Computer Generation

① First Generation (1942-1955)

The Early Computer where manufacatred using vaccum tubes. A vaccum tubes is switching devices. A vaccum tubes a fragile glass device using filaments as a source of electronic. These vaccum tubes computers could perform calculations in millisecond (10^{-3}) where first generation computers. example: Mark-I computer, ABC (Atanasoff Berry Computer), ENAIC (Electronic Numerical Integrater and Calculator), EDVAC (Electronic Discrete Variable Automatic Computer), EDSAC (Electronic Delay Storage automatic calculator)

Characteristic of First Generation Computer

- They were very bulky in size, required large rooms.
- These computers were difficult to program and use.
- The vaccum tubes used more power and Generated heat.
- The vaccum tubes had Alament which had limited life.

② Second Generation (1955-1964)

In second generation computers a new electronic switching device called transistors replaced vaccum tubes. The transister where very small, used less power, cheap and 10 times faster than vaccum tubes. Magnetic tapes were uses as storage medium. after that magnetic disk was also develop.

Characteristic of Second Generation Computer:

- They were smaller them first generation computers.
- They consumed less power and dissipated (gave out) less heat.
- They were more faster and had higher storage capacity.

③ Third Generation Computer (1964-1975)

In 1958, The first intergrated ~~toto~~ circuit was developed and Integrated circuit are those circuit consisting of several electronic components such as resistors, Indicator, capacitor, transistors grown on a single chip of silicon without necessity of wires. So IC technology is also known as micro electronic.

Characteristic of third Generation Computer

- They were more powerful than second generation computer. They were capable were performing one millions instructions.

- They had faster and larger storage.

- These machines were used for both scientific and commercial uses.

- These computer used less power and generated less heat.

- Earlier the IC used SSI technology (Small Scale Intregration) and later MSI technology (Medium scale intregration)

  SSI (up to 1000 electronic components in a single chip)

  MSI (1000 to 3000 electronic components in a single chip)

Example: IBM 360 series
First commerical Computer - PDP-8
First commerical application - DEC.Ltd

Fourth Generation Computer (1975-1989)

Fourth Generation computer used LSI (Large Scale Intregration) $30000 electronic components in a single chip & and followed by VLSI (Very Large Scale Interegration) & more than million components in a single chip &

These progress led to the development of microprocessor. A micro-processor contains all circuits to perform arithmetic logical & control functions.

During four Generation different software like windows, mac os, Linux, unix, developed, the computer became general purpose machine.

The semi-conductor technology replace magnetic core memories.

Graphical User Interface (GUI) was develop rapidally.

Example: Apple II (1978), IBM PC (1980)

Fifth Generation Computers (1989-present)

In fifth generations computers the production of microprocessor having ten millions electronic component in a single chip using VLSI technology.

The microprosessors became more powerful and the development of multicore processor was introduce.

During fifth generation optical disk known as cd was portable

Storage media.

Features:

- Portable PC's a known as notebook or laptop are much smaller and handy then pc of fourth Generation.

- They consumed less power then previous @ generation.

- They are General ~~pur~~ purpose machines

- The technology develop were www, Java and different programming languages.

- They are easy to used and learn.

- They have plug & play features

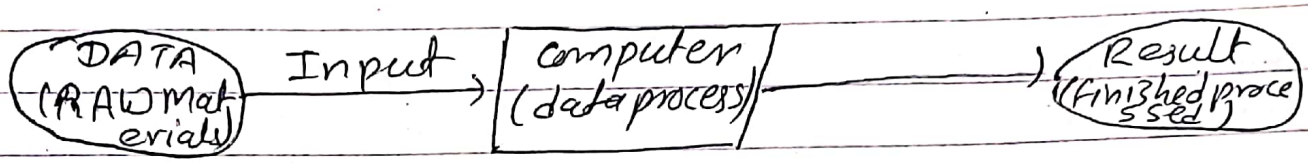
Use of ~~sta~~ standard high level programming languages allow programs written for one computer to be easily used to another computer.

(1)

Introduction

Computers

Computer is an electronic device that takes raw data as an input and process or calculates through different operations and provides the output.



Charecteristics of computers:

① Automatic: An automatic ~~computer~~ machine works by itself without human intervention. Computers are automatic machine because once they carry out the work, they can finish the task without any assistant.

② Speed- A computer is a very fast device in other words computer can do a task in few minutes that would take a man his entire life.

③ Accuracy- A computer performs every calculations accurately

④ Memory- A computer can store huge amount of information that can be retrived at any time.

⊛ Judgement (No feelings): A computer cannot do any task itself.

Evolution of Computer

- Blaise Pascal invented first mechnical machine in 1642 A.D
- In 1671, Leibniz invented the first calculator for multiplication.
- In 1870's Herman Hollerith invented punch card as an input medium.
- Charles Babbage which also known as father of computer, design a differentiea engine in 1822, In 1842 babbage came out with his new idea of compeletly automatic analytical Engine for performing basic arithmetic operations.

