

UNIT - 1

INTRODUCTION OF COMPUTER

⇒ Definition of Computer:

It is a programmable electronic device designed for storing and processing data, based on sequence of instruction.

⇒ Evolution: The evolution of digital computing is often divided into generation. Each generation is characterized by dramatic improvement over the previous generation in the tech. used to build computers, in terms of the internal organisation of computer and programming languages.

Five Generation of Computers:

First Generation

Second Generation

Third Generation

Fourth Generation

Fifth Generation.

→ First Generation: Vacuum Tubes (1940-1955)

The first Computer Systems used vacuum tubes for circuitry and magnetic drums for memory, and were often and in addition to using a great deal of electricity, the first computers generation a lot of heat, which was often the cause of malfunctions. First generation Computers relied on mechanical language, the lowest-level programming language understood by computers related to perform operations, and they could only solve one problem at a time. It would take operations day or even weeks to set up a new problem. If Input was based on punched cards and paper tape, and output

was delayed on printouts.
 The UNIVAC (Universal Automatic Computer) and ENIAC (Electronic Numerical Integrator and Computer) are examples of first generation computing devices. The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

→ Second Generation: Transistors (1956-1963):

The world would see transistors replace vacuum tubes in the second generation of computers. The transistor was invented at Bell Labs in 1947 but did not see widespread use in computers until the late 1950s.

The transistor was far superior to the vacuum tube, allowing computers to become smaller

faster, cheaper, more energy-efficient and more reliable than their first generation predecessors. Though the transistors still generated a great deal of heat subjected the computer to damage, it was a vast improvement over the vacuum tube. Second-generation computers still relied on punched cards for inputs and printouts for output. Second generation computers moved from cryptic binary machine language to symbolic or assembly language.

→ Third generation! Integrated Circuit (1964 - 1971):

The development of the integrated circuit was the hallmark of the third generation of computers. Transistors were

miniaturized and placed on Silicon Chips. Called Semiconductors which drastically increased the speed and efficiency of computers. Instead of Punched Cards and Printouts, user interacted with third generation Computers through Keyboards and monitors and interfaced with an operation system, which allowed the device to run many different applications at once time with a Central program that monitored the memory. Computers for the first time become accessible to a mass audience because they are smaller and cheaper than their predecessors.

→ Fourth Generation: Microprocessors (1971 - Present);

The microprocessor brought the fourth generation of computers.

as thousands of integrated Circuits were built into a single Silicon chip. What is in the first generation filled a entire room could now fit in the palm of the hand. The Intel 4004 Chip, developed in 1971, located all the Components of the Computer - from the unit and memory to input/output Controls - on a single chip. In 1981 IBM introduced the first Computer for the home uses, and in 1984 Apple introduced the Macintosh. Microprocessors also moved out of the realm of desktop Computer and into many areas of life as more and more everyday products begin to use microprocessors. As these small Computers become more powerful, they could

be linked together to form networks, which eventually led to the development of the internet. Fourth generation Computers also saw the development of GUIs, the mouse and handheld devices.

→ Fifth Generation: Artificial Intelligence (Present and beyond)!

Fifth generation Computing devices, based on artificial intelligence are still in development though there are some applications such as voice recognition, that are being used today. The use of parallel processing of supercomputers is helping to make artificial intelligence a reality. Quantum Computing and molecular and nanotechnology will radically change the face of computers in years to come.

The goal of fifth generation Computing is to develop devices that respond a natural language input and are capable of learning and self-organization.

Characteristics of Computer.

