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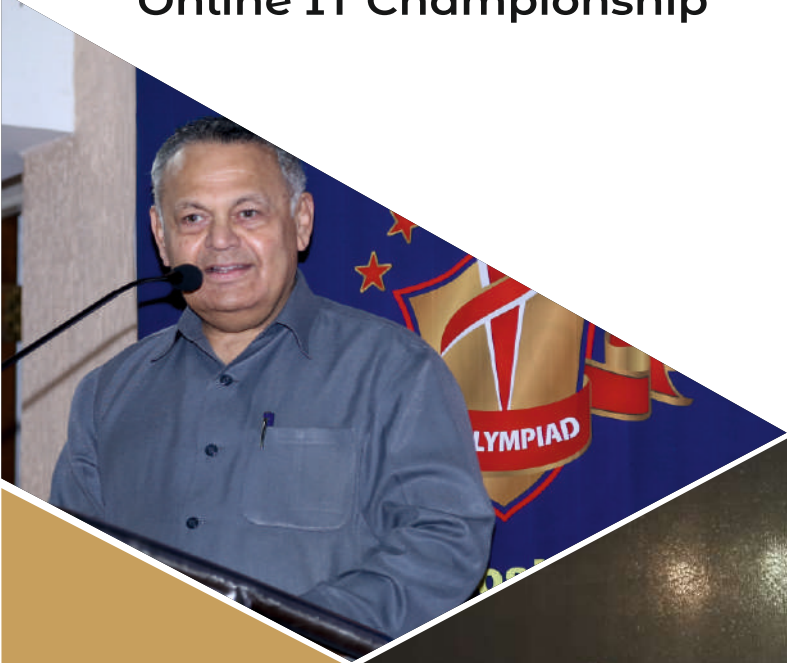
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1. Computer Introduction

What is Computer?

What is Computer : Computer is an electronic device that is designed to work with Information. *The term computer* is *derived from the Latin term* '**computare**', this means to *calculate* or *programmable machine*. **Computer cannot do anything without a Program**. It represents the decimal numbers through a string of binary digits. The Word 'Computer' usually refers to the Center Processor Unit plus Internal memory.

Charles Babbage is called the "Grand Father" of the computer. The First mechanical computer designed by Charles Babbage was called **Analytical Engine.** It uses read-only memory in the form of punch cards.

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.
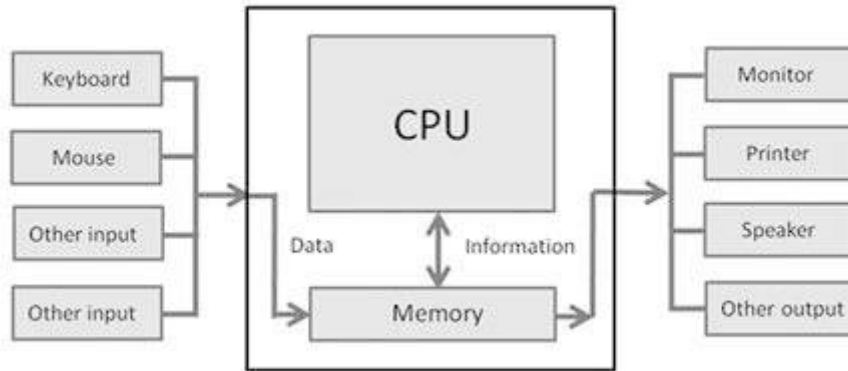
Digital Computer Definition

The basic components of a modern digital computer are: Input Device, Output Device, Central Processor Unit (CPU), mass storage device and memory. A Typical modern computer uses LSI Chips. Four Functions about computer are:

accepts data	Input
processes data	Processing
produces output	Output
stores results	Storage

Input (Data):

Input is the raw information entered into a computer from the input devices. It is the collection of letters, numbers, images etc.

Process:

Process is the operation of data as per given instruction. It is totally internal process of the computer system.

Output:

Output is the processed data given by computer after data processing. Output is also called as Result. We can save these results in the storage devices for the future use.

Computer Classification: By Size and Power

Computers differ based on their data processing abilities. They are classified according to purpose, data handling and functionality.

According to functionality, computers are classified as:

• **Analog Computer:** A computer that represents numbers by some continuously variable physical quantity, whose variations mimic the properties of some systembeingmodeled.

• **Personal computer:** A **personal computer** is a computer small and low cost. The term"personal computer" is used to describe desktop computers (desktops).

• **Workstation:** A terminal or desktop computer in a network. In this context, workstation is just a generic term for a user's machine (client machine) in contrast to a "server" or "mainframe."

• **Minicomputer:** A **minicomputer** isn't very mini. At least, not in the way most of us think of mini. You know how big your personal computer is and its related family.

• **Mainframe:** It refers to the kind of large computer that runs an entire corporation.

• **Supercomputer:** It is the biggest, fastest, and most expensive computers on earth.

• **Microcomputer:** Your *personal computer* is a **microcomputer**.

Uses of Computer

Education : Getting the right kind of information is a major challenge as is getting information to make sense. College students spend an average of 5-6 hours a week on the internet.Research shows that computers can significantly enhance performance in learning. Students exposed to the internet say they think the web has helped them improve the quality of their academic research and of their written work. One revolution in education is the advent of distance learning. This offers a variety of internet and video-based online courses.

Health and Medicine :

Computer technology is radically changing the tools of medicine. All medical information can now be digitized. Software is now able to computer the risk of a disease. Mental health researchers are using computers to screen troubled teenagers in need of psychotherapy. A patient paralyzed by a stroke has received an implant that allows communication between his brain and a computer; as a result, he can move a cursor across a screen by brainpower and convey simple messages.

Science :

Scientists have long been users of it. A new adventure among scientists is the idea of a "collaboratory", an internet based collaborative laboratory, in which researchers all over the world can work easily together even at a distance. An example is space physics where space physicists are allowed to band together to measure the earth's ionosphere from instruments on four parts of the world.

Business :

Business clearly see the interest as a way to enhance productivity and competitiveness. Some areas of business that are undergoing rapid changes are sales and marketing, retailing, banking, stock trading, etc. Sales representatives not only need to be better educated and more knowledgeable about their customer's businesses, but also must be comfortable with computer technology. The internet has become a popular marketing tool. The world of cybercash has come to banking – not only smart cards but internet banking, electronic deposit, bill paying, online stock and bond trading, etc.

Recreation and Entertainment:

Our entertainment and pleasure-time have also been affected by computerization. For example:
• In movies, computer generated graphics give freedom to designers so that special effects and even imaginary characters can play a part in making movies, videos, and commercials.
• In sports, computers compile statistics, sell tickets, create training programs and diets for athletes, and suggest game plan strategies based on the competitor's past performance.
• In restaurants, almost every one has eaten food where the clerk enters an order by indicating choices on a rather unusual looking cash register; the device directly enters the actual data into a computer, and calculates the cost and then prints a receipt.

Government:

Various departments of the Government use computer for their planning, control and law enforcement activities. To name a few – Traffic, Tourism, Information & Broadcasting, Education, Aviation and many others.

Defence:

There are many uses computers in Defence such as:

• Controlling UAV or unmanned air-crafts an example is Predator. If you have cable I would recommend watching the shows "Future Weapons" and "Modern Marvels". The show future weapon gives an entire hour to the predator.

• They are also used on Intercontinental Ballistic Missiles (ICBMs) that uses GPS and Computers to help the missile get to the target.

• Computers are used to track incoming missiles and help slew weapons systems onto the incoming target to destroy them.

• Computers are used in helping the military find out where all their assets are (Situational Awareness) and in Communications/Battle Management Systems.

• Computers are used in the logistic and ordering functions of getting equipments to and around the battlefield.

• Computers are used in tanks and planes and ships to target enemy forces, help run the platform and more recently to help diagnose any problems with the platforms.

• Computers help design and test new systems.

Sports:

In today's technologically growing society, computers are being used in nearly every activity.

Recording Information

Official statistics keepers and some scouts use computers to record statistics, take notes and chat online while attending and working at a sports event.

Analyzing Movements

The best athletes pay close attention to detail. Computers can slow recorded video and allow people to study their specific movements to try to improve their tendencies and repair poor habits.

Writers

Many sportswriters attend several sporting events a week, and they take their computers with them to write during the game or shortly after while their thoughts are fresh in their mind.

Scoreboard

While some scoreboards are manually updated, most professional sports venues have very modern scoreboards that are programmed to update statistics and information immediately after the information is entered into the computer.

Safety

Computers have aided in the design of safety equipment in sports such as football helmets to shoes to mouth guards

Block Diagram of Computer and Explain its Various Components

A computer can process data, pictures, sound and graphics. They can solve highly complicated problems quickly and accurately. A computer as shown in Fig. performs basically five major computer operations or functions irrespective of their size and make. These are

1) it accepts data or instructions by way of input,

2) it stores data,

3) it can process data as required by the user,

4) it gives results in the form of output, and

5) it controls all operations inside a computer.

We discuss below each of these Computer operation
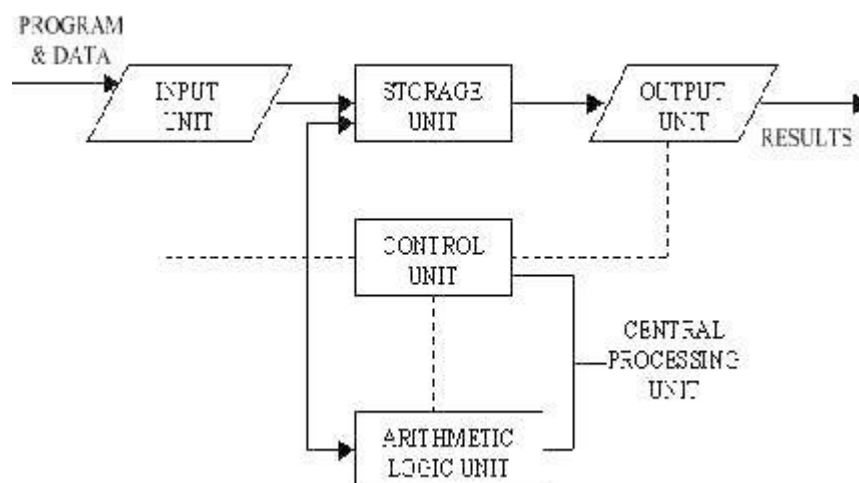
1. Input: This is the process of entering data and programs in to the computer system. You should know that computer is an electronic machine like any other machine which takes as inputs raw data and performs some processing giving out processed data. Therefore, the input unit takes data from us to the computer in an organized manner for processing.

2. Storage: The process of saving data and instructions permanently is known as storage. Data has to be fed into the system before the actual processing starts. It is because the processing speed of Central Processing Unit (CPU) is so fast that the data has to be provided to CPU with the same speed. Therefore the data is first stored in the storage unit for faster access and processing. This storage unit or the primary storage of the computer system is designed to do the above functionality. It provides space for storing data and instructions.

The storage unit performs the following major functions:

• All data and instructions are stored here before and after processing.

• Intermediate results of processing are also stored here.

3. Processing: The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided. It is then sent back to the storage unit.

4. Output: This is the process of producing results from the data for getting useful information. Similarly the output produced by the computer after processing must also be kept somewhere inside the computer before being given to you in human readable form. Again the output is also stored inside the computer for further processing.

5. Control: The manner how instructions are executed and the above operations are performed. Controlling of all operations like input, processing and output are performed by control unit. It takes care of step by step processing of all operations inside the computer.

FUNCTIONAL UNITS

In order to carry out the operations mentioned in the previous section the computer allocates the task between its various functional units. The computer system is divided into three separate units for its operation. They are

Arithmetic Logical Unit (ALU)

Logical Unit :After you enter data through the input device it is stored in the primary storage unit. The actual processing of the data and instruction are performed by Arithmetic Logical Unit. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

Control Unit (CU)

The next component of computer is the Control Unit, which acts like the supervisor seeing that things are done in proper fashion. Control Unit is responsible for co - ordinating various operations using time signal. The control unit determines the sequence in which computer programs and instructions are executed. Things like processing of programs stored in the main memory, interpretation of the instructions and issuing of signals for other units of the computer to execute them. It also acts as a switch board operator when several users access the computer simultaneously. Thereby it coordinates the activities of computer's peripheral equipment as they perform the input and output.

Central Processing Unit (CPU)

The ALU and the CU of a computer system are jointly known as the central processing unit. You may call CPU as the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations.

Classification of Computers | Type of Computer

Computers differ based on their data processing abilities. They are classified according to purpose, data handling and functionality.

According to purpose, computers are either general purpose or specific purpose. **General purpose computers** are designed to perform a range of tasks. They have the ability to store numerous programs, but lack in speed and efficiency. Specific purpose computers are designed to handle a specific problem or to perform a specific task. A set of instructions is built into the machine.

According to data handling, computers are analog, digital or hybrid. Analog computers work on the principle of measuring, in which the measurements obtained are translated into data. Modern analog computers usually employ electrical parameters, such as voltages, resistances or currents, to represent the quantities being manipulated. Such computers do not deal directly with the numbers. They measure continuous physical magnitudes. Digital computers are those that operate with information, numerical or otherwise, represented in a digital form. Such computers process data into a digital value (in 0s and 1s). They give the results with more accuracy and at a faster rate. Hybrid computers incorporate the measuring feature of an analog computer and counting feature of a digital computer. For computational purposes, these computers use analog components and for storage, digital memories are used.

According to functionality, **Type of computers** are classified as :

Analog Computer

An analog computer (spelt analogue in British English) is a form of computer that uses *continuous* physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved.

Digital Computer

A computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system

Hybrid Computer (Analog + Digital)

A combination of computers those are capable of inputting and outputting in both digital and analog signals. A hybrid computer system setup offers a cost effective method of performing complex simulations.

On the basis of Size: Type of Computer

Super Computer

The fastest and most powerful type of computer Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration.

The chief difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.

Mainframe Computer

A very large and expensive computer capable of supporting hundreds, or even thousands, of users simultaneously. In the hierarchy that starts with a simple microprocessor (in watches, for example) at the bottom and moves to supercomputers at the top, mainframes are just below supercomputers. In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. But supercomputers can execute a single program faster than a mainframe.

Mini Computer

A midsized computer. In size and power, minicomputers lie between *workstations* and *mainframes*. In the past decade, the distinction between large minicomputers and small mainframes has blurred, however, as has the distinction between small minicomputers and workstations. But in general, a minicomputer is a multiprocessing system capable of supporting from 4 to about 200 users simultaneously.

Micro Computer or Personal Computer

• **Desktop Computer**: a personal or micro-mini computer sufficient to fit on a desk.

• **Laptop Computer**: a portable computer complete with an integrated screen and keyboard. It is generally smaller in size than a desktop computer and larger than a notebook computer.

• **Palmtop Computer/Digital Diary /Notebook /PDAs**: a hand-sized computer. Palmtops have no keyboard but the screen serves both as an input and output device.

Workstations

A terminal or desktop computer in a network. In this context, workstation is just a generic term for a user's machine (client machine) in contrast to a "server" or "mainframe."

Characteristic of a Computer

Basic characteristics about computer are:

1. Speed: - As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. You will be surprised to know that computer can perform millions (1,000,000) of instructions and even more per second.

Therefore, we determine the speed of computer in terms of microsecond (10-6 part of a second) or nanosecond (10 to the power -9 part of a second). From this you can imagine how fast your computer performs work.

2. Accuracy: - The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is **7.**determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

3. Diligence: - A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.

4. Versatility: - It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.

5. Power of Remembering: - Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. It depends entirely upon you how much data you want to store in a computer and when to lose or retrieve these data.

6. No IQ: - Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

7. No Feeling: - It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

8. Storage: - The Computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as

floppies, which can be kept outside your computer and can be carried to other computers.

History of computer | Generation of Computer

Each generation of computer is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, more powerful and more efficient and reliable devices.

The various generations of computers an listed below :

(i) First Generation (1946-1954) : In **1946** there was no 'best' way of storing instructions and data in a computer memory. There were four competing technologies for providing computer memory: electrostatic storage tubes, acoustic delay lines (**mercury or nickel**), **magnetic drums** (and disks?), and **magnetic core storage.**

The digital computes using **electronic valves** (Vacuum tubes) are known as first generation computers. the first 'computer' to use electronic valves (ie. vacuum tubes). The high cost of vacuum tubes prevented their use for main memory. They stored information in the form of propagating sound waves.

The vacuum tube consumes a lot of power. The Vacuum tube was developed by Lee DeForest in 1908. These computers were large in size and writing programs on them was difficult. Some of the computers of this generation were:

Mark I : The **IBM Automatic Sequence Controlled Calculator (ASCC),** called the Mark I by **Harvard University**, was an **electro-mechanical computer**. Mark I is the first machine to successfully perform a long services of **arithmetic and logical operation**. Mark I is the **First Generation Computer**. it was the first operating machine that could **execute long computations automatically**. *Mark I* computer which was built as a partnership between Harvard and **IBM in 1944**. This was the first programmable digital computer made in the U.S. But it was not a purely electronic computer. Instead the Mark I was constructed out of switches, relays, rotating shafts, and clutches. The machine weighed 5 tons, incorporated 500 miles of wire, was 8 feet tall and 51 feet long, and had a 50 ft rotating shaft running its length, turned by a 5 horsepower electric motor.

ENIAC: It was the **first general-purpose electronic computer** built in **1946** at **University of Pennsylvania, USA by John Mauchly and J. Presper Eckert**. The completed machine was announced to the public the evening of **February 14, 1946.** It was named **Electronic Numerical Integrator and Calculator (ENIAC).** ENIAC

contained 17,468 vacuum tubes, 7,200 crystal diodes, 1,500 relays, 70,000 resistors, 10,000 capacitors and around 5 million hand-soldered joints. It weighed more than 30 short tons (27 t), was roughly 8 by 3 by 100 feet (2.4 m × 0.9 m × 30 m), took up 1800 square feet (167 m2), and consumed 150 kW of power. Input was possible from an **IBM card reader**, and an **IBM card punch** was used for output. These cards could be used to produce printed output offline using an IBM accounting machine, such as the **IBM 405**. Today your favorite computer is many times as powerful as ENIAC, still size is very small.

EDVAC: It stands for **Electronic Discrete Variable Automatic Computer** and was developed in **1950**.it was to be a vast improvement upon ENIAC, it was **binary** rather than **decimal**, and was a stored program computer. **The concept of storing data and instructions inside the computer was introduced here.** This allowed much faster operation since the computer had rapid access to both data and instructions. The other advantage of storing instruction was that computer could do logical decision internally.

The EDVAC was a **binary serial computer** with automatic addition, subtraction, multiplication, programmed division and automatic checking with an ultrasonic serial memory. EDVAC's **addition time was 864 microseconds** and its **multiplication time was 2900** microseconds (2.9 milliseconds).

The computer had almost 6,000 vacuum tubes and 12,000 diodes, and consumed 56 kW of power. It covered 490 ft² (45.5 m²) of floor space and weighed 17,300 lb (7,850 kg).

EDSAC: It stands for **Electronic Delay Storage Automatic Computer** and was developed by **M.V. Wilkes at Cambridge University in 1949**. Two groups of individuals were working at the same time to develop the first stored-program computer. In the United States, at the University of Pennsylvania the EDVAC (Electronic Discrete Variable Automatic Computer) was being worked on. In England at Cambridge, the EDSAC (Electronic Delay Storage Automatic Computer) was also being developed. The **EDSAC** won the race as the first **stored-program computer** beating the United States' EDVAC by two months. The EDSAC performed computations in the three millisecond range. It performed arithmetic and logical operations without human intervention. The key to the success was in the **stored instructions** which it depended upon solely for its operation. **This machine marked the beginning of the computer age.** EDSAC is the first computer is used to store a program

UNIVAC-1: **Ecker and Mauchly produced it in 1951 by Universal Accounting Computer** setup. it was the **first commercial computer** produced in the United States. It was designed principally by J. Presper Eckert and John Mauchly, the inventors of the ENIAC.

The machine was 25 feet by 50 feet in length, contained 5,600 tubes, 18,000 crystal diodes, and 300 relays. It utilized serial circuitry, 2.25 MHz bit rate, and had an internal storage capacity 1,000 words or 12,000 characters.

It utilized a **Mercury delay line**, magnetic tape, and **typewriter output**. The UNIVAC was used for **general purpose computing** with large amounts of input and output.

Power consumption was about 120 kva. Its reported processing speed was 0.525 milliseconds for arithmetic functions, 2.15 milliseconds for multiplication and 3.9 Milliseconds for division.

The UNIVAC was also the first computer to come equipped with a magnetic tape unit and was the **first computer to use buffer memory**.

Other Important Computers of First Generation

Some other computers of this time worth mentioning are the Whirlwind, developed at Massachussets Institute of Technology, and JOHNNIAC, by the Rand Corporation. The Whirlwind was the first computer to display real time video and use core memory. The JOHNNIAC was named in honor of Jon Von Neumann. Computers at this time were usually kept in special locations like government and university research labs or military compounds.

Limitations of First Generation Computer

Followings are the major drawbacks of First generation computers.

1. They used valves or vacuum tubes as their main electronic component.

2. They were large in size, slow in processing and had less storage capacity.

3. They consumed lots of electricity and produced lots of heat.

4. Their computing capabilities were limited.

5. They were not so accurate and reliable.

6. They used machine level language for programming.

7. They were very expensive.

Example: ENIAC, UNIVAC, IBM 650 etc

(ii) **Second Generation (1955-1964) :** The second-generation computer used **transistors** for CPU components &**ferrite cores for main memory**&**magnetic disks** for secondary memory. They used high-level languages such as **FORTRAN (1956), ALGOL (1960) & COBOL (1960 - 1961)**. I/O processor was included to control I/O operations.

Around 1955 a device called *Transistor* replaced the bulky Vacuum tubes in the first generation computer. Transistors are smaller than Vacuum tubes and have higher operating speed. They have no filament and require no heating. Manufacturing cost was also very low. Thus the size of the computer got reduced considerably.

It is in the second generation that the concept of Central Processing Unit (CPU), memory, programming language and input and output units were developed. The programming languages such as COBOL, FORTRAN were developed during this period. Some of the computers of the Second Generation were

1. **IBM 1620**: Its size was smaller as compared to First Generation computers and mostly used for scientific purpose.

2. **IBM 1401**: Its size was small to medium and used for business applications.

3. **CDC 3600**: Its size was large and is used for scientific purposes.

Features:

1. Transistors were used instead of Vacuum Tube.

2. Processing speed is faster than First Generation Computers (Micro Second)

3. Smaller in Size (51 square feet)

4. The input and output devices were faster.

Example: IBM 1400 and 7000 Series, Control Data 3600 etc.

(iii) **Third Generation (1964-1977) :** By the development of a small chip consisting of the capacity of the **300 transistors**. These ICs are popularly known as *Chips*. A single IC has many transistors, registers and capacitors built on a single thin slice of **silicon**. So it is quite obvious that the size of the computer got further reduced. Some of the computers developed during this period were **IBM-360, ICL-1900, IBM-370, and VAX-750**. Higher level language such as **BASIC (Beginners All purpose Symbolic Instruction Code)** was developed during this period. Computers of this generation were small in size, low cost, large memory and processing speed is very high. Very soon ICs Were replaced by **LSI (Large Scale Integration)**, which consisted about 100 components. An IC containing about 100 components is called LSI.

Features:

1. They used Integrated Circuit (IC) chips in place of the transistors.

2. Semi conductor memory devices were used.

3. The size was greatly reduced, the speed of processing was high, they were more accurate and reliable.

4. Large Scale Integration (LSI) and Very Large Scale Integration (VLSI) were also developed.

5. The mini computers were introduced in this generation.

6. They used high level language for programming.

Example: IBM 360, IBM 370 etc.

(iv) **Fourth Generation :** An IC containing about 100 components is called LSI (Large Scale Integration) and the one, which has more than 1000 such components, is called as **VLSI (Very Large Scale Integration)**. It uses *large scale Integrated Circuits* (LSIC) built on a single silicon chip called microprocessors. Due to the development of microprocessor it is possible to place computer's *central processing unit* (CPU) on single chip. These computers are called microcomputers. Later *very large scale Integrated Circuits* (VLSIC) replaced LSICs. Thus the computer which was occupying a very large room in earlier days can now be placed on a table. The personal computer (PC) that you see in your school is a Fourth Generation Computer Main memory used fast semiconductors chips up to 4 M bits size. Hard disks were used as secondary memory. Keyboards, dot matrix printers etc. were developed. OS-such as **MS-DOS, UNIX, Apple's Macintosh** were available. Object oriented language, **C++ etc** were developed.

Features:

1. They used Microprocessor (VLSI) as their main switching element.

2. They are also called as micro computers or personal computers.

3. Their size varies from desktop to laptop or palmtop.

4. They have very high speed of processing; they are 100% accurate, reliable, diligent and versatile.

5. They have very large storage capacity.

Example: IBM PC, Apple-Macintosh etc.