- In 1940, Dr. John von neuman introduce the stored program concept which is the basic idea of operations in modern digital computers.

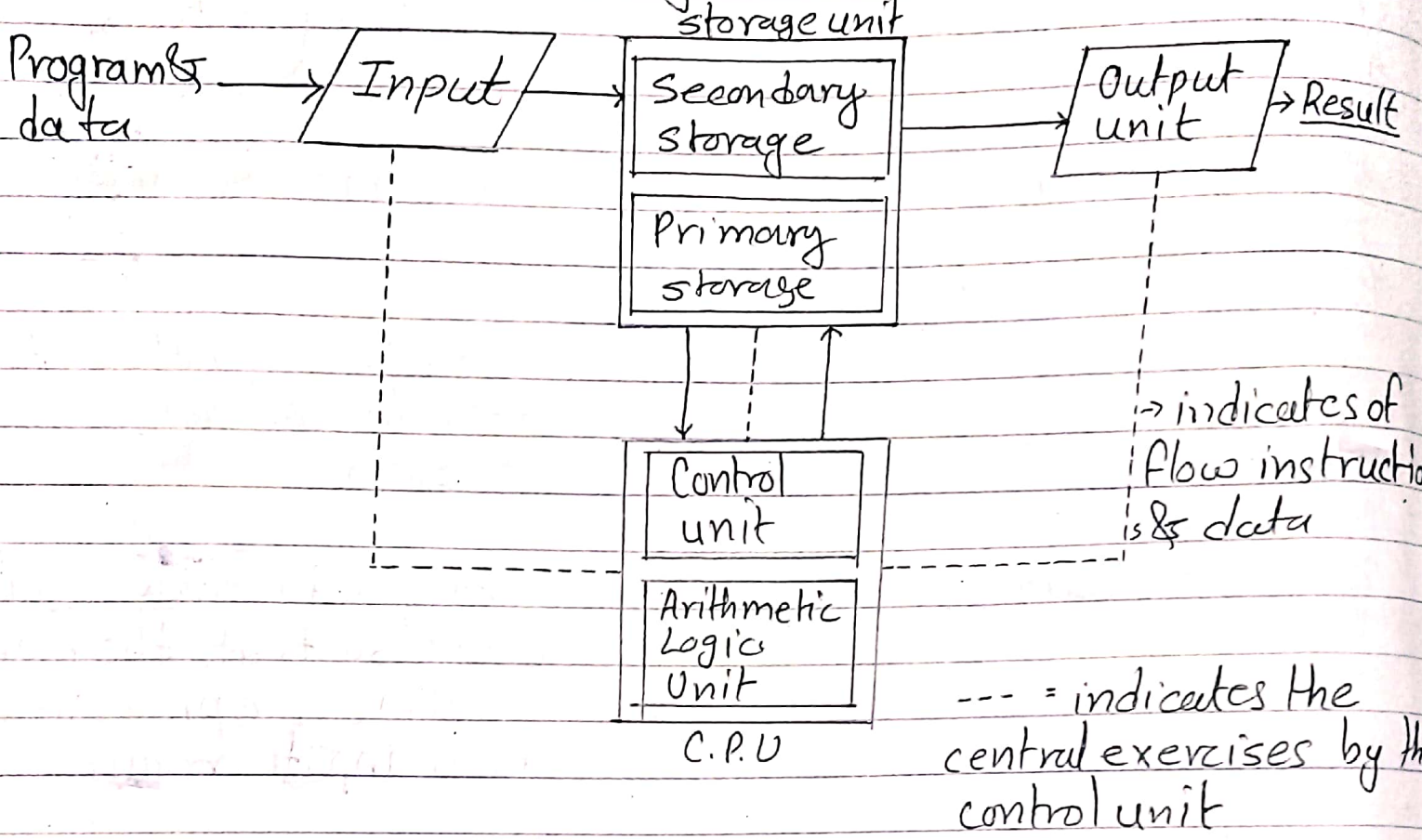
Types of computer

SN.	Types	SPECIFICATIONS
1.	PC (Personal Computer)	It is a single user computer system. having moderately micro processors.
2.	Workstation	It is a single user computer system similar to pc. However has a more powerful CPU.
3.	Mini Computer	It is a multiuser, computer system capable of supporting 100 of user simultaneously.
4.	Mainframe computer	It is a large size computer that supporting 1000 of user simultaneously.
5.	Super computer	Super computer are extremly fast computers that can excute 100 of million of instructions per second.

All types of computer follow the basic logical structure and perform of the following five basic operations given below:

S.N	Operations	Descriptions
1.	Take input	The processor of the entirely from the data into the computer system.
2.	Store data	Saving data and instructions so that they are available for processing as an when required.
3.	Processing data	Performing airthmetic and logical operations on data in order to convert them into useful information.
4.	Output information	The process of producing useful information for the user such as printed report or visual display.
5.	Control the work flow	The computer directs the manner and sequence in which all above operations are performed

Basic Computer Organization



Motherboard - A motherboard is the main Printed Circuit Board (PCB) found in General purpose computers and other expendable system. It holds and allows communication between many of the important component of a system such as CPU, memory, and provides connetors for other peripherals.

