

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 Computer is often divided into generation. Each generation is characterized dramatic improvement over the previous generation in the technology used to build Computer in terms of the internal organization of Computer and programming language.

⇒ Five Generation of Computer

First Generation

Second Generation

Third Generation

Fourth Generation

Fifth Generation.

⇒ First Generation Vacuum Tubes (1940-1950)

The first Computer system used vacuum tubes for circuitry and magnetic drum for memory and were often enormous, taking up entire rooms. These Computer were very expensive to operate and in addition it used a great deal of electricity. The first Computer generated a lot of heat, which was often the cause of malfunction.

First generation Computer relied on machine language the lower-level programming language understood by Computer to perform operation and they could only solve one problem at a time. It would take operators

day or even weeks to set up a new problem. Input was based on punched cards and paper tape and output was displayed on printers.

The UNIVAC (Universal Automatic Computer) and ~~ENIAC~~ ENIAC (Electronic Numerical Integrator and Computer) 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: Trans (1956 - 1963)

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

The transistor was far superior to the vacuum tube, allowing computer to become smaller, faster, cheaper, more energy efficient and more reliable than their first-generation predecessors. Through the transistor still generated a great deal of heat that subjected the computer to damage. It was a vast improvement over the vacuum tube. Second generation computers still relied on punched cards for input and printers for output. Second-generation computers moved from cryptic machine language to symbolic, or assembly language.

⇒ Third Generation: Integrated Circuits (1964-1971)
The development of the Integrated Circuit was the hallmark of the third generation of Computer. Transistor were miniaturized and placed on silicon chips, called Semiconductors, which drastically increased the speed and efficiency of Computer. Instead of punched cards and printouts users integrated with third generation Computer through keyboards and monitors and interfaced with an operation system which allowed the device to run way many different application at one time with a central program that ~~not~~ monitored the memory. Computer for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.

⇒ Fourth Generation: Microprocessors (1971-present)
The microprocessor brought the fourth generation of Computer as through of integrated circuits were built onto a single silicon chip. What in the first generation filled an entire room could now fit on the palm of the hand. The Intel 4004 Chip development in 1971 located all the Computer of the Computer - from the unit and memory to input central on a single chip. In 1981 IBM introduced its first Computer for the home user and in 1984 Apple introduced the Macintosh. Microprocessor also moved out of the realm of desktop Computer and into many area of life as more

Everyday products began to use microprocessor. 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 Computer also saw the development of GUIs, the mouse and hand-held 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 and superconduction is helping to make artificial intelligence a reality.

Quantum Computer and molecular and nanotechnology will radically change the face of computer in years to come. The goal of fifth generation computing is to develop a device that responds to natural language input and is capable of learning and self-organization.

Characteristics of Computer

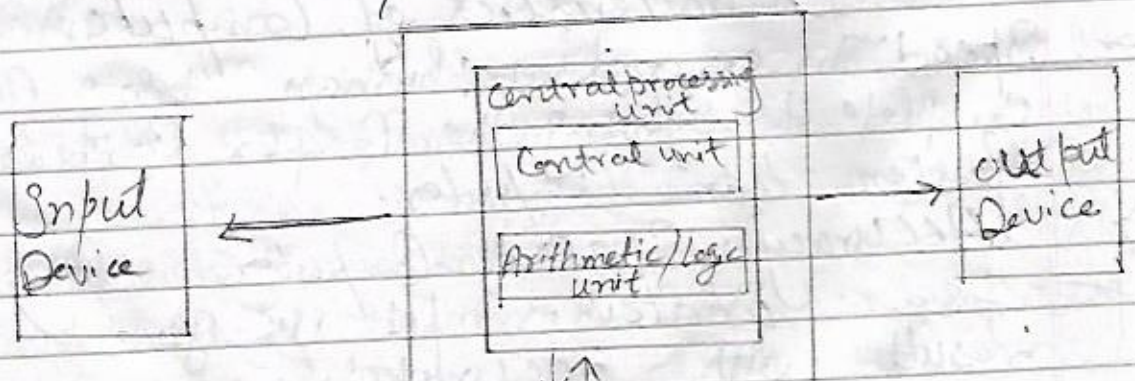
- **Speed:** In general, to human being, a computer is complete for solving the complex computation, faster than a computer.
- **Accuracy:** Since a computer is programmed so whatever input we give it gives a result with accuracy.

- Storage: Computer Can store mass storage of data with appropriate format.
- Dilligence: Computer Can work for hours without any break and creating error.
- Versatillity: 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 quattend (IQ): Computer does not work without instruction.
- No Feeling: Computer does not have emotion, knowledge, experience and felling.