(v)   **Fifth Generation (1991- continued) :** 5th generation computers use ULSI (Ultra-Large Scale Integration) chips. Millions of transistors are placed in a single IC in ULSI chips. 64 bit microprocessors have been developed during this period. Data flow & EPIC architecture of these processors have been developed. RISC & CISC, both types of designs are used in modern processors. Memory chips and flash memory up to 1 GB, hard disks up to 600 GB & optical disks up to 50 GB have been developed. fifth generation digital computer will be **Artificial intelligence.**

What is CPU | CPU Definition | CPU Meaning

What is CPU: It's meaning is *Central Processing Unit*. Sometimes referred to simply as the **central processor** or **Nerve Centre** or **heart**, but more commonly called **processor**, the CPU is where most calculations take place. The CPU is the **brains of the computer.**

CPU Definition

Central processing unit (CPU) is the central component of the Computer System. Sometimes it is called as **microprocessor or processor**. It is the brain that runs the show inside the Computer. All functions and processes that is done on a computer is performed directly or indirectly by the processor. Obviously, computer processor is one of the most important element of the Computer system. CPU is consist of transistors,that receives inputs and produces output.Transistors perform logical operations which is **called processing**. It is also, scientifically, not only one of the most amazing parts of the PC, but one of the most amazing devices in the world of technology.
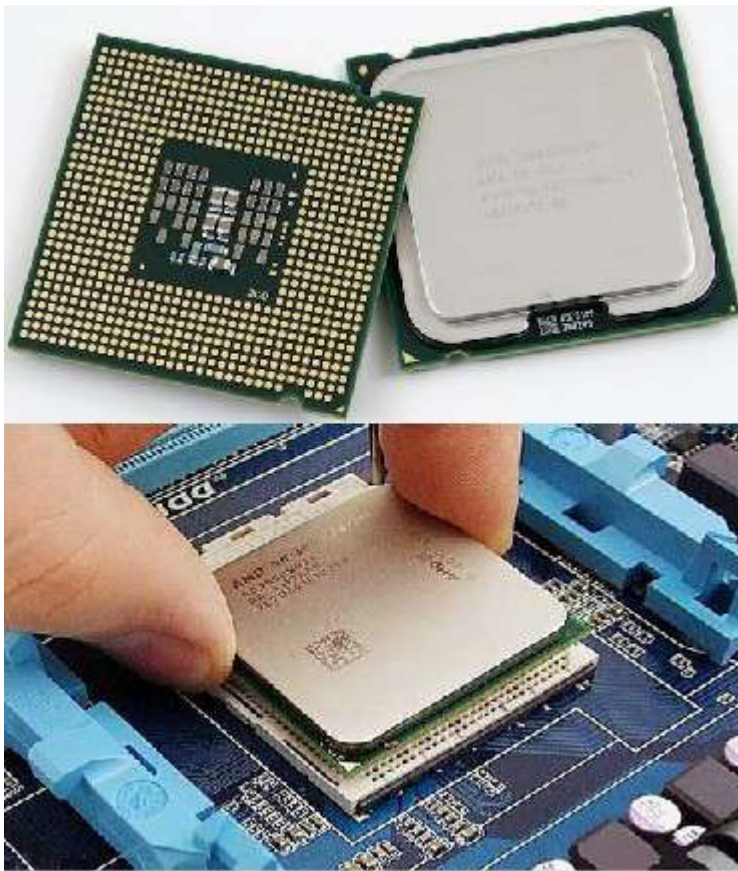
In terms of computing power, the *computer processor* is the most important element of a computer system. It add and compare its data in cpu chip. A CPU of all computers, whether micro, mini or mainframe must have three parts.

Parts of CPU

Arithmetic Logic Unit (**ALU**): It is the part of computer processor (CPU) can be used to perform arithmetic and logic operations. An arithmetic-logic unit (ALU) is further divided into two parts, (AU) arithmetic unit and a (LU) logic unit.

Control Unit (**CU**): Decodes the program instruction. CPU chip used in a computer is partially made out of Silica. on other words silicon chip used for data processing are called Micro Processor.

Registers: It is temporary storage areas of the computer processor. It is managed by controlunit(CU).Registers holding data,instruction and address that are needed by program while running.

The processor plays a significant role in the following important aspects of your computer system;

Performance: The processor is probably the most important single determinant of system performance in the Pc. While other components also playa key role in determining performance, the processor's capabilities dictate the maximum performance of a system. The other devices only allow the processor to reach its full potential.

Software Support: Newer, faster processors enable the use of the latest software. In addition, new processors such as the Pentium with MMX Technology, enable the use of specialized software not usable on earlier machines.

Reliability and Stability: The quality of the processor is one factor that determines how reliably your system will run. While most processors are very dependable, some are not. This also depends to some extent on the age of the processor and how much energy it consumes.

Energy Consumption and Cooling: Originally processors consumed relatively little power compared to other system devices. Newer processors can consume a great deal of power. Power consumption has an impact on everything from cooling method selection to overall system reliability.

Motherboard Support: The processor that decides to use in your system will be a major determining factor in what sort of chipset we must use, and hence what motherboard you buy. The motherboard in turn dictates many facets of. The system's capabilities and performance.

Von-Neumann Architectures

Von Neumann Architecture also known as the *Von Neumann model*, the computer consisted of a CPU, memory and I/O devices. The program is stored in the memory. The CPU fetches an instruction from the memory at a time and executes it.

Thus, the instructions are executed sequentially which is a slow process. Neumann m/c are called control flow computer because instruction are executed sequentially as controlled by a program counter. To increase the speed, parallel processing of computer have been developed in which serial CPU's are connected in parallel to solve a problem. Even in parallel computers, the basic building blocks are Neumann processors.

The von Neumann architecture is a design model for a stored-program digital computer that uses a processing unit and a single separate storage structure to hold both instructions and data. It is named after mathematician and early computer scientist John von Neumann. Such a computer implements a universal Turing machine, and the common "referential model" of specifying sequential architectures, in contrast with parallel architectures.
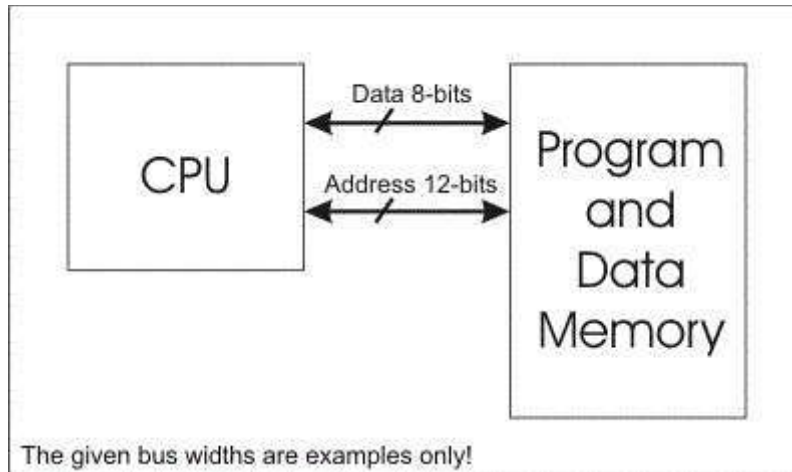

One shared memory for instructions (program) and data with one data bus and one address bus between processor and memory. Instructions and data have to be fetched in sequential order (known as the Von Neuman Bottleneck), limiting the operation bandwidth. Its design is simpler than that of the Harvard architecture. It is mostly used to interface to external memory.

Direct memory access (DMA)

DMA stands for "Direct Memory Access" and is a method of transferring data from the computer's RAM to another part of the computer without processing it using the CPU. While most data that is input or output from your computer is processed by the CPU, some data does not require processing, or can be processed by another device.

In these situations, DMA can save processing time and is a more efficient way to move data from the computer's memory to other devices. In order for devices to use direct memory access, they must be assigned to a DMA channel. Each type of port on a computer has a set of DMA channels that can be assigned to each connected device. For example, a PCI controller and a hard drive controller each have their own set of DMA channels.

Direct Memory Access (DMA)
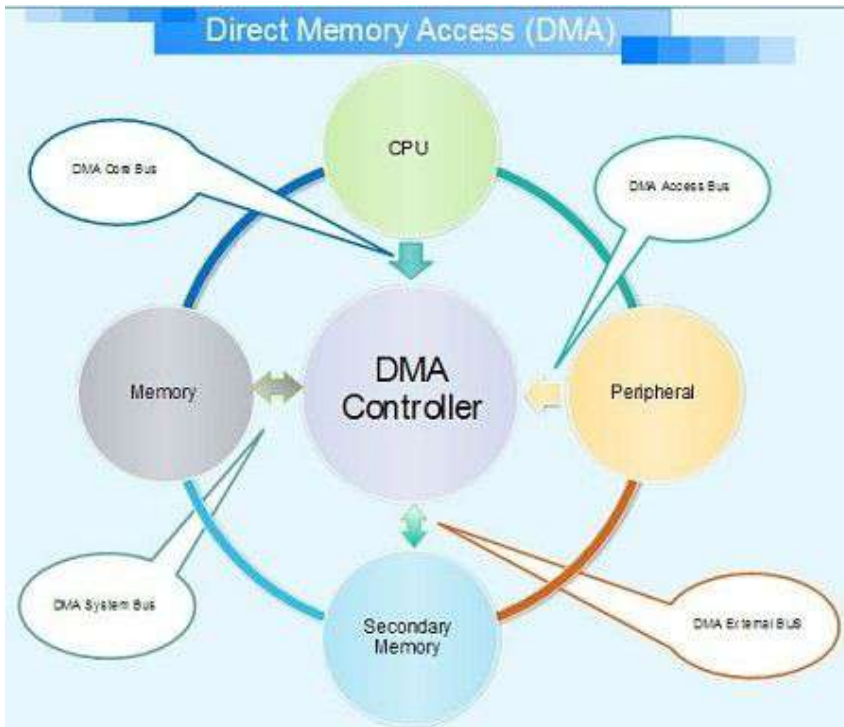
For example, a sound card may need to access data stored in the computer's RAM, but since it can process the data itself, it may use DMA to bypass the CPU. Video cards that support DMA can also access the system memory and process graphics without needing the CPU. Ultra DMA hard drives use DMA to transfer data faster than previous hard drives that required the data to first be run through the CPU.

An alternative to DMA is the Programmed Input/Output (PIO) interface in which all data transmitted between devices goes through the processor. A newer protocol for the ATAIIDE interface is Ultra DMA, which provides a burst data transfer rate up to 33 mbps. Hard drives that come with Ultra DMAI33 also support PIO modes 1, 3, and 4, and multiword DMA mode 2 at 16.6 mbps.

DMA Transfer Types

Memory To Memory Transfer

In this mode block of data from one memory address is moved to another memory address. In this mode current address register of channel 0 is used to point the source address and the current address register of channel is used to point the destination address in the first transfer cycle, data byte from the source address is loaded in the temporary register of the DMA controller and in the next transfer cycle the data from the temporary register is stored in the memory pointed by destination address. After each data transfer current address registers are decremented or incremented according to current settings. The channel 1 current word count register is also decremented by 1 after each data transfer. When the word count of channel 1 goes to FFFFH, a TC is generated which activates EOP output terminating the DMA service.

Auto initialize

In this mode, during the initialization the base address and word count registers are loaded simultaneously with the current address and word count registers by the microprocessor. The address and the count in the base registers remain unchanged throughout the DMA service.
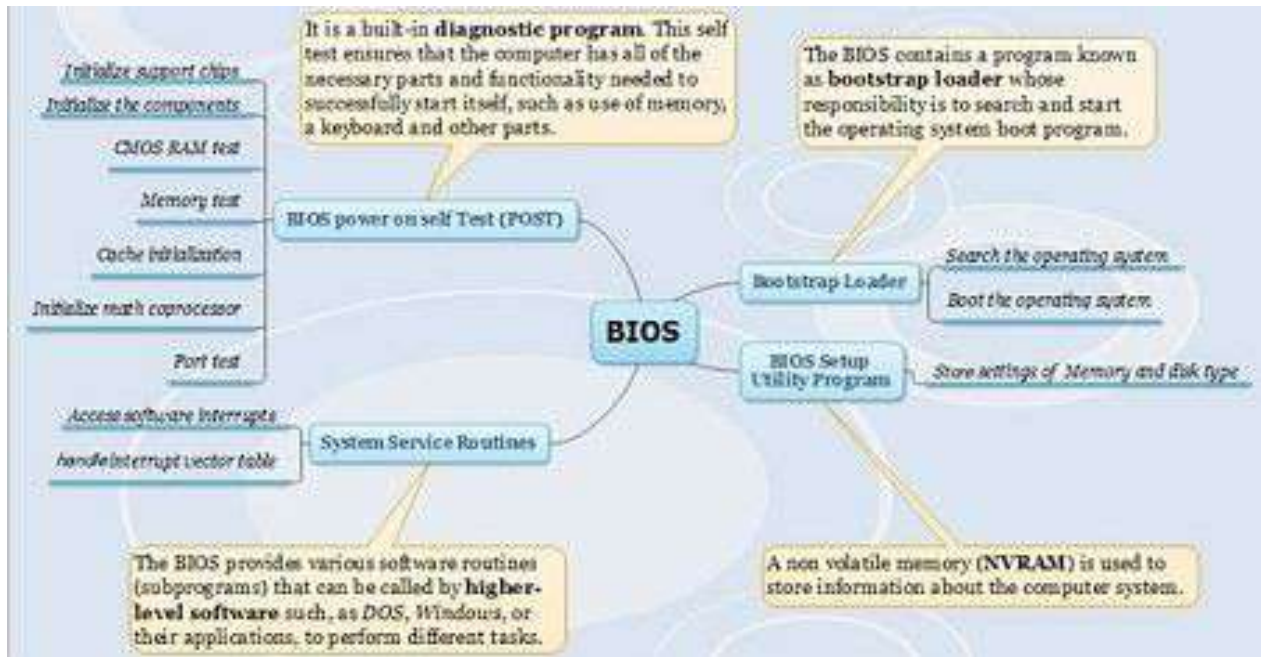
After the first block transfer i.e. after the activation of the EOP signal, the original values of the current address and current word count registers are automatically restored from the base address and base word count register of that channel. After auto initialization the channel is ready to perform another DMA service, without CPU intervention.

DMA Controller

*The co*ntroller is integrated into the processor board and manages all DMA data transfers. Transferring data between system memory and an 110 device requires two steps. Data goes from the sending device to the DMA controller and then to the receiving device. The microprocessor gives the DMA controller the location, destination, and amount of data that is to be transferred. Then the DMA controller transfers the data, allowing the microprocessor to continue with other processing tasks. When a device needs to use the Micro Channel bus to send or receive data, it competes with all the other devices that are trying to gain control of the bus. This process is known as arbitration. The DMA controller does not arbitrate for control of the BUS instead; the I/O device that is sending or receiving data (the DMA slave) participates in arbitration. It is the DMA controller, however, that takes control of the bus when the central arbitration control point grants the DMA slave's request.

What is BIOS (basic input/output system)?

   A **BIOS** (**Basic Input/Output System**) Short for **ROM** is boot firmware program that a computer uses to successfully start operating. The BIOS is located on a chip inside of the computer and is designed in a way that protects it from disk failure.
When you turn on a PC, the BIOS first conduct a basic hardware check, called a Power-On Self Test (POST), to determine whether all of the attachments are present and working. Then it loads the operating system into your computer's random access memory, or RAM. The BIOS also manages data flow between the computer's operating system and attached devices such as the hard disk, video card, keyboard, mouse, and printer. The BIOS stores the date, the time, and your system configuration information in a battery-powered, non-volatile memory chip, called a CMOS (Complementary Metal Oxide Semiconductor) after its manufacturing process. The main functions of the BIOS are:

The following text labels appear in the diagram:

- Initialize support chips
- Initialize the components
- CMOS RAM test
- Memory test
- Cache initialization
- Initialize math coprocessor
- Port test
- Access software interrupts
- handle interrupt vector table
- BIOS power on self Test (POST) — It is a built-in **diagnostic program.** This self test ensures that the computer has all of the necessary parts and functionality needed to successfully start itself, such as use of memory, a keyboard and other parts.
- System Service Routines — The BIOS provides various software routines (subprograms) that can be called by **higher-level software** such as DOS, Windows, or their applications, to perform different tasks.
- **BIOS**
- Bootstrap Loader — The BIOS contains a program known as **bootstrap loader** whose responsibility is to search and start the operating system boot program.
  - Search the operating system
  - Boot the operating system
- BIOS Setup Utility Program — Store settings of Memory and disk type
- A non volatile memory (**NVRAM**) is used to store information about the computer system.

Functions of BIOS

(i) BIOS Power on Self Test (POST): It is a built-in diagnostic program. This self test ensures that the computer has all of the necessary parts and functionality needed to successfully start itself, such as use of memory, a keyboard and other parts. Then additional tests are done during booting. If errors are detected during the test, the BIOS instruct the computer to give a code that reveals the problem. Error codes are typically a series of beeps heard shortly after startup.

The BIOS also works to give the computer basic information about how to interact with some critical components, such as drives and memory that it will need to load the operating system. Once the basic instructions have been loaded and the self-test has been passed, the computer can proceed with loading the operating system from one of the attached drives. Computer users can often make certain adjustments to the BIOS through a configuration screen on the computer. The setup screen is typically accessed with a special key sequence during the first moments of startup. This setup screen often allows users to change the order in which drives are accessed during startup and control the functionality of a number of critical devices. Features vary among individual BIOS versions.

We can also use flash-memory cards to hold BIOS information. This allows users to update the BIOS version on computers after a vendor releases an update. This system was designed to solve problems with the original BIOS or to add new functionality. Users can periodically check for updated BIOS versions, as some vendors release a dozen or more updates over the course of a product's lifetime. Mother board (System) BIOS, Video adapter firmware (BIOS), Drive controller firmware (BIOS), Modem Card firmware (BIOS), Network adapter board BIOS, SCSI adapter BIOS. The mother board BIOS provides routines to support motherboard features. BIOS ROM chips for major sub systems of computer such as video and drive control must also be included.

Actually BIOS can be placed in between the computer and external devices as its name tells it is used for reading the keystroke, displaying values on screen, Reading and writing to and from floppy and hard disks etc.

The keyboard is assigned the port number 60, which is known to BIOS. BIOS read this port and data from keyboard goes to computer.

(ii) **Bootstrap Loader**: To boot the operating system. The BIOS contains a program known as bootstrap loader whose responsibility is to search and start the operating system boot program. Then the boot program of operating system controls the computer system and boots the operating system.

(iii) **BIOS Setup Utility Program:** A non volatile memory (NVRAM) is used to store information about the computer system. During installation of a system, the user run BIOS setup program and enter the correct parameters. The settings of memory, disk types and other settings are stored in NVRAM and not in BIOS chip itself. To construct NVRAM, the material required is CMOS (Complementary metal oxide semiconductor). These CMOS chips are very efficient storage devices as they store and maintain data on very low values of current. The system's configurations therefore are also termed as CMOS settings, which we can set using BIOS set up program. The BIOS reads the parameters from CMOS RAM as and when required.

CMOS settings can be maintained by battery backup either by using capacitor or by a battery built into NVRAM chip. This chip also has system clock. If there is no battery, the setting remains for short period of time and we need to reset the system. With it there is loss of BIOS password which protects BIOS set up program.

To clear the CMOS RAM contents, two methods used are

(i) By using clear CMOS jumper.

(ii) By holding down enter key during booting of the system.

For Pentium III motherboards, different set ups are there in AMI BIOS. These are:

• **Standard CMOS Setup:** It is used to set time date, hard disk type, type of floppy drive, type of monitor and keyboard.

Advanced CMOS Setup: It is used to set typematic rate and delay, above 1 MB memory test, memory test tick sound, Hil < Del> message display, system boot up sequence etc.

• **Advanced Chipset Setup:** It is used to set features of chipset.

• **Power Management Setup:** It is used to control power conservation options.

• **PCI/Plug and Play Setup:** It is used to set options of PCI bus and that of plug and play devices.

• **Peripherals Setup:** It is used to control options related to I/O controllers.

• **CPU Configuration Setup:** This setup is used to select the types of CPU installed in the motherboard. In AMI BIOS, the settings are auto as it automatically finds out the type of CPU in the computer system.

(iv) **System Service Routines:** The BIOS provides various software routines (subprograms) that can be called by higher-level software such, as DOS, Windows, or their applications, to perform different tasks. Virtually every task that involves accessing the system hardware has traditionally been controlled using one or more

of the BIOS programs (although many newer operating systems now bypass the BIOS for improved performance). This includes actions like reading and writing from the hard disk, processing information received from devices, etc.

BIOS services are accessed using software interrupts, which are similar to the hardware interrupts except that they are generated inside the processor by programs instead of being generated outside the processor by hardware devices. One thing that this use of interrupts does is to allow access to the BIOS without knowing where in memory each routine is located.

Normally, to call a software routine you need to know its address. With interrupts, a table called an interrupt *vector table* is used that bypasses this problem. When the system is started up, the BIOS puts addresses into this table that represent where its routines are located for each interrupt it responds to. Then, when DOS or an application wants to use a BIOS routine, it generates a software interrupt. The system processes the interrupt, looks up the value in the table, and jumps to the BIOS routine automatically. DOS itself and application programs can also use this interrupt vector table.

Personal Computer - What is personal computer (PC)?

Personal Computer Definition: The first general-purpose, cost-effective *personal computer* created by IBM was called the **IBM PC** or means "personal computer" . It is a microprocessor technology that has been any small, relatively inexpensive computer designed to be used by one person, at home or in an office. It is often simply called a **Personal Computer** (**PC**). The example of *Personal Computer* or *PC* are microcomputer, desktop computer, laptop computer, tablet. In all these computer manufacturers to put an entire CPU on one chip.

What is personal computer?

 A **personal computer** is a computer small and low cost, which is intended for personal use (or for use by a small group of individuals). The term "personal computer" is used to describe desktop computers (desktops). It is often shortened to the acronym PC or microcomputer, whose meaning in English is "personal computer". It is a very common type of machines.

Personal Computer (acronym PC) consists of a central processing unit (CPU) contains the arithmetic, logic, and control circuitry on an single (IC) integrated circuit; two types of memory, main memory, such as RAM, and ROM, magnetic hard disks (HDD) and compact discs and various input/output devices, including a display screen, keyboard and mouse, modem, and printer.

History of Personal Computer

Prior to the Personal Computer (acronym PC), computers were designed for large organization who attached thin terminals for multiple users to a single large computer whose resources were shared among all users. The advent of the personal computer (PC), they break up the tradition of terminals computing. By the late 1980s, technology advances made it feasible to build a small computer that an individual could own and use.

The personal computer began to be wide spread in the 1980s. The first was expensive, work late and had little capacity seen with today's eyes. History shows that they had their antecedents in particular as calculating machines. It was the development of an effective operating system and a user friendly interface which gave impetus to the development and let them be word processors.

According to the Computer History, the first "personal computer" was the Kenbak-1, launched in 1971. had 256 bytes of memory and was advertised in Scientific American for $750, however, did not have CPU and was, like other systems of this era, designed for educational use.

Uses of Personal Computers

Personal computer (PC) is used for Work with word processing, Internet communications, and sound compositions and also for DTP. The PC is a most valued piece of technology around the world. The data processing capabilities of PC have added to their usage.

Advantages and Disadvantages Of Computer

Computer has making human life faster because of its incredible speed,Accuracy and storage, with which human can save anything and search it out easily when needed. We can say computer a versatile machine because it is very flexible in performing their jobs. but Computers have several important **advantages and disadvantages.**

Advantages of computer

Multitasking

Multitasking is one of the major advantage of computer. Person can perform multiple task, multiple operation, calculate numerical problems within few seconds. Computer can perform trillion of instructions per second.

Speed

Now computer is not just a calculating device. Now a day's computer has very important role in human life. One of the main advantages of computer is its incredible speed, which helps human to complete their task in few seconds. All the operations

can be performed very fast just because of its speed elsewise it takes a long time to perform the task.

Cost/ Stores huge amount of data

It is a low cost solution. Person can save huge data within a low budget. Centralized database of storing information is the major advantage that can reduce cost.

Accuracy

One of the root advantage of computer is that can perform not only calculations but also with accuracy.

Data Security

Protecting digital data is known as data security. Computer provide security from destructive forces and from unwanted action from unauthorized users like cyberattack or access attack.

Disadvantage of Computer

As we know advantage comes with disadvantage.

Virus and hacking attacks

Virus is a worm and hacking is simply an unauthorized access over computer for some illicit purpose. Virus is being transferred from email attachment, viewing an infected website advertisement, through removable device like USB etc. once virus is transferred in host computer it can infect file, overwrite the file etc. For example: Huge portion of internet was going down including Twitter, Netflix, Reddit and CNN in October 2016 because the largest DDoS attack was launched on service provider DYN using IoT Botnet.

Online Cyber Crimes

Online cyber-crime means computer and network may have used in order to commit crime. Cyberstalking and Identity theft are the points which comes under online cyber-crimes. **For example**: one may get the access of the access to your shopping account like amazon account now that person will be able to know your personal details like debit card or credit card number which can be than misused.

Reduction in employment opportunity

Mainly past generation was not used of the computer or they have the knowledge of computer they faced a big problem when computer came in field. As we have seen in banking sector senior bank employees faced this problem when computer came to the banking sector.

Above were the main disadvantage of computer, no IQ, Dependency, No feeling, Break down are the basic disadvantages of computer.

Laptop - What is a Laptop Computer?

A **Laptop computer** (also called *portable computer* or *notebook computer* in English) (Other terms, such as **ultrabook** or **netbook**, refer to specific *types* of laptop) is designed with portability in mind. It was developed in the late 1980s. It is briefcase style with a foldout screen with a clamshell form factor, suitable for mobile use and with a miniature keyboard. It is small enough to use in your lap. The laptop is battery or AC-powered personal computer that should be charged via a plug and socket, and when it runs out of power, it must be recharged regularly.

Laptop computer originally monochrome CRT-based, The components of a laptop are built-in **monitor; keyboard**, **touchpad** (which replaces the mouse), USB, graphics card and sound cards as well as high-capacity batteries that are made to keep the laptop power for a long period of time.

The laptops are more expensivebecause the technologyto be morecompact and they are more difficult to design and manufacture. If youhave a limited space, it is worth consideringa"portable"computer.They giveyou exactly thesame comfort andperformance of adesktop computer,but theytake up less space.

How is a Laptop Different from a Desktop?

There are some important differences between laptop and desktop is its mobility as well as its compact size. The laptops computer work with the same equipment using a desktop computer thanks to its numerous I/O ports. This basically turns your laptop computer into a desktop, with one main difference: You can easily disconnect the equipment and take the laptop with you wherever you go. However, some laptop computer, such as netbooks, sacrifices some functionality in order to be even more portable. There are many different styles and brands of laptop and they all come with different software and programs. Laptop computer can also be used to access the Internet using a USB wireless. They can also be connected to a microphone, webcam and digital camera. The screen sizes of these computers are 12 inches to 16 inches.