Motherboards specially refers to a PCB with expension capability and as the name suggest this board is often refers as "mother" of all component attached to it, which often include peripherals, sound card, video cards, network cards, harddives etc.

Power Supply Unit (PSU)

The power supply unit is the piece of hardware that is used is the piece of hardware that is used to convert the power provided from the outlet into useable power for the many ports inside the computer case.

It converts the alternative current into a continuous form of power that the computers components need in order to run, normally called Direct Current (DC). The PSU is mounted just inside the back of the case. There is a also a fan opening at the back of the power supply. That send airout the back of the computer case. The side of the PSU has a power switch.

BIOS (BASIC INPUT OUTPUT SYSTEM)

BIOS which stand for basic input output system, is a software storage on a small memory chip on the mother board. It is BIOS that is responsible for the computer operation and therefore makes it the very first software to run.

The BIOS firmware is non-volatile meaning that its setting are saved and recoverable even after power has been remove.

★ What is BIOS used for?

⇒ BIOS instructed the computer on how to perform a number of basic functions such as booting and keyword controll. It is also use to identify and configure the hardware

in a computer such as harddrive, optical drive, CPU, memory. BIOS is accessed and configured to the bios setup utility. All mordern computers motherboard contain bios software. Some of the company develop BIOS :- Dell, IBM Phoenix - Technologies, Gateway.

CPU (Central Processing Unit)

CPU is just like the brain of the computer. It performs all the calculations and controls all the operation of the computer system. There are two basic component of a CPU. They are control unit (CU) & Arithmetic logic unit (ALU). The Control Unit selects and interpretes program instructions and then manages their execution. The CPU also has speeial purpose register and general purpose register. The registers are storage units that store program and data temporarily.

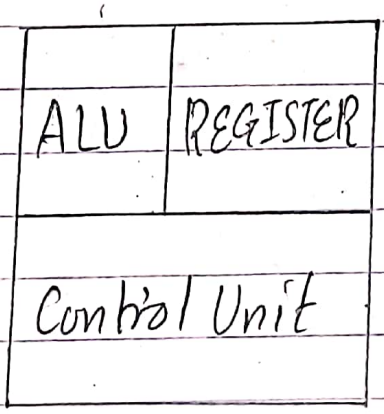


Diagram of CPU

REGISTER

- Special purpose register
- General purpose register

Special purpose register (Example):

→ Program counter (PC)
→ Instruction Register (IR)
→ Memory Address Register (MAR)

General purpose register (Example):

→ B
→ C
→ D
→ E
→ H
→ L

ALU (Arithmetic Logic Unit)

ALU is the place where the execution of instructions takes place like add, subtract, multiple, divide etc. The CPU is comprised of ALU that does arithmetic and logical operations. CPU is contained on a single tiny silicion chip known as microprocessor.

What do you mean by instructions and instruction set?

Answer: The programs or operations that is given to a CPU is known as instruction and the list of instructions that

the CPU can perform is known as instruction set.

Processor speed

The CPU performs at a very high speed. The speed of the processor is measured in megahertz, gigahertz.

1 megahertz = 10^6 hertz
1 gigahertz = 10^9 hertz

Normally, we measure the processing speed of a PC in MHZ or GHZ. But in case of workstations, minicomputer and mainframe computers. we measure the speed in MIPS (Millions of instructions per second) or BIPS (Billion of instructions per second). In super computers the speed measured in MFLOPS, GFLOPS and TFLOPS.

MFLOPS = Millions of floating point operation per second.