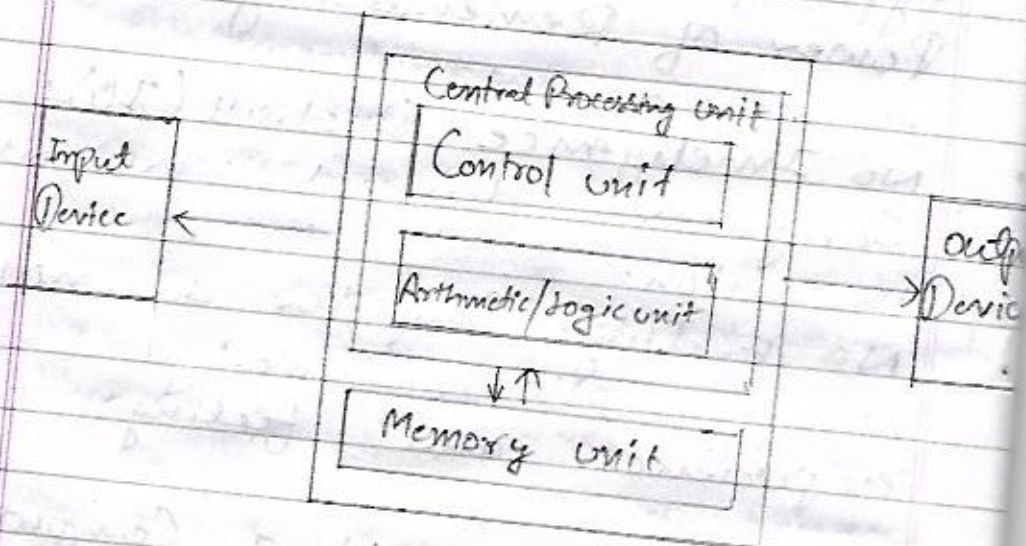
- **Speed:** In general no human being can complete to solving the complex computation, faster than computer.
- **Accuracy:** Since computer is programmed, so whatever input we give it gives a result with accurately.
- **Storage:** Computer can store mass storage of data with appropriate format.

- **Delligence:** Computer Can work for hours without any break and creating error.
- **Versatility:** we can use Computer to perform completely different type of work at the same time.
- **Power of Remembering:** It can remember data for us.
- **No Intelligence Quotient (IQ):** Computer does not work without instruction.
- **No Feeling:** Computer does not have emotions, knowledge experience and feeling.

Organisation of a Computer.

A Computer is a fast system that is organised to accept, store and process data and produce output result under the direction of a stored Programme of instruction. This

Section explains how a Computer System is organised -
Basic organised of Computer System includes input, processing unit, Memory unit and output devices.



- **Input devices:** Computer system uses many devices for input. devices include the mouse, input pen, touch screen and microphone. Regardless of the type of device used all are components for interpretation.

and Communication b/w people and Computer System.

- **Central Processing unit (CPU):** It is the brain of Computer without this unit Computer unable to process.
- **Output Device:** output device is used to show the result of instruction e.g Monitor, Printer, headphone etc.
- **Memory unit:** A memory unit is the collection of storage units or devices together. The memory unit stores the binary information in the form of bits.

Classification of Computers.

Based on size and Capacity, Computers are classified as follows:

- Super Computers
 - Miniframe Computers
 - Minicomputer
 - Micro computer.
- Super Computers: Super Computers are the most powerful and physically the large by size. These are systems are designed to process huge amounts of data and the faster Super Computers can perform over one trillion calculation in a second. Supercomputers have thousands of processors. Because of the extraordinary speed, accuracy and processing power

Supercomputers are well suited for solving highly complex problems and performing tasks that demand huge amounts of calculation.