You getall multimediaqualities ofyourlaptop withoutresponse timethanks toa RAMmemory of 2GBon average anda graphics card thatis just aspowerfulasa desktop. Thus you can easily enjoy your favorite DVDs, playing video games or edit your pictures. Your laptop can handle it all.

2. Information Technology

What do you mean by Data and Information?

The words **Data** and **Information** may look similar and many people use these words very frequently, But both have lots of differences between them.

what is data: Data are plain facts. The word "data" is plural for "datum." When data are processed, organized, structured or presented in a given context so as to make them useful, they are called Information.

It is not enough to have data (such as statistics on the economy). Data themselves are fairly useless, but when these data are interpreted and processed to determine its true meaning, they becomes useful and can be named as Information.

Information is data that has been processed in such a way as to be meaningful to the person who receives it. it is any thing that is communicated.

Data is the term, that may be new to beginners, but it is very interesting and simple to understand. It can be anything like name of a person or a place or a number etc. Data is the name given to basic facts and entities such as names and numbers. The main examples of data are weights, prices, costs, numbers of items sold, employee names, product names, addresses, tax codes, registration marks etc.

Data is the raw material that can be processed by any computing machine. Data can be represented in the form of:

Numbers and words which can be stored in computer's language

Images, sounds, multimedia and animated data as shown.

Different forms of data representation
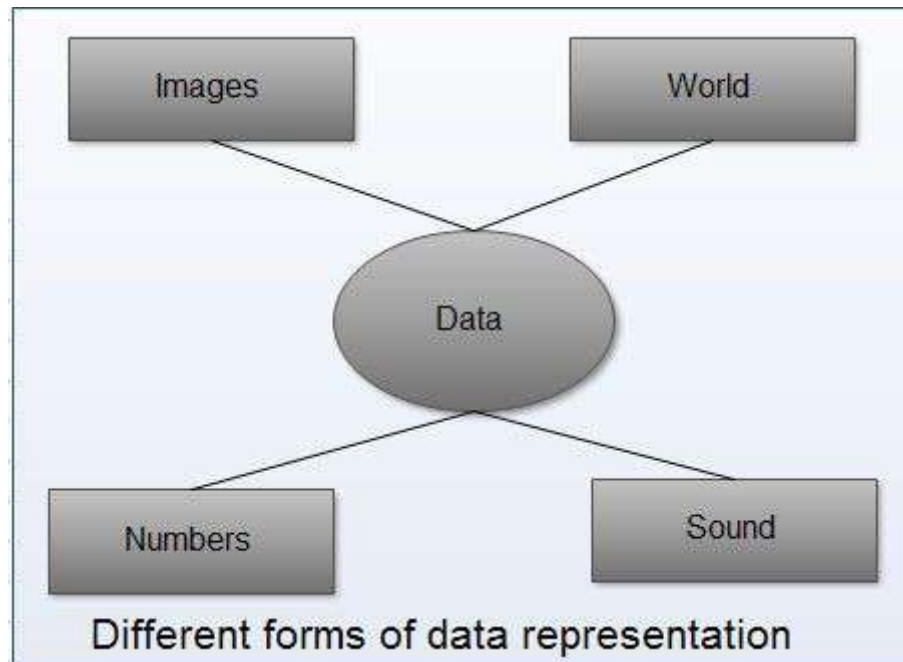
Information: Information is data that has been converted into a more useful or intelligible form. It is the set of data that has been organized for direct utilization of mankind, as information helps human beings in their decision making process. Examples are: Time Table, Merit List, Report card, Headed tables, printed documents, pay slips, receipts, reports etc. The information is obtained by assembling items of data into a meaningful form. For example, marks obtained by students and their roll numbers form data, the report card/sheet is the .information. Other forms of information are pay-slips, schedules, reports, worksheet, bar charts, invoices and account returns etc. It may be noted that information may further be processed and/or manipulated to form knowledge. Information containing wisdom is known as knowledge.

Need of Information

Modem civilization has become so complicated and sophisticated that to survive one has to be competitive. This compels the people to keep himself informed of all types of happenings in the society. With the advent of educational reforms in society, mankind is surrounded with a vast amount of data available. Modem business management system has also rendered itself to bulk collection of data from various sources, that needs to be rearranged in a fashion so that it can be utilized with minimum possible time. This needs a high amount of filing either at data stage or at information stage. No office can be without files. If you go to any tax collection department or municipal office you will find a high amount of files stacked here and there.

Modem rules, regulation and law requires every transaction to happen in a written form, may be an agreement, application, voucher, bill, letter, memo, order etc. Paper files require a high amount of storage space and paper storage creates several other problems like fire risk, spoilage and deterioration by way of aging microorganism and humidity etc. In modem days information is needed to run man's own livelihood to run a system or process or to command a business.

The amount of information is growing very rapidly. The current age of information demands computer literacy to be accompanied by information literacy as employers' dependence is .now focused on professionals with up to date information and all kinds of information processing skills so as to take the challenge of ever changing scenario of information in this world information literacy helps to gather the appropriate information, evaluate the information and generate an informed decision. The impact of information revolution has been extended to each individual in the society and it is much faster than industrial revolution.

The migration from industrial age to an information age has ended the repetitive effort of workers by replacing them with computer software, robots with artificial intelligence have replaced the humans, and multiprocessing computers have replaced office workers with typewriters.

Information is needed to:

• To gain knowledge about the surroundings, and whatever is happening in the society and universe.

• To keep the system up to date.

• To know about the rules and regulations and bye laws of society, local government, provincial and central government, associations, clients etc. as ignorance is no bliss.

• Based on above three, to arrive at a particular decision for planning current and prospective actions in process of forming, running and protecting a process or system

Knowledge

Human mind purposefully organized the information and evaluate it to produce knowledge. In other words the ability of the person recalls or uses his information and experience is known as knowledge. For example, "386" is data, "your marks are 386" is information, and "It is result of your hard work" is knowledge.

The relationship between data, information and knowledge is shown.
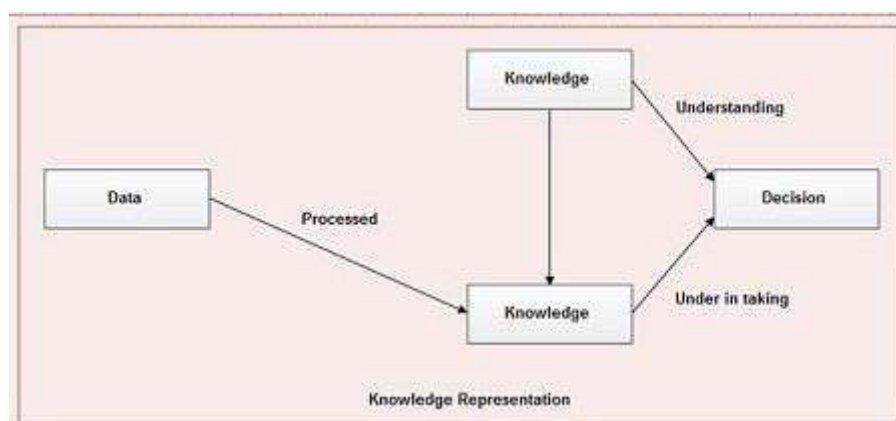
Knowledge is of two types:

• **FactsbasedorInformationbasedKnowledge**: The knowledge gained from fundamentals and through experiments. The knowledge is derived from the information contained in fundamental science derived from experiments, rules, regulations commonly agreed by experts.

• **Heuristic Knowledge**: It is knowledge of good practice, experience and good judgment like hypothesis. It is the knowledge underlying "expertise", rules of thumb, rules of good guessing, that usually achieves desired results but do not guarantee them.

Today Knowledge Management plays a significant role in the development of an organization.

What is Information Technology? Explain Difference Between Data and Information

Information technology is the study, design, development, implementation, support or management of computer based information systems, particularly software applications and computer hardware. It is the capability to electronically input, process, store, output, transmit and receive data and information, including text, graphics, sound and video as well as the ability to control machines of all kinds electronically.

It is comprised of computers, networks, satellite communications, robotics, e-mail, electronic games and automated office equipment. The information industry consists of all computers, communications and electronics related organizations, including hardware, software and services.

Information is the summarization of data. Data are raw facts and figures that are processed into information, such as summaries and totals. Information is the result of processing, manipulating and organizing data in a way that adds to the knowledge of the receiver. Even though information and data are often used interchangeably, they are actually very different.
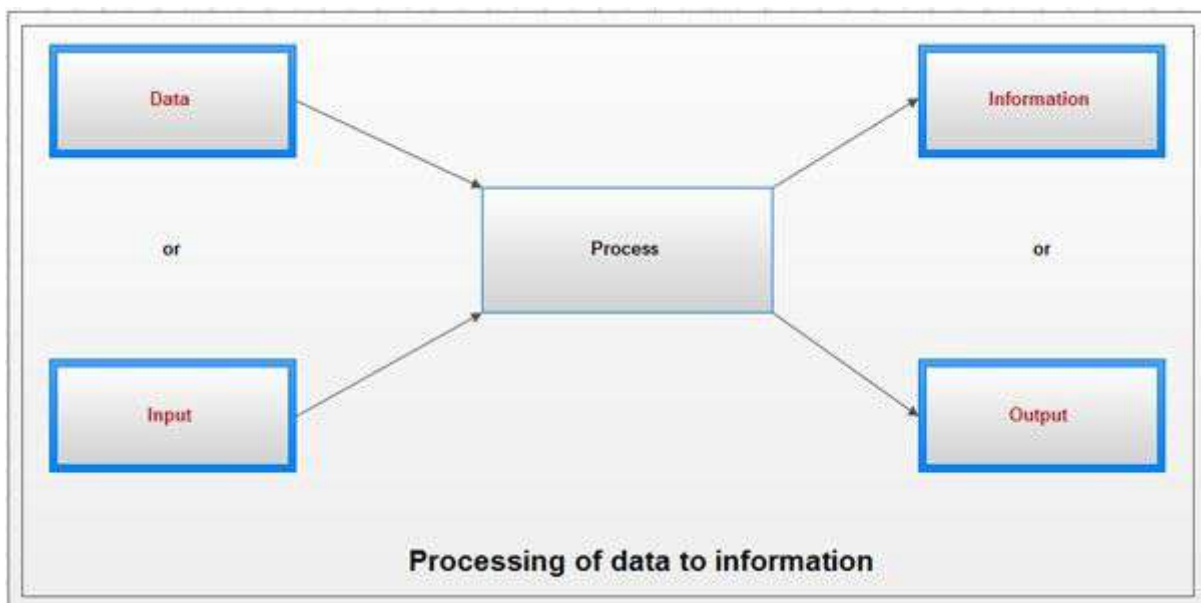
Data is a set of unrelated information and as such is of no use until it is properly evaluated. Upon evaluation, once there is some significant relation between data, it is converted into information. Now this data can be used for different purposes. Till data conveys some information, they are not useful.

It is necessary to make a distinction between two terms, which are usually used interchangeably, namely data and information. Data is the material on which computer programs work upon. It can be numbers, letters of the alphabet, words,

special symbols etc. But by themselves they have no meaning. For example, the following sequence of digits 240343 is meaningless by itself since it could refer to a date of birth, a part number for an automobile, the number of rupees spent on a project, population of a town, the number of people employed in a large organization etc. Once we know what the sequence refers to, then it becomes meaningful and can be called information. When we write above as 24-03-43, it may mean date of birth as 24th March 1943.

A set of words would be data but text would be information. For example "ANNUAL EXAMINATION, AMIT ABH, JYOTSNA, PHYSICS" is a set of data and "JYOTSNA SCORED THE HIGHEST MARKS IN PHYSICS IN ANNUAL EXAMINATION'" is information. This is not the end of affair, information may be processed or manipulated further of course e.g. a printed text may be reorganized. Also information received from one source or system may become data input for another system. In case of examination, score card is information about the individual but is actually a source of input data for making merit list of the entire board or university. Data is something like raw materials used in production processes practiced in factories or industries. In a paper manufacturing factory bamboos and old clothes are the inputs and paper is the output.

Here is the comparison between data and information:

Processing of data to information

Data	Information
Data is raw fact figures. For example : 23 is data.	Information is processes form of data. For example : When 23 is stored in row column form as show become information. Age 23
Data is not significant to a business and of itself.	information is significant to a business and of itself, for example 23 is insignificant for business but age 23 is significant for a business like music.
Data are atomic level pieces of information.	information is a collection of data for example age and 23 collected together to form information.
For example in the health care industry, much activity surrounds data collection. Nurses collect data every day and sometimes hourly. Examples of data include vital signs, weight and relevant assessment parameters.	information, however, provides answers to questions that guide clinicians to change their practices. For example, the trending of vital signs overtime provides a pattern that may lead to certain clinical decisions.
Data does not help in decision making.	AS explained above information helps in decision-marking.

What are the types of Information Systems?

Transaction Processing System (TPS) : Organizations perform routine, repetitive tasks. For example employees are paid at regular intervals, customers place purchase orders and are billed and expenses are monitored and compared to budgets.

The information system that supports such tasks is called 'Transaction Processing System'. A TPS supports the monitoring, collection, storage and processing of the organization's basic transactions. It also provides the input data for many other applications.

Management Information System (MIS): These systems access, organize, summarize and display information for supporting routine decision making in the functional areas. A MIS provides reports about topics like operational efficiency, effectiveness and productivity. It prepares these reports by extracting information from the corporate database and processing it according to the needs of the user. MISs' are used for monitoring, planning and control. They also enable managers to detect possible problems in their early stages.

Support Systems : Support systems for office employees began to emerge in the late 1960s. Airline reservation systems are the best example of this development. Electronic communication is only one aspect of what is now known as an Office Automation System (O.A.S.). Decision support system is used to provide computerized support for complex, non-routine decisions.

Intelligent Systems : By the mid 1980s, managerial application of the so called artificial intelligence began, creating intelligent systems that seem to be able to replicate the thought process of humans. Expert systems are advisory systems that provide the stored knowledge of experts to non-experts, so that the latter can solve difficult problems.

What are the Personal, Social and Ethical Issues in IT?

Personal Issues : An increase in work load and / or responsibilities can trigger job stress. Many employees feel information anxiety because other people are better than they in using computers, because they are slow in learning new technology and because of the need to continuously learn new things.

Exposure to terminals can cause radiation exposure which is associated with cancer and other health related problems. It can also affect eyesight. Other hazards are backaches and muscle tension in the wrist and fingers.

Social Issues : They are mainly positive issues. There is now flexibility in jobs that can greatly improve the quality of leisure time. There are also great opportunities for people with disabilities. Those who cannot type are able to use voice-operated typewriters or work from home. It has brought about major improvement in health care delivery, ranging from better diagnosis to research of new drugs, to more accurate monitoring of critically ill patients.

Ethical Issues : Many companies and professional organizations develop their own code of ethics. A code of ethics is a collection of principles intended as a guide for the members of a company or an organization. There are four kinds of ethical issues - privacy, accuracy, property and accessibility. Information privacy is the right to determine when and to what extent information about oneself can be communicated to others. The issues to be considered here are electronic surveillance and personal information in databases. Millions of computer users are being monitored without their knowledge. Information about individuals is being kept in many databases. Intellectual property is the intangible property created by individuals which is protected by trade secrets, patent and copyright laws.

3. I/O and Memory

Register - What is Registers? Types of Registers

Register are used to quickly accept, store, and transfer data and instructions that are being used immediately by the CPU, there are various types of Registers those are used for various purpose. Among of the some Mostly used Registers named as AC or **Accumulator**, Data Register or DR, the AR or **Address Register**, **program counter** (PC), **Memory Data Register** (MDR), **Index register**, *Memory Buffer Register*.

These Registers are used for performing the various Operations. While we are working on the System then these Registers are used by the **CPU for Performing the Operations**. When We Gives Some Input to the System then the I**nput will be Stored into the Registers** and When the System will gives us the Results after Processing then the Result will also be from the Registers. So that they are used by the **CPU for Processing the Data** which is given by the User.

Registers Perform:-

1) **Fetch**: The Fetch Operation is used for taking the instructions those are given by the user and the Instructions those are stored into the Main Memory will be fetch by using Registers.

2) **Decode**: The Decode Operation is used for interpreting the Instructions means the Instructions are decoded means the CPU will find out which Operation is to be performed on the Instructions.

3) **Execute**: The Execute Operation is performed by the CPU. And Results those are produced by the CPU are then Stored into the Memory and after that they are displayed on the user Screen.

Types of Registers are as Followings

MAR stand for Memory Address Register

This register holds the memory addresses of data and instructions. This register is used to access data and instructions from memory during the execution phase of an instruction. **Suppose CPU wants to store some data in the memory or to read the data from the memory. It places the address of the-required memory location in the MAR.**

Program Counter

The **program counter (PC)**, commonly called the **instruction pointer** (IP) in Intel x86 microprocessors, and sometimes called the **instruction address register**, or just part of the instruction sequencer in some computers, is a processor register

It is a 16 bit special function register in the 8085 microprocessor. It keeps track of the the **next memory address** of the instruction that is to be executed once the execution of the current instruction is completed. **In other words, it holds the address of the memory location of the next instruction when the current instruction is executed by the microprocessor.**

Accumulator Register

This Register is used for storing the Results those are produced by the System. When the CPU will generate Some Results after the Processing then all the Results will be Stored into the **AC Register.**

Memory Data Register (MDR)

MDR is the register of a computer's control unit that contains the **data to be stored in the computer storage** (e.g. RAM), or the **data after a fetch from the computer storage**. It acts **like a buffer** and holds anything that is copied from the memory ready for the processor to use it. **MDR hold the information before it goes to the decoder.**

MDR which contains the data to be written into or readout of the addressed location. For example, to retrieve the contents of cell 123, we would load the value 123 (in

binary, of course) into the MAR and perform a fetch operation. When the operation is done, a copy of the contents of cell 123 would be in the MDR. To store the value 98 into cell 4, we load a 4 into the MAR and a 98 into the MDR and perform a store. When the operation is completed the contents of cell 4 will have been set to 98, by discarding whatever was there previously.

The MDR is a two-way register. When data is fetched from memory and placed into the MDR, it is written to in one direction. When there is a write instruction, the data to be written is placed into the MDR from another CPU register, which then puts the data into memory.

The Memory Data Register is half of a minimal interface between a micro program and computer storage, the other half is a memory address register.

Index Register

A hardware element which holds a number that can be added to (or, in some cases, subtracted from) the address portion of a computer instruction to form an effective address. Also known as **base register**. An index register in a computer's CPU is a processor register used for modifying operand addresses during the run of a program.

Memory Buffer Register

MBR stand for *Memory Buffer Register*. This register holds the contents of data or instruction read from, or written in memory. It means that this register is used to store data/instruction coming from the memory or going to the memory.

Data Register

A register used in microcomputers to temporarily store data being transmitted to or from a peripheral device.

Input and Output Devices

The devices which are used to input the data and the programs in the computer are known as "**Input Devices**". or Input device can read data and convert them to a form that a computer can use. **Output Device** can produce the final product of machine processing into a form usable by humans. It provides man to machine communication. Some of the I/O devices are explained below:

(1) **Keyboard** : Keyboard is used in the input phase of a computer-based information system. Keyboard is most common input device is used today. The data and instructions are input by typing on the keyboard. The message typed on the keyboard reaches the memory unit of a computer. It's connected to a computer via a cable. Apart from alphabet and numeral keys, it has other function keys for performing different functions.

(2) **Mouse** : It's a pointing device. The mouse is rolled over the mouse pad, which in turn controls the movement of the cursor in the screen. We can click, double click or drag the mouse. Most of the mouse's have a ball beneath them, which rotates when the mouse in moved. The ball has 2 wheels of the sides, which in turn mousse with the movement of the ball. The sensor notifies the speed of its movements to the computer, which in turn moves the cursor/pointer on the screen.

(3) **Scanner** : Scanners are used to enter information directly in to the computers memory. This device works like a Xerox machine. The scanner converts any type of printed or written information including photographs into digital pulses, which can be manipulated by the computer.

(4) **Track Ball** : Track ball is similar to the upside- down design of the mouse. The user moves the ball directly, while the device itself remains stationary. The user spins the ball in various directions to effect the screen movements.

(5) **Light Pen** : This is an input device which is used to draw lines or figures on a computer screen. It's touched to the CRT screen where it can detect raster on the screen as it passes.

(6) **Optical Character Rader** : It's a device which detects alpha numeric characters printed or written on a paper. The text which is to be scanned is illuminated by a low frequency light source. The light is absorbed by the dark areas but reflected from the bright areas. The reflected light is received by the photocells.

(7) **Bar Code Reader** : This device reads bar codes and coverts them into electric pulses to be processed by a computer. A bar code is nothing but data coded in form of light and dark bars.

(8) **Voice Input Systems** : This devices converts spoken words to M/C language form. A micro phone is used to convert human speech into electric signals. The signal pattern is then transmitted to a computer when it's compared to a dictionary of patterns that have been previously placed in a storage unit of computer. When a close match is found, the word is recognized.

(9) **Plotter** : Plotter is an O/P device that is used to produce graphical O/P on papers. It uses single color or multi color pens to draw pictures as blue print etc.

(10) **Digital Camera** : It converts graphics directly into digital form. It looks like an ordinary camera, but no film is used therein, instead a CCD (changed coupled Divide) Electronic chip in used. When light falls, on the chip though the lens, it converts light waves into electrical waves.

Different Types of RAM? Explain in Detail

Random Access Memory (**RAM**) is the best known form of *Computer Memory*. The Read and write (R/W) memory of a computer is called RAM. The User can write information to it and read information from it.With Ram any location can be reached in a fixed (and short) amount of time after specifying its address.

The RAM is a volatile memory, it means information written to it can be accessed as long as power is on. As soon as the power is off, it cannot be accessed. So this mean RAM computer memory essentially empty. RAM holds data and processing instructions temporarily until the CPU needs it.

RAM is considered "**random access**" because you can access any memory cell directly if you know the row and column that intersect at that cell. RAM is made in electronic chips made of so called semiconductor material, just like processors and many other types of chips. In RAM, transistors make up the individual storage cells which can each "remember" an amount of data, for example, 1 or 4 bits – as long as the PC is switched on. Physically, RAM consists of small electronic chips which are mounted in modules (small printed circuit boards). The modules are installed in the PC's motherboard using sockets – there are typically 2, 3 or 4 of these.

There are two basic types of RAM

Dynamic RAM: loses its stored information in a very short time (for milli sec.) even when power supply is on. D-RAM's are cheaper & lower.

Similar to a microprocessor chip is an Integrated Circuit (IC) made of millions of transistors and capacitors.

In the most common form of computer memory, Dynamic Memory Cell, represents a single bit of data. The capacitor holds the bit of information – a 0 or a 1. The transistor acts as a switch that lets the control circuitry on the memory chip read the capacitor or change its state. A capacitor is like a small bucket that is able to store electrons. To store a 1 in the memory cell, the bucket is filled with electrons.

To store a 0, it is emptied. The problem with the capacitor's bucket is that it has a leak. In a matter of a few milliseconds a full bucket becomes empty. Therefore, for dynamic memory to work, either the CPU or the Memory Controller has to come along and recharge all of the capacitors holding it before they discharge. To do this, the memory controller reads the memory and then writes it right back. This refresh operation happens automatically thousands of times per second.

This refresh operation is where dynamic RAM gets its name. Dynamic RAM has to be dynamically refreshed all of the time or it forgets what it is holding. The downside of all of this refreshing is that it takes time and slows down the memory.

Static RAM uses a completely different technology. S-RAM retains stored information only as long as the power supply is on. Static RAM's are costlier and consume more power. They have higher speed than D-RAMs. They store information in Hip-Hope.

In static RAM, a form of flipflop holds each bit of memory. A flip-flop for a memory cell takes four or six transistors along with some wiring, but never has to be refreshed. This makes static RAM significantly faster than dynamic RAM. However, because it has more parts, a static memory cell takes up a lot more space on a chip than a dynamic memory cell. Therefore, you get less memory per chip, and that makes static RAM a lot more expensive. Static RAM is fast and expensive, and

dynamic RAM is less expensive and slower. Static RAM is used to create the CPU's speedsensitive cache, while dynamic RAM forms the larger system RAM space.

Some other RAMS are

(a) EDO (Extended Data Output) RAM : In an EDO RAMs, any memory location can be accessed. Stores 256 bytes of data information into latches. The latches hold next 256 bytes of information so that in most programs, which are sequentially executed, the data are available without wait states.

(b) SDRAM (Synchronous DRAMS), SGRAMs (Synchronous Graphic RAMs) These RAM chips use the same clock rate as CPUuses. They transfer data when the CPU expects them to be ready.

(c) DDR-SDRAM (Double Data Rate – SDRAM) : This RAM transfers data on both edges of the clock. Therefore the transfer rate of the data becomes doubles.

ROM : Read only memory: Its nonvolatile memory, ie, the information stored in it, is not lost even if the power supply goes off. It's used for the permanent storage of information. It also posses random access property. Information cannot be written into a ROM by the users/programmers. In other words the contents of ROMs are decided by the manufactures.

The following types of ROMs an listed below :

(i) PROM : It's programmable ROM. Its contents are decided by the user. The user can store permanent programs, data etc in a PROM. The data is fed into it using a PROM programs.

(ii) EPROM : An EPROM is an erasable PROM. The stored data in EPROM's can be erased by exposing it to UV light for about 20 min. It's not easy to erase it because the EPROM IC has to be removed from the computer and exposed to UV light. The entire data is erased and not selected portions by the user. EPROM's are cheap and reliable.

(iii) EEPROM (Electrically Erasable PROM) : The chip can be erased & reprogrammed on the board easily byte by byte. It can be erased with in a few milliseconds. There is a limit on the number of times the EEPROM's can be reprogrammed, i.e.; usually around 10,000 times.

Flash Memory : Its an electrically erasable & programmable permanent type memory. It uses one transistor memory all resulting in high packing density, low power consumption, lower cost & higher reliability. Its used in all power, digital cameras, MP3 players etc.