GFLOPS = GIGA of floating point operation per second

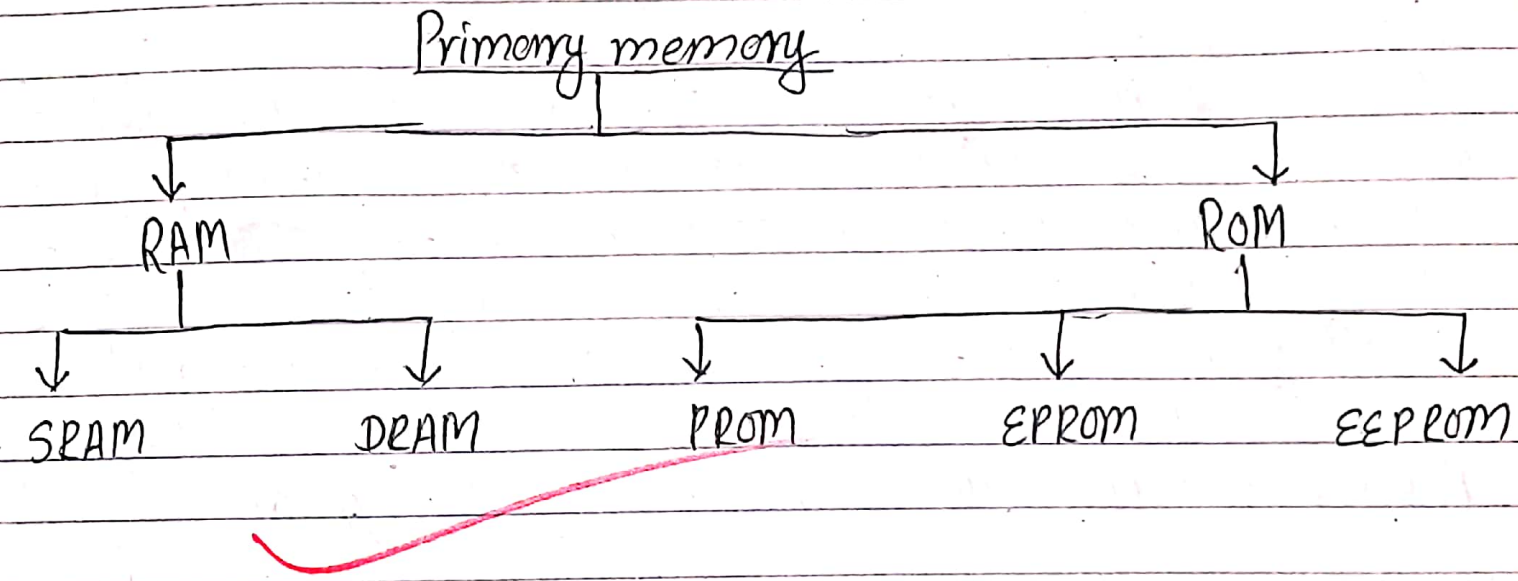
TFLOPS = TERA of floating point operation per second.

MEMORY

The computer needs the storage capacity to store instructions, programs and data. Mainly there are 2 types of memory. They are

i) Primary memory
ii) Secondary memory

The performance of a computer also depend upon the speed and storage capacity of memory.



Primary memory (Main memory):

Primary memory holds those data instructions on which the computer is currently working. It has a limited capacity and the data is lost when the power is switched off. They are generally made of semiconductor devices.

Characterstices of main memory.

i). It is the working memory of a computer.
ii). These are faster than secondary memory.
iii). A computer cannot run without primary memory.

There are two types of primary memory

i) RAM
ii) ROM

RAM (Random Access Memory)

It is the random aeeess memory which is volatile. It stores the data and program, and program result. It is a read/write memory which store the data until the machine is working.

RAM is volatile that is the data store in it is lost when the we switch off the computer or if there any power failure. RAM chips are a two types:

i) Static RAM (SRAM)
ii) Dynamic RAM (DRAM)

Static RAM (SRAM)

It is the static random aecess memory which does not need any special circuit to keep the stored data. It is made of transistors. The S-RAM does not need to be refresh reguraly

SRAM Features:-

i) It has long life.
ii) No need to refresh.
iii) It is faster then DRAM.
iv) It consumed more power.
v) It used as cache memory.

DRAM (Dynamic Random Access Memory)

Unlike SRAM, Dynamic RAM most be refresh in a continuous way in order to maintain the data. This is done by placing an extra circuit to refresh. DRAM is use for most system memory. As it is cheap and small.

DRAM Features:

i) It is slower then SRAM.
ii) It is smaller in size but have larger capacity.
iii) It is cheap.
iv) It consumed less power.
v) It need contin refresh.

ROM (Read Only Memory)

The ROM is non-volatile memory chip in which data is stored permanently. Usually, programs cannot change this data. A ROM chip doesnot loss its stored data in case

of power off. ROM is also known as field stores, pemanent stores, dead stores. System designers use ROM mainly to store programs and data which do not change and are used frequently. The following are the types of ROM:-

i) PROM (Programmable read only memory)
ii) EPROM (Erasable Programmable read only memory)
iii) EEPROM (Electrically Erasable Programmable read only memory)

i) PROM

* PROM is the read only memory that can be modified only once by the user. Once the user programs are store in a PROM chip, the system can excuate at a very high speed. A special device known as PROM programmer is used to program a PROM chip. The information recorded in PROM can only be read. It is non-volatile storage which means that the information stored in its remain even in case of power off.

ii) EPROM

The erasable programmable read only memory can be program more than once by erasing the data in the ROM. EPROM can be erased by exposing its to a ultra voilet light for a duration of to 40 minutes.

iii) EEPROM

The EEPROM is program and erased electrically. It can be erased and re-program about 10 thousand times. Both erasing and programming about 4-10 ms (millisecond). EEPROM is also known as flash memory. Many new storage devices like pendrive, music player use flash memory.

Advantages of ROM:

- Non-volatile
- Cheaper than RAM
- Easy to test
- Static so they do not need refresh.
- Cannot be accidentally changed.

"Magnetic tapes"

Magnetic tape medium is a plastic ribbin usually 1/2 inch or 1/4 inch wide and 50 to 2400 feet long. It surface hews a coating (like iron oxide Fe_2O_3) that can record data by magnetization. Data is recorded on the coated surface as tiny, invisible magnetize and non-magnetize spots (representing 1 & 0 respectively) tape ribbin is stored in reel's or cassette.

