

COMPUTER APPLICATION

with Cyber-Safety, Scratch & Python

(CBSE CODE 165)

Revised & Updated Edition



**Strictly as per the revised
CBSE syllabus**

- ◎ Concise, comprehensive and easy language.
- ◎ Solved questions with each chapter.
- ◎ Latest recommended technology and software.
- ◎ Hands on projects for practical learning.

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COMPUTER APPLICATION

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Based on Updated CBSE Syllabus



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PREFACE

With sudden increase in the usage of computer and software globally, schools are focusing on computer education with the BEST (BEYOND IMAGINATION, EXCELLENT, SYSTEMATIC, TEACHING PLAN) learning technique. But the study material used was not fulfilling the requirement of modern BEST based training, followed with traditional educational methodology with outdated software versions.

Computer Applications for Class IX is the latest and advanced computer book which has been prepared, keeping in mind the interest of students and teachers in the field of Information Technology. In compliance with the prescribed curriculum, this book covers basics of information technology, cyber safety, Office productivity tools and programming basics with Scratch and Python.

The book is designed with an interactive and hands-on approach to communicate the essential aspects of computer. We have used simple language in the entire series for precise and better understanding.

Salient features of the series:

- "Chapter focuses on" - a brief overview of the chapter.
- Use of more pictures to make theory interesting.
- "You have learned" - a complete summary of the chapter.
- "Activity Time" and "Lab Activities" - for practice.
- "Tips" and "Do You Know" - for additional information.
- All the definitions have been highlighted for better impact.
- Usage of latest technology and softwares to make the learning effective & industry relevant.

We welcome your valuable feedback to improve the content and the presentation of the chapters. Please contact us at eduitspl@gmail.com.



COURSE STRUCTURE

Learning Outcomes:

1. Ability to familiarise with basics of computers.
2. Ability to navigate the file system.
3. Ability to create and edit documents, spread sheets, and presentations.
4. Ability to perform basic data manipulation using spread sheets and use Indian languages in documents.
5. Ability to send and receive emails, follow email etiquette, and communicate over the internet.
6. Ability to create and upload videos.
7. Ability to safely and correctly use websites, social networks, chat sites, and email.

Distribution of Marks and Periods

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
1	Basics of Information Technology	15	10	05
2	Cyber Safety	10	05	05
3	Office Tools	15	10	55
4	Scratch/Python	10	30	60
5	Lab Exercises	50	-	-
	Total	100	55	125

Unit 1: Basics of Information Technology

- ❑ **Computer Systems:** characteristics of a computer, components of a computer system – CPU, memory, storage devices and I/O devices
- ❑ **Memory:** primary (RAM and ROM) and secondary memory
- ❑ **Storage devices:** hard disk, CD ROM, DVD, pen/flash drive, memory stick
- ❑ **I/O devices:** keyboard, mouse, monitor, printer, scanner, web camera
- ❑ **Types of software:** system software (operating system, device drivers), application software including mobile applications
- ❑ **Computer networking:** Type of networks: PAN, LAN, MAN, WAN, wired/wireless communication, Wi-Fi, Bluetooth, cloud computers (private/public)
- ❑ **Multimedia:** images, audio, video, animation

Unit 2: Cyber-safety

- ❑ Safely browsing the web and using social networks: identity protection, proper usage of passwords, privacy, confidentiality of information, cyber stalking, reporting cybercrimes
- ❑ Safely accessing websites: viruses and malware, adware

Unit 3: Office tools

- ☐ **Introduction to a word processor:** create and save a document.
- ☐ **Edit and format text:** text style (B, I, U), font type, font size, text colour, alignment of text. Format paragraphs with line and/or paragraph spacing. Add headers and footers, numbering pages, grammar and spell check utilities, subscript and superscript, insert symbols, use print preview, and print a document.
- ☐ **Insert pictures, change the page setting, add bullets and numbering, borders and shading, and insert tables** – insert/delete rows and columns, merge and split cells.
- ☐ **Use auto-format, track changes, review comments,** use of drawing tools, shapes and mathematical symbols.
- ☐ **Presentation tool:** understand the concept of slide shows, basic elements of a slide, different types of slide layouts, create and save a presentation, and learn about the different views of a slide set – normal view, slide sorter view and hand-outs.
- ☐ **Edit and format a slide:** add titles, subtitles, text, background, and watermark, headers and footers, and slide numbers.
- ☐ **Insert pictures from files,** create animations, add sound effects, and rehearse timings.
- ☐ **Spreadsheets:** concept of a worksheet and a workbook, create and save a worksheet.
- ☐ **Working with a spreadsheet:** enter numbers, text, date/time, series using auto fill; edit and format a worksheet including changing the colour, size, font, alignment of text; insert and delete cells, rows and columns. Enter a formula using the operators (+, -, *, /), refer to cells, and print a worksheet.
- ☐ **Use simple statistical functions:** SUM (), AVERAGE (), MAX (), MIN (), IF () (without compound statements); embed charts of various types: line, pie, scatter, bar and area in a worksheet.

Unit 4: Scratch or Python

Alternative 1: Educational programming language – Scratch

- ☐ Introduction to Scratch.
- ☐ Drag and drop commands, creating simple scripts, repeating blocks of commands.
- ☐ Discuss x-y plane, create scripts to move the cat (Scratch mascot).
- ☐ Create a script to draw diagrams using the pen feature.

Alternative 2: Python - (provided as an option to children with special needs)

- ☐ Introduction to Python
- ☐ A simple "Hello World" program
- ☐ Running a Python program
- ☐ The notion of data-types and variables: integer, float, string
- ☐ Arithmetic operations: +, -, *, /

Lab Exercises

Basic I/O devices: use the mouse and keyboard, draw a figure.

Working with the operating system: Navigation of the file system using a mouse and keyboard, and then doing the same with shell commands.

Word processing: create a text document, create a letter, report, and greeting card.

Create a text document with figures in it. It should describe a concept taught in another course.

Discuss the following in a text document about the basic organisation of a computer: CPU, memory, input/output devices, hard disk.

Create a text document in an Indian language other than English.

Create a presentation.

Create a presentation with animation.

Create and edit existing images, and then include them in a presentation.

Animate pictures and text with sound effects in a presentation

Create a simple spreadsheet and perform the following operations: min, max, sum, and average.

Create different types of charts using a spreadsheet: line, bar, and pie.

Send an email to your friends. Attach some documents that you have prepared earlier. Put some friend in the CC and BCC list. Interact with friends to find out who was in the BCC list.

Do an online chat with multiple friends. Transmit documents using the chat platform.

Create a video and upload it on YouTube.

Write basic Scratch/Python programs.

Breakup of marks for the Practicals

Serial No.	Unit Name	Marks
1.	Lab Test (30 Marks)	
	Word Processing	7
	Handling Spreadsheets	7
	Creating Presentations	8
	Writing basics Python/Scratch Programs	8
2.	Report File + viva (10 Marks)	
	Report file: 4 documents each with a word processor, spreadsheet, and presentation tool - At least 4 programs on Scratch/Python	8
	Viva voce (based on the report file)	2
3.	Project (that uses most of the concepts that have been learnt) (10 marks)	
	Total	50

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Computer Networks
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Networking Technology (Wired and Wireless)
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UNIT 2

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UNIT 3

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Create and Save the Presentation
Different views of a slide
Editing and formatting a slide
Adding Headers and footers
Adding pictures
Animating the objects with sound effects
Create Slide Shows

9. Spreadsheet- OpenOffice.org Calc (172- 201)

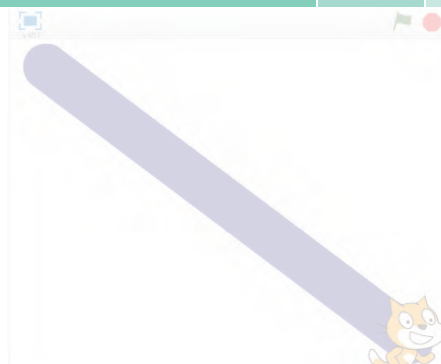
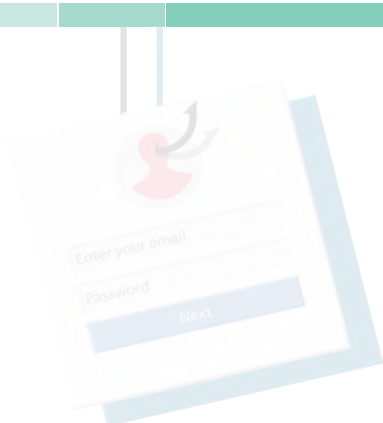
Introduction to spreadsheets
Creating and Saving a worksheet
Working with a spreadsheet
Editing and Formatting a worksheet
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Entering a Formula
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Functions
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COMPUTER SYSTEM

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CHAPTER FOCUSES ON

- ✓ Computer and its Characteristics
- ✓ Application and Components of Computers
- ✓ Convergence of technologies

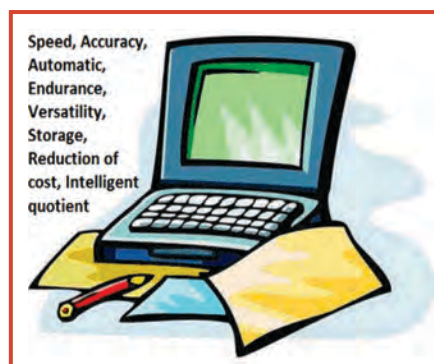
Computers are an integral part of our lives. Wherever we are—sitting in our homes, working in the office, driving on roads, sitting in a movie hall, staying in a hotel, etc.—our lives are directly or indirectly affected by the computers. In this era of information, we are dependent on the storage, flow and processing of data and information, which can only be possible with the help of computers. Computers are used as tools in every part of society together with the Internet.

A computer is an automatic electronic, calculating device which can process a given input in a prescribed manner to produce a desired output, at a very high speed with remarkable accuracy. It can also perform all arithmetic and logical functions according to the instructions given in a systematic order to solve any problem and produce processed information.

CHARACTERISTICS OF COMPUTERS

Speed: Computer works very fast. It takes only few seconds for calculations that we take hours to complete. It can perform millions of calculations per second.

Storage: The computer can store huge amount of data. Once recorded, a piece of information can be retrieved instantly. The computer has an in-built memory where it can store a large amount of data. We can also store data in secondary storage devices such as Pen Drive and External Hard Disc, which can be kept outside computer and can be carried to other computers.



Try: Find other characteristics of computer.

Accuracy: A computer provides accurate output. The output is dependent on the instructions and input data given to the computer. The errors in computer are due to human and inaccurate data.

Versatility: Computer can perform various tasks. We can use computer for doing office work, playing music and games, watching movies, etc.

Diligence: A computer is free from tiredness, lack of concentration and fatigue. It can perform most boring, repetitive and monotonous task continuously without creating any error. Due to this capability, it overpowers human being in routine type of work.

Automatic Operation: Once a program is fed into the computer, the individual instructions are processed one after the other. Thus computer works automatically without manual intervention.

Obedience: It has the ability to take and store a sequence of instructions. Such a sequence of instruction is called a 'Program' and it must be written in the Computer Language.

LIMITATIONS OF COMPUTER

Computer is a versatile machine and it is used for many purposes but the computer has some of the limitations as well.

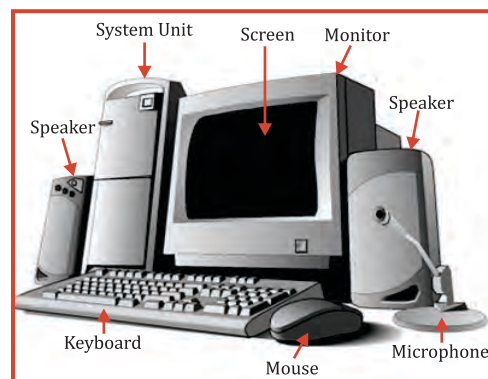
1. **Zero IQ:** Computer has lack of decision-making ability. Computer cannot take decisions itself. Computers need to tell each and every step. They are dumb machine with zero IQ.
2. Computer does not learn anything from its past experience.
3. **No Feeling:** Computer does not have feelings, emotion, taste, knowledge or experience.

COMPONENTS OF COMPUTER

A computer (system) consists of mainly four units: input unit, memory unit, processing unit (CPU) and output unit. Computers work through an interaction of hardware and software.

Hardware refers to the parts of a computer that you can see and touch (including the computer case (cabinet) and everything inside it). Hardware items such as your monitor, keyboard, mouse, printer, memory and other components are often called hardware devices, or devices. *We shall study about hardware devices in detail in chapter 2.*

Software refers to the instructions, or programs, that tell the hardware what to do. A word-processing program that you can use to write letters on your computer is a type of software. The operating system (OS) is software that manages your computer and the devices connected to it. Windows is a well-known operating system. *We shall study about softwares in detail in chapter 3.*



Components of Computer

Input Unit

The input data instructions are given through this unit to the computer. Keyboard and mouse are most common input devices.



Keyboard



Mouse

Processing Unit

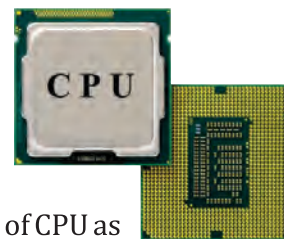
The most important unit device of a computer is known as CPU (Central Processing Unit). It is also known as microprocessor or processor. A CPU is the brain of a computer. It is responsible for all the functions and processes.

The CPU is consisted of thin layers of thousands of transistors. Each transistor receives a set of inputs and produces output. Transistors hold a key role in functioning of CPU as they make computer able to count and perform logical operations which is called processing. It processes the instructions that it collects by decoding the code in programs.

The following table lists the different generations of CPU (Intel, AMD and Via).

The leading CPU manufacturers (for PCs) in the world are Intel, AMD and Via Technologies.

The task of processing is done by processor in computer. It collects data from input unit, stores in memory unit, processes and produces output.



CPU

There are four important functions of CPU,

1. **Fetch:** To fetch the instructions from memory.
2. **Decode:** To decode the instructions and organize them.
3. **Execute:** To execute the instructions.

Tip: In November, 1971, Intel publicly introduced the world's first single chip microprocessor, the Intel 4004.

Try: There are more than 10 CPU manufacturers (for PC, mobiles and other electronics devices) in the world. Search about computer CPU manufacturers on internet.

4. **Write back:** To write- back the result (after execution) to registers or main memory.

A CPU consists of one or more electronic components fabricated on a silicon chip. These are: *Arithmetic and Logic Unit (ALU)*, local storage for intermediate results (*Registers*), *Control Unit (CU)*, and possibly a *Cache* to speed access to memory.

Control Unit (CU): It coordinates the components of a computer system. The control unit, as its name suggests, is the circuitry that issues commands to other hardware components to execute programs. The control unit doesn't actually execute any code itself; rather, it just manages the execution of program instructions by fetching instructions from memory, parsing those instructions as necessary and then scheduling the appropriate hardware components to act on those instructions. In this way the control unit manages the operation of the entire computer.

Arithmetic Logic Unit (ALU): The arithmetic-logic unit (ALU) performs all arithmetic operations (addition, subtraction, multiplication, and division) and logic operations. Logic operations test various logical conditions encountered during processing and allow for different actions to be taken based on the results. The data required to perform the arithmetic and logical functions are inputs from the designated CPU registers and operands.

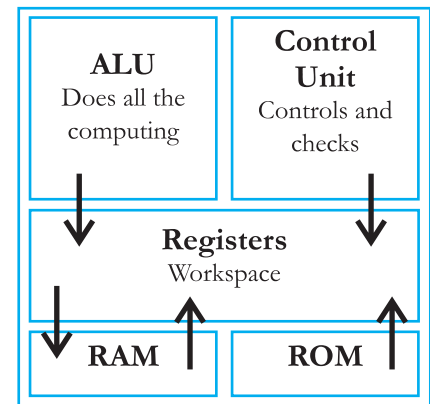
Registers: Registers are small amount of storage available on the CPU whose contents can be accessed more quickly than other types of storage. Processor registers are at the top of the memory hierarchy, and provide the fastest way for a CPU to access data.

Functions of CPU

- (a) The CPU accesses and stores the relevant data and instructions during processing.
- (b) The CPU controls the sequence of operations.
- (c) The CPU gives the commands and coordinates the actions of all parts of the computer system.
- (d) The CPU carries out the processing.

Computers use two types of storage: Primary storage and secondary storage. The CPU mainly interacts with primary storage or main memory, referring to it for both instructions and data.

Bootting: Booting comes from the term "pull yourself up from your boot straps" which means self-starting. It is a process in which your computer gets initialized. This process includes initializing all your hardware components in your computer and gets them to work together and to load your default Operating System which will make your computer operational.



Let's have a look on different types of processors with their features

First introduced	Prominent consumer CPU brands	Notable (new) features
1978	Intel 8086, Intel 8088 and clones	First x86 microprocessors
1982	Intel 80186, Intel 80188 and clones, NEC V20/V30	Hardware for fast address calculations, fast mul/div, etc.
	Intel 80286 and clones	MMU, for protected mode and a larger address space.
1985	Intel 80386 and clones, AMD Am386	32-bit instruction set, MMU with paging.
1989	Intel 80486 and clones, AMD Am486/Am5x86	RISC-like pipelining, integrated x87 FPU (80-bit), on-chip cache.
1997	IDT/Centaur-C6, Cyrix III-Samuel, VIA C3-Samuel2 / VIA C3-Ezra (2001), VIA C7 (2005)	In-order, integrated FPU, some models with on-chip L2 cache, MMX, SSE.
1993	Pentium, Pentium MMX, Cyrix 5x86, Rise mP6	Superscalar, 64-bit databus, faster FPU, MMX (2x 32-bit).
1996	AMD K5, Nx586 (1994)	μ-op translation.
1995	Pentium Pro, Cyrix 6x86, Cyrix MII, Cyrix III-Joshua (2000)	μ-op translation, conditional move instructions, Out-of-order, register renaming, speculative execution, PAE (Pentium Pro), in-package L2 cache (Pentium Pro).
1997	AMD K6/-2/3, Pentium II/III	L3-cache support, 3DNow!, SSE (2x 64-bit).
2003	Pentium M, Intel Core (2006)	optimized for low power.
1999	Athlon, Athlon XP	Superscalar FPU, wide design (up to three x86 instr./clock).
2000	Pentium 4	deeply pipelined, high frequency, SSE2, hyper-threading.
2000	Transmeta Crusoe, Transmeta Efficeon	VLIW design with x86 emulator, on-die memory controller.
2004	Pentium 4 Prescott	Very deeply pipelined, very high frequency, SSE3, 64-bit capability (integer CPU) is available only in LGA 775 sockets.
2006	Intel Core 2	64-bit (integer CPU), low power, multi-core, lower clock frequency, SSE4 (Penryn).
2008	VIA Nano	Out-of-order, superscalar, 64-bit (integer CPU), hardware-based encryption, very low power, adaptive power management.
2003	Athlon 64, Opteron	x86-64 instruction set (CPU main integer core), on-die memory controller, hypertransport.
2007	AMD Phenom	Monolithic quad-core, SSE4a, HyperTransport 3 or QuickPath, native memory controller, on-die L3 cache, modular.
2008	Intel Core i3/i5/i7, AMD Phenom II	
	Intel Atom	In-order but highly pipelined, very-low-power, on some models: 64-bit (integer CPU), on-die GPU.
2011	AMD Bobcat, Llano	Out-of-order, 64-bit (integer CPU), on-die GPU, low power (Bobcat).
2011	Intel Sandy Bridge/Ivy Bridge, AMD Bulldozer and Trinity	SSE5/AVX (4x 64-bit), highly modular design, integrated on-die GPU.
2013	Intel Haswell	AVX2, FMA3, TSX, BMI1, and BMI2 instructions.
2012	Intel Xeon Phi (Larrabee)	Many Integrated Cores (62), In-order P54C with x86-64, Very wide vector unit, LRBni instructions (8x 64-bit)
2013	AMD Athlon II X2 280	2 cores, 3.6 GHz
2013	Intel Iris Pro Graphics 5200 GPU	3.2 GHz, 6 MB of L3 cache
2014	AMD Sempron 2650, Pro A series APU processors	2 cores, 1.9 GHz to 2.2 GHz
2017	AMD Ryzen 7 processors	8 cores, 3.0 to 3.6 GHz, 16 MB L3 cache
2017	AMD Ryzen 5 processors	4 to six cores, 3.2 to 3.6 GHz, 8 to 16 MB L3 cache
2017	Intel Core i9 desktop processor	10 cores, 3.3 GHz, 13.75 MB L3 cache
2017	AMD Ryzen 3 processors	4 cores, 3.1 to 3.5 GHz, 8 MB L3 cache
2017	Intel i9-7920X	12 cores, 2.9 GHz, 16.50 MB L3 cache
2017	AMD Ryzen Threadripper 1950X	12 cores, 3.4 GHz, 32 MB L3 cache
2017	Intel i9-7940X	14 cores, 3.1 GHz, 19.25 MB L3 cache
2017	Intel i9-7960X	16 cores, 2.8 GHz, 22 MB L3 cache
2017	Intel i9-7980X	18 cores, 2.6 GHz, 24.75 MB L3 cache
2018	Intel i9 mobile processor	6 cores, 2.9 GHz, 12 MB L3 cache

Tip: In a computer system, a clock signal is an oscillation frequency used to coordinate interaction between digital circuits.

General Booting sequence comprises of the following steps:

1. Turn on the Power button.
2. CPU pins are reset and registers are set to specific value.
3. CPU jump to address of BIOS (0xFFFF0).
4. BIOS run POST (Power-On Self Test) and other necessary checks.
5. BIOS jumps to MBR (Master Boot Record).
6. Primary Bootloader runs from MBR and jumps to Secondary Bootloader.
7. Secondary Bootloader loads Operating System.

BIOS-Basic Input Output System

As we have seen that at power up CPU is reset and its registers are set to the default value, which is an address pointing or directing to the hardware containing BIOS. Generally the hardware is EEPROM containing the BIOS. The tasks performed by BIOS are categorized as follows:

1. POST- Power on Self Test is the foremost routine which checks and tests the basic hardware. If it fails then it displays error.
2. Initialization of the hardware devices by letting them run their individual BIOS(eg. video card have their own inbuilt BIOS code).
3. Searching for the Master Boot Record and reading it.
4. Copying the boot sector code to RAM and then switching the control to it.

Memory Unit

The unit holds the data and instructions. there are different types of memory which are used for different purpose. Memory unit can be divided in two categories.

1. Primary Memory: It is the main memory of the computer. This memory is primarily used by CPU for booting of system and temporarily storage of data for processing. For example: RAM (Random Access memory) and ROM (Read Only Memory).

Primary memory is needed by the computer for its own working. It stores the data currently used by CPU and Operating System programs. It is also known as the main memory because it directly communicates with CPU.

RAM (Random Access Memory)

It is the main working memory of the computer. When we generally talk about a computer memory, we usually mean the RAM. It is situated inside the System Unit (CPU Box).

The CPU uses this memory for storing inputs, currently running Software programs and the results of processing etc. It is also called Read/Write memory as data can be read and written on it. It is a temporary/volatile memory. Its contents are accessible only as long as the computer is switched ON. After turning OFF its contents are erased.



RAM

There are several types of RAM:-

- I. DRAM (Dynamic RAM):** As the name suggests this memory gets refreshed periodically. This form of memory is less expensive and slower than static RAM.
- ii. SRAM (Static RAM):** This form of RAM is more expensive than dynamic RAM, but is generally faster and requires less power than DRAM and, in modern computers, is often used as cache memory for the CPU.
- iii. SD RAM (Synchronous Data RAM):** SD RAM can run at faster speed than DRAM. It is synchronized with the clock of the processor and system bus.

- iv. **RD RAM (Ram bus Data RAM):** It is a type of RAM made by Rambus Technology and is the fastest type of computer memory available. Typical SDRAM can transfer data at speeds up to 133 MHz, while standard RDRAM can crank it up over 1 GHz.
- v. **DDR RAM (Double Data Rate RAM):** DDR RAM is based on SDRAM architecture, but it utilizes the clock signal differently to transfer twice the data in the same amount of time. It achieves greater bandwidth than the preceding single-data-rate SDRAM by transferring data on the rising and falling edges of the clock signal (double pumped).

Cache Memory: It is a type of RAM i.e, SRAM. Cache memory is fast memory that is built into computer's CPU or located next to it on a separate chip. The CPU uses cache memory to store instructions that are repeatedly required to run programs, which improves overall system speed (because CPU does not have to use the motherboard's system bus for data transfer. When the required data is not available in cache memory than CPU accesses the required data from RAM or other storage, the data transfer speed slows due to Disc reading and the motherboard's system bus capability.

ROM (Read Only Memory)

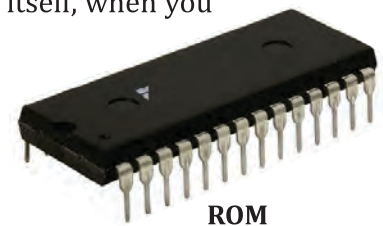
It is a permanent/non-volatile memory located inside the system unit. It retains the data even if the computer is switched OFF.

It contains a set of start-up instructions called, "bootstrap loaders" (that are stored in it at the time of manufacturing). These instructions help the computer to start up or boot up itself, when you switch it ON.

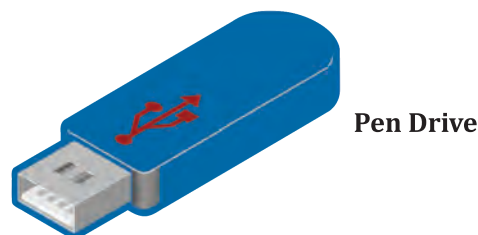
The computer can only read information from the ROM.

Types of ROM

- **PROM (Programmable Read Only Memory):** Once the information or data is recorded on this memory, it cannot be changed or erased.
- **EPROM (Erasable Programmable Read Only Memory):** The information or data stored in it can be erased by exposing it to Ultra Violet (UV) light.
- **EEPROM (Electrically Erasable Programmable Read Only Memory):** EEPROM is user-modifiable read-only memory (ROM) that can be erased and reprogrammed (written to) repeatedly using electrical charge.



2. Secondary Memory: This type of memory is used for permanent storage of data so that we can use it later. This type of memory is used to store large amount of data. For example, Hard Disc, DVD, Blu-ray disc, Pen drive.



Output Unit

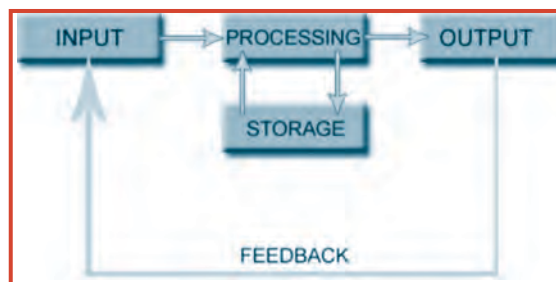
This unit provides the result of the operation performed by the computer. The most common output devices are monitor and printer. *we shall study about input devices in detail in the next chapter.*



IPO (Input Processing Output) Process

How does computer work?

All the processes in computer goes through IPO process. It is basically how a computer works. IPO process refers to the input-process-output process. A computer needs certain input (raw data), it is provided by the input devices like keyboard, mouse, etc. These input devices convert the data into computer understandable form (the binary code). Then the CPU of the computer processes the raw data with the help of its components (ALU, CU and Memory Unit). Finally, the output unit converts the out coming electronic binary signals (result or the information) in the form which can be easily understood by human beings. This is done by output devices like speaker, printer, plotter, etc.



IPO Process

The steps of IPO process are given below:

1. You enter data into the computer using input unit/devices and tell the computer what to do with it. This data is known as input.
2. The computer works on the data given to it using processing unit/device to produce the result. This result is called the processing.
3. The computer then displays the result using output unit/devices and stores it in memory unit/devices for later use this result is called the output.

These three steps together form the process which is known as IPO process:

I = Input

P = Process

O = Output

For example, addition of two numbers:

1. **Input:** Two numbers are given to the computer using input device.
2. **Process:** Addition operation performed on these two numbers.
3. **Output:** Result is displayed on the screen.

BASIC APPLICATIONS OF COMPUTER

Computers are used to help in many areas such as business, research, education, communication, security, war, production, accounting, etc. Some of the common areas where computers are being frequently used are discussed below-

Education: The computers are frequently used in all levels of education. They are used for both teaching and learning. They are not only used to teach computer related subjects but also to teach various other subjects. They are used for fee collection, student record, employee record and other record maintenance. Now-a-days, students are exposed to the internet and it helps them to improve the quality of their academic research. One revolution in education is the advent of distance learning. This offers a variety of internet and video-based online courses.

Business: Computers are used in businesses to prepare letters, bills, income/expense sheets etc. They are used for all accounting purposes because each and every business requires arithmetic and logical operations. Now a days businesses run on internet to improve the productivity or profitability of a business. This is called e-business.

Health and Medicine: Computers are used to maintain the records of doctors and patients in the hospital. These days, knowledge on medicines and research reports are available online. The medical reports can be sent via e-mail for instant feedback from the doctors. Computers help us to keep track of all the medical history of the patients, drug action, sales and purchases of medicines and medical equipments, personal information of patients and doctors and more.

Science, Research and Engineering: Computers are used for research and experiment purposes. Various complex calculations are being done using computers. Weather forecasting, automobile designing, nuclear weapon designing and testing, space research, aircraft simulation designing and much more scientific research areas are there, where computers (super and mainframe computers) are being used. Computer Aided Designing (CAD) and Computer Aided Engineering (CAE) are few tools used in to assist in the creation, modification, optimization of a 2D and 3D design and to analyze the robustness and performance of components and assemblies/products.

Communication: Computers are proving a very big means of communication these days with integration of Internet. Along with e-mail service, text, voice and video chatting are very popular way of communication now-a-days.



Law Enforcement



Manufacturing



Business



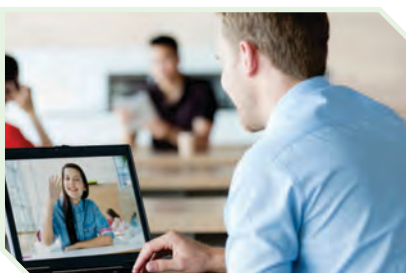
Office



Health & Medicine



Military



Communication



Science, Research and Engineering



Bank (ATM)



Education



Entertainment

Some of the applications of computer

Banks: Computers are used to handle the accounts of customers. These days, we can see number of (Automatic Teller Machine) ATMs around us to withdraw cash from our bank account without going to bank. Now-a-days e-banking or internet banking is used widely by masses, and has numerous benefits to offer. Now-a-days, all banks provide online banking facility to their customers. Internet banking enables people to carry out most of their banking transactions using a safe website, which is operated by their respective banks.

Recreation and Entertainment: Computers are one of the major sources of entertainment. We can play games, watch videos, listen to music etc. on computer. In movies, computer helps to generate graphics and special effects. We can create cartoon movies using computer.

Military: Many military and defence related applications are now based on computers. Computer are used for many crucial tasks such as controlling unmanned air-crafts (UAV), Ballistic Missiles, Submarines, Tanks, War ships, etc.

Offices: In offices, computers are used to keep records like salaries, particulars of employees, etc. These days, computers are almost used in every office for speedy disposal of work.

Manufacturing: Computers are effectively used in manufacturing purpose in the companies. The design of product, manufacturing and packing are done using computer.

Law Enforcement: Computers are used by police to monitor speeding vehicles as well as to monitor people violating law. Advance computer techniques like DNA and finger print matching techniques can be used to identify the criminals.

Try: Find out other applications of computer.

CONVERGENCE OF TECHNOLOGIES

Convergence of technology is a fact which can hardly be denied that computers have considerably changed the lives of human beings and the majority of us cannot imagine life without them. Computers have changed the way we work. They play a vital role in every field of our work. This century has witnessed the convergence of technology in various fields as the interlinking of computing and other information technologies, media content, and communication networks that have arisen as result of the evolution and popularization of the Internet as well as the activities, products and services that have emerged in the digital media space. The information technology and communication technology have already converged leading to Information and Communication Technology (ICT).

Glossary

IPO process	:	(Input Processing Output) process
CPU	:	Central Processing Unit
ALU	:	Arithmetic Logic Unit
CU	:	Control Unit
RAM	:	Random Access Memory
ROM	:	Read Only Memory
ICT	:	Information and Communication Technology

You have learned

- ✓ A computer is an automatic electronic, calculating device which can process a given input in a prescribed manner to produce a desired output.
- ✓ Computer has several characteristics such as speed, storage, accuracy, versatility, diligence, automatic, obedience etc.
- ✓ Computer has some limitations such as lack of decision-making, intelligence, feelings and emotions, time taken in development etc.
- ✓ The parts of computer are hardware and software.
- ✓ The physical components or devices attached to the computers are called hardware.
- ✓ Software is a computer program which is used to do works of computer.
- ✓ A process in computer goes through IPO process.
- ✓ The input/ data/ instructions are given through input devices to the computer.
- ✓ Processing unit does all the processing work in a computer.
- ✓ Memory unit holds all the data and instructions.
- ✓ Output unit provides all result of the operation performed by the computer.
- ✓ Convergence of technology is a fact which can hardly be denied that computers have considerably changed the lives of human beings.

Solved Questions

1. What is computer?

Ans. A computer is an automatic electronic, calculating device which can process a given input in a prescribed manner to produce a desired output.

2. What are characteristics of computer?

Ans. (i) Speed (ii) Storage
(iii) Accuracy (iv) Versatility
(v) Diligence (vi) Automatic operation
(vii) Obedience

3. What are limitations of computer?

Ans. (i) Zero IQ
(ii) Does learn from past experience.
(iii) No feelings

4. What is hardware?

Ans. The physical components or devices attached to the computers are called hardware.

5. What is software?

Ans. Software is a set of computer program which is used to do the work of a computer.

6. What is IPO process?

Ans. All the processes in computer goes through IPO process. It is basically how a computer works. It refers to input-process-output process.

7. What is the use of processing unit?

Ans. This unit does all the processing work in the computer i.e. CPU (Central Processing Unit). It is also known as the brain of the computer where all calculations take place.

8. What is the use of memory unit?

Ans. This unit is used to hold the data and instructions.

9. What main parts of CPU?

Ans. ALU, CU and Registers.

10. Explain DDR RAM.

Ans. DDR RAM is based on SDRAM architecture, but it utilizes the clock signal differently to transfer twice the data in the same amount of time. It achieves greater bandwidth than the preceding single-data-rate SDRAM by transferring data on the rising and falling edges of the clock signal (double pumped).

11. What is cache?

Ans. It is type of RAM i.e. SRAM. Cache memory is fast memory that is built into computer's CPU or located next to it on a separate chip.

12. What is booting?

Ans. It is a process in which your computer gets initialized.

13. What is the main difference between primary memory and secondary memory?

Ans. Primary memory is needed by the computer for its own working. Generally it is non-volatile memory while secondary memory devices are used to store the work done on the computer permanently.

14. Write the difference between primary memory and secondary memory.

Ans. 1. Primary memory is the temporary memory while secondary memory is the permanent memory.

2. Primary memory is primarily used by CPU for booting of system and temporarily storage of data for processing while secondary memory is used for storage of data for later use.

15. Write examples of primary memory and secondary memory.

Ans. Primary memory: RAM, ROM.

Secondary memory: hard Disc, DVD, Blu-ray disc, pen drive.

Work Out Time

A. Choose the correct answer.

1. Which of the following is not the characteristic of computer?

a) Speed

b) Feelings

c) Obedience

d) Storage

2. Which of the following are the basic application areas of computer?

a) Business

b) Research

c) Education

d) All of these

3. A computer basically made up of _____ parts.

a) Two

b) Three

c) Four

d) Five

4. Which unit is responsible to give data/ instructions to the computer?

a) Output Unit

b) Processing Unit

c) Input Unit

d) None of these

4. _____ is a set of program.
5. A process in computer goes through _____ cycle.
6. A CPU has three parts (i) _____, (ii) _____ and (iii) _____.
7. A computer is a dumb machine with _____ IQ.
8. _____ unit holds the data and instructions.
9. Cache memory is a type of RAM i.e. _____.

E. State true or false.

1. Computer has lack of decision-making ability.
2. Secondary memory is the main memory of the computer.
3. Hard Disc is used to store the data permanently.
4. Processing unit provides the result of the operation performed by computer.
5. RAM and ROM are the examples of primary memory.
6. A computer is basically made up of two parts: live ware and software.
7. ALU controls all the hardware parts of the computer.

F. Practical/ lab Activity

1. Surf the internet and find the applications of computer (with the areas where computers are being used, with their images).
2. Divide the class in four groups. Name each group on a hardware unit e.g., Input Unit, Processing Unit, Output Unit, Memory Unit. Ask each group to carefully study the properties of their related hardware devices with their mode of use and make scrap book.
3. Draw the outline of IPO process on a chart (with its explanation).

COMPONENTS OF A COMPUTER 2

CHAPTER FOCUSES ON

- ✓ Input Unit
- ✓ Output Unit
- ✓ Storage Unit

INPUT UNIT

If you want to feed the data and give some instructions to computer to carry out various tasks then you need input devices to do this. These devices convert the input data and instruction into computer understandable form and send it to the CPU for processing.

There are various types of input devices used for different computer applications. Let us learn about these devices.

Keyboard

The keyboard is one of the common input devices. It looks like a typewriter. It is used to feed the data into computer. It contains a number of buttons/ keys like typing (alphanumeric) keys, control keys, function keys, navigation keys and numeric keypad.

- **Typing (alphanumeric) keys-** These keys include the alphabet, number, punctuation, and symbol keys.
- **Control keys-** These are Ctrl, Alt, the Windows logo key  and Esc. These keys are used alone or in combination with other keys to perform certain actions.
- **Function keys-** The function keys are used to perform specific tasks. They are labeled as F1, F2, F3... to F12.
- **Navigation keys-** They include the arrow keys, Home, End, Page Up, Page Down, Delete, and Insert. These keys are used for moving around in documents or web pages and editing text.
- **Numeric keypad-** On numeric keypad, keys are grouped together in a block like a conventional calculator for entering the numbers quickly.



Keyboard

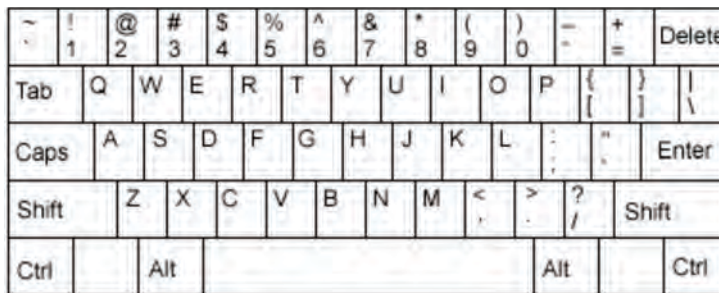
- | | | |
|-------------------|---------------------|-----------------|
| 1 Navigation Keys | 2 Numeric Keypad | 3 Function Keys |
| 4 Control Keys | 5 Alphanumeric Keys | |

Keyboard can be categorized according to key arrangement. Above given is a traditional QWERTY layout keyboard. *A standard QWERTY contains at least 104 keys.*

According to key layout there are two types of keyboard.

- (a) **QWERTY Keyboard:** - It is the standard keyboard which comes in English language. Its top row of alphabets consist Q, W, E, R, T, and Y keys from the left that's why it is called the QWERTY keyboard.
- (b) **DVORAK Keyboard:** - This keyboard has the key layout which is created to make the typing work easier and faster on when compared with other keyboards.

Tip: Christopher Latham Sholes invented the QWERTY keyboard in 1875.