What is a Printer and what are the different types of Printers?

Printers are Output devices used to prepare permanent Output devices on paper. Printers can be divided into two main categories :

Impact Printers : In this hammers or pins strike against a ribbon and paper to print the text. This mechanism is known as electro-mechanical mechanism. They are of two types.
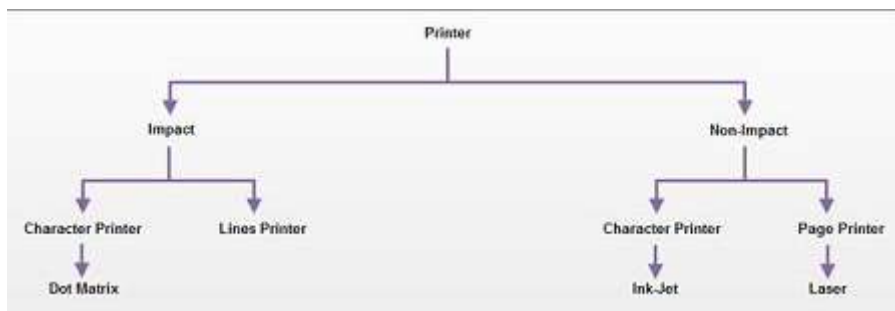
Character Printer : It prints only one character at a time. It has relatively slower speed. Eg. Of them are Dot matrix printers.

Dot Matrix Printer : It prints characters as combination of dots. Dot matrix printers are the most popular among serial printers. These have a matrix of pins on the print head of the printer which form the character. The computer memory sends one character at a time to be printed by the printer. There is a carbon between the pins & the paper. The words get printed on the paper when the pin strikes the carbon. There are generally 24 pins.

Laser Printer is a type of printer that utilizes a laser beam to produce an image on a drum. The light of the laser alters the electrical charge on the drum wherever it hits. The drum is then rolled through a reservoir of toner, which is picked up by the charged portions of the drum. Finally, the toner is transferred to the paper through a combination of heat and pressure.

This is also the way copy machines work. Because an entire page is transmitted to a drum before the toner is applied, laser printers are sometimes called page printers. There are two other types of page printers that fall under the category of laser printers even though they do not use lasers at all. One uses an array of LEDs to expose the drum and the other uses LCDs. Once the drum is charged, however, they both operate like a real laser printer. One of the chief characteristics of laser printers is their resolution – how many dots per inch (dpi) they lay down.

The available resolutions range from 300 dpi at the low end to 1,200 dpi at the high end. In addition to text, laser printers are very adept at printing graphics, so you need significant amounts of memory in the printer to print high-resolution graphics. To print a full-page graphic at 300 dpi, for example, you need at least 1 MB (megabyte) of printer RAM. For a 600 dpi graphic, you need at least 4 MB RAM.

Because laser printers are non-impact printers, they are much quieter than dotmatrix or daisy-wheel printers. They are also relatively fast, although not as fast as some dot-matrix or daisy-wheel printers. The speed of laser printers ranges from about 4 to 20 pages of text per minute (ppm). A typical rate of 6ppm is equivalent to about 40 characters per second (cps).

Non-Impact Printers : There printers use non-Impact technology such as ink-jet or laser technology. There printers provide better quality of O/P at higher speed. These printers are of two types :

Ink-Jet Printer : It prints characters by spraying patterns of ink on the paper from a nozzle or jet. It prints from nozzles having very fine holes, from which a specially made ink is pumped out to create various letters and shapes. The ink comes out of the nozzle in a form of vapors. After passing through a reflecting plate, it forms the desired letter/shape at the desired place.

What are Impact and Non-Impact Printers?

A printer is an output device that prints characters, symbols, and perhaps graphics on paper. The printed output is generally referred to as **hardcopy** because it is in relatively permanent form. Softcopy refers to temporary images such as those displayed on a monitor. Printers are categorized according to whether or not the image produced is formed by physical contact of the print mechanism with the paper. Impact printers have contact; nonimpact printers do not.

Impact printers

An impact printer has mechanisms resembling those of a **typewriter.** It forms characters or images by **striking a mechanism** such as a print **hammer or wheel** against an **inked ribbon**, leaving an image on paper. Impact printers are dying out; however, you may still come in contact with a dot-matrix printer. A dot-matrix printer contains a print head of small pins that strike an inked ribbon, forming characters or images. Print heads are available with **9, 18, or 24 pins**; the **24-pin** head offers the **best print quality.**

Dot-matrix printers permit a choice between output of draft quality; a coarser-looking 72 dots per inch vertically, which may be acceptable for drafts of papers and reports, and near-letter-quality, a crisper-looking 144 dots per inch vertically, which is more suitable for a finished product to be shown to other people.

Dot-Matrix Printers

Dot-matrix printers print about **40-300 characters per second (cps)** and can print some graphics, although the reproduction **quality is poor. Color ribbons** are available for limited use of color. Dot-matrix printers are **noisy, inexpensive**, and they can print through multipart forms, creating several copies of a page at the same time,

Daisy-Wheel Printer

A type of printer that produces **letter-quality type**. Daisy-wheel is a **serial printer** A daisy-wheel printer works on the same principle as a **ball-head typewriter**. The daisy wheel is a **disk made of plastic or metal** on which characters stand out in relief along the outer edge. To print a character, the printer rotates the disk until the desired letter is facing the paper. Then a **hammer strikes the disk**, forcing the

character to hit an ink ribbon, leaving an impression of the character on the paper. You can change the daisy wheel to print **different fonts.**

Daisy-wheel printers **cannot print graphics**, and in general they are **noisy and slow**, printing from **10 to about 75 characters per second**. As the price of laser and ink-jet printers has declined, and the quality of dot-matrix printers has improved, daisy-wheel printers have become obsolete.

Drum Printer

An impact printer in which a complete set of characters for each print position on a line is on a continuously rotating drum behind an inked ribbon, with paper in front of the ribbon; **identical characters are printed simultaneously** at all required positions on a line, on the fly, by signal-controlled hammers.

Chain Printer

It is the **character printer**. The print element in a **chain printer is a metallic band** or chain containing the **embossed characters** that rotates horizontally in front of paper. A complete chain consists of the **five sections**; each section consists of **48 characters**. As the print chain rotates, properly timed print **hammers strike** the paper along with linked ribbon, against the **proper character on the chain** as it passes. Chain printer are one of the **fastest impact printers** that can produce up to **400 to 2500 characters per second**. Chain Printer also called **band printers**, contain **characters on a rotation band**. Speeds of up to **3000 lines a minute** may be possible with these machines.

Line Printer

A **high-speed printer capable of printing an entire line at one time**. A fast line printer can print as many as **3,000 lines per minute**. The disadvantages of line printers are that they **cannot print graphics**, the **print quality is low**, and they are **very noisy**.

Other Impact Printer Are

1. **wire matrix printer** - an impact printer in which each character is represented by a pattern of dots made by wires

2. **wang image printer** devices an output composed of a series of dots

Nonimpact Printers

Nonimpact printers, used almost everywhere now, are faster and quieter than impact printers because they have fewer moving parts. Nonimpact printers form characters and images without direct physical contact between the printing mechanism and the paper.

Two types of nonimpact printers often used with microcomputers are laser printers and ink-jet printers.

Laser Printer:

Like a dot-matrix printer, a laser printer creates **images with dots**. However, as in a photocopying machine, these **images are created on a drum**, treated with a **magnetically charged ink-like toner** (powder), and then transferred from drum to paper.
- There are good reasons why laser printers are so popular. They produce **sharp, crisp images** of both text and graphics, providing resolutions from **300 dpi up to 1200 dpi**, which is **near-typeset quality** (NTQ). They are quiet and fast. They can print **4-32 text-only pages per minute** for individual microcomputers, and more than **120 pages per minute for mainframes**. (Pages with more graphics print more slowly.) They can **print in many fonts** (type styles and sizes). The more expensive models can print in different colors.

- Laser printers have **built-in RAM chips** to store documents output from the computer. If you are working in desktop publishing and printing complicated documents with color and many graphics, you will need a printer with a lot of RAM. Laser printers also have their own ROM chips to store fonts and their own small dedicated processor. To be able to manage graphics and complex page design, a laser printer works with a page description language, a type of software that has become a standard for printing graphics on laser printers. A **PDL (page description language)** is software that describes the shape and position of letters and graphics to the printer. **PostScript,** from **Adobe Systems**, is one common type of page description language; **HPGL, Hewlett-Packard Graphic Language**, is another.

Ink-jet printer

Like laser and dot-matrix printers, ink-jet printers also form **images with little dots. Ink-jet printers spray small, electrically charged droplets of ink** from four nozzles through holes in a matrix at high speed onto paper.

- Ink-jet printers can **print in color** and are quieter and much less expensive than a color laser printer. However, they are slower and print in a somewhat lower **resolution (300-720 dpi)** than laser printers. Some new, expensive ink-jet printers print up **1200 or 1400 dpi**. High resolution output requires the use of special coated paper, which costs more regular paper. And, if you are printing color graphics at a high resolution on an ink-jet printer, it may take 10 minutes or more for a single page finish printing.

- A variation on ink-jet technology is the **bubble-jet printer**, which use miniature heating elements to force specially formulated inks through print heads with **128 tiny nozzles**. The **multiple nozzles print fine images at high speeds**. This technology is commonly used in portable printers.

plotter

A plotter is a computer printing device for printing **vector graphics**. In the past, plotters were widely used in applications such as computer-aided design, though they have generally been replaced with wide-format conventional printers. It is now commonplace to refer to such wide-format printers as "plotters,"

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

In general, plotters are considerably more expensive than printers. They are used in engineering applications where precision is mandatory.

Interrupt - What is Interrupt? Types of Interrupts.

When a Process is executed by the CPU and when a user Request for another Process then this will create disturbance for the Running Process. This is also called as the **Interrupt.**

Interrupts can be generated by User, Some Error Conditions and also by Software's and the hardware's. But CPU will handle all the Interrupts very carefully because when Interrupts are generated then the CPU must handle all the Interrupts Very carefully means the CPU will also Provides Response to the Various Interrupts those are generated. So that When an interrupt has Occurred then the CPU will handle by using the Fetch, decode and Execute Operations.

Types of Interrupts

Generally there are three types of Interrupts those are Occurred For Example

1) Internal Interrupt
2) Software Interrupt.
3) External Interrupt.

The External Interrupt occurs when any Input and Output Device request for any Operation and the CPU will Execute that instructions first For Example When a Program is executed and when we move the Mouse on the Screen then the CPU will handle this External interrupt first and after that he will resume with his Operation.

The Internal Interrupts are those which are occurred due to Some Problem in the Execution For Example When a user performing any Operation which contains any Error and which contains any type of Error. So that Internal Interrupts are those which are occurred by the Some Operations or by Some Instructions and the Operations those are not Possible but a user is trying for that Operation. And The Software Interrupts are those which are made some call to the System for Example

while we are Processing Some Instructions and when we wants to Execute one more Application Programs.

Read Only Memory. What are the types of ROM

ROM Definition: It is an example of non volatile memory. **ROM full form is Read Only Memory**. It is a class of storage medium used in computers and other electronic devices. *Read Only Memory* (*ROM*), also known as firmware, is an integrated circuit programmed with specific data when it is manufactured. The instructions for starting the computer are housed on Read only memory chip.

Why Need ROM

ROM chips are used not only in computers, but in most other electronic items as well. Because data is fully incorporated at the ROM chip's manufacture, data stored can neither be erased nor replaced. This means permanent and secure data storage. However, if a mistake is made in manufacture, a ROM chip becomes unusable. The most expensive stage of ROM manufacture, therefore, is creating the template.

If a template is readily available, duplicating the ROM chip is very easy and affordable. A ROM chip is also non volatile so data stored in it is not lost when power is turned off. ROM is a semiconductor memory that is capable of operating at electronics speed.

Difference between ram and rom

• ROM can hold data permanently and RAM cannot.

• ROM chip is a non-volatile and RAM chip is volatile in nature.

Types of ROM :

 PROM : Short for programmable read-only memory, a memory chip on which data can be written only once. Once a program has been written onto a PROM, it remains there forever. Unlike RAM, PROMs retain their contents when the computer is turned off. The difference between a PROM and a ROM (read-only memory) is that a PROM is manufactured as blank memory, whereas a ROM is programmed during the manufacturing process. To write data onto a PROM chip, you need a special device called a PROM programmer or PROM burner. The process of programming a PROM is sometimes called burning the PROM.

EPROM : Acronym for erasable programmable read-only memory, and pronounced ee-prom, EPROM is a special type of memory that retains its contents until it is exposed to ultraviolet light. The ultraviolet light clears its contents, making it possible to reprogram the memory. To write to and erase an EPROM, you need a special device called a PROM programmer or PROM burner.

EEPROM : Short form of electrically erasable programmable read-only memory. EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge. Like other types of PROM, EEPROM retains its contents even when the power is turned off. Also like other types of ROM, EEPROM is not as fast as RAM.

What is CISC and RISC? Explain RISC in detail

CISC (Complex Instruction Set Computer) : It was developed by Intel. CISC is a type of design for the computers. CISC based computer will have shorter programs which are made up of symbolic machine language.

A **Complex Instruction Set Computer (CISC)** supplies a large number of complex instructions at the assembly language level. During the early years, memory was slow and expensive and the programming was done in assembly language. Since memory was slow and instructions could by retrieved up to 10 times faster from a local ROM than from main memory, programmers tried to put as many instructions as possible in a microcode.

RISC (Reduced Instruction Set Computer) : RISC is a type of microprocessor that has a relatively limited number of instructions. It is designed to perform a smaller number of types of computer instructions so that it can operate at a higher speed (perform more million instructions per second, or millions of instructions per second). Earlier, computers used only 20% of the instructions. Making the other 80% unnecessary. One advantage of reduced instruction set computers is that they can execute their instructions very fast because the instructions are so simple.

RISC chips require fewer transistors, which makes them cheaper to design and produce. In a RISC machine, the instruction set contains simple, basic instructions, from which more complex instructions can be composed. Each instruction is of the same length, so that it may be fetched in a single operation. Most instructions complete in one machine cycle, which allows the processor to handle several instructions at the same time. This pipelining is a key technique used to speed up RISC machines.

Advantages :

i) Speed : Since a simplified instruction set allows for a pipelined, superscalar design RISC processors often achieve 2 to 4 times the performance of CISC processor using comparable semiconductor technology and the same clock rates.

ii) Simpler Hardware : Because the instruction set of a RISC processor is so simple, it uses up much less chip space; extra functions, such as memory management units or floating point arithmetic units, can also be placed on the same chip. Smaller chips allow a semiconductor manufacturer to place more parts on a single silicon wafer, which can lower the per-chip cost dramatically.

iii) Shorter Design Cycle : Since RISC processors are simpler than corresponding CISC processors, they can be designed more quickly, and can take advantage of

other technological developments sooner than corresponding CISC designs, leading to greater leaps in performance between generations.

Storage Devices

As we know that the Main Memory Stores the data in a Temporary Manner means all the data will be loss when the Power switched off. And all the data will be loss when the power goes switched off.

So that we uses the Secondary Storage devices those are used for Storing the data in a Permanent Manner means all the Data will remain Stored whether the Power is Switched on or Switched off means the Power Will never effect on the System. For storing the data in a Permanent Manner we uses the Magnetic Storage Devices. There are also Some Advantages of Secondary Storage Devices.

1) **Non-Volatile Storage Devices**: The Non-Volatile Storage Devices are Non-Volatile in the nature means them never loss their data when the Power goes switched off. So that data which is Stored into the Non-Volatile Storage Devices will never be Loosed When the Power Switched off.

2) **Mass Storage**: The Capacity of these Devices is very high means we can Store the Huge Amount of data into the Secondary Storage Devices. We can Store data into the Secondary Storage Devices in the form of Giga Bytes and Tera Bytes.

3) **Cost Effective**: The Cost of Secondary Storage Devices is very lower in compare to the Main Memory So that they are also called as the more cost effective and they are very small and couldn't easily damage. And the data can't be easily loss from these Disks.

4) **Reusability**: As Memory Contains the Data in the Temporary as well as Permanent Manner. But the Secondary Storage Devices are always Reusable means they can be erased and stored any Time. Means we can add or Remove the Contents from these Disks when we Requires.

There are Many Types of Storage Devices those are based on the Sequential and Random Access Means the data which is Stored into the Secondary Storage devices can be Read either from the First Location which is also known as the Sequential Access or Sequential Manner and the Data can be Read from these Disks and also from any Locations. So if any Disk provides this Utility then this is called as the Direct Access Mechanism. There are Many Storage Devices those are either based on the SASD or Some are DASD.

Various types of Secondary Storage Devices are as Followings:

1) **Magnetic Tapes**: The Magnetic Tapes is the Type of Secondary Storage Device and this Device is used for taking back up of data and this Tape contains some magnetic fields and the Magnetic Tapes are used Accessing the data into the Sequential Form and the Tape Also Contains a Ribbon which is coated on the Single Side of the Tape and also contains a head which reads the data which is Recorded on to the Tape. And when we are reading the information from the disk then we can

also read backward information means we can also back the Tape for Reading the Previous information. And For inserting the Tape into the System we also Requires Some Tape Drives Which Contains Tape and which is Responsible for Reading the contents from the Tapes.

They can Store huge Amount of data into the Tape Drive , But the Main Limitation of the Tape Drive is that we cant Access the Data from the Disks directly means if we wants to 100th Record from the Tape then we must have to move all the Previous i.e. 99th Records first. And the Tapes are also easily damaged due to the Human Errors.

2) **Magnetic Disks** : - This is also called as the hard disk and this is made from the thin metal platter which is coated on the both sides of the magnetic Disks. And the there are Many Plates or Platters into a single Hard Disk and all the Plates are Made from the Magnetic Materials and all the Disks are Rotate from the 700 to 3600 rpm means Rotation per Minute and the Hard Disk also Contains a head which is used for both Reading and Writing the Data from the Hard Disks.

The Plate of Disk is Divided into the Tracks and sectors and the collection of Tracks makes a Cylinder means all the Tracks of the Disk which a Consecutive Areas makes a Cylinder.

The Disk is first divided into the Number of Tracks and the Tracks are further divided into the sectors and the Number of Tracks Makes a Cylinder. All the data is Stored into the disk by using Some Sectors and each sectors belongs to a Tracks. The Data is accessed from the Disk by using the heads, all the heads have Some Arm those are used for Reading the Data from the Particular Tracks and sector. When the Disk Rotates very high Speed then the Head also Moves, For Reading the data from the Disk the ARM touches with the Particular Track and read the data from that Location.

For Locating a Particular data from the Disk the head Moves Around the Disk very Fastly and data which a user wants to Access must have an Address So that Arm of the head just use that Address Means the Number of Cylinder, Number of Track and Number of Sectors from which user wants to read the data. With the Help of these Read and Write heads we can also Read the Data from the Disk and we can also Stores some data onto the Disk. Some Time Considerations are also used when we are accessing or storing the data onto the hard disk.

1) **Seek Time**: - The Total Time which is Taken to Move on the Desired track is known as the seek Time. And time is always measured by using the Milliseconds.

2) **Latency Time**. : The time required to Bring the Particular Track to the Desired Location Means the Total Time to bring the Correct the Sector for Reading or for the read and Write head. This is also called as the Average Time.

3) **Data Transfer Time**: The Total Time which is required for Reading and Writing the data into the Disk is known as the Data transfer Time.

When we are Taking About the Magnetic Tapes then we can say that the Storage Capacity of the disk is Measure in the Form of Mega Bytes and when are talking

about the Hard Disk then the Measurement will be in the Form of Giga Bytes. Means the Capacity of t the Hard Disk will be Read by using the Giga Bytes. The Magnetic Tapes are Sequential Access Device and the Hard Disk is the Direct Access Device means the data of this Disk will be Read from Any Location and the Data can be Read from the Disk by using the Read Write Heads. But hard Disks are Costlier than the Simple Magnetic Tapes. But the capacity of the Hard Disk is very high in compare to the Tapes.

3) **Floppy Diskette**: Floppy disk is a kind of storage device that can be used to carried around? The Floppy Disk is also a Secondary Storage device which is used for storing the data in a Permanent Manner. The floppy is made up of Rigid Mylar Plastic and also contains a Magnetic black disk inside the Plastic Cover. The Floppy Disk also Stores all the Data into the Form of Tracks and Sectors and the floppy Disk provides both Reading and Writing the data into the Disk. The Floppy Disk is also called as Reusable Disk means the Floppy Disk Provides us the Facility to Read and Writes the Data into disk as and When Necessary and Also Many Times. We can Read and Write the data from the Disk.

The Main Advantage of the Floppy Disk is that the Data can be Stored many Times but the Main Limitation of the floppy Disk is that floppy Disk have a Small capacity and the Floppy Disk also doesn't have Reliability means the Data Stored into the Disk may not be used for Long Time because the floppy Disk is very Sensitive Thing when we Move the Head of the Disk Again and Again then the floppy disk gets Damaged. So that we can say that Floppy Disk is not a Reliable thing. And I the Other side the Cost of floppy Disk is also high means with the Comparison of the Other Storage Media's Floppy Disk have some more cost.

But the Main Advantage of the Floppy Disk is that floppy Disk is used for Moving the data from one Computer to Another With the Advent of the Floppy Disk we can Store the Data Into the Floppy Disk and after that we can Easily Remove that Disk from the System and Also Put the Disk into the Another System for Taking the Data.

But we can not Start or Run the System without the Hard Disk So that floppy Disk is used to Transfer the Files from one System into the. There are Two Types of floppy Disk Available first is the 3.5 and second is the 5.2. But for inserting the Floppy Disk into the System we must have to use the Floppy Disk Drive in the System.

For Reading the data from the Disk there are also Some Read and Write heads those are too used. And the Head will touch the Surface of the floppy Disk So that this will lead to the Damage of the Disk So Quickly because when the Head Directly Touch the Surface of the Disk, then this will lead to the Scratches on the Disk and also cause Damage of the Disk. And the Drive can take only one Disk Means we can insert only one Floppy Disk at a Time into the Floppy Drive. The capacity of the floppy Disk is 1.44 MB. So that we can Floppy Disks as rare as Possible.

Floppy Disk Contains a Notch which Specify Whether the data will be Read or Write Means to Say if we wants to Protect our data then we can set the Notch of the Floppy Disk as a Read Only.

4) Optical Disks: The Optical Disks are also called as the CD-ROM's means Compact Disk Read Only Memory which is also used for Storing the data into the Disk and this is called as the Optical Disk because the CD-ROM 's are made up of the Golden or Aluminum Material and the data is Stored on the Disk in the Form of the Tracks and Sectors. The Whole Disk is Divided into the Number of Tracks and the Single Track is Divided into the Number of Sectors and the Data is Stored into the Sectors and the Disk is Divided into the Sectors as the first Track Contains the Sectors in the huge Size and the Other Tracks contains the Sectors in a Small Manner. So that as the Disk grows the Disk is Divided into the Small Number of Tracks and the Sectors.

CD-ROM Contains the data Which is truly Read able means we cant edit the contents of the CD-ROM Means once Data has been Written into the CD , we can be able to Change the Contents of the Disk and the Data which is Stored on the Disk can be Any Time Read by the user. The CD-ROM provides us the Large Capacity in compare to the Floppy Disks and the CDROM can Store the Data from 650 MB to 800 MB means the data can be Store up to this Space.

There are Many Disks that cant be Erased once Written So they are also called as the WORM Disks Means the Write Once and Read Many Mane a user can just Write the data only one Time and then after that he can use that Disk Many Times but a user cant Edit or Change those Contents after they are Written into the File. So that these Disks are not Reusable. So that these Types of Optical Disks are also called as the CD-ROM and also Some Times they are known as the CD-R Means the Read Only Disks because the data which is Written into these Types of Disks is never to be Erased.

Now these Days there are also Some CDs Available those are also called as the CD-RW or Read Writable Disks. As the Name Suggest these Disks Provides the feature to the user to Read and Write the Contents from the Disk as they feel Necessary So that the CD-RW are now Most Popular because a user can any Time Remove the Contents from the Disk and also he can store the new Contents into the Disk.

The CD-R and CD-RW both have Same Capacity and both these can be used for Transferring the Files from one System to another but the Main difference is that the cost. The CD-RW has Some More Cost in compare to the Simple CD or in Compare to the CD-R.

Winchester Disk: Another term for hard disk drive. The term **Winchester** comes from an early type of disk drive developed by IBM that had 30MB of fixed storage and 30MB of removable storage; so its inventors called it a Winchester in honor of its 30/30 rifle. Although modern disk drives are faster and hold more data, the basic technology is the same, so Winchester has become synonymous with hard.

Magnetic Drum: A direct-access, or *random-access*, storage device. A magnetic drum, also referred to as *drum*, is a metal cylinder coated with magnetic iron-oxide material on which data and programs can be stored. Magnetic drums were once used as a primary storage device but have since been implemented as auxiliary storage devices.

The tracks on a magnetic drum are assigned to channels located around the circumference of the drum, forming adjacent circular bands that wind around the drum. A single drum can have up to 200 tracks. As the drum rotates at a speed of up to 3,000 rpm, the device's read/write heads deposit magnetized spots on the drum during the write operation and sense these spots during a read operation. This action is similar to that of a magnetic tape or disk drive.

Unlike some disk packs, the magnetic drum cannot be physically removed. The drum is permanently mounted in the device. Magnetic drums are able to retrieve data at a quicker rate than tape or disk devices but are not able to store as much data as either of them.

How can you classify Storage Devices? What are its different types elaborate?

Storage Device is a device for recording (storing) information (data). Recording can be done using virtually any form of energy. Storage device is a hardware device capable of storing information. There are two storage devices used in computers; a primary storage device such as computer RAM and a secondary storage device such as a computer hard disk drive.

