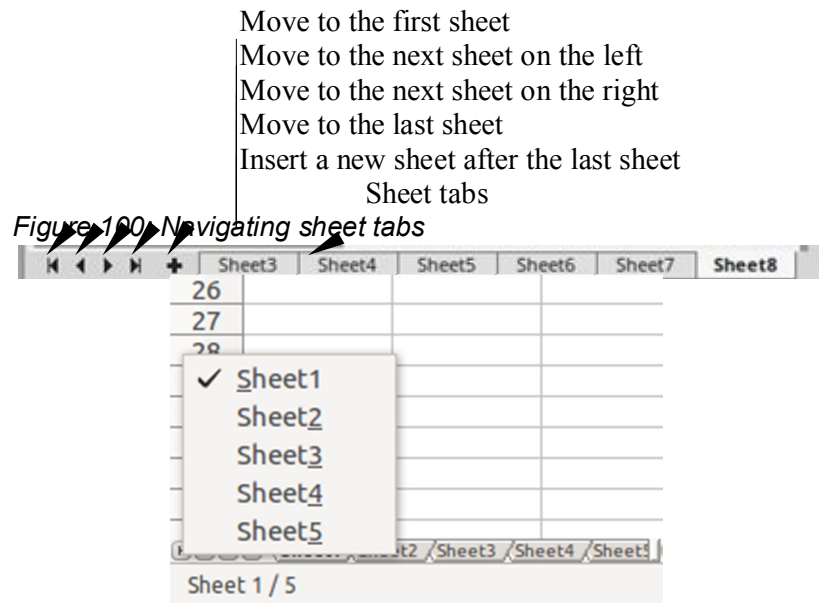


Figure 101: Right-click any arrow button

Keyboard navigation

To navigate a spreadsheet using the keyboard, pressing a key or a combination of keys. For a key combination, press more than one key at the same time. Table 4 lists the keys and key combinations you can use for spreadsheet navigation in Calc.

Table 4. Keyboard cell navigation

Keyboard shortcut	Cell navigation
→	Moves cell focus right one cell.
←	Moves cell focus left one cell.
↑	Moves cell focus up one cell..
↓	Moves cell focus down one cell
Ctrl+→	Moves cell focus to the first column on the right containing data in that row if cell focus is on a blank cell. Moves cell focus to the last column on the right in the same range of occupied cells in that row if cell focus is on a cell containing data. Moves cell focus to the last column on the right in the spreadsheet if there are no more cells containing data.
Keyboard shortcut Ctrl+←	Moves cell focus to the last column on the left containing data in that row if cell focus is on a blank cell. Moves cell focus to the first column on the left in the same range of occupied cells in that row if cell focus is on a cell containing data. Moves cell focus to the first column in that row if there are no more cells containing data.
Ctrl+↑	Moves cell focus from a blank cell to the first cell above containing data in the same column. Moves cell focus to the first row in the same range of occupied cells if cell focus is on a cell containing data. Moves cell focus from the last cell containing data to the cell in the same column in the last row of the spreadsheet.

Ctrl+↓	Moves cell focus from a blank cell to the first cell below containing data in the same column. Moves cell focus to the last row in the same range of occupied cells in that column if cell focus is on a cell containing data. Moves cell focus from the last cell containing data to the cell in the same column in the last row of the spreadsheet.
Ctrl+Home	Moves cell focus from anywhere on the spreadsheet to Cell A1 on the same sheet.
Ctrl+End	Moves cell focus from anywhere on the spreadsheet to the last cell in the lower right-hand corner of the rectangular area of cells containing data on the same sheet.
Alt+Page Down	Moves cell focus one screen to the right (if possible).
Alt+Page Up	Moves cell focus one screen to the left (if possible).
Ctrl+Page Down	Moves cell focus to the same cell on the next sheet to the right in sheet tabs if the spreadsheet has more than one sheet.
Ctrl+Page Up	Moves cell focus to the same cell on the next sheet to the left in sheet tabs if the spreadsheet has more than one sheet.
Tab	Moves cell focus to the next cell on the right.
Shift+Tab	Moves cell focus to the next cell on the left.
Enter	Moves cell focus down one cell (unless changed by user).
Shift+Enter	Moves cell focus up one cell (unless changed by user).

Customizing the Enter key

You can customize the direction in which the *Enter* key moves the cell focus by going to **Tools > Options > LibreOffice Calc > General**. Select the direction cell focus moves from the drop-down list. Depending on the file being used or the type of data being entered, setting a different direction can be useful. The *Enter* key can also be used to switch into and out of editing mode. Use the first two options under *Input settings* in Figure 102 to change the *Enter* key settings.

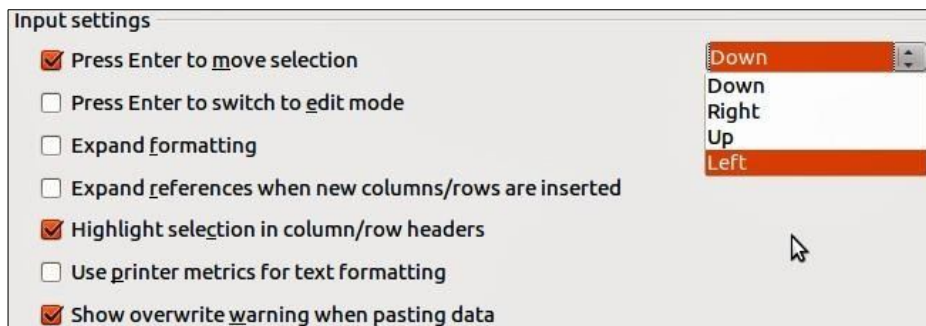


Figure 102: Customizing the Enter key

Selecting items in a spreadsheet

Selecting cells

Single cell

Left-click in the cell. You can verify your selection by looking in the Name Box on the Formula Bar (Figure 92 on page 118).

Range of contiguous cells

A range of cells can be selected using the keyboard or the mouse.

To select a range of cells by dragging the mouse cursor:

- 1) Click in a cell.
- 2) Press and hold down the left mouse button.
- 3) Move the mouse around the screen.
- 4) Once the desired block of cells is highlighted, release the left mouse button.

To select a range of cells without dragging the mouse:

- 1) Click in the cell which is to be one corner of the range of cells.
- 2) Move the mouse to the opposite corner of the range of cells.
- 3) Hold down the *Shift* key and click.



Tip

You can also select a contiguous range of cells by first clicking in the **Selection mode** field on the Status Bar (Figure 94 on page 120) and selecting **Extending selection** before clicking in the opposite corner of the range of cells. Make sure to change back to **Standard selection** or you may find yourself extending a cell selection unintentionally.

To select a range of cells without using the mouse:

- 1) Select the cell that will be one of the corners in the range of cells.
- 2) While holding down the *Shift* key, use the cursor arrows to select the rest of the range.



Tip

You can also directly select a range of cells using the Name Box. Click into the Name Box on the Formula Bar (Figure 92 on page 118). To select a range of cells, enter the cell reference for the upper left-hand cell, followed by a colon (:), and then the lower right-hand cell reference. For example, to select the range that would go from A3 to C6, you would enter A3:C6.

Range of non-contiguous cells

- 1) Select the cell or range of cells using one of the methods above.
- 2) Move the mouse pointer to the start of the next range or single cell.
- 3) Hold down the *Ctrl* key and click or click-and-drag to select another range of cells to add to the first range.
- 4) Repeat as necessary.

Selecting columns and rows

Single column or row

To select a single column, click on the column header (Figure 91 on page 117).

To select a single row, click on the row header.

Multiple columns or rows

To select multiple columns or rows that are contiguous:

- 1) Click on the first column or row in the group.
- 2) Hold down the *Shift* key.
- 3) Click the last column or row in the group.

To select multiple columns or rows that are not contiguous:

- 1) Click on the first column or row in the group.
- 2) Hold down the *Ctrl* key.
- 3) Click on all of the subsequent columns or rows while holding down the *Ctrl* key.

Entire sheet

To select the entire sheet, click on the small box between the column headers and the row headers (Figure 103), or use the key combination *Ctrl+A* to select the entire sheet, or go to **Edit** on the Menu bar and select **Select All**.

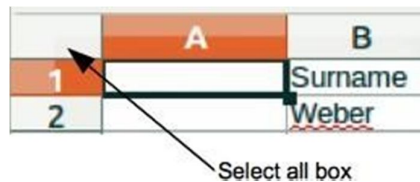


Figure 103: Select All box

Selecting sheets

You can select one or multiple sheets in Calc. It can be advantageous to select multiple sheets, especially when you want to make changes to many sheets at once.

Single sheet

Click on the sheet tab for the sheet you want to select. The tab for the selected sheet becomes white (default Calc setup).

Multiple contiguous sheets

To select multiple contiguous sheets:

- 1) Click on the sheet tab for the first desired sheet.
- 2) Move the mouse pointer over the sheet tab for the last desired sheet.
- 3) Hold down the *Shift* key and click on the sheet tab.
- 4) All tabs between these two selections will turn white (default Calc setup). Any actions that you perform will now affect all highlighted sheets.

Multiple non-contiguous sheets

To select multiple non-contiguous sheets:

- 1) Click on the sheet tab for the first desired sheet.
- 2) Move the mouse pointer over the sheet tab for the second desired sheet.
- 3) Hold down the *Ctrl* key and click on the sheet tab.
- 4) Repeat as necessary.
- 5) The selected tabs will turn white (default Calc setup). Any actions that you perform will now affect all highlighted sheets.

All sheets

Right-click a sheet tab and choose **Select All Sheets** from the context menu.

Working with columns and rows

Inserting columns and rows

Note

When you insert columns or rows, the cells take the formatting of the corresponding cells in the next column to left or the row above.

Single column or row

Using the **Sheet** menu:

- 1) Select a cell, column, or row where you want the new column or row inserted.
- 2) Go to **Sheet** on the Menu bar and select either **Insert > Columns > Columns Left** or **Columns Right** or **Insert > Rows > Rows Above** or **> Rows Below**.

Using the mouse:

- 1) Select a column or row where you want the new column or row inserted.
- 2) Right-click the column or row header.
- 3) Select **Insert Columns Left**, **Insert Columns Right**, **Insert Rows Above**, or **Insert Rows Below** from the context menu.

Multiple columns or rows

Multiple columns or rows can be inserted at once rather than inserting them one at a time.

- 1) Highlight the required number of columns or rows by holding down the left mouse button on the first one and then dragging across the required number of identifiers.
- 2) Proceed as for inserting a single column or row above.

Deleting columns and rows

Single column or row

To delete a single column or row:

- 1) Select a cell in the column or row you want to delete.
- 2) Go to **Sheet** on the Menu bar and select **Delete Cells** or right-click and select **Delete** from the context menu.
- 3) Select the option you require from the Delete Cells dialog (Figure 104).