QWERTY Keyboard



DVORAK Keyboard

- Advantages:**
1. Easy to input text and numbers.
 2. Various formats are available, such as standard, multimedia, DVORAK, etc.
- Disadvantages:**
1. Un-suitable for creating diagrams.
 2. Very slow to move the cursor on the monitor.

Mouse

It is another important input device. It is a handy/ hand-operated pointing device that rolls on a flat surface. It controls the movement of pointer on monitor screen. It is used to point at or select things on the computer screen, draw sketches/diagrams, drag and drop the object. It has two or three buttons on the top and a scroll wheel. Functions which can be performed using mouse buttons are left-click, double-click, right-click and drag and drop.

There are different types of mouse used these days. These are,

- (a) Mechanical Mouse
- (b) Optical Mouse
- (c) Cordless Mouse

(a) Mechanical Mouse: This type of mouse has a rubber or metal ball on its underside, which can be rolled in any direction. A sensor within the mouse detects the motion of ball and moves the pointer on screen (monitor) in the same direction.

(b) Optical Mouse: This type of mouse uses light-emitting diode or laser to detect the movement of mouse relative to the surface i.e., by sensing changes in reflected light.

(c) Cordless Mouse: It is also known as wireless mouse. It can be used from a distance to operate a computer. It is not physically connected to the computer. Thus it is portable and comfortable to the users.

Mostly, a cordless mouse uses radio waves to communicate with the computer. It comes with a receiver connected to the computer.



Mechanical Mouse



Optical Mouse



Cordless Mouse

Tip: The computer mouse, as we know it today, was invented and developed by Douglas Englebart during the 60's.

A **laser mouse** is a type of optical mouse that uses laser light to detect mouse movement. Laser is more accurate than the standard optical mouse design, providing for up to 20x greater sensitivity and precision. This improved sensitivity and precision can be key for gaming applications and graphical or engineering design applications, where pinpoint accuracy is important.

Do You Know?

The latest cordless mouse is coming up with Bluetooth technologies that don't need such a receiver.

Advantages:

1. Ideal to use with desktop computers.
2. Easy to use to point an item or object on the screen.

Disadvantages:

1. They need a flat surface close to the computer.
2. Excessive use can lead to health problems such as repetitive strain injury (in the wrist).

Joystick

It is also a pointing device. A joystick consists of a stick that pivots on a base and reports its angle or direction to the controlling device. Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer.

Joysticks are used in civilian and military aircraft, cranes, underwater unmanned vehicles, wheelchairs, surveillance cameras and zero turning radius lawn mowers.

Advantages:

1. They give a better gaming experience for racing or flying styles of computer game.

Disadvantages:

1. They can be broken if too much force is used on them.
2. Excessive use can lead to health problems such as repetitive strain injury (in the wrist).



Joystick

The computer joystick was invented by Shu-Ming Liu of Taipei, A-Ming Chang of Taiwan and Lu-Chou of Taiwan in 1998.

Scanner

A scanner is a device that converts a document, film, graphic, or photograph to a digital image, which can be manipulated according to the requirement through an appropriate software.

Scanners come in *hand-held, flatbed, sheet fed and drum types*.

Taiwan-based Microtek introduced the world's first 200 dpi black and white sheet-fed scanner in 1984.

(a) Hand-held scanner: As the name suggests, it is a handy device useful for their portability and low price. While scanned images from these type of scanner are considerably of low quality. It is generally used for capturing the text.



Hand-held scanner



Flatbed scanner

- (b) **Flatbed scanner:** It is the most commonly used scanners. It is made up of flat glass surface on which we can place the document or photo that are to be scanned. It is a type of optical scanner. This type of scanner is mostly used in offices.
- (c) **Sheet fed scanner:** This type of scanner scans only one piece of paper at a time. It moves the paper across a stationary scan head. It looks like a fax machine.
- (d) **Drum scanner:** This type of scanner is used to capture the highest resolution from an image. Drum scanners use photo-multiplier tubes (PMT). Images are mounted on a glass cylinder/drum. The optical system shines a light through the film. The optical system picks up the transmitted light on the other side and directs it to the photo-multiplier tubes (PMTs) via mirrors and lenses and generates an electrical signal. This type of scanners is mostly used in printing industries.



Sheet fed Scanner

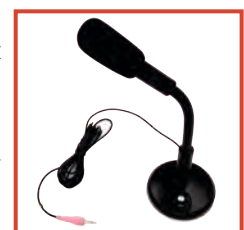


Drum Scanner

- Advantages:**
1. (Flatbed) scanners are very accurate and can produce reasonably high quality images.
 2. Any image which is digitized by the scanner can then be included on electronic documents.
 3. Images once digitized can be enhanced with a graphic application.
 4. It can accurately capture an image, but the original source may be more important than the scanned image.
- Disadvantages:**
1. Image produce by the scanner can take up a lot of memory space.
 2. Images lose some quality in the scanning and digitizing process.
 3. The quality of the final image is dependent on the quality of the original image.

Microphone

A microphone sometimes referred to as a mike or mic, is a device used to convert voice/sound into electrical signals. Microphones are used in many applications such as telephones, tape recorders, hearing aids, motion picture production, live recording, audio engineering, in radio and television broadcasting and in computers for recording voice.



Microphone

- Advantages:**
1. Voice recognition software can be used to convert your voice into text or to control menu options on a phone system.
- Disadvantages:**
1. Stored audio files can take up a lot of memory.
 2. Voice commands can be difficult to recognise by the software.

OCR (Optical Character Reader)

It is an optical input device which is used to read alphabets and numeric characters on a document either hand-written or typed or special type of font printed on special paper. OCR system includes an optical scanner to read the text and software to recognize the characters. It uses light source to read characters and then convert images of text into characters which are editable using word- processor.

- Advantages:**
1. It is cheaper than paying someone to manually enter large amounts of text.

2. Much faster than someone manually entering large amounts of text.
3. The latest software can recreate tables and the original layout.

Disadvantages:

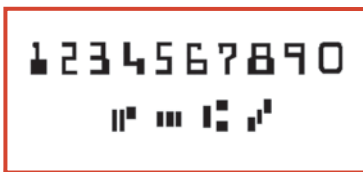
1. Not 100% accurate, there are likely to be some mistakes made during the process.
2. All document need to be checked over carefully and then manually corrected.
3. If the original document is of poor quality or the handwriting difficult to read, more mistakes will occur.



Optical Character Reader

MICR (Magnetic Ink Character Recognition)

MICR is used to read magnetic ink characters primarily used by banking industry for the processing of cheques i.e. to read numbers and characters found on the bottom of cheques (usually containing the cheque number, Branch code, and account code) and processes to produce and analyze these characters. The characters are printed using magnetic ink.



MICR Font



Bank Cheque



Magnetic Ink Character Reader

When a document that contains this ink, needs to be read, is passes through a machine, which magnetizes the ink and then translates the magnetic information into characters.

MICR provides a secure, high-speed method of scanning and processing information.

Advantages:

1. It is difficult to forge the MICR.
2. Documents can still be read when folded or written on.

Disadvantages:

1. It can read only 14 characters.
2. MICR readers and encoders are expensive.

Do You Know?

1. To print Magnetic Ink, you need a laser printer that accepts MICR toner.
2. The reading speed of the MICR is around 300 cheques per minute.

Light Pen

Light Pen is a light-sensitive pen shaped pointing device. It allows the user to point the displayed objects or draw on the screen. It is used with computer's CRT display. The light pen consists of a photo sensor at the tip. When we place it against the screen, it detects the light from the screen which in turn helps the computer to identify the location of the light pen on the screen.

Advantages:

1. They have extremely good positional accuracy on a computer screen.
2. It draws directly on the screen.

Disadvantages:

1. Using a light pen can become uncomfortable as it sometimes involves the user.
2. They do not work with LCD screen.

Do You Know?

A light pen cannot work with LCD screens. It was invented at MIT in 1952 as part of the Whirlwind project.



Light Pen

You must have noticed, during cricket match, light pen is used to mark various points/locations of the playground.

Barcode Reader

A bar code is an optical machine-readable representation of data in the form of vertical black lines of different widths, which shows data about the object to which it attaches. Some bar codes also have a series of alphanumeric codes around the bars. The bar codes identify the price and the description of the item.

A bar code reader is used to read printed bar codes. The bar code reader is equipped with three main components: an infrared light source, a photo diode and a bidirectional link to a computer. The infrared light source projects a beam of light on the bars and records the breaks in the beam, which represent the widths and the lengths.

The photo diode interprets this information and sends it to the computer via the bidirectional link.

- Advantages:**
1. A barcode scan is fast and reliable, and takes infinitely less time than entering data by hand.
 2. Data obtained through bar codes is available rapidly.
 3. Bar codes are inexpensive to design and print.

- Disadvantages:**
1. If a bar code is ripped or damaged there is no way to scan the product.
 2. Barcode scanners need a direct line of sight to the bar code to be able to read.



Barcode Reader

Digital Camera

Digital camera records and store photographic images in digital form. It stores the images either on a Disc or a special memory, called flash memory. It doesn't require films like the traditional camera for recording the images. Once a picture has been taken, it can be downloaded to a computer system using a USB (Universal Serial bus) cable or via Blue tooth and then it can be processed and printed.

Digital cameras can display images on a screen immediately after being recorded, and store and delete images from memory. Many digital cameras can also record moving video with sound. Some digital cameras can crop and stitch pictures and performs other elementary image editing.

- Advantages:**
1. Eliminating film processing (you don't need to waste your time and energy in developing the roll of film in a dark room).
 2. It can easily store up to 10,000 photos, depending on the size of the memory card.
 3. Digital photography enables you use editing software to do a variety of things to your images.

- Disadvantages:**
1. Good digital cameras are expensive.
 2. Battery consumption is much more faster in case of digital cameras.
 3. A corrupted memory card may result in lost photos.



Digital Camera

Web Camera

A web camera is a video camera that feeds its image in real time to a computer or computer network.

In this age of video chatting with friends/relatives or video conferencing with the colleagues, you can use it to transmit audio or video over the internet. You can communicate with other people who have web cams, each of you watching a video of the other as you talk. **Note:** A web camera comes with built-in microphone.

Web camera can also be used to capture an image. *Note: You need to install required software (device driver) to your computer (which you get when you buy a web camera).*

- Advantages:**
1. Able to interact with people across long distances.
 2. Both sound and video is used, making the communication more sophisticated.

- Disadvantages:**
1. Discourages people to interact face-to-face.



Web Camera

OUTPUT UNIT

This unit helps the user to get output generated by the computer in different formats. If we want to view images, letters or listen to songs or taking printout etc. then we need different types of output devices like monitor, speakers and printers. Let's learn about these devices.

Monitor

The Monitor is one of the most important parts of the computer. It is an output device. It is used to show the result returned by the computer. It is also known as Visual Display Unit (VDU). It shows the data entered by the user and the output generated by the computer (CPU). The monitor displays the video and graphics information generated by the computer.

There are three most common types of monitors available now-a-days. These are,

Karl Ferdinand Braun invented CRT monitor in 1897.

- (1) CRT (Cathode Rays Tube) Monitor:** It is similar to television and works on the cathode ray tube technology which is the oldest technology and uses a lot of electricity. It is bigger in size. It is heavy in weight and difficult in terms of portability. This type of monitor is no longer popular.



CRT Monitor

- (2) LCD (Liquid Crystal Display) Monitor:** A liquid crystal display (commonly abbreviated LCD) is a thin, flat display device made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector.

It is smaller and lighter than CRT, often called flat panel, which makes them ideal for use with portable computers such as Laptops, Tablet PCs, and Palmtop etc. LCD monitors use much less desk space, electricity and are lightweight and thinner.



LCD Monitor

TFT (Thin Film Transistor) is a variant of LCD which uses Thin- Film Transistor (TFT) technology to improve image quality. TFT- LCD is one type of active matrix LCD, though it is usually synonymous with LCD.

- (3) LED (Light Emitting Diode) Monitor:** LED monitor use light emitting diodes. It is the most modern technology in the field of VDU (monitor) development. LED monitor gives much more gradation in intensity and a larger light wavelength spectrum, giving a truer color quality. It offers a better dynamic contrast ratio too.

- Advantages of CRT:**
1. They operate at any resolution, geometry and aspect ratio without the need for re-scaling the image.
 2. CRTs are less expensive than comparable displays using other display technologies.

- Disadvantages of CRT:**
1. They are having geometric distortion and screen regulation problems. Also affected by magnetic fields from other equipment including other CRTs.
 2. They are large, heavy, and bulky. They consume a lot of electricity and produce a lot of heat.

Advantages of LCD:

1. Zero geometric distortion.
2. Thin, with a small footprint. Consume little electricity and produce little heat.

Disadvantages of LCD:

1. Each panel has a fixed pixel resolution format determined at the time of manufacture that can not be changed.
2. These are expensive than CRTs.

Advantages of LED:

1. Comfortable viewing.
2. High quality resolution with vivid colours.

Disadvantages of LED:

1. Very expensive
2. Delicate device and needs careful handling.

In 1953, the first high-speed printer was developed by Remington-Rand for use on the Univac computer.

Printer

A Printer is an output device which is used to take print out of information/ data on paper. Printer is a very widely used device. It is used in Offices, Railways, Banks, Airports etc.

Printers are divided into two broad categories:

a) Impact Printers: Impact printers are the oldest printing technology. In this category, printers operate by striking a metal or plastic head against an ink ribbon. The ink ribbon is pressed against the paper, marking the page with the appropriate character, dot, line, or symbol. These printers are mostly used in the fields where low- cost printing is essential. This printer produces sound while it is printing. For example, Dot-matrix printers, Daisy Wheel printers, Line printers, and Drum printers.

Dot Matrix Printer: Dot matrix printer works by striking a grid of pins against a ribbon. It prints one character at a time. It prints the character in dotted format. In this type of printers, there is a vertical array of pins. As the head moves across the paper, the selected pins hit on the ribbon to form the character in the pattern of dots on the paper.

Advantages of Dot Matrix printer:

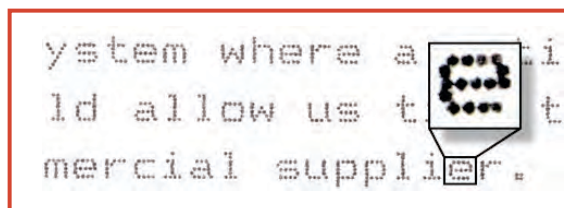
1. Cheaper in terms of cost.
2. Can use continuous paper.

Disadvantages of Dot Matrix printer:

1. Printing quality is low.
2. Can be used to print carbon copies.
3. Printing speed is slow.
4. It is very noisy.



Dot Matrix Printer

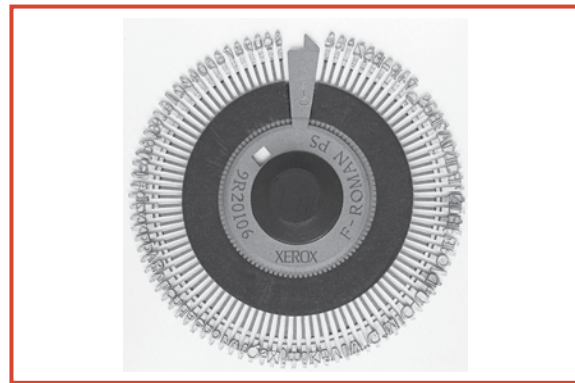


Output Print of Dot Matrix Printer

Daisy-Wheel Printer: Daisy-wheel printer uses a circular wheel with “petals” that each has a different character or symbol on the end. In order to print each character, the wheel spins to the appropriate petal and a hammer strikes the petal against the ribbon and the page. It cannot print any graphics.



Daisy-wheel Printer



Print Petals

- b) Non-Impact Printer:** In this category of printer, printing head do not strike the paper. These printers produce no sound while printing. The two major types of non-impact printers are Inkjet printer and Laser printer.

Inkjet Printer : An Inkjet printer is a kind of printer that works by spraying ionized ink on a sheet of paper. Magnetized plates in the ink's path direct the ink onto the paper in the desired shapes to create impression of text or image. It is used in home and small offices.



Inkjet Printer



Output of Inkjet Printer

Advantages of Inkjet printer:

1. Printing quality is much better than impact printers.
2. Almost silent, don't make noise while printing.
3. In terms of costing, cheaper than laser printer.
4. Used for both black and colour printouts.

Disadvantages of Inkjet printer:

1. Slower than laser printer.
2. The printing speed is good but slower than laser printer.
3. Due to expensive replacement of ink cartridges, running cost is much higher than the dot- matrix and laser printer.
4. Need to dry the printouts because ink on the paper is in droplets.
5. Can't use for high volume printing.

Laser Printer: The laser printer is the latest technology printers which prints the character by laser beams. It has a photocopier drum which works with the help of laser beam and prints the characters. It consists of toner inks.

Monochrome (black) laser printer, which use single toner are being used at offices.



Laser Printer



Output of Laser Printer

Advantages of Laser printer:

1. Very high quality printing.
2. Print speed is good. It can be up to 10-20 pages per minute.
3. Per page printing cost is less than inkjet printer.
4. Can be used for high volume printing.

Disadvantages of Laser printer:

1. Colour laser printers are expensive in comparison to monochrome laser printer.
2. It is more expensive than inkjet printer.
3. Toner and drum replacement is expensive.

Thermal Printer

Thermal printer is used for digital printing. This printer uses heat energy for printing. A thermal paper passes over the print head and heat produces image on the paper. Thermal paper is also known as thermochromic paper.

Advantages of Plotter:

1. Longer life because there are few moving parts
2. Quiet operation
3. No cost for ink or toner

Disadvantages of Plotter:

1. Paper is expensive
2. Paper has a short shelf life.
3. Images are poor quality.



Thermal Printer

Plotter

A Plotter is used to print high-quality graphics or drawings using ink pens of different colours. In the past, plotters were used in applications such as computer-aided design e.g., engineering and architectural drawings i.e., making maps, plotting civil engineering drawings and machine components.

There are two types of plotters: flatbed plotter and drum plotter.



Flatbed Plotter



Drum Plotter

Flatbed Plotter: In flatbed plotter paper is fixed on a flat surface and pens of different colours are mounted in the pen holding mechanism that moves on the surface (paper) in two orthogonal (vertical and horizontal) directions to draw the image.

Drum Plotter: In drum plotters, the paper on which the design has to be made, is placed over a drum that rotates back and forth to produce vertical motion. The pen is mounted on a carriage, which moves across the width of the paper. Pen moves only in horizontal direction and paper in vertical and this combination of movements of pen and paper create the required design.

Pen having ink of different colours can be used to produce output in multi-colours. The plotter size may be very large with paper widths of up to 1 meter.

Advantages of Plotter:

1. Print more precise lines.
2. Has a high colour accuracy & printer quality.

Disadvantages of Plotter:

1. Can take half an hour to print drawings.
2. More expensive than a regular printer.
3. It takes a lot of space.

Speakers

Speakers are used to generate sound. They convert analog electric signals into air vibrations. Speakers are used to listen to music and sounds on the computer.

Advantages:

1. Everyone in the room can hear the output from the computer.
2. They help blind people to use the computer because text can be converted into sound.

Disadvantages:

1. The output from speakers can disturb others who are trying to work.
2. High quality external speakers can be expensive.



Speakers

STORAGE/ MEMORY UNIT

Storage devices are used to store the data or information in the computer so that we can use it later.

Computer can remember many things in its mind because it has memory. So, as like us computer also has memory to store the information and data.

Computer memory is divided into two parts

1. Primary Memory (Main Memory)/ Internal Memory.
2. Secondary Memory (Permanent Memory)/ External Memory/ auxiliary memory.

When CPU executes a program, primary memory stores instructions and data. Primary memory consists of RAM and ROM. We have already learned about them in chapter 1. Here, we will learn about secondary memory.

On the other hand, secondary memory stores programs and data which are not currently in use and provides permanent storage. These memory devices are also known as auxiliary memory. Their only use is to keep the information stored for a longer period, so that users can refer to it whenever it is required.

Let us learn about the various secondary storage devices.

The Hard Disc

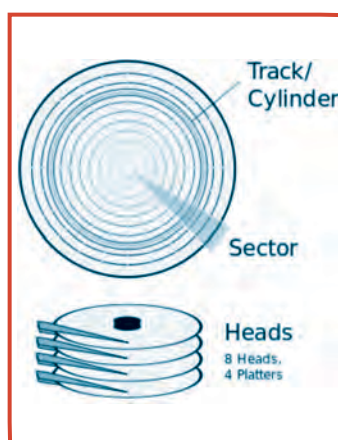
A Hard Disc is also known as Hard Disc Drive (HDD). The Hard Disc is a common storage device for the computer. It is located inside the system unit. All the work we do on the computer, by default gets stored in the hard disc.

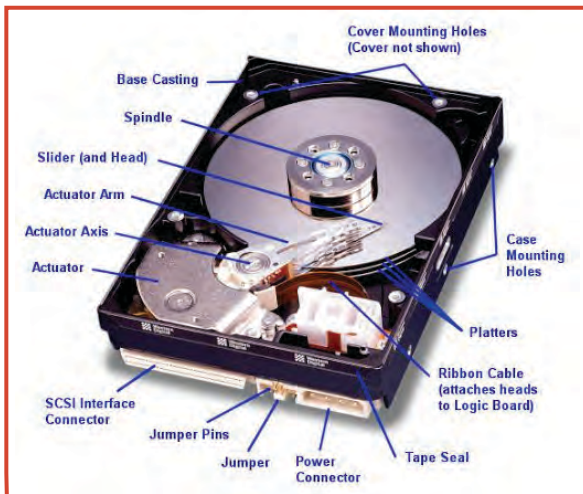
A single Hard Disc usually consists of several metal *platters* coated with a magnetic material. Each platter requires two read/write heads, one for each side. All the read/write heads are attached to a single access arm.

Each platter has some concentric circles called *tracks*. *Tracks* are logically divided into *sectors*. The data is stored in the sectors. These platters spin at a speed of 4500 to 7200 rpm.

- Advantages:**
1. Large storage capacity.
 2. Stores and retrieves data much faster than a optical disc.
 3. Usually fixed inside the computer so cannot get mislaid.

- Disadvantages:**
1. Regular 'head' crashes can damage the surface of the disk, leading to loss of data in that sector.
 2. Usually fixed inside the computer and cannot be transferred to another computer.





The Components of a Hard disk

DO YOU KNOW?

The Hard Disc was invented on September 13, 1956 by IBM team led by Rey Johnson.

Optical Disc

Optical disc can store information or data like video, audio, text, images, games, software etc. Various types of optical discs are available which can store up to 8 GB data.

CD-ROM (Compact Disc- Read Only Memory)

The CD-ROM (Compact Disc Read Only Memory) is an optical disc that comes with data already written on them for distribution for example, music CDs. It is read-only storage media, data or information cannot be erased from it. It is used to store data up to 700 MB. CDs are mostly used for distributing software.

There are two types of CDs:-

- (i) **CD-R (Compact Disc Recordable)** - It is also called WORM (Write Once Read Many) means data can be written once but read many times. We can use the discs (to read) with a standard CD player/CD-ROM drive.
- (ii) **CD-RW (Compact Disc Re-Writable)** - It is a re-writable disc. It allows us to erase previous data and write new data on them. But the CD-RW media doesn't work in all players.

A CD-ROM drive is used to read data from CD-ROM disc but it cannot write on CD-R or CD-RW. CD-Writer is used to write data on CD-R and CD-RW.

Advantages:

1. Small and portable.
2. Very cheap to produce.
3. Most computers can read CDs. If there is no CD drive, a DVD drive can usually read them.

Disadvantages:

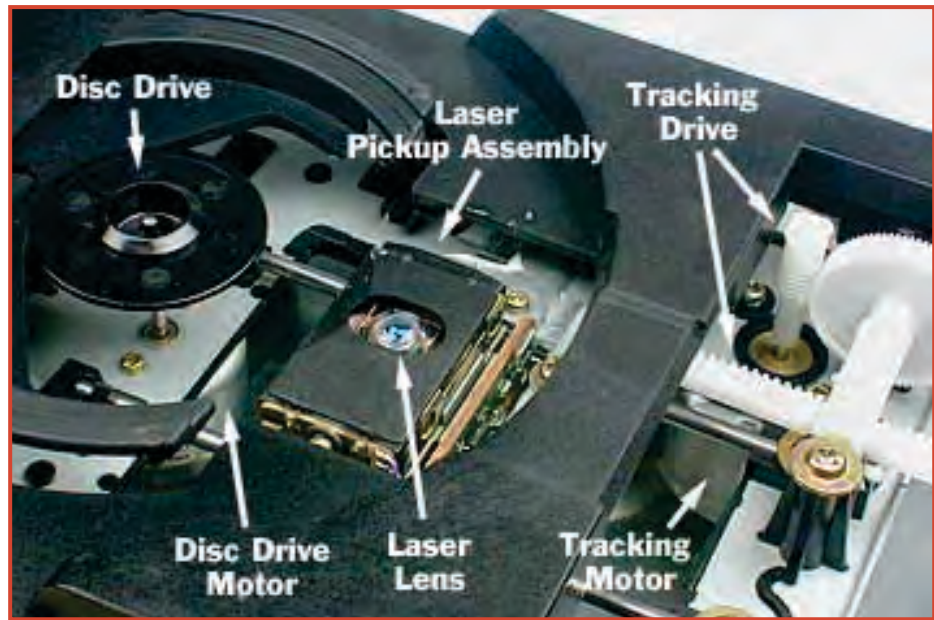
1. Fairly fragile, easy to sanp or scratch.
2. Smaller storage capacity than a hard disk or DVD.
3. Slower to access than the hard disk.



CD-RW



CD-R



CD-ROM was invented by James Russel (a senior scientist at Pacific Northwest Laboratory) in 1965. The first commercially available CD-ROMs were introduced by Sony and Philips in 1982.

The DVD (Digital Versatile Disc)

It stands for *Digital Versatile Disc* or *Digital Video Disc*, a popular optical disc which looks similar to a CD. A single-sided DVD can store data up to 4.7 GB.

Like CD-ROMs, DVD-ROMs come with data already written on them for distribution. For example, movie DVDs.

DVDs can be single- or double-sided, and can have two layers on each side; a double-sided, two-layered DVD will hold up to 17 gigabytes of video, audio, or other information.

There are two types of DVDs:-

- (i) **DVD-R:** It is a recordable DVD similar to CD-R and allows us to write the data or information only once. Once written, the data cannot be erased but read repeatedly.
- (ii) **DVD-RW:** Like CD-RW, DVD-RW is re-writable media, means we can write, read and erase the data many times.

A DVD-Drive is needed to read data from DVD and a DVD-Writer is required to write data on it.



DVD-R



DVD-RW

- Advantages:**
1. Large storage capacity.
 2. Sound and picture quality is excellent, making them ideal for storing films with video and sound.
- Disadvantages:**
1. DVDs does not work in CD drives.
 2. There is no single standard of DVD.

Blu-ray Disc

The name *Blu-ray Disc* is a new optical disc format, which is rapidly replacing DVD. Its storage capacity is up to 25 GB on a single-layer disc which is more than five times the storage capacity of traditional DVDs and 50 GB on a dual-layer disc.

Blu-ray technology uses a blue-violet laser to read and write data from and to the disc. The name is a combination of "Blue" (blue-violet laser) and "Ray" (optical ray), which allows information to be stored at a greater density.

As with conventional CDs and DVDs, Blu-ray plans to provide a wide range of formats including ROM/R/RW.

The following formats are part of the Blu-ray Disc specification, BD-ROM: Read-Only format for distribution of HD movies, games, software, etc.

BD-R: Recordable format for HD video recording and PC data storage.



Blue-ray Disc

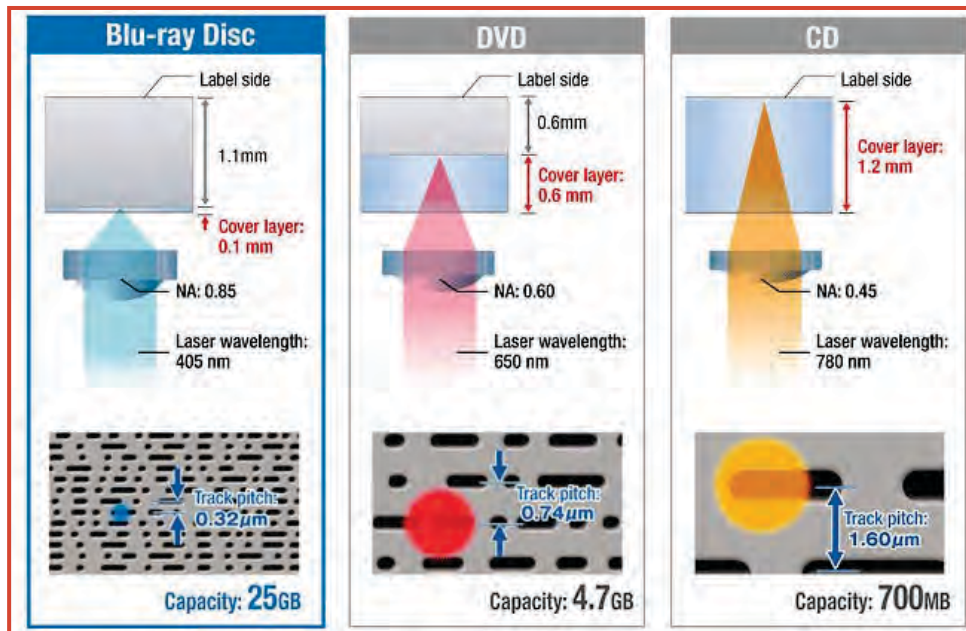
Do You Know?

Jacques Amott created the Blu-Ray on April, 2004; Blu-ray Disc Association bought it on November, 2005.

Blu-ray Disc Association (BDA) is a group of the world's leading consumer electronics, personal computer and media manufacturers (including Apple, Dell, Hitachi, HP, JVC, LG, Mitsubishi, Panasonic, Pioneer, Philips, Samsung, Sharp, Sony, TDK and Thomson).

Do You Know?

There is also planning for a BD/DVD hybrid format, which combines Blu-ray and DVD on the same disc so that it can be played in both Blu-ray players and DVD players.



- Advantages:**
1. Larger storage capacity than CD and DVD.
 2. Universality, means major corporations already are or are planning to support Blu-ray compatibility in recent and future technology.
- Disadvantages:**
1. Very expensive technology and Blu-ray discs have a higher tag as well.
 2. Due to increasing popularity of High Definition DVD players, Blu-ray may be nullified because customers will settle for the less expensive competitor.

BD-RE: Re-writable format for HD video recording and PC data storage.

The Pen Drive/ Flash Drive

The Pen Drive is a USB (Universal Serial Bus) flash memory device. It is used for storing and transferring audio, video, and data from one computer to another.

It is small in size i.e. portable, easy to carry and easy to use and low cost secondary memory. It can store a lot of data on it i.e. more than CD and DVD.

It is plugged into USB port of the computer. Pen Drives are getting very popular now-a-days. It can store data up to 64 GB now a day. But usually we are using 4 or 32 GB pen drive.



Pen Drive

- Advantages:**
1. Faster read and write compared to traditional hard disk drives.
 2. Uses less power than traditional optical and hard disc drives.
 3. Less prone to damage.
- Disadvantages:**
1. Flash memory cells have a limited number of write and erase cycles before failing..
 2. Most flash drives do not have a write-protection mechanism.

DO YOU KNOW?

Pen Drive is a semiconductor based memory. USB flash drives are also called thumb drives, jump drives, pen drives, key drives, tokens, or simply USB drives.

Sony launched the Memory Stick, a type of flash memory, in October 1998. It is their idea and only later did they team up with SanDisk to further develop it.

Memory Stick

Memory Stick is a removable flash memory card format, digital data storage are being used in digital cameras, digital music players and camcorders. A memory card reader is required to transfer the data from memory stick to computer and vice versa.

Like a floppy disk, the Memory Stick has a lock mechanism to prevent erasing of data. It has a 10-pin connector.

Storage capacity of memory stick ranges from 8 GB to 128 GB.

Advantages:

1. Small in size thus occupy less space.
2. Small in size but large data storage capacity.

Disadvantages:

1. Cannot be attached to the computer for read and write without proper hardware (card reader).
2. Sometimes work slow.



Memory Sticks

UNITS OF MEMORY

All digital computers store the data (number, character or other) in the form of binary digits i.e. '0' or '1'. These are called bits. Each bit can take value of either 0 or 1. A bit is the smallest unit of data in a computer. A group of 4 bits is called a nibble and a group of 8 bits is called a byte.

Memory measurement Units in Computer

Name (Symbol)		Equal to
Bit	8 Bits	1 Byte
Byte	1024 Bytes	1 Kilobyte
Kilobyte (KB)	1024 Kilobytes (KB)	1 Megabyte
Megabyte (MB)	1024 Megabytes (MB)	1 Gigabyte
Gigabyte (GB)	1024 Gigabytes (GB)	1 Terabyte
Terabyte (TB)	1024 Terabytes (TB)	1 Petabyte
Petabyte (PB)	1024 Petabytes (PB)	1 Exabyte
Exabyte (EB)	1024 Exabytes (EB)	1 Zettabyte
Zettabyte (ZB)	1024 Zettabytes (ZB)	1 Yottabyte

Glossary

PMT	:	Photo- Multiplier Tubes
OCR	:	Optical Character Reader
MICR	:	Magnetic Ink Character Recognition
USB	:	Universal Serial Bus

VDU	:	Visual Display Unit
CRT	:	Cathode Rays Tube
LCD	:	Liquid Crystal Display
TFT	:	Thin Film Transistor
LED	:	Light Emitting Diode
QWERTY Keyboard	:	It is a standard keyboard.
HDD	:	Hard Disc Drive
CD-ROM	:	Compact Disc Read Only Memory
CD-R	:	Compact Disc Recordable
CD-RW	:	Compact Disc Re-writable
DVD	:	Digital Versatile Disc
DVD-R	:	Digital Versatile Disc Recordable
DVD-RW	:	Digital Versatile Disc Re-writable
HD Video	:	High Definition Video
BDE	:	Blu-ray Disc Association
BD-R	:	Blu-ray Disc Recordable
BD-RE	:	Blu-ray Disc Re-writable
UNIVAC	:	UNIVersal Automatic Computer
KB	:	Kilobyte
MB	:	Megabyte
GB	:	Gigabyte
TB	:	Terabyte
PB	:	Petabyte
EB	:	Exabyte
ZB	:	Zettabyte
YB	:	Yottabyte

You have learned

- ✓ The keyboard is one of the common input devices.
- ✓ The keyboard looks like a typewriter.
- ✓ Mouse is a handy/hand-operated pointing device that rolls on a flat surface.
- ✓ A joystick consists of a stick that pivots on a base and reports its angle or direction to the device it is controlling.
- ✓ A scanner is a device that scans a document, film, graphic, or photograph and converts them to a digital image.

- ✓ Microphone is a device used to convert voice/sound into electrical signals.
- ✓ OCR is used to read alphabets and numeric characters on a document either hand-written or typed or special type of font printed on special paper.
- ✓ MICR is used to read magnetic ink characters primarily used by banking industry for the processing of cheques.
- ✓ Light Pen is a light-sensitive pen shaped pointing device and allows the user to point to displayed objects or draw on the screen.
- ✓ A bar code reader is used to read printed barcodes.
- ✓ Digital camera records and store photographic images in digital form.
- ✓ A Monitor shows the result returned by the computer.
- ✓ CRT (Cathode Rays Tube) is similar to television. It is bigger in size and heavy in weight.
- ✓ LCD (Liquid Crystal Display) and LED (Light Emitting Diode) is thin monitor.
- ✓ Printer is an output device which gives the output on the paper.
- ✓ Dot matrix, Drum, Daisy wheel etc. are Impact printer and Inkjet and Laser Printer are Non-impact printer.
- ✓ Plotter is used for printing high-quality graphics in engineering and architectural drawings. There are two types of plotters: flatbed plotter and drum plotter.
- ✓ Speakers are used to generate sound.
- ✓ Storage devices are used to store the data or information in the computer so that we can use it later.
- ✓ Primary memory is needed by the computer for its own working.
- ✓ Secondary memory devices are used to store the work done on the computer permanently.
- ✓ The Hard Disc is a common storage device for the computer.
- ✓ The CD-ROM is an optical Disc that can store information or data like video, audio, text, images, games, software etc.
- ✓ DVD (Digital Versatile Disc or Digital Video Disc) is a popular optical disc which looks similar to a CD.
- ✓ Blu-ray Disc is a new optical disc format, which is rapidly replacing DVD.
- ✓ The Pen Drive is a USB (Universal Serial Bus) flash memory device for storing and transferring audio, video, and data from one computer to another.
- ✓ Memory Stick is a removable flash memory card format, digital data storage being used in digital cameras, digital music players and camcorders.

Solved Questions

1. What is the use of input unit?

Ans. Input unit is used to feed the data and give some instructions to the computer.

2. How many types of keys are available on the keyboard?

Ans. (i) Alphanumeric keys (ii) Numeric keys
(iii) Control keys (iv) Function keys
(v) Navigation keys

3. Write the functions of mouse buttons.

- Ans.** (i) Left-click (ii) Right-click.
(iii) Double-click (iv) Drag and drop
4. Name the input device which is mostly used to play games on the computer.
- Ans.** Joystick
5. You want to insert your photo (printed on paper) in computer, which device will you use?
- Ans.** Scanner.
6. For which applications microphone is used?
- Ans.** Microphones are used in many applications such as telephones, tape recorders, hearing aids, motion picture production, live and recorded audio engineering, in radio and television broadcasting and in computers for recording voice.
7. What is the use of output unit?
- Ans.** This unit helps the user to get output generated by the computer in different formats.

8. What are the common types of monitor?
- Ans.** CRT monitor, LCD monitor and LED monitor.
9. What are two types of printer?
- Ans.** Impact printers and Non- Impact printers.
10. What is the use of storage unit?
- Ans.** Storage unit are used to store the data or information in the computer so that we can use it later.
11. What are the two types of memory unit?
- Ans.** Primary memory and secondary memory.
12. In which form data is stored in the computer?
- Ans.** All digital computer stores the data (number, character or other) in the form of binary digits i.e. 0 or 1.
13. Where memory stick are being used?
- Ans.** Memory sticks are used in digital cameras, digital music player and camcorders.
14. What is the storage capacity of Blu-ray disc?
- Ans.** Storage capacity of Blu-ray disc is upto 25GB.