The commonly used magnetic tapes are 1/2 reel tape, 1/4 realstreamer tape, 1/2 tape cartidge, 4mm digital audio tape.

Advantages:-

① Storage capacity of magnetic tape is very large.

② The cost is low for producing magnetic tapes.

③ The reel's and cassette are portable and light.

limitations:-

① Magnetic tape are not suitable for storage of those data that we need to access randomly.

② They most be kept in dust free environment.

Direct Access Devices

Magnetic disk

Magnetic disks are most popular direct access storage device. They are most popular for secondary storage devices.

A magnetic disk is a thin circular plate of metal or plastic. It surfaces have a coating on both sides that can record data by magnetization. It uses a standard binary code usually 8-bit EBCDIC. The magnetic disk is procteded in a sheel container.

* How does a magnetic disk stores the data?

Ans:- A magnetic disks surface has many concentric circle which are insivible known as tracks. A magnetic disk's surface also has invisible pie shape segments known as sector. Generally a seeter contains 512 bytes. It is the smallest unit of data that a disk drive can have.

Types of Magnetic disk

All magnetic disk are round platters. There size can vary, uses different types of packaging and made of rigid metal or flexible plastic.

Floppy disk:

A floppy disk is a fibre, circular piece of flexible plastic coated with magnetic oxide. It is cencased in a squar plastic cover. It was introduce by IBM in 1972 AD. Ther are two ~~side~~ sizes of floppy disk. (3 ½ inch, 5 ½ inch The floppy disk were portable that can store the data. The main disadvantage of this disk was that it had very limited and small storage capacity.

Harddisk:

Harddisk are the main secondary storage device for almost all computer today. They are made of a rigid metal platters & come in many sizes. There are 3 types of harddisk depending upon the packaging.

① Zipdisk (Bernowi disk):

It consists of a single harddisk platter in cased in a plastic cover. Depending upon size of the disk. the store capacity very 8 GB to 500 GB or more. It can be

portable or fixed type.

2) Diskpack

It consist of two or more harddisk platters mounted on a single central shaft. All disk revolves together at same speed. All the disk have a seperate read/write head for each usable disk. The whole disk system in encase in a plastic case. The number of disk in the diskpack can be added or remove hence the storage capacity of diskpack is verticallg unlimited. The storage capacity of a diskpack vary form few 100 GB to thousand GB

3) Winchester disk

Winchester disk consists of two or more harddisk platters mounted on a single central shaft. Winchester disk ~~is~~ ~~a~~ is a fixed type which means that all the disk platters and disk drive are sheated ~~permantely~~ permanently. Due to the sheated environment there is better result in data storage then other types of harddisk. Storage capacity of winchester disk today very from few Gigabytes to terabytes.

Advantages of magnetic disk

- Magnetic disk support higher storage of data
- They can be used to store audios, videos, & Document for long

time.
- They have low cost and can be used in all types of computers such as pc, workstations etc.

- They have compact size and are some what portable.

- They are superior then sequential devices.

Limitations

- It is difficult for those disk to store sequential data that can be used for sequential applications.

- Magnetic disk most be stored in dust free environment.

- If a failure occurs or when there is a driver failure then we cannot access data.

Optical disk

An optical disk storage system consists of a metalic or plastic disk coated with the highly reflected materials. It uses laser bean technology for reading and writing data from & to the disk. They are also known as laser disk

Types of optical disk

All optical disk are round platters. They come in different size and capacity. Different optical disk are as follows:

(i) CD-ROM (Compact disk- Read Only Memory)

CD-ROM is a shiny silver color metal or plastic disk. Usually, 12 cm in diameter. It has storage capacity 650 MB to 750 MB. This is read only disk which are pre-recorded and the user cannot change the information stored in it. Nowadays, CD-ROM is used for distribution of new software products and software upgrade, multimedia application (game, video, audio)

(ii) CD-R / WORM Disk

WORM = Write Once Read Many CD-R = Compact Disk- Recordable

WORM disk allow user to their own CD-ROM. WORM are available blank in the market. The information in WORM disk is recorded by CD-R drive. As the says, we can write data only ones in this disk but can read it many times. Since, the data is permanently recorded, This disk are use for data storage.

(iii) CD-R/W (Compact Disk Read write)

CD-R/W disk is very similar to worm but in this disk we can erase previous data and write on it many times. They are more expensive then CDROM

DVD (Digital Versatile (Video) Disk)

It is the standard format for distribution and interchange of digital contain in both computer and other electronic devices. Physical both CD and DVD are identical. There are two types of DVD. They are single layer DVD and double layer DVD. Single layer disk has storage capacity of 9.7 GB whereas double layer disk has storage capacity of 8.5 GB.

The physical layer of DVD are following types:-

(i) DVD-ROM
(ii) DVD-R
(iii) DVD-R/W

DVD-ROM

User use it for ~~means~~ mass distribution of pre-recorded software programs and multimedia.

DVD-R

User use it for low cost write once read many recordable media.

DVD-RW

It is the re-writable.