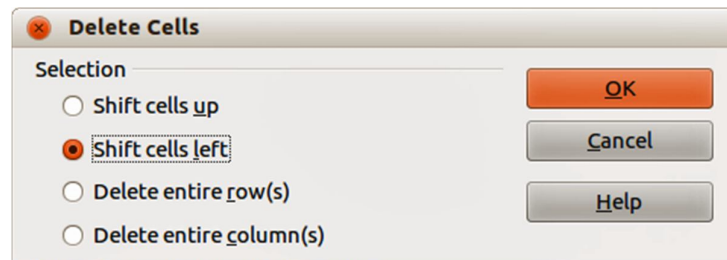


Figure 104. Delete Cells dialog

Alternatively:

- 1) Click in the column or header to select the column or row.
- 2) Go to **Sheet** on the Menu bar and select **Delete Cells** or right-click and select **Delete Columns** or **Delete Rows** from the context menu.


Multiple columns or rows

To delete multiple columns or rows:

- 1) Select the columns or rows, see "Multiple columns or rows" on page 129 for more information.
- 2) Go to **Sheet** on the Menu bar and select **Delete Cells**, or right-click and select **Delete Columns** or **Delete Rows** from the context menu.

Working with sheets

Inserting new sheets

Click on the **Add Sheet** icon  on the bottom of the screen to insert a new sheet after the last sheet in the spreadsheet without opening the **Insert Sheet** dialog. The following methods open the **Insert Sheet** dialog (Figure 105), where you can position the new sheet, create more than one sheet, name the new sheet, or select a sheet from a file.

- 1) Select the sheet where you want to insert a new sheet, then go to **Sheet > InsertSheet...** on the Menu bar.
- 2) Right-click on the sheet tab where you want to insert a new sheet and select **InsertSheet** from the context menu.
- 3) Click in the empty space at the end of the sheet tabs.
- 4) Right-click in the empty space at the end of the sheet tabs and select **Insert Sheet** from the context menu.

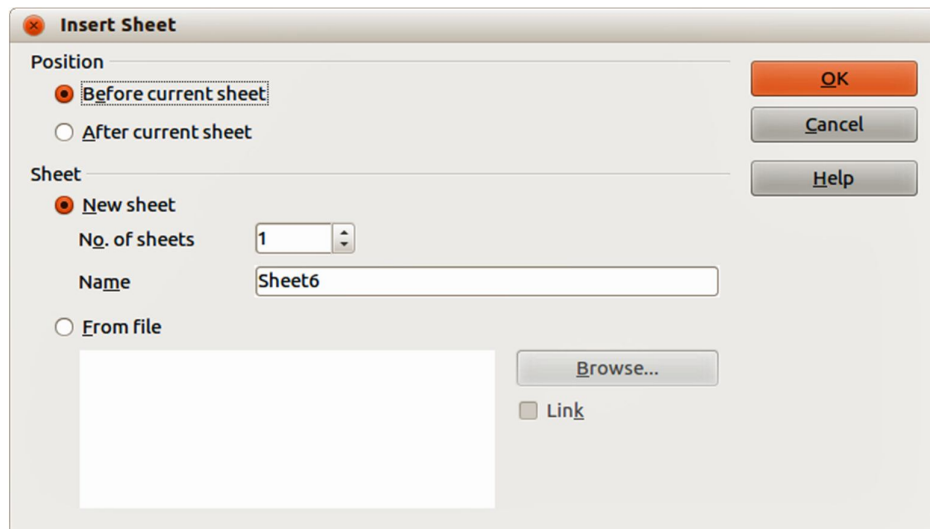


Figure 105: Insert Sheet dialog

Moving and copying sheets

You can move or copy sheets within the same spreadsheet by dragging and dropping or using the **Move/Copy Sheet** dialog. To move or copy a sheet into a different spreadsheet, you have to use the **Move/Copy Sheet** dialog.

Dragging and dropping

To move a sheet to a different position within the same spreadsheet, click and hold on the sheet tab and drag it to its new position before releasing the mouse button.

To *copy* a sheet within the same spreadsheet, hold down the **Ctrl** key (**Option** key on Mac) then click on the sheet tab and drag it to its new position before releasing the mouse button. The mouse pointer may change to include a plus sign depending on the setup of your operating system.

Using a dialog

Use the **Move/Copy Sheet** dialog (Figure 106) to specify exactly whether you want the sheet in the same or a different spreadsheet, its position within the spreadsheet, and the sheet name when you move or copy the sheet.

- 1) In the current document, right-click on the sheet tab you wish to move or copy and select **Move/Copy Sheet** from the context menu or go to **Sheet > Move or Copy Sheet...** on the Menu bar.
- 2) Select **Move** to move the sheet or **Copy** to copy the sheet in the Action area.
- 3) Select the spreadsheet where you want the sheet to be placed from the drop-down list in **To document**. This can be the same spreadsheet, another spreadsheet already open, or a new spreadsheet.
- 4) Select the position in **Insert before** where you want to place the sheet.
- 5) Type a name in the **New name** text box if you want to rename the sheet when it is moved

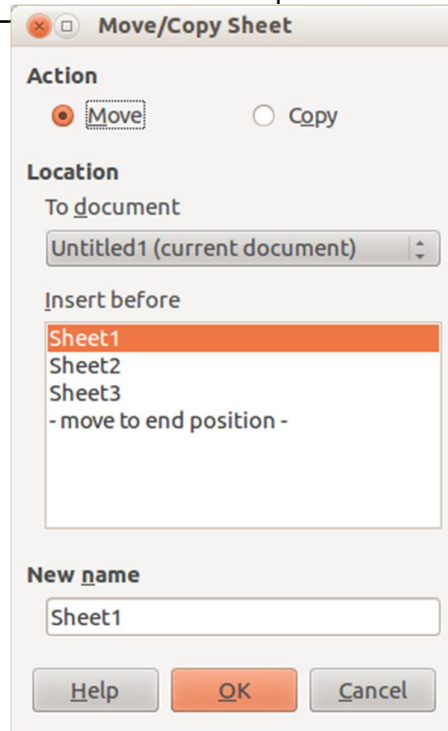
or copied. If you do not enter a name, Calc creates a default name (Sheet 2, Sheet 3, and so on).

- 6) Click **OK** to confirm the move or copy and close the dialog.



Caution

When you move or copy to another spreadsheet or a new spreadsheet, a conflict may occur with formulas linked to other sheets in the previous location.



Move/Copy Sheet dialog

Deleting sheets

To delete a single sheet, right-click on the sheet tab you want to delete and select **Delete Sheet** from the context menu, or go to **Sheet > Delete Sheet...** on the Menu bar. Click **Yes** to confirm the deletion.

To delete multiple sheets, select the sheets (see “Selecting sheets” on page 130), then right-click one of the sheet tabs and select **Delete Sheet** from the context menu, or go to **Sheet > Delete Sheet...** from on the Menu bar. Click **Yes** to confirm the deletion.

Renaming sheets

By default, the name for each new sheet added is *SheetX*, where *X* is the number of the next sheet to be added. While this works for a small spreadsheet with only a few sheets, it can become difficult to identify sheets when a spreadsheet contains many sheets.

You can rename a sheet using one of the following methods:

- Enter the name in the **Name** text box when you create the sheet using the Insert Sheet dialog (Figure 105 on page 132).
- Right-click on a sheet tab and select **Rename Sheet** from the context menu to replace the existing name with a different one.
- Double-click on a sheet tab to open the **Rename Sheet** dialog.

Note



Sheet names must start with either a letter or a number; other characters, including spaces, are not allowed. Apart from the first character of the sheet name, permitted characters are letters, numbers, spaces, and the underscore character. Attempting to rename a sheet with an invalid name will produce an error message.

Viewing Calc

Changing document view

Use the zoom function to show more or fewer cells in the window when you are working on a spreadsheet. For more about zoom, see *Chapter 1 Introducing LibreOffice* in this guide.

Freezing rows and columns

Freezing locks a number of rows at the top of a spreadsheet or a number of columns on the left of a spreadsheet or both rows and columns. Then, when moving around within a sheet, the cells in frozen rows and columns always remain in view.

Figure 107 shows some frozen rows and columns. The heavier horizontal line between rows 3 and 23 and the heavier vertical line between columns F and Q indicate that rows 1 to 3 and columns A to F are frozen. The rows between 3 and 23 and the columns between F and Q have been scrolled off the page.

	A	B	C	D	E	F	Q	R
1		Surname	First Name	Address	City	Country		
2		Weber	Jean	PO Box 640	Airlie Beach	Australia		
3		Schofield	Peter	Jankowskiego	Opole	Poland		
23								
24								

Figure 107: Frozen rows and columns

Freezing rows or columns

- 1) Click on the row header below the rows where you want the freeze, or click on the column header to the right of the columns where you want the freeze.
- 2) Click on the **Freeze Rows and Columns** icon in the main toolbar or go to **View** on the Menu bar and select **Freeze Rows and Columns**. A heavier line appears between the rows or columns indicating where the freeze has been placed.

Freezing rows and columns

- 1) Click into the cell that is immediately below the rows you want frozen and immediately to the right of the columns you want frozen.
- 2) Click on the **Freeze Rows and Columns** icon in the main toolbar or go to **View** on the Menu bar and select **Freeze Rows and Columns**. A heavier line appears between the rows or columns indicating where the freeze has been placed.

Unfreezing

To unfreeze rows or columns, either go to **View** on the Menu bar and select **Freeze Rows and Columns** or click on the **Freeze Rows and Columns** icon in the main toolbar. The heavier lines indicating freezing will disappear.

Splitting the screen

Another way to change the view is by splitting the screen your spreadsheet is displayed in (also known as splitting the window). The screen can be split horizontally, vertically, or both, giving you up to four portions of the spreadsheet in view at any one time. An example of splitting the screen is shown in Figure 108 where a split is indicated by additional window borders within the sheet.

Why would you want to do this? For example, consider a large spreadsheet in which one cell contains a number that is used by three formulas in other cells. Using the split-screen technique, you can position the cell containing the number in one section and each of the cells with formulas in the other sections. You can then change the number in one cell and watch how it affects each of the formulas.

