

## ATOM TO BYTE : MODULE 1 (INTRODUCTION TO COMPUTERS)

### What is a computer ?

A computer is an electronic device, operating under the control of instructions stored in its own memory that can accept data (input), process the data according to specified rules, produce information (output), and store the information for future use.

### What is DATA and INFORMATION?

Data is just a collection of some records either in graphs, statistical manner. It is raw, means it is non-processed aspect.

When a data is processed using certain set of rules or when operations are performed on data, it becomes information. It is not raw because it is the processed aspect.



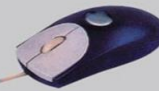











### What is input and output in computer?

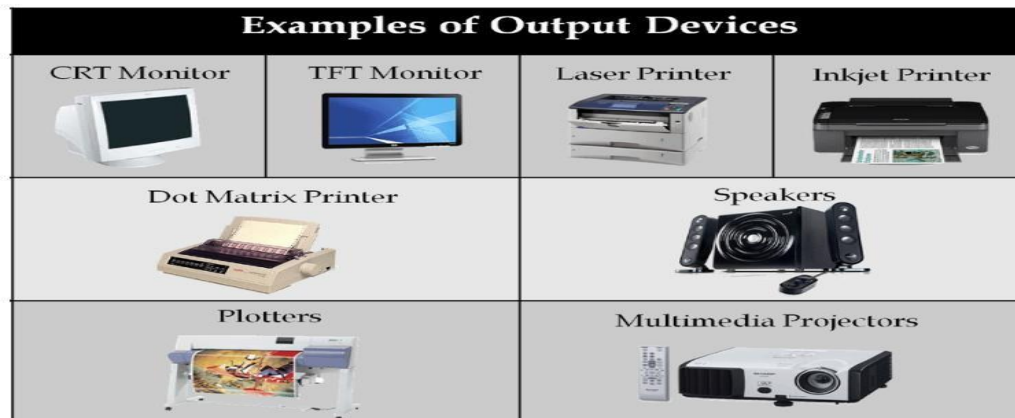
- Input: Any instruction given to the computer is called input. A device which is used to give input to the computer is called input device.

Examples :

1. Typing a sentence in computer using keyboard. Here, the user gives instruction to the computer by typing keys to input the alphabets. Keyboard is a input device.
2. Clicking a folder to open in computer using mouse. Here, the user gives instruction to the user by clicking the buttons on mouse. Mouse is a input device.

Examples of Manual Input Devices			
Keyboard 	Numeric Keypad 	Pointing Device 	Remote Control 
Joystick 	Touch Screen 	Scanner 	Graphics Tablet 
Microphone 	Digital Camera 	Webcams 	Light Pens 

- **Output:** The processed instruction given out by the computer as a result of the input to the computer is called output. A device which is used to give output from the computer is called output device.



1. Monitor	2. LCD Projection Panels
3. Printers (all types)	4. Computer Output Microfilm (COM)
5. Plotters	6. Speaker(s)
7. Projector	Find out some yourself!

Examples :

1. Watching movie on a computer. The screen, also called as Monitor or VDU(Visual Display Unit) is used to watch films, movies and also to play games. Here, the monitor is output device which displays the various icons, movies, etc.
2. We use printer to get print on paper. Here, printer is an output device because it gives us output in terms of paper from the computer.

### Why use computers?

Computers are important to use because

1. It is faster than humans. You may take time to add three 5-digits numbers, but computer can do it in seconds.
2. It is more reliable than human memory. You may forget things after a while but computers donot forget things. They hold it in their memory for a very long time.
3. Everything and everywhere are computers being used, be it schools, hospitals or offices. This world is growing on computers at a very fast rate. So to keep up with the trend in the future, we need to learn computers.
4. There are many more uses of computers, explore them yourselves and write it down. Think of the possibilities.

### Components Of Computer

The components of computers are :

1. Hardware
2. Software

- **Hardware :**

Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware refers to the physical parts or components of a computer such as the monitor, mouse, keyboard, computer data storage, hard drive disk (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), etc. all of which are physical objects that can be touched.

### **Central Processing Unit (CPU)**

A CPU is brain of a computer. It is responsible for all functions and processes. Regarding computing power, the CPU is the most important element of a computer system.

The CPU is comprised of three main parts :

- \* *Arithmetic Logic Unit (ALU)*: Executes all arithmetic and logical operations. Arithmetic calculations like as addition, subtraction, multiplication and division. Logical operation like compare numbers, letters, or special characters
- \* *Control Unit (CU)*: controls and co-ordinates computer components.
  1. Read the code for the next instruction to be executed.
  2. Increment the program counter so it points to the next instruction.
  3. Read whatever data the instruction requires from cells in memory.
  4. Provide the necessary data to an ALU or register.
  5. If the instruction requires an ALU or specialized hardware to complete, instruct the hardware to perform the requested operation.
- \* *Registers* :Stores the data that is to be executed next, "very fast storage area".

