

COMPUTER SCIENCE

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ASSIGNMENT – 1

FUNDAMENTALS OF COMPUTER



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FUNDAMENTALS OF COMPUTER

Introduction to Computers:

- Computers are seen everywhere around us, in all spheres of life, in the field of education, research, travel and tourism, weather forecasting, social networking, e-commerce etc.
- Computers have revolutionised our lives with their accuracy and speed of performing a job, it is truly remarkable.
- Today, no organisation can function without a computer. In fact, various organisations have become paperless.

Generations of Computers:

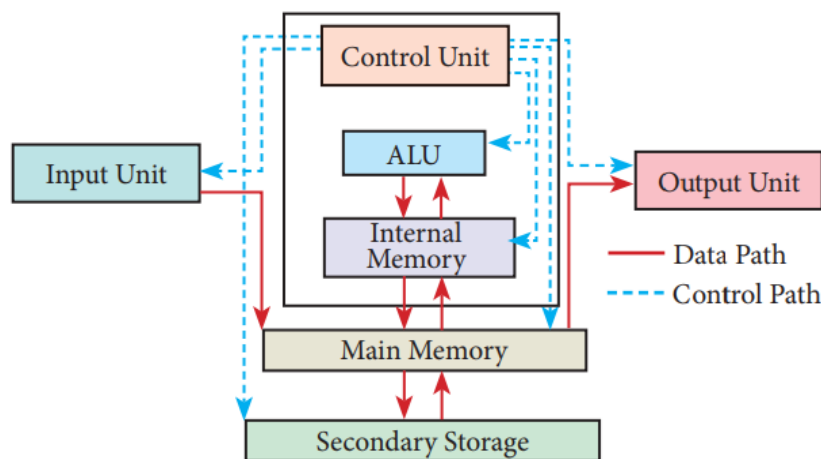
Generation	Period	Main Component used	Merits/Demerits
First Generation	1940-1956	Vacuum tubes	<ul style="list-style-type: none"> • Big in size. • Consumed more power. • Machine Language was used.
First Generation Computers - ENIAC , EDVAC , UNIVAC 1			
Second Generation	1956-1964	Transistors	<ul style="list-style-type: none"> • Smaller in size. • Generated Less Heat. • Consumed less power. • Punched cards were used. • First operating system was developed. • Machine language as well as Assembly language was used.
Second Generation Computers IBM 1401, IBM 1620, UNIVAC 1108			
Third Generation	1964 - 1971	Integrated Circuits (IC)	<ul style="list-style-type: none"> • Computers were smaller, faster and more reliable. • Consumed less power. • High Level Languages were used
Third Generation Computers IBM 360 series, Honeywell 6000 series			
Fourth Generation	1971-1980	Microprocessor Very Large Scale Integrated Circuits (VLSI)	<ul style="list-style-type: none"> • Smaller and Faster. • Microcomputer series such as IBM and APPLE were developed. • Portable Computers were introduced.
Fifth Generation	1980 - till date	Ultra Large Scale Integration (ULSI)	<ul style="list-style-type: none"> • Parallel Processing. • Computers size was drastically reduced. • Can recognise Images and Graphics. • Introduction of Artificial Intelligence and Expert Systems.
Sixth Generation	In future		<ul style="list-style-type: none"> • Parallel and Distributed computing. • Computers have become smarter, faster and smaller. • Development of robotics.

What is a computer?

- A Computer is an electronic device that processes the input according to the set of instructions provided to it and gives the desired output at a very fast rate.

Basic components of a computer:

- The computer is the combination of hardware and software.
- Hardware is the physical component of a computer like motherboard, memory devices, monitor, keyboard etc., while software is the set of programs or instructions.
- Every task given to a computer follows an Input- Process- Output Cycle (IPO cycle).



Input Unit:

- Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing.
Example: Keyboard, mouse, etc.

Central Processing Unit:

- CPU is the major component which interprets and executes software instructions.
- The CPU has three components which are Control unit, Arithmetic and logic unit (ALU) and Memory unit.
 - The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations.
 - The control unit controls the flow of data between the CPU, memory and I/O devices. It also controls the entire operation of a computer.

Output Unit:

- An Output Unit is any hardware component that conveys information to users in an understandable form.
Example: Monitor, Printer etc.

Memory Unit

- The Memory Unit is of two types which are primary memory and secondary memory.
 - The primary memory is used to temporarily store the programs and data when the instructions are ready to execute.
 - The secondary memory is used to store the data permanently.