Work Out Time

A. Choose the correct answer.

- _____ keys are used for moving around in documents or web pages and editing text.
 - Typing Keys
 - Numeric Keys
 - Navigation Keys
 - Function Keys
- You have a big monitor screen with computer and want to operate your computer from a distance. Which type of mouse would you use?
 - Mechanical Mouse
 - Wireless Mouse
 - Laser Mouse
 - None of these
- Which of the following is a type of scanner?
 - Hand-held scanner
 - Drum scanner
 - Sheet fed scanner
 - All of these
- Which device is used to read characters on a document?
 - Scanner
 - OCR
 - MICR
 - Mic

5. Which device is used to read the codes written on bank cheque?
a) Scanner
b) OCR
c) Light Pen
d) MICR
6. During cricket matches sometimes you see on your TV screen, commentators point out a player or some area on the field. Which device do they use to do this?
a) Light Pen
b) Bar Code Reader
c) Mouse
d) None of these
7. You went to a shopping mall to purchase some products. At the time of billing, the salesman points a machine at an information tag on the product and some details about the product appear on the computer screen. What did the tag contain and which machine did the salesman use?
a) OCR codes, OCR
b) Magnetic ink characters, MICR
c) Barcodes, Barcode reader
d) None of these
8. You went to a photo studio and a photographer shows your photo immediately after being clicked. Which type of device is being used by the photographer?
a) Digital camera
b) Web Camera
c) Both of these
d) None of these
9. Which of the following is the best monitor?
a) CRT Monitor
b) LCD Monitor
c) LED Monitor
d) TFT Monitor
10. Which of the following is a best printer in terms of quality of printing?
a) Dot Matrix Printer
b) Inkjet Printer
c) Laser Printer
d) Daisy Wheel Printer
11. You went to bank with your mother and she took her account statement. During printing, the printer was noisy and printing quality was low. Which printer was being used in the bank?
a) Dot Matrix Printer
b) Inkjet Printer
c) Laser Printer
d) Daisy Wheel Printer
12. Which device is used for high-quality printing of a map created by an architect?
a) Daisy Wheel Printer
b) Laser Printer
c) Plotter
d) None of these
13. _____ is called main memory of the computer.
a) Hard Disk
b) DVD
c) Pen Drive
d) RAM
14. Which memory is fast in terms of reading and transferring the data?
a) Hard Disk
b) RAM
c) Pen Drive
d) Cache

15. Which optical disc gives large data storage area?
 - a) Blu-ray Disc
 - b) DVD-R
 - c) CD-R
 - d) None of these
16. Which is the smallest unit of data in a computer?
 - a) Byte
 - b) Nibble
 - c) Bit
 - d) None of these

B. Short answer type questions.

1. Write at least two differences between:
 - a) Mechanical mouse Vs. Optical mouse
 - b) Hand-held scanner Vs. Flat-bed scanner
 - c) OCR Vs. MICR
 - d) CRT monitor Vs. LCD monitor
 - e) Inkjet printer Vs. Laser printer
 - f) Mouse Vs. Light Pen
 - g) Scanner Vs. Digital Camera
 - h) CD-ROM Vs. DVD
2. Give any five examples of input devices.
3. What is the use of joystick?
4. Write the use of microphone?
5. Give any four examples of output devices.
6. What is a Pen Drive?
7. What is a Memory Stick?

C. Long answer type questions.

1. Write at least four differences between,
 - a) Hard disk Vs. Pen drive
 - b) Impact printer Vs. Non-Impact printer
 - c) Dot matrix printer Vs. Laser printer
 - d) Printer Vs. Plotter
2. Explain different types of keys on the keyboard.
3. Explain Blu-ray Disc. What are its different types of formats?
4. Write different memory measurement terms.

D. Fill in the blanks.

1. The _____ is one of the common input devices. It looks like a typewriter.
2. _____ is a handy/ hand-operated pointing device that rolls on a flat surface.
3. Microphone is a device used to convert _____ into electrical signals.
4. _____ is a light-sensitive pen shaped pointing device.
5. _____ is a process in which your computer gets initialized.
6. The _____ is common storage device for the computer.
7. Memory Stick is a removable _____ card format.
8. Blu-ray Disc is a new optical disc format, which is rapidly replacing _____.
9. $1024 \text{ _____} = 1 \text{ Yottabyte}$.

E. State true or false.

1. Input devices are used to process the data.
2. Joystick is an output device.
3. A scanner can be used to scan a document.
4. MICR is used to read code printed on bank cheques.
5. Printing quality of Dot Matrix printer is better than inkjet printer.
6. Hard Disk is the main working memory of the computer.
7. Impact printers produce sound while it is functioning.
8. All digital computer stores the data in the form of binary digits i.e. 0 or 1.
9. 8 bits = 1 Nibble.

F. Practical/ lab Activity

1. Visit your school computer room, list different types of hardware parts (Input, Output, Processing and Storage Devices) which are being used.
2. Visit your school office and try to find out which type of printer is being used and compare its advantage to other printers.
3. Collect pictures of all the computer peripherals and paste it in a scrapbook. Also write their uses.
4. Create three groups in the class and assign one category of hardware (Input, Output, Processing or Storage Devices) to each group to search about the devices, which comes under their categories, on internet or magazines and find the following details,
 - a) Image of the hardware device.
 - b) Manufacturing company of the device (with price).
 - c) Specifications/features of the device.

COMPUTER SOFTWARE

3

CHAPTER FOCUSES ON

- ✓ Computer Languages
- ✓ Computer Software and its types
- ✓ System Software (Operating Systems)
- ✓ Application Software and its categories
- ✓ Utility Software

COMPUTER SOFTWARE

As we know that a computer is made up of two main components i.e, hardware and software. Hardware is the tangible part while software is a non-tangible part. Both are compulsory to form a computer system. Without software computer is a dumb machine.

Computer requires a number of instructions to do any job. These set of instructions forms programs. Numbers of programs are combined for some purposes which are called software.

In general terms, computer software or software is a collection of programs and related data which provides the instructions to a computer, what to do and how to do.

To develop a software we need a computer language. A computer language is an interface between a computer and a human being. There are various types of computer languages, for example, Machine language, Assembly language, Third level languages, Fourth level languages and Fifth level languages. But computer understands only machine language. We use translator program (assembler, interpreter and compiler) to convert the program code of other level languages into machine code.

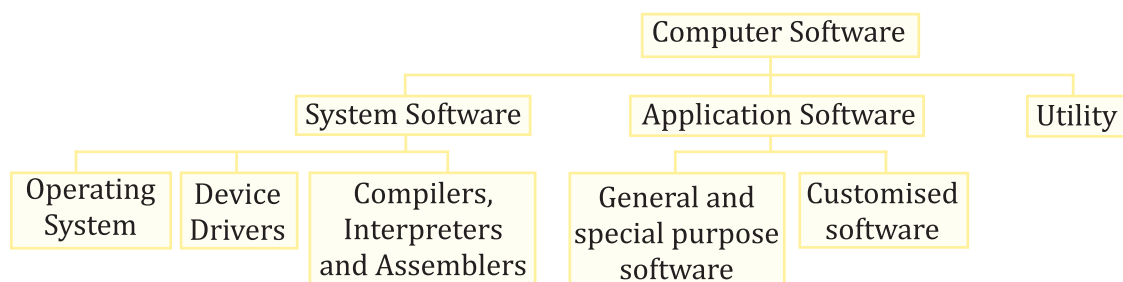
Before using a software we need to install it on the required computer. Once a software is installed, it is ready for use.

There are three types of software:

1. System Software
2. Application Software
3. Utility Software

DO YOU KNOW?

Ms. Ada Lovelace has been called world's first programmer.



A block diagram of the types of computer software

SYSTEM SOFTWARE

System software operates and controls the internal functioning of a computer. It executes various tasks such as processing the data and information, controlling hardware components, and allowing users to use application software i.e, systems software functions as a bridge between computer system hardware and the application software.

System software is made up of many control programs, including the Operating System, communications software and database manager. System software consist of three types of programs:-

- (a) **System management program:** This is used to manage the application software, computer hardware and data resources of the computer system. For example, Operating Systems.
- (b) **System Support Program:** These are the programs that help the operations and management of a computer system. For example, system utilities, virus checking etc.
- (c) **System Development Programs:** These are programs that help users develop information system programs and prepare user programs for computer processing. For example, language translators, programing IDE (Net Beans 7.0, Microsoft Visual Studio 2010), etc.

Language Processor

As we know that computer can understand the instructions written only in machine code, i.e. in the form of 0s and 1s. But it is difficult to write computer program in machine code. Nowadays, programs are written mostly in high- level languages. For example, C++, Java, etc. *A program written in assembly language and high- level programming language is called the 'source code/program'.*

The source code cannot be executed directly by the computer. Then it is required that source code must be converted into machine code to run it. To do so, we need a language translator.

A language processor is a type of computer software that has the capacity to translator the source code/program written in assembly language and high- level programming language into machine codes.

The program translated into machine code is known as 'object program'.

Every program has its own language translator. The language processors are divided into three types: Compilers, Interpreters and Assemblers.

Compiler: The language processor that translates the complete source program as a whole in machine code before execution is called compiler. For example, The C and C++ compilers.

The source code is translated to object code successfully if it is free of errors. If there are any errors in the source code, the compiler specifies the errors at the end of compilation. **Note:** *The errors must be removed before the compiler can successfully compile the source code.* The object program can be executed a number of times without translating it again.

Assembler: An assembler is used to translate the program written in Assembly language, into machine code. An assembler performs the translation process in similar way as compiler. But assembler is the translator program for low-level programming language. An assembler translates from a low level language to binary machine code.

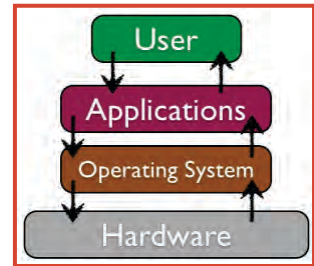
Interpreter: The language processor that translates (converts) each statement of source program into machine code and executes it immediately before to translate the next statement is called Interpreter. If there is an error in the statement the interpreter terminates its translating process at that statement and displays an error message. For example, Java interpreter.

The Interpreter differs from compiler that translates the entire source program into object program before execution. The main advantage of Interpreter is that it makes easy to trace out and correct errors in the source program. The main disadvantages of Interpreter are:

It is a time consuming process of translating and executing statements one by one. Each time the program is run, the source code is translated and executed have a translator program (Interpreter) permanently in your computer.

Operating System

Operating System provides link between the user and the computer. It provides a platform to use a computer. It enables the user to have complete control over the computer system by commands through the keyboard or any other input device. The supervisor part of an Operating System resides all the time in the memory (RAM) of the computer after the computer is turned on. An Operating System performs the following tasks:-



1. Controls basic Input and Output devices
2. Allocates system resources
3. Manages storage space
4. Supports application software
5. Maintains security
6. Detects equipment failure

This enables the user to achieve high efficiencies of which the processing systems are capable.

Operating System provides both CUI (Character User Interface) and GUI (Graphical User Interface).

CUI (Character User Interface): In CUI based operating requires the users to interact with it by typing commands. Examples of CUI based Operating System are DOS and UNIX.

GUI (Graphical User Interface): GUI based Operating Systems are popular now days. GUI based Operating System provides the commands in the form of icons and menus. Users just need to click on it with help of mouse or press shortcut keys using the keyboard. Examples of GUI based Operating Systems are MS Windows, Linux, and Mac OS.

Device Driver

More commonly known as a driver, a device driver or hardware driver is a group of software files that enable one or more hardware devices to communicate with the computer's operating system. Without drivers, a hardware device such as a computer printer would not be able to work with the computer, which is why every hardware device in and connected to your computer has associated drivers.

APPLICATION SOFTWARE

Application software is any program designed to perform a specific function for the users or, in some cases, for another application program. Examples of application programs include word processors, presentation programs, Spreadsheet and accounting programs, database programs, web browsers, development tools, drawing and paint, image editing programs, media players programs etc. Application program uses the services of the computer's Operating System and other supporting programs.

Application software includes a variety of programs that can be subdivided into two categories: general-purpose application software and specific purpose application software.

General-Purpose Application Programs

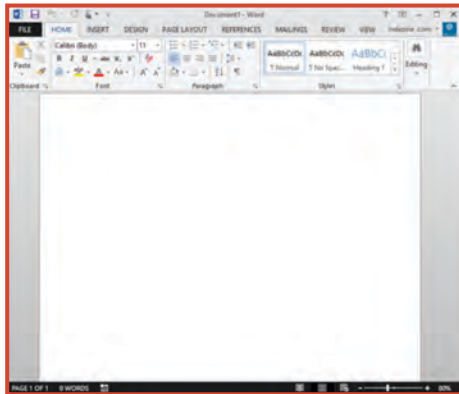
General purpose application softwares are developed by software vendors keeping in mind a large set of users. Anyone can purchase it and use it without making any modifications to it. Word processing programs, electronic spreadsheet programs, database management programs, graphics programs, communication programs, and integrated packages are popular with microcomputer users for home, education, business, scientific, and many other general purposes.

They are also known as productivity packages, because they significantly increase the productivity of end users. This packaged software is also called off-the-shelf software packages, because these products are packaged and available for sale. Many features are common to most packaged programs. Let's take view on some of the general purpose application software.

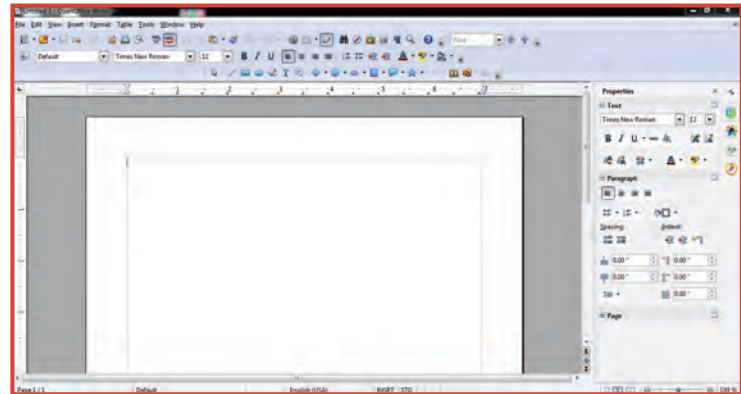
Word Processing Software

Word processing software is used to create, edit and format the documents. We can create letters, reports, etc. Some word processors also provide facility to save a document as a web page and upload it on the internet. Some examples of word processing software are, MS Word, OpenOffice.org Writer, WordPerfect, Lotus WordPro, etc.

Using word processor teachers can create and maintain syllabus and lesson plans of their related subjects. Students can use it to create letter or invitations to their friends.



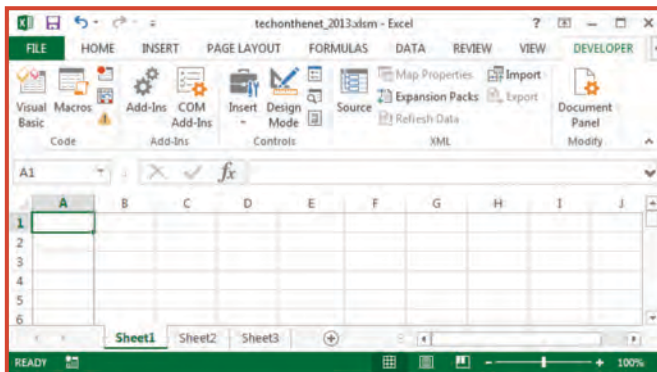
MS Word



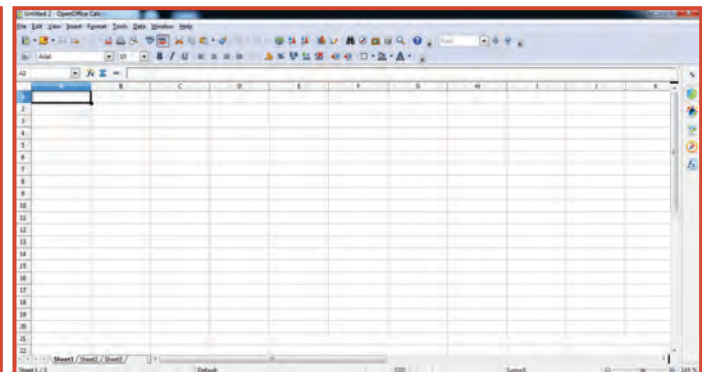
OpenOffice.org Writer

Electronic Spreadsheet Software

Spreadsheet software is used to organize and process data in columns and rows. It provides facilities to use formulas and functions to apply on the numeric data. It is generally used for business applications i.e. financial calculations, budgeting, financial forecasting etc. Some examples of spreadsheet software are, MS Excel, OpenOffice.org Calc, Lotus 1-2-3, Apple Numbers, etc.



MS Excel



OpenOffice.org Calc

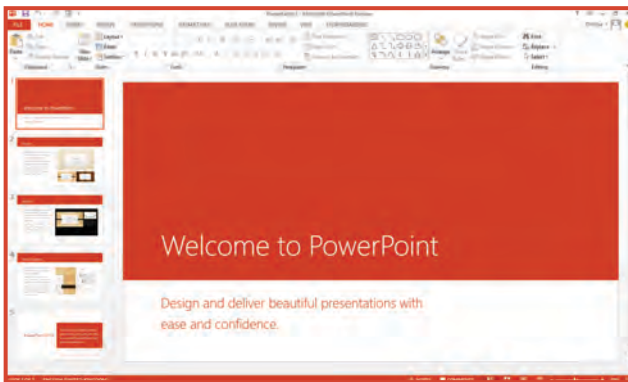
Using spreadsheet teachers can create and maintain marks/ grade list of the students of CCE pattern. Students can use it to calculate their total marks with percentage.

Presentation Software

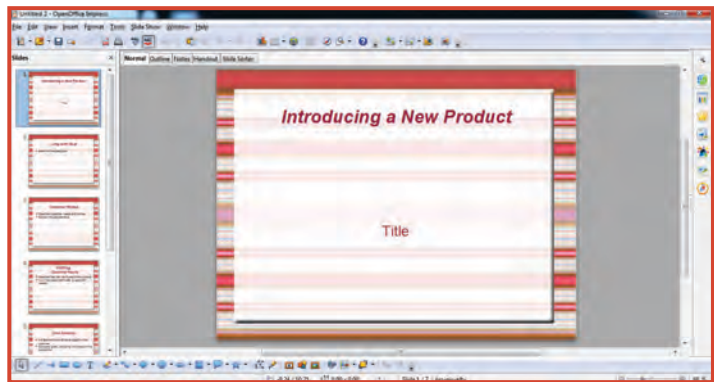
Presentation software is used to display the information (in summarized way) in the form of slide show. We can add sound effects and use videos in a presentation. It typically includes the three major functions; an editor that allows text to be inserted and formatted, manipulating graphic image and slide show system.

It can be used to express /display key information in front of audience. Some examples of presentation software are, MS PowerPoint, OpenOffice.org Impress, King soft Presentation, Apple keynote, etc.

Using presentation software teachers can create presentations on a topic to make it attractive and easy to understand to the students. Students can use it to present their project overview in an impressive manner.



MS PowerPoint

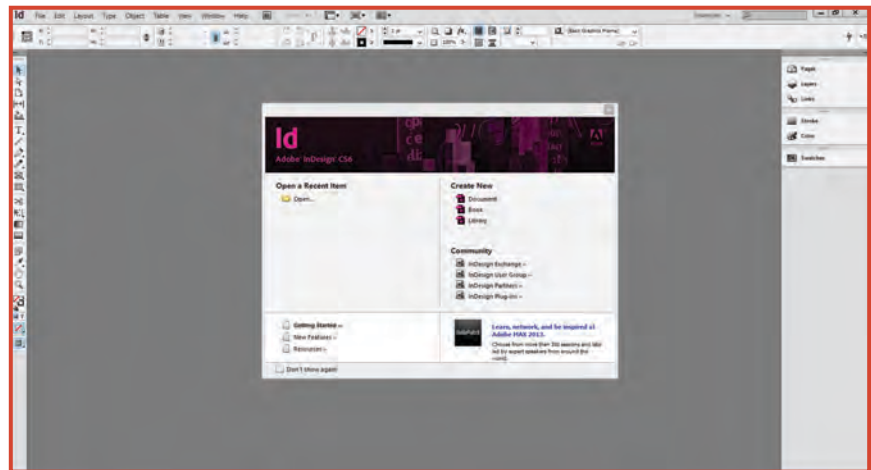


OpenOffice.org Impress

Desktop Publishing Software

Desktop publishing software is a tool for graphic designers and non-designers to create visual communications (brochures, business cards, greeting cards, Web pages, posters, etc.) for professional or desktop printing as well as for online or on-screen electronic publishing.

Programs such as Adobe InDesign, Corel Draw, Illustrator, QuarkXPress, Serif PagePlus, and Scribus are examples of desktop publishing software. Some of these are used more by graphic designers. Others are used more by office workers, teachers, students, small business owners and non-designers.



Adobe InDesign

Browser

A browser allows us to explore the Internet in an easy to use way. Navigating the Internet through a series of links the user is able to browse the Internet. Examples of popular browsers are Google Chrome, Internet Explorer, Firefox, Safari, Netscape Navigator and Opera.

Each browser has a navigation toolbar, like the ones shown below that help also illustrate how the Internet browser toolbar has changed over the history of Internet browsers. This navigation bar is the most essential portion of the browser and will always at least contain the Back arrows and address bar.

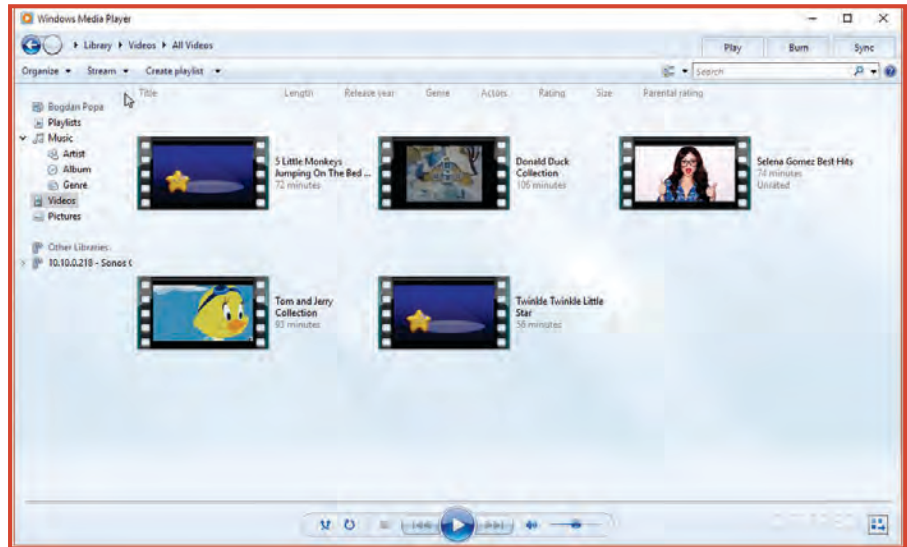


Browser

Multimedia Software

Multimedia software is used to create multimedia files that include text, graphics, video, animation, and sound. For example, Flash, Photoshop, Director, Maya, etc.

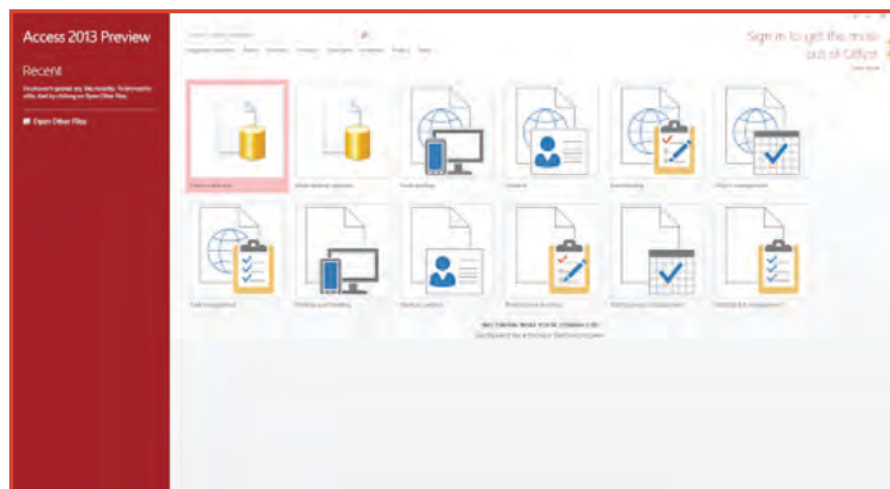
We need multimedia players to play multimedia files. For example: VLC player, Windows Media Player, QuickTime, etc.



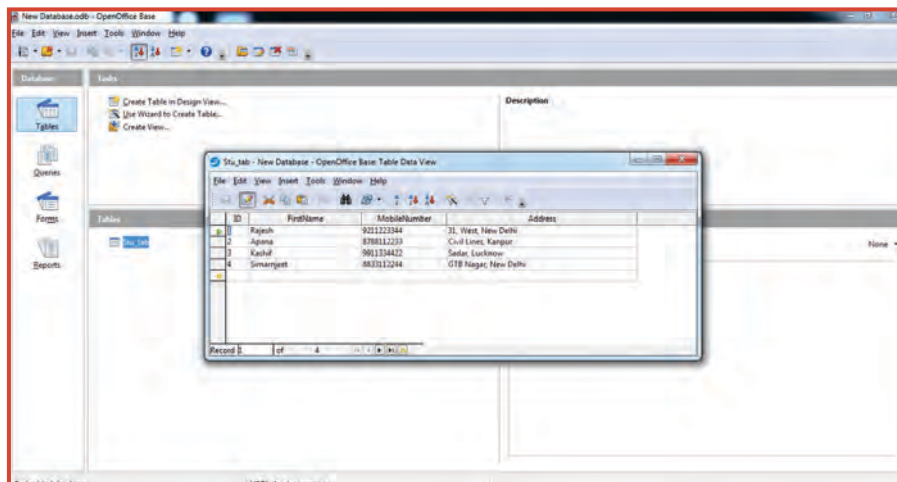
Windows Media Player

Database Management Software

Database management software is used to create and manage database. A database is a collection of related data. Database management software provides facilities to store, retrieve, and manipulate the data. For example, MS Access, Oracle, SQL Server, MySQL, etc.



MS Access

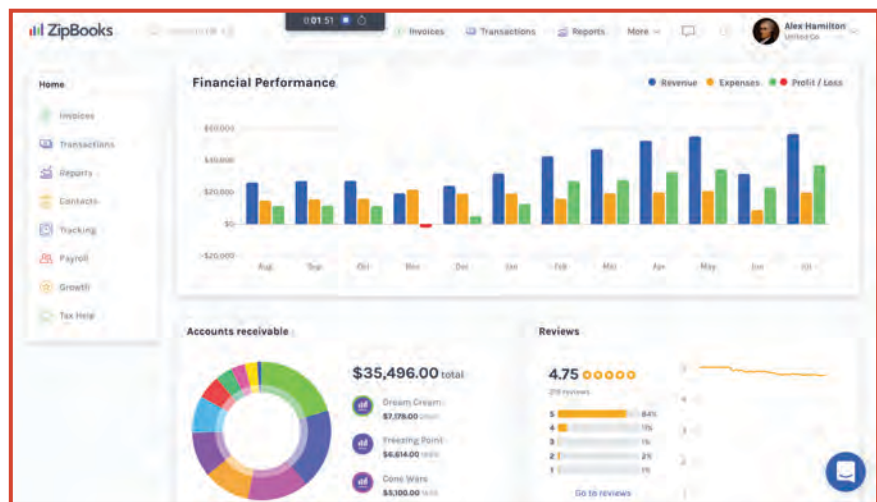


00 Base

Specific Purpose Application Software

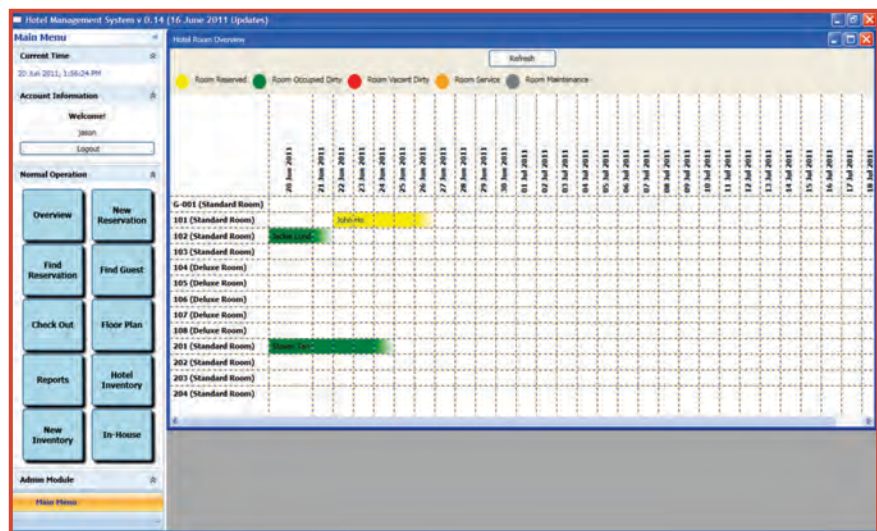
Specific purpose application softwares are designed to carry out specific task for a particular group of user. For example, accounting management, reservation system, HR management, attendance system, payroll system, school, inventory control system, billing system, etc.

Accounting Management: An accounting management software is used to record and process accounting transactions of the organization or company such as accounts payable, account receivable and financial reports.



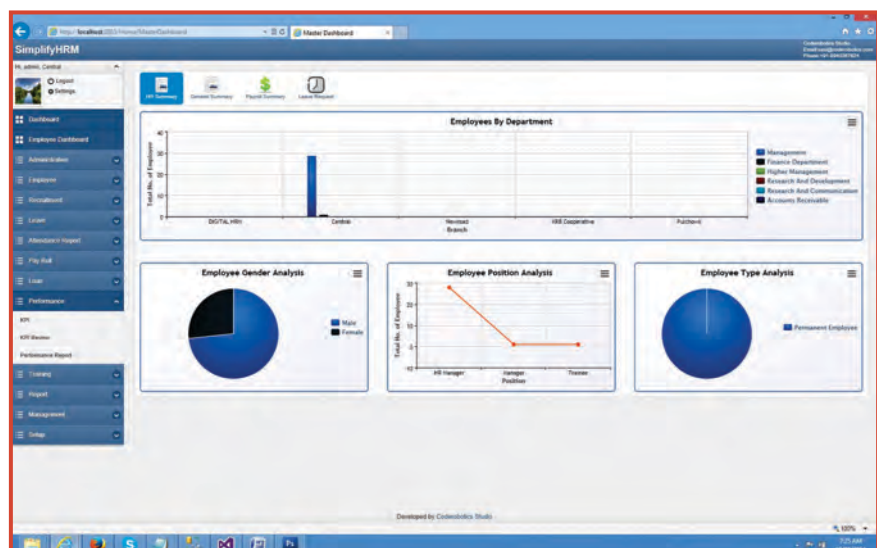
An Accounting Software

Reservation System: Reservation system or software is used for reservation of flight, train, hotels etc. Different types of reservation system are used for different fields.



A Reservation Software

HR Management: HR Management system is used to improve administration efficiency, streamline HR processes, reduce HR related paperwork, tackle recruitments and employee efficiency reviews.



A HR Management Software

Attendance System: Attendance software is used to record and track the attendance of employees. It can output simple reports that can be passed to payroll department to calculate salary according to the amount of hours worked by an employee, the amount of holidays owed wages and so on, saving hours of time used to spend tallying up hand-written time cards or punch clock cards.

Generally this software is used with biometric attendance machine.

EmpId	Name	StatusName	CardNo
101	Mam...	Active	101
102	Ano...	Active	102
103	Sk.A...	Active	103
104	Cha...	Active	104
105	Abd...	Active	105
106	Md...	Active	106
107	Abd...	Active	107
218	Sum...	Active	218
509	Moh...	Active	509
511	Raji...	Inactive	511
512	Amz...	Active	512

An Attendance System

Payroll System: Payroll system is used to calculate the salary of the employees in an organization or company (sometimes after getting details from attendance system).

It handles the grades, travel allowances, dearness allowances, incentives, bonus, etc.

A Payroll Software

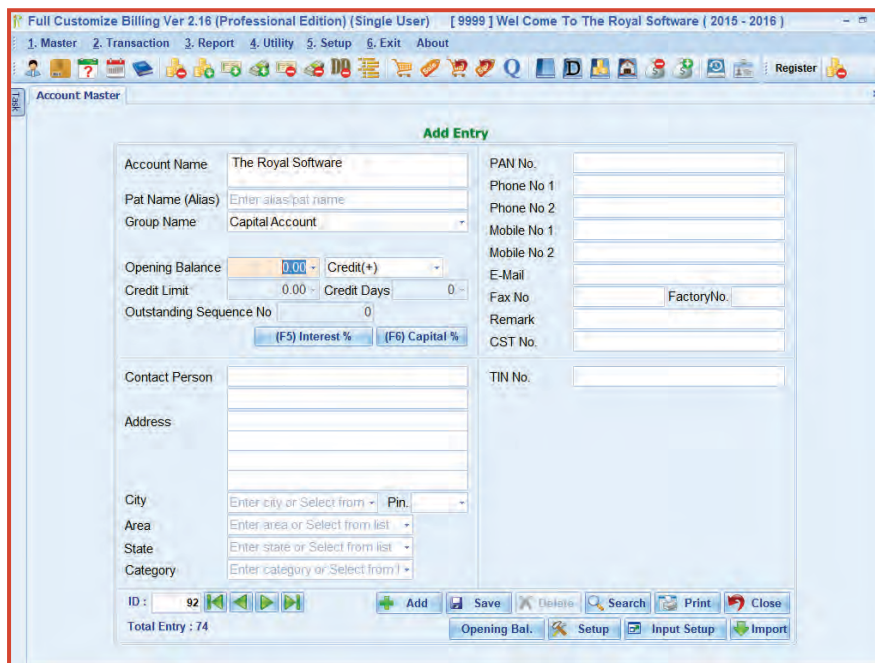
Inventory Control System: An inventory control system is an integrated package of software and hardware used in managing a company's inventories; purchasing, shipping, receiving, tracking, warehousing and storage, turnover, and reordering. *In common usage, the term (Inventory Control) may also refer to just the software components.*

An inventory control system may be used to automate a sales order fulfillment process. Such a system contains a list of order to be filled, and then prompts workers to pick the necessary items, and provides them with packaging and shipping information.

An Inventory Control System/Software

Billing System: Billing system is used at shopping malls, showrooms, supermarkets, etc. to calculate and generate the bill of the products/items purchased by the customer.

Generally, different types of machines are used with special peripherals (bar code reader) to record items details being purchased.



A Billing System/Software

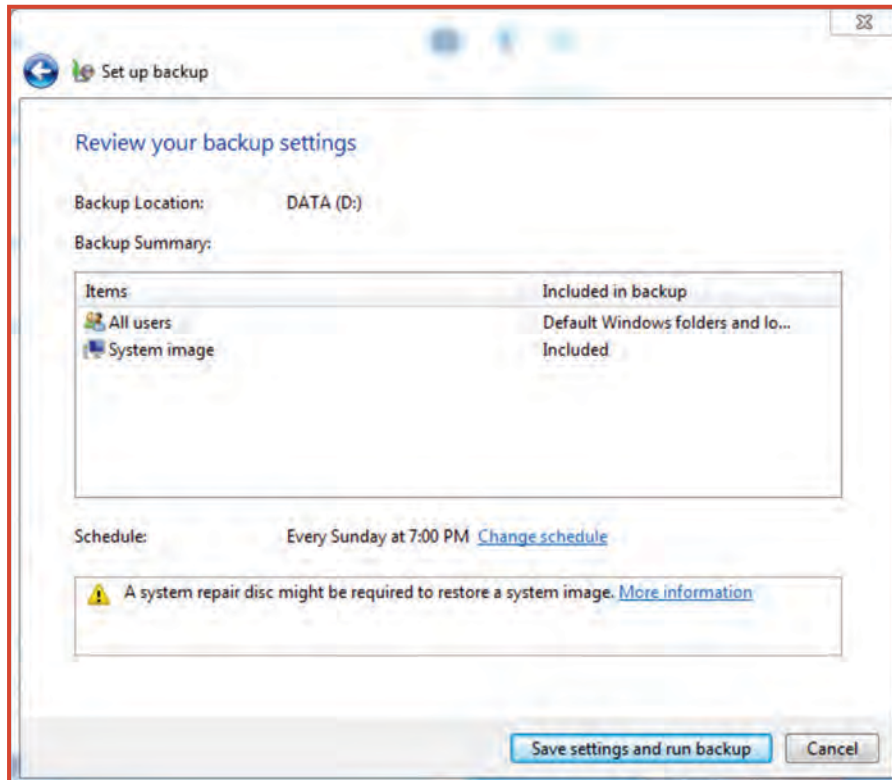
UTILITY SOFTWARE

Utilities are specifically designed software to help the end-user and tune the computer hardware/Software, Operating System or application software.

Utilities programs assist a computer by performing housekeeping functions like Disc/Folder/File Management (creating, moving, renaming and deleting files and folders), backup utilities that facilitates the backing-up of Discs, compression utility that facilitates compression of files, Disc fragmentation utility that attempts to minimize the fragmentation on your Disc and anti-virus software that ensures a virus-free environment.

Data Backup Utility

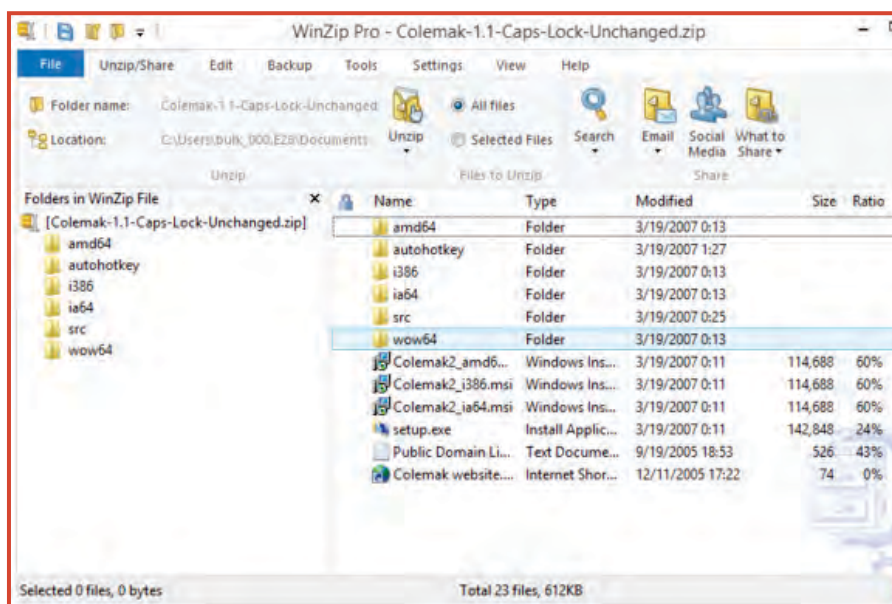
Back up means making copy of data. Data backup utility copies the contents from one storage medium to another. The files or folders or Disc drives can be backed up using this utility. The backed up data can be restored when needed in case original files are damaged or lost. Mostly all Operating Systems provide data backup facility. Some examples of other data backup software are, NovaBACKUP, DT Utilities PC Backup, Norton Ghost, Stellar Insta Backup, etc.



A Data backup tool

Compression Utility

This utility program shrinks file so that less Disc space is occupied. These compressed files cannot be used directly and must be decompressed to their actual form being used. For example, WinZip, PkZip, etc.



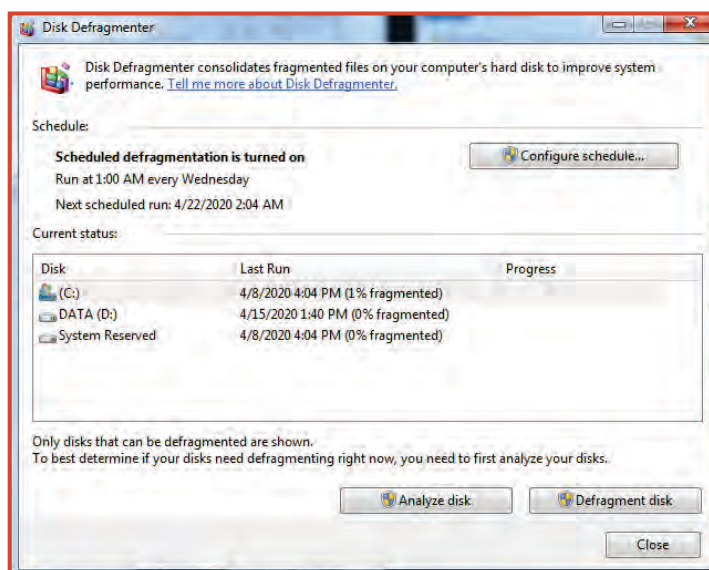
A Data compression tool

Disk Defragmenter

Disk Defragmenter is a tool that rearranges the data on the storage (Hard Disk) and reunites fragmented files that computer can run more efficiently. It increases files or folders access speed.