	A	B	C
1		Beta=	3.2000
2		A0=	0.1000
7	A1=	Beta*A0*(1*A0)	0.2880
8	A2=	Beta*A1*(1*A1)	0.6562
9	A3=	Beta*A2*(1*A2)	0.7219
10	A4=	Beta*A3*(1*A3)	0.6424
11	A5=	Beta*A0*(1*A4)	0.7351
12			

Figure 108: Split screen example

Splitting horizontally or vertically

- 1) Click on the row header below the rows where you want to split the screen horizontally or click on the column header to the right of the columns where you want to split the screen vertically.
- 2) Go to **View** on the Menu bar and select **Split Window**. Window borders appear between the rows or columns indicating where the split has been placed, as shown in Figure 109. Alternatively:
 - For a horizontal split, drag the new horizontal window border beneath the row where you want the horizontal split positioned.
 - For a vertical split, drag the new vertical window border across to the right of the column where you want the vertical split positioned.

Splitting horizontally and vertically

- 1) Click in the cell that is immediately below the rows where you want to split the screen horizontally and immediately to the right of the columns where you want to split the screen vertically.
- 2) Go to **View** on the Menu bar and select **Split Window**. Heavy black lines appear between the rows or columns indicating where the split has been placed.

	N	O	P	B
				Beta=
				A0=
				Beta*A0*(1*A0)
				Beta*A1*(1*A1)
				Beta*A2*(1*A2)
				Beta*A3*(1*A3)
				Beta*A0*(1*A4)

Figure 109: Split screen window borders

Removing split views

To remove a split view, do one of the following:

- Drag the split window borders back to their places at the ends of the scroll bars.
- Go to **View** on the Menu bar and deselect **Split Window**.

Using the keyboard

Most data entry in Calc can be accomplished using the keyboard.

Numbers

Click in the cell and type in a number using the number keys on either the main keyboard or numeric keypad. By default, numbers are right aligned in a cell.

Minus numbers

To enter a negative number, either type a minus (–) sign in front of the number or enclose the number in parentheses (), for example (1234). The result for both methods of entry will be the same, for example -1234.

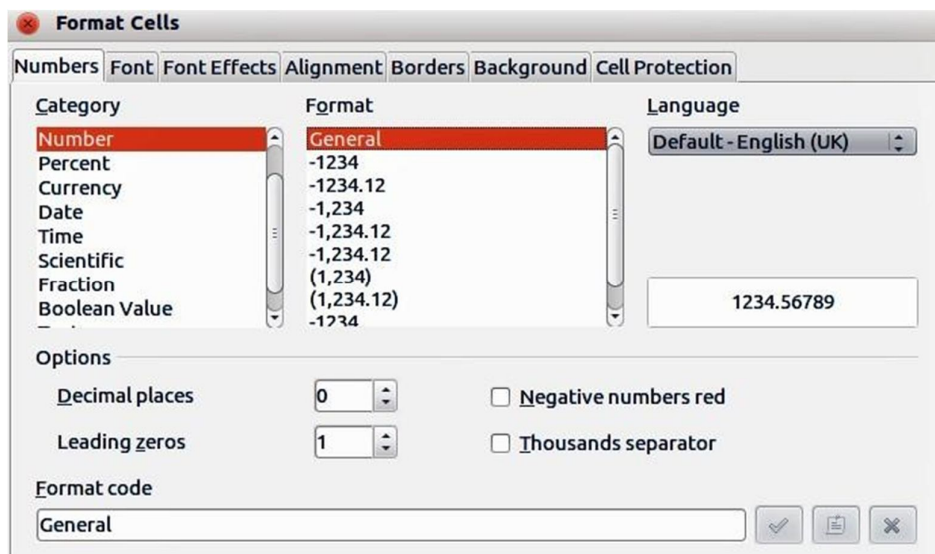
Leading zeroes

To retain a minimum number of integer characters in a cell when entering numbers in order to retain the number format, for example 1234 and 0012, leading zeros have to be added using one of the following methods.

Method 1

- 1) With the cell selected, right-click on the cell, select **Format Cells** from the context menu or go to **Format > Cells** on the Menu bar or use the keyboard shortcut *Ctrl+1* to open the **Format Cells** dialog (Figure 110).

Figure 110: Format Cells dialog – Numbers page



- 2) Make sure the **Numbers** tab is selected then select *Number* in the *Category* list.
- 3) In **Options > Leading Zeros**, enter the minimum number of characters required. For example, for four characters, enter 4. Any number less than four characters will have leading zeros added, for example 12 becomes 0012.
- 4) Click **OK**. The number entered retains its number format and any formula used in the spreadsheet will treat the entry as a number in formula functions.

Method 2

- 1) Select the cell.
- 2) Open the Sidebar (**View > Sidebar**) and click the **Open Panel (+)** icon on the **Number Format** panel to open it.
- 3) Select **Number** in the **Category** list box.
- 4) Set the **Leading zeroes** value box to **4**. Formatting is applied immediately.

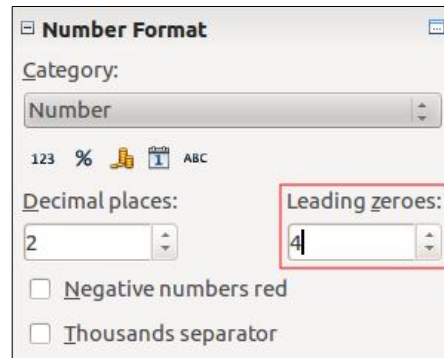


Figure 111: Set Leading zeroes

If a number is entered with leading zeroes, for example 01481, without first setting the Leading zeros parameter, then by default Calc will automatically drop the leading 0. To preserve leading zeros in a number:

- 1) Type an apostrophe (') before the number, for example '01481.
- 2) Move the cell focus to another cell. The apostrophe is automatically removed, the leading zeros are retained and the number is converted to text left aligned.

Numbers as text

Numbers can also be entered as text using one of the following methods.

Method 1

- 1) With the cell selected, right-click on the cell and select **Format Cells** from the context menu or go to **Format > Cells** on the Menu bar or use the keyboard shortcut **Ctrl+1** to open the **Format Cells** dialog (Figure 110).
- 2) Make sure the **Numbers** page is selected, then select **Text** from the **Category** list.
- 3) Click **OK** and the number, when entered, is converted to text and, by default, left aligned.

Method 2

- 1) Select the cell.
- 2) Open the Sidebar (**View > Sidebar**) and click the **Open Panel (+)** icon on the **Number Format** panel.
- 3) Select **Text** in the **Category** list box. Formatting is applied to the cell immediately.
- 4) Click back on the cell. Enter the number and move focus from the cell to have the data formatted.



Note

By default, any numbers that have been formatted as text in a spreadsheet will be treated as a zero by any formulas used in the spreadsheet. Formula functions will ignore text entries.

Text

Click in the cell and type the text. By default, text is left-aligned in a cell.

Date and time

Select the cell and type the date or time.

You can separate the date elements with a slash (/) or a hyphen (–) or use text, for example 10 Oct 2012. The date format automatically changes to the selected format used by Calc.

When entering a time, separate time elements with colons, for example 10:43:45. The time format automatically changes to the selected format used by Calc.

To change the date or time format used by Calc, use one of the following methods.

Method 1

- 1) With the cell selected, right-click on the cell and select **Format Cells** from the context menu, or go to **Format > Cells** on the Menu bar, or use the keyboard shortcut *Ctrl+1*, to open the **Format Cells** dialog (Figure 110).
- 2) Make sure the **Numbers** page is selected, then select *Date* or *Time* from the *Category* list.
- 3) Select the date or time format you want to use from the *Format* list.
- 4) Click **OK**.

Method 2

- 1) Select the cell.
- 2) Open the Sidebar (**View > Sidebar**) and (if necessary) click the **Open Panel (+)** icon on the **Number Format** panel.
- 3) Select **Date** in the **Category** list box.
- 4) Click the **More Options** button in the panel title bar to open the **Format Cells** dialog.
- 5) Select the date or time format you want to use from the *Format* list.
- 6) Click **OK**.

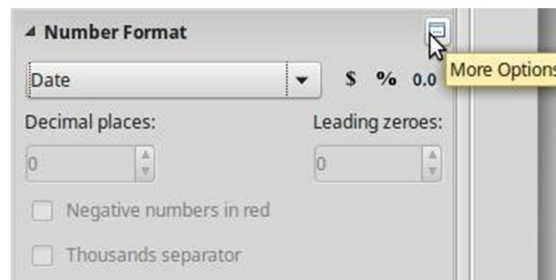


Figure 112: Select Date and More Options

Autocorrection options

Calc automatically applies many changes during data input using autocorrection, unless you have deactivated any autocorrect changes. You can also undo any autocorrection changes by using the keyboard shortcut *Ctrl+Z* or manually by going back to the change and replacing the autocorrection with what you want to actually see.

To change the autocorrect options, go to **Tools > AutoCorrect Options** on the Menu bar to open the **AutoCorrect** dialog (Figure 113).

Replace

Edits the replacement table for automatically correcting or replacing words or abbreviations in the document.

Exceptions

Specify the abbreviations or letter combinations that you do not want LibreOffice to correct automatically.

Options

Select the options for automatically correcting errors as you type and then click **OK**.

Localized options

Specify the AutoCorrect options for quotation marks and for options that are specific to the language of the text.

Reset

Resets modified values back to the LibreOffice default values.

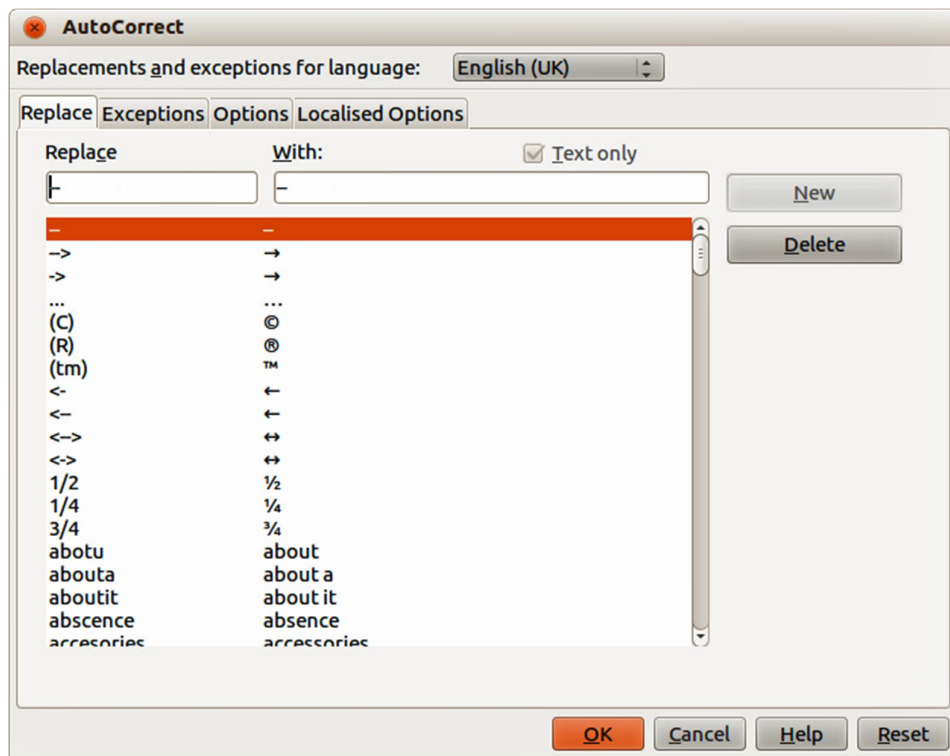


Figure 113: AutoCorrect dialog

Deactivating automatic changes

Some AutoCorrect settings are applied when you press the spacebar after you enter data. To turn off or on Calc AutoCorrect, go to **Tools** on the Menu bar and deselect or select **AutoInput**.