Organization of Computer:

A Computer is a fast system that is organized to accept, store, and process data and produce out put result under the direction of a stored program of instruction. This section explain how a Computer System is organized.

Basic organization of Computer system Include, input, processing unit, Memory unit and out put device.



→ Input device: Computer system use many devices for input purpose. Input device include the mouse, input pen, touch screen, and microphone. Regardless of the type of device used all are component for interpretation and ~~comp.~~ communication between people and computer system.

→ Central Processing Unit (CPU): It is the brain of the computer without this unit computer unable to process.

→ Output device → Output device is used to show the result of the instruction. Example, monitor, printer, headphone etc.

→ Memory Unit: A Memory Unit is the collection of storage unit or device together. The memory unit store the binary information in the form of bits.

Classification of Computer:

Based on size and capacity, computer are classified as follow.

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

→ Super Computers: super computer are the most power full and physically the largest by size. These are system designed to process huge amount of data and the fastest super computer processor over one trillion calculation in a second. super computer have

thousand for process, because of their extraordinary speed, accuracy and processing power super computer are well suited for solved highly complex problem and performing tasks that demand huge amount of calculation.

→ Main Computer: Mainframe Computer are very large often filling an entire room and can process thousand of millions of instruction per second. In a mainframe environment user connect to the mainframe through the many terminal wired to the main frame. Mainframe are cable of supporting hundreds to thousand of user simultaneously. Some of the function performed by a mainframe include flight scheduling reservation and ticketing for an airline etc.

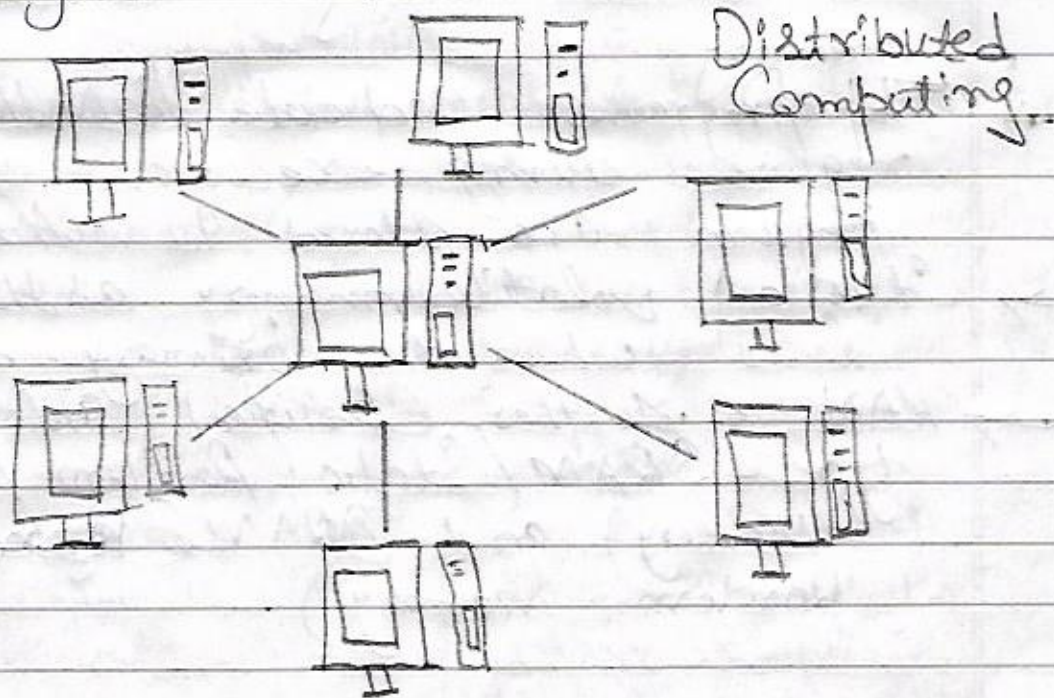
→ Mini Computer: Mini Computer are much smaller than mainframe. These computer are also less expensive. Some time referred to as midrange server or midrange computer, they are typically large more powerful and more expensive than desktop computer. Midrange computer are usually used by small and medium sized business as their server. Users connect to the server through a network by using desktop computer.

→ Micro Computer: micro computer are the small desktop computer used for individual tasks and applications.

Also known as personal Computer (PC), a micro Computer is a small Computer system designed to be used by one person at a time.

→ Distributed Computer: It is a model in which Component of a software system are shared among multiple Computer to improve efficiency and performance. According to the narrowest of definition distributed Computing is limited to programs with Component shared among Computer with in a limited geographic area.