Uses of Optical disk

- For distributing large amounts of data at low cost
- For distribution of electronic version of conference proceedings journals, magazines, books, product catalogs, etc.
- For distribution of new or upgraded versions of software products by software vendors
- For storage and distribution of a wide variety of multimedia applications.

- For archiving of data, which are not used frequently, but which may be used once in a while

- WORM disks are often used by end-user companies to make permanent storage of their own proprietary information

Memory storage devices

The memory storage devices are used to store different data. These devices are small in size & are portable. Some of these devices are as follows:

① Pen drive (flash drive)

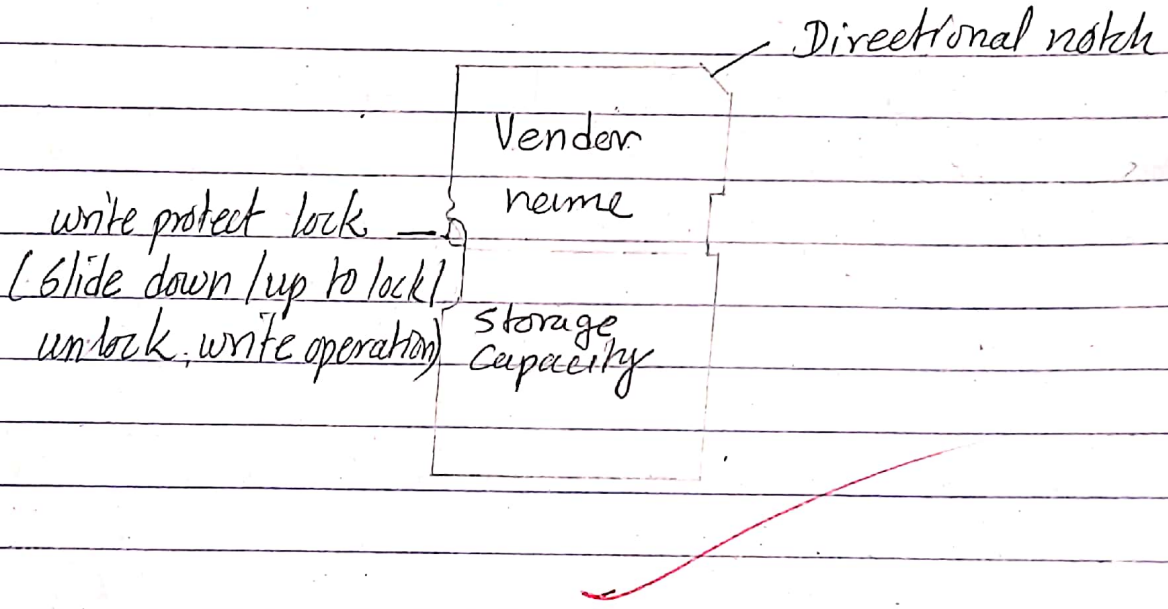
Flash drive also known as pendrive is a compact storage device. It come in different shapes and stylish design. It enables easy transport of data from one computer to another.

A user simple plugs it into usb (universal serial bus) port of a computer. The computer detects it automatically as a removable device or drive. Now the user can read, write, copy, delete and move the data from the computer harddisk drive to the flash drive and vice-versa.

The name flash memory or drive is used because it uses flash memory which is non volatile EEPROM. Storage capacity are 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB, 64 GB, ---, 1 TB etc.