Speeding up data entry

Entering data into a spreadsheet can be very labor-intensive, but Calc provides several tools for removing some of the drudgery from input.

The most basic ability is to drop and drag the contents of one cell to another with a mouse. Many people also find AutoInput helpful. Calc also includes several other tools for automating input, especially of repetitive material. They include the fill tool, selection lists, and the ability to input information into multiple sheets of the same document.

Using the Fill tool

The Calc Fill tool is used to duplicate existing content or create a series in a range of cells in your spreadsheet (Figure 114).

- 1) Select the cell containing the contents you want to copy or start the series from.
- 2) Drag the mouse in any direction or hold down the *Shift* key and click in the last cell you want to fill.
- 3) Go to **Sheet > Fill Cells** on the Menu bar and select the direction in which you want to copy or create data (**Up**, **Down**, **Left** or **Right**) or **Series** and **Random Number...** from the submenu.

Alternatively, you can use a shortcut to fill cells.

- 1) Select the cell containing the contents you want to copy or start the series from.
- 2) Move the cursor over the small square in the bottom right corner of the selected cell. The cursor will change shape.

- 3) Click and drag in the direction you want the cells to be filled. If the original cell contained text, then the text will automatically be copied. If the original cell contained a number, a series will be created.

	A	B
1	Original	
2	Original	
3	Original	
4	Original	
5	Original	
6	Original	
7	Original	
8	Original	

	A	B
1	1234	
2	1235	
3	1236	
4	1237	
5	1238	
6	1239	
7	1240	
8	1241	

Figure 114: Using the Fill tool

Using a fill series

When you select a series fill from **Sheet > Fill Cells > Series...**, the **Fill Series** dialog (Figure 115) opens. Here you can select the type of series you want.

Figure 115: Fill Series dialog

- **Direction** – determines the direction of series creation.
 - *Down* – creates a downward series in the selected cell range for the column using the defined increment to the end value.
 - *Right* – creates a series running from left to right within the selected cell range using the defined increment to the end value.
 - *Up* – creates an upward series in the cell range of the column using the defined increment to the end value.
 - *Left* – creates a series running from right to left in the selected cell range using the defined increment to the end value.
- **Series Type** – defines the series type.
 - *Linear* – creates a linear number series using the defined increment and endvalue.
 - *Growth* – creates a growth series using the defined increment and endvalue.
 - *Date* – creates a date series using the defined increment and end date.
 - *AutoFill* – forms a series directly in the sheet. The AutoFill function takes account of customized lists. For example, by entering January in the first cell, the series is completed using the list defined in **Tools > Options > LibreOffice Calc > Sort Lists**. AutoFill tries to complete a value series by using a defined pattern. For example, a numerical series using 1,3,5 is automatically completed with 7,9,11,13; a date and time series using 01.01.99 and 15.01.99, an interval of fourteen days is used.

- **Unit of Time** – in this area you specify the desired unit of time. This area is only active if the Date option has been chosen in the Series type area.
 - *Day* – use the Date series type and this option to create a series using seven days.
 - *Weekday* – use the Date series type and this option to create a series of five day sets.
 - *Month* – use the Date series type and this option to form a series from the names or abbreviations of the months.
 - *Year* – use the Date series type and this option to create a series of years.
- **Start Value** – determines the start value for the series. Use numbers, dates or times.
- **End Value** – determines the end value for the series. Use numbers, dates or times.
- **Increment** – determines the value by which the series of the selected type increases by each step. Entries can only be made if the linear, growth or date series types have been selected.

Figure 116: Sort Lists dialog

To define your own fill series:

Defining a fill series from a range in a sheet

- 1) Select the range containing the text values that you want to use as a fill series.
- 2) Go to **Tools > Options > LibreOffice Calc > Sort Lists** to open the Sort List dialog (Figure 116).
- 3) The selected range is in the box **Copy list from**. Click **Copy** to add the range to the sort list.

Selection lists are available only for text and are limited to using only text that has already been

entered in the same column.

- 1) Select a blank cell in a column that contains cells with text entries.
- 2) Right-click and select **Selection Lists** from the context menu. A drop-down list appears listing any cell in the same column that either has at least one text character or whose format is defined as text.
- 3) Click on the text entry you require and it is entered into the selected cell.

Sharing content between sheets

You might want to enter the same information in the same cell on multiple sheets, for example to set up standard listings for a group of individuals or organizations. Instead of entering the list on each sheet individually, you can enter the information in several sheets at the same time.

- 1) Go to **Sheet > Select Sheets...** on the Menu bar to open the **Select Sheets** dialog.

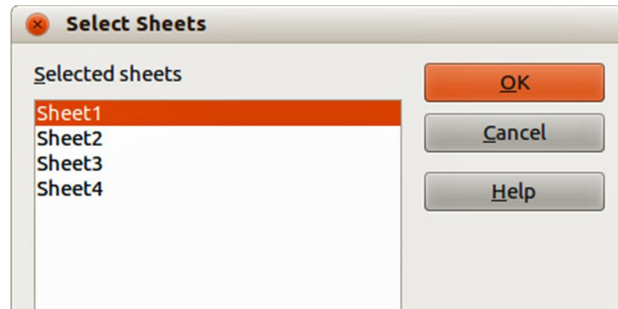


Figure 117: Select Sheets dialog

- 2) Select the individual sheets where you want the information to be repeated. Use the *Shift* and *Ctrl* (*Options* on Mac) keys to select multiple sheets.
- 3) Click **OK** to select the sheets and the sheet tabs will change color.
- 4) Enter the information in the cells on the first sheet where you want it to appear and it will be repeated in all the selected sheets.

Note

This technique automatically overwrites, without any warning, any information that is already in the cells on the selected sheets. Make sure you deselect the additional sheets when you are finished entering information that is going to be repeated before continuing to enter data into your spreadsheet.

Validating cell contents

When creating spreadsheets for other people to use, validating cell contents ensures that they enter data that is valid and appropriate for the cell. You can also use validation in your own work as a guide to entering data that is either complex or rarely used.

Fill series and selection lists can handle some types of data, but are limited to predefined information. To validate new data entered by a user, select a cell and go to **Data > Validity** on the Menu bar to define the type of contents that can be entered in that cell. For example, a cell may require a date or a whole number with no alphabetic characters or decimal points, or a cell may not be left empty.

Depending on how validation is set up, validation can also define the range of contents that can be entered, provide help messages explaining the content rules set up for the cell and what users should do when they enter invalid content. You can also set the cell to refuse invalid content, accept it with a warning, or start a macro when an error is entered. See the *Calc Guide Chapter 2 Entering, Editing and Formatting Data* for more information on validating cell contents.

Editing data

Deleting data

Deleting data only

Data can be deleted from a cell without deleting any of the cell formatting. Click in the cell to select it and then press the *Delete* key.

Deleting data and formatting

Data and cell formatting can be deleted from a cell at the same time.

- 1) Click in the cell to select it.
- 2) Press the *Backspace* key, or right-click in the cell and select **Delete Contents** from the context menu, or go to **Edit > Delete Contents** on the Menu bar to open the **Delete Contents** dialog (Figure 118). Here you can delete the different aspects of the data in the cell or to delete everything in the cell.

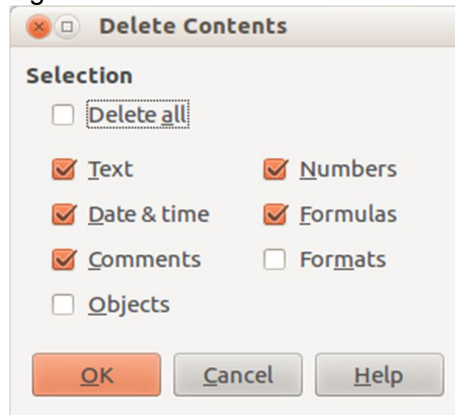


Figure 118: Delete Contents dialog

Replacing data

To completely replace data in a cell and insert new data, select the cell and type in the new data. The new data will replace the data already contained in the cell but will retain the original formatting used in the cell.

Alternatively, click in the Input Line on the Formula Bar (Figure 92 on page 118), then double-click on the data to highlight it completely and type the new data.

Editing data

Sometimes it is necessary to edit the contents of cell without removing all of the data from the cell. For example, changing the phrase "Sales in Qtr. 2" to "Sales rose in Qtr" can be done as follows.

Using the keyboard

- 1) Click in the cell to select it.
- 2) Press the *F2* key and the cursor is placed at the end of the cell.
- 3) Use the keyboard arrow keys to reposition the cursor where you want to start entering the new data in the cell.
- 4) When you have finished, press the *Enter* key and your editing changes are saved.

Using the mouse

- 1) Double-click on the cell to select it and place the cursor in the cell for editing.
- 2) Either:
 - Reposition the cursor to where you want to start entering the new data in the cell.
 - Single-click to select the cell.
- 3) Move the cursor to the Input Line on the Formula Bar (Figure 92 on page 118) and click at the position where you want to start entering the new data in the cell.
- 4) When you have finished, click away from the cell to deselect it and your editing changes are saved.

Formatting data

Note

All the settings discussed in this section can also be set as a part of the cell style. See the *Calc Guide Chapter 4 Using Styles and Templates in Calc* for more information.

Multiple lines of text

Multiple lines of text can be entered into a single cell using automatic wrapping or manual line breaks. Each method is useful for different situations.

Automatic wrapping

To automatically wrap multiple lines of text in a cell, use one of the following methods.

Method 1

- 1) Right-click on the cell and select **Format Cells** from the context menu, or go to **Format > Cells** on the Menu bar, or press **Ctrl+1**, to open the Format Cells dialog.
- 2) Click on the **Alignment** tab (Figure 119).
- 3) Under **Properties**, select **Wrap text automatically** and click **OK**.