Primary Storage: - Primary storage is a storage location that holds memory for short periods of times while the computer is on. For example, computer RAM (random-access memory) and cache are both examples of a primary storage device. This type of storage is the fastest type of memory in your computer and is used to store data while it's being used. For example, when you open a program data is moved from the secondary storage into the primary storage. It is also known as internal memory and main memory.

Secondary Storage: - Secondary storage is a storage medium that holds information until it is deleted or overwritten regardless if the computer has power. For example, a floppy disk drive and hard disk drive are both good examples of secondary storage devices. As can be seen by the below picture there are three different types of storage on a computer, although primary storage is accessed much faster than secondary storage because of the price and size limitations secondary storage is used with today's computers to store all your programs and your personal data.

It is also known as external memory and auxiliary storage. Off-line storage in Fig could be considered secondary storage, we've separated these into their own category because these types of media can be easily removed from the computer and stored elsewhere.

Secondary Storage devices and their Classification
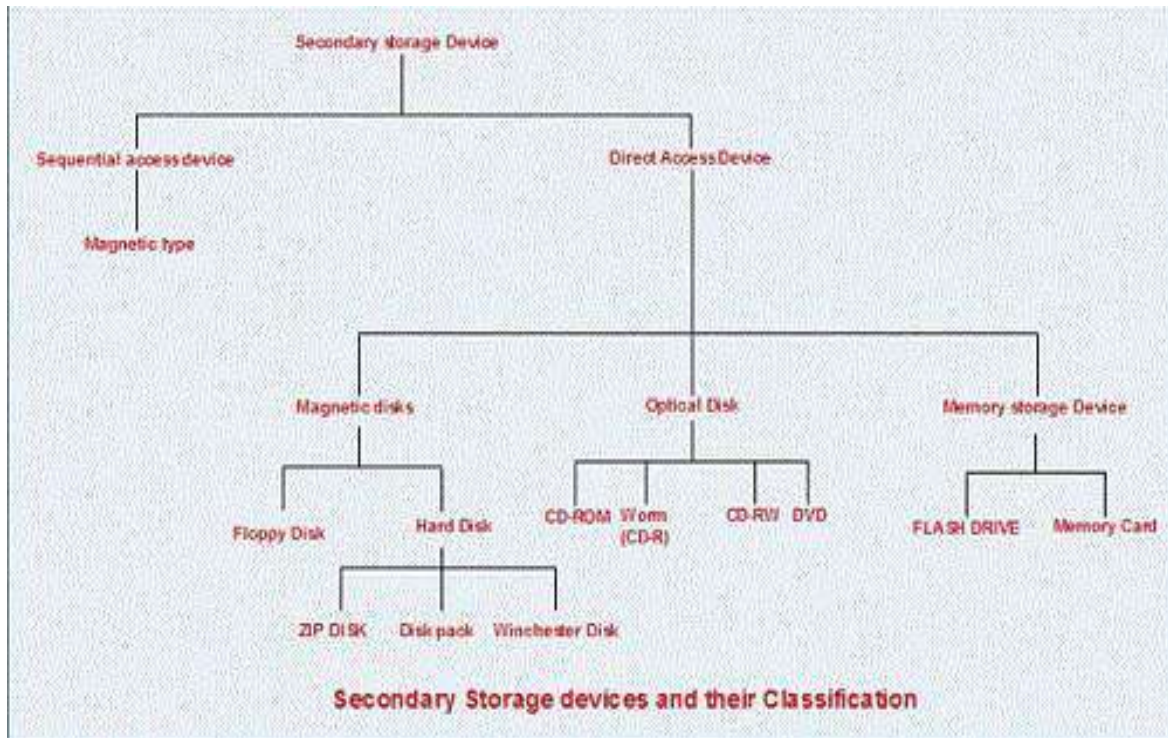
Floppy Disk : It's a circular disk coated with magnetic oxide and enclosed within square plastic cover (Jacket). It's available in different size, but the most commonly used floppy is 3½. Data up to 1.44 MB can be stored in it. Data is written as tiny magnetic spots on the dish surface creating new data or a disk surface eraser data previously stored at that location. Floppies are available in 2 sizes, 3.5 inch & 5.25 inch. The 3.5 inch size floppy is mostly used. The 5.25 inch floppy is kept in a flexible cover & it's not safe. It can store about 1.2 MB data.

Hard Disk : Hard disks are made of aluminum or other metal alloys which are coated on both sides with magnetic material. Unlike floppy disks, hark disks are not removable from the computer. To remain the storing capacity several disks are packed together & mounted on a common drive to form a disk pack. A disk is also called a platter.

Magnetic Tape: Magnetic Tape can be used to perform both functions -input and output. Magnetic Tapeis a **secondary storage media.** Magnetic tapes are used for large computers like mainframe computers where large volume of data is stored for a longer time. In PC also you can use tapes in the form of cassettes. The cost of storing data in tapes is inexpensive. Tapes consist of magnetic materials that store data permanently. It can be 12.5 mm to 25 mm wide plastic film-type and 500 meter to 1200 meter long which is coated with magnetic material. The deck is connected to the central processor and information is fed into or read from the tape through the processor. It similar to cassette tape recorder.

Advantages of Magnetic Tape:

• **Compact:** A 10-inch diameter reel of tape is 2400 feet long and is able to hold 800, 1600 or 6250 characters in each inch of its length. The maximum capacity of such tape is 180 million characters. Thus data are stored much more compactly on tape.

• **Economical**: The cost of storing characters is very less as compared to other storage devices.

• **Fast**: Copying of data is easier and fast.

• **Long term Storage and Re-usability**: Magnetic tapes can be used for long term storage and a tape can be used repeatedly with out loss of data.

Magnetic Disk: You might have seen the gramophone record, which is circular like a disk and coated with magnetic material. Magnetic disks used in computer are made on the same principle. It rotates with very high speed inside the computer drive. Data is stored on both the surface of the disk. Magnetic disks are most popular for *direct access* storage device*.*

Each disk consists of a number of invisible *concentric circles* called *tracks*. Information is recorded on tracks of a disk surface in the form of tiny magnetic spots. The presence of a magnetic spot represents *one bit* and its absence represents zero bit. The information stored in a disk can be read many times without affecting the stored data. So the reading operation is non-destructive. But if you want to write a new data, then the existing data is erased from the disk and new data is recorded.

Optical Disk : Information is written to or read from an optical disk or tape using laser beam. Optical disks are not suitable memory storage units because their access time is more than that of hard disks. Their advantage is that they have very high storage capacity.

Types of optical memory are: CD –ROM, CD-R, CD-RW, DVD-ROM, DVD-R and DVD-RW. Information on a CD-ROM is written at the time of manufacture. CD-R/W of 700 MB are available. A DVD-ROM is similar to CD-ROM. It uses shorter wave length of laser beam and hence, stores more data than CD-ROM.

With every new application and software there is greater demand for memory capacity. It is the necessity to store large volume of data that has led to the development of optical disk storage medium. Optical disks can be divided into the following categories:

1. Compact Disk/ Read Only Memory (CD-ROM): CD-ROM disks are made of reflective metals. CD-ROM is written during the process of manufacturing by high power *laser beam.* Here the storage density is very high, storage cost is very low and access time is relatively fast. Each disk is approximately 4 1/2 inches in diameter and can hold over 600 MB of data. As the CD-ROM can be *read only* we cannot write or make changes into the data contained in it.

2. **Write Once Read Many (WORM)**: The inconvenience that we can not write any thing in to a CD-ROM is avoided in WORM. A WORM allows the user to write data permanently on to the disk. Once the data is written it can never be erased without physically damaging the disk. Here data can be recorded from keyboard, video scanner, OCR equipment and other devices. The advantage of WORM is that it can store vast amount of data amounting to gigabytes (109 bytes). Any document in a WORM can be accessed very fast, say less than 30 seconds.

3. **Erasable Optical Disk**: These are optical disks where data can be written, erased and re-written. This also applies a laser beam to write and re-write the data. These disks may be used as alternatives to traditional disks. Erasable optical disks are based on a technology known as *magnetic optical* (MO). To write a data bit on to the erasable optical disk the MO drive's laser beam heats a tiny, precisely defined point on the disk's surface and magnetizes it.

4. Number System

What is EBCDIC (Extended Binary Coded Decimal Inter change code)?

EBCDIC(pronounced "ebb see dick") is short for extended binary coded decimal interchange code is eight bits, or one byte, wide. This is a coding system used to represent characters-letters, numerals, punctuation marks, and other symbols in computerized text. A character is represented in EBCDIC by eight bit. EBCDIC mainly used on IBM mainframe and IBM midrange computer operating systems. Each byte consists of two nibbles, each four bits wide. The first four bits define the class of character, while the second nibble defines the specific character inside that class.

EBCDIC is different from, and incompatible with, the ASCII character set used by all other computers. The EBCDIC code allows for 256 different characters. For personal computers, however, ASCII is the standard. If you want to move text between your computer and a mainframe, you can get a file conversion utility that will convert between EBCDIC and ASCII.

EBCDIC was adapted from the character codes used in IBM's pre electronic PUNCHED CARD machines, which made it less than ideal for modern computers. Among its many inconveniences were the use of non-contiguous codes for the alphabetic characters, and the absence of several punctuation characters such as the square brackets [] used by much modern software.

For example, setting the first nibble to all-ones,1111, defines the character as a number, and the second nibble defines which number is encoded. EBCDIC can code up to 256 different characters.

There have been six or more incompatible versions of EBCDIC, the latest of which do include all the ASCII characters, but also contain characters that are not supported in ASCII.

Explain ASCII, Unicode and Gray Code

ASCII : ASCII codes represent text in computers, communications equipment, and other devices that work with text. ASCII, pronounced "*ask-ee*" is the acronym for **American Standard Code for Information Interchange**. It's a set of characters which, unlike the characters in word processing documents, allow no special formatting like different fonts, bold, underlined or italic text. ASCII is computer code for the interchange of information between terminals.

An "ASCII file" is a data or text file that contains only characters coded from the standard ASCII character set. Characters 0 through 127 comprise the Standard ASCII Set and characters 128 to 255 are considered to be in the Extended ASCII

Set. These codes, however, may not be the same in all computers and files containing these characters may not display or convert properly by another ASCII program. ASCII characters are the ones used to send and receive email.

The reflected binary code, also known as **Gray Code** after Frank Gray, is a binary numeral system where two successive values differ in only one digit.The reflected binary code was originally designed to prevent spurious output from electromechanical switches. Today, Gray codes are widely used to facilitate error correction in digital communications such as digital terrestrial television and some cable TV systems. This is a variable weighted code and is cyclic.

This means that it is arranged so that every transition from one value to the next value involves only one bit change. The gray code is sometimes referred to as reflected binary, because the first eight values compare with those of the last 8 values, but in reverse order. The gray code is often used in mechanical applications such as shaft encoders.

Unicode is an industry standard allowing computers to represent & manipulate text expressed in any of the world's writing systems. It consists of about 10000 characters, a set of code charts for visual reference, an encoding methodology and a set of character encodings, rules, etc. It allows for combining characters as it contains precomposed versions of most letter combinations in normal use. This makes conversion to and from encodings simpler. It covers almost all scripts like Arabic, Bengali, Greek, Hebrew, Latin, Gujrati, etc. It is used in operating systems, email, web, fonts, etc.

What are BCD numbers

Meaning of BCD – "Binary Coded Decimal", is a method that use binary digits 0 which represent "off" and 1 which represent "on". BCD has been in use since the first UNIVAC computer. Each digit is called a bit. Four bits are called a nibble and is used to represent each decimal digit (0 through 9).

The first binary number system was documented by Gottfried Leibniz in the 17th century. In 1854 mathematician George Boole came up with a system of logic that is know today as Boolean Algebra (based on two elements 0's and 1's).

The binary numbering system use a base of 2 whereas the decimal numbering system use a base of 10. When the binary number is 0, then the number is off, when the binary number is 1, then the number is on. The configuration of BCD is "8421" a 4 bit binary called a nibble . Therefore, the decimal 5 is a BCD 0101: where 0=8, 1=4, 0=2, 1=1; the 8 and 2 are turned off.

The following is an example of binary digits and how they represent decimal digits:

Decimal	BCD
0	0000
1	0001

2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001

The advantage that Binary Coded Decimal (BCD) has over Binary is that there is no limit to number size. For every decimal number added, you add 4-bits or one nibble. Binary numbers are limited to the largest number that can be represented by 8, 16, 32 and 64 bits. It is easier to convert decimal numbers to and from BCD than Binary.

BCD is usually converted to Binary for arithmetic processing since computers only process 0's and 1's. However, hardware can be built to operate directly with BCD. BCD is common in electronic systems where numeric value is displayed. This is done in systems that consist of digital logic and do not contain a microprocessor.

Computer processing requires a minimum of 1 byte (8 bits) therefore, the left portion of each BCD number is wasted storage. Because storage is valuable, storage can be saved by using packed BCD numbers. With packed BCD numbers (e.g. 2 bytes are use to store 3484 instead of 4 bytes) the left byte will consist of 00110100 (34) the right byte will consist of 10000100 (84).

What is Bit (Binary digit)?

Bit is short for Binary digit. A bit is a single digit, either a 1 or a 0, and it is the fundamental unit of information in computing, communications and physics. Binary numbers (bits) are stored within a computer's microchips by turning an electrical current "on" or "off"; a 1 is represented by an "on" or high voltage current, and a 0 is represented by an "off" or low current.

When you hit a key or click a mouse button, you send tiny electronic on/ off signals to the computer. Each tiny electronic signal is one bit. The computer usually groups these tiny signals, or bits, into bigger chunks to work with: a series of eight bits strung together is a byte; a byte typically creates one character (letter, number, etc.) on your screen. A series of 1024 bytes strung together is a kilobyte. You've probably noticed that most computer storage devices (such as disks) and software files (your documents, for instance) are measured in kilobytes or megabytes (a megabyte is 1024 kilobytes). Well, those measurements are referring to how many electronic on/off signals it took to create and store the information. The more information there is, the greater the number of kilobytes or megabytes.

For example, the letter A is stored by saving the eight bits, 01000001.

Because bits are so small, they are rarely referred to as units of storage. However, bytes, kilobytes (roughly a thousand or 1,024 bytes), megabytes (roughly a million or

1,048,576 bytes), and gigabytes (roughly a thousand megabytes or 1,073,741,824 bytes) are more commonly used.

Of course, all of these are based on the humble bit. The size of a file, the storage capacity of a disk, or the amount of computer memory can all be measured in bits.

More fun from Steve: You can represent any number as a series of bits you just have to use the "base 2" or binary counting system. In our accustomed base 10, or decimal, system, 7 equals 111. Reading from the right, each place signifies a power of 2 rather than a power of 10; in this case, the digit on the right means 1, the middle digit means 2, the one on the left, 4, for a total of 7. The expression 101 in binary equals 5 in decimal (1 plus 0 plus 4). In binary, three bits (digits) are enough to make any number between 0 and 7. Four bits cover everything from 0 to 16, eight bits take you up to 256, and 32 bits allow for numbers as large as 4,294,967,296.

What is ASCII Code?

ASCII Stands for American Standard Code for Information Interchange (pronounced 'as-key'). This is a standard set of characters understood by all computers, consisting mostly of letters and numbers plus a few basic symbols such as $ and %. Which employs the 128 possible 7-bit integers to encode the 52 uppercase and lowercase letters and 10 numeric digits of the Roman alphabet, plus punctuation characters and some other symbols. The fact that almost everyone agrees on ASCII makes it relatively easy to exchange information between different programs, different operating systems, and even different computers.

It also means you can easily print basic text and numbers on any printer, with the notable exception of PostScript printers. If you are working in the MacWrite word processing application on the Mac and you need to send your file to someone who uses WordStar on the PC, you can save the document as an ASCII file (which is the same as text-only). After you transfer the file to the PC (on a disk or via a cable or modem),the other person will be able to open the file in WordStar.

In ASCII, each character has a number which the computer or printer uses to represent that character. For instance, a capitalAis number 65 in the code. Although there are 256 possible characters in the code, ASCII standardizes only 128 characters, and the first 32 of these are "control characters," which are supposed to be used to control the computer and don't appear on the screen. That leaves only enough code numbers for all the capital and lowercase letters, the digits, and the most common punctuation marks.

Another ASCII limitation is that the code doesn't include any information about the way the text should look (its format). ASCIIonly tells you which characters the text contains. If you save a formatted document asASCII,you will lose all the font formatting, such as the typeface changes, the italics, the bolds, and even the special characters like ©, TM, or ®. Usually carriage returns and tabs are saved.

Unlike some earlier character encodings that used fewer than 7 bits, ASCII does have room for both the uppercase and lowercase letters and all normal punctuation characters but, as it was designed to encode American English it does not include

the accented characters and ligatures required by many European languages (nor the UK pound sign £). These characters are provided in some 8-bit EXTENDED ASCII character sets, including ISO LATIN 1 or ANSI 1, but not all software can display 8-bit characters, and some serial communications channels still remove the eighth bit from each character. Despite its shortcomings, ASCII is still important as the 'lowest common denominator' for representing textual data, which almost any computer in the world can display.

The ASCII standard was certified by ANSI in 1977,and the ISO adopted an almost identical code as ISO 646.

Standard ASCII Codes

Decimal	Binary	Character	Description
0	00000000	NUL	NULL
1	00000001	SOH	Start of heading
2	00000010	STX	Start of text
3	00000011	ETX	End of text
4	00000100	EOT	End of transmit
5	00000101	ENQ	Enquiry
6	00000110	ACK	Acknowledgement
7	00000111	BEL	Audible bell
8	00001000	BS	Backspace
9	00001001	HT	Horizontal tab
10	00001010	LF	Line feed
11	00001011	VT	Vertical tab
12	00001100	FF	Form feed
13	00001101	CR	Carriage return
14	00001110	SO	Shift out
15	00001111	SI	Shift in
16	00010000	DLE	Data link escape
17	00010001	DC1	Device control 1
18	00010010	DC2	Device control 2
19	00010011	DC3	Device control 3
20	00010100	DC4	Device control 4
21	00010101	NAK	Neg. acknowledge
22	00010110	SYN	Synchronous idle
23	00010111	ETB	End trans. block
24	00011000	CAN	Cancel
25	00011001	EM	End of medium
26	00011010	SUB	Substitution
27	00011011	ESC	Escape
28	00011100	FS	Figures shift
29	00011101	GS	Group separator
30	00011110	RS	Record separator
31	00011111	US	Unit Separator
32	00100000	SP	Spacebar/ blank space

What is RAM (random access memory)? Definition

What is RAM (pronounced as *raem*), Ram full form " random access memory " and is **volatile**. First we'll tell you what RAM memory alternatively referred to as *main memory*, *primary memory*, or *system memory*, **Random Access Memory** (RAM) in a computer system, it is also sometimes known as read-write memory or **RWM**, then we'll go over how RAM works in Macintoshes and pcs. Also, there are different kinds of RAM, including *VRAM, PRAM, DRAM and SRAM*

Definition of RAM (Random Access Memory)

Technically, (**Physical memory**) RAM meaning is nothing more than integrated circuits (IC) or physical hardware (little **volatile memory***)* in your computer and is other kinds of data storage device located on the computer motherboard, which allows simultaneous read and write.

RAM read/write speed is always allows your computer to work considerably faster than other storage devices in the computer. RAM purpose is to store application from the slower hard disk drive (HDD), solid-state drive (SSD) or optical drive, When it is launched and given to the CPU, so that CPU can access the data much faster. because it has its own, direct dedicated line of communication with the CPU, on the other side storage devices such as a hard disk drive (HDD) has to share communication buses (shared communication link) with processor, that's why **Computer memory** or **computerRAM is used to holds operating system (OS), application programs and data that is being processed by CPU**. it make it possible to allow stored data to be accessed in random order, But other types of storages, Such as hard disk are not random-access they read/write in a predetermined order.

How much main memory a computer has in measured in **megabytes or gigabytes**, and that is often what confuses people: you might know that you have an 80-megabyte hard disk and 8 megabytes of RAM (Memory module), but what's the difference?
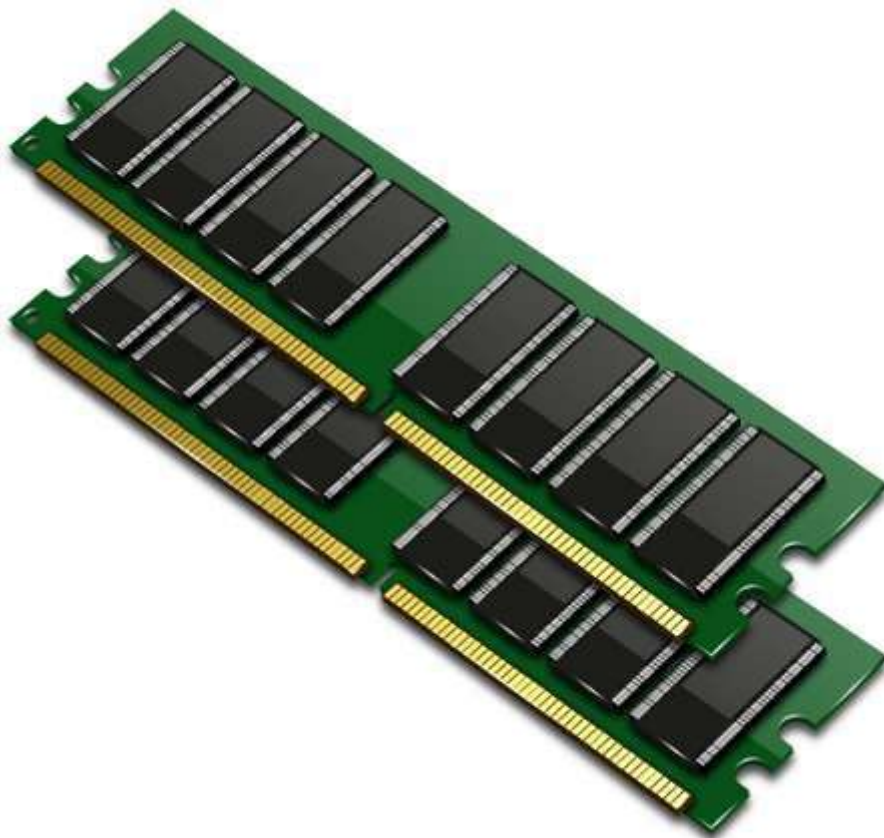
Two Basic Types of RAM

DRAM (Dynamic Random Access Memory)

DRAM (dynamic random access memory) retain its stored contents in a very short period of time (measured in milliseconds) even when power supply is on. DRAM is cheaper. It is similar to a microprocessor chip and made of millions of transistors instead of transistors . In computer memory, Dynamic Cell, represents a single bit of data. The capacitor in Computer memory holds the only one bit of information 0 or 1. The transistor in main memory control the circuitry to read the capacitor or change its state. A capacitor is similar to a bucket that store electrons. When 1 or 0 is store in memory cell,the bucket is filled with electrons.

To store 0, it is emptied. The problem with the capacitor's bucket is that it has a leak. In a period of time (measured in milliseconds) a full bucket becomes empty.Therefore, either the CPU or Memory Controller has recharge all of the capacitors before they fully discharge. This refreshing cycle happens automatically in a veryshort period of time.Due to this dynamically refreshing all in every second the dynamic RAM or DRAM (dynamic random access memory) gets its name. DRAM require constant refreshing.

SRAM (Static Random Access Memory)

On the other side Static Random Access Memory (SRAM) is the completely different technology. SRAM retains it stored contents as long as the power supply is on. It iscostlier than DRAM and it also consume more power. They store information in Hip-Hope with higher speed than DRAM. In the form of flipflop it holds each bit ofinformation in memory cell. This type of memory, is no longer to be used and has been replaced by DRAM.

RAM Works With Your Hard Disk Drive (But Both are Different Things)

You probably have at least one hard disk, and you definitely have a collection of floppy disks, filled with all kinds of applications and documents. Disks are for storing large amounts information (your applications and your files) over the long term. The hard disk is known as permanent mass storage.

A hard disk in your computer is like a filing cabinet in your office. Your computer, though, can't actually work from the hard disk; it would be like you climbing inside your filing cabinet to work. You probably take things out of the filing cabinet and put them on your desk, right? Well, the computer does a similar thing. When you ask it to open a particular application, the computer goes to the hard disk (the filing cabinet), finds the application, and puts a copy of that application into RAM, into **temporary primary memory**. RAM, to the computer, is like your desk is to you. Likewise, when you start a new document, that document lives in RAM, just like a document would

stay on your desk while you're working on it. This type of memory, provides much faster read/write times than hard drive.

When you give that document a name and *save* it, the computer puts a copy of the document onto the hard disk, just as if you would put a copy into your filing cabinet for safekeeping. Whenever you save changes to that document, the version on your hard disk (in your filing cabinet) is updated with those changes.

Nature of RAM (Random Access Memory)

PC RAM is volatile memory, meaning that everything in it will lost as soon as the D.C. power applied to the **flip-flops** is interrupted, either because you turn off the computer or there is a power outage, no matter how brief (even if there is just enough interruption to cause your lights to flicker). Anything that you changed in the document but did not yet save to the disk will just lost. while **ROM is non-volatile** in nature that holds data permanently when the power is turned off or there is a power outage.

How Much (Random Access Memory) RAM Do You Need?

There is a finite amount of space in Computer RAM. Some computers have as little Memory module as 640K (less than one megabyte), or even less. Memory module come in various capacities such as 256 MB, 512 MB, 1 GB, and 2 GB sizes. New Macs usually have at least 5 megs, and these days, most pcs come with at least 2 gigabyte. An Apple Quadra can have up to 256 megabytes! The more PC RAM you have (the bigger your desk), the more stuff you can work on at one time. You can add more memory modules to most computers. It comes in the form of little *chips* you stick inside your machine. These days most computers require SIMMs (single inline memory modules), which are little pieces of plastic (cards) with several memory chips attached and you (or someone) stick them inside your computer. But there is always a limit to the amount of RAM your computer can actually use, or *address*.