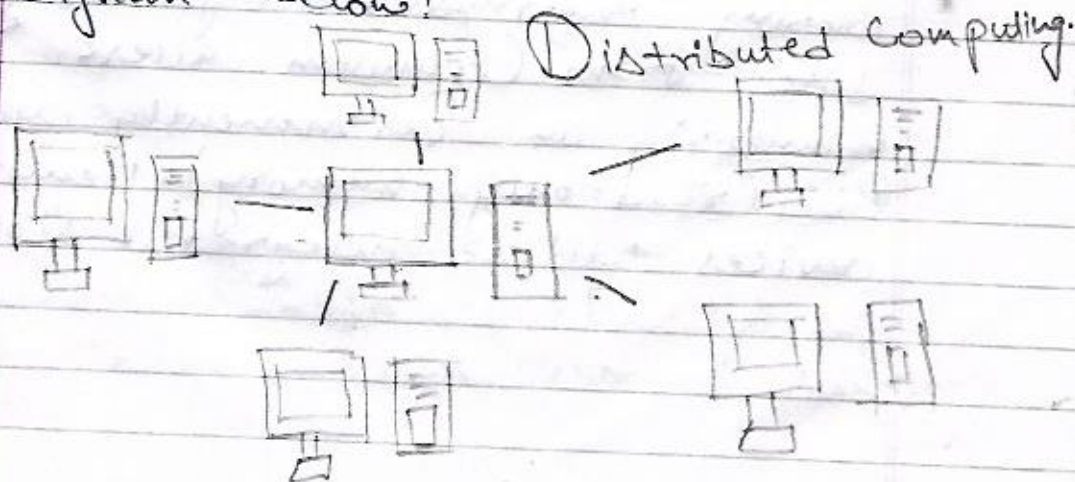
→ Mainframe Computers: Mainframe computers are very large often filling an entire room and can process thousands of millions of instruction per second. In a mainframe environment users connect to the mainframe through the many terminals wired to the mainframe. Mainframe are capable of supporting hundreds of thousands of user simultaneously. Some of the function performed by mainframe include flight scheduling reservation and ticketing for an airline etc.

→ Mini Computers: Mini computers are much smaller than mainframe

These Computers are also less expensive, sometimes referred to as Midrange Server or Midrange Computer, they are typically large, more powerful and more expensive than desktop Computers. Midrange Computers are usually used by small and medium sized business as their server. users connect to the server through a network by using desktop Computers.

→ MicroComputers, MicroComputers are the most frequently used type of Computer. Also known as Personal Computer (PC) a microComputer is small Computer system designed to be used by one person at a time.

→ Distributed Computers: It is a model in which components of a software system are shared among multiple computers to improve efficiency and performance. Acc. to the narrowest of definition, distributed computing is limited to programs with components shared among computers within a limited geographic area. In distributed computing each processor has its own private memory (distributed memory). Information is exchanged by passing message b/w the processors. It is shown in the diagram below!



→ Parallel Computation: It is a type of Computer in which many Calculation or the execution of process are carried out simultaneously. Large problems can often be divided into smaller one, which can be solve same time.

In Parallel Computing all process may have access a shared memory to exchange information b/w processors.

Computer Memory.

Computer memory is any physical device capable of storing information temporarily like Ram (Random access memory) or Permanently, like ROM (Read only memory). Memory devices utilize integrated circuit.

Random Access Memory (RAM):

- It is also called as read write memory or the main memory or the primary memory.
- The Programs and data that the CPU requires during execution of a Program are stored in this memory.
- It is volatile memory as the data losses when the power is turned off.
- Ram is further Classified into two types - SRAM (Static Random access memory) and DRAM (Dynamic Random access memory).

Read only Memory (ROM)

- Stores crucial information essential to operate the system like the program essential to boot the Computer.

- It is a not-volatile.
- Always retain its data.
- Used in embedded systems or where the programming needs to damage. change.
- Used in calculation and peripheral devices.
- ROM is classified 4 types- ROM, PROM, EPROM, EEPROM.

Types of Read only Memory (ROM).

1. PROM (Programmable read-only memory): It can be programmed by user. once programmed the data and instruction cannot be changed.
2. ~~EPROM~~ EPROM: (Erasable Programmable read only memory): It can be reprogrammed to erase data from it expose

it to ultra violet light. To reprogram it, erase all the previous data.

3. EEPROM (Electrically Erasable Programmable read only memory):
The data can be erased by applying electric field, no need of ultra violet light. We can erase only portions of chip.

SNo	RAM	ROM
1.	Temporary Storage	Permanent Storage
2.	Store data in MBs	Store data in GBs
3.	Used in normal operation	Used for startup of computer
4.	Volatile	Non-volatile
5.	Writing data is faster	Writing data is slower

Secondary Memory: Consist of all permanent or persistent storage devices, such as ROM, flash drives

hard disk drives (HDD), magnetic tapes etc.