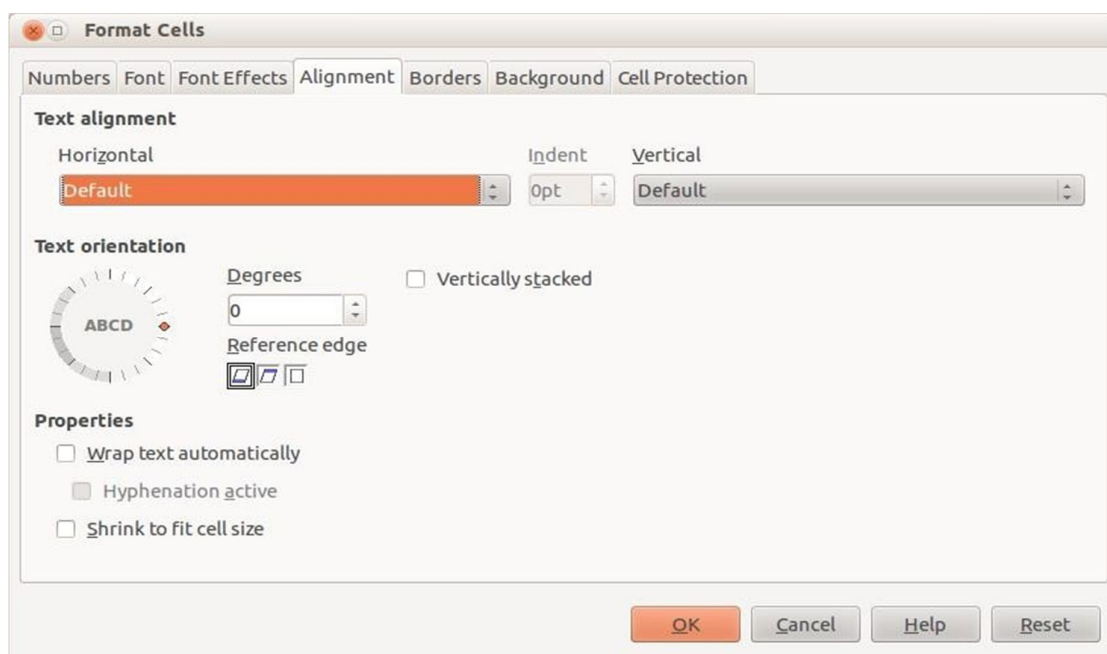


Figure 119: Format Cells dialog – Alignment page

Method 2

- 1) Select the cell.
- 2) Open the Sidebar (**View > Sidebar**) and click the **Open Panel (+)** icon on the **Alignment** panel.
- 3) Select the **Wrap text** option to apply the formatting immediately.

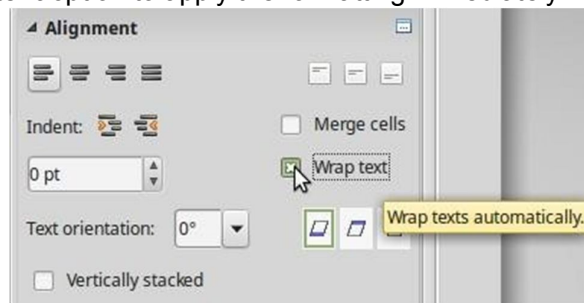


Figure 120: Wrap text formatting

Manual line breaks

To insert a manual line break while typing in a cell, press *Ctrl+Enter*. This method does not work with the cursor in the input line. When editing text, double-click the cell, then reposition the cursor to where you want the line break.

When a manual line break is entered, the cell width does not change and your text may still overlap the end of the cell. You have to change the cell width manually or reposition your line break so that your text does not overlap the end of the cell.

Shrinking text to fit the cell

The font size of the data in a cell can automatically adjust to fit inside cell borders. To do this, select the *Shrink to fit cell size* option under **Properties** in the Format Cells dialog (Figure 119) on the **Alignment** page. This dialog is also available by clicking the **More Options** button in the **Character** title bar of the **Properties** deck on the opened Sidebar.

Formatting numbers

Several different number formats can be applied to cells by using icons on the Formatting toolbar (highlighted in Figure 121). Select the cell, then click the relevant icon to change the number format.



Figure 121: Number icons on Formatting toolbar

For more control or to select other number formats, use the *Numbers* page of the Format Cells dialog (Figure 110 on page 137):

- Apply any of the data types in the **Category** list to the data.
- Control the number of decimal places and leading zeros in **Options**.
- Enter a custom format code.
- The **Language** setting controls the local settings for the different formats such as the date format and currency symbol.

Some number formats are available from the Sidebar's **Number Format** panel in the Properties deck. Click the **More Options** button to open the Format Cells dialog described above.

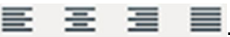

Formatting a font

To quickly select a font and format it for use in a cell:

- 1) Select the cell.
- 2) Click the small triangle on the right of the Font Name box on the Formatting toolbar (highlighted in Figure 122) and select a font from the drop-down list.
- 3) Click on the small triangle on the right of the Font Size on the Formatting toolbar and select a font size from the drop down list.



Figure 122: Font Name and Size on Formatting toolbar


- 4) To change the character format, click on the **Bold**, *Italic*, or Underline icons.
- 5) To change the paragraph alignment of the font, click on one of the four alignment icons (Left, Center, Right, Justified) .
- 6) To change the font color, click the arrow next to the Font Color icon  to display the color palette, then select the desired color.

The **Properties** deck of the Sidebar has five panels, **Styles**, **Character**, **Number Format**, **Alignment** and **Cell Appearance**, which between them contain all the formatting controls from the Formatting toolbar and more.



To specify the language used in the cell, open the **Font** page on the Format Cells dialog. You can also select the **More Options** button on either of the Sidebar panels to open the Format Cells dialog. Changing language in a cell allows different languages to be used within the same document.

Use the *Font Effects* tab on the Format Cells dialog to set other font characteristics. See the *Calc Guide Chapter 4 Using Styles and Templates in Calc* for more information.

Formatting cell borders

To format the borders of a cell or a group of selected cells, click on the Borders icon  on the Formatting toolbar, and select one of the border options displayed in the palette.

To format the line style and line color for the borders of a cell, click the small arrows next to the

Line Style  and Line Color (Border Color)  icons on the Formatting toolbar. A line style palette and a border color palette respectively are displayed.

The **Cell Appearance** panel of the **Properties** deck in the Sidebar contains **Cell border**, **Line style** and **Line color** controls.

For more control, including the spacing between cell borders and any data in the cell, use the *Borders* page of the Format Cells dialog (Figure 110 on page 137), where you can also define a shadow style. Clicking the **More Options** button on the **Cell Appearance** title bar, or clicking **More** in the panel's line style drop-down list, opens the Format Cells dialog at the *Borders* page.


See the *Calc Guide Chapter 4 Using Styles and Templates in Calc* for more information.

Note

Cell border properties apply only to the selected cells and can only be changed if you are editing those cells. For example, if cell C3 has a top border, that border can only be removed by selecting C3. It cannot be removed in C2 despite also appearing to be the bottom border for cell C2.

Formatting cell background

To format the background color for a cell or a group of cells, click the small arrow next to the

Background Color icon  on the Formatting toolbar. A color palette, similar to the Font Color palette, is displayed. You can also use the *Background* tab of the Format Cells dialog (Figure 110 on page 137). The **Cell Appearance** panel of the **Properties** deck in the Sidebar contains a **Cell background** control with a color palette. See the *Calc Guide Chapter 4 Using Styles and Templates in Calc* for more information.

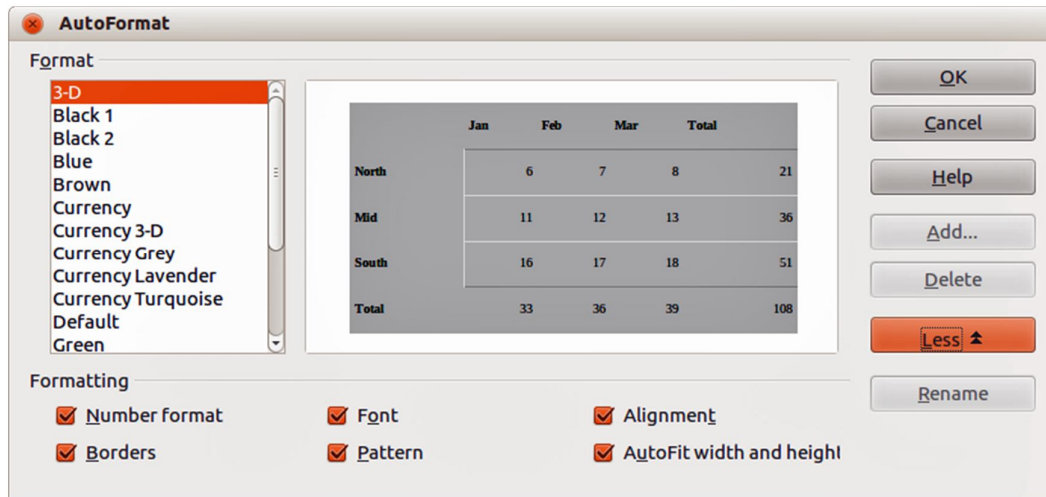
AutoFormatting of cells

Using AutoFormat

You can use Calc's AutoFormat feature to format a group of cells quickly and easily. It also let you format different parts of the sheet with the same look and feel very easily.

- 1) Select the cells in at least three columns and rows, including column and row headers, that you want to format.
- 2) Go to **Format > AutoFormat** on the Menu bar to open the **AutoFormat** dialog (Figure 123).
- 3) Select the type of format and format color from the list.
- 4) If necessary, click **More** to open **Formatting** if Formatting is not visible.
- 5) Select the formatting properties to be included in the AutoFormat function.

- 6) Click **OK**.



AutoFormat dialog

Defining a new AutoFormat


You can define a new AutoFormat so that it becomes available for use in all spreadsheets.

- 1) Format the data type, font, font size, cell borders, cell background, and so on for a group of cells.
- 2) Go to **Edit > Select All** on the Menu bar to select the whole spreadsheet.
- 3) Go to **Format > AutoFormat** to open the AutoFormat dialog and the **Add** button is now active.
- 4) Click **Add**.
- 5) In the *Name* box of the Add AutoFormat dialog that opens, type a meaningful name for the new format.
- 6) Click **OK** to save. The new AutoFormat is now available in the *Format* list in the AutoFormat dialog.