Troubleshooting RAM Issues

Sometimes you might get a message telling you that you can't open an application (run a program) or complete a process because the computer is out of memory. Have you seen that message? You may have said to yourself, "How can I be out of memory? I have 8 megs left on my hard disk," but remember: Memory isn't the same as hard disk storage space. Some systems will just crashif RAM gets too full.

In some situations, it may be that your computer just doesn't have enough memory installed to do what you want it to. If your machine does not have a lot of RAM, you have to work smarter. Larger documents may not fit into the RAM you have, but you can sometimes split up the document into small ones that will. Save every few minutes, not only so you don't lose any work, but because the longer you work without saving, the fuller RAM gets. So you see, the more RAM you have (the bigger the desk), the more projects or the bigger the project you can work on at one time. And the bigger your hard disk (your filing cabinet), the more stuff you can file away in it

If you find you are running out of memory often, there may be some things you can do to help yourself, short of buying and installing more SIMMs (memory chips). Over the time many type of memory modules have been emerged including **DIP, SIP, SIMM, DIMM and most recently RIMM.**

What is Binary Numbers?

The binary system is a method for working with numbers based on only two digits: 1 and 0 (binary is also known as "base two"). Binary numbers are the basis for computer storage. Input into the computer is changed into binary numbers that the computer can store and manipulate. A binary numbering system uses a series of 1's and 0's to represent any number. Non-numbers (such as the letter D) or characters (such as a question mark) are assigned an eight digit binary number so that they too can be represented within the computer.

Binary numbers can also represent decisions and results. For example, a yes (or true) will be represented by a 1, and a no (or false) can be represented by a 0. Each one of these single signals, 1 or 0, is called a *bit.*Using this method, the computer can compare two numbers and, if they are equal, make the result equal to 1. If they are not equal, the result would be 0. In addition, the computer can take further action based on this comparison. For example, if the result was true (1), a certain series of commands could be performed. If the result were false (0), a different set of commands could be performed.

The 1's and 0's of a computer's binary system are represented by two electronic states: ON (high voltage electrical current) or OFF (low current). Quite simply, the 1's and O's are like little ON/OFF switches inside the computer. Basing an electronic system on the binary system that uses just two numbers is much easier and less expensive than using the decimal system (which has to differentiate between 10 different states: 0, 1,2,3,4,5,6,7,8, and 9).

Binary data is stored as bits, each bit equal to a 0 or a 1. Eight bits equal one byte of information (a single character, such as the letter S or the number 4). For example, the binary number for the letter A is 01000001.

For those who like number puzzles, this is from Steve; To make the conversion between binary and decimal, start at the right and multiply each digit by the next higher power of two, then add up all your answers. So, with 10101, the first digit equals 1 (1 times 1: 2 to the 0th power is 1); the next digit is 0 (2^1 equals 2, but 2 times 0 makes 0); the third digit equals 4 (1 x 2^2); the fourth digit is 0 again; and the 1 on the left equals 16 (1x 2^4). And 16 + 0 + 4 + 0 + 1 = 21.

What is Byte?

A byte is a group of eight bits. Bit, short for Binary digit, which can represent any number in the range 00000000 To 11111111 Binary, or 0 To 255 Decimal. From the early days of digital computing, it is the basic unit of information within a computer,

equal to a 1 or a 0. It is used to measure both memory size (Kilobytes, Megabytes) and data transfer speed (Kilobytes per second). Eight individual electronic on/off signals, strung together to make a message that the computer can interpret. Bits are stored within the computer's microchips and are led by control the flow of electrical currents; a 1 is represented by an "on" or high voltage electrical current, and a 0 is represented by an "off" or low current. A byte is formed by combining eight bits together to store the equivalent of one character. For example, the letter A (a single byte) is made up of the eight bits 01000001.

The sequence of eight bits which make up a particular byte is determined by an internal table called the ASCII (American Standard Code for Information Interchange) table. The ASCII table contains the byte codes for all letters, numbers, and special symbols such as $, * or ^. However, to represent a number greater than 9, two bytes are needed. For example, The number 15 is equal to the two bytes 00110001 (1) and 00110101 (5).

The size of a file, the storage capacity of a disk, or the amount of computer memory can all be measured in bits and bytes. A kilobyte is roughly a thousand bytes; a megabyte is roughly one million bytes. A gigabyte, equal to 1,073,741,824 bytes, is roughly one thousand megabytes.

For example, most computers use one byte to represent each character (letter, number, or other symbol) that you see on your screen. A really small file, like a *batch file* on a PC or a one-page word-processed letter on the Mac, might consist of 20 bytes to 150 bytes.

The information-storing capacity of a computer is usually measured in multiples of bytes. A series of 1024 bytes strung together is a *kilobyte.* Lower-capacity *floppy disks,* for example, hold 360 kilobytes (KE or just K) or 800 K of data; old pcs came with just 256Kor 640Kof *memory (RAM).* A *megabyte* (ME) is 1024 kilobytes. Your computer probably has 2 to S megabytes of RAM and a hard disk that can hold 20 to 260 ME of data.

What is Machine Code or Machine Language?

Computer is a collection of digital electronic circuits in which the memory circuits play a major role. The input to as well as outputs from the microprocessor are all expressed in terms of voltages applied on the specified set of terminals meant for input and outputs, respectively. We may code the high value of voltage (typical value 5 V) as 1 and low value of voltage (typical value 0) as 0. Thus, an instruction to the microprocessor of the computer may be represented as a sequence of 0s and 1s (ones and zeros), such as 11001001. These ones and zeros are electronic signals that tell the computer what to do. In fact, microprocessors are designed to carry out a large number of instructions. The manufacturers supply the set of instructions and their respective codes.

Also, the numbers that we use in our daily life, i.e., *decimal numbers,* can also be represented in terms of binary numbers. For instance, 1 is represented as 1, 2 are represented as 10, 3 is represented as 11, 4 is represented as 100, and so on. A typical program comprises of instructions and data which may be represented as

sequences of 0s and 1s. Thus, a complete program becomes a long list of sequences of 0s and 1s. You may now raise the query "How does a computer know which number is instruction and which number is simple data?" There are different instruction formats which are combinations of opcodes (operation code), other codes, and data. The first number in an instruction is *opcode* which is linked to the instruction for the microprocessor. An instruction may or may not be followed by data because some instructions do not require data. Thus, the processor can make out which sequence of 0s and 1s is instruction and which is data. The complete set of these instructions for a CPU is called **machine language code** or simply **machine language.** Although we make the program as sequences of 0s and 1s, these are interpreted as 5V and 0V respectively (some systems work on 3V and 0V).This is the language which the machine or the microprocessor understands. **Machine code** is the only language a computer understands. The format of typical instruction requiring two data items is illustrated in Fig.

OPCODE	code	Data	Data

A typical instruction format

A program written in machine language will consist of a large number of sequences of 0s and 1s. Because of this reason, it is very difficult to write programs using machine language. It is even more difficult to locate errors and debug the program.

The instruction codes for processors made by different manufacturers are different for the same process such as storage or for manipulations such as addition, subtraction etc. Therefore, the program written in one machine language for one type of CPU will work only on computers having same type of CPU and it will not work on computers based on other types of CPUs. That is, besides being cumbersome to write and debug there is no portability of these programs from one type of computer to another type of computer. Moreover, it is very difficult to convert a program made for one type of CPU to suit another type of CPU. For these two reasons, high-level languages (HLL) have been developed. With high-level computer languages it is easy to develop a program, easy to maintain the program, and most importantly the programs are portable from one computing platform to another.

Bits and Bytes

Most computer operations involve manipulation of data stored in various memories. The smallest unit of computer memory is called a **bit.** When a bit is *set* its value is taken to be equal to **1** and when it is *reset* its value is taken to be 0. Thus, a bit can have one of the two values, i.e., 0 or 1. In electronics, memory circuits are *called flip-flops.* A flip-flop is the name given to a memory circuit which behaves in a manner similar to a switch. When a switch is set on, there is high voltage at its output and it remains on till it is reset ill which case the voltage at its output terminal becomes 0. Similarly, when a flip-flop is *set* its value is taken as 1 and when it is *reset* its value becomes 0. One flip-flop represents one bit of memory. The output state can be manipulated according to the input signal to the flip-flop. Since bits are extremely small units of memory, in computer programs we often deal with groups of bits. A group of 8 bits is called a byte.

Let us now proceed to explore the number systems that we would require to deal with while learning more about computer programs. Consider a decimal number 1575 (one thousand five hundred seventy five). How is this number constructed? We are already aware of the place values used in decimal number system, which is - unit's place, ten's place, hundred's place, thousand's place, and so on. In the given number 1575, 5 occurs at unit's place, therefore, its value is 5; 7 occurs at ten's place, so, its value is 70; 5 occurs at hundred's place, so, its value is 500; and finally, 1 occurs at thousand's place, so, its value is 1000. The complete number may be composed as shown below.

1575 = 1 x 1000 + 5 x 100 + 7 x 10 + 5 x 1

Thus, apart from the value of the digit, its place value in the number is also important. In the above case, we dealt with the decimal number system in which the place values are multiples or powers of 10. Similarly, in a binary number system, there are only two allowed digits, 0 and 1, and the place values vary as powers of 2. Thus, if we have a number, say 1101, its decimal equivalent will be calculated as illustrated below.

$1101 = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + I \times 2^0 = 8 + 4 + 0 + 1 = 13$

From the above example, it is clear that if we have a row of bits, we can easily represent a number in binary form. Figure shows 8 bits (1 byte) using 8 rectangular figures numbered from 0 to 7. In computer terminology, the counting starts from 0 (zero-based counting). Here, we take the rightmost bit in the figure as the 0thbit at the unit's place. The digit in this position has the place value $2^0 = 1$. The next flip flop (shown by rectangle at I) occurs at a place where the place value is $2^1 = 2$. The next bit (third from right) has a place value of $2^2 = 4$ and so on. The last position has the place value $2^7 = 128$. Now, if the bits numbered 0, 1, 3, 4, 6, and 7 are set (each equal to 1) and bits 2 and 5 are 0, then the number stored is 219 as explained in Fig. If all the bits are set as high (i.e., 1) they represent the number 255, and when all of them are set as low, they represent 0. So, a set of 8 memory bits (or one byte) can hold any number from 0 to 255 or from 0 to $(2^8 1)$

Binary Number Representation
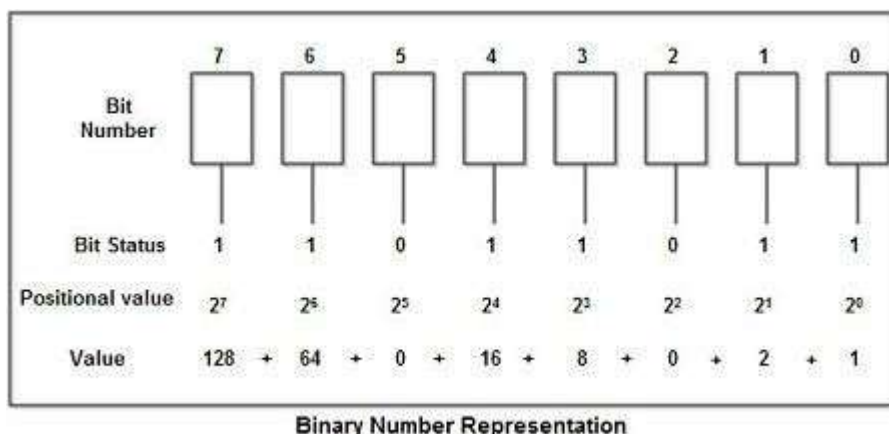
Consider that we have two bytes to represent our number (as shown in Fig), if all of them are 0 the number stored is 0 and if all of them are set (1) the value stored is 2^{16}

- **1**= 65535. So, any positive number in the range from 0 to 65535 may be stored using two bytes of memory.
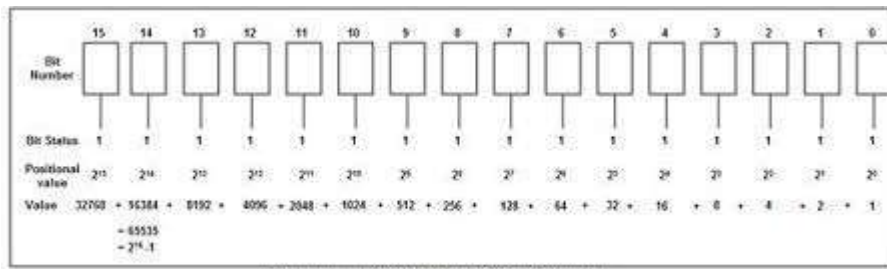
Binary representation of a two-byte positive number

So, the basic working of a computer may be understood as follows: In a computer, all objects are represented by numbers in binary form, whether they are digits, letters, or operators. A computer can easily manipulate them and output a result in the form of a binary number which is then coded into decimal numbers and letters and displayed on the monitor or printed using a printer.

5. Operating System

What is Operating System? Definition

Operating System Definition: It is a software that works as an interface between a user and the computer hardware. The primary objective of an *operating system* is to make computer system convenient to use and to utilize computer hardware in an efficient manner. The operating system performs the basic tasks such as receiving input from the keyboard, processing instructions and sending output to the screen.

What is Operating System

The Software is the Non-Touchable Parts of the Computer, and Software's are those which are used for Performing an Operation So that Software's are just used for Making an Application but hardware's are those which are used for Performing an Operation .

Operating system is software that is required in order to run application programs and utilities. It works as a bridge to perform better interaction between application programs and hardware of the computer. **Examples of operating system are UNIX, MS-DOS, MS-Windows - 98/XP/Vista, Windows-NT/2000, OS/2 and Mac OS.**

Functions of operating system

Operating System Means that Resource Manager, that manage all the Resources those are Attached to the System,like Memory,Processor,Input/output Devices.

Storage Management:It manage all the Storing and Accessing Files and Directories Reading/Writing Operations.

Operating system manages overall activities of a computer and the input/output devices attached to the computer. It is the first software you see when you turn on the computer, and the last software you see when the computer is turned off. It is the software that enables all the programs you use. At the simplest level, an operating system does two things:
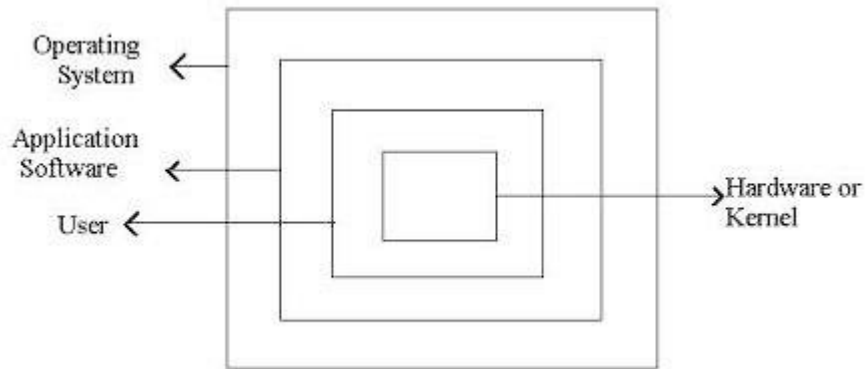
The first, it manages the hardware and software resources of the computer system. These resources include the processor, memory, disk space, etc. The second, it provides a stable, consistent way for applications to deal with the hardware without having-to know all the details of the hardware.

The first task is very important i.e. managing the hardware and software resources, as various processes compete to each other for getting the CPU time and memory space to complete the task. In this regard; the operating system acts as a manager to allocate the available resources to 'satisfy the requirements of each process.

The second task i.e. providing a consistent application interface is especially important. A consistent application program interface (API) allows a user (or *S/W* developer) to write an application program on any computer and to run this program on another computer, even if the hardware configuration is different like as amount of memory, type of CPU or storage disk. It shields the user of the machine from the low-level details of the machine's operation and provides frequently needed facilities.

Process Management:It manage all the User and system Process.
Memory Management: Operating System also Manages the Computer Memory that is provided to the process.

Extended Machine: It is behaves like an Extended Machine that Provides us Sharing of Files between Multiple Users.

Mastermind: It performs Many Functions that's why we can say that Operating System is a Mastermind.

Different types of operating system

There are different types of operating system those are organized by their Working.

Serial Processing:In Serial Processing operating system that use FIFO (First in First Out) technique for processing the process.

Batch Processing: In batch processing a similar type of jobs prepared and processed.

Multi-Programming: In Multi programming Operating System Multiple Programs are Executed on the System at a Time.

Real Time System: Real Time System are used there Requires higher and Timely Response.

Distributed Operating System: In this Operating system Data is Stored and Processed on Multiple Locations.

Multiprocessing: In This type of operating system there are two or More CPU in a Single OS.

Parallel operating systems: It manage parallely all running resources of the computer system.

How Operating System Work

When you turn on the computer, the operating system program is loaded into the main memory. This program is called the kernel. Once initialized, the system program is prepared to run the user programs and permits them to use the hardware efficiently. Windows *98/XP* is an excellent example that supports different types of hardware configurations from thousands of vendors and accommodates thousands of different *I/O* devices like printers, disk drives, scanners and cameras.

Operating systems may be classified based on if multiple tasks can be performed simultaneously, and if the system can be used by multiple users. It can be termed as single-user or multi-user OS, and single-tasking or multi-tasking OS.A multi-user system must be multi-tasking. MS-DOS and Windows 3x are examples of single user operating system. Whereas UNIX is an example of multi-user and multitasking operating system.

For Example if we want to Perform Some Paintings on the Screen, then we must use the Application Software as Paint and Hardware as a Mouse for Drawing an Object. But how the System knows what to do when Mouse Moves on the Screen and When the Mouse Draws a Line on the System so that Operating System is Necessary which Interact between or which Communicates with the Hardware and the Software. For Better understanding you can see the Working of the Operating System.

Characteristics of Operating System

1) Operating System is a Collection of Programs those are Responsible for the Execution of other Programs.

2) Operating System is that which Responsible is for Controlling all the Input and Output Devices those are connected to the System.

3) Operating System is that which Responsible is for Running all the Application Software's.

4) Operating System is that which Provides Scheduling to the Various Processes Means Allocates the Memory to various Process those Wants to Execute.

5) Operating System is that which provides the Communication between the user and the System.

6) Operating System is Stored into the BIOS Means in the Basic Input and Output System means when a user Starts his System then this will Read all the instructions those are Necessary for Executing the System Means for Running the Operating System, Operating System Must be Loaded into the Computer For this, this will use the Floppy or Hard Disks Which Stores the Operating System.

Functions of Operating System

There are Many Functions those are Performed by the Operating System But the Main Goal of Operating System is to Provide the Interface between the user and the hardware Means Provides the Interface for Working on the System by the user. The various Functions those are Performed by the Operating System are as Explained below:-

Operating System as a Resource Manager

Operating System Also Known as the Resource Manager Means Operating System will Manages all the Resources those are Attached to the System means all the Resource like Memory and Processor and all the Input output Devices those are Attached to the System are Known as the Resources of the Computer System and the Operating system will Manage all the Resources of the System. The Operating System will identify at which Time the CPU will perform which Operation and in which Time the Memory is used by which Programs. And which Input Device will respond to which Request of the user means When the Input and Output Devices are used by the which Programs. So this will manage all the Resources those are attached to the Computer System.

Storage Management

Operating System also Controls the all the Storage Operations means how the data or files will be Stored into the computers and how the Files will be Accessed by the users etc. All the Operations those are Responsible for Storing and Accessing

the Files is determined by the Operating System Operating System also Allows us Creation of Files, Creation of Directories and Reading and Writing the data of Files and Directories and also Copy the contents of the Files and the Directories from One Place to Another Place.

1) **Process Management :The Operating System also Treats the Process Management means all the Processes those are given by the user or the Process those are System 's own Process are Handled by the Operating System** . The Operating System will Create the Priorities foe the user and also Start or Stops the Execution of the Process and Also Makes the Child Process after dividing the Large Processes into the Small Processes.

2) **Memory Management:** Operating System also Manages the Memory of the Computer System means Provide the Memory to the Process and Also Deallocate the Memory from the Process. And also defines that if a Process gets completed then this will deallocate the Memory from the Processes.

3) **Extended Machine :** Operating System also behaves like an Extended Machine means Operating system also Provides us Sharing of Files between Multiple Users, also Provides Some Graphical Environments and also Provides Various Languages for Communications and also Provides Many Complex Operations like using Many Hardware's and Software's.

4) **Mastermind:** Operating System also performs Many Functions and for those Reasons we can say that Operating System is a Mastermind. It provides Booting without an Operating System and Provides Facility to increase the Logical Memory of the Computer System by using the Physical Memory of the Computer System and also provides various Types of Formats Like NTFS and FAT File Systems.

Operating System also controls the Errors those have been Occurred into the Program and Also Provides Recovery of the System when the System gets Damaged Means When due to Some Hardware Failure , if System Doesn't Works properly then this Recover the System and also Correct the System and also Provides us the Backup Facility. And Operating System also breaks the large program into the Smaller Programs those are also called as the threads. And execute those threads one by one.

Types of Operating System

There are Many **Operating Systems** those have be Developed for Performing the Operations those are requested by the user. There are Many Operating Systems which have the Capability to Perform the Requests those are received from the System. The Operating system can perform a Single Operation and also Multiple Operations at a Time. So there are many types of Operating systems those are organized by using their Working Techniques.

1) **Serial Processing**: The Serial Processing Operating Systems are those which Performs all the instructions into a **Sequence Manner** or the Instructions those are given by the user will be **executed by using the FIFO Manner** means First in First Out. All the Instructions those are Entered First in the System will be Executed First

and the Instructions those are Entered Later Will be Executed Later. **For Running the Instructions the Program Counter is used which is used for Executing all the Instructions.**

In this the Program Counter will determines which instruction is going to Execute and the which instruction will be Execute after this. Mainly the **Punch Cards** are used for this. In this all the Jobs **are firstly Prepared and Stored on the Card** and after that card will be entered in the System and after that all the Instructions will be executed one by One. But the **Main Problem is that a user doesn't interact with the System** while he is working on the System, means the user can't be able to enter the data for Execution.

2) **Batch Processing**: The Batch Processing is **same as the Serial Processing Technique.** But in the Batch Processing **Similar Types of jobs are Firstly Prepared** and they are Stored on the Card. and that card will be Submit to the System for the Processing. The System then Perform all the Operations on the Instructions one by one. And a **user can't be Able to specify any input**. And Operating System wills increments his Program Counter for Executing the Next Instruction.

The **Main Problem is that the Jobs those are prepared for Execution must be the Same Type** and if a job requires for any type of Input then this will not be Possible for the user. And Many Time will be wasted for Preparing the Batch. The Batch Contains the Jobs and all those jobs will be executed without the user Intervention. And **Operating System will use the LOAD and RUN Operation. This will first LOAD the Job from the Card and after that he will execute the instructions**. By using the RUN Command.

The Speed of the Processing the Job will be Depend on the Jobs and the Results those are produced by the System in difference of Time which is used for giving or submit the Job and the Time which is used for Displaying the Results on the Screen.

3) **Multi-Programming**: As we know that in the Batch Processing System there are multiple jobs Execute by the System. The System first prepare a batch and after that he will Execute all the jobs those are Stored into the Batch. But the Main Problem is that if a process or job requires an Input and Output Operation, then it is not possible and second there will be the wastage of the Time **when we are preparing the batch and the CPU will remain idle at that Time.**

But With the help of **Multi programming we can Execute Multiple Programs on the System at a Time** and in the Multi-programming the CPU will never get idle, because with the help of Multi-Programming we can Execute Many Programs on the System and When we are Working with the Program then we can also Submit the Second or Another Program for Running and the CPU will then Execute the Second Program after the completion of the First Program. And in this we can also specify our Input means a user can also interact with the System.

The Multi-programming Operating Systems never use any cards because the Process is entered on the Spot by the user. But the **Operating System also uses the Process of Allocation and De-allocation of the Memory** Means he will

provide the Memory Space to all the Running and all the Waiting Processes. There must be the Proper Management of all the Running Jobs.

4) **Real Time System**: There is also an Operating System which is known as Real Time Processing System. In this Response Time is already fixed. Means time to Display the Results after Possessing has fixed by the Processor or CPU. Real Time System is used at those Places in which we **Requires higher and Timely Response.** These Types of Systems are used in Reservation. So when we specify the Request, the CPU will perform at that Time. There are two Types of Real Time System.

1) **Hard Real Time System**: In the Hard Real Time System, Time is fixed and we can't Change any Moments of the Time of Processing. Means CPU will Process the data as we Enters the Data.

2) **Soft Real Time System**: In the Soft Real Time System, some Moments can be Change. Means after giving the Command to the CPU, CPU Performs the Operation after a **Microsecond.**

5) **Distributed Operating System**. - Distributed Means Data is Stored and Processed on Multiple Locations. When a Data is stored on to the Multiple Computers, those are placed in Different Locations. Distributed means In the Network, Network Collections of Computers are connected with Each other.

Then if we want to Take Some Data From other Computer, Then we uses the Distributed Processing System. And we can also Insert and Remove the Data from out Location to another Location. In this Data is shared between many users. And we can also Access all the Input and Output Devices are also accessed by Multiple Users.

6) **Multiprocessing**: Generally a Computer has a Single Processor means a Computer have a just one CPU for Processing the instructions. But if we are Running multiple jobs, then this will decrease the Speed of CPU. For Increasing the Speed of Processing then we uses the Multiprocessing, in the Multi Processing there are two or More CPU in a Single Operating System if one CPU will fail, then other CPU is used for providing backup to the first CPU. With the help of Multi-processing, we can Execute Many Jobs at a Time. All the Operations are divided into the Number of CPU's. if first CPU Completed his Work before the Second CPU, then the Work of Second CPU will be divided into the First and Second.

7) **Parallel operating systems** are used to **interface multiple networked computers to complete tasks in parallel.** The architecture of the software is often a **UNIX-based platform,** which allows it to coordinate **distributed loads between multiple computers in a network**. Parallel operating systems are able to use software to manage all of the different resources of the computers running in parallel, such as memory, caches, storage space, and processing power. Parallel operating systems also allow a user to directly interface with all of the computers in the network.