Disk Defragmenter analyzes the hard drive and merges fragmented files into one contiguous block or space.

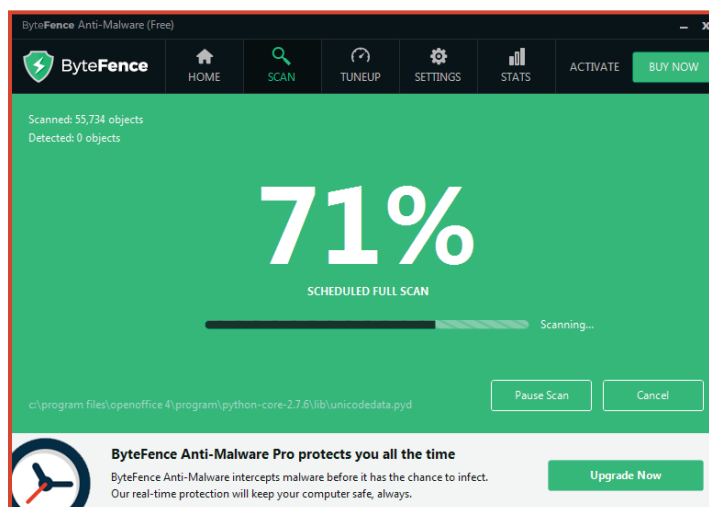
Mostly all Operating Systems provide disc defragmenter.



A Disk defragment tool

Virus Scanner/Cleaner

Antivirus software performs the cleaning up process by scanning the computers for viruses and removes them if any virus is found on the Disc. They can detect any virus immediately and protect the computer from them. For example, Bit Defender, Quick Heal, Kaspersky, Norton etc.



An Antivirus tool

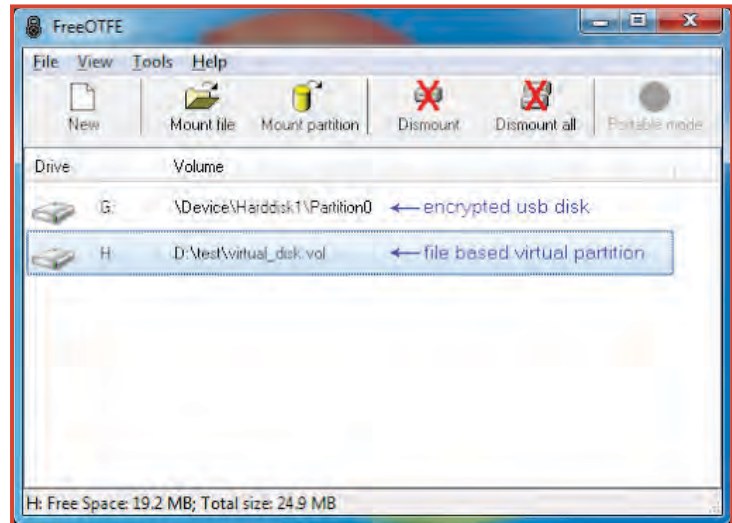
Encryption/Decryption Tools

Encryption is the conversion of data into coded form using some special algorithms, called a cipher text, which cannot be easily understood by unauthorized people. This tool is applied on the confidential data and stored in computers and needed to be transmitted over internet.

The data is first encrypted and then transmitted over the network.

Decryption is the process of converting encrypted data back into its original form (using proper algorithms), so that it can be understood by receiver.

This tool is available in some Operating Systems. For example, MS Windows. Some other examples of data encryption tools are, Folder Lock, Advanced Encryption Packages Pro, SensiGuard, SecureIT etc.



An Encryption tool

THE AGE OF MOBILE APPS

Today, we have smartphones and tablets which help us carry our world with us and remain online 24X7. We use Mobile Internet for several reasons – communication, entertainment, training, tour and travel, job search, banking, shopping, booking flights, cabs and hotels – the list is too long to accommodate here. Most of our transactions are carried out by some app.

A mobile app is a piece of software specifically designed to be installed on the handheld devices such as smart phones and tablets to provide desired services.

An app runs under the control of Mobile operating system such as Android and iOS etc. Apps are mostly free to download but user may have to pay for the services provided by the service provider of the app.

Main Features of Mobile Apps

- Apps are easy to download and install on the device.
- Apps are mostly free and very lightweight (on memory and processor) software easily run in lesser memory and CPU power.
- Apps are generally not bound with licence restrictions as software.
- App is an interface between the online services provided by the business and the customer. For example, if you have a bank account then major services of your account can be accessed through a mobile app made freely available by the bank.
- Apps are a great way for businesses to reach their customers and develop a bigger customer base with lesser expenses of time and money.
- Apps help businesses provide their customers quick and better services. This strengthens their relationship with the customer and ensures customer loyalty.
- Apps are quicker way to address customer grievances.
- Apps are a reliable way to carry out transactions since they are provided by the service provider and the responsibility of secured transactions lies with the business.
- Apps are provided as an option. Users are still free to access web services though mobile micro-browser.

- Apps do not have a detailed, comprehensive menu and navigation interface. They are designed to make best use of limited screen space and yet keep the interface intuitive and user friendly.
- Apps in the form of Web Apps over mobile devices are used as responsive versions of the web sites.

Note: Responsive version of a web site is a version of the main web site which works on every mobile device without distorting the web site interface. It adapts to the screen size, touch features and display properties if the mobile device.



Types of Mobile Apps

Broadly, apps are of following types:

Native Apps

The term *native* means *belonging to a particular place or location*. A native app is designed to run on a specific operating system. For example, an app designed for any Google Android version may not run on Apple iOS and vice versa. Such apps can be downloaded from the app stores of respective company, for example, Google provides Play Store and Apple provides App Store. Microsoft has its own app store. Most of the game apps are native apps. They install and use processing power of the mobile device.



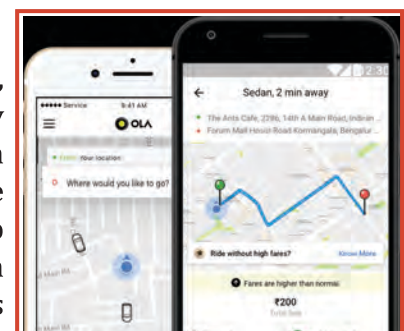
Web Apps

These apps are responsive versions of their web sites. They have in-built micro browser to display the web site interface adaptive to the small screen of mobile device. Web apps do not install on the user's device. These apps use the processing power of the web server on which the web site is hosted. These web apps run successfully on a good network connectivity since they are not installed on user's device. Examples of web apps are Facebook, OLX, Pinterest, BookMyShow, Flipkart, AliExpress, Forbes etc.



Hybrid Apps

As the name suggests, *hybrid* means *having features of both or dual features*, hybrid apps demonstrate the features of both native and web apps. They combine the elements of native as well as web apps. They provide certain important features even if device is not connected with the Internet. They are integrated with the operating system of the mobile device as well as the web based services. Hybrid apps are more popular since they combine best of both the types. Hybrid apps store some content locally while rest of the content is stored on web server.



Popular cloud services are in the form of Web apps such as cloud based office tools for word processing, spreadsheets and presentations. Other examples are Instagram, Gmail, Twitter, Uber, Ola etc.

How are apps organised in App Stores or Markets?

There are several hundreds of apps available online for each possible service. For users, it is very difficult to look up for the desired app. App stores organise the apps in various categories for the ease of search and navigation for the users.

Uses of Common Apps

Though there are several thousand apps categorised under several categories, most popular and frequently used app types are a few. Let us have a look at some popular apps.

Gaming Apps

Popular among all age groups, this category lists a variety of games, puzzles and riddles. Offline, online, multiplayer are some broad categories of games. Recently Pikachu and Pubg have been most popular games. Other popular games are:

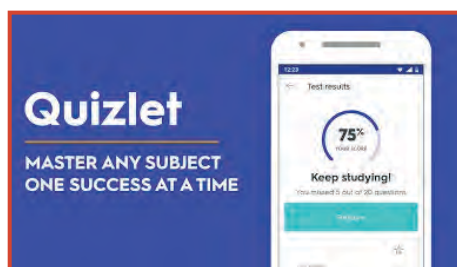
- Clash of Clans
- Candy Crush Saga
- Angry Birds Go
- Temple Run
- Pokemon GO
- PUBG



Educational Apps

Various self-paced learning apps as well as comprehensive online courses from recognised universities and colleges worldwide are available through various apps. Popular examples are:

- Duolingo – Learn Languages for Free
- Photomath – Camera Calculator
- Quizlet: Flashcard & Language App to Study & Learn
- Lumosity – Brain Training
- TED
- Udemy
- Byju



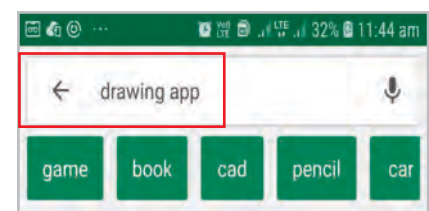
Business Apps

Business-to-business (B2B), Business-to-Consumer (B2C) and Consumer-to-Consumer (C2C) types of apps are available. B2B apps allow the businesses to network and collaborate together to sell their products and services. Manufacturers, distributors and retailers use such apps. B2C apps allow customers and consumers to browse, subscribe or buy and use the products and services. C2C apps allow the users to sell their product and services using the platform provided by the business web site. Here, customers can publish their services for other customers to use. Some examples are:

B2B apps: Google analytic, Hootsuite, WebEx, Salesforce, Docusign

B2C apps: Snapchat, Flipkart, Amazon, All gaming apps, Banking apps.

C2C apps: EBay, OLX, MagicBricks, Quikr. Amazon also provides such services now.

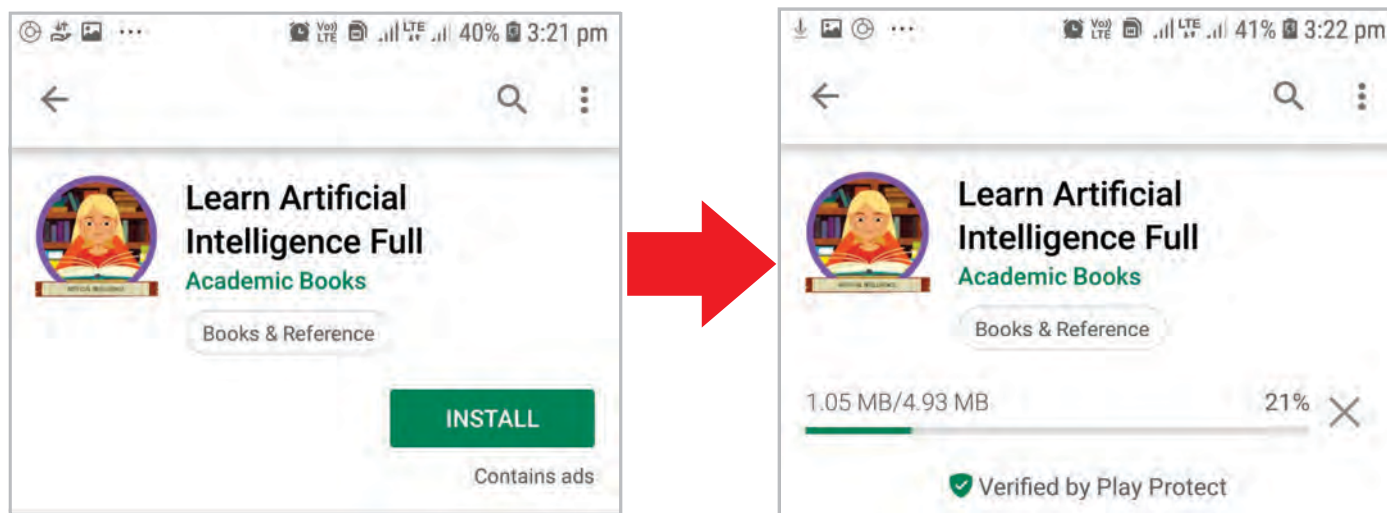


Downloading and Installing an App

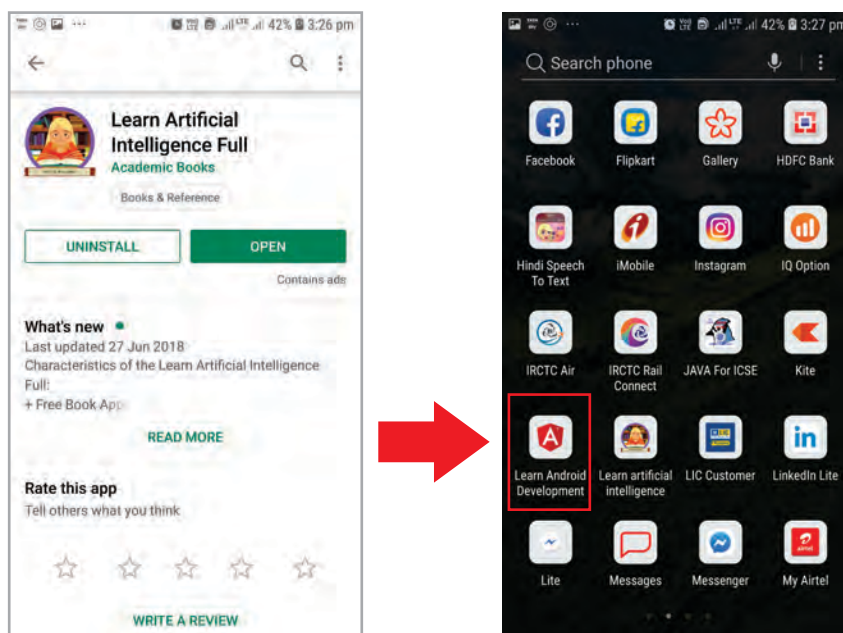
Having an app on your mobile devices is not a challenging task at all. You just need to search it in the app market, once found, download it with one click and after download, install it with one click.

Let us see how we can install a Google android app from Google Play Store.

1. Open Google Play Store App. You can also go to  play.google.com.
2. Search the desired app by typing its full or partial name in search bar at the top or browse for the app in various categories.
3. Select the app once it is found by touching its icon on the mobile device screen.
It will display the features, rating and reviews of the app along with the button **Install**.
If app is already installed then it may show **Update** button.
If app is not free then click on item's price and complete the payment steps.
4. Touch on **Install** button. App will begin downloading showing the download progress bar and after a short while it will install.



5. After installation, **Open** button will appear. Click on it to launch the app.
A shortcut icon for installed app will be created on the device screen and main icon will be created in the menu.



Glossary

Program	:	Program is a set of instructions.
Software	:	Software is a set of programs.
System Software	:	System software operates and controls the internal functioning of a computer.
Operating System	:	Operating System provides a link between the user and the computer.
CUI	:	Character User Interface
GUI	:	Graphical User Interface
Application Software	:	Application software is any program designed to perform a specific function for the users or, in some cases, for another application program.

You have learned

- ✓ Set of instructions in a computer form a computer program and the number of programs are combined for some purposes which makes software.
- ✓ Some common types of software are system software, application software and utility software.
- ✓ The types of system software are system management program, system support program and system development program.
- ✓ The system management program manages the application software, computer hardware and data resources of system e.g, Operating System.
- ✓ System support program helps the operations and management of a computer system e.g, Virus Checking, etc.
- ✓ System development programs consist of language translators, programming IDE, etc. for example, Net Beans 7.0, Microsoft Visual Studio 2010, etc.
- ✓ CUI based operating requires the users to interact with it by typing commands.
- ✓ GUI based Operating System provides the commands in the form of icons and menus.
- ✓ Application software can be subdivided into two categories: general-purpose application software and specific purpose application software.
- ✓ General purpose application softwares are developed by software vendors keeping in mind a large set of users.
- ✓ Specific purpose application software are design to carry out specific tasks for a particular group of users. E.g. accounting, HR management, attendance, billing, payroll etc.
- ✓ A mobile app is a piece of software specifically designed to be installed on the handheld smart devices. It runs under the control of Mobile OS.

Solved Questions

- | | |
|---|---|
| 1. What are two main things a computer is made up of? | 2. What is a program? |
| Ans. A computer is made up of two things, hardware and software. | Ans. A program is a set of instructions. |
| | 3. What are the categories of software? |

Ans. Software is a collection of programs and related data which provides the instructions to a computer, what to do and how to do.	the users. For example, creating an animation file in Flash.
4. What are the types of computer languages?	9. What are the categories of application software?
Ans. Machine language, Assembly language, Third level languages, Fourth level languages and Fifth level languages.	Ans. General-purpose application software and specific purpose application software.
5. What are the types of software?	10. What are utilities programs?
Ans. System Software, Application Software, and Utility Software.	Ans. These are the programs to help the end-user and tune the computer hardware/Software, Operating System or application software. For example, Disc Management, data backup, compression, Disc fragmentation, and anti-virus software.
6. What is the use of system software?	11. What is encryption?
Ans. System software operates and controls the internal functioning of a computer. For example, formatting of a storage medium.	Ans. Encryption is the conversion of data into coded form using some special algorithms, called a cipher text that it cannot be easily understood by unauthorized people.
7. What are the types of system software?	12. What is decryption?
Ans. Operating System, Device Drivers and Language translators (Compiler, Interpreters and Assemblers).	Ans. Decryption is the process of converting encrypted data back into its original form (using proper algorithms), so that it can be understood by receiver.
8. What is the use of application software?	
Ans. Application software is any program designed to perform a specific function for	

Work Out Time

A. Choose the correct answer.

- A computer software is a set of
 - Program
 - Device
 - Research
 - None of these
- Managing storage space is the responsibility of _____ software?
 - System
 - Application
 - Utility
 - None of these
- Which of the following is not an Operating System?
 - Linux
 - UNIX
 - Windows
 - Office
- Which of the following type of Operating System is easy to use?
 - CUI Operating System
 - GUI Operating System
 - None of these
 - All of these

5. Which of the following is an example of application software?
 - a) Quick Heal
 - b) Oracle
 - c) Mac OS
 - d) None of these
6. Which one of the following is used to create multimedia file?
 - a) Quick Time
 - b) Word Perfect
 - c) Maya
 - d) WinZip
7. Which type of software do we use to create electronic sheet of numeric data?
 - a) Open Office- Writer
 - b) Apple Keynote
 - c) Norton Ghost
 - d) MS Excel
8. Which type of software is used to manage a collection of related data?
 - a) Word Processing
 - b) Presentation
 - c) Multimedia
 - d) Databases Management
9. Which of the following is a specific purpose application software?
 - a) HR management
 - b) Compression program
 - c) Word Processor
 - d) All of these
10. Which type of program is used to protect computer from virus?
 - a) Disc Defragmenter
 - b) Encryption Tool
 - c) Data Backup
 - d) Virus Cleaner

B. Short answer type questions.

1. What is a software? Write the categories of software.
2. What is a GUI Operating System? Give some examples.
3. What are the functions of Operating System?
4. What is an application software? Give examples.
5. What is a database?
6. What is the use of disk defragmenter tool?
7. What is an inventory?
8. What is data encryption?

C. Long answer type questions.

1. What is an Operating System? How can we categorise the Operating System on the basis of interface? Give examples.
2. Give differences between general-purpose application software and specific purpose application software.

3. Discuss any three general purpose application softwares.
4. Discuss any three specific purpose application softwares.
5. Define utility software. Explain any two utility softwares.

D. Fill in the blanks.

1. A set of _____ form a computer program.
2. CUI based operating requires the users to interact with it by typing _____.
3. _____ software is used to create, edit and format the documents.
4. Database management software is used to create and manage _____.
5. _____ software is used for reservation of flight, train, hotels etc.
6. _____ software performs the cleaning up process by scanning the computers.
7. The _____ system is used to maintain record of the things purchased for the schools.

E. State true or false.

1. Some common types of software are system software, application software and utility software.
2. System support program is used to manage the operation in computer.
3. GUI Operating System is not better than CUI.
4. Presentation software provides facilities to use formulas and functions to apply on the numeric data.
5. Data backup utility copies the contents from one storage medium to another.
6. Compression program shrinks file so that more disc space is occupied.
7. Utility softwares are used to create animations.
8. Decryption is the process of converting encrypted data back into its original form.

F. Practical/ lab Activity

1. Search various Operating System names and make a list of their names and features.
2. Search various application softwares and list them in the spaces given below. Search minimum

Antivirus Programs	
Photo Editing Programs	
Animation Programs	
Database Programs	
Browser Program	

3. Make a PowerPoint presentation on the topic 'Computer Software'. 10 names of each category.

COMPUTER NETWORKING

4

CHAPTER FOCUSES ON

- ✓ Computer Networks
- ✓ Types of Network (LAN, MAN, WAN and PAN)
- ✓ Networking Technology (Wired and Wireless)
- ✓ Internet
- ✓ Data, Information and Multimedia
- ✓ Cloud Computing

INTRODUCTION

In earlier chapters we studied about individual/standalone computers. Each computer had its own set of hardware and software. In our daily life computers are being used in many fields. In an organization, a number of people work in different departments and need to share information from each other. For example, in a school to print report card of a student, personal details are shared from Administration department and marks are shared from Evaluation department. This sharing of information is possible by connecting them through a network (computer network).

Tip: A 'standalone computer' is the one which is not connected to a network.

In this chapter we will learn about different aspects of computer network.

COMPUTER NETWORK

A computer network is a system for communication among computers and other peripherals that are interconnected together to exchange information and devices. The Information includes the sharing of files, images, and songs and so on from one computer to another.

Advantages of Computer Network

- **Data Sharing:** The data can be easily shared in a network so that other users can access it when it is needed. Sharing and transferring files within networks are very fast. In a standalone environment to share the data, we need flash memory, CD, DVD or other secondary storage to put data into it and copy it to other computer.
- **Hardware Resource Sharing:** We can share/use peripheral/device of other computer on a network. For example, we use printer for printouts, DVD-Writer to burn a CD/DVD of other computer on a network.
- **Software Resource Sharing:** In a client- server environment, software is needed to be installed only on server and they can be used by clients also. It saves because it doesn't need of installation and updating of software on the client computers and eliminates to buy several copies of software for client computers.



- **Communication:** Using a network we can connect with other people on network and exchange phonographs, movies, songs and text using mails. It is very fast and cheap to send mail on the computer network.

Types of Computer Networks

The computer networks can be classified into four major categories. These are:

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

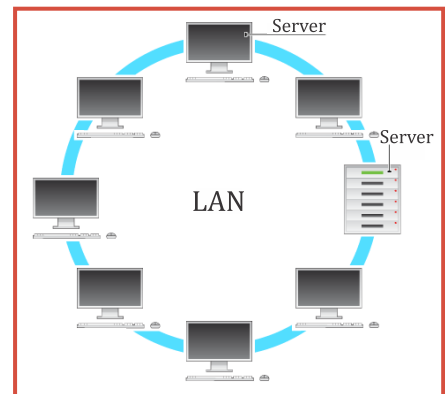
Local Area Network (LAN)

A *Local Area Network (LAN)* is a computer network that covers a small geographic area, such as home, office or any building. They are used within smaller geographic range and have limited telecommunication lines. LANs have higher data transfer rate.

A LAN is useful for sharing resources like files, printers, games or other applications. A LAN in turn often connects to other LANs, and to the Internet or other WAN.

Most local area networks are built with relatively inexpensive hardware (wired media) such as Ethernet/ co-axial cables, network adapters, and hubs.

A LAN can be set up using wireless media (infrared, radio waves) also. If a LAN is set up using unguided media, it is known as WLAN (Wireless LAN).

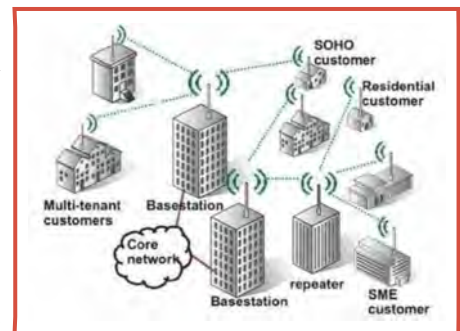


Metropolitan Area Network (MAN)

A *Metropolitan Area Network (MAN)* is a large network that usually spans a city or connects two or more Local Area Networks (LANs) in a city, but does not extend beyond the boundaries of the immediate town, city, or metropolitan area. Data transfer rate in Metropolitan Area Network is little slower than the Local Area Network.

Networks of branches of schools, banks, or government offices etc. spread at different locations in a city are examples of a MAN.

All types of communication media (guided or unguided) are used to set up a MAN.



Wide Area Network (WAN)

A *Wide Area Network (WAN)* is a geographically independent communications network. It covers large geographic area, for example, state or country. A wide area network may be privately owned or rented.

WANs often connect multiple smaller networks, such as local area networks (LANs) or metropolitan area networks (MANs).

Networks of branches of schools, banks, or government offices etc. spread at different locations in different cities or states or countries are the examples of a WAN. Best known example of a WAN is the internet.



Personal Area Network (PAN)

A *personal area network (PAN)* is a computer network used for communication among computer devices (including telephones and personal digital assistants) close to one person. The devices may or may not belong to the person in question. The reach of a PAN is typically a few meters. PANs can be used for communication among the personal devices themselves (intrapersonal communication), or for connecting to a higher level network and the Internet.

Personal area networks may be wired with computer buses such as USB and FireWire. A wireless personal area network (WPAN) can also be made possible with network technologies such as IrDA and Bluetooth.



Data Communication Devices/Network Devices

Modem: Modem is a device that enables a computer to transfer the data through telephone cables. Modem stands for Modulator and Demodulator. The data that a system sends is in the form of digital signals. The telephone cables cannot transmit these digital signals. So the modem changes these digital signals to analog signals that can be transmitted through the telephone cables.

Network Interface Card (NIC)/LAN card: A Network Interface Card (NIC) is a computer hardware device designed to allow computers to communicate over a network. It is also called a network card or network adapter or LAN adapter.

Repeater: A repeater receives a signal and regenerates it. It then transmits the signal at a higher level or higher power onto the other side. So, the signal can cover longer distance without any change.

Hub: A hub is a component that duplicates the information and makes the data available to all systems. A hub has multiple ports. When a data packet arrives at one port, it is copied to other systems.

Bridge: A bridge is a device used to connect two local area networks (LANs) or two segments of the same LAN that use the same protocol. It forwards data depending on the destination address in the data packet.

Switch: A switch is a device used to transmit the data received from several input ports to the specified output port, which in turn sends data to the receiver's system. It identifies the output ports' addresses by using the MAC address in a LAN and by using the IP address in a WAN.

Router: A router is a device used to forward the data packets. It finds a specified path to send data through networks. It can be used to connect a LAN to a LAN, a WAN to a WAN, or a LAN to the Internet.

Tip: Data is transmitted through the center wire, while the outer braided layer serves as a line to ground. Both of these conductors are parallel and share the same axis. This is why the wire is called coaxial.

COMMUNICATION MEDIA

As we know that a network is used to share/ transmit data from one computer to other computers. In a computer network devices are connected through a communication channel which makes it possible to transmit data. We can establish a communication channel using cables/wires or wireless technologies. On the basis of communication channel, networks can be divided into two categories:

- (a) Wired Networks
- (b) Wireless Networks

Wired (guided) networking technology

As the name suggests, in wired or guided network technology signals/data is transmitted from one place to another through a wired/guided/physical media. In other words, this technology uses wires/ cables as communication channel.

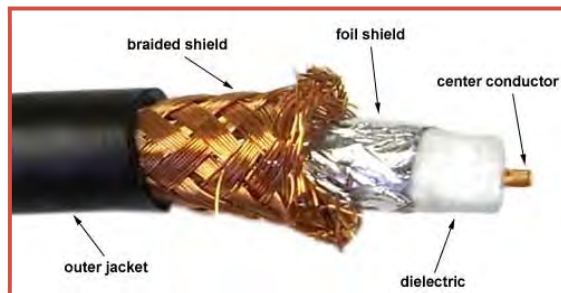
There are various kinds of cables or wires used in wired networking. For example, Ethernet cable, Coaxial cable and Fiber Optic cable.

Co-axial Cable

Coaxial cable is generally used by cable TV companies to transmit TV signal from antenna to TV sets.

It is a type of cable which consists of a center wire surrounded by insulation and then a grounded shield of braided wire the shield minimizes electrical and radio frequency interference). Finally, there is an outer plastic jacket that covers the braided wire. Coaxial cable is the kind of copper cable used by cable TV companies between the community antenna and user homes and businesses.

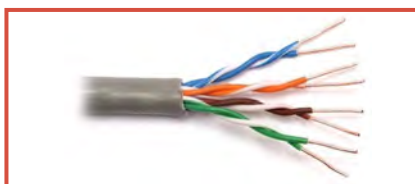
Coaxial cable is sometimes used by telephone companies from their central office to the telephone poles near users. It is also widely installed for use in business and corporation Ethernet and other types of local area network.



Co-axial cable



Shielded cable



Unshielded cable



Connector

Ethernet Cable (Twisted pair cable)

An Ethernet cable is one of the most common forms of network cables used on wired networks. It is used to connect devices like computer system, switches, and modems. Each Ethernet cable, connecting two hardware devices, has an eight pin jack at each end to plug into network/Ethernet port of the devices.

There are two types of twisted pair cable: crossover cable and straight cable.

A crossover cable is used to connect two computer systems together directly while a straight cable is used to connect a computer to a network switch, hub or router in a network.

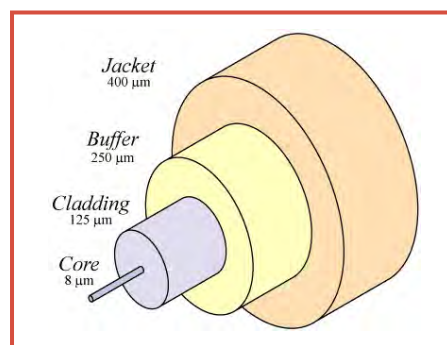


Ethernet cable

Optical Fiber Cable

Optical fiber cable is made up of one or more optical fiber media i.e. thin glass fiber which is coated with a layer of acrylate polymer called cladding which in is turn protected by a Jacket(that surrounds one or more fibers to protect them) .Optical fiber cable transmits data in the form of light pulses.

Generally, optical fiber cable consists of a bundle of glass threads (optical fiber) permits transmission of data over longer distances and at higher bandwidths (data transmission rates) than other forms of communication. It is much thinner and lighter than other metallic wire but expensive to install.



Optical Fibre Cable

Fibers that support many propagation paths or modes are called multi-mode fibers (MMF), while those that only support a single mode are called single-mode fibers (SMF). Multi-mode fibers generally have a wider core diameter, and are used for short-distance communication links and for applications where high power must be transmitted. Single-mode fibers are used for most communication links longer than 1,050 meters (3,440 ft).

Advantages of fiber optical cable

- Lower signal loss
- Data security

High bandwidth (data carrying capacity) over long distance

- Light weight
- Fast data transmission

Disadvantages

- Expensive than other wired media
- Higher installation cost
- Fragility

Wireless (unguided) Networking Technology

Wireless or unguided media uses electromagnetic waves for transmission of data between devices. Wireless technology does not use any physical medium like cable or wire. Depending upon the distance and speed different technologies are used like Bluetooth, Infrared and Wi-Fi for transmission of data between the devices.

Bluetooth

Bluetooth is a technology that uses short-range radio links to connect devices. It uses low powered frequency and can transmit data over short distance typically up to 30 feet (10 meters). Bluetooth devices generally communicate at less than 1 Mbps.

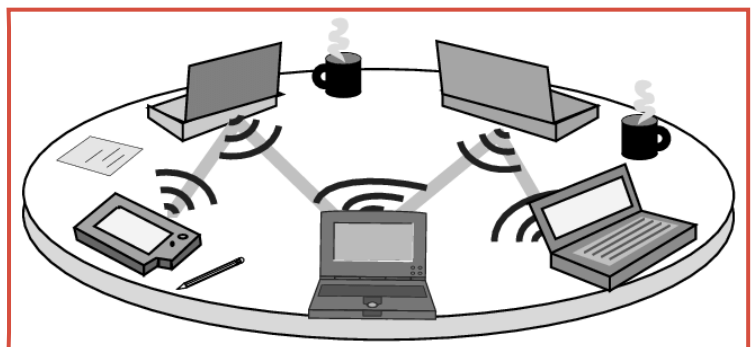
Bluetooth technology is used primarily to support simple wireless networking of personal consumer devices and peripherals, including cell phones, PDAs, wireless headsets and printers.



Infrared

Infrared technology allows computing devices to communicate via short-range wireless signals. With infrared, computers can transfer files and other digital data bidirectional. The infrared transmission technology used in computers is similar to that used in remote control units of TVs, VCRs, CD players and Car Locking systems.

Infrared communications span very short distances. It works for a short range (1m to 5m). Unlike Wi-Fi and Bluetooth technologies, infrared network signals cannot penetrate (come through) walls or other obstructions and work only in the direct 'line of sight.'



Wi-Fi (Wireless Fidelity)

It is the most popular wireless communication technology used for high-speed data transfer connections over a short distance (a few hundred feet).

A Wi-Fi based Local Area Network is also known as WLAN. It also provides wireless broadband internet access to Wi-Fi enabled devices, such as mobiles and laptops.

Wi-Fi provides its users with the liberty of connecting to the Internet from any place such as their home, office, education campus or a public place without the hassles of plugging in the wires. Wi-Fi connections in airports, hotels, bars, coffee shops and more are traditionally called hot spots. Some Wi-Fi hot spots are free and some cost money.



Disadvantages

- Bad weather gives poor signals. One can suffer when you are in dire need of internet connectivity and weather won't allow you to connect.
- If your wireless internet connection is not security-enable, you would suffer in the form of data loss. Spying is a constant threat if computer is not firewall protected.

INTERNET

The Internet, sometimes called 'the Net' is a worldwide network of computer networks, which is accessible to the general public. Internet is such a huge network of different interlinked networks related to the business, academics, government, and other networks, therefore internet is known as the network of networks. Internet is used for various important functions which include the several means of communications like the online chat, file transfer, electronic mail, sharing of data and websites on the www.

ARPANET is commonly thought of as the predecessor to the Internet and created by the US Department of Defenses Advanced Research Projects Agency (ARPA) in 1960s-1970s. The first known fully operational packet-switching network, the ARPANET was designed to facilitate communication between ARPA computer terminals (located at different science and technology research universities in USA) during the early 1960s just after the Russians had climbed the space era with the launch of Sputnik. Later all other universities also joined the network for academic research.



Uses of Internet

Internet has been the most useful technology of the modern times which helps us not only in our daily lives, but also our personal and professional lives developments. The internet provides many things to us.

- **E-mail and Chatting-** You can send and receive instant messages (e-mails) using internet. Various things such as pictures, videos, songs, e-cards can be added along with email messages. Your messages are delivered instantly to people anywhere in the world, unlike traditional mail that takes a lot of time. E-mail is now an essential communication tools in business. It is also excellent way of keeping in touch with family and friends. The advantages to email is that it is free (no charge per use) when compared to telephone, fax and postal services. We can chat with our friends using 'chat room' and stay in touch with the friends.
- **News and Information-** The internet provides facility to read different newspapers online and get the information regarding various topics of our interest such as science, technology, sports, education etc. It also keeps us updated on current events. The Internet is a virtual treasure trove of information. Any kind of information on any topic under the sun is available on the Internet. The 'search engines' on the Internet can help you to find data on any subject that you need.

- **Services-** Many services are now provided on the internet such as online banking, job seeking and applications, and hotel reservations, railway and air tickets booking etc. Often these services are not available off-line or cost more.
- **Online Shopping-** The internet is a very effective way to buy and sell products all over the world. Along with getting information on the Internet, you can also shop online. There are many online stores and sites that can be used to look for products as well as buy them using your credit card. You do not need to leave your house and can do all your shopping from the convenience of your home.
- **Communities-** Communities of all types have sprung up on the internet. It's a great way to meet up with people of similar interest and discuss common issues.
- **Software Downloading-** You can download free games, videos, software, educational information and music from internet.

Basic Requirements for an Internet Connection

To connect your computer to the Internet, you need the following things:

- A Computer
- A Modem and Network Interface Card
- An account with Internet Service Provider
- An Internet Connection
- An Internet Browser

Interspace

Information sharing has always been one of the Internet's most popular functions. Within the next decade, computer technology will transfer the internet into the *Interspace*.

Using technologies that go beyond searching individual repositories to analyzing and correlating knowledge across multiple sources and subjects, the Interspace will offer distributed services to transfer concepts across domains.

Content Technology

Data

Data is a collection of raw facts (unprocessed data) that does not have meaning of itself. Data can be in the form of numbers, symbols, characters, words, images and measurements.

Data can be qualitative (it describes something) or quantitative (numbers) e.g. Name, Address, Age, Weight, Complex etc.

Let us consider the following data:

Saumya, G.T.B. Nagar, 5 years, 18 KG, Fair

The above data has no significance. You cannot take decision using this data. It is needed to be processed and combined in a meaningful manner.

Information

When data is processed, organized in some way in order to refine and present in a specific context becomes useful and called information. Information is nothing but the processed form of data which is meaningful to the individual who receives it. Let us consider the data discussed in previous section. Arrange it in the following way:

Name : Saumya

Weight: 18 kg

Address: G.T.B. Nagar

Complexion: Fair

Age: 5 years

Let us present the above data as shown below:

Saumya is a 5 years old girl.

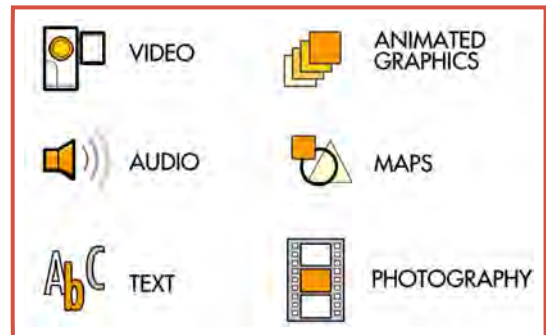
She is 18 kg in weight and fair complexion.

She lives at G.T.B Nagar.

The above data gives details of a girl named Saumya. This data has become meaningful and called information.

MULTIMEDIA

Multimedia is media and content that utilises a combination of different content forms. The term can be used as a noun (a medium with multiple content forms) or as an adjective describing a medium as having multiple content forms. The term is used in contrast to media which only utilise traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video and interactivity content forms.



Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerised and electronic devices, but can also be part of a live performance. Multimedia (as an adjective) also describes electronic media devices used to store and experience multimedia content. Multimedia is similar to traditional mixed media in fine art, but with a broader scope. The term "rich media" is synonymous with interactive multimedia. Hypermedia can be considered one particular multimedia application.

Modalities of Multimedia

Multimedia involves multiple modalities of text, audio, images, drawings, animation and video.

Examples of how these modalities are put to use:

1. Video teleconferencing.
2. Distributed lectures for higher education.
3. Tele-medicine.
4. Cooperative work environments.
5. Searching in (very) large video and image databases for target visual objects.
6. Augmented reality: placing real-appearing computer graphics and video objects into scenes.
7. Including audio cues from where video-conference participants are located.
8. Building searchable features into new video, enabling very high to very low-bit-rate use of new and scalable multimedia products.
9. Making multimedia components editable.
10. Building "inverse-Hollywood" applications that can recreate the process by which a video was made.
11. Using voice-recognition to build an interactive environment, say a kitchen-wall web browser.

Categorisation of Multimedia

Multimedia may be broadly divided into linear and non-linear categories.