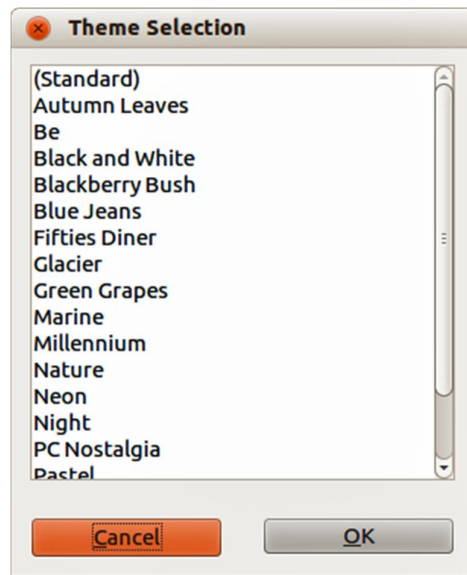
Using themes

Calc comes with a predefined set of formatting themes that you can apply to spreadsheets. It is not possible to add themes to Calc and they cannot be modified. However, you can modify their styles after you apply them to a spreadsheet, and the modified styles become available for use in that spreadsheet after you have saved it.

To apply a theme to a spreadsheet:

- 1) Click the **Choose Themes** icon  in the **Tools** toolbar. If this toolbar is not visible, go to **View > Toolbars** on the Menu bar and select **Tools**, and the **Theme Selection** dialog (Figure 124) opens. This dialog lists the available themes for the whole spreadsheet.
- 2) Select the theme that you want to apply. As soon as you select a theme, the theme styles are applied to the spreadsheet and are immediately visible.
- 3) Click **OK**.

- 4) If you wish, you can now open the Styles and Formatting window to modify specific styles. These modifications do not modify the theme; they only change the appearance of the style in the specific spreadsheet you are creating.



Theme Selection dialog

Using conditional formatting

You can set up cell formats to change depending on conditions that you specify. For example, in a table of numbers, you can show all the values above the average in green and all those below the average in red.

Conditional formatting depends upon the use of styles and the AutoCalculate feature must be enabled. Go to **Tools > Cell Contents > AutoCalculate** on the Menu bar to enable this feature. See the *Calc Guide Chapter 2 Entering, Editing, and Formatting Data* for more information.

Hiding and showing data

In Calc you can hide elements so that they are neither visible on a computer display nor printed when a spreadsheet is printed. However, hidden elements can still be selected for copying if you select the elements around them. For example, if column B is hidden, it is copied when you select columns A and C.

For more information on how to hide and show data, including how to use outline groups and filtering, see the *Calc Guide Chapter 2 Entering, Editing, and Formatting Data*.

Note

When data in cells are hidden, the blank cells remain visible in the spreadsheet.

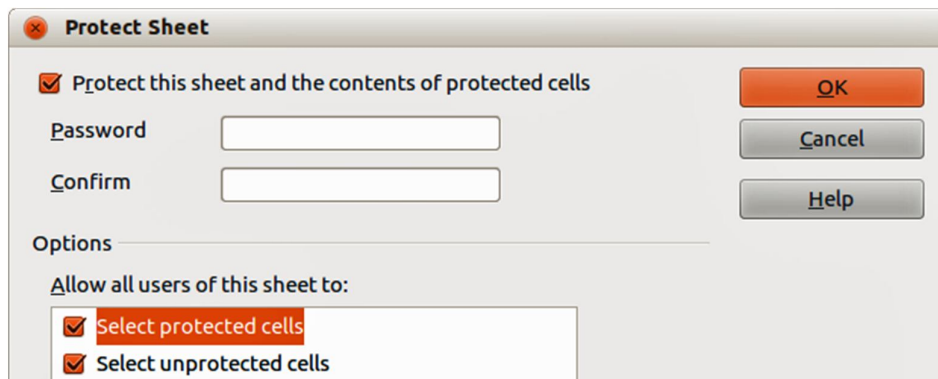
Hiding and protecting data

To hide sheets, rows, and columns:

- 1) Select the sheet, row or column you want to hide.
- 2) Go to **Format** on the Menu bar and select **Sheet, Row or Column**.
- 3) Select **Hide** from the menu and the sheet, row or column can no longer viewed or printed.
- 4) Alternatively, right-click on the sheet tab, row header or column header and select **Hide** from the context menu.

To hide and protect data in selected cells:

- 1) Go to **Tools > Protect Sheet**. The **Protect Sheet** dialog will open (Figure 125).
- 2) Select *Protect this sheet and the contents of protected cells*.
- 3) Create a password and then confirm the password.
- 4) Select or deselect the user selection options for cells.
- 5) Click **OK**.
- 6) Select the cells you want to hide.
- 7) Go to **Format > Cells** on the Menu bar, or right-click and select **Format Cells** from the context menu, or use the keyboard shortcut *Ctrl+1* to open the **Format Cells** dialog.
- 8) Click the *Cell Protection* tab (Figure 126) and select an option to hide the cells.
- 9) Click **OK**.



Protect Sheet dialog

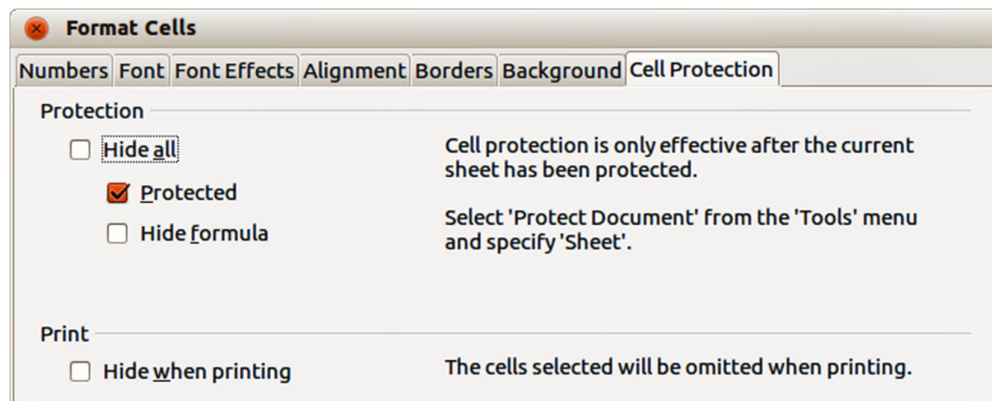


Figure 126: Cell Protection page in Format Cells dialog

Showing data

To show hidden sheets, rows, and columns:

- 1) Select the sheets, rows or columns each side of the hidden sheet, row or column.
- 2) Go to **Format** on the Menu bar and select **Sheet, Row** or **Column**.
- 3) Select **Show** from the menu and the sheet, row or column will be displayed and can be printed.
- 4) Alternatively, right-click on the sheet tabs, row headers or column headers and select **Show** from the context menu.

To show hidden data in cells:

- 1) Go to **Tools > Protect Sheet**.
- 2) Enter the password to unprotect the sheet and click **OK**.
- 3) Go to **Format > Cells** on the Menu bar, or right-click and select **Format Cells** from the context menu, or use the keyboard shortcut **Ctrl+1** to open the **Format Cells** dialog.
- 4) Click the *Cell Protection* tab (Figure 126) and deselect the hide options for the cells.
- 5) Click **OK**.

Sorting records

Sorting within Calc arranges the cells in a sheet using the sort criteria that you specify. Several criteria can be used and a sort applies each criteria consecutively. Sorts are useful when you are searching for a particular item and become even more useful after you have filtered data. Also, sorting is useful when you add new information to your spreadsheet. When a spreadsheet is long, it is usually easier to add new information at the bottom of the sheet, rather than adding rows in their correct place. After you have added information, you then carry out a sort to update the spreadsheet.

For more information on how to sort records and the sorting options available, see the *Calc Guide Chapter 2 Entering, Editing, and Formatting Data*.



Sort Criteria dialog

To sort cells in a spreadsheet:

- 1) Select the cells to be sorted.
- 2) Go to **Data > Sort** on the Menu bar to open the **Sort** dialog (Figure 127).
- 3) Select the sort criteria from the drop down lists. The selected lists are populated from the selected cells.
- 4) Select either ascending order (A-Z, 1-9) or descending order (Z-A, 9-1).
- 5) Click **OK** and the sort is carried out on your spreadsheet.

Using formulas and functions

You may need more than numbers and text on your spreadsheet. Often the contents of one cell depend on the contents of other cells. Formulas are equations that use numbers and variables to produce a result. Variables are placed in cells to hold data required by equations.

A function is a predefined calculation entered in a cell to help you analyze or manipulate data. All you have to do is enter the arguments and the calculation is automatically made for you. Functions help you create the formulas required to get the results that you are looking for.

See the *Calc Guide Chapter 7 Using Formulas and Functions* for more information.

Analyzing data

Calc includes several tools to help you analyze the information in your spreadsheets, ranging from features for copying and reusing data, to creating subtotals automatically, to varying information to help you find the answers you need. These tools are divided between the Tools and Data menus. One of the most useful of these tools is the PivotTable, which is used for combining, comparing, and analyzing large amounts of data easily. Using the PivotTable, you can view different summaries of the source data, display the details of areas of interest, and create reports, whether you are a beginner, an intermediate or advanced user.

Calc also includes many tools for statistical analysis of data, where you can obtain important numerical information on data obtained from physical measurements, polls, or even business transactions such as sales, stock quotations, and so on. These statistical data analyses are available in the menu **Data > Statistics**.

See the *Calc Guide Chapter 8 Using Pivot Tables* and *Chapter 9 Data Analysis* for more information on pivot tables and other tools available in Calc to analyze your data.

Printing


Printing from Calc is much the same as printing from other LibreOffice components (see *Chapter 10 Printing, Exporting, and Emailing* in this guide). However, some details for printing in Calc are different, especially regarding preparation for printing.

Print ranges

Print ranges have several uses, including printing only a specific part of the data or printing selected rows or columns on every page. For more information about using print ranges, see the *Calc Guide Chapter 6 Printing, Exporting, and E-mailing*.

Defining a print range


To define a new print range or modify an existing print range:

- 1) Select the range of cells to be included in the print range.
- 2) Go to **Format > Print Ranges > Define** on the Menu bar. Page break lines are displayed on screen.
- 3) To check the print range, go to **File > Print Preview** on the Menu bar or click on the **Print Preview** icon . LibreOffice will display the cells in the print range.

Adding to a print range

After defining a print range, you can add more cells to it by creating another print range. This allows multiple, separate areas of the same sheet to be printed while not printing the whole sheet.

- 1) After defining a print range, select an extra range of cells for adding to the print range.
- 2) Go to **Format > Print Ranges > Add** on the Menu bar to add the extra cells to the print range. The page break lines are no longer displayed on the screen.

- 3) To check the print ranges, go to **File > Print Preview** on the Menu bar or click on the **Print**
- 4) **Preview** icon . LibreOffice will display the print ranges as separate pages.

Note

The additional print range will print as a separate page, even if both ranges are on the same sheet.

Removing a print range

It may become necessary to remove a defined print range, for example, if the whole sheet needs to be printed later.

To remove all the defined print ranges, go to **Format > Print Ranges > Remove** on the Menu bar. After the print ranges have been removed, the default page break lines will appear on the screen.

