

Introduction Computer Systems

Computer Hardware

Lecture 3

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Computer hardware refers to the physical components of a computer that you can see and touch. These components work together to process input and deliver output based on user instructions

- **What is a Computer Hardware**

Computer hardware is a physical device of computers that we can see and touch. E.g. Monitor, Central Processing Unit, Mouse, Joystick, etc. Using these devices, we can control computer operations like input and output.

Computer Hardware Parts

These hardware components are further divided into the following categories, which are:

- **Input Devices**
- **Output Devices**
- **Storage Devices**
- **Hardware Components**

- **Input Devices**

Input devices allow users to interact with a computer by entering data or commands. These devices convert the input into a format that the computer can process.

Keyboard: The most widely used input device, featuring 104 keys, including alphabetic, numeric, and function keys. Modern keyboards connect via Bluetooth, replacing traditional wired connections.

- **Mouse:** A pointing device that controls the cursor on the screen. It features left, right, and middle buttons for selection and interaction. The sensor inside the mouse detects its movement speed, adjusting the cursor accordingly.
- **Scanner:** Scans documents, images, and other media, converting them into digital formats for editing or processing.
- **Trackball:** A stationary pointing device with a ball that the user rotates to control the cursor, requiring less space than a traditional mouse.

Light Pen: A light-sensitive pen used to draw or select objects on a CRT screen by detecting raster patterns, offering a direct interaction with the display.

- **Microphone:** Converts sound into electrical signals. It captures voice input for speech recognition and voice commands on the computer.
- **Optical Character Reader (OCR):** Scans printed or handwritten text, converting it into digital data by detecting reflected light from the characters, similar to a scanner.
- **Bar Code Reader:** Reads bar codes and converts them into digital data for processing. The bar code consists of light and dark lines that encode information.

Output Devices

Output devices display the results of tasks given to the computer in a human-readable form. Let's discuss some common output devices:

- **Monitor:** The main output device. It is also called VDU (visual display unit) and it looks like a TV screen. The Monitor displays the information from the computer. It is used to display text, video, images, etc.
- **Printer:** A printer is an output device that transfers data from the computer in a printed format by using text or images on paper. There are both coloured and black & white printers. Further, there are also different types of printers, like Laser Printer, Dot-matrix printers, and Inkjet printers.

- **Plotter:** It is similar to a printer but plotters are large. A plotter is used to generate large drawings, architectural blueprints, etc. on paper and these are high-quality images and drawings and large.
- **Speakers:** It is a very common output device and it gives sound as an output. The speaker is generally used to play music or anything having sound.

Storage Devices

Some devices are used for storage purposes and are known as secondary storage devices. Some of them are discussed below

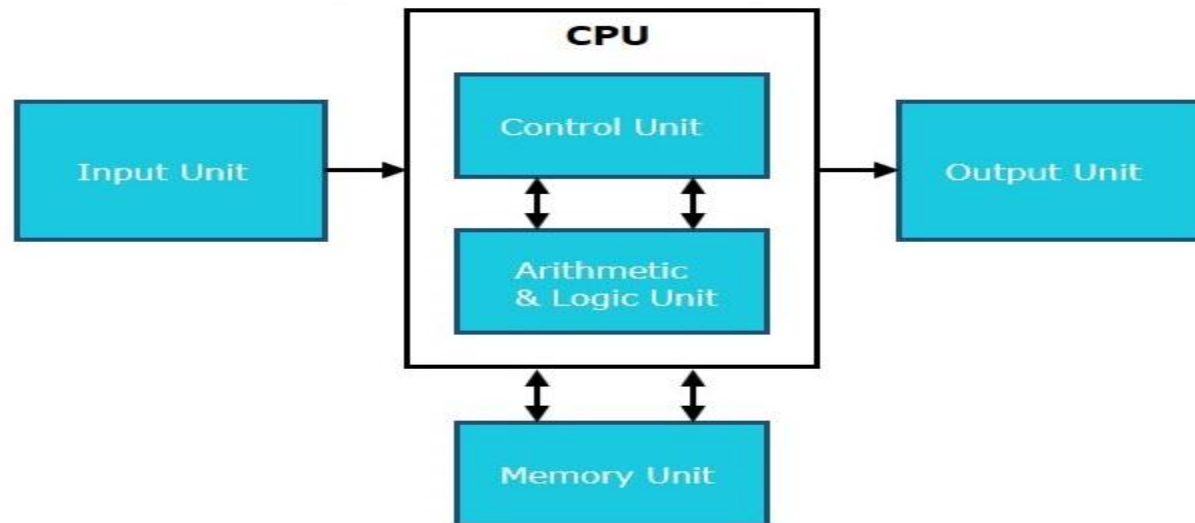
- **1. CD (Compact disc).**
- **2. DVD (Digital Video/Versatile Disc).**
- **3. Hard Disk.**

Hardware Components

Some important hardware devices known as the internal components are discussed below:

1. CPU (Central Processing Unit)

The CPU is also known as the heart of the computer. It consists of three units, generally known as the control unit, the Arithmetic Logical Unit (ALU), and the memory unit. Below is the block diagram of the CPU is given:



- As shown in the diagram input is given to the CPU through input devices. This input goes to memory and the control unit gets instructions from memory. The control unit now decides what to do with the input or instructions and transfers it to ALU. Now, ALU performs various operations like addition, subtraction, multiplication, division, logical operations, etc. After that, the final result gets stored in memory and finally passed to output devices to give the output. So, this is how the CPU works.
- **2. Motherboard**
- It is the main circuit board inside a computer and it contains most of the electronic components together. All the components of the computer are directly or indirectly connected to the motherboard. It includes RAM slots, controllers, system chipsets, etc.

3. RAM (Random Access Memory)

It is also known as temporary or volatile memory. It holds the program and data, which are currently in process or processing. All the data is erased as soon as the computer is turned off or in case of a power failure. Data stored in this memory can be changed.

4. Video Graphics Array Port

A video input commonly used on computer monitors is called a video graphics array (VGA) port. Verifying that there isn't a loose connection, a damaged cable, or a broken display is one step in troubleshooting a VGA port. Compressed air can also be sprayed inside the VGA port by a computer expert to make sure it's dust-free.

5. Power Supply

All of a computer system's parts are powered by a power source.

Typically, a power cord is used to connect a computer tower to an electrical outlet. By turning off the computer, unplugging and separating the power supply cord, or trying a different cord or socket.

6. Cooling Fan

A computer's system to prevent overheating uses cooling fans. To aid customers who use their computers intensively, such as when streaming video or playing games, many computers contain more than one cooling fan. If a user detects their computer overheating, a computer expert might need to repair the cooling fan. The blades may be examined for any damage and cleared of any foreign objects.

7. Hard Drive

On a computer system, files, programs, and other types of information are stored on hard drives, which are data storage devices. They utilise hard drives, which are magnetically coated discs used to store digital versions of information.