- Linear active content progresses without any navigation control for the viewer such as a cinema presentation.
- Non-linear content offers user interactivity to control progress as used with a computer game or used in self-paced computer-based training. Hypermedia is an example of non-linear content.

Multimedia presentations can be live or recorded. A recorded presentation may allow interactivity via a navigation system. A live multimedia presentation may allow interactivity via an interaction with the presenter or performer.

Multimedia represents the convergence of text, pictures, video and sound into a single form. The power of multimedia and the Internet lies in the way in which information is linked.

Applications of Multimedia

Multimedia finds its application in various areas including, but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathematics, business, scientific research and spatial temporal applications. Below are the several examples as follows:

Creative Industries

Creative industries use multimedia for a variety of purposes ranging from fine arts, to entertainment, to commercial art, to journalism, to media and software services provided for any of the industries listed below.

Commercial: Exciting presentations are used to grab and keep attention in advertising. Industrial, business to business, and interoffice communications are often developed by creative services firms for advanced multimedia presentations beyond simple slide shows to sell ideas or liven-up training.

Entertainment and Fine Arts : Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations. Multimedia games are a popular pastime and are software programs available either as CD-ROMs or online. Some video games also use multimedia features.

Multimedia applications that allow users to actively participate instead of just sitting by as passive recipients of information are called Interactive Multimedia.

Education: In Education, multimedia is used to produce computer-based training courses (popularly called CBTs) and reference books like encyclopaedia and almanacs.

Engineering: Software engineers may use multimedia in Computer Simulations for anything from entertainment to training such as military or industrial training.

Industry: In the Industrial sector, multimedia is used as a way to help present information to shareholders, superiors and co-workers.

Mathematical and Scientific Research: In Mathematical and Scientific Research, multimedia are mainly used for modelling and simulation.

Medicine: In Medicine, doctors can get trained by looking at a virtual surgery or they can simulate how the human body is affected by diseases spread by viruses and bacteria and then develop techniques to prevent it.

Components of Multimedia

Now, let us consider the components (Hardware and Software) required for a multimedia system:

Capture Devices: Video Camera, Video Recorder, Audio Microphone, Keyboards, Mice, Graphics tablets, 3D input devices.

Storage Devices: Hard disks, CD-ROMs, Jaz/Zip drives, DVD, etc.

Communication Networks: Ethernet, Intranets, Internets.

Computer Systems: Multimedia Desktop machines, Workstations.

Display Devices: CD-quality Speakers, HDTY, Hi-Res Monitors, Color Printers, etc.

Picture/Image Files

Picture files have specific file extensions. A picture file extension stands for the format of the picture or the standard that was used to make the computer readable picture. The file extension also tells you what kind of software you need to view the picture.

Pixel

In digital imaging, a pixel (picture element) is the smallest piece of information in an image. Pixels are normally arranged in a regular 2-dimensional grid, and are often represented using dots, squares or rectangles. Each pixel is a sample of an original image, where more samples typically provide a more accurate representation of the original. The intensity of each pixel is variable; in color systems, each pixel has typically three or four components such as red, green, and blue, or cyan, magenta, yellow and black.

CODEC

A codec is a device or program capable of encoding and/or decoding a digital data stream or signal. The word codec may be a combination of any of the following: 'compress or decompressor', 'coder-decoder', or 'compression/decompression algorithm'. Compression Quality

- **Lossy Codecs:** Many of the more popular codecs in the software world are lossy, meaning that they reduce quality by some amount in order to achieve compression.
- **Lossless Codecs:** There are also many lossless codecs which are typically used for archiving data in a compressed form while retaining all of the information present in the original stream.

Bitmap

In computer graphics, a bitmap or pixmap is a type of memory organisation or image file format used to store digital images. The term bitmap comes from the computer programming terminology, meaning just a map of bits. In some contexts, the term bitmap implies one bit per pixel, while pixmap is used for images with multiple bits per pixel.

Raster Formats

These formats store images as bitmaps (also known as pixmaps). Raster image formats (RIFs) should be the most familiar to Internet users. A Raster format breaks the image into a series of colored dots called pixels. The number of ones and zeros (bits) used to create each pixel denotes the depth of color you can put into your images.

The three main Internet formats, GIF, JPEG and Bitmap are all Raster formats.

GIF

GIF stands for Graphic Interchange Format and it is a standard format for images that was developed by CompuServe to be a device-independent method of storing pictures. GIF allows high-quality, high resolution graphics to be displayed on a variety of graphics hardware and is intended as an exchange and display mechanism for graphic images.

GIF is reasonably well matched to inexpensive computer displays, since it can only store 8 bits/pixel (256 or fewer colors) and most old PCs cannot display more than 256 distinct colors at once. GIF does well on images with only a few distinct colors, such as line drawings and simple cartoons. A GIF picture file has an extension .gif.

- **Animated GIF:** An animated GIF contains several frames, i.e. a sequence of GIF images, and can be set up to display the images one after another or in a loop, so you can see the images moving. An animated GIF picture has the same file extension .gif as a still GIF picture.
- **Transparent GIF:** A Transparent GIF is a GIF image with a transparent background. A Transparent GIF file has the same file extension .gif as a regular GIF format.

JPEG

JPEG is a standardised image compression mechanism. JPEG stands for Joint Photographic Experts Group, the original name of the committee that wrote the standard. JPEG is designed for compressing either full-color or gray-scale images of natural, real-world scenes. It works well on photographs, naturalistic artwork and similar material; not so well on lettering, simple cartoons or line drawings.

JPEG stores full color information-24 bits/pixel (16 million colors). Therefore, with full-color hardware, JPEG images look much better than GIFs on such hardware. JPEG files are much smaller than GIF. Therefore, they are superior to GIF in terms of disk space saving and transmission time. A JPEG picture file has an extension .jpg, .jpeg, .jfif.

TIFF

Tagged Image File Format (abbreviated TIFF) is a file format for storing images, including photographs and line art. TIFF format is widely supported by image-manipulation applications, by publishing and page layout applications, by scanning, faxing, word processing, optical character recognition and other applications.

For really high quality images, TIFFs are used, but cannot be viewed through a browser.

PNG

PNG stands for Portable Network Graphics. One version of the format, PNG-8, is similar to the GIF format. It can be saved with a maximum of 256 colors and supports 1-bit transparency. File sizes will be noticeably smaller than the GIF counterpart, as PNGs save their color data more efficiently.

PNG-24 is another flavour of PNG, with 24-bit color support, allowing ranges of color akin to a high color JPG. PNG-24 is in no way a replacement format for JPG. However, because it is a loss-less compression format. This means that file sizes can be rather big against a comparable JPG.

BMP

BMP files are Windows Bitmap files. They are usually 8-bit color images (256 colors) and can be viewed by many programs including Windows Paintbrush. BMP files can be used as backgrounds for the Windows desktop.

PCX

A PCX is a Zsoft paint file. PCXs are openable by Windows Paintbrush.

Image File Formats to Use

Briefly, the three most common image file formats, the most important for general purposes today, are TIF, JPG and GIF and the new PNG format too.

Web pages require JPG or GIF or PNG image types, because that is all that browsers can show. On the web, JPG is the best choice (smallest file) for photo images, and GIF is most common for graphic images.

Other than the web, TIF file format is the undisputed leader when best quality is required, and TIF is very common in commercial printing or professional environments. High Quality JPG can be pretty good too, but do not ruin them by making them too small. Try to make them large instead.

Vector Formats

As opposed to the raster image formats above (where the data describes the characteristics of each individual pixel), vector image formats contain a geometric description which can be rendered smoothly at any desired display size.

- **ODG:** ODG (Open Document Graphics) is an open standard.
- **WMF:** Windows Metafile (WMF) is a graphics file format on Microsoft Windows systems.
- **PDF:** PDF stands for Portable Document Format and is created by Adobe Acrobat.
- **SWF:** The file format SWF (Shockwave Flash pronounced swift) is small enough for publication on the web.

Audio Formats

An audio file format is a container format for storing audio data on a computer system.

The general approach towards storing digital audio is to sample the audio voltage which, on playback, would correspond to a certain position of the membrane in a speaker of the individual channels with a certain resolution - the number of bits per sample - in regular intervals (forming the sample rate). This data can then be stored uncompressed, or compressed to reduce the file size.

Types of Formats

It is important to distinguish between a file format and a codec. A codec performs the encoding and decoding of the raw audio data while the data itself is stored in a file with a specific audio file format. Though most audio file formats support only one audio codec, a file format may support multiple codecs, as AVI does.

There are three major groups of audio file formats:

- Uncompressed audio formats, such as WAV.
- Formats with lossless compression, such as Apple Lossless and Lossless Windows Media Audio (WMA).
- Formats with lossy compression, such as MP3, Vorbis, Lossy Windows Media Audio (WMA) and AAC.

Pulse Code Modulation

Pulse code modulation (PCM) is the standard form for digital audio in computers and the compact disc format. It is also standard in digital video.

Open File Formats

- **wav:** Standard audio file format used mainly in Windows PCs.
- **mp3:** The MPEG Layer-3 format is the most popular format for downloading and storing music.
- **ogg:** A free, open source container format supporting a variety of codecs, the most popular of which is the audio codec vorbis.

Proprietary Formats

- **wma:** The popular Windows Media Audio format owned by Microsoft.
- **aac:** The Advanced Audio Coding format is based on the MPEG4 audio standard owned by Dolby.

Video Codecs

A variety of codecs can be implemented with relative ease on PCs and in consumer electronics equipment. Some widely-used video codecs are listed below, starting with a chronological order list of the ones specified in international standards.

- **H.261:** Used primarily in older video conferencing and video telephony products.

- **MPEG-1 Part 2:** Used for Video CDs, and also sometimes for online video. Includes the *.mp3 standard. Almost every computer in the world can play this codec and very few DVD players do not support it.
- **MPEG-2 Part 2 (a common-text standard with H.262):** Used on DVD and in another form for SVCD and used in most digital video broadcasting and cable distribution systems.
- **H.263:** Used primarily for video conferencing, video telephony and internet video.
- **MPEG-4 Part 2:** An MPEG standard that can be used for internet, broadcast and on storage media. It offers improved quality relative to MPEG-2 and the first version of H.263. MPEG-4 Part 10 (a technically aligned standard with H.264 and often also referred to as AVC). This new standard has been adopted into HD-DVD/Blu-Ray.
- **WMV (Windows Media Video):** Microsoft's family of video codec designs including WMV 7, WMV 8, and WMV 9. It can do anything from low resolution video for dial up internet users to HDTV. Files can be burnt to CD and DVD or output to any number of devices.

ANIMATION

Animation is the rapid display of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement. It is an optical illusion of motion due to the phenomenon of persistence of vision, and can be created and demonstrated in a number of ways. The most common method of presenting animation is as a motion picture or video program, although several other forms of presenting animation also exist.

2D and 3D Animation

2D animation, true to its name, is rendered in a two-dimensional space. 3D animation, however, is rendered in a virtual three-dimensional space, using polygons captured by various virtual "cameras" to "film" the animation. 3D animation has a variety of applications, from video games to animated films. Most commonly, 3D animation is used to render many of the special effects seen in live-action films, removing the need for scale model sets or staged stunts.

While both types of computer animation can be accomplished by either frame-by-frame animation or by mathematical interpolation between key frames, the initial steps prior to animating are drastically different; the two separate processes also require different software packages.

CLOUD COMPUTING

Cloud computing is a technology that uses the Internet to access and maintain data and applications. It allows us to create, configure and customize the application online.

The term cloud refers to a Network or Internet. Cloud computing provides facilities to the user to store and access the data, as The concept of cloud computing came into existence in the year 1950. application. The goal of cloud computing is to provide easy access of resources.

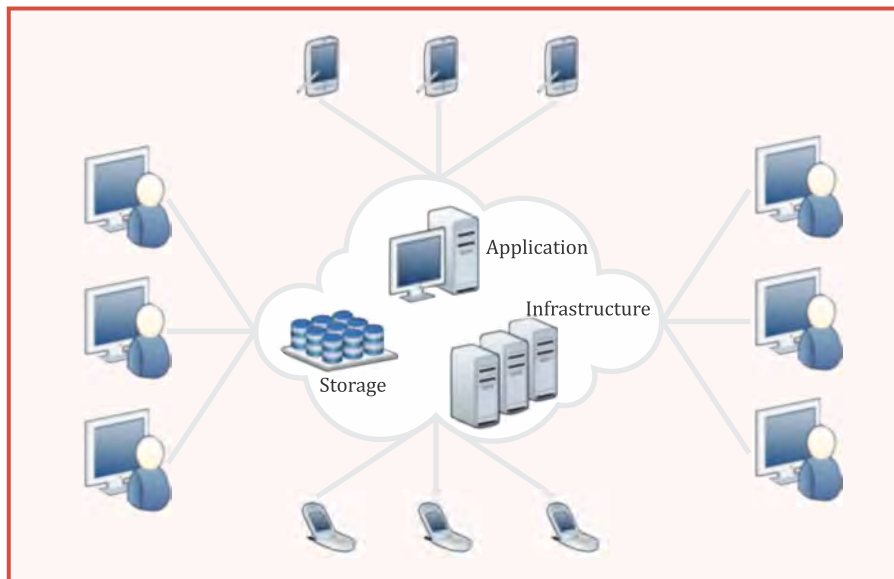
Tip: A 'standalone computer' is the one which is not connected to a network.

Characteristics of Cloud Computing

- **On demand self service:** Computer services such as email, applications, network or server, service can be provided without requiring human intervention with each service provider. Cloud service providers providing on demand self services include Amazon Web Services (AWS), Microsoft, Google, IBM and Salesforce.com. New York Times and NASDAQ are examples of companies using AWS (NIST). Gartner described this characteristic as service based.
- **Ubiquitous access:** Ubiquitous access represents the ability for a cloud service to be widely accessible. Establishing ubiquitous access for a cloud service can require support for a range of devices, transport

protocols, interfaces and security technologies. To enable this level of access generally requires that the cloud service architecture be tailored to the particular needs of different cloud service consumers.

- **Measured usage:** The measured usage characteristic represents the ability of a cloud platform to keep track of the usage of its IT resources, primarily by cloud consumers. Based on what is measured, the cloud provider can charge a cloud consumer only for the IT resources actually used and/or for the timeframe during which access to the IT resources was granted. Measured usage is not limited to tracking the statistics for billing purposes. It also covers the general monitoring of IT resources and related usage reporting (for both cloud provider and cloud consumers). Therefore, measured usage is also relevant to clouds that do not charge for usage.
- **Sharing of data:** Data and applications stored using cloud computing can be shared and accessed with other people.



Structure of Components in cloud computing

Types of Clouds

There are four types of clouds available as given below:

Public Cloud

In this type of cloud, data and information are easily accessible to general public over Internet.

Private Cloud

In this type of cloud, data and information are accessible by a single organization. It is more secure and reliable because of its private nature.

Community Cloud

In this type of cloud, data and services are accessible to a group of organizations or communities having common concerns.

Hybrid Cloud

This type of cloud is a combination of two (public or private) clouds. Services are accessible according to the level of complexity. Complex activities are performed using private cloud while non- complex activities are performed using public cloud.

Public Cloud	Private Cloud
Hybrid Cloud	Community Cloud

Types of clouds

Cost Efficient

Cloud computing is probably the most cost efficient method to use, maintain and upgrade. Traditional desktop software costs companies a lot in terms of finance. Adding up the licensing fees for multiple users can prove to be very expensive for the establishment concerned. The cloud, on the other hand, is available at much cheaper rates and hence, can significantly lower the company's IT expenses.

Almost Unlimited Storage

Storing information in the cloud gives you almost unlimited storage capacity. Hence, there no is need to worry about running out of storage space or increasing your current storage space availability.

Backup and Recovery

Since all your data is stored in the cloud, backing it up and restoring the same is relatively much easier than storing the same on a physical device. Furthermore, most cloud service providers are usually competent enough to handle recovery of information. Hence, this makes the entire process of backup and recovery much simpler than other traditional methods of data storage.

Automatic Software Integration

In the cloud, software integration is usually something that occurs automatically. This means that you do not need to take additional efforts to customise and integrate your applications as per your preferences. This aspect usually takes care of itself. Not only that, cloud computing allows you to customize your options with great ease. Hence, you can handpick just those services and software applications that you think will best suit your particular need.

Easy access to Information

Once you register yourself in the cloud, you can access the information from anywhere, where there is an Internet connection. This convenient feature lets you move beyond time zone and geographic location issues.

On-demand Self-service

Cloud computing provides on-demand self-service anytime and at anywhere with the use of Internet connection.

Disadvantages of cloud computing

Everything in this world had its own pros and cons. Although cloud computing is one of the promising innovation with various advantages in the world of computing, but it comes with a few risk factors. Some of the disadvantages of cloud computing are discussed below:

Security and Privacy Concern

It is one of the biggest concern about cloud computing. Since, data management and infrastructure management are provided by Cloud Service Providers (CSPs), it is of high risk to handover sensitive data to them. The personnel using cloud computing service ensures highly secured password, so never communicate your password with anyone to avoid security breach.

Lock In

Since it is very difficult to switch from one Cloud Service Provider to another, so personnel depends on a particular CSP for service.

Glossary

LAN	:	Local Area Network
WLAN	:	Wireless LAN
MAN	:	Metropolitan Area Network
MODEM	:	MOdulator DEModulator
NIC	:	Network Interface Card
Wi-Fi	:	Wireless Fidelity
ARPANET	:	Advanced Research Projects Agency Network
Multimedia	:	Interactive combination of text, animation, audio and video.
Cloud	:	Internet based ecosystem for online access to data, applications and storage.

You have learned

- ✓ A computer network is a system for communication among computers that are connected together to exchange information.
- ✓ Computer Network allows the sharing of files, folders, hardware and software devices etc.
- ✓ A Local Area Network (LAN) is a computer network that covers a small geographic area.
- ✓ A Metropolitan Area Network (MAN) is a large network that usually spans a city.
- ✓ A Wide Area Network (WAN) is a geographically independent communication network.
- ✓ A personal area network (PAN) is used for communication among computer devices close to a person.
- ✓ On the basis of communication channel, networks can be divided into two categories: wired networks and wireless networks.
- ✓ Various kinds of cables or wires used in wired networking are Ethernet cable, Coaxial cable and Fiber Optic cable.
- ✓ Different technologies used in wireless networking are Bluetooth, Infrared and Wi-Fi.
- ✓ The Internet, sometimes called 'the Net' is a worldwide network of computer networks.
- ✓ Data is a collection of raw facts (unprocessed data) that does not have meaning of itself. When data is processed, organized in some way in order to refine and present in a specific context becomes useful and called *information*.
- ✓ Multimedia means medium of communication that uses multiple forms of media such as text, audio, images, video, animation and interactivity.
- ✓ Cloud computing is a technology that uses the Internet to access and maintain data and applications. There are 4 types of cloud – public, private, community and hybrid.

Solved Questions

1. What is a computer network?

Ans. A computer network, often referred to as a network, is a system for communication among computers and other peripherals that are interconnected together to exchange information and devices.

2. What are the four main categories of computer network?

Ans. (i) LAN (ii) MAN (iii) WAN (iv) PAN

3. In your school computer room LAN is required. Which type of cable will be needed for cost effective wired network?

Ans. Ethernet cable

4. At your home, you have a cable TV connection. Which type of wire is used by your cable TV operator?

Ans. Co-axial cable

5. Which type of cable is being used for high bandwidth data transmission over long distance?

Ans. Optical fiber cable.

6. Which wireless technology is being used for data transfer between mobile to mobile now a days?

Ans. Bluetooth technology.

7. At your home you must have used remote to use TV. Which technology is used in these devices?

Ans. Infrared technology.

8. Write about Wi-Fi technology.

Ans. It is the most popular wireless communication technology used for high-speed data transfer connections over a short distance (a few hundred feet) such as office, hotels, malls etc.

9. What is Internet?

Ans. The Internet, sometimes called 'the Net' is a worldwide network of computer networks, which is accessible to the general public. Internet is such a huge network of different interlinked networks related to the business, academics, government, and other networks, therefore internet is known as the network of networks.

10. What are basic requirements for an Internet connection?

Ans. (i) A Computer.
(ii) A Modem and Network Interface Card.
(iii) An account with Internet Service Provider.
(iv) An Internet Connection.
(v) An Internet Browser.

11. What are the uses of Internet?

Ans. (i) Email and Chatting
(ii) News and Information
(iii) Online Shopping

(iv) Communities (Social Networking)

(v) Software Downloading

12. What is data?

Ans. Data is a collection of raw facts (unprocessed data) that does not have meaning of itself. Data can be in the form of numbers, symbols, characters, words, images and measurements.

13. What is information?

Ans. Information is nothing but the processed form of data which is meaningful to the individual who receives it.

14. What is multimedia?

Ans. It is the media or medium of communication that uses multiple forms of media such as text, audio, images, video, animation and interactivity.

15. What Are some common applications of multimedia?

Ans. Multimedia has a variety of applications in different industries. Some common fields are entertainment in the form of musical videos, movies and animation series; education – computer based teaching, interactive courses, immersive training, learning through virtual reality, educational videos, assessments, digital content; scientific research and medical fields use multimedia for 3D designs of products and medicines, multimedia based communication and information sharing.

16. What is cloud computing? What are its benefits?

Ans. When we access data and applications over Internet along with its online storage then it is called cloud computing. Cloud computing is cost effective because you have to pay only for the services used not for entire package. Cloud computing provides easier and flexible access from anywhere since all the data is stored on dedicated storage servers and applications are accessed online. It enhances productivity of the businesses since they do not have to bother about maintaining infrastructure required for using applications and data.

Work Out Time

A. Choose the correct answer.

- Computer network is a system of
a) Computer b) Communication c) Networks d) All of these
- Which of the following are the advantages of computer network?
a) Communication b) Hardware resource sharing
c) Data Sharing d) All of these
- Which of the following networks is used to connect the computer across the countries?
a) LAN b) MAN c) WAN d) None of these
- Which of the following is not a data communication device?
a) Modem b) Hub c) Monitor d) Switch
- Co-axial cable is used to:
a) Transmit TV signals from antenna to TV sets b) Create a LAN
c) Both (a) and (b) d) None of (a) and (b)
- _____ is used for cross countries high speed data transmission.
a) Co-axial cable b) Ethernet cable
c) Optical Fiber cable d) Wi-Fi
- _____ is used to connect a computer to a network.
a) Co-axial cable b) Crossover Ethernet cable
c) Optical Fiber cable d) Straight Ethernet cable
- _____ is used for connecting to internet without wires at a college campus.
a) Bluetooth b) Infrared c) Wi-Fi d) All of these
- _____ is known as predecessor to the internet.
a) EDUNET b) Telnet c) USENET d) ARPANET
- _____ is used to convert analog signals to digital signals and vice-versa.
a) Modem b) Hub c) Bridge d) Router
- _____ technology cannot penetrate obstructions between two communicating devices.
a) Bluetooth b) Infrared c) Wi-Fi d) None of these
- _____ is a collection of raw facts.
a) Knowledge b) Information c) Data d) None of these
- _____ is a medium of communication that uses multiple forms of media.
a) Multimedia b) Modem
c) Optical Fiber Cable d) None of these
- The reach of _____ is usually a few meters.
a) LAN b) WAN c) PAN d) MAN
- Anywhere, anytime, on-demand access to data and applications is possible through _____.
a) Internet b) Cloud c) Both a) and b) d) WAN

B. Short answer type questions.

- Write the use of Modem.

2. Write a short note on Communication Media.
3. What is the use of Ethernet cable?
4. What is Bluetooth?
5. Write about Infrared technology. Also write its disadvantages.
6. What is Interspace?
7. How is PAN different from Internet?
8. How is cloud cost effective for businesses?

C. Long answer type questions.

1. Write the advantages of computer network.
2. Define the following
 - a) Local Area Network (LAN)
 - b) Metropolitan Area Network (MAN)
 - c) Wide Area Network (WAN)
3. Define network devices with their uses.
4. Differentiate between,
 - a) Wired networking technology and Wireless networking technology
 - b) Co-axial cable and Ethernet cable
 - c) Bluetooth and Wi-Fi
 - d) Data and Information
5. Write about Optical Fiber cable. Also write its advantages and disadvantages.
6. Explain the uses of internet.
7. Define the term Multimedia.
8. Discuss 2 broad categories of multimedia.
9. Briefly discuss some common image, audio and video file formats/codecs.
10. Briefly discuss the benefits of cloud computing.

D. Match the following.

Column-A

1. Co-axial cable
2. Bluetooth
3. Optical Fiber cable
4. Ethernet cable
5. Infrared
6. Wi-Fi

Column-B

- a. WLAN
- b. Remote Control Unit
- c. Short range radio links
- d. Cable TV signals
- e. High bandwidth
- f. Twisted pair

E. Fill in the blanks.

1. A _____ is a computer network that covers a small geographic area.
2. A _____ is a geographically independent communication network.
3. A _____ allow computers to communicate over a network.
4. In Co-axial cable data is transmitted through the _____.

5. A _____ is used to connect two computer systems together directly.
6. Blue tooth devices can transmit data over short distance typically up to _____.
7. _____ work only in the direct 'line of sight'.
8. Wi-Fi connections in airports, hotels, bars, coffee shops are traditionally called _____.
9. The reach of PAN is a few _____.
10. _____ and _____ are the technologies that make a WPAN.
11. A _____ is a device or program that encodes and/or decodes a digital data stream or signal.
12. _____ images are smoother than bitmaps.
13. Measured usage is a characteristic of _____.
14. A _____ cloud is a combination of public and private clouds where access to resources is based on level of _____.
15. The two prime disadvantages of cloud computing are _____ and _____.

F. State true or false.

1. All types of communication media (guided or unguided) are used to set up a MAN.
2. A switch is a device used to connect two local area networks (LANs).
3. Parallel Ethernet cable is used to connect a computer to a network switch, hub in a network.
4. Bluetooth devices generally communicate at less than 1 Mbps.
5. Bad weather does not affect signals in WLAN.
6. The Internet, sometimes called 'the Net'.
7. Free games and educational information can be downloaded from internet.
8. Interspace will offer better searching services on internet.
9. Due to its shorter span, there is no need for a PAN to be wireless.
10. One salient feature of multimedia is that it is interactive.
11. Pixel is the smallest piece of information in an image.
12. Cloud computing adds to the overhead expenses to the business.

G. Practical/Lab Activity

1. Try to find out that which category of network is followed in your lab.
2. Make a complete analysis of all types of network.
3. Find the type of internet connection being used at your home and school. Also note the type of media used for it.
4. Take help of your teacher/friend and try to use internet through,

a) Broadband line	b) Internet Data Card
c) Mobile modem with your PC	d) Wi-Fi
5. Take help of your teacher and find out free educational software on internet, download and use them.
6. Collect information about Internet Service Provider companies in India.

CYBER – SAFETY

5

CHAPTER FOCUSES ON

- ✓ Cyber Safety, Cyber Threats, Cyber Crime and Cyber Literacy.
- ✓ Various cyber threats and protection against them.
- ✓ Online Predators, Cyber Bullying and Cell Phone Protection

INTRODUCTION

Cyber-safety generally refers to a set of discipline, measures and actions taken to protect personal information and your computer from attacks. It also involves the practice to respect others' information privacy and not to indulge knowingly in divulging any information not meant for unauthorized entities.

The threats of viruses and malware are there since the dawn of computing. Exponential growth of Internet and its convenient accessibility has made the security and sanctity of information on computer systems and networks vulnerable to unauthorized threats like hackers bringing down websites, stealing sensitive information and committing fraud and extortion.

Unauthorised access to one's information online and exploiting it to bully, commit fraud and extortion is called cybercrime.

Considering the size, span, variety of technologies and devices, fighting and preventing cybercrime is a challenge. Policies, regulations, strategies and implementations of practices, discipline and technology to prevent or fight cybercrime is called cybersecurity.

Besides technological defence, cybersecurity also concerns people. Home user, professionals, students, industries and government, everyone needs to have a fundamental understanding of cybercrime, online threats and their preventive and countermeasures. Knowing the threat and what to do once it occurs is the important part of digital literacy.

HOW WE ARE TRACKED WHILE BROWSING THE WEB?

Staying anonymous online is a requirement today for several reasons. Avoiding targeted ads for items searched earlier, undesired popups that compel you to click on them, undesired unidentified links, unsolicited surveys and quizzes, articles seeking charities and donations, unwanted requests for subscription are some common examples. As a matter of fact, our presence and browsing habit is tracked in many ways by various websites.

IP Address

This is the most basic way of identifying a user's device. IP address is a unique identification allocated to each device over a network. In turn, IP address of user's device identifies that user on the Internet. A website can determine rough geographical location of the user from the IP address.

HTTP Referer

When user visits a website by clicking a link in another website then browser forwards that website name to the other one user has just visited. Such information is found in the HTTP Referer header sent by the browser.

While loading content of a web page web browser forwards information to tracking websites about the webpage visited by the user.

Tiny, one-by-one pixel, invisible images called web bugs use HTTP Refererto track the user without appearing on a web page. They also track emails opened if email message contains images.

Cookies

Cookies or HTTP cookies is the most traditional and common way to track information about us such as website visiting time, duration and frequency, products added in the shopping cart while online shopping, data entered into form-fields like name, address, and passwords etc. Later, on next visit of the user such information is extracted from the cookies created during last visit on user's computer.

Cookies are stored as small piece of information usually in plain text form. Cookies can be "first party" or "third party" by type. First party cookies are set by the first website a user is directly visiting, while third party cookies are set by those websites that are visited by the user switching from the first website either by clicking on a link, popup or advertisement or any such alluring offer.

Zombie cookie or Super cookie: A zombie cookie is recreated even after deletion. These cookies are stored in different backup places outside the web browser which makes them difficult to remove.

Fingerprinting

Techniques using fingerprinting tracking are done without storing cookies on user's device. Here, a user, device or combination is identified by the information that user reveals unsuspectingly. Fingerprinting can be done in two ways:

Passive fingerprinting: In this technique, website visited by the user observes user's browsing, the links and choices clicked and from that, create a unique identifier for the user-device combination. With this fingerprint, tracking websites follow users for longer periods of time.

Active fingerprinting: In addition to passive fingerprinting, websites send some queries to the user's computer without user being aware about them and some of the information like name and version of the operating system and browser, fonts etc. is collected.

User History Tracking

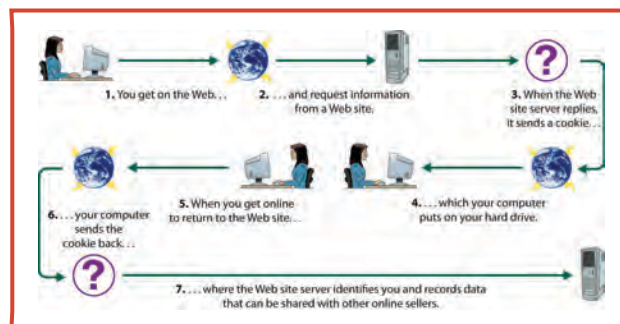
History tracking is a process to learn about websites and links visited by the user in past. This is done by checking link styling as visited link and non-visited links are displayed in different colors. This information is useful for a website in knowing if user had visited a competitor's website. Online sales promotion and marketing firms apply these methods a lot.

Online Advertising

Online advertising or online marketing or web advertising is a mean to convey promotional marketing messages to the users. Such advertising is more of a distraction with little benefits. Various forms of online advertising involve email marketing, marketing through search engines, promotions on social platforms, display advertising, pop-ups, banner and mobile advertising. The kind of advertisements and banners clicked by the users tell a great deal about their interests to the online marketing firms.

Analytics

Today, websites analyse online data traffic with the help of third-party analytics services like Google Analytics. The data traffic is analysed by the analytics engine and a detailed browsing profile of the user is created and updated regularly which helps online businesses to identify their potential customers and retaining their existing customers.



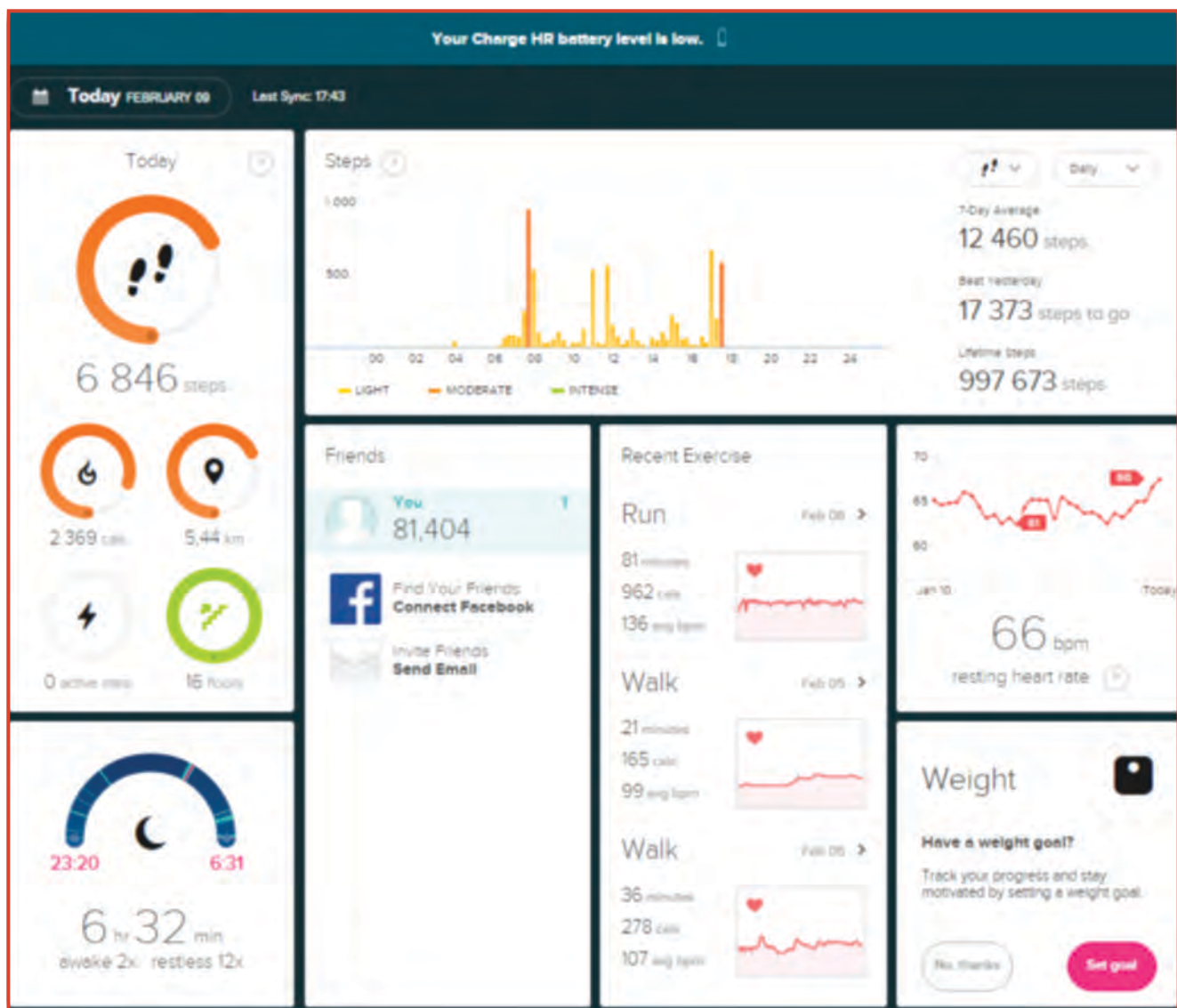
CYBER THREATS AND PROTECTION FROM THEM

Protecting an online computer is crucial. An online computer is exposed to the threat of viruses, spyware, unauthorized access and information theft. Once information is stolen it can be used for criminal purposes by hackers. Hackers can use a computer to launch attacks, commit criminal activities, and send out spam. Users must protect their computers and devices as much as possible by setting up suitable security measures.

Viruses, Trojans and Worms

Viruses are malicious codes that attach themselves with program files and corrupt them. They destroy useful data, format or corrupt data storage and eventually render entire computer system useless.

Trojans are the malicious programs that are promoted as useful utilities or software and, once installed, affect the computer system and files. Worms are the program codes that replicate over a network from one computer to the other and make the computers slower and sluggish in speed.

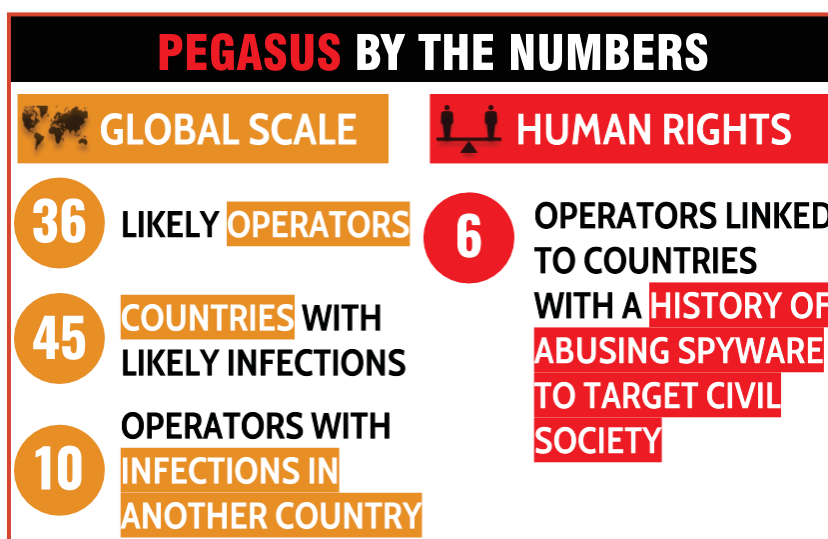


Protection

- **Anti-viruses:** Anti-virus tools are easily deployable defenses against malicious programs. Antiviruses like Norton AntiVirus, McAfee VirusScan, Kaspersky etc. provide robust and effective protection to the device. Users should have the anti-virus software installed on their computers before connecting to the internet. It is also important to keep the antivirus updated regularly to identify and neutralize newly developed malicious programs.
- **Firewall:** A firewall provides another level of protection to prevent incoming attacks. Operating system provides firewall protection which can be activated to filter unwanted access and attack to the computers over a network. Private networks use firewalls to keep unwanted IP addresses filtered out.
- **Operating System Update:** Windows updates and update of your browser fills any security holes and bugs which hackers can use to access user's computer. Keep browser security at Medium or High to block common virus propagation. Do not install undesired utilities or plugins in your browser.
- Do not open strange, unrecognized emails or attachments even if sent by a reliable source. Worms spread by infected attachments and may launch email attack to other users. Necessary attachments should be saved and virus scanned.

Spyware or Adware

Spyware is used for the purpose of eavesdropping. It installs itself on the computer without user's knowledge and monitors keystrokes, takes screenshots, reads chat, collects device and user information and forwards it to the malicious owners of such program. Loss of confidential information and identity theft are the threats posed by spywares. Spyware requires specific anti spyware tools to identify and remove.



Protection

- Install an effective spyware detecting software.
- Keep your operating system and browser updated. Setup security settings of the operating system and the browser. Windows and browsers have a set of security settings to choose from.
- Check if any unnecessary software is being installed. It is often during the installation steps and in the User Agreement.

- Carefully read and close any warning boxes that look like important messages.
- Be careful while installing free programs, games or shareware. Free programs may contain spyware.
- Install a Firewall. A firewall will create an extra layer of protection between the internet and your computer which will help to keep out intruders and spyware programs.

Spam

Spam is unsolicited or undesired junk email usually a promotional material. Senders of such emails are called spammers. Spammers collect or buy email addresses from various sources. Spams have a link that lures the user into clicking it. This confirms user's email ID and that brings in more spam in future.