Editing a print range

At any time, you can directly edit the print range, for example to remove or resize part of the print range. Go to **Format > Print Ranges > Edit** on the Menu bar to open the **Edit Print Ranges** dialog where you can define the print range.

Printing options

To select the printing options for page order, details, and scale to be used when printing a spreadsheet:

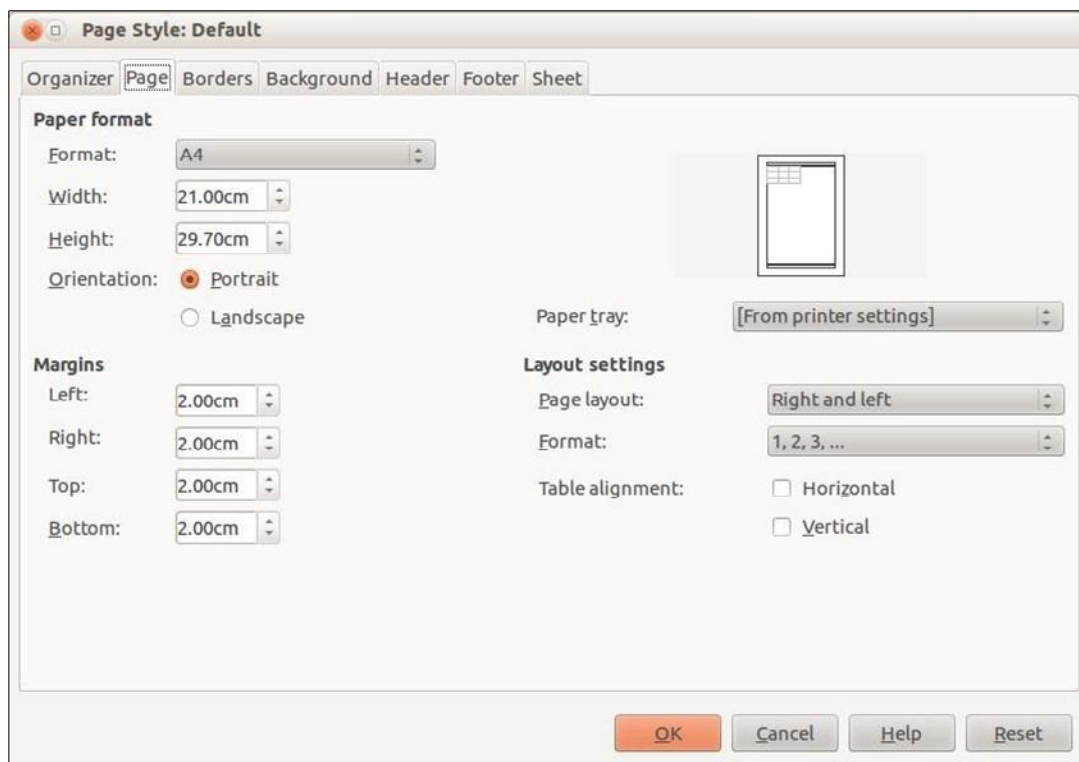
- 1) Go to **Format > Page** on the Menu bar to open the **Page Style** dialog (Figure 128).
- 2) Select the **Sheet** tab and make your selections from the available options.
- 3) Click **OK**.

For more information on printing options, see the *Calc Guide Chapter 6 Printing, Exporting, and E-mailing*.

Repeat printing of rows or columns

If a sheet is printed on multiple pages, you can set up certain rows or columns to repeat on each printed page. For example, if the top two rows of the sheet as well as column A need to be printed on all pages, do the following:

- 1) Go to **Format > Print Ranges > Edit** on the Menu bar to open the **Edit Print Ranges** dialog (Figure 129).
- 2) Type the row identifiers in the *Rows to repeat* box. For example, to repeat rows 1 and 2, type **\$1:\$2**. This automatically changes *Rows to repeat* from, - none - to - user defined-.



Page Style dialog

- 3) Type the column identifiers in the *Columns to repeat* box. For example, to repeat column A, type **\$A**. In the *Columns to repeat* list, - **none** - changes to - **user defined** -.
- 4) Click **OK**.

For more information on editing print ranges, see the *Calc Guide*, Chapter 6 Printing, Exporting, and E-mailing.



Edit Print Ranges dialog

Page breaks

While defining a print range can be a powerful tool, it may sometimes be necessary to manually adjust the Calc printout manually using a *manual or page break*. A page break helps to ensure that your data prints properly according to your page size and page orientation. You can insert a horizontal page break above or a vertical page break to the left of the active cell.

For more information on manual breaks, see the *Calc Guide Chapter 6 Printing, Exporting, and E-mailing*.

Inserting a break

To insert a page break:

- 1) Navigate to the cell where the page break will begin.
- 2) Go to **Insert > Page Break** on the Menu bar.
- 3) Select **Row Break** to create a page break above the selected cell.
- 4) Select **Column Break** to create a page break to the left of the selected cell.

Deleting a page break

To remove a page break:

- 1) Navigate to a cell that is next to the break you want to remove.
- 2) Go to **Edit > Delete Page Break** on the Menu bar.
- 3) Select **Row Break** or **Column Break** depending on your need and break is removed.



Note

Multiple manual row and column breaks can exist on the same page. When you want to remove them, you have to remove each break individually.

Headers and footers

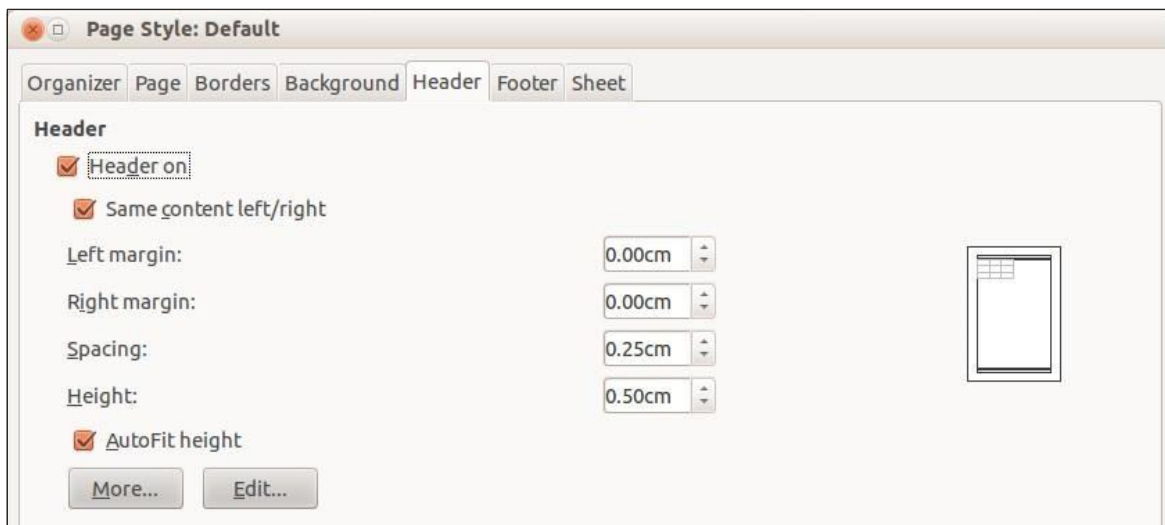
Headers and footers are predefined pieces of text that are printed at the top or bottom of a page when a spreadsheet is printed. Headers and footers are set and defined using the same method. For more information on setting and defining headers and footers, see the *Calc Guide Chapter 6 Printing, Exporting, and E-mailing*.

Headers and footers are also assigned to a page style. You can define more than one page style for a spreadsheet and assign different page styles to different sheets within a spreadsheet. For more information on page styles, see the *Calc Guide Chapter 4 Using Styles and Templates*.

Setting a header or footer

To set a header or footer:

- 1) Navigate to the sheet that you want to set the header or footer for.
- 2) Go to **Format > Page** on the Menu bar to open the **Page Style** dialog (Figure 130).
- 3) On the Page Style dialog, select **Header** or **Footer** tab.
- 4) Select the **Header on** or **Footer on** option.
- 5) Select **Same content left/right** option if you want the same header or footer to appear on all the printed pages.
- 6) Set the margins, spacing, and height for the header or footer. You can also select **AutoFit height** box to automatically adjust the height of the header or footer.
- 7) To change the appearance of the header or footer, click on **More** to open the borders and background dialog.
- 8) To set the contents, for example page number, date and so on, that appears in the header or footer, click on **Edit** to open the style dialog.



Header page of Page Style dialog

COMPUTER FUNDAMENTAL
SET - 1

1. UNIVAC is

- a. Universal Automatic Computer**
 - b. Universal Array Computer
 - c. Unique Automatic Computer
 - d. Unvalued Automatic Computer
-

2. CD-ROM stands for

- a. Compactable Read Only Memory
 - b. Compact Data Read Only Memory
 - c. Compactable Disk Read Only Memory
 - d. Compact Disk Read Only Memory**
-

3. ALU is

- a. Arithmetic Logic Unit**
 - b. Array Logic Unit
 - c. Application Logic Unit
 - d. None of above
-

4. VGA is

- a. Video Graphics Array**
 - b. Visual Graphics Array
 - c. Volatile Graphics Array
 - d. Video Graphics Adapter
-

5. IBM 1401 is

- a. First Generation Computer
 - b. Second Generation Computer**
 - c. Third Generation Computer
 - d. Fourth Generation Computer
-

6. MSI stands for

- a. Medium Scale Integrated Circuits**
 - b. Medium System Integrated Circuits
 - c. Medium Scale Intelligent Circuit
 - d. Medium System Intelligent Circuit
-

7. The capacity of 3.5 inch floppy disk is

- a. 1.40 MB
 - b. 1.44 GB
 - c. 1.40 GB
 - d. 1.44 MB**
-

8. The first computer introduced in Nepal was

- a. IBM 1400
 - b. IBM 1401**
 - c. IBM 1402
 - d. IBM1402
-

9. WAN stands for

- a. Wap Area Network
- b. Wide Area Network**

- c. Wide Array Net
- d. Wireless Area Network

10. MICR stands for

- a. Magnetic Ink Character Reader**
- b. Magnetic Ink Code Reader
- c. Magnetic Ink Cases Reader
- d. None

SET - 2

1. EBCDIC stands for

- a. Extended Binary Coded Decimal Interchange Code**
- b. Extended Bit Code Decimal Interchange Code
- c. Extended Bit Case Decimal Interchange Code
- d. Extended Binary Case Decimal Interchange Code

2. BCD is

- a. Binary Coded Decimal**
- b. Bit Coded Decimal
- c. Binary Coded Digit
- d. Bit Coded Digit