Primary has a limited storage capacity and is volatile. Secondary memory overcomes this limitation by providing permanent storage of data and in bulk quantities. Secondary memory is also termed as external memory and refers to various storage media on which a computer can store data and programs. The secondary storage media can be fixed or removable. Fixed storage media is an internal storage medium like hard disk that is fixed inside the computer. Storage medium that are portable and can be taken outside the computer are termed as removable storage media.

Compact Disc Read only Memory:
A CD-ROM is a CD that can be read by Computer with an optical drive. The ROM part of the term means the data of disc is read-only or cannot be altered or erased. Because of this feature and their large capacity, CD-ROMs are a great media format for retail software.

Magnetic Storage Drives: Magnetic Storage is one of the most affordable ways to store large amount of data. Magnetic storage uses the two types of magnetic polarities to present the binary information consisting of zeros and ones. Commonly used device that use magnetic storage include magnetic tape, floppy disks and hard disk drives.

Magnetic media is coated with a magnetic layer which is magnetized in clockwise or anticlockwise direction. When the disk moves, the head interprets the data stored at a specific location in binary 1s and 0s at reading.

- **Floppy Disk:** A floppy disk is a flexible disk with a magnetic coating on it. It is packaged inside a protective plastic envelope. These are one of the oldest type of portable storage devices that could store up to 1.44 MB of data but now they are not used due to very less memory storage.
- **Hard disk:** A hard disk is one

or more circular disk called platters which are mounted on a common spindle. Each surface of platter is coated with a magnetic material. Both surface of each disk are capable of storing data except the top and bottom disk where only inner surface is used. The information is recorded on the surface of the rotating disk by a magnetic read/write heads. The heads are joined at a common arm k/as access arm.

USB: A universal serial bus (USB) is a common interface that enable communication b/w devices and a host controller such as a personal computer (PC). It connects peripheral devices such as digital cameras, mice,

Keyboard, printer, Scanner, mouse devices, external hard drives and flash drives.

Software

Software is a set of instructions used to operate computer and execute specific tasks.

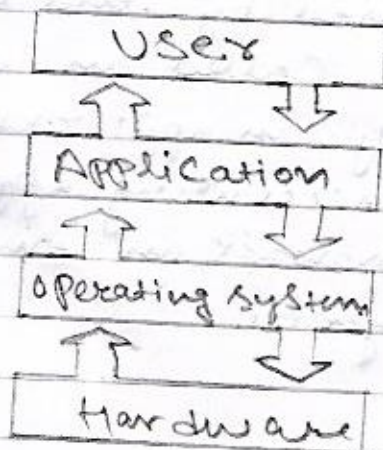
Types of S/W: The Software is used extensively for different purposes in several domains. It can be categorized into different types.

System Software: It is a type of software that is designed to run a computer hardware and application programs. Software like operating system, compilers, editors and drivers etc. come under this category. A computer

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cannot function with the presence of there. If we think of the Computer System as a layered model, the system software is interface b/w the hardware and user application.

Operating System (OS): operating system act as a manager of all resources of Computer i.e resource manager. It is system software that manages computer hardware and software resources and provide services. Thus operating system becomes a interface b/w user and machine.



Operating System Representation

Utility Programme: The programme analyze and maintain a Computer. These programmes are focused on how OS works on the basis it perform task to enable smooth functioning of Computer. This programme may come along with OS like windows defender, windows disk cleanup tool, Antivirus, Backup Software, files manager, disk Compression tool all are utility Software.

Application Software: It is Software Created for a specific purpose, used by end users. It can be called an application or simply an app. Example: word processor, accounting application, a web browser, an email client, media player etc.

Proprietary Software: It is a software that is owned by individual or a company (generally the one that developed it). There are almost always major restriction on its use, and its source code is almost kept secret. The proprietary software is a non-free computer software for which the software publishers or another person retains intellectual property rights - usually copyright of the source code. It is also known as closed-source software.

Overview of open source technology: open source technology is defined as the development of software for allowing end users and developers to not only see the source code of software, but modify it as well.

Open Source Software (OSS):

It is a type of computer software in which source code is released under a license in which the copyright holder grants under the right to study, change, and distribute the software to anyone and for any purpose. The Linux operating system (OS) is the best-known example of open source software technology.