### **Primary Memory:-**

1. RAM: Random Access Memory (RAM) is a memory scheme within the computer system responsible for storing data on a temporary basis, so that it can be promptly accessed by the processor as and when needed. It is volatile in nature, which means that data will be erased once supply to the storage device is turned off. RAM stores data randomly and the processor accesses these data randomly from the RAM storage. 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.
2. ROM (Read Only Memory): ROM is a permanent form of storage. ROM stays active regardless of whether power supply to it is turned on or off. ROM devices do not allow data stored on them to be modified.

### **Secondary Memory:-**

Stores data and programs permanently :its retained after the power is turned off

1. **Hard drive (HD):** A hard disk is part of a unit, often called a "disk drive," "hard drive," or "hard disk drive," that store and provides relatively quick access to large amounts of data on an electromagnetically charged surface or set of surfaces.
2. **Optical Disk:** an optical disc drive (ODD) is a disk drive that uses laser light as part of the process of reading or writing data to or from optical discs. Some drives can only read from discs, but recent drives are commonly both readers and recorders, also called burners or writers. Compact discs, DVDs, and Blu-ray discs are common types of optical media which can be read and recorded by such drives. Optical drive is the generic name; drives are usually described as "CD" "DVD", or "Bluray", followed by "drive", "writer", etc. There are three main types of optical media: CD, DVD, and Blu-ray disc. CDs can store up to 700 megabytes (MB) of data and DVDs can store up to 8.4 GB of data. Blu-ray discs, which are the newest type of optical media, can store up to 50 GB of data. This storage capacity is a clear advantage over the floppy disk storage media (a magnetic media), which only has a capacity of 1.44 MB.

### 3. Flash Disk

A storage module made of flash memory chips. A Flash disks have no mechanical platters or access arms, but the term "disk" is used because the data are accessed as if they were on a hard drive. The disk storage structure is emulated.

Comparison between Main memory (RAM) and Secondary Memory (Hard disk)

<b>RAM</b>	<b>Hard Disk (Hard Drive)</b>
Memory	Storage
Smaller amount (typically 500 MB-6 GB)	Much larger amount (typically 80GB to 1000 GB)
Temporary storage of files and programs	Permanent storage of files and programs
A little like your real desktop - has only your current work on it (which could be ruined by a spill of Coke or coffee!)	Like a file cabinet - has long-term storage of work (it's safe from spills!)
Contents disappear when you turn off power to the computer and when the computer crashes	Contents remain when you turn off the power to the computer (they don't disappear unless you purposely delete them), and when the computer crashes
Consists of chips (microprocessors)	Consists of hard disks (platters)
When you want to use a program, a temporary copy is put into RAM and that's the copy you use	Holds the original copy of the program permanently

- **Software :**

Software is a generic term for organized collections of computer data and instructions, often broken into two major categories: system software that provides the basic non- task-specific functions of the computer, and application software which is used by users to accomplish specific tasks.

#### Software Types

- A. System software is responsible for controlling, integrating, and managing the individual hardware components of a computer system so that other software and the users of the system see it as a

functional unit without having to be concerned with the low-level details such as transferring data from memory to disk, or rendering text onto a display. Generally, system software consists of an operating system and some fundamental utilities such as disk formatters, file managers, display managers, text editors, user authentication (login) and management tools, and networking and device control software.

- B.** Application software is used to accomplish specific tasks other than just running the computer system. Application software may consist of a single program, such as an image viewer; a small collection of programs (often called a software package) that work closely together to accomplish a task, such as a spreadsheet or text processing system; a larger collection (often called a software suite) of related but independent programs and packages that have a common user interface or shared data format, such as Microsoft Office, which consists of closely integrated word processor, spreadsheet, database, etc.; or a software system, such as a database management system, which is a collection of fundamental programs that may provide some service to a variety of other independent applications.

#### Comparison Application Software and System Software

	System Software	Application Software
	Computer software, or just software is a general term primarily used for digitally stored data such as computer programs and other kinds of information read and written by computers. App comes under computer software though it has a wide scope now.	Application software, also known as an application or an "app", is computer software designed to help the user to perform specific tasks.
Example:	1) Microsoft Windows 2) Linux 3) Unix 4) Mac OSX 5) DOS	1) Opera (Web Browser) 2) Microsoft Word (Word Processing) 3) Microsoft Excel (Spreadsheet software) 4) MySQL (Database Software) 5) Microsoft PowerPoint (Presentation Software) 6) Adobe Photoshop (Graphics Software)
Interaction:	Generally, users do not interact with system software as it works in the background.	Users always interact with application software while doing different activities.
Dependency:	System software can run independently of the application software.	Application software cannot run without the presence of the system software.

### 3. How does a computer look like?