3. ASCII stands for

- a. American Stable Code for International Interchange
- b. American Standard Case for Institutional Interchange
- c. American Standard Code for Information Interchange**
- d. American Standard Code for Interchange Information

4. Which of the following is first generation of computer

- a. EDSAC**
- b. IBM-1401
- c. CDC-1604
- d. ICL-2900

5. Chief component of first generation computer was

- a. Transistors
- b. Vacuum Tubes and Valves**
- c. Integrated Circuits
- d. None of above

6. FORTRAN is

- a. File Translation
- b. Format Translation
- c. Formula Translation**
- d. Floppy Translation

7. EEPROM stand for

- a. Electrically Erasable Programmable Read Only Memory**

- b. Easily Erasable Programmable Read Only Memory
 - c. Electronic Erasable Programmable Read Only Memory
 - d. None of the above
-

8. Second Generation computers were developed during
- a. 1949 to 1955
 - b. 1956 to 1965**
 - c. 1965 to 1970
 - d. 1970 to 1990
-

9. The computer size was very large in
- a. First Generation**
 - b. Second Generation
 - c. Third Generation
 - d. Fourth Generation
-

10. Microprocessors as switching devices are for which generation computers
- a. First Generation
 - b. Second Generation
 - c. Third Generation
 - d. Fourth Generation**
-

SET-3

1. Which of the following devices can be used to directly image printed text?
- a. OCR**
 - b. OMR
 - c. MICR
 - d. All of above
-

2. The output quality of a printer is measured by
- a. Dot per inch
 - b. Dot per sq. inch**
 - c. Dots printed per unit time
 - d. All of above
-

3. In analog computer
- a. Input is first converted to digital form
 - b. Input is never converted to digital form**
 - c. Output is displayed in digital form
 - d. All of above
-

4. In latest generation computers, the instructions are executed
- a. Parallel only
 - b. Sequentially only
 - c. Both sequentially and parallel**
 - d. All of above
-

5. Who designed the first electronics computer – ENIAC?
- a. Van-Neumann
 - b. Joseph M. Jacquard
 - c. J. Presper Eckert and John W Mauchly**
 - d. All of above
-

6. Who invented the high level language c?

- a. **Dennis M. Ritchie**
 - b. Niklaus Writh
 - c. Seymour Papert
 - d. Donald Kunth
-

7. Personnel who design, program, operate and maintain computer equipment refers to
- a. Console-operator
 - b. Programmer
 - c. **Peopleware**
 - d. System Analyst
-

8. When did arch rivals IBM and Apple Computers Inc. decide to join hands?
- a. 1978
 - b. 1984
 - c. 1990
 - d. **1991**
-

9. Human beings are referred to as Homosapinens, which device is called Sillico Sapiens?
- a. Monitor
 - b. Hardware
 - c. Robot
 - d. **Computer**
-

10. An error in software or hardware is called a bug. What is the alternative computer jargon for it?
- a. Leech
 - b. Squid
 - c. Slug
 - d. **Glitch**
-

11. Modern Computer are very reliable but they are not
- a. Fast
 - b. Powerful
 - c. **Infallible**
 - d. Cheap
-

12. What is the name of the display feature that highlights are of the screen which requires operator attention?
- a. Pixel
 - b. **Reverse video**
 - c. Touch screen
 - d. Cursor
-

13. IMB launched its first personal computer called IBM-PC in 1981. It had chips from Intel, disk drives from Tandon, operating system from Microsoft, the printer from Epson and the application software from everywhere. Can you name the country which contributed the video display?
- a. India
 - b. China
 - c. Germany
 - d. **Taiwan**
-

14. Personal computers use a number of chips mounted on a main circuit board. What is the common name for such boards?
- a. Daughter board

b. Motherboard

- c. Father board
- d. Breadboard

15. In most IBM PCs, the CPU, the device drives, memory expansion slots and active components are mounted on a single board. What is the name of this board?

a. Motherboard

- b. Breadboard
- c. Daughter board
- d. Grandmother board

16. What is meant by a dedicated computer?

- a. Which is used by one person only
- b. Which is assigned one and only one task**
- c. Which uses one kind of software
- d. Which is meant for application software

17. The system unit of a personal computer typically contains all of the following except:

- a. Microprocessor
- b. Disk controller
- c. Serial interface
- d. Modem**

18. A computer program that converts an entire program into machine language is called a/an

- a. Interpreter
- b. Simulator
- c. Compiler**
- d. Commander

19. A computer program that translates one program instructions at a time into machine language is called a/an

- a. Interpreter**
- b. CPU
- c. Compiler
- d. Simulator

20. A small or intelligent device is so called because it contains within it a

- a. Computer
- b. Microcomputer
- c. Programmable
- d. Sensor**

SET-4

1. The ALU of a computer responds to the commands coming from

- a. Primary memory
- b. Control section**
- c. External memory
- d. Cache memory

2. The act of retrieving existing data from memory is called

- a. Read-out
- b. Read from

- c. Read
 - d. All of above**
-

3. All modern computer operate on
- a. Information
 - b. Floppies
 - c. Data**
 - d. Word
-

4. Instructions and memory address are represented by
- a. Character code
 - b. Binary codes**
 - c. Binary word
 - d. Parity bit
-

5. Which of the following code used in present day computing was developed by IBM Corporation?
- a. ASCII
 - b. Hollerith Code
 - c. Baudot Code
 - d. EBCDIC Code**
-

6. What is the latest write-once optical storage media?
- a. Digital paper
 - b. Magneto-optical disk
 - c. WORM disk
 - d. CD-ROM disk**
-

7. The most important advantage of a video disk is
- a. Compactness
 - b. Potential capacity**
 - c. Durability
 - d. Cost effectiveness
-

8. What is the number of read-write heads in the drive for a 9-trac magnetic tape?
- a. 9**
 - b. 16
 - c. 18
 - d. 27
-

9. Before a disk drive can access any sector record, a computer program has to provide the record's disk address. What information does this address specify?
- a. Track number
 - b. Sector number
 - c. Surface number
 - d. All of above**
-

10. As compared to diskettes, the hard disks are
- a. More expensive**
 - b. More portable
 - c. Less rigid
 - d. Slowly accessed
-

11. Floppy disks which are made from flexible plastic material are also called?
- a. Hard disks

- b. High-density disks
 - c. Diskettes**
 - d. Templates
-

12. Regarding a VDU, Which statement is more correct?

- a. It is an output device
 - b. It is an input device
 - c. It is a peripheral device**
 - d. It is hardware item
-

13. What is the name of the computer terminal which gives paper printout?

- a. Display screen
 - b. Soft copy terminal
 - c. Hard copy terminal**
 - d. Plotter
-

14. Dot-matrix is a type of

- a. Tape
 - b. Printer**
 - c. Disk
 - d. Bus
-

15. The two kinds of main memory are:

- a. Primary and secondary
 - b. Random and sequential
 - c. ROM and RAM**
 - d. All of above
-

16. A kind of serial dot-matrix printer that forms characters with magnetically-charged ink sprayed dots is called

- a. Laser printer
 - b. Ink-jet printer**
 - c. Drum printer
 - d. Chan printer
-

17. Which printer is very commonly used for desktop publishing?

- a. Laser printer**
 - b. Inkjet printer
 - c. Daisywheel printer
 - d. Dot matrix printer
-

18. An output device that uses words or messages recorded on a magnetic medium to produce audio response is

- a. Magnetic tape
 - b. Voice response unit**
 - c. Voice recognition unit
 - d. Voice band
-

19. Which of the following will happen when data is entered into a memory location?

- a. It will add to the content of the location
 - b. It will change the address of the memory location
 - c. It will erase the previous content**
 - d. It will not be fruitful if there is already some data at the location
-

20. A storage area used to store data to compensate for the difference in speed at which the different units can handle data is
- a. Memory
 - b. Buffer**
 - c. Accumulator
 - d. Address

SET-5

1. To locate a data item for storage is
- a. Field
 - b. Feed
 - c. Database
 - d. Fetch**

-
2. programs designed to perform specific tasks is known as
- a. system software
 - b. application software**
 - c. utility programs
 - d. operating system

-
3. perforated paper used as input of output media is known as
- a. paper tapes**
 - b. magnetic tape
 - c. punched papers tape
 - d. card punch

-
4. Time during which a job is processed by the computer is
- a. Delay times
 - b. Real time
 - c. Execution time**
 - d. Down time

-
5. a computer which CPU speed around 100 million instruction per second and with the word length of around 64 bits is known as
- a. Super computer**
 - b. Mini computer
 - c. Micro computer
 - d. Macro computer

-
6. An approach that permits the computer to work on several programs instead of one is
- a. On-line thesaurus
 - b. Multiprogramming
 - c. Over lapped processing**
 - d. Outline processor

-
7. A directly accessible appointment calendar is feature of a ... resident package
- a. CPU
 - b. Memory**
 - c. Buffer
 - d. ALU

-
8. The term gigabyte refers to
- a. 1024 bytes
 - b. 1024 kilobytes

c. **1024 megabytes**

d. 1024 gigabyte

9. Which of the following processors use RISC technology?

a. 486dx

b. **Power PC**

c. 486sx

d. 6340

10. A/n Device is any device that provides information, which is sent to the CPU

a. **Input**

b. Output

c. CPU

d. Memory

11. Current SIMMs have either ... or ... connectors (pins)

a. 9 or 32

b. 30 or 70

c. 28 or 72

d. **30 or 72**

12. The storage subsystem in a microcomputer consists mainly of ... or ... media with varying capacities

a. Memory or video

b. **Magnetic or optical**

c. Optical or memory

d. Video or magnetic

13. Which of the following is not an input device?

a. OCR

b. Optical scanners

c. Voice recognition device

d. **COM (Computer Output to Microfilm)**

14. The central processing unit (CPU) consists of

a. Input, output and processing

b. Control unit, primary storage, and secondary storage

c. **Control unit, arithmetic-logic unit and primary storage**

d. Control unit, processing, and primary storage

15. EBCDIC can code up to how many different characters?

a. **256**

b. 16

c. 32

d. 64

16. Which is considered a direct entry input device?

a. Optical scanner

b. Mouse and digitizer

c. Light pen

d. **All of the above**

17. Which is used for manufacturing chips?

a. Bus

- b. Control unit
 - c. Semiconductors**
 - d. A and b only
-

18. The computer code for the interchange of information between terminals is

- a. ASCII**
 - b. BCD
 - c. EBCDIC
 - d. All of above
-

19. A byte consists of

- a. One bit
 - b. Four bits
 - c. Eight bits**
 - d. Sixteen bits
-

20. A hybrid computer

- a. Resembles digital computer
- b. Resembles analog computer
- c. Resembles both a digital and analog computer**
- d. None of the above