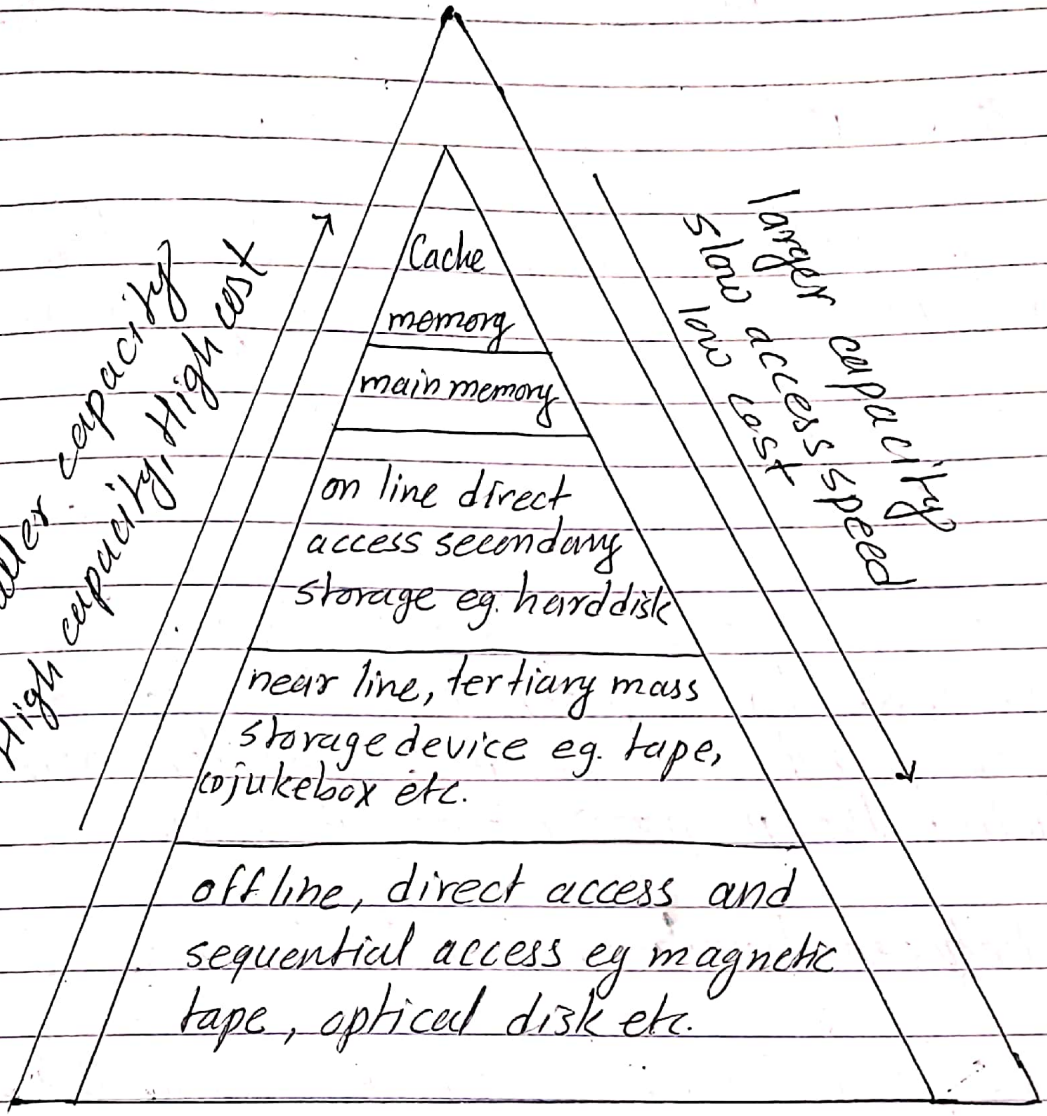
Memory Card (SD card / MMC)

These are flash memory based cards which are available as removable storage device in different types of electronic equipment. Some of the most popular memory cards are secure digital card (SD card), multimedia card (MMC). They have storage capacity of 1 GB, ----, 32 GB etc



Memory Hierarchy [Hierarchical Storage System]

There are different type of storages which have different capacity, speed and cost to build a good computer with efficient memory, memory hierarchy is used. The following pyramid shows the typical storage hierarchy pyramid.



Memory hierarchy

Software

What is software?

The term "software" is a group of programs that solve a specific problem. A software is necessary to operate a computer.

Program

The program of a sequence of ~~int~~ instruction written in a language understood by computer. A program controls a computer processing activity and computer perform precisely what the program wants it to do.

Relation between hardware, and software.

1. Both hardware and software are necessary for computer to do useful job.

2. A software cannot be utilize without supporting hardware.

3. Hardware without set of programs to operate upon cannot be utilize and is useless.

Types of Software

1. System Software
2. Application Software

System Software

A system software is a collection of programs which controls the operation and the processing capabillity of a computer system. Programs included in a system software pack are called system programs and the programmer who prepare system software are known as system programmers.

Features of System software

- This software is close to the system.
- Difficult to design
- Difficult to understood (Generally written in low level language)

Some ~~example~~ of system software are:

- Operating System (OS): windows XP, windows 7, windows 10, OSX (mountain lion), linux (Fedora, Kali, Debian, Redhat, Ubuntu, manjaro, Arch, pc linux os)

mobile os : Android os

Unix
BSD

- Programming Language translator:

  Compiler, Intrepreter, assembler

- Utility programs

Utility programs are set of programs that help users in system maintainence like: formatting, making backup etc

② Application Software

Application software is a set of one or more programs, which solves a specific problem or does a specific task. Program included in application programs and programmers who prepare application software are called application programmer

Some commonly known applications software are:-

① Word processing Software

This software enables us to make a use of a computer for creating, editing, reading, storing and printing documents. for example: Notepad, Ms-word, wordpad, libre office writer etc.

② Spreedsheet software

This software is a numeric data analysics tool that allows us to create a kind of computerized ledger. example: Ms-excel, libre-office calc etc.

③ Database software

A database is a collection of related data stored. A database software is a set of programs that enable us to create database, maintain it, organize data. example:- SQL, MS-SQL, Ms-Access, Oracle etc.

④ Graphics software

This software is use for creating, editing, viewing and printing of designs, drawing photos etc. Example:- Ms-paint, Adobe Photoshop, Adobe illustrator, GIMP, Corel Draw, Ink space Vector graphics etc.

⑤ Personal Assistant Software

This allows us to use computers for storing and retrieving (Get back information) personal information example:- calender, alarm, google now, siri, to-do-lisk, google keep etc.