A parallel operating system works by dividing sets of calculations into smaller parts and **distributing them between the machines on a network.** To facilitate communication between the processor cores and memory arrays, **routing software has to either share its memory by assigning the same address space to all of the networked computers,** or distribute its memory by assigning a different address space to each processing core.

Sharing memory allows the operatingsystem to run very quickly, but it is usually not as powerful. When using distributed shared memory, processors have access to both their own local memory and the memory of other processors; this distribution may slow the operatingsystem, but it is often more flexible and efficient.

What is Booting? Type of Booting

Booting: When we start our Computer then there is an operation which is performed automatically by the Computer which is also called as Booting. In the Booting, System will check all the hardware's and Software's those are installed or Attached with the System and this will also load all the Files those are needed for running a system.

In the Booting Process all the Files those are Stored into the ROM Chip will also be Loaded for Running the System. In the Booting Process the System will read all the information from the Files those are Stored into the ROM Chip and the ROM chip will read all the instructions those are Stored into these Files. After the Booting of the System this will automatically display all the information on the System. The Instructions those are necessary to Start the System will be read at the Time of Booting.

There are two Types of Booting

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

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

What is Cache Memory | Types of Cache Memory

Cache definition : The *Cache Memory* (Pronounced as "cash") is the volatile computer memory which is very nearest to the CPU so also called **CPU memory**, all the Recent Instructions are Stored into the Cache Memory. It is the fastest memory that provides high-speed data access to a computer microprocessor. Cache

meaning is that it is used for storing the input which is given by the user and which is necessary for the computer microprocessor to Perform a Task. But the Capacity of the Cache Memory is too low in compare to Memory (random access memory (RAM)) and Hard Disk.

Importance of Cache memory

The cache memory lies in the path between the processor and the memory. The cache memory therefore, has lesser access time than memory and is faster than the main memory. A cache memory have an access time of 100ns, while the main memory may have an access time of 700ns.

The cache memory is very expensive and hence is limited in capacity. Earlier cache memories were available separately but the microprocessors contain the cache memory on the chip itself.

The need for the cache memory is due to the mismatch between the speeds of the main memory and the CPU. The CPU clock is very fast, whereas the main memory access time is comparatively slower. Hence, no matter how fast the processor is, the processing speed depends more on the speed of the main memory (the strength of a chain is the strength of its weakest link). It is because of this reason that a cache memory having access time closer to the processor speed is introduced.
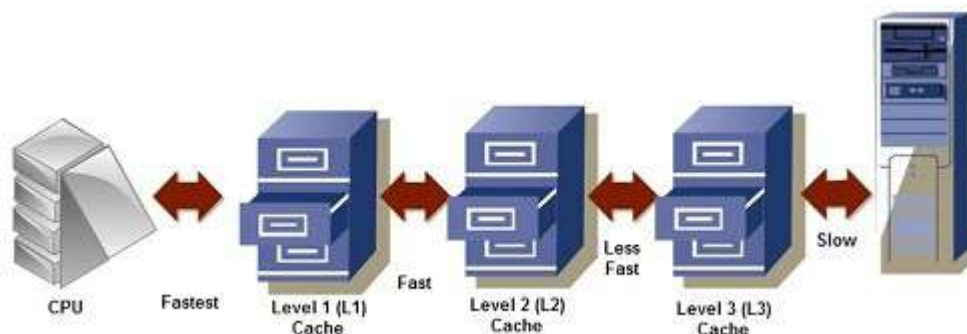
The cache memory stores the program (or its part) currently being executed or which may be executed within a short period of time. The cache memory also stores temporary data that the CPU may frequently require for manipulation.

The cache memory works according to various algorithms, which decide what information it has to store. These algorithms work out the probability to decide which data would be most frequently needed. This probability is worked out on the basis of past observations.

It acts as a high speed buffer between CPU and main memory and is used to temporary store very active data and action during processing since the cache memory is faster then main memory, the processing speed is increased by making the data and instructions needed in current processing available in cache. The cache memory is very expensive and hence is limited in capacity.

Type of Cache memory

Cache memory improves the speed of the CPU, but it is expensive.Type of Cache Memory is divided into different level that are L1,L2,L3:
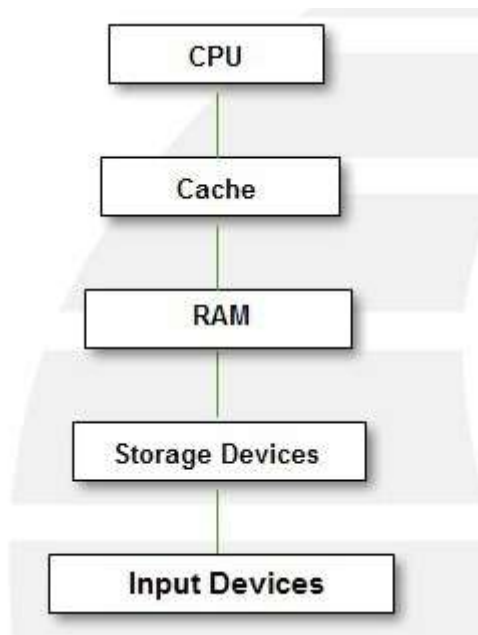
Level 1 (L1) cache or Primary Cache

L1 is the primary type cache memory. The Size of the L1 cache very small comparison to others that is between 2KB to 64KB, it depend on computer processor. It is a embedded register in the computer microprocessor (CPU).The Instructions that are required by the CPU that are firstly searched in L1 Cache. Example of registers are accumulator, address register,, Program counter etc.

Level 2 (L2) cache or Secondary Cache

L2 is seconday type cache memory. The Size of the L2 cache is more capacious than L1 that is between 256KB to 512KB.L2 cache is Located on computer microprocessor. After searching the Instructions in L1 Cache, if not found then it searched into L2 cache by computer microprocessor. The high-speed system bus interconnecting the cache to the microprocessor.

Level 3 (L3) cache or Main Memory

The L3 cache is larger in size but also slower in speed than L1 and L2,it's size is between 1MB to 8MB.In Multicore processors, each core may have separate L1 and L2,but all core share a common L3 cache. L3 cache double speed than the RAM.

Difference between Application Software and System Software

Operating System is the **System Software** that makes the Computer work. We can say that an Operating System (OS) is Software that acts as an **interface between you and the hardware**. It not only contains drivers used to speak the hardware's

language, but also offers you a very specific graphical user interface (GUI) to control the computer.

An OS can also act as an interface (from the hardware) to the other software. A **complex OS like Windows or Linux or Mac OS offers the services of an OS**, but also has applications built in. **Solitaire, Paint, Messenger, etc. are all applications.**

Application software is the software that you install onto your Operating System. It consists of the programs that actually let you do things with your computer. These Applications are written to run under the various Operating Systems.

These include things like your word processing programs, spread sheets, email clients, web browser, games, etc. Many programs, such as most of the Microsoft Office suite of programs, are written in both Mac and Windows versions, but you still have to have the right version for your OS.

For example - Tally for Accounting, MS-Word for Word Processing etc.

So, the Operating system of a Computer is the Software that allows the Computer work. It provides the framework under which the Applications run. An operating system is the type of Computer system you have such as Window XP or Window 95, 98, Mac, etc.

The Applications are the Software that actually allows the user to do something with the Computer. Without the applications, all you can do is change settings and navigate among the folders. You can purchase its CD from a software company or download from a software company's web site.

Examples of System Software are - Operating Systems, Language Translators etc.

What is Files & Types of Files? Types of File Operations.

Files: As we know that Computers are used for storing the information for a Permanent Time or the Files are used for storing the Data of the users for a Long time Period. And the files can contains any type of information means they can Store the text, any Images or Pictures or any data in any Format. So that there must be Some Mechanism those are used for Storing the information, Accessing the information and also Performing Some Operations on the files.

There are Many files which have their Owen Type and own names. When we Store a File in the System, then we must have to specify the Name and the Type of File. The Name of file will be any valid Name and Type means the application with the file has linked.

So that we can say that Every File also has Some Type Means Every File belongs to Special Type of Application software's. When we Provides a Name to a File then we also specify the Extension of the File because a System will retrieve the Contents of the File into that Application Software. For Example if there is a File Which Contains Some Paintings then this will Opened into the Paint Software.

1) Ordinary Files or Simple File: Ordinary File may belong to any type of Application for example notepad, paint, C Program, Songs etc. So all the Files those are created by a user are Ordinary Files. Ordinary Files are used for Storing the information about the user Programs. With the help of Ordinary Files we can store the information which contains text, database, any image or any other type of information.

2) Directory files: The Files those are Stored into the a Particular Directory or Folder. Then these are the Directory Files. Because they belongs to a Directory and they are Stored into a Directory or Folder. For Example a Folder Name Songs which Contains Many Songs So that all the Files of Songs are known as Directory Files.

3) Special Files: The Special Files are those which are not created by the user. Or The Files those are necessary to run a System. The Files those are created by the System. Means all the Files of an Operating System or Window, are refers to Special Files. There are Many Types of Special Files, System Files, or windows Files, Input output Files. All the System Files are Stored into the System by using. sys Extension.

4) FIFO Files: The First in First Out Files are used by the System for Executing the Processes into Some Order. Means To Say the Files those are Come first, will be Executed First and the System Maintains a Order or Sequence Order. When a user Request for a Service from the System, then the Requests of the users are Arranged into Some Files and all the Requests of the System will be performed by the System by using Some Sequence Order in which they are Entered or we can say that all the files or Requests those are Received from the users will be Executed by using Some Order which is also called as First in First Out or FIFO order.

Types of File Operations

Files are not made for just reading the Contents, we can also Perform Some other operations on the Files those are Explained below As :

1) Read Operation: Meant To Read the information which is Stored into the Files.

2) Write Operation: For inserting some new Contents into a File.

3) Rename or Change the Name of File.

4) Copy the File from one Location to another.

5) Sorting or Arrange the Contents of File.

6) Move or Cut the File from One Place to Another.

7) Delete a File

8) Execute Means to Run Means File Display Output.

We can Also Link a File with any other File. These are also called as the Symbolic Links, in the Symbolic Links all the files are linked by using Some Text or Some Alias.

When a User Clicks on the Special text or on the Alias then this will open that Linked File. So that we can say that the Files are linked With each other by using Some Names and by using Some Locations.

These are Also Called as the Symbolic Links and always remember that when we remove the Link from the System then this will not effect on the Actual file Means the Original File will be Kept Save into the Locations.

What is Fragmentation? Different Types of Fragmentation

Fragmentation occurs in a dynamic memory allocation system when many of the free blocks are too small to satisfy any request.

External Fragmentation: External Fragmentation happens when a dynamic memory allocation algorithm allocates some memory and a small piece is left over that cannot be effectively used. If too much external fragmentation occurs, the amount of usable memory is drastically reduced. Total memory space exists to satisfy a request, but it is not contiguous.

Internal Fragmentation: Internal fragmentation is the space wasted inside of allocated memory blocks because of restriction on the allowed sizes of allocated blocks. Allocated memory may be slightly larger than requested memory; this size difference is memory internal to a partition, but not being used

Time Sharing Operating System

A **time sharing system** allows many users to share the computer resources simultaneously. In other words, time sharing refers to the allocation of computer resources in time slots to several programs simultaneously. For example a mainframe computer that has many users logged on to it. Each user uses the resources of the mainframe -i.e. memory, CPU etc. The users feel that they are exclusive user of the CPU, even though this is not possible with one CPU i.e. shared among different users.

The time sharing systems were developed to provide an interactive use of the computer system. A time shared system uses CPU scheduling and multiprogramming to provide each user with a small portion of a time-shared computer. It allows many users to share the computer resources simultaneously. As

the system switches rapidly from one user to the other, a short time slot is given to each user for their executions.

The time sharing system provides the direct access to a large number of users where CPU time is divided among all the users on scheduled basis. The OS allocates a set of time to each user. When this time is expired, it passes control to the next user on the system. The time allowed is extremely small and the users are given the impression that they each have their own CPU and they are the sole owner of the CPU. This short period of time during that a user gets attention of the CPU; is known as a *time slice or a quantum.* The concept of time sharing system is shown in figure.
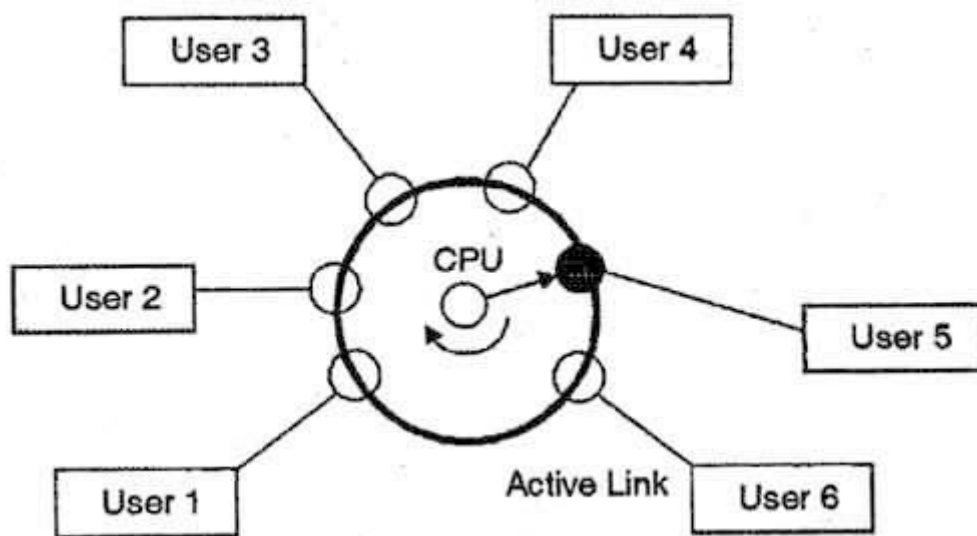
In above figure the user 5 is active but user 1, user 2, user 3, and user 4 are in waiting state whereas user 6 is in ready status.

As soon as the time slice of user 5 is completed, the control moves on to the next ready user i.e. user 6. In this state user 2, user 3, user 4, and user 5 are in waiting state and user 1 is in ready state. The process continues in the same way and so on.

The time-shared systems are more complex than the multi-programming systems. In time-shared systems multiple processes are managed simultaneously which requires an adequate management of main memory so that the processes can be swapped in or swapped out within a short time.

Note: The term 'Time Sharing' is no longer commonly used, it has been replaced by 'Multitasking System'.

Definition of Multiprogramming Operating System

To overcome the problem of underutilization of CPU and main memory, the multiprogramming was introduced. The multiprogramming is interleaved execution of multiple jobs by the same computer.

In multiprogramming system, when one program is waiting for I/O transfer; there is another program ready to utilize the CPU. So it is possible for several jobs to share the time of the CPU. But it is important to note that multiprogramming is not defined to be the execution of jobs at the same instance of time. Rather it does mean that there are a number of jobs available to the CPU (placed in main memory) and a portion of one is executed then a segment of another and so on. A simple process of multiprogramming is shown in figure
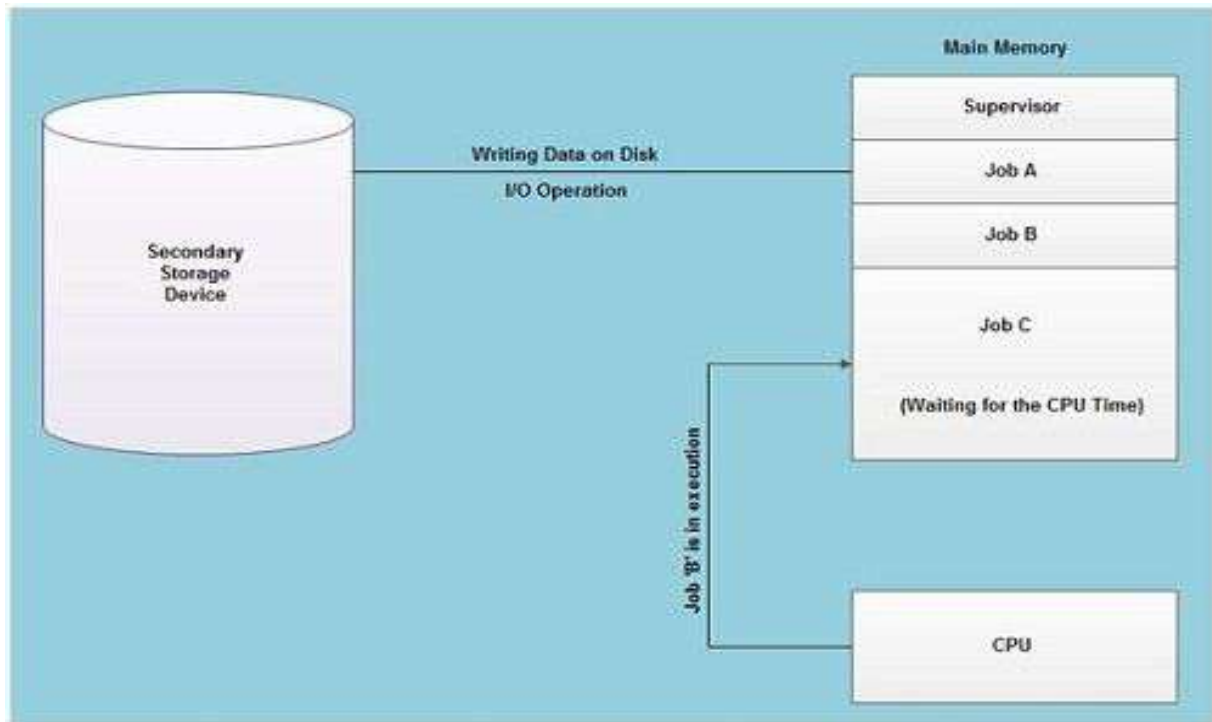
As shown in fig, at the particular situation, job' A' is not utilizing the CPU time because it is busy in I/ 0 operations. Hence the CPU becomes busy to execute the job 'B'. Another job C is waiting for the CPU for getting its execution time. So in this state the CPU will never be idle and utilizes maximum of its time.

A program in execution is called a "Process", "Job" or a "Task". The concurrent execution of programs improves the utilization of system resources and enhances the system throughput as compared to batch and serial processing. In this system, when a process requests some I/O to allocate; meanwhile the CPU time is assigned to another ready process. So, here when a process is switched to an I/O operation, the CPU is not set idle.

Multiprogramming is a common approach to resource management. The essential components of a single-user operating system include a command processor, an input/ output control system, a file system, and a transient area. A multiprogramming operating system builds on this base, subdividing the transient area to hold several independent programs and adding resource management routines to the operating system's basic functions.

MULTIPLE CHOICE QUESTIONS

Section 1

1) The transistorized computer circuits were introduced in the
A. First generation
B. Second generation
C. Third generation
D. Fourth generation

2) Which of the following is required when more than one person uses a central computer at the same time?
A. Terminal
B. Light pen
C. Digitize
D. Mouse

3) Which of the following memories has the shortest access time?
A. Cache memory
B. Magnetic Bubble memory
C. Magnetic core memory
D. RAM

4) An output device that uses words or messages recorded on a magnetic medium to produce audio response is …
A. Magnetic tape
B. Voice response unit
C. Voice recognition unit
D. Voice band

5) Typical data transfer rates in LAN are of the order of
A. Bits per sec
B. Kilo bits per sec
C. Mega bits per sec
D. None of the above

6) The two types of computer chips are
A. External memory Chip
B. Primary memory Chip
C. Microprocessor chips
D. Both B and C

7) Programs designed to perform specific tasks is known as
A. System software
B. Application Software

C. Utility Programs
D. Operating system

8) A plastic card similar to a credit card but having some memory and a microprocessor embedded within it is …
A. Punch Paper Tape
B. Chip Card
C. Card Punch
D. Magnetic Tape

9) A network topology in which the outer nodes connect to a single central node is ….
A. LAN
B. Broadband network
C. Passive star
D. Pass band

10) The central processing unit(CPU) consists of
A. Input, output and processing
B. Control unit, Primary storage and secondary storage
C. Control unit arithmetic-logic unit, and primary storage
D. Control unit, processing, primary storage

11) Which was the most popular first generation computer?
A. IBM 1650
B. IBM 360
C. IBM 1130
D. IBM 2700

12) A storage device where the access time is dependent upon the location of the data is ..
A. Random access
B. Serial access
C. Sequential access
D. Transaction access

13) The computer code of the interchange of information between terminals is …
A. ASCII
B. BCD
C. EBCDIC
D. All of the above

14) A physical connection between the microprocessor memory and other parts of the microcomputer is known as …
A. Path
B. Address bus
C. Route
D. All of the above

15) What is the responsibility of the logical unit in the CPU of a computer?
A. To produce result
B. To compare numbers

C. To control flow of information
D. To do math's works

16) A hybrid computer ..
A. Resembles digital computer
B. Resembles analog computer
C. Resembles both a digital and analog computer
D. None of the above

17) A technique used by codes to convert an analog signal into a digital bit stream is known as …
A. Pulse code modulation
B. Pulse stretcher
C. Query processing
D. Queue management

18) Which of the following produces the best quality graphics reproduction?
A. Laser printer
B. Ink jet printer
C. Plotter
D. Dot matrix printer

19) Which of the following is used for manufacturing chips?
A. Control bus
B. Control unit
C. Parity unit
D. Semiconductor

20) A set of information that defines the status of resources allocated to a process is …
A. Process control
B. ALU
C. Register unit
D. Process description

Answers:

1)B. Second generation
2) A. Terminal
3) A. Cache memory
4) B. Voice response unit
5) C. Mega bits per sec
6) D. Both B and C
7) C. Utility Programs
8) A. Punch Paper Tape
9) C. Passive star
10) D. Control unit, processing, primary storage
11) A. IBM 1650
12) B. Serial access

13) A. ASCII
14) B. Address bus
15) B. To compare numbers
16) C. Resembles both a digital and analog computer
17) A. Pulse code modulation
18) C. Plotter
19) D. Semiconductor
20) D. Process description

MULTIPLE CHOICE QUESTIONS

Section 2

1) Central Processing Unit is combination of …..
A. Control and Storage Unit
B. Control and Output Unit
C. Arithmetic Logic and Input Unit
D. Arithmetic Logic and Control Unit

2) The octal equivalent of 111010 is ……
A. 81
B. 72
C. 71
D. None of the above

3) Programs designed to perform specific tasks is known as ….
A. System Software
B. Application Software
C. Utility Software
D. Operating Software

4) Analog Computer works on the supply of
A. Continuous electrical pulses
B. Electrical pulses but not continuous
C. Magnetic strength
D. None of the above

5) Time during which a job is processed by a the computer is ….
A. Delay times
B. Real time
C. Execution time
D. Down time

6) Which of the following chips can be reprogrammed with special electric pulses?
A. EPROM
B. PROM

C. ROM
D. EEPROM

7) Hexadecimal number system have …
A. One stable stage
B. Two stable state
C. Eight Stable state
D. Sixteen Stable state

8) The mostly commonly used standard data code to represent alphabetical, numerical and punctuation character used in electronic data processing system is called …
A. ASCII
B. EDCDII
C. BCD
D. All of the above

9) The term gigabyte refers to …
A. 1024 bytes
B. 1024 kilobytes
C. 1024 megabytes
D. 1024 terabytes

10) Seek time is …..
A. Time to position the head over proper track
B. Time to position the head over proper sector
C. Time to position the head over proper cylinder
D. None of the above

11) Which is considered a direct entry input device?
A. Optical scanner
B. Mouse and digitizer
C. Light pen
D. All of the above

12) Group of instructions that directs a computer is called …
A. Storage
B. Logic
C. Memory
D. Program

13) A type of memory chip whose contents can not be saved when a computer is turned off ….
A. ROM
B. PROM
C. RAM
D. EPROM

14) In latest generation computers, the instructions are executed …..
A. Parallel only

B. Sequentially only
C. Both sequentially and parallel
D. All of the above

15) Which of the following terms is the most closely related to main memory?
A. None volatile
B. Permanent
C. Control unit
D. Temporary

16) Which language is directly understood by the computer without translation program …
A. Machine language
B. Assembly language
C. High level language
D. None of the above

17) Which of the following is used only for data entry and storage, and never of processing?
A. Mouse
B. Dumb terminal
C. Micro computer
D. Dedicated data entry system

18) Who is called called the "GrandFather" of the computer?
A. Blaise Pascal
B. Charles Babbage
C. Joseph Jacquard
D. Dr. Herman Hollerith

19) The translator program used in assembly language is called …
A. Computer
B. Interpreter
C. Assembler
D. Translator

20) A modern electronic computer is a machine that is meant for ….
A. Doing quick mathematical calculation
B. Input, storage, manipulation and outputting of data
C. Electronic Data processing
D. Performing repetitive task accurately

Answers:

1) D. Arithmetic Logic and Control Unit
2) B. 72
3) B. Application Software
4) A. Continuous electrical pulses
5) C. Execution time
6) D. EEPROM

7) D. Sixteen Stable state
8) A. ASCII
9) C. 1024 megabytes
10) A. Time to position the head over proper track
11) D. All of the above
12) D. Program
13) C. RAM
14) C. Both sequentially and parallel
15) D. Temporary
16) A. Machine language
17) B. Dumb terminal
18) B. Charles Babbage
19) C. Assembler
20) B. Input, storage, manipulation and outputting of data

MULTIPLE CHOICE QUESTIONS

Section 3

1) In the third generation of computer ..
A. Distributed data processing first became popular
B. On operating system was first developed
C. High level procedural language were first used
D. On-line, real time system first became popular

2) A communication protocol that converts noisy data links into communication channels free of transmission errors is known as …
A. Data link protocol
B. Data link
C. Data medium
D. Data model

3) What is required when more than one person uses a central computer at the same time?
A. Light pen
B. Mouse
C. Digitizer
D. Terminal

4) A digital computer did not score over an analog computer in terms of ….
A. Speed
B. Accuracy
C. Cost
D. Memory