Input Devices:

Keyboard:

- Keyboard is the most common input device used today. The individual keys for letters, numbers and special characters are collectively known as character keys.
- This keyboard layout is derived from the keyboard of original typewriter. The data and instructions are given as input to the computer by typing on the keyboard.

Mouse:

- Mouse is a pointing device used to control the movement of the cursor on the display screen. It can be used to select icons, menus, command buttons or activate something on a computer. Some mouse actions are move, click, double click, right click, drag and drop.
- Different types of mouse available are: Mechanical Mouse, Optical, Laser Mouse, Air Mouse, 3D Mouse, Tactile Mouse, Ergonomic Mouse and Gaming Mouse.

Output Devices:

Monitor:

- Monitor is the most commonly used output device to display the information. It looks like a TV. Pictures on a monitor are formed with picture elements called PIXELS.
- Monitors may either be Monochrome which display text or images in Black and White or can be color, which display results in multiple colors.

Printers:

- Printers are used to print the information on papers. Printers are divided into two main categories:
 - Impact Printers
 - Non Impact printers

Memory Devices:

- Computer memory is the storage space in the computer, where data and instructions are stored. There are two types of accessing methods to access (read or write) the memory.

Random-Access Memory (RAM)

- The main memory is otherwise called as **Random Access Memory**. This is available in computers in the form of Integrated Circuits (ICs). It is the place in a computer where the Operating System, Application Programs and the data in current use are kept temporarily so that they can be accessed by the computer's processor.

Read Only Memory (ROM)

- Read Only Memory refers to special memory in a computer with pre-recorded data at manufacturing time which cannot be modified. The stored programs that start the computer and perform diagnostics are available in ROMs. ROM stores critical programs such as the program that boots the computer. Once the data has been written onto a ROM chip, it cannot be modified or removed and can only be read.

Secondary Storage Devices:

- To store data and programs permanently, secondary storage devices are used. Secondary storage devices serve as a supportive storage to main memory and they are non-volatile in nature, secondary storage is also called as Backup storage.
- Some secondary storage devices are: **Hard Disks, Compact Disc (CD), Digital Versatile Disc (DVD), Flash Memory Devices, Blu-Ray Disc**

Booting of computer:

- An Operating system (OS) is a basic software that makes the computer to work. When a computer is switched on, there is no information in its RAM. At the same time, in ROM, the pre-written program called POST (Power on Self Test) will be executed first. This program checks if the devices like RAM, keyboard, etc., are connected properly and ready to operate. If these devices are ready, then the BIOS (Basic Input Output System) gets executed. This process is called Booting.
- Booting process is of two types.
 - Cold Booting
 - Warm Booting

Data Representations:

- Computer handles data in the form of '0' (Zero) and '1' (One). Any kind of data like number, alphabet, special character should be converted to '0' or '1' which can be understood by the Computer. '0' and '1' that the Computer can understand is called **Machine language**. '0' or '1' are called '**Binary Digits**' (BIT).
- A **nibble** is a collection of 4 bits (Binary digits).
- A collection of 8 bits is called **Byte**. A byte is considered as the basic unit of measuring the memory size in the computer.
- **Word length** refers to the number of bits processed by a Computer's CPU.

Computer Organisation:

- Computer organisation deals with the hardware components of a computer system. It includes Input / Output devices, the Central Processing Unit, storage devices and primary memory. It is concerned with how the various components of computer hardware operate. It also deals with how they are interconnected to implement an architectural specification.
- The term computer organisation looks similar to the term computer architecture. But, computer architecture deals with the engineering considerations involved in designing a computer. On the other hand, Computer Organisation deals with the hardware components that are transparent to the programmer.

Basics of Microprocessors:

- The CPU is the major component of a computer, which performs all tasks. This is realized by the microprocessor which is an Integrated Circuit. Microprocessors were first introduced in early 1970s.
- A Microprocessor's performance depends on the following characteristics:
 - a) Clock speed
 - b) Instruction set
 - c) Word size

Ports and Interfaces:

- The Motherboard of a computer has many I/O sockets that are connected to the ports and interfaces found on the rear side of a computer. The external devices can be connected to the ports and interfaces. The various types of ports are given below:
 - Serial Port * Parallel Port * USB Ports * USB 3.0
 - VGA Connector * Audio Plugs * PS/2 Port * SCSI Port
 - High Definition Multimedia Interface (HDMI)



EDUCATION is the
MOST POWERFUL WEAPON
..... which you can use to
CHANGE THE WORLD.



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