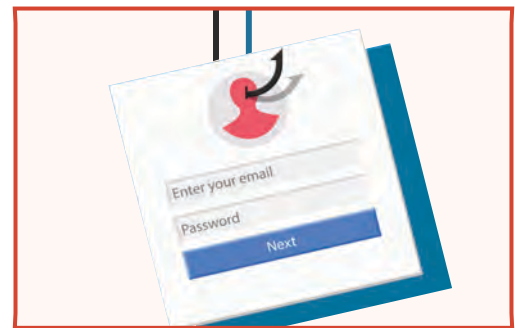
Protection

- Use spam filtering settings in the email service.
- Share your personal email ID with those you trust.
- Do not display your email online for everyone to access.
- Create separate email accounts for public use.
- Look out for spelling mistakes and bad grammar. Certain words or terms are misspelt by the spammers to pass through the spam filter.

Phishing and Pharming

Phishing: Fraudulently acquiring sensitive information from the users by impersonating trusted websites like banks and e-commerce merchants etc. is called Phishing. Phishers target the details like pins, passwords and answers to security questions. Phishing occurs generally in the form of an email or through a legitimate sounding phone call.

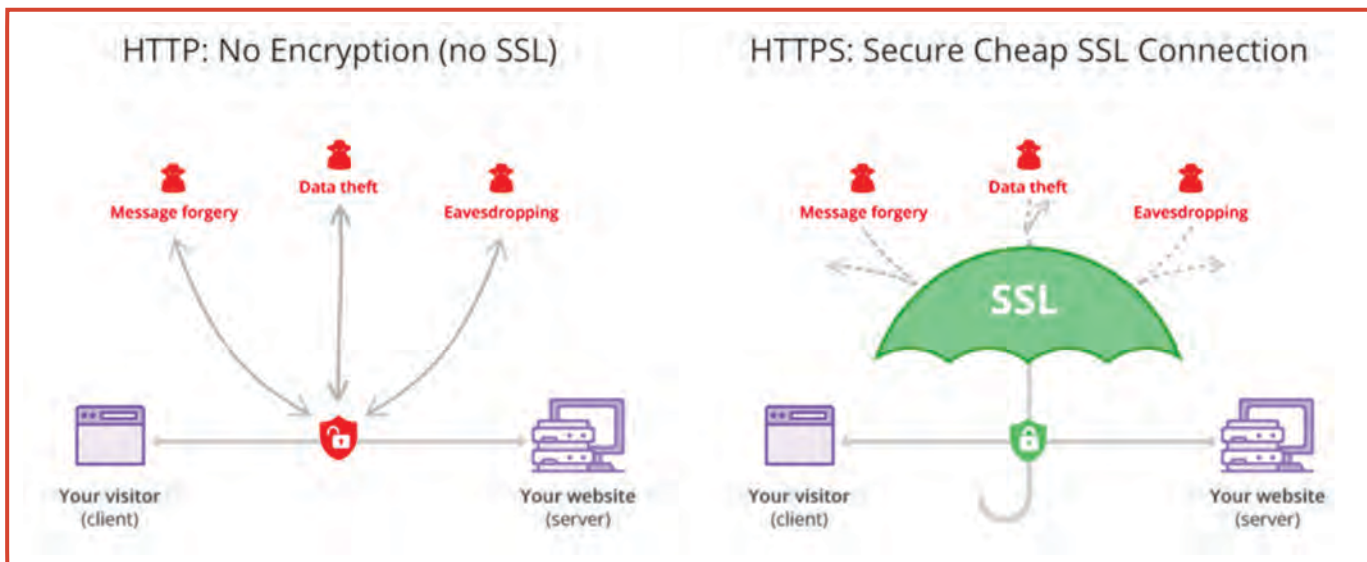
Pharming: In pharming, website's traffic is redirected to another unauthorized fake URL. Hackers manage to manipulate the configuration files which identify the server as host website on Internet.



Protection

- Never give away any sensitive information related to finance and security in reply to undesired emails and never on phone. No genuine agency asks for sensitive information like pins, passwords, bank balance, transaction details, identification numbers etc.
- Always cross check the source of email and phone call with the concerned agency.
- Look for misspelt words in URL and compare it with the URL of the concerned agency.
- Today all authentic agencies like banks and merchants have their own secured apps for transactions. Download and use them on your mobile phones instead of unknown third- party apps.
- It is a good practice to use government approved and supported apps like BHIM for online transactions.
- Phishers address their targets with fancy terms like "valued customer" but genuine agency will address you by your correct name, username, customer ID etc.
- To create a scare and extract account details from you, phisher's message would be slightly rude in informing you cancellation or suspending your account which genuine agencies never do.
- Install anti-phishing software.

- Regularly check your financial statements and account details by logging into your online accounts. Do not keep a long gap in accessing the accounts.
- Keep as many accounts as you can easily manage.
- Always know where to report any such attacks immediately. Delay in informing such incidents leads to ineffective investigations.
- Secured Socket Layer Certification is done for websites by known authorised Certification Authorities (CA). CAs do not issue SSL certificates to phishers, spammers or any agency that is not properly identified and cleared. Check the website's certificate icon of a padlock in the address bar. All secured websites have SSL (Secured Socket Layer) certificates. If padlock icon is of open lock then website is not secured and must be left immediately.
- Never ignore operating system, antivirus and browser upgrades. Do them as and when prompted or required.
- Websites should deploy effective firewalls with suitable settings to keep away unauthorized access and intrusion.



LET US UNDERSTAND WHAT A FIREWALL IS AND WHAT DOES IT DO.

Firewall

A firewall is a security combination of hardware and software that is used to protect a server and network resources from unauthorized access and intrusion. Firewall checks the incoming data packets over the networks and filters out which do not have suitable and sufficient permission to access the network. This way an extra level of protection is created right at the gates of the network.



Hardware firewalls are more powerful and effective and they are easy to setup and configure. Hardware firewall is a dedicated computer that provides firewall protection to the network. Software firewalls need to be installed on each computer. On a network, software firewalls are installed at the gateway server.

Large organisations opt for the combination of both hardware and software firewalls for better protection against cyber crooks. Firewalls do not protect from viruses. They just filter out unauthorized packets.

Internet Frauds and Scams

Today we virtually live and shop on Internet. Scammers send the users tempting newsletters and prompts of getting rich quick through roulette, lottery or games alluring them to click the link. Once you accept the offer they attempt to take sensitive information like credit card numbers, pins etc.

Protection

- Do not accept offers impulsively.
- Know your "needs" and "wants".
- Ask yourself: Do I really need it? Does it really concern me?
- Know that if such schemes were genuine then everyone in the world would have been rich and no one would be doing any hard work in jobs and businesses.
- Avoid individuals asking for donations.
- Avoid any such agency seeking donation and which has not stood up against your suspicions.
- Avoid accepting or vouching for any financial transaction with online friends whom you have never met especially those in known notorious regions of the world.
- Avoid charity involvement offers, off shore placement schemes with instant visas, trading offers from unknown sources, medical claims of quacks to cure certain disease instantly, money back guarantee offers from strange agencies, loan, overdraft and privilege credit offers.

Online Predators

Online predators are individuals or groups who pose a serious threat to children using Internet. There was a recent notorious game wherein children were compelled to play with a threat that if they quit their near and dear ones will be harmed. The last step of the game compelled the children to commit harm to themselves. Online predators easily find children online whose young immature minds can be lured into any unethical activity through games, live video chat, mind affecting videos and music, thought provoking speeches and many times causing nervous breakdowns. Online usage education and check is a must for children.

Protection

- Children must be educated about cyberbullying. They should know what to do when such incidents occur.
- Guardians and parents must always be available for them when children face such problem. Children must be dealt with patience and sympathy instead of criticism. If needed, expert's help must be taken.
- Children must always remember that no matter what, their parents, elders and teachers are their most reliable support.
- Children must be educated to inform their parents, elders and teachers about any such incidents that seem nasty even remotely.
- Children must be made aware to know that in fact, cyberbullies are not capable to do any harm and they can

never carry out their threats to harm someone. They actually play bluff and try to threaten the young minds.

- Children must block such intruders and never entertain them under any circumstances.
- It is a good idea to save all messages and communication of the cyberbully like chat history, emails, video screenshots etc. as evidence for later use.
- Children must know about the anti-bullying policy at their school and also by the law enforcement agencies in their region.

Cyber Bullying

Any sort of threat, scare or harassment over internet is the act of cyber bullying. Undesired messages in bad taste and intentions, online mockery in friend groups or circles, stalking someone's online profile and trying to post unwanted updates, sending unsolicited private messages, videos, and pictures. Cyber bullying threatens and affects young minds intensely even up to the threats of death.



Protection

- Educate your children about cyber bullying. Tell them what to do in such incidents.
- Always be available for them when they face such problem. Be patient and sympathetic and handle the incident either tactfully or with expert's help if needed.
- Inculcate trust in your child that no matter what, you are their first support.
- Encourage your children to inform you about any incident that sounds nasty even remotely.
- Tell your children that cyber bullies in fact are not capable to do any harm and they can never carry out their preposterous claims of harming someone.
- Advise children to block such intruders immediately and never entertain them.
- Be aware about anti-bullying policy at your child's school and by law enforcement agencies.
- In case of cyber bully attack, save all his/ her messages offline as evidence for later use.

Identity Theft

Easier than stealing anyone's money is to become that person. Identity theft works on this wicked premise. Hacking or stealing someone's authentication details, financial access codes like password, credit card numbers or pins, hacking into mobile phone SIM cards, duplicating information and then impersonating that person to carry out illicit online transactions is the prime goal of identity thieves. The consequences of identity theft could be very serious. Illicit transactions may attract financial law enforcers, any terrorist or criminal funding transactions or conversations can be carried out using your identity.

Protection

- Regular logins and checks of all your accounts is very necessary. Report even a minor suspicion to the concerned authorities as soon as possible seeking their help.
- Keep track of your credit transactions and do not authorise anyone else to access your card.
- Share information online with care.
- Educate yourself about cyber frauds. Do not ignore but read and understand the security guidelines sent by authorized agencies like banks and government.
- Avoid keeping sensitive information in the form of images and editable documents in a public domain.
- Avoid automatic online transaction settings. Always take pain of entering the details for each

transaction.

- For all important information, keep a regular backup offline at your home. Do not be too trusting even with known people in sharing documents like cheques, agreement copies, deeds and other such sensitive and legal documents.
- Implement suitable software protection like antivirus, firewall, anti phishing utilities, encryption utilities etc.
- Avoid using devices on public locations like cybercafé, airport, free wifi zones etc. to execute sensitive transactions like fund transfers, sharing documents etc.

MALICIOUS SMARTPHONE APPLICATIONS

There have been a series of incidents where smartphone applications which seem attractive but in fact contain malicious code steals information stored in a smartphone, such as the address book data without the owner's knowledge. The secondary damage has also been confirmed in which the stolen personal information is abused in cybercrimes such as spam operations and billing frauds.

Smartphone Safety Measures

- Think before you post or share something and then only touch the send button.
- Set up emergency numbers for instant calling.
- Do not use cellphone everywhere – keep your senses free to perceive other stimuli like while crossing road, driving, using escalators, crowded areas etc.
- Get rid of unwanted data as soon as possible – keep your phone data tidy.
- Protect your phone from physical theft. Make it a habit to check while leaving any place.
- Keep good password and pattern protection. Do not just rely upon face recognition or voice activated locking apps.
- Keep the antivirus and software updated.
- Sign out of and close the apps that are used.
- Avoid automatic download settings.
- Keep your wireless access secured.
- Keep your phone data protected with authentic encrypters and utilities.
- Do not install just any app impulsively or in peer pressure. Apply your good sense first and consider if you really need it.
- Keep a regular backup of your phone data.



You have learned

- ✓ Cyber-safety generally refers to a set of discipline, measures and actions taken to protect personal information and your computer from attacks. It also involves the practice to respect others' information privacy and not to indulge knowingly in divulging any information.
- ✓ IP address is a unique identification allocated to each device over a network.
- ✓ While loading content of a web page web browser forwards information to tracking websites about the webpage visited by the user.
- ✓ Cookies are stored as small piece of information usually in plain text form.
- ✓ A zombie cookie is recreated even after deletion.
- ✓ In Passive fingerprinting, website visited by the user observes user's browsing and creates a unique identifier for the user-device combination.
- ✓ In active fingerprinting, websites send some queries to the user's computer without user being aware about them.
- ✓ Viruses are malicious codes that attach themselves with program files and corrupt them.
- ✓ Trojans are the malicious programs that are promoted as useful utilities or software and, once installed, affect the computer system and files.
- ✓ Worms are the program codes that replicate over a network from one computer to the other and make the computers slower.
- ✓ A firewall is a security combination of hardware and software that is used to protect a server and network resources from unauthorized access and intrusion.
- ✓ Spyware is used for the purpose of eavesdropping.
- ✓ Spam is unsolicited or undesired junk email usually a promotional material.
- ✓ Fraudulently acquiring sensitive information from the users by impersonating trusted websites like banks and e-commerce merchants etc. is called Phishing.
- ✓ When website's traffic is redirected to another unauthorized fake URL then it is called pharming.
- ✓ Secured Socket Layer Certification is done for websites by known authorised Certification Authorities (CA).
- ✓ Online predators are individuals or groups who pose a serious threat to children using Internet.
- ✓ Any sort of threat, scare or harassment over internet is the act of cyber bullying.
- ✓ Identity theft is stealing someone's authentication details and access codes and then impersonating that person to carry out illicit online transactions.

Solved Questions

1. What do you mean by the terms Cyber-crime and Cyber-safety?

Ans. Cyber-safety generally refers to a set of discipline, measures and actions taken to protect personal information and your computer from attacks. It also involves the practice to respect others' information privacy and not to indulge knowingly in divulging any information not meant for unauthorized entities.

2. What is an IP address?

Ans. IP address is the most basic way of identifying a user's device. IP address is a unique identification allocated to each device over a network. In turn, IP address of user's device identifies that user on the Internet. A website can determine rough geographical location of the user from the IP address.

3. How are we tracked by cookies while surfing Internet?

Ans. Cookies is the most traditional and common way to track information about us such as website visiting time, duration and frequency, products added in the shopping cart while online shopping, data entered into form-fields like name, address, and passwords etc. Later, on next visit of the user such information is extracted from the cookies created during last visit on user's computer. Cookies are stored as small piece of information usually in plain text form.

4. How are viruses, trojans and worms different from each other?

Ans. Viruses are malicious codes that attach themselves with program files and corrupt them. They destroy useful data, format or corrupt data storage and eventually render entire computer system useless.

Trojans are the malicious programs that are promoted as useful utilities or software and, once installed, affect the computer system and files.

Worms are the program codes that replicate over a network from one computer to the other and make the computers slower and sluggish in speed.

5. How does a spyware performs eavesdropping on our computer system?

Ans. Spyware installs itself on the computer without user's knowledge and monitors keystrokes, takes screenshots, reads chat, collects device and user information and forwards it to the malicious owners of such program.

6. How are firewall and Secured Socket Layer Certification different?

Ans. A firewall is a security combination of hardware and software that is used to protect a server and network resources from unauthorized access and intrusion. Firewall checks the incoming data packets over the networks and filters out which do not have suitable and sufficient permission to access the network.

Secured Socket Layer Certification is done for websites by known authorised Certification Authorities (CA). CAs do not issue SSL certificates to phishers, spammers or any agency that is not properly identified and cleared. Secured website has certificate icon of a padlock in the address bar of the browser.

7. Briefly describe two threats for children over Internet.

Ans. Online predators easily find children online whose minds can be lured into any unethical activity through games, live video chat, mind affecting videos and music etc.

Cyber-bullying involves any sort of threat, or harassment over internet in the form of undesired messages in bad taste and intentions, online mockery in friend groups or circles, stalking someone's online profile and trying to post unwanted updates, sending unsolicited private messages, videos, and pictures.

Work Out Time

A. Choose the correct answer.

1. Practices and technology used to prevent cyber crime is called:
a) Cyber-safety
b) Cyber-security
c) Cyber-health
d) Firewall
2. Which of the following is not a way of online user tracking over internet?
a) Fingerprinting
b) Cookies
c) Adware
d) Online Advertising
3. Which of the following is promoted as useful program and, once installed, affects the computer system?
a) Trojan
b) Spyware
c) Worm
d) Spam
4. Fraudulently acquiring sensitive information from the users by impersonating trusted website is called _____.
a) Spam
b) Phishing
c) Cyber-bullying
d) Pharming
5. A Firewall is a security combination of _____ and _____.
a) virus, anti-virus
b) SSL, HTTPS
c) hardware, software
d) Windows, MS-Office
6. A fake online lottery offer is an example of _____.
a) Cyber-bullying
b) Internet fraud or scam
c) Phishing
d) Pharming
7. Stealing someone's authentication details is an example of _____.
a) Identity theft
b) Internet scam
c) Phishing
d) Trojan
8. SSL stands for Secured _____ Layer
a) Security
b) Server
c) Software
d) Socket
9. Spam filtering is an effective measure against _____.
a) Phishers
b) Pharmers
c) Undesired emails
d) Adware
10. Whom should children inform very first in case of cyber-bullying?
a) Parents
b) Neighbours
c) Police
d) School Principal

B. Short answer type questions.

1. What is digital literacy?
2. How does a worm affect computer network or computer system?
3. List various ways in which users are tracked online.
4. List 3 examples of anti-virus software.
5. What does spam filter do?
6. List any 2 measures to protect against phishing.
7. How will you identify that a website has SSL certificate.
8. How do online predators harm children?
9. Define the term cyber-bullying.
10. List any 2 common measures for smartphone safety.

C. Long answer type questions.

1. Briefly explain the terms: Cyber-safety, Cyber-Security and Cyber-crime.
2. How is your device uniquely identified on a network?
3. What is the purpose of a cookie? Are cookies useful or harmful? Explain.
4. What do you mean by fingerprinting. What is the basic difference between active and passive fingerprinting?
5. How does a firewall protect a network?
6. What is the technique of eavesdropping called? How can we protect against it?
7. How can we protect ourselves against phishing and pharming?
8. How online predators and cyber bullies affect young minds?
9. List any 5 effective ways to protect against identity theft.
10. List any 5 ways to use your mobile phone responsibly.

D. State true or false.

1. A zombie cookie occupies a lot of space on computer hard disk.
2. Cyber bullying is an online game not meant for children.
3. SSL stands for Secured Socket Layer.
4. A firewall is an attack deployed by a hacker on a network.
5. Trojan is a harmful program in the guise of a useful one.
6. In active fingerprinting the details about client computer are queried by the host site.
7. We should install every useful app on our mobile phone.
8. Best way to protect children from cyber predators is not to allow them to use computers and mobile phones at all.
9. A broken padlock icon means that website has no SSL certificate.
10. Online advertisements entertain us a lot.

E. Fill in the blanks.

1. _____ is the unique identification allotted to each device over a network.
2. _____ party cookies are set by the first website a user is directly visiting.
3. _____ are the program codes that replicate over a network from one computer to the other.
4. _____ is used for the purpose of eavesdropping.
5. Senders of undesired emails are called _____.
6. A _____ impersonates trusted website.
7. A _____ authority issues SSL certificate.
8. _____ filters out unauthorised data packets and prevents them from entering the network.

WORD PROCESSOR— OPENOFFICE WRITER—I

6

CHAPTER FOCUSES ON

- ✓ Introduction to Writer
- ✓ Create, Edit, Save and Close the document
- ✓ Edit and Format the document

INTRODUCTION TO WORD PROCESSOR

A word processor is an application that is used to create, edit, format, organize and print the documents. The document can include text, graphics, table, Clip Art, borders and shadings, etc. We can create letters, project reports, articles, labels etc. It has various features than conventional typewriter.

There are a number of word processing software available today e.g., MS Word, OpenOffice Writer, WordStar, etc.

MS Word is the most commonly used word processor. It comes in MS Office package. But you can use this software only with MS Windows operating system.

Today, there are number of open source software available for free. Generally, these softwares can work on different operating systems.

OpenOffice.org office suite is one of the leading open source software for word processing, spreadsheets, presentations, database and more. You can download it for free from www.openoffice.org.

In this chapter we will learn about OpenOffice Writer.

FEATURES OF WORD PROCESSOR

Let's discuss some common features of word processing software.

WYSIWYG (What You See Is What You Get): With WYSIWYG, the screen shows you exactly how your document will look and when you take its print out.

Insert text: For insertion of text anywhere in the document.

Delete text: For erasing characters, words, lines, or pages.

Cut and paste: For removing (cutting) a section of text from one place in a document and insert (pasting) it somewhere else.

Copy: For duplicating a section of text.

Page size and margins: For defining various page sizes and margins.

Find and replace: For directing the word processor to search for a particular word or phrase and for replacing one group of characters with another everywhere that the first group appears.

Word Wrap: For automatically moving to the next line after one line is filled with text.

Print: For printing a document to get hardcopy.

Font: For changing font type, size, style and colour of the text in the document.

Footnotes: Automatic sequential numbering of footnotes and positioning of the footnotes at the bottom of their appropriate pages during pagination.

Insert graphics: For embedding images/graphics and shapes in the document.

Headers, footers, and page numbering: For specifying customized headers and footers of every page.

Layout: For specifying different margins and indenting paragraphs in a document.

Macros: A macro is a character or word that represents a series of keystrokes. The keystrokes can represent text or commands. The ability to define macros allows you to save yourself a lot of time by replacing common combinations of keystrokes.

Merges: For merging text from one file into another file. This is particularly useful for generating many files that have the same format but different data.

Spell checker: For spelling checking. It will highlight any words that it does not recognize.

INTRODUCTION TO WRITER

OpenOffice is an open source free office suite which replicates many of the features/ capabilities of popular competing software products like Microsoft Office suite and Corel Office. Writer is the word processing component of OpenOffice.org for creating text documents.

Opening OpenOffice Writer

To open OpenOffice.org Writer, the steps are given below

- Click on **Start** → **All Programs** → **OpenOffice** → **OpenOffice Writer**

The Writer Interface

The Writer window contains several componets: Menu bar, Standard toolbar, Formatting toolbar, Rulers, Scrollbars, and Status bar (figure 1).

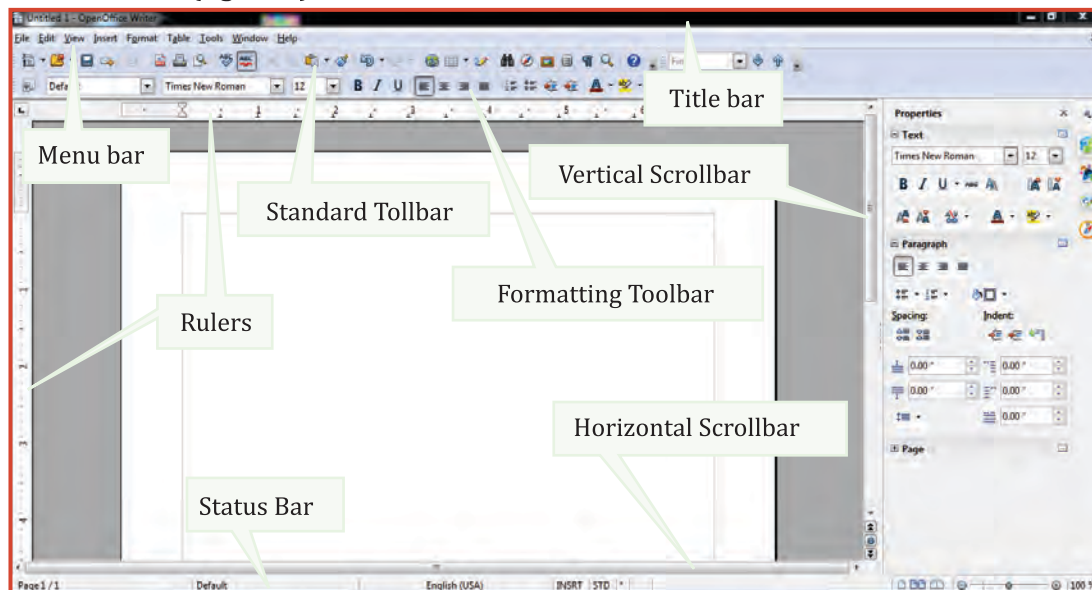


Figure 1: The Writer Interface window

- **Title Bar:** It is located at the top of the window. It display the name of the application and the document.
- **Menu Bar:** It contains menus such as File, Edit, View, Insert, Format, Table, etc.
- **Standard Toolbar:** It contains standard options like New, Open, Save, Cut, Copy, Paste, Spell Check, etc. (figure 2).
- **Formatting Toolbar:** It contains formatting options like Font type, Font Size, Font style, Alignment, etc. (figure 3).

- **Ruler:** The ruler is used to scale the document. There are two rulers- horizontal ruler and vertical ruler.
- **Scroll Bars:** Scroll bars are used to navigate throughout the document. There are two types of scroll bars: horizontal scrollbar and vertical scrollbar.
- **Help:** The Help option is used to show the help dialog.
- **Text Area:** The text area is used to create the document.
- **Status Bar:** Status bar displays information such as current page, column, line number at which the cursor is currently placed, text insert mode, zoom percentage, etc (figure 4).

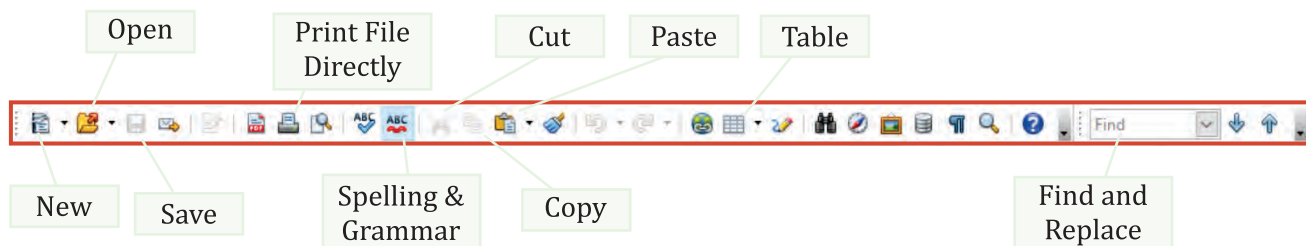


Figure 2: The Standard toolbar

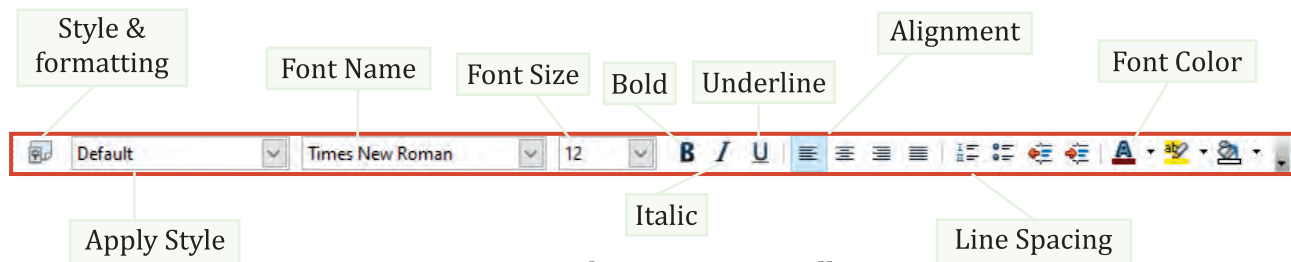


Figure 3: The Formatting toolbar

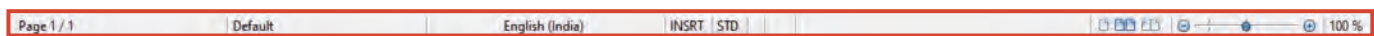


Figure 4: The Status bar

- **Zoom Control:** It is used to increase or decrease view of the window contents.

Note: 1. Toolbars can be customised by following steps: **View** → **Toolbar** → **Customize...**

Note: 2. Toolbars can be added/removed by following steps: **View** → **Toolbar**. Now **add/remove** the required toolbar by clicking on the name of the toolbar (figure 5).

CREATE, SAVE, CLOSE, OPEN AND EXIT THE DOCUMENT

Create a New document

To create a new document steps are following:

1. Click on the **File** menu.

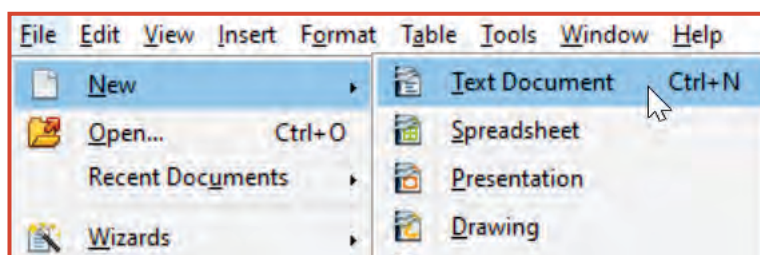


Figure 6: Creating a new document

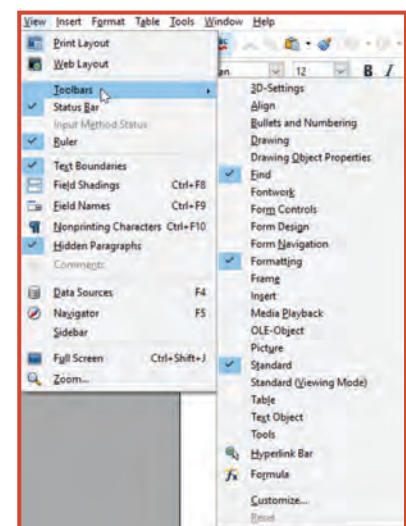


Figure 5: Add/ remove a toolbar

2. Go to **New** option and click on **Text Document** option (figure 6).

Or

Click on **New** button icon on standard toolbar .

Or

Press **Ctrl + N**.

The blank document will appear:(figure 7).

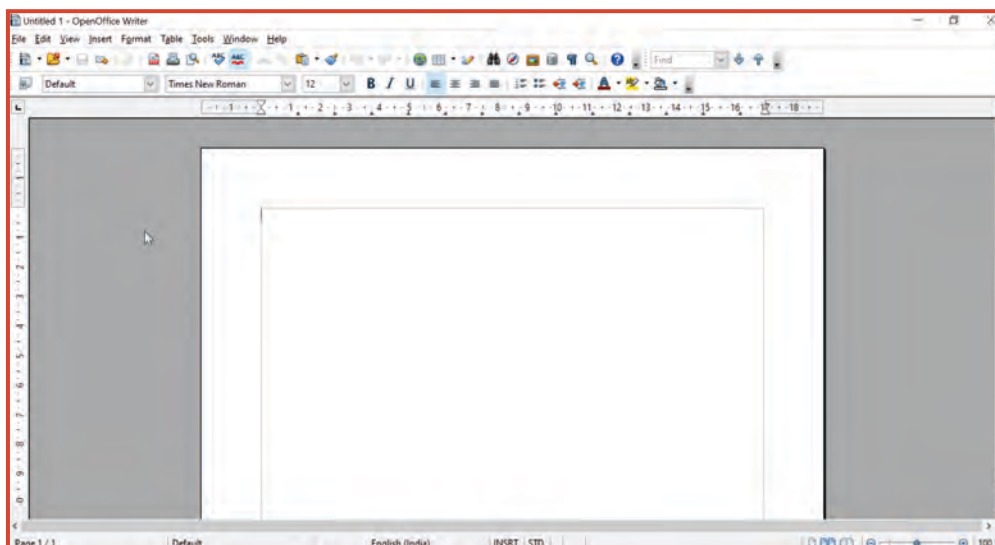


Figure 7: The blank document in the Writer window

Typing the Text

Typing the text in a word processor is easy. The text automatically wraps itself as the insertion point reaches the end of the right margin.

Remember that, this property of the text wrapping itself to the next line when it goes past the right margin is called the word wrap.

Navigating in a Document

The given table shows how to move around a document by using the keyboard.

Keys	Functions
UP arrow, DOWN arrow, LEFT arrow, RIGHT arrow	One character up, down, left and right
Ctrl + Right arrow	Next word
Ctrl + Left arrow	Previous Word
Home	Beginning of the Line
End	End of the line
Ctrl + Home	Beginning of the document
Ctrl + End	End of the document
Ctrl + Page Up	Previous page
Ctrl+Page Down	Next Page

Saving a document

To save a new document, steps are following.

1. Click on **File** menu and select **Save As** option (figure 8).

Or

Click on **Save** button icon on standard toolbar . (We also use this method to save the changes in a document).

Or

Press Ctrl + Shift + S key.

2. The **Save As** dialog box appears (figure 9).
3. Type file's name in **File name** text box.
 - You can change the location to save the file other than the default directory.
 - You can select file's type from **Save as** type list box.
4. Click on Save button from the **Save As** dialog box.

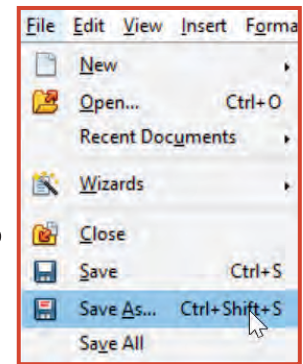


Figure 8: Click on Save As option

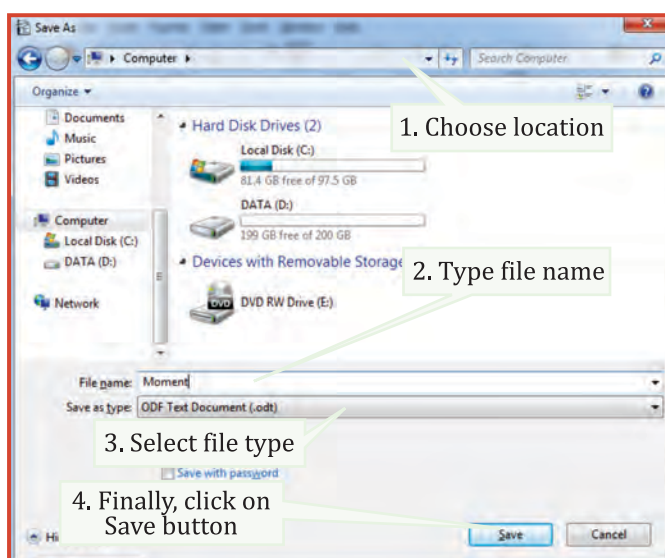


Figure 9: The Save As dialog box

Note: 1. To save the changes in an existing file, click on Save option. In this case, you don't need to give file name again.

Note: 2. Save As option is used to save the file with new name.

Note: Writer saves the document with extension '.odt' by default.

Close the document

To close the document,

1. Click on the **File** menu and click on **Close** option (Figure 10a).

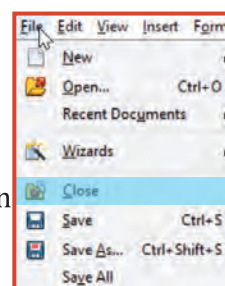


Figure 10a: Select Close option

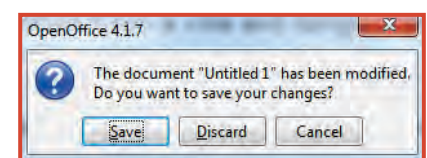


Figure 10b: Select Save option

Note: If you have not saved the file before closing, then a dialog box appears (figure 10b) to confirm save the file before closing or discarding the file (close the file without saving) or cancel the action i.e. to go back to the document and continue working.

Open an existing document

1. Click on **File** menu and select **Open** option.

Or

Click on **Open** button icon on standard toolbar .

Or Press **Ctrl + O**.

The **Open** dialog box appears (figure 11).

2. Choose the file from files list in **Open** dialog box.
3. Click on **Open** button.

Exit from Writer window

1. Click on **File** menu and select **Exit** option.

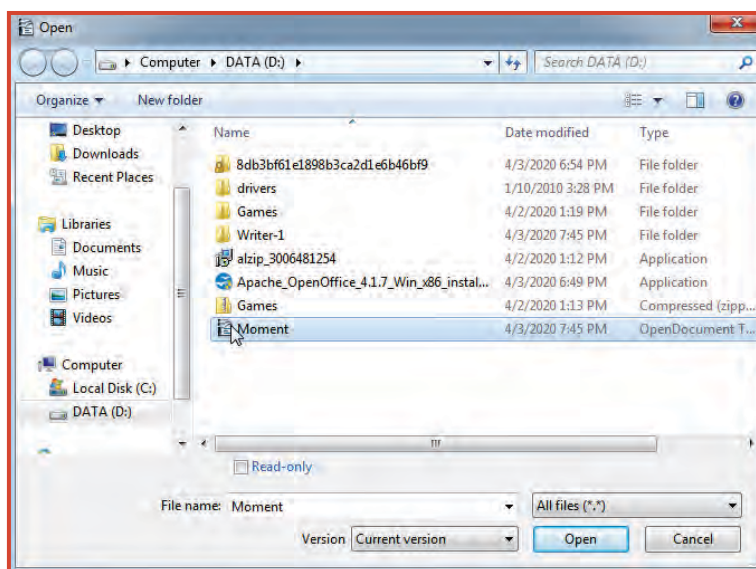


Figure 11: The Open dialog box

Note: If you have not saved the file before closing, then a dialogue box will be opened. We have discussed about this in the previous (Close the document) section.

EDITING AND FORMATTING A DOCUMENT

Editing is the process to make changes in the document. There are many ways through which we can edit the document. The term 'editing' includes deleting, moving and replacing of the text.

Formatting refers to changing the text appearance by changing the alignment, font type, style, size, etc.

Selecting the Text

To perform operations like moving, copying, changing the type, style or size of the text, you need to select the text. By selecting a piece of text you tell the application that you want to work with this specific piece of text. Follow these steps to select a given piece of text.

Using mouse click:

- a)
 - i. Place the cursor at the beginning of the text for selecting.
 - ii. Hold down the Shift key and click at the end of the text to be selected. The entire text between the starting and end points will get selected.
 - iii. Release the shift key.
- b) You can also **select a piece of text** by bringing the mouse pointer at the beginning of the required text, clicking and holding down the left mouse button and dragging the mouse up to the end of the text.
- c) To select a **single word** in a document, double click on it.
- d) To select a **line or paragraph**, hold down the Ctrl key and click anywhere in the line or paragraph Or triple click anywhere in the line or paragraph.

Using keyboard:

- To select the **entire text** in a document press the **Ctrl + A** keys.
- To select **one word** or **words** place the cursor at one end of the word press Shift key and move the cursor with help of Left or Right arrow key to other end.

- To select **one line** place the cursor at the beginning of the line. Press Shift + End key or Down arrow key.
For a group of line, keep pressing Down arrow key.
- Shift + Home to select one line while the cursor is placed at the end of the line.
- Ctrl + Shift + Down to select the text in a paragraph from the cursor position to the end of the paragraph.
- Ctrl + Shift + Up to select the text in a paragraph from the cursor position to the beginning of the paragraph.
- Ctrl + Shift + Home to select the text in a document from the cursor position to the beginning of the document.

Note: You can delete the selected text or objects by pressing Delete key.

Do it yourself : Take help of your teacher and learn some more methods of text selection.

Copying the Text

Copying the text means to copy the text from the original location to some other location.

Using drag and drop

1. Select the text.
2. Put the cursor over the selected text, press Ctrl key and keeping it pressed; drag the text to the required location.
3. Release the mouse button.

Using Copy, Paste commands

1. Select the text.
2. Click **Edit** → **Copy** Or press Ctrl + C key Or click on **Copy** icon  on standard toolbar.
3. Place the cursor at the location where you want the copy of the selected text.
4. Click **Edit** → **Paste** Or press Ctrl + V key Or click on **Paste** icon  on standard toolbar (figure 12).