In distributed Computing each processor each has it own private memory (distributed memory). Information is exchange by passing message between the processors. It is shown in the diagram below.



→ Parallel Computer: It is a type of Computation in which many calculation or the execution of processes are carried out simultaneously. Large problem can often be divided into smaller ones, which can then be solved at the same time.

In parallel computing all processor may have access to shared memory to exchange information between 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 device utilize Integrated Circuits.

Random Access Memory (RAM):

→ It is also called a read write memory or the main memory or the primary memory.

→ The programs and data that the CPU require during execution of a ~~program~~ program are stored in this memory.

→ It is a volatile memory as the data loses when the primary memory.

→ RAM is further classified into two type - SRAM (Static Random Access Memory) and DRAM (~~Random~~ Dynamic Random Memory).

- Read only Memory (ROM)
- Stores crucial information essential to operate the system, like the program essential to boot the Computer.
- It is not volatile.
- Used in embedded system or where the programming needs no change.
- Used in calculation and peripheral device.
- ROM is further classified into 4 type ROM, PROM, EPROM, and 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 in it cannot be changed.
2. EPROM (Erasable Programmable read only memory) - It can be reprogrammed. To erase data from it expose into Ultra violet light. To ~~reprogram~~ reprogram it erase all the previous data.
- 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 the chip.

S.No	RAM	ROM
1	Temporary Storage	Permanent Storage
2	Store data in MBs	Store data in GBs
3	Volatile	Non - Volatile
4	Used in normal operation	Used for start up process of Computer

→ Secondary Memory: Consists of all permanent or persistent storage device such as read-only memory (ROM), flash drive (HDD), magnetic tapes etc.

Primary memory has limited storage capacity and is volatile. Secondary memory overcomes this limitation by providing permanent storage of data and in bulk quantity. Secondary memory is also termed as external memory and refers to the various storage media on which a computer can store data and programs. The secondary storage media can be fixed or removable. Fixed storage media medium that are portable 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 a computer with an optical drive. The ROM part of the term means the data on the 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 uses the two types of magnetic polarities to represent the

Binary Information Consisting of zeros and ones. Commonly used devices that use magnetic storage include magnetic tape, floppy disk and hard-disk drive. 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 consists of one or more circular disks called platters which are both surface of each disk are capable of storing data except the top and bottom disk where disk by magnetic read/write heads. These heads are joined to a common arm known as access arm.

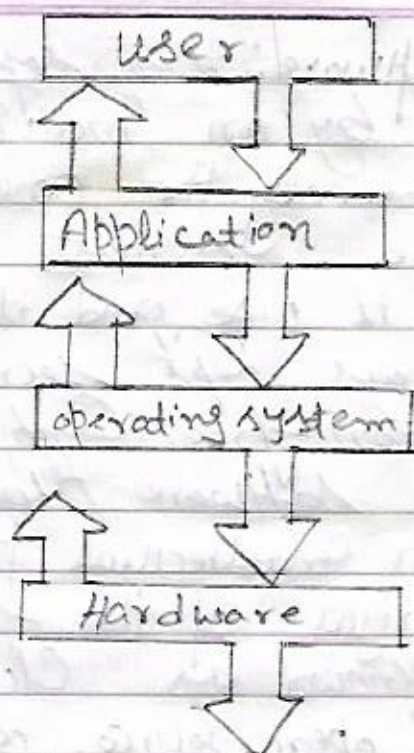
→ USB: A Universal Serial Bus (USB) is a common interface that enables communication between device and a host controller (PC). It connects peripheral devices such as digital camera, mice.

Keyboards, printer, scanner, media device, external hard drives and flash drives.

Software:

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

- Types of S/W: The software is used that is 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 cannot function without the presence of these. If we think of the computer system as a layered model, the system software is the interface between the hardware and user application.
- Operating System (OS): Operating system acts as a manager of all the resources of a computer i.e. resource manager. It is system software that manages computer hardware and software resources and provides services. Thus, the operating system becomes an interface between the user and the machine.



Operating System Representation.

- ⇒ Utility Programs: These programs analyze and maintain a Computer. These programs are focused on how OS works on that basis it performs tasks to enable smooth functioning of Computer. This program may come along with OS like window defender, window 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 software that is owned by an individual or a company (generally the one that developed) it there are almost always major restrictions on its use, and its source code is almost always kept secret. The proprietary software is a non-free computer software for which the software publisher or another person retain 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 user and development to not only see the source code of software, but modify it as well.

⇒ open-source: Software (OSS) is a type of computer software in which source code is released under a license in which the copyright holder grants users 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.