⑥. Education and multimedia software

Education software is used for educational purpose example:- code blocks, typeshala etc.

Multimedia software is used for entertainment purpose like listening music, viewing video. example:- vlc media player, mx player, windows media player etc.

The Internet

The internet is a networks of computers which links many different types of computer all over the world. It is the network of network sharing a common mechanism for identify computers.

History of Internet

The first wide area network (WAN) was developed by ARPANET under US. Department of defence. The internet developed from this basic idea of inter-connecting computers.

TCP/IP

TCP- Transmission Control Protocol
IP- Internet Protocol

TCP/IP is an the development of world wide web (WWW) invented by Tim Berner's Lee. Nowadays, The internet is easily available in the most of the places.

Intranet

Intranet is the system in which multiple PC's are connected to each other. PC's in intranet are not available to the world outside the intranet. Usually, Each organization has its own intranet network and each members of that organization can access the computers in the intranet.

* Write the different between internet and intranet?

Internet	Intranet
1. Internet is general to computers all over the world.	1. Intranet is specific to few computers.
2. Internet provides a wider and better access to website to a longer population.	2. Intranet is restricted.
3. Internet is not safe.	3. Intranet can be safely privatized as per the need

Electronic Mail (E-mail)

Electronic mail service also known as Email. Email enables an internet use to send message to another internet user in any part of the world. An Email message takes a few second to several times to reach its destination because it travels from one network to another network until it reeches to its destination.

FTP (File Transfer Protocol)

FTP service enables an internet user to move a file from one computers to another computer on the internet. A file may contain any type of digital information. like- text document, images, movies, sound, software etc.

Downloading is process of moving a file from a

remote computer to one's own computer.
Uploading is the process of moving a file from a one's own computer to a remote computer.

Telnet

Telnet service enables an internet user to login into another computer on the internet from his/her local computer. It means thats a user can execute the telnet command on his/her local computer to start a login session on a remote computer thus action is called remote login.

WWW (World Wide Web)

The world wide web also called WWW or 'W3' is the most popular method is organizing an accessing information on the internet.
The main reason for its popularity is use of hypertext. WWW was developed by Tim berners Lee. WWW uses client-server model and protocol called hypertext transfer protocol (HTTP) for interaction between computer on the internet

Hypertext

WWW uses hyper-text is text that links to other information. A link is a special type of item in a hypertext document connecting the document to another documents that provides more information about the linked item. The

hypertext is used in webpages. Hypertext document are known as webpages.

HTML (Hypertext Markup language)

HTML describe the structure of web pages using markup. HTML elements are represented by tags.

HTTP (Hypertext Transfer Protocol)

This protocol is used by WWW. Any computer in the internet using HTTP protocol is called web server. And any computer accessing that server is called web client. HTTP allows different kinds of computers on the internet to interact with eachother.

WEB Browser (WWW Browser)

WWW Browser is a software application for accessing information on the world wide web. Each individual web pages image and video is defined by distinct URL (Uniform Resource Locator) enabling broswers to retrieve and display them on users device. There are many types of web broswers. some of them are microsoft edge (previously known as internet Explorer), Mozilla firefox (by Netscape), Google chrome, Apple safari, Opera, Chromium etc.

Search Engine

An internet search engine is an application which helps users locate websites containing useful information. The result that we get from the search engine helps to locate the requsted information quickly from the vast ocean of information available on the internet. Some of the popular search Engine are google (www.google.com), yahoo (www.yahoo.com). Bing, DuckDuck go etc.

Computer virus

The computer virus is a malicious program that self-replicates by copying itself to another program.

In other words, the computer virus spreads by itself into other excuteable code or documents. The purpose of creating a computer virus is to infect vulnerable system, gain control and steal user sensetive data.

History of computer virus:

Robert Thomas develop the first known computer virus in 1971. This virus was named was "Creeper virus."

But first original computer virus to be trackdown was "ELK Cloner". This virus infected Apple II operating system through floppy disk. The term computer virus was coined by fred cohen in 1983.

Types of Computer virus

Computer's virus in come in different form to infected the system in different ways by altering or by changing programs and applications. Some of the common viruses are:-

① Boot sector virus:

This types of virus infect the Master boot record (MBR). It is challenging and a complex task to remove this virus. An

often requires the system to be formatted. It is spreads through removeable media.

(ii) Macro virus:

The macro virus particullary target macro language command. In application like Ms-word. The macro virus are design to add their malicious code to the genuine macro code in a work file

(iii) Program Virus:

Program viruses can travel on media like CD, pendrive, across the internet by email. They hide in a useful program and then run when the program is open. They are often called trojan-horse viruses.

The most sophisticated (advanced) virus are stealth viruses which encrypt their contain and hy to avoid detection by antivirus. And polymorphic virus which after ~~to~~ their contain everytime they replicate.

(*) How to be safe from viruses and worms?

- We should make sure that the computer ~~that~~ has updated anti-virus software
- We should avoid downloading documents and software from untrusted websites in the internet.
- Donot trust fake message.
- Get knowledge about viruses.