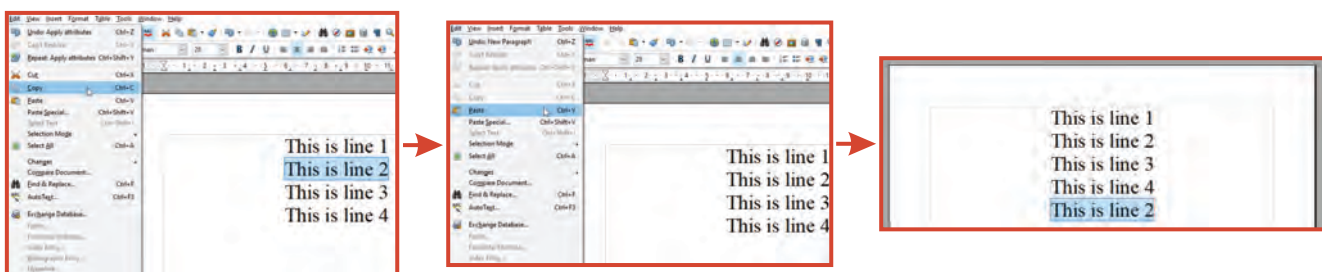


Figure 12: Copying and pasting the text

Moving the text

Moving the text means to move the text from the original location to the some other location.

Using drag and drop

1. Select the text.
2. Put the cursor over the selected text, click and keep pressing the mouse button, drag the text to the required location.
3. Release the mouse button.

Using Cut, Paste commands

1. Select the text.
2. Click **Edit** → **Cut** Or press Ctrl + X key Or click on **Cut** icon  on standard toolbar.
3. Place the cursor at the location where you want the selected text to be moved.
4. Click **Edit** → **Paste** Or press Ctrl + V key Or click on **Paste** icon  on standard toolbar (figure 13).

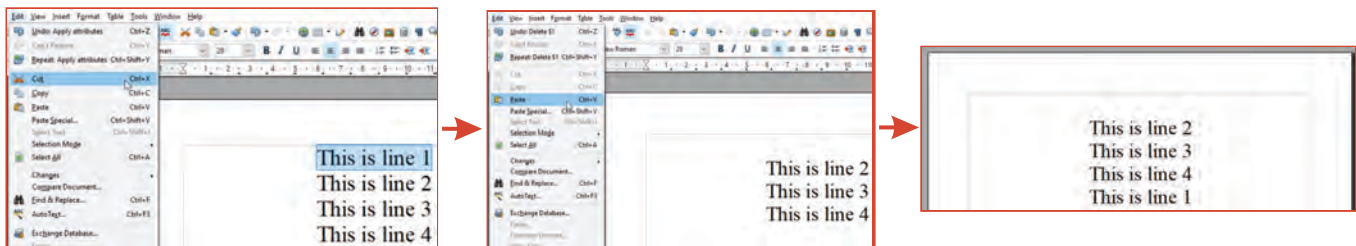


Figure 13: Moving the text

FIND & REPLACE TEXT FEATURE

Find & Replace feature helps to search for a specific word, line or a phrase. Instead of reading and going through the entire document, you can make use of this feature. The Find & Replace feature can be used to search and for all the occurrences of the given word or phrase and replace it with another word or phrase in the document.

The steps to find the text are:

1. Click **Edit** → **Find & Replace** option (figure 14) Or press Ctrl + F, the **Find & Replace** dialog box appears (figure 15).
2. Enter the text that you want to search for in the **Search for** text box.
3. Click the **Find** button to locate the text. The next text gets highlighted that matches the entry.
Click **Find** button again to find the next occurrences of the text in the document.
Or click on **Find All** button to select all the text that matches the entry.
4. When Writer has finished searching for all the occurrences of the given word, it displays a message box (figure 16). Click **Yes** button to continue searching at beginning or **No** to stop the action.

Do it yourself : Take help of your teacher and do the following:

1. Practice copying and moving of text by right-click method.
2. Learn about the use of Paste Special option.

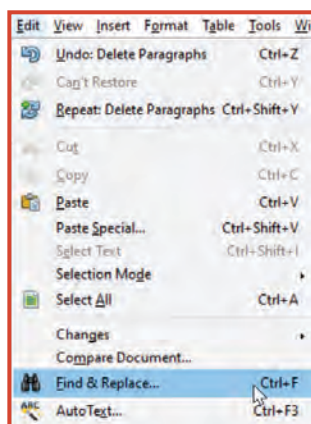


Figure 14: Selecting Find & Replace option

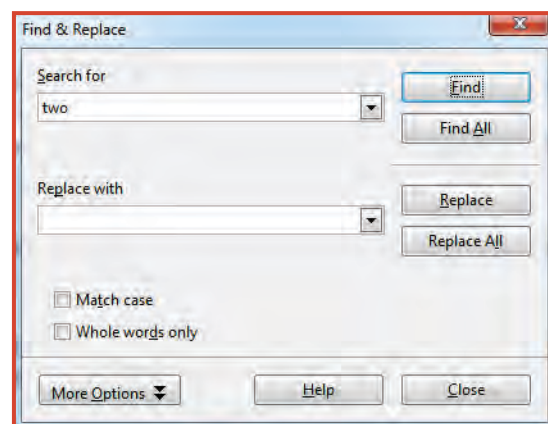


Figure 15: Find & Replace dialog box

The steps to replace the text are:

1. Click **Edit** → **Find & Replace** option, the **Find & Replace** dialog box appears (figure 17).
2. Enter the text you want to **search for** in the Search for text box.
3. Enter the text to replace the found text in the **Replace with** text box.
4. Click the **Replace** button. It will search the whole document for the text in the **Search for** text box, starting at the current cursor position. When the text is found, it will be highlighted. Again, click on **Replace** button to replace the highlighted text

Note: You can click on Find button to next occurrence of text without replacing it.

Click **Replace** button again to replace the next occurrences of the text in the document.

Or click on **Replace All** button to replace all the occurrences of text that matches the entry.

5. When Writer has finished replacing for all the occurrences of the given word, it displays message (figure 18), informing about total replaced occurrences. Click on **OK** button.

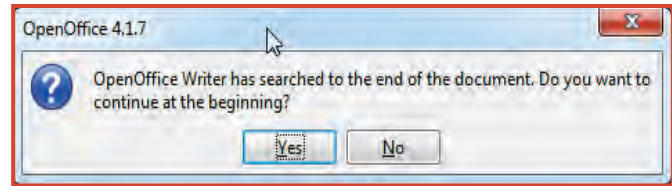


Figure 16

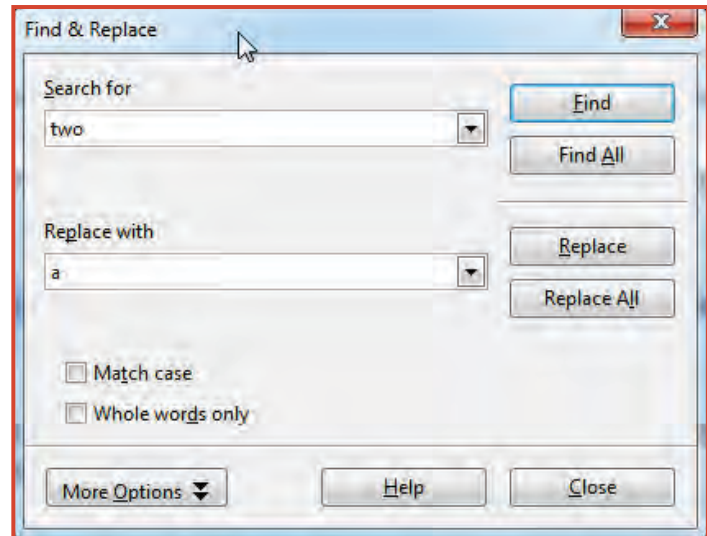


Figure 17: Find & Replace dialog box

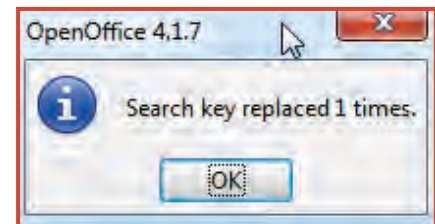


Figure 18

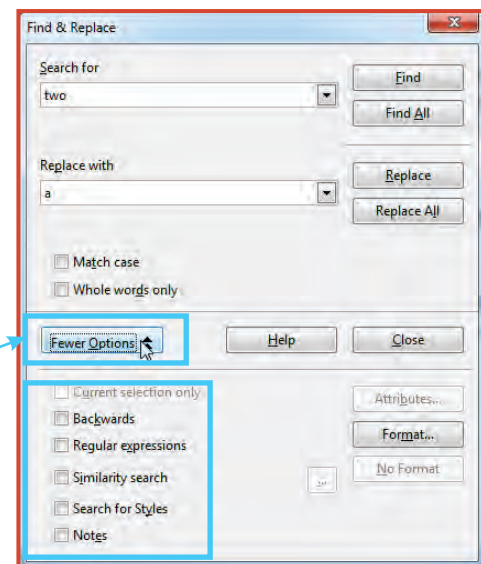
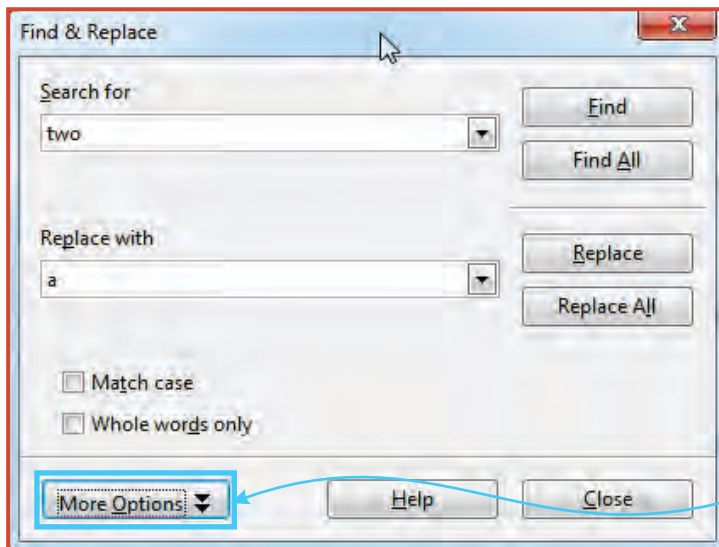


Figure 19: Other features of Find & Replace dialog box

There are some more options available on Find & Replace dialog box (figure 19).

Match case: If you want to search a word according to its case, such as upper case or lower case, then select this option. For example, if search about the word 'sentence' then this tool will ignore 'SENTENCE' and 'Sentence' words.

Whole words only: If you want to search only the complete word and not the part of another word, then select this option. For example, if you search about the word 'main' then this tool will ignore 'mains' and 'maintenance' words.

Other features

Click on **More Options** button for other features in the **Find & Replace** dialog box.

Track Changes

In Writer, track changes is an editing command that is commonly used when you create an original document and make changes and want to keep track of the changes that are made to that original document. It is also a useful tool for collaborating on a document, as it allows multiple users to make revisions without losing the context of the original document.

Steps to track the changes are following:

1. Click **Edit** → **Changes** → **Record** to begin tracking changes. (A tick mark before **Record** shows that it is on).

To stop recording the changes click **Edit** → **Changes** → **Record** again.

2. Click **Edit** → **Show** to show or hide the highlight the changes.
3. To add a comment on a change, put cursor in the line (of the change) and click **Edit** → **Change** → **Comment**. The **Comment Insertion** dialog box appears (figure 20).

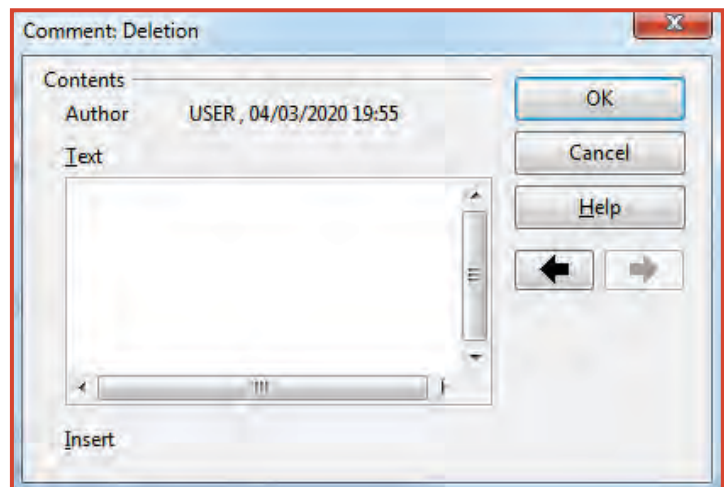


Figure 20: The Comment insertion dialog window

Add comment in the **Text** box and click on **OK** button.

Comment will be displayed in the **Accept and Reject Changes** dialog box (figure 21).

Accept and Reject the changes

To accept or reject the changes do the following,

1. Click **Edit** → **Changes** → **Accept or Reject**. An **Accept or Reject Changes** dialog box appears (figure 21).
2. In **Accept or Reject Changes** dialog box select any change. The change is highlighted in the document so that you see the change done made in the document.
3. Click on **Accept** button to accept the change or **Reject** to reject the change. To accept all the changes, click on **Accept All** and to reject all the changes, click on **Reject All** button.

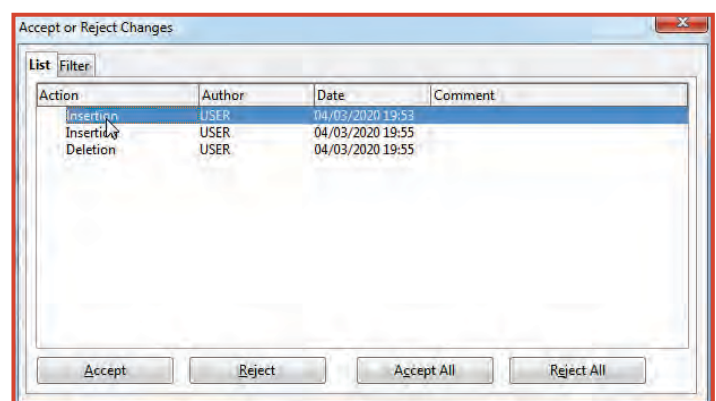


Figure 21: The Accept or Reject changes dialog box

CHECKING SPELLINGS

OpenOffice.org Writer allows you to check and correct language errors in the document. It has built dictionaries that help to check the spellings in a document.

There are two ways of checking spelling and grammar of a document:

1. **AutoSpellcheck:** It automatically checks the spelling and grammar mistakes in the document (when it is activated).

Note: To activate this utility, click on AutoSpellcheck icon on the Standard toolbar.

When this utility is turned ON, all the misspelled words are automatically marked with a red wavy line.

While typing the text, if the spellings are wrong, you will see a red wavy line under it. And if there is some grammatical mistake, you will see a green wavy line under it.

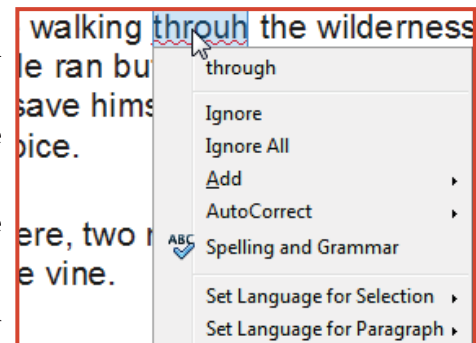


Figure 22: Right clicking on misspelt word

2. **Spelling and Grammar:** To use this option, select **Tool** → **Spelling and Grammar** option on the menu bar. It scans the entire document for language errors and correct those errors.

To use Spelling & Grammar to correct a spelling mistake-

Method 1:

1. Right-click on the misspelt word (having a red wavy line under it) (figure 22).
2. A pop-up menu will appear with the suggestions for the misspelt word. Click on the suggestion which you think is correct.

Method 2:

1. Click on **Tool** → **Spelling & Grammar** Or click on **Spelling & Grammar** button on the standard toolbar.

In case of a spelling error the **Spelling: English (USA)** dialog box appears (figure 23). It shows some suggestions of correct words for a wrong word.

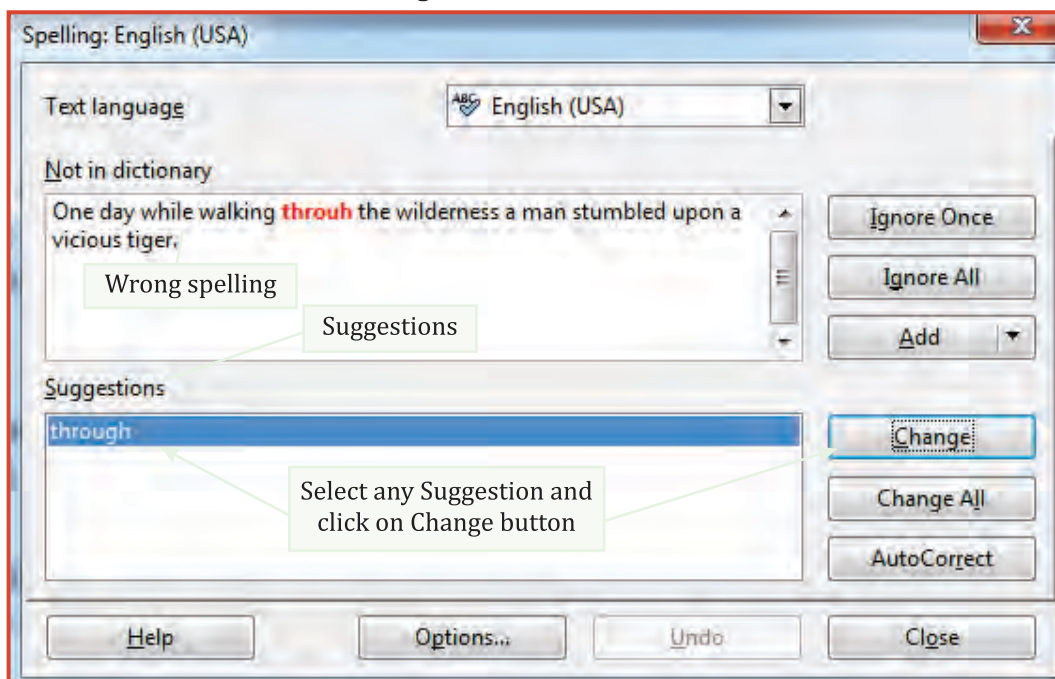


Figure 23: The Spelling: English (USA) dialog box

2. Now, use either of the following to correct the mistakes,
 - To accept the suggestion, click on any suggestion and click the **Change** button.
 - Edit the word/sentence in the upper text box and then click the **Change** button to accept the editing.
 - Click the **Add button** to add the unknown word in the user-defined dictionary.

Note: If the word is spelled correctly but doesn't appear in Word's dictionary, click on either Ignore All.

3. At last, a message box appears after correction of all the misspelled words in the document. Click on OK button (figure 24).

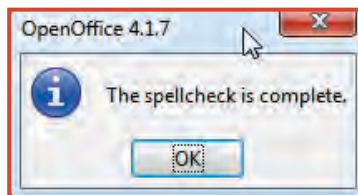


Figure 24

Note: Remember that, the nouns such as the names are also considered as spelling mistakes in OpenOffice.org Writer. You can ignore their corrections.

Changing the Language

You can change the language in Writer for your documents.

To set the language,

1. Click **Tools** → **Languages** → **For All Text** → **More** (figure 25).

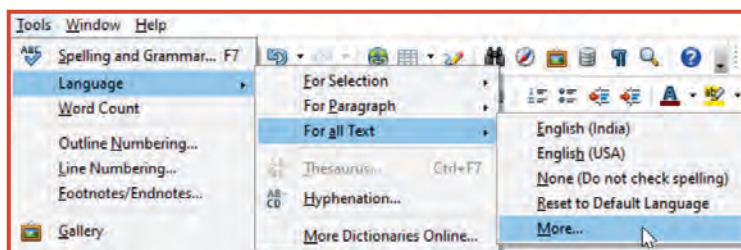


Figure 25: Opening language changing option

For selection: Applies the specified language to the selected text (the selection can be only a few characters or several paragraphs).

For paragraph: Applies the specified language to the paragraph where the cursor is located.

For all text: Applies the specified language to the entire document.

The **Option - Language Settings Languages** dialog box appears (figure 26).

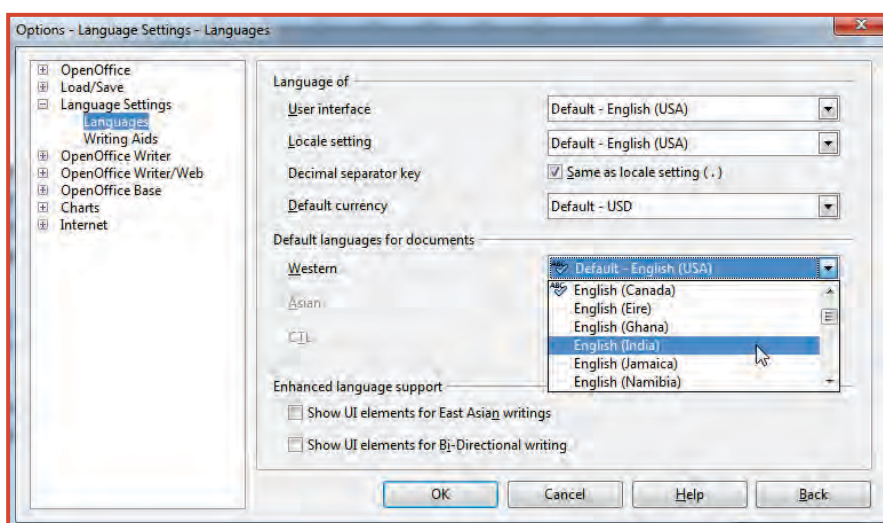


Figure 26: The Options Languages setting dialog box

2. Select the desired language from **Western** list box of Default language for documents section.

Using Synonyms

A synonym is a word or phrase that means exactly or nearly the same as another word or phrase in the same language, for example shut is a synonym of close. The Writer contains the Thesaurus that provides synonyms for the selected words.

To use the Thesaurus,

1. Type a word and click on it.
2. Click on **Tools** → **Language** → **Thesaurus** (figure 27). The Thesaurus (English (USA)) dialogbox appears (figure 28).
3. In the **Alternatives** box, select the alternative (synonym) word.
4. Click on **Replace** button.

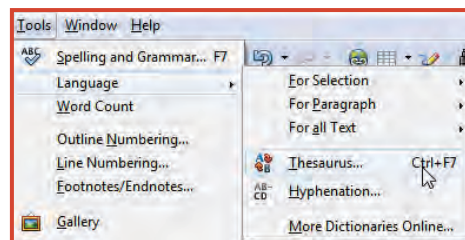


Figure 27

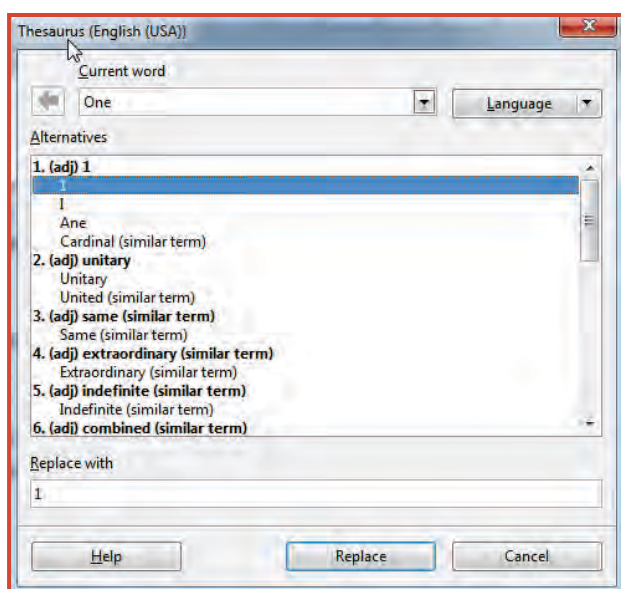


Figure 28

Note: Shortcut key to open Thesaurus (English (USA)) dialog box is Ctrl+F7.

Undo and Redo Actions

Undo: If you want to undo the most recent change, follow the steps given below.

Press Ctrl + Z.

Or

Click the **Undo** icon  on the standard toolbar. There is a triangle right to the **Undo** button. Click on it to display the list of all the changes that can be undone.

Or

Select **Edit** → **Undo** (figure 29). **Edit** menu shows the latest changes that can be undone.

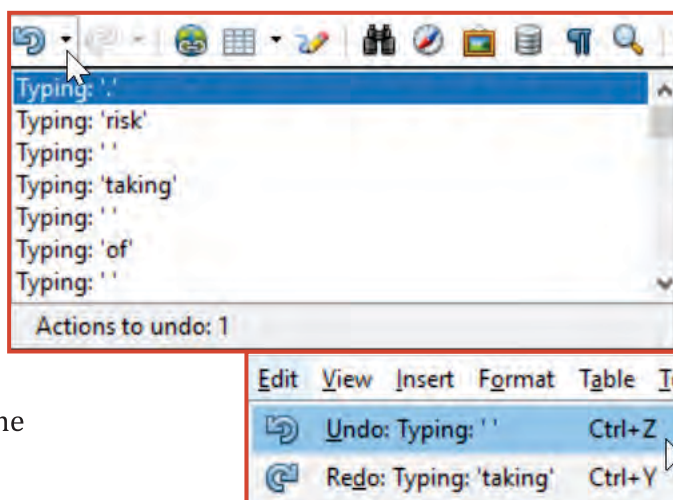


Figure 29: The Undo actions

Redo: If you want to redo the changes, follow the steps given below.

Press Ctrl + Y.

Or

Click the **Redo** icon  on the **Standard** toolbar. There is a triangle right to the **Redo** button. Click on it to display the list of all the changes that can be undone.

Or

Select **Edit** → **Redo**. Edit menu shows the latest changes that can be undone (figure 30).

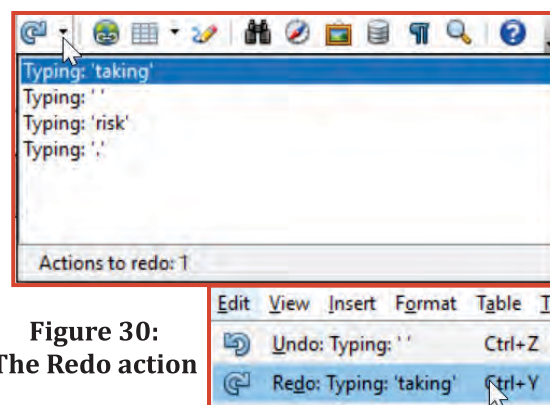


Figure 30:
The Redo action

INSERT AND OVERWRITE MODES IN DOCUMENT

Insert mode

In this mode, when you add new text in a line in the document then the text after the cursor shifted to the right to make space for the text you type. In this mode you can enter the text without replacing the old text (figure 31a).

Overwrite mode

In this mode, when you add new text in a line in the document then it overwrites or replaces the previous text (text after the cursor)(figure 31b).

On the keyboard, press 'Insert' key to toggle between overwrite mode and insert mode.

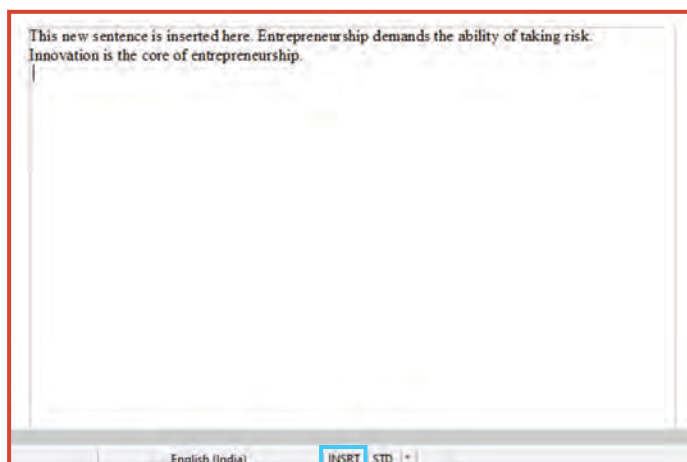


Figure 31a: Insert Mode

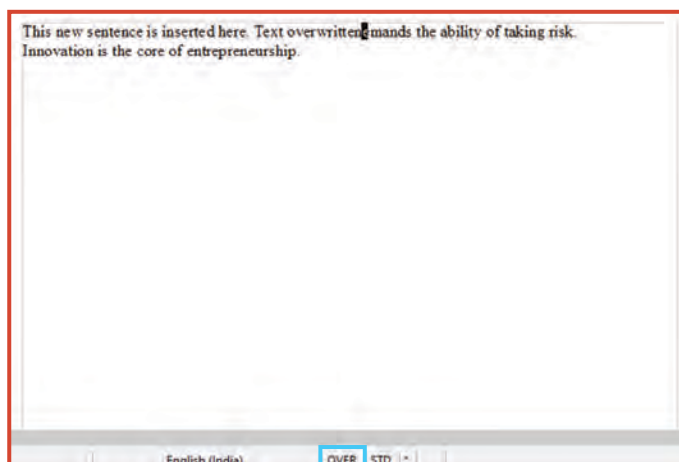


Figure 31b: Overwrite Mode

CHARACTER/TEXT FORMATTING

Character formatting refers to changing the character/text appearance by changing the alignment, font type, style, size and color.

Text formatting using Format menu

To apply any type of formatting on a part of text, you need to first select it.

Select the text to be formatted, click on **Format** → **Character** (figure 32), the **Character** dialog box appears (figure 33). Click on **OK** button.

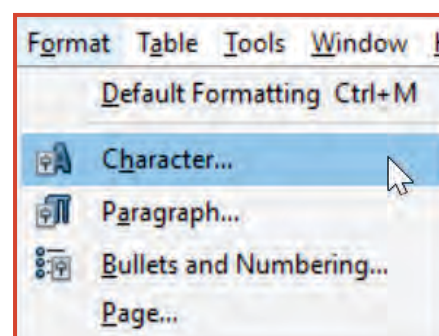


Figure 32: Formatting characters

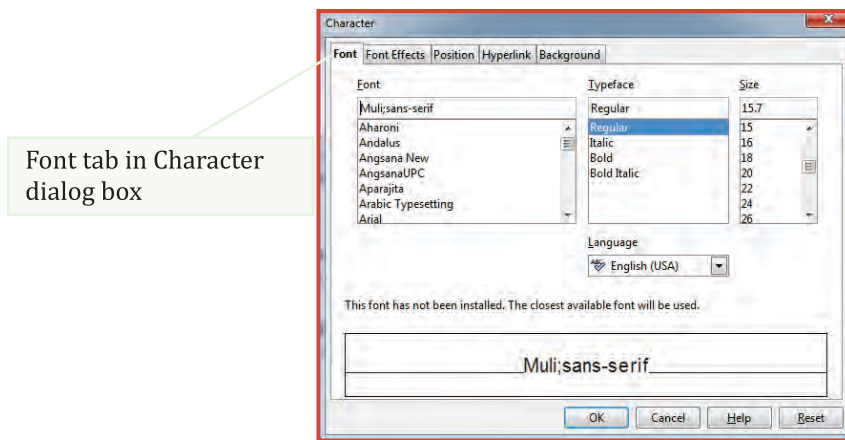


Figure 33: The Character dialog box

In this dialog box, you can format characters/text by setting appropriate values of various options.

1. **To change the Font type:** Click the **Font** tab and select the required font from **Font** list (figure 34a).

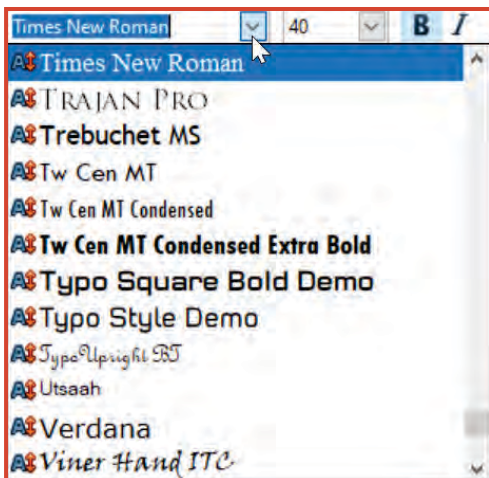


Figure 34a:
Different Font types



Figure 34b:
Different Typefaces



Figure 34c:
Different Font Sizes

2. **To change the font Typeface:** Select the required typeface from **Typeface** list (figure 34b).
3. **To change the font Sizes:** Select the required size for text from **Size** box (figure 34c).
4. **To change the font Colour:** Click the **Font Effects** tab and select the required colour from **Font Color** box (figure 35a, 35b).

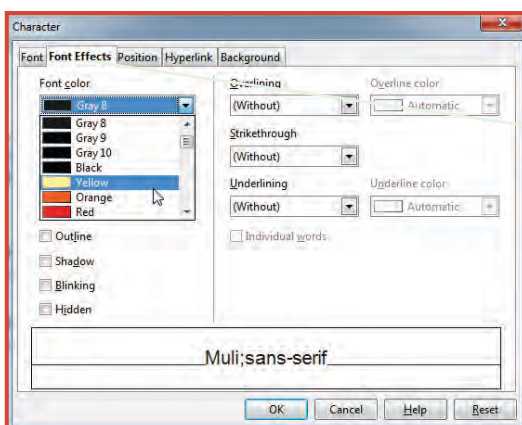


Figure 35a: Selecting Font Effects

FontEffect tab in
Character dialog
box

Different font
colours

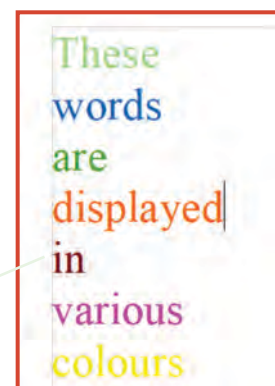


Figure 35b: Different Font
Colors applied on the text

5. **There are some more options available** on **Font Effects** tab such as Effects, Relief (Change Case feature), Overlining, Strikethrough, Underlining. Choose the appropriate styles to apply on the text (figure 36a & 36b).

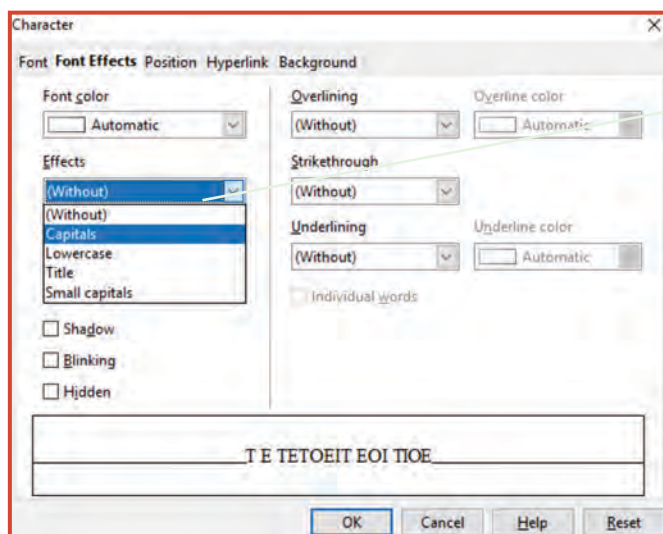


Figure 36a: Selecting Font effects

Applying other text effect

Example of using other text effects

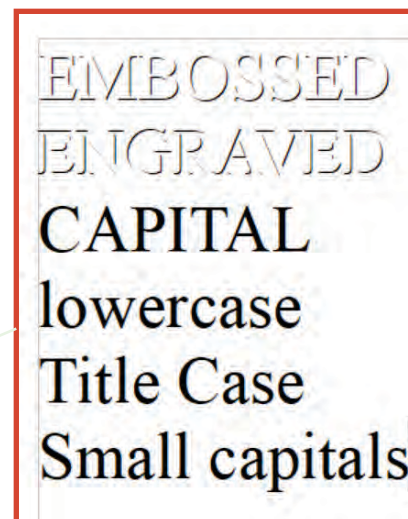


Figure 36b: Different Font effect applied on the text

6. **Using subscript and superscript:** These options are used to raise or lower a character from its normal position. For example, consider the following mathematical equations,

$$a) \quad a^2 - b^2 = (a + b)(a - b) \quad b) \quad (45)_{10} = (40)_{10} + (5)_{10}$$

In equation (a) notice the number '2' which is appearing above the normal position of the text (below baseline). This is called **superscript**.

In equation (b) notice the number '10', which is appearing below the normal position of the text. This is called **subscript**.

To use these options, click the **Position** tab. In the **Position** section, choose either **Superscript** or **Subscript** for a character (figure 37a & 37b).

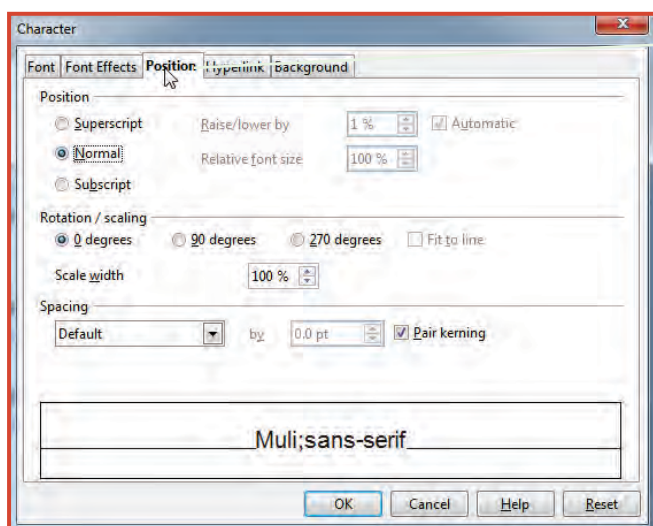


Figure 37a: Selecting Position option

Setting text position

Example of setting text position

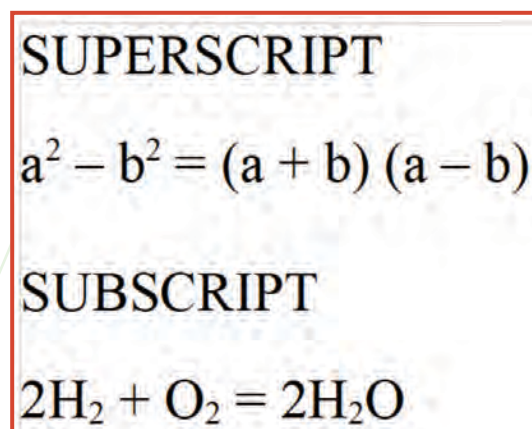


Figure 37b: Different Positions applied on the text

Text formatting using Formatting toolbar

You can also use Formatting toolbar for character formatting by using the tools given in the toolbar (as shown in figure 38).

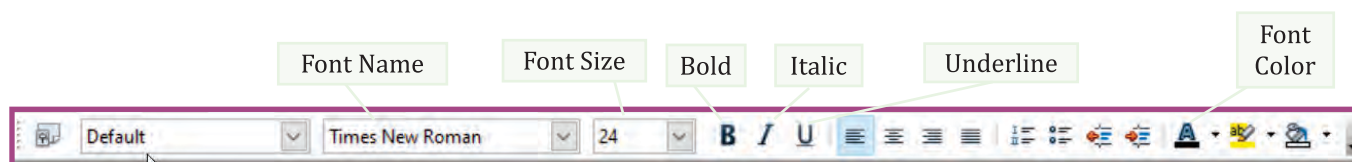


Figure 38: Formatting toolbar

Text Styles(**B**, *I*, U)

Bold: This option change the text into bold face text.

Italic: This option gives the slanting appearance of text.

Underline: This option is used to set the line below the text (figure 39).

Follow the given steps to apply text styles.