5) The storage capacity of a disk system depends on the bits per inch of track and the tracks per inch of ……
A. Cylinder
B. Hub
C. Cluster

D. Surface

6) Which type of computers uses the 8-bit code called EBCDIC?
A. Minicomputer
B. Microcomputer
C. Mainframe computers
D. Super computer

7) The two basic types of record access method are …
A. Sequential and random
B. Sequential and indexed
C. Direct and immediate
D. On-line and real time

8) The disk drive component used to position read/write heads over a specific track is known as …
A. Acoustic couples
B. Access arm
C. Cluster
D. All of the above

9) Computer instructions written with the use of English words instead of binary machine code is called ..
A. Mnemonics
B. Symbolic code
C. Gray codes
D. Opcode

10) Which American computer company is called big blue?
A. Microsoft
B. Compaq Corporation
C. IBM
D. Apple

11) Which number system is commonly used as a shortcut notation for groups of four binary digits.
A. Binary
B. Decimal
C. Octal
D. Hexadecimal

12) Before a disk can be used to store data it must be …
A. Formatted
B. Reformatted
C. Addressed
D. None of the above

13) Who invented the Microprocessor?
A. Marican E. Huff

B. Herman H Goldstein
C. Joseph Jacquard
D. All of the above

14) Sending data from one place to another. By physical or electronic means is ….
A. E-mail
B. Internet
C. Data transmission
D. Distributed processing

15) Multi user systems provided cost saving for small business because they use a single processing unit to link several …
A. Personal computers
B. Workstations
C. Dumb terminals
D. Mainframes

16) Which is the part that transmits data from one part of the computer to another?
A. Bus
B. CPU
C. Hard Disk
D. None of the above

17) A software package to perform calculations on data arranged in an array is ….
A. System Software
B. Utility programs
C. Electronic spreadsheet
D. Application programs

18) Which part of the computer is used for calculating and comparing?
A. Disk unit
B. Control unit
C. ALU
D. Modem

19) Plotter accuracy is measured in terms of repeat-ability and ..
A. Buffer size
B. Resolution
C. Vertical dimension
D. Intelligence

20) Which computer memory is used for storing program and data currently being processed by the CPU?
A. Mass memory
B. Internal memory
C. Non-volatile memory
D. PROM

Answers:

1) D. On-line, real time system first became popular

2) A. Data link protocol
3) D. Terminal
4) C. Cost
5) D. Surface
6) C. Mainframe computers
7) A. Sequential and random
8) B. Access arm
9) B. Symbolic code
10) C. IBM
11) D. Hexadecimal
12) A. Formatted
13) A. Marican E. Huff
14) C. Data transmission
15) C. Dumb terminals
16) A. Bus
17) C. Electronic spreadsheet
18) B. Control unit
19) B. Resolution
20) B. Internal memory

MULTIPLE CHOICE QUESTIONS

Section 4

1) The computer memory holds data and …..
A. Bytes
B. Program
C. Registers
D. Bits

2) A file that has been transferred to a lower level in the memory hierarchy is known as ….
A. Random File
B. Archive File
C. Serial File
D. Sequential File

3) The computer that process both analog and digital is called ..
A. Mainframe Computer
B. Hybrid Computer
C. Analog Computer
D. Digital Computer

4) The binary number 1000 is equivalent to decimal number ..
A. One thousand
B. Eight
C. One
D. Sixteen

5) A general purpose single use microcomputer designed to be operated by one person at time is …

A. Special Purpose computer
B. KIPS
C. AI
D. PC

6) ASCII Stand for
A. American Standard Code for Information Interchange
B. American Stable Code for International Interchange
C. American Standard Case for International Interchange
D. American Standard Code for Interchange Information

7) The checking operation performed in input data is called the …
A. Validation of data
B. Verification of data
C. Cross check
D. Control data

8) Most important advantage of an IC is its ..
A. Easy replacement in case of circuit failure
B. Extremely high reliability
C. Reduced Cost
D. Low power consumption

9) Software in computer ….
A. Enhanced the capabilities of the hardware machine
B. Increase the speed of central processing unit
C. Both of the above
D. None of the above

10) The larger RAM of computer, the fastest processing speed is, since it eliminates ..
A. Need for external memory
B. Need of ROM
C. Frequent disk I/Os
D. Need for wider data path

11) The earlier device the qualifies as a digital computer is …
A. EDSAC
B. Abacus
C. ENIAC
D. EDVAC

12) Latency time is …
A. Time to spin the needed data under head
B. Time to spin the needed data under track
C. Time to spin the needed data under sector
D. All of the above

13) Which of the following printer can be classified as a page at a time printer?
A. Laser Printer
B. Dot matrix printer
C. Thermal Printer
D. Ink-jet printer

14) What are the units used to count the speed of a printer?
A. CPM
B. DPI
C. PPM
D. BIT

15) Who is the founder of Oracle Corporation?
A. Bill Gates
B. Laris Ellison
C. Andrew S Grove
D. Marc Andreson

16) Plotter prints …
A. with ballpoint pens
B. with ink pens
C. electristatically
D. All of the above

17) Which of the following organizations looks at standards for representation of data on the Internet?
A. ISOC
B. W3C
C. IEEE
D. IETE

18) Who is the founder of BSD Unix?
A. Bill Gates
B. Dennis Ritche
C. Bill Joy
D. Linux Torvalds

19) Which of the following topologies is highly reliable?
A. Star
B. Bus
C. Fully connected mesh
D. All of the above

20) People typically interface with a computer based system when …
A. Information must be output

B. Data must be input
C. Information must be reviewed
D. All of the above

Answers:

1) B. Program
2) B. Archive File
3) B. Hybrid Computer
4) B. Eight
5) D. PC
6) A. American Standard Code for Information Interchange
7) A. Validation of data
8) B. Extremely high reliability
9) A. Enhanced the capabilities of the hardware machine
10) C. Frequent disk I/Os
11) B. Abacus
12) A. Time to spin the needed data under head
13) A. Laser Printer
14) C. PPM
15) B. Laris Ellison
16) D. All of the above
17) B. W3C
18) C. Bill Joy
19) C. Fully connected mesh
20) A. Information must be output

MULTIPLE CHOICE QUESTIONS

Section 5

1) Different components on the motherboard of a PC unit are linked together by sets of parallel electrical conducting lines. What are these lines called?
A. Conductor's
B. Buses
C. Connectors
D. Consecutively

2) The ARPANET helped to develop protocol called …..
A. TCP/IP
B. POPA
C. ARP
D. None

3) The ALU of central processing unit does the essential math work for the computer. What does the control unit do …..
A. Communicate its results

B. Activates the output device
C. Monitors the flow of information
D. Control the printer

4) The language that the computer can understand and execute is called ….
A. Machine language
B. Application software
C. System program
D. All of the above

5) Boot virus affects the ……… of the program of a system.
A. Boot recorded program
B. Booting computer
C. Boot halted
D. None

6) Which of the following is not characteristic of a relational database model?
A. Tables
B. Treelike Structure
C. Complex logical relationships
D. Records

7) Who designed the first electronics computer ENIAC?
A. Van neumann
B. Joseph M jackquard
C. J. Presper Eckers and John W Mouchley
D. All of the above

8) The process of rewriting parts of a file to continuous sectors on a hard disk to increase the speed of access and retrieval.
A. Fragmentation
B. Defragmentation
C. Both
D. None

9) A language used to express algorithms in computer understandable form is ….
A. Assembly language
B. Low level language
C. Algorithmic language
D. Programming language

10) Instructions and memory addresses are represented by ..
A. Character codes
B. Binary codes
C. Binary words
D. Parity bit

11) Scandisk is performed by using …..
A. Application software
B. Operating system software

C. Utility software
D. None

12) BCD is
A. Bit Coded digit
B. Binary Coded Decimal
C. Bit Code digit
D. Binary Coded Digit

13) What is the name of the computer terminal, which gives paper printout?
A. Display screen
B. Soft-copy terminal
C. Hard copy terminal
D. Plotter

14) Optical fibers are very reliable communication channels and they transmit data in ….
A. Analog
B. Both
C. Digital
D. None

15) Chief components of first generation computer was …
A. Transistors
B. Vacuum Tubes and Valves
C. Integrated Circuits
D. None of the above

16) The function of CPU is ….
A. to provide a hard copy
B. to read, interprets and processes the information and instruction
C. to communicate with the operator
D. to provide external storage of text

17) Copying file from Internet Server to client computer is called …..
A. Telnet
B. FTP
C. Internet copy
D. Message copy

18) Fifth Generation of Computer is also known as ….
A. Knowledge information processing system
B. Very large scale Integration
C. Both of the above
D. None of the above

19) What is meant by the term RAM?
A. Memory which can only be read

B. Memory which can be both read and written to
C. Memory which is used for permanent storage
D. Memory which can only be written to

20) Which is not the network operating system?
A. LINUX
B. UNIX
C. XENIX
D. MS-DOS

Answers:
1) B. Buses
2) C. ARP
3) C. Monitors the flow of information
4) A. Machine language
5) A. Boot recorded program
6) B. Treelike Structure
7) C. J. Presper Eckers and John W Mouchley
8) A. Fragmentation
9) A. Assembly language
10) B. Binary codes
11) B. Operating system software
12) B. Binary Coded Decimal
13) C. Hard copy terminal
14) C. Digital
15) B. Vacuum Tubes and Valves
16) B. to read, interprets and processes the information and instruction
17) B. FTP
18) A. Knowledge information processing system
19) B. Memory which can be both read and written to
20) D. MS-DOS

MULTIPLE CHOICE QUESTIONS

Section 6

1) A computer Programmer ……..
A. does all the thinking for a computer
B. can enter input data quickly
C. can operate all types of computer equipment
D. can draws only flowchart.

2) The first calculating device is ……….
A. Slide rule
B. Mark I
C. Pascaline
D. Abacus

3) A printed circuit board that adds additional capabilities and functions to a computer's hardware is ….
A. Expansion Board
B. Mother Board
C. Integrated circuit
D. Extended Board

4) The difference between memory and storage is that memory is ….. and storage is ……
A. Temporary, permanent
B. Permanent, temporary
C. Slow, fast
D. All of the above

5) Fifth generation computers will have ….
A. Ordinary Intelligence
B. Common Intelligence
C. Natural Intelligence
D. Artificial Intelligence

6) Which of the following can be used to control the movement of a cursor on a video screen?
A. Mouse
B. OCR
C. Card Punch
D. Joystick

7) Which was the computer conceive by Babbage?
A. Analytical engine
B. Arithmetic machine
C. Donald Knuth
D. All of the above

8) Super computer is also known as …….
A. Number Counter
B. Number Cashier
C. Number Crunchier
D. Number Displayer

9) A local storage register, which contains the address of the next instruction to be executed, is
A. Accumulator
B. Address register
C. Buffer
D. Memory

10) Microprocessors can be used to make
A. Computers
B. Digital Systems
C. Calculators
D. All of the above

11) IBM PC was established in …….
A. 1924 AD
B. 1824 AD
C. 1942 AD
D. 1928 AD

12) Printers are categorized according to ….
A. Whether the image produced is formed by physical contact of the print mechanism with paper
B. The number of characters printed in a minute
C. The size of computer that the printer is linked to
D. The application software needs of the user

13) Serial access memories are useful in applications where
A. Data consists of numbers
B. Short access time is required
C. Each stored word is processed differently
D. Data naturally needs to flow in an out in serial form.

14) Transistors were used in ……… generation computer.
A. First
B. Third
C. Second
D. Fourth

15) Linkage between the CPU and the users is provided by ….
A. Peripheral devices
B. Storage
C. Control Unit
D. Software

16) Registers, which are partially visible to users and used to hold conditional, are known as
A. PC
B. Memory address registers
C. General purpose register
D. Flags

17) ……… unit acts as a combination channel between user and a computer.
A. Input
B. Processing
C. Output
D. Storage

18) What is the generation of the computers which are built with VLSI technology and microprocessors?
A. Third
B. Fourth
C. Second

D. First

19) An integrated circuit is ..
A. A complicated circuit
B. An integrating device
C. Much costlier than a single chip
D. Fabricated on a tiny silicon chip

20) Which is the connector of coaxial cable?
A. RJ 45
B. DIX
C. BNC
D. None

Answers:

1) A. does all the thinking for a computer
2) D. Abacus
3) B. Mother Board
4) A. Temporary, permanent
5) D. Artificial Intelligence
6) D. Joystick
7) A. Analytical engine
8) C. Number Crunchier
9) B. Address register
10) D. All of the above
11) A. 1924 AD
12) A. Whether the image produced is formed by physical contact of the print mechanism with paper
13) D. Data naturally needs to flow in an out in serial form
14) C. Second
15) A. Peripheral devices
16) D. Flags
17) A. Input
18) B. Fourth
19) D. Fabricated on a tiny silicon chip
20) C. BNC

MULTIPLE CHOICE QUESTIONS

Section 7

1) What is the name of the software that allows us to browse through web pages called?
A. FTP Client
B. Browser
C. Mail Client
D. Messenger

2) Which of the following is not a logic gate?
A. AND
B. OR
C. NOT
D. NAT

3) The register which keeps track of the execution of a program and which contains the memory address of the instructions currently being executed is known as ….
A. index register
B. memory address register
C. program counter
D. Instructions register

4) Punch cards were introduced by ….
A. Powers
B. Pascal
C. Jacquard
D. Herman Hollerith

5) Which of the following statements is/are true?
A. Cache Memories are bigger than RAM
B. Cache Memories are smaller then RAM
C. ROM are faster than RAM.
D. Information in ROM can be written by users

6) The ALU of computer normally contains a number of high-speed storage elements called
A. Semiconductor memory
B. Register
C. Hard Disk
D. Magnetic Disk

7) Computers built before the first Generation of computers were ..
A. Mechanical
B. Electro mechanical
C. Electrical
D. None of the above

8) Which of the following registers is loaded with the contents of the memory location pointed by the PC?
A. Memory Address Register
B. Memory Data Register
C. Instruction Register
D. Program Counter

9) A computer program that converts an entire program into machine language is called …
A. Interpreter
B. Modem
C. Complier
D. Commander

10) Programs stored in ROM are called …
A. Hardware
B. Firmware
C. Software
D. None of the above

11) Which of the following registers is used to keep track address of the memory location where the next instruction is located?
A. Memory address register
B. Memory data register
C. Instruction register
D. Program Counter

12) The memory component of first generation was ….
A. Transistor
B. Vacuum Tubes
C. IC
D. LSI

13) A compiler ….
A. is a computer program
B. translates a high level language into machine language
C. is a part of software
D. none of the above

14) Which chips are erasable by ultra-violet rays after removing them from main circuit?
A. EPROM
B. EEPROM
C. PROM
D. All of the above

15) Fourth generation computers were ……
A. extremely fast and accurate
B. very much reliable
C. Possessing enormous capacity
D. all of the above

16) EEPROM can be used for …
A. Erasing the contents of ROM
B. Reconstructing the contents of ROM
C. Erasing and reconstructing the contents of ROM
D. Duplicating ROM

17) The processing capacity of the computer means ….
A. input/output operation
B. text manipulation and calculation
C. logic and comparative operation
D. storage and retrieval operation

18) The computer can perform a task repeatedly which is explained by term ….

A. Processing capacity
B. Diligence
C. Versatility
D. Storage capacity

19) Time taken to move from one cylinder of a HDD to another is called ….
A. Transfer rate
B. Average seek time
C. Latency
D. Round trip time

20) A set of flip flops integrated together is called ….
A. Counter
B. Adder
C. Register
D. None of the above

Answers:

1) B. Browser
2) D. NAT
3) C. program counter
4) D. Herman Hollerith
5) B. Cache Memories are smaller then RAM
6) B. Register
7) B. Electro mechanical
8) C. Instruction Register
9) C. Complier
10) B. Firmware
11) D. Program Counter
12) B. Vacuum Tubes
13) B. translates a high level language into machine language
14) A. EPROM
15) D. all of the above
16) C. Erasing and reconstructing the contents of ROM
17) C. logic and comparative operation
18) B. Diligence
19) B. Average seek time
20) C. Register

MULTIPLE CHOICE QUESTIONS

Section 8

1) Separate Read/Write heads are required in which of these memory access schemes.
A. Random Access
B. Sequential Access
C. Direct Access
D. None of these

2) The ALU of a computer response to the commands coming from
A. Primary memory
B. Control memory
C. External memory
D. Cache memory

3) What allows you to print on both sides of the printers?
A. Fuser
B. Duplexer
C. Toner
D. Paper swapping unit

4) A register organized to allow to move left or right operations is called a ….
A. Counter
B. Loader
C. Adder
D. Shift register

5) Before a disk drive can access any sector record, a computer program has to provide the record's disk address what information does this address specify?
A. Track number
B. Sector number
C. Surface number
D. All of the above

6) Laser Jet Printer speeds are measured in pages per minute(PPM), what do we use to measure dot-matrix printers?
A. Lines per inch
B. Lines per sheet
C. Characters per inch
D. Characters per second

7) Which of the following have the fastest access time?
A. Semiconductor Memories
B. Magnetic Disks
C. Magnetic Taps
D. Compact Disks

8) Which printer is very commonly used for desk to publishing?
A. Laser Printer
B. Ink jet printer
C. Daisy wheel printer
D. Dot matrix printer

9) What is a common language that computers use to talk with one another on a network?
A. Client
B. Adapter
C. Protocol
D. Operating Systems

10) A hard disk is divided into tracks, which are further subdivided into …
A. Clusters
B. Sectors
C. Vectors
D. Heads

11) The bar-code which is used on all types of items, is ready by a scanning device directly into the computer. What is the name of this scanning?
A. Laser scanner
B. Wand
C. OCR
D. MICRO

12) Which of the following are characteristics of peer to peer networking?
A. Limited number of computers involved
B. Computer acting as both a client and a server
C. Centralized security and admin
D. Both A and B

13) Which of the following devices send and receive information from other devices?
A. Parallel port
B. Serial port
C. Video port
D. Both A and B

14) What is the name of the reading device which makes use of photo sensors and laser technologies to interpret printed types of even handwritten data directly from the source document?
A. MICR
B. OCR
C. MARK SENSING
D. ATM

15) Modem use ………. transmission.
A. synchronous
B. asynchronous
C. timed interval
D. PPP

16) Which of the following is a type of preventive maintenance used on a hard drive?
A. Disk diagnostics
B. Head alignment diagnostics
C. Initializing
D. Un-initializing

17) The storage location in the internal storage of a CPU are called …
A. Contents
B. Address
C. Locations
D. Mask

18) What are alternative names for the internal storage of a computer?
A. real storage
B. primary memory
C. main memory
D. Both A and B

19) During the normal PC boot process, which of the following is active first?
A. RAM BIOS
B. ROM BIOS
C. CMOS
D. Hard disk information

20) Which of the following chips can be reprogrammed with special electric pulses?
A. EPROM
B. PROM
C. ROM
D. EEPROM

Answers:
1) D. None of these
2) B. Control memory
3) B. Duplexer
4) D. Shift register
5) D. All of the above
6) D. Characters per second
7) A. Semiconductor Memories
8) A. Laser Printer
9) C. Protocol
10) B. Sectors
11) A. Laser scanner
12) D. Both A and B
13) D. Both A and B
14) B. OCR
15) A. synchronous
16) A. Disk diagnostics
17) B. Address
18) D. Both A and B
19) B. ROM BIOS
20) D. EEPROM

MULTIPLE CHOICE QUESTIONS

Section 9

1) The ALU and control unit of most of the microcomputer and combined and manufactured on a single silicon chip what it is called …
A. Mono chip
B. Micro Processor
C. ALU
D. Control Unit

2) Mini computers are ….
A. larger than micro computer
B. larger than micro but smaller than mainframe
C. smaller than mainframe
D. all of the above

3) The decreased cost and increased performance of computer hardware were the distinguishing features of which generation of computer?
A. first and second
B. second and third
C. third and fourth
D. all generations

4) The CPU chip used in a computer practically made out of …
A. silica
B. carbon
C. copper
D. gold

5) The word 'computer' usually refers to the central processing unit plus
A. External memory
B. Internal memory
C. Input device
D. Output device

6) Super computers are ….
A. used to process complex scientific jobs
B. used in star wars and space research
C. the largest and fastest systems
D. all of the above

7) A computer will function in its memory ..
A. has control unit
B. is given input data
C. has a program in its memory
D. has software package

8) Which statement is valid for the digital computer?
A. its less accurate than the analog computer
B. it represents the decimal numbers through a string of binary digits
C. it is used primarily in scientific application
D. both A and C

9) A hybrid computer in an aeroplane can also measure …
A. altitude of the plane
B. speed of the plane
C. convert the analog data into digital data
D. weight of the plane
E. All of the above

10) The central computer in a distributed processing system is called the
A. Mainframe
B. CPO
C. Multiplexer
D. Host

11) ROM is a non-volatile memory because …
A. it can be programmed when required
B. the programs are permanently stored
C. the programs are erased as the power is switched off
D. the programs are changeable as required

12) Memories in which any location can be reached in a fixed land short amount of the time after specifying its address is called …
A. Sequential-access
B. Random access memory
C. Secondary memory
D. Mass storage

13) Which of the following is not a part of the CPU?
A. Storage unit
B. Arithmetic an logic unit
C. Program
D. Control unit

14) The register which contains the data to be return into or read out of the addressed location is known as …
A. Index register
B. Instruction register
C. Memory register
D. Memory data register

15) An UPS is attached to the computer so that ….
A. it prevents from loss of data
B. it supplies electricity all the time
C. all of the above
D. none of the above

16) The Qwerty keyboard ..
A. is the most popular keyboard
B. is the fastest keyboard
C. is a keyboard that is really used
D. all of the above

17) Microcomputers are …
A. Highly efficient in data processing
B. Very much reliable
C. Small and elegant
D. Super computers

18) Which of the computer memory is essentially empty?
A. RAM
B. ROM
C. EPROM
D. FROM

19) Which is the most powerful type of computer?
A. micro computer
B. mini computer
C. mainframe computer
D. super computer

20) Which of the following is not a sequence storage device?
A. Magnetic disk
B. Magnetic tape
C. Paper tape
D. All of the above

Answers:

1) B. Micro Processor
2) B. larger than micro but smaller than mainframe
3) D. all generations
4) A. silica
5) B. Internal memory
6) D. all of the above
7) C. has a program in its memory
8) B. it represents the decimal numbers through a string of binary digits
9) E. All of the above
10) D. Host
11) B. the programs are permanently stored
12) B. Random access memory
13) C. Program
14) C. Memory register
15) D. none of the above
16) A. is the most popular keyboard
17) C. Small and elegant

18) D. FROM
19) D. super computer
20) A. Magnetic disk

MULTIPLE CHOICE QUESTIONS

Section 10

1) Poor response times are usually caused by
A. Process busy
B. High I/O rates
C. High paging rates
D. Any of the above

2) ……….. runs on computer hardware and serve as platform for other software to run on …
A. Operating system
B. Application Software
C. System Software
D. All

3) Which of the following about addresses is true?
A. they have a unique identifier
B. their contents will not change
C. their identifier will not be same
D. none of the above

4) Which of the following program is not a utility?
A. Debugger
B. Editor
C. Spooler
D. All of the above

5) The number of digits a number system uses to represent the numbers in the system is called …
A. base
B. basic
C. radix
D. base or radix

6) Each time you turn the power switch on which control files the computer will check
A. command.com, IO.sys
B. command.com, dat.com, dir.com
C. command.com, IO.sys, MSDOS.sys
D. chkdsk.exe

7) …………. interface consists of things like program counter, registers, interrupts and terminals.

A. Hardware
B. Software
C. Data
D. None

8) The number of bits that a computer can process at a time in parallel is called the …
A. Word length
B. Speed
C. Accuracy
D. Diligence

9) The binary equivalent of 20 is ……
A. 11111
B. 10100
C. 10101
D. 10011

10) ………….. is the first program run on a computer when the computer boots up
A. System software
B. Operating system
C. System operations
D. None

11) The decimal equivalent of 111111 is …
A. 25
B. 40
C. 65
D. none of the above

12) A system that synchronizes hardware and software to produce electronic tones is a ….
A. Synthesizer
B. Plain talk
C. Voice type
D. MIDI

13) ………… shares characteristics with both hardware and software.
A. Operating system
B. Software
C. Data
D. None

14) How many characters can be coded in ASCII-7?
A. 7
B. 128
C. 256
D. none of the above

15) Which of the following is a portable computer?
A. Laptop

B. Sub-note books
C. PDAS
D. All of the above

16) Multiprogramming systems ..
A. Are easier to develop than single programming systems
B. Execute each job faster
C. Execute more jobs in the same time period
D. Are used only large mainframe computers

17) Microsecond is ….
A. thousand of a second
B. millionth of a second
C. billionth of a second
D. trillionth of a second

18) How many characters can be coded in ASCII-8 and EBCDIC?
A. 7
B. 128
C. 256
D. none of the above

19) The primary purpose of an operating system is …..
A. To make the most efficient use of the computer hardware
B. To allow people to use the computer
C. To keep systems programmers employed
D. To make computers easier to use

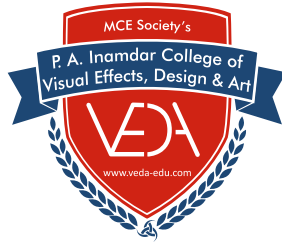20) The main function of computer is/are ….
A. receive input and produce output
B. information processing
C. information storage
D. all of the above

Answers:

1) D. Any of the above
2) A. Operating system
3) A. they have a unique identifier
4) C. Spooler
5) D. base or radix
6) C. command.com, IO.sys, MS-DOS.sys
7) A. Hardware
8) A. Word length
9) B. 10100
10) B. Operating system
11) D. none of the above
12) D. MIDI

13) A. Operating system
14) B. 128
15) D. All of the above
16) C. Execute more jobs in the same time period
17) B. millionth of a second
18) C. 256
19) A. To make the most efficient use of the computer hardware
20) D. all of the above