1. Select the text.
2. Click on the required text style on the **Formatting** toolbar.
3. Remove selection (by single- click).



Figure 39: Bold, Italic and underlined text

Paragraph Formatting

A paragraph is a portion of the text typed continuously without pressing the **Enter** key and not formatted by default. When you press the **Enter** key, the insertion point will jump to the new line and a new paragraph will start.

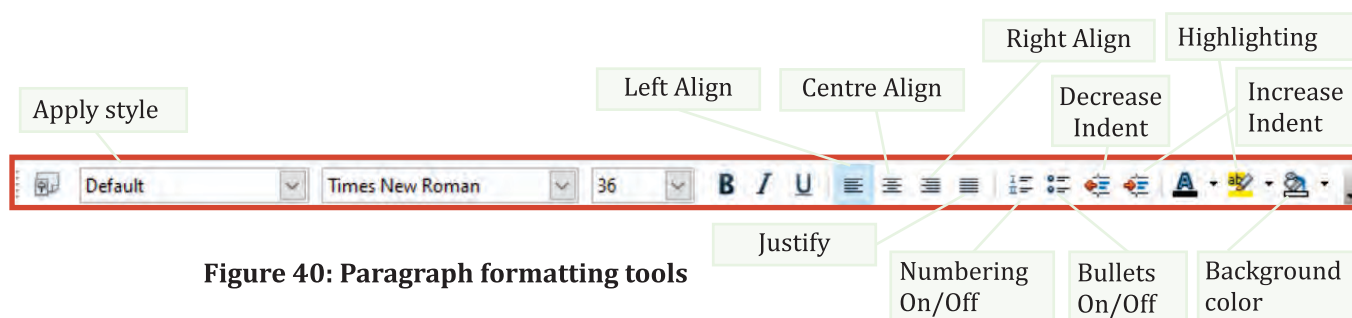


Figure 40: Paragraph formatting tools

Text Alignment

Uniform setting of the text with respect to page margins is called the alignment. Writer provides four types of alignments. These are- left align, centered align, right align and justified align.

- Left Align:** Set the alignment of the text to the left page margin Or press Ctrl + L keys.
- Centered Align:** Set the alignment of the text to the centre of the page margin Or press Ctrl + E keys.
- Right Align:** Set the alignment of the text to the right of the page margin Or press Ctrl + R keys.
- Justify Align:** Set the alignment of the text evenly along both left and right page margin Or press Ctrl + J keys.

Alignment using Format toolbar

To align text, select the text or put the cursor in the paragraph that you want to align and click the required alignment option on formatting toolbar.

For example, to center align text, select the text and click the **Centered** option.

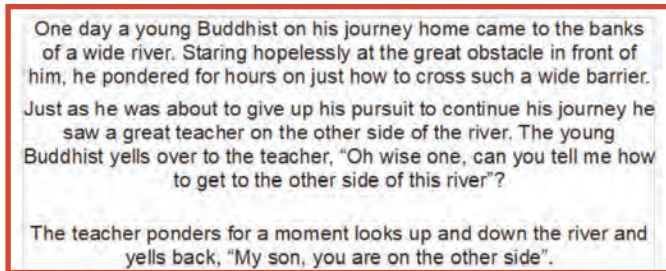


Figure 41a: Center Align

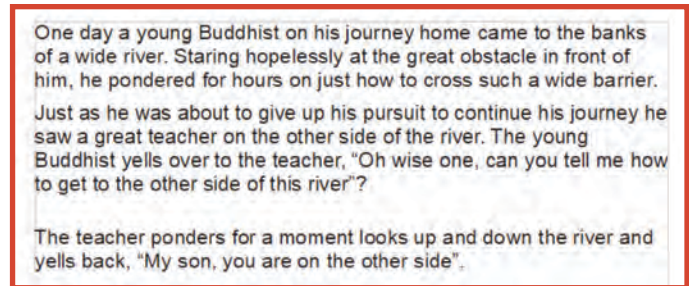


Figure 41b: Left Align

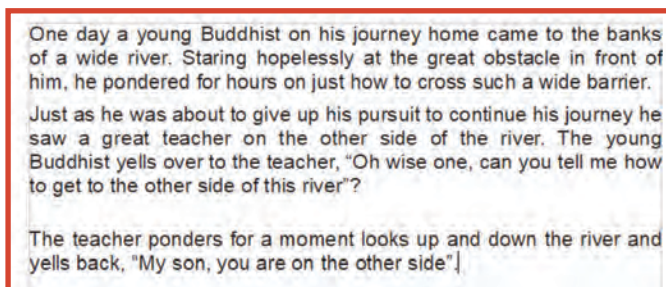


Figure 41c: Justify Align

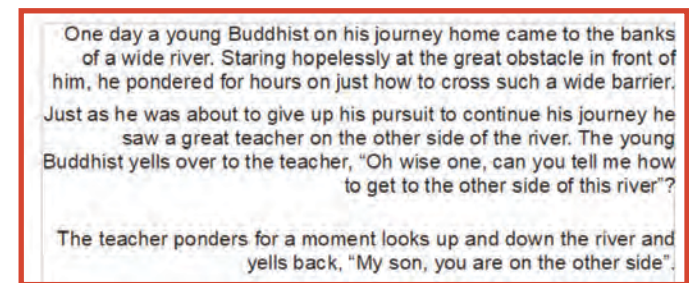


Figure 41d: Right Align

Alignment using Format menu

1. Put the cursor in the paragraph that you want to align.
2. Click on **Format** → **Paragraph** option.
3. In the **Paragraph** dialog box, click on **Alignment** tab.
4. Click on **Left**, **Right**, **Centered** or **Justified** option, as per your requirement (figure 42).

Line spacing and Paragraph Indentation

Line spacing determines the amount of vertical space between lines of text in a paragraph. By default, lines are single-spaced. You can adjust how much space is between lines of text.

Paragraph spacing determines the amount of space above or below a paragraph. When you press **Enter** to start a new paragraph, the spacing is carried over to the next paragraph, but you can change the settings for each paragraph.

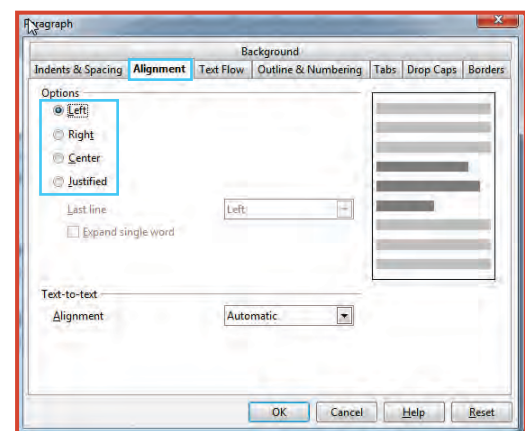
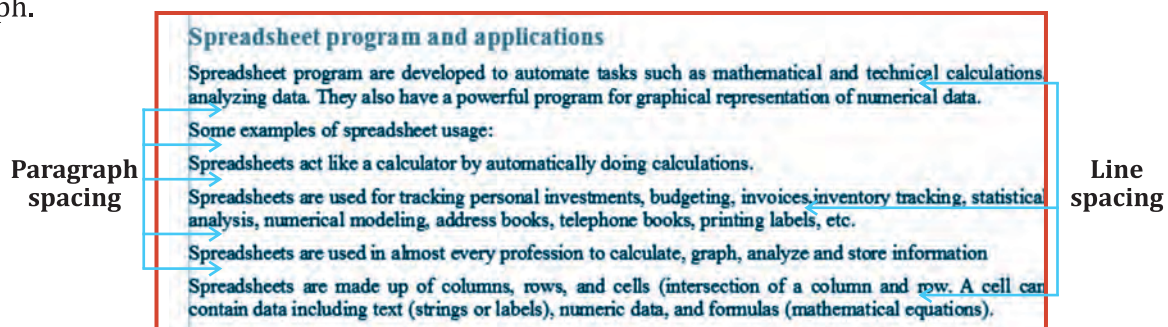


Figure 42 : Paragraph dialog box



Paragraph indentation determines the distance of the paragraph from either the left or the right margin. Within the margins, you can increase or decrease the indentation of a paragraph or group of paragraphs. You can also create a negative indent (also known as an outdent), which pulls the paragraph out toward the left margin. You can also create a hanging indent, in which the first line of the paragraph is not indented, but subsequent lines are.

To use these features in Writer, select the required paragraph.

1. Click **Format** → **Paragraph** option, the **Paragraph** dialog box appears.
2. Click on **Indent & Spacing** tab.

Here you will find several options for indentation and spacing. Let's learn about them.

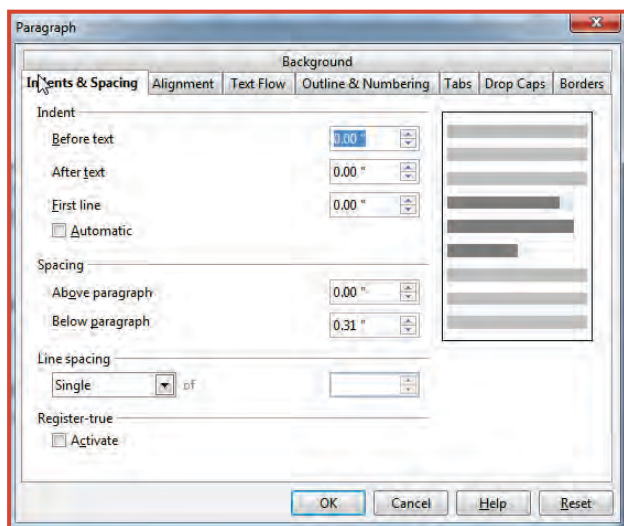


Figure 43: Indent and spacing tab

To specify the hanging indent (figure 44):

- Give positive value in **Before** text box.
- Give negative value in **First line** box.

Indent using Formatting toolbar

To indent paragraph you can also use Decrease indent and Increase indent button available on Formatting toolbar.

Spacing

There are two types of paragraph spacing, **Above paragraph** and **Below paragraph** (figure 45).

Above paragraph: Provide the amount of space to leave before/above the selected paragraph.

Below paragraph: Provide the amount of space to leave after/below selected paragraph.

Line Spacing

In this section you can specify the space to leave between lines in a paragraph. Various options available in this section are **Single** (This is default line spacing), **1.5 lines**, **Double**, **Proportional**, **At Least** (figure 45) etc.

Indent

Following are different indents available in Indent section in **Indents & Spacing** tab (figure 43):

Before text: Here enter the amount of space to indent from the left page margin.

After text: Here enter the amount of space to indent from the right page margin.

First line: It specifies the first line indent. For positive indent you need to provide a positive value and for negative indent you need to provide negative value.

Automatic: It automatically indents the first line according to the font size and line spacing. Indent setting of First line box is ignored.

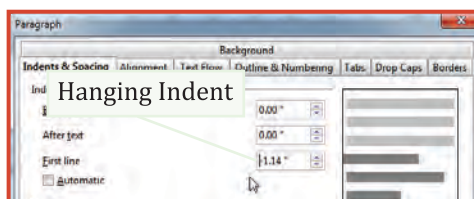


Figure 44: Hanging indent

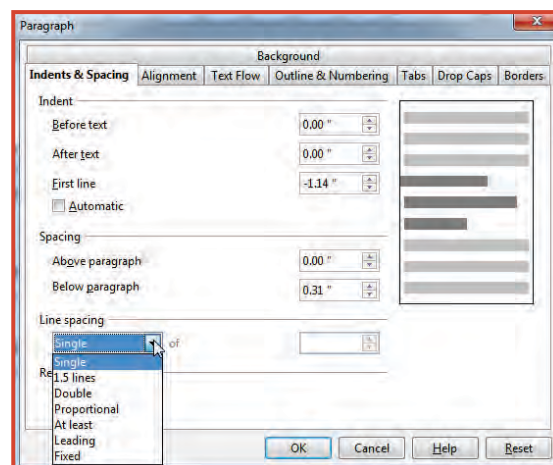
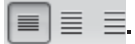


Figure 45: Using Line Spacing option

Line spacing using Formatting toolbar

To set line spacing one can also use line spacing buttons available on Formatting toolbar .

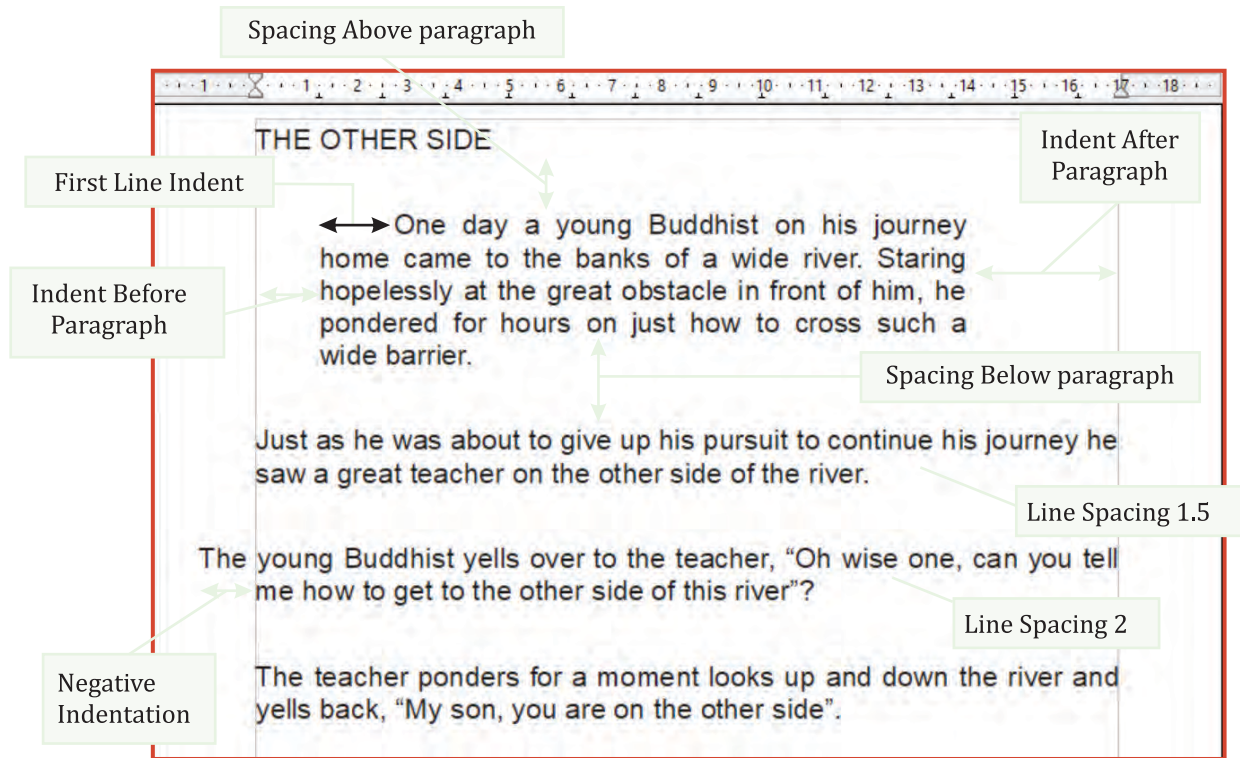


Figure 46: Line Spacing and Paragraph settings

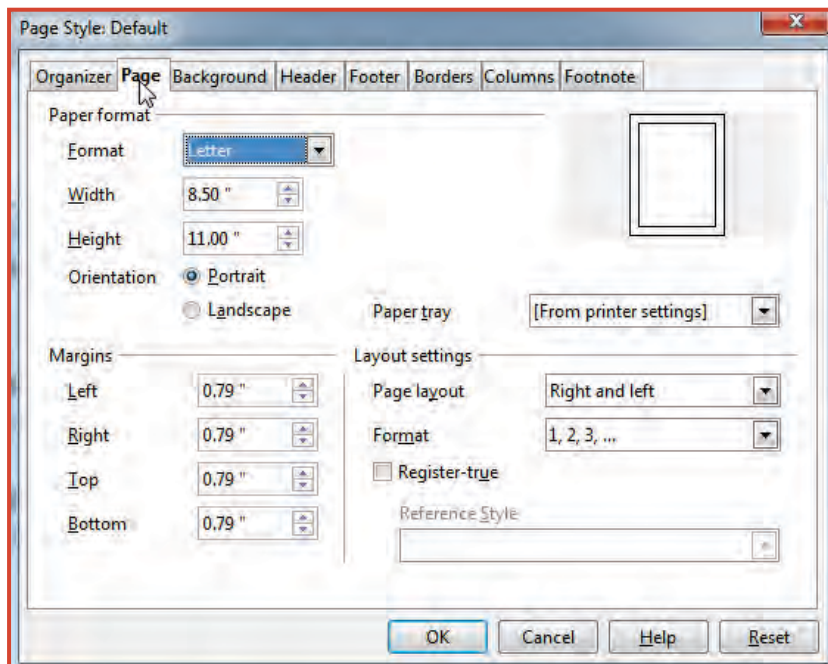


Figure 47: The Page Style dialog box

Page Setting

The Page Setting refers to the process of setting page size, margins and orientation. Writer provides several page styles to modify the document.

To set various page styles, open **Page Style** dialog box.

1. Click **Format** → **Page**, the **Page Style** dialog box appears (figure 47).

The following settings can be done with the help of **Page Style** dialog box.

i) Page Size

To set page size of your document,

1. Click on **Page** tab in **Page Style** dialog box.
2. In **Paper format** section, click on **Format** list box and select any one set page (figure 48). For example, 'A4'. By default page size is 'Letter'.

For customized page size (page size other than given in the **Format** list),

1. In **Paper format** section, set required **Width** and **Height** of the page (figure 49).

ii) Page Orientation

There are two page orientations provided by Writer:

1. Click on **Page** tab in **Page Style** dialog box.
2. In **Paper format** section, choose any one orientation- **Portrait** or **Landscape** (figure 50a).

By default page size is Portrait.

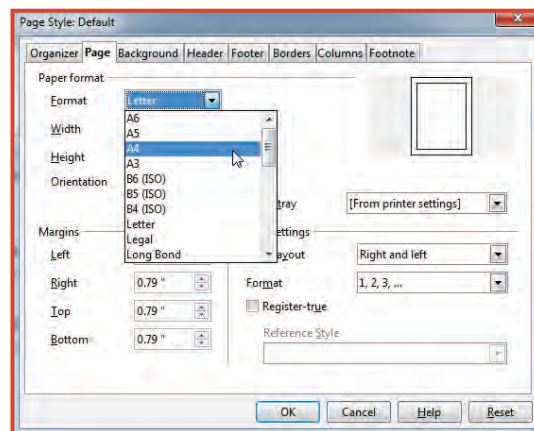


Figure 48: Setting page size

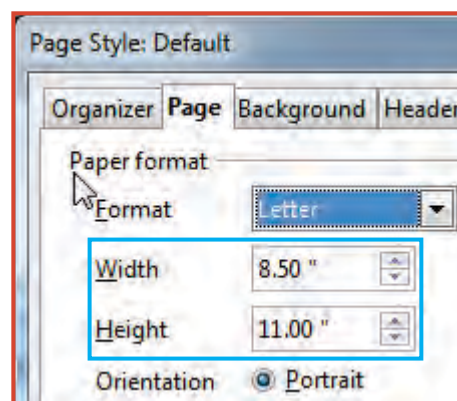


Figure 49: Setting Width and Height of page

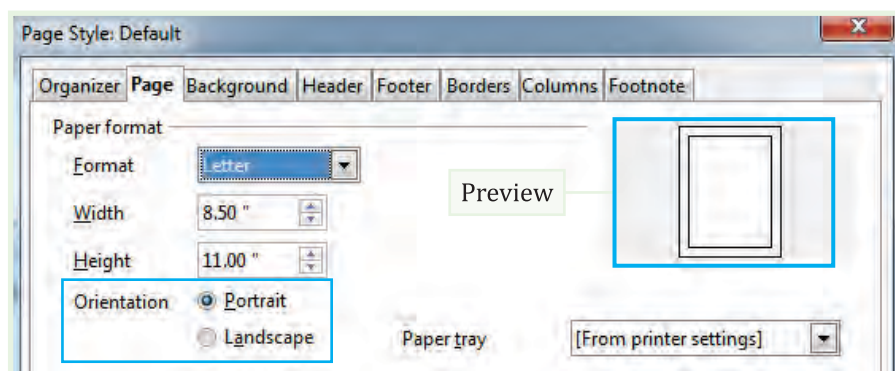


Figure 50a: Setting page orientation

iii) Page Margin

It refers to the blank white areas near the edges of the page in the document. The Writer provides two ways to set page margins:- using **Page Style** dialog box and **Ruler**.

a) Using the Page Style dialog box

1. Click on **Page** tab in **Page Style** dialog box (figure 51).
2. In **Margins** section, specify desired margin values in **Left**, **Right**, **Top** and **Bottom** spin boxes.

For example, to set the left and right margins to 1.5", click the up arrows in the left and right spinner boxes. Alternatively, enter the values and click on **OK** button.

Figure 50b: Portrait

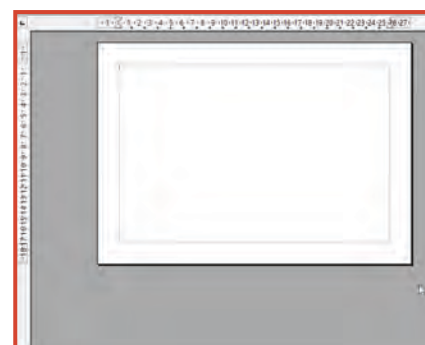
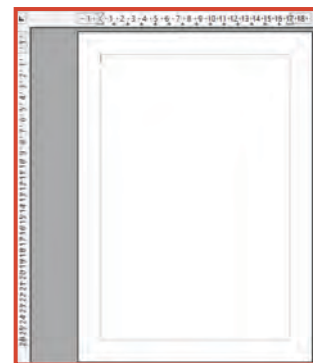


Figure 50c: Landscape

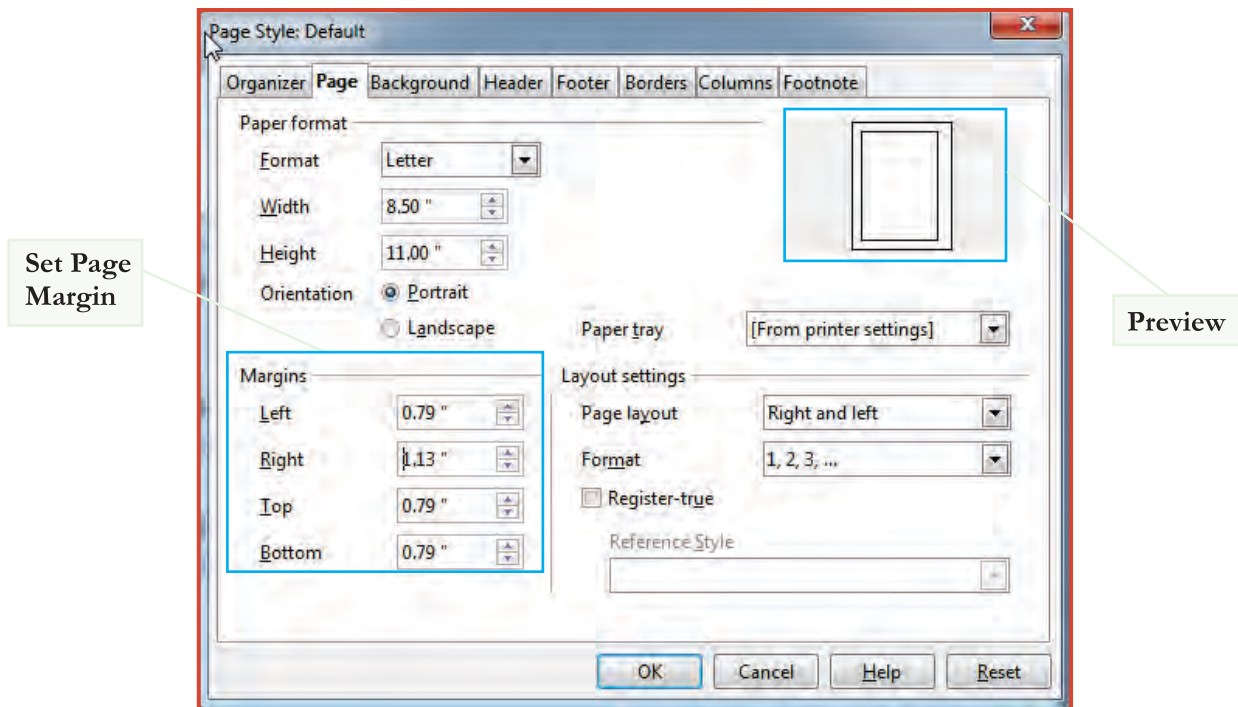


Figure 51: Setting Page margins

b) Using the Rulers

To set the page margin using ruler bars, do the following:

1. Move the mouse over the shaded area of the ruler (shaded shows the margin).
2. The pointer turns into a double-headed arrow. Keeping the left mouse button pressed, drag the margin indicator to the required margin (figure 52).
3. Leave the mouse button.

You can set all four margins using rulers.

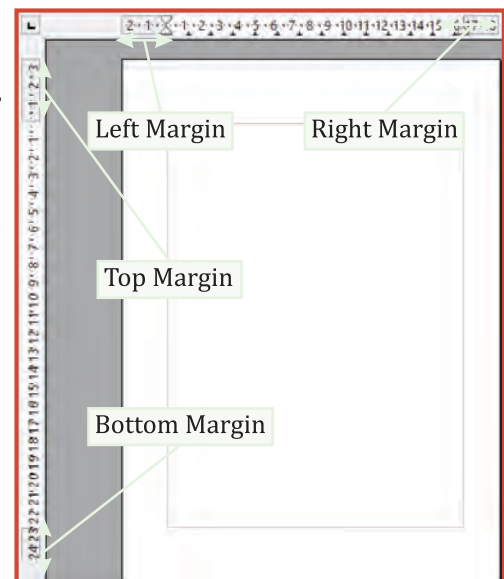


Figure 52: Different page margins of the document

Border and Shading

This feature is used to set page border and shading in the document. It enhances the look of the document.

There are different border options available with different styles.

To give border to the page(s) do the following:

1. Click **Format** → **Page**, the **Page Style** dialog box appears.
2. Click on **Border** tab in **Page Style** dialog box.
3. Select the desired border and shading options (figure 53).
4. Select the desired color for page border and shading click on **OK** button.

Note: To set a page border on all four sides select All four sides border button in Line arrangement section in Border tab (figure 54a).

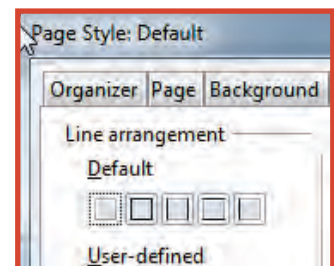


Figure 53: Border options

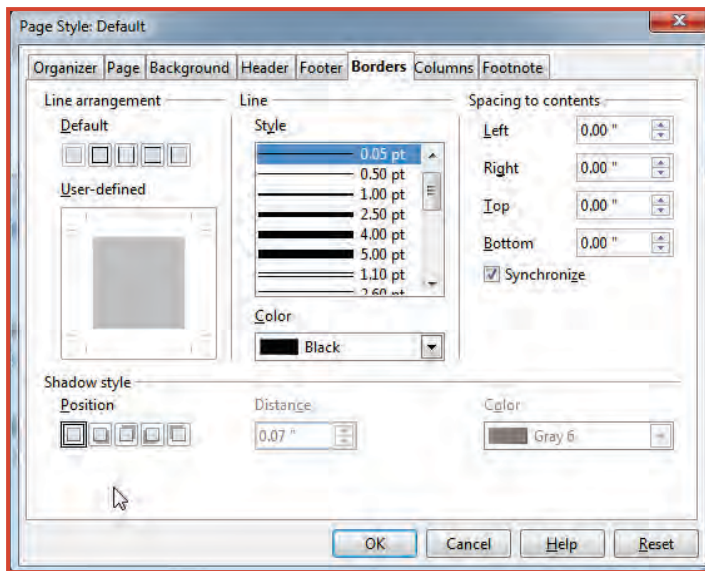


Figure 54a: Border tab on Page Style dialog box

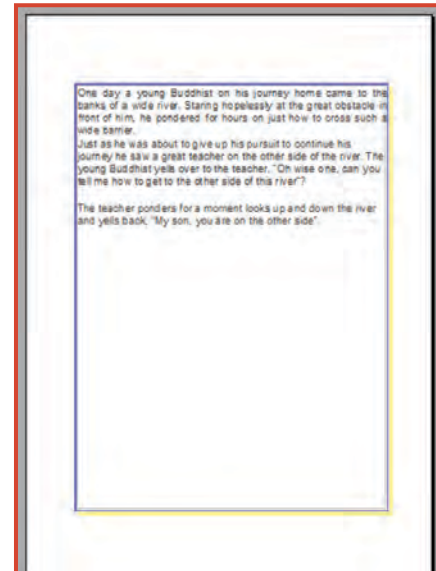


Figure 54b: A border on the page

Multiple-Column Page Setting

You must have seen newspapers and noticed that there are multiple even-spaced columns of news in it. You can set multiple columns on the page in your document (new as well as existing). To set multiple columns in the document:

1. Click **Format** → **Page** and select **Columns** tab in **Page Style** dialog box (figure 55a).
Or Click **Format** → **Columns**, a **Columns** dialog box appears.
2. In **Settings** section, specify the number of columns. You can select number of columns from **Columns** list box or predefined multiple-columns patterns.
3. In **Width and spacing** section, specify the width of columns and spacing between the columns.
4. You can set line separator from **Separator line** section.
5. Click on **OK** button.

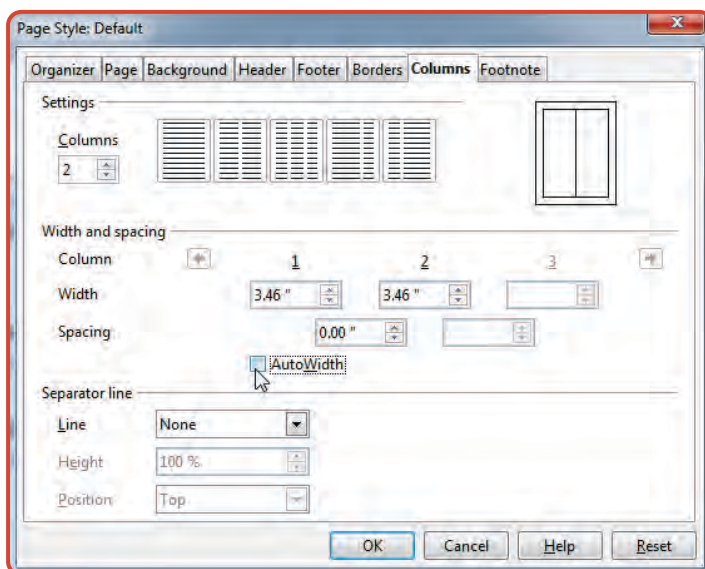


Figure 55a: Columns tab on Page Style dialog box



Figure 55b: Two-columns setting on the page

Using the Format Paintbrush

This option allows you to copy the formatting of a text or object and apply it to another. It can be font size, font style, font type, font color etc. To copy the format

1. Select the text whose formatting you want to copy.
2. Click the **Format Paintbrush** button  on the **Standard** toolbar. The shape of the cursor changes to a paint bucket.
3. Drag the cursor over the text to be formatted so that the copied formatting is applied.

Note: Double-click the Format Paintbrush button, to apply the same selected formatting to multiple places in the document.

Glossary

Word processor	:	A word processor is an application that is used to create, edit, format, organize and print the documents.
WYSIWYG	:	What You See Is What You Get
Editing	:	Editing is the process to make changes in the document. The term 'editing' includes deleting, moving and replacing of the text.
Text Selection	:	By selecting a piece of text you tell the application that you want to work with this specific piece of text.
Formatting	:	Formatting refers to changing the text appearance by changing the alignment, font type, style, size, etc.
Paragraph	:	It is a portion of the text typed continuously without pressing the Enter Key and not formatted by default.

You have learned

- ✓ Writer is the word processing component of OpenOffice.org.
- ✓ With WYSIWYG, the screen shows you exactly how your document will look and when you take its print out.
- ✓ Writer saves the document with extension '.odt' by default.
- ✓ Copying the text means to copy the text from the original location to some other location.
- ✓ Moving the text means to move the text from the original location to some other location.
- ✓ Find & Replace feature helps to search for a specific word, line or a phrase.
- ✓ Track change tool is used to keep track of the changes made in an original document.
- ✓ Using the Spelling & Grammar option, all the spelling and grammatical mistakes which has occurred while typing can get corrected.
- ✓ Undo is used to revert back to the previous step and Redo is used to go back to the step while Redo is used to redo the changes.
- ✓ Alignment is used to set the direction of text in the document.

- ✓ Line spacing determines the amount of vertical space between lines of text in a paragraph.
- ✓ The Page Setting refers to the process of setting page size, margins and orientation.
- ✓ Format Paintbrush option allows you to copy the formatting of a text or object and apply it to another.

Solved Questions

1. What is a word processor?

Ans. A word processor is an application that is used to create, edit, format, organize and print the documents. For example, MS Word, OpenOffice.org Writer, WordStar etc.

2. Write some important features of word processor?

Ans. Some of the important features of word processor are following:

- WYSIWYG
- Word Wrap
- Page Setup
- Insert Graphics
- Layout
- Macros
- Merge
- Spell checker
- Search & Replace
- Print

3. What are different interface parts of Writer window?

Ans. Main parts of Writer window are following:

- Title Bar
- Menu Bar
- Standard Toolbar
- Formatting
- Ruler
- Scroll Bars

- Document Area
- Status Bar
- Zoom Control

4. Define the term Editing.

Ans. Editing is the process to make changes in the document. There are many ways through which we can edit the document. The term 'editing' includes deleting, moving and replacing of the text.

5. Which option helps you to search for a particular text in a document and replace it with other?

Ans. Find & Replace feature helps to search for a specific word, line or a phrase. Instead of reading and going through the entire document, you can make use of this feature.

6. What is the use of Track Change tool?

Ans. Track Change is used when you create an original document and make changes and want to keep track of the changes that are made to that original document.

7. What can you do with the help of Spelling & Grammar option?

Ans. Using the Spelling & Grammar option, all the spelling and grammatical mistakes which has occurred while typing can get corrected.

8. How can you check about wrong spelled words and grammatical mistakes in your document?

Ans. While typing the text, if the spellings are wrong, there will be a red wavy line under it. And if there is some grammatical mistake, you will see a green wavy line under it.

9. What is the main difference between Insert mode and Overwrite mode?

Ans. In Insert mode when you add a new text in a line in the document then the text after the cursor is shifted to the right to make space for the text you type. While in Overwrite mode when you add a new text in a line in the document then it overwrites or replaces the previous text (text after the cursor).

10. What is character formatting?

Ans. Character formatting refers to changing the character/text appearance by changing the alignment, font type, style, size and color.

11. Define paragraph.

Ans. A paragraph is a portion of the text typed continuously without pressing the Enter Key

and not formatted by default. When you press the Enter Key, the insertion point will jump to the new line and a new paragraph will start

12. What is alignment? How many types of alignment are there in Writer?

Ans. Uniform setting of the text with respect to page margins is called the alignment. Writer provides four types of alignments. These are-left align, centered align, right align and justified align.

13. What can you do with Page Setup option?

Ans. Using Page Setup option you can set page size, margins and orientation.

14. What is the use of Format Paintbrush?

Ans. This option allows you to copy the formatting of a text or object and apply it to another.

Work Out Time

A. Choose the correct answer.

1. For what purpose is word processors used?
 - a) Photo Editing
 - b) Typing
 - c) Engineering Drawing
 - d) Downloading
2. Which of the following is not a part of Writer interface?
 - a) Standard Toolbar
 - b) Status Bar
 - c) Formatting Toolbar
 - d) Formula bar
3. Shortcut key to create a new document is,
 - a) Ctrl + D
 - b) Ctrl + N
 - c) Ctrl + C
 - d) Ctrl + F
4. Which option is used to copy the text from one location to another?
 - a) Cut, paste
 - b) Redo
 - c) Copy, paste
 - d) Format Painter
5. _____ feature is used to search for a word in a document.
 - a) Find & Replace
 - b) Track Change
 - c) Spell Check
 - d) None of these
6. Home key is used to move the cursor to,
 - a) End of the document
 - b) End of the line
 - c) Beginning of the document
 - d) Beginning of the line

7. Writer saves the document with extension _____.
a) .doc
b) .txt
c) .htm
d) .odt
8. Shortcut key to select the text in a paragraph from the cursor position to the end of the paragraph is,
a) Shift + Home
b) Ctrl + A
c) Ctrl + Shift + Home
d) Ctrl + Shift + Down
9. Which tool is used to find all the spelling and grammatical mistakes in the document?
a) Track change
b) Spelling & Grammar
c) Find & Replace
d) None of these
10. Which of the following determines the vertical space between lines in a paragraph?
a) Paragraph Indent
b) Alignment
c) Line spacing
d) Paragraph spacing
11. The area in Writer window in which you can type is called,
a) Menu bar
b) Status bar
c) Text area
d) None of these
12. Default text alignment of text in Writer is _____.
a) Justified
b) Right
c) Center
d) Left
13. Default line spacing between lines of text in a paragraph in Writer is _____.
a) Single-spaced
b) 1.5 lines
c) Double
d) Proportional
14. What is default page size in Writer?
a) A4
b) A3
c) Legal
d) Letter
15. Which one is in proper sequence (commands in File menu)?
a) New, Open, Save, Save As
b) New, Open, Recent Documents, Wizards
c) New, Open, Save, Close
d) New, Open, Save, Exit

B. Short answer type questions.

1. What are the uses of Word Processor?
2. Write the name of some commonly used word processors.
3. Define macros in Writer.
4. What happens when you try to close the document without saving it?
5. What is the difference between Save and Save As tools?
6. Name some of the operations used in Editing the text.
7. Define the term WYSIWYG.

8. Why it is required to select the text before editing?
9. Write the difference between Undo and Redo?
10. What is formatting? What are its uses?
11. What is paragraph spacing?
12. Define margins in a document.

C. Long answer type questions.

1. Write about the main parts of Writer window.
2. Write about Spelling & Grammar option and methods to correct a spelling mistake.
3. Write the use of Font tab on the Character dialog box (opened from Format menu).
4. Explain Subscript and Superscript options with the help of examples.
5. Explain four types of alignments. Also write the methods of alignment using Format menu and Format toolbar.
6. Write about paragraph indentation. Also explain four types of paragraph indentation with example using Format menu.

D. Write the steps to do the following.

1. Open an existing document.
2. Select two lines of text in a paragraph with the help of mouse and keyboard.
3. Move a paragraph from page 1 to page 2 in the document.
4. Find a word 'smile' and replace it with 'pleasure'.
5. You have created a project and gave it to your teacher for checking. Now keep track of the changes/ corrections made by your teacher in your project.
6. Change page size 'letter' to 'A4'.
7. Change page border.
8. Set multiple columns (3 columns) in the document.

E. Fill in the blanks.

1. A _____ is an application that is used to create, edit, format, organize and print the documents.
2. A _____ is a character or word that represents a series of keystrokes.
3. _____ contains menus such as File, Edit, View, Insert, Format, Table, etc.
4. The term 'editing' includes _____, _____ and _____ the text.
5. _____ key is used to move to the beginning of the line.
6. Moving of text means to move the text from the original location to some other _____.
7. Find tool is used to _____ a particular word or a line.
8. _____ formatting refers to changing the text appearance.
9. Writer provides _____ types of text alignments.
10. There are two types of page orientation _____ and _____.



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