

# Identify Hardware Components

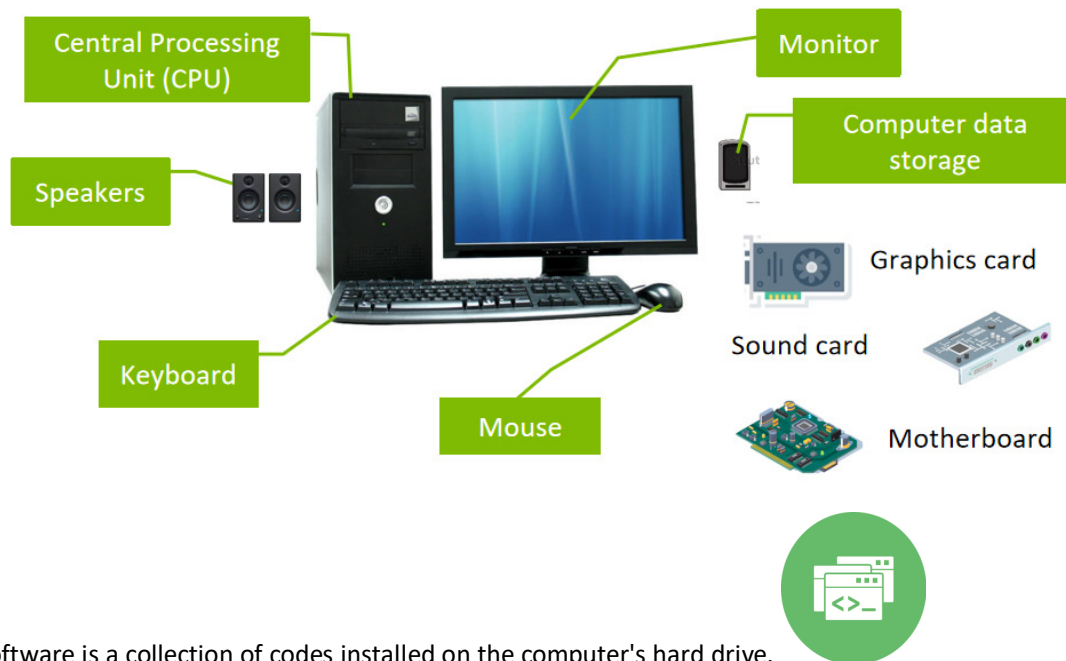
## Session: Identify Hardware Components of a Computer

Have you seen a computer without a CPU or keyboard or monitor? What happens if a device or component of a computer is missing? How do you identify the required component?

List the hardware components of the computer.

### Components of Computer

Hardware is any physical device used in or with the machine, such as:





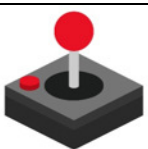



Software is a collection of codes installed on the computer's hard drive.

Hardware is typically directed by the software to execute any command or instruction.

A combination of hardware and software forms a usable computing system, although other systems exist with only hardware.

### Hardware Components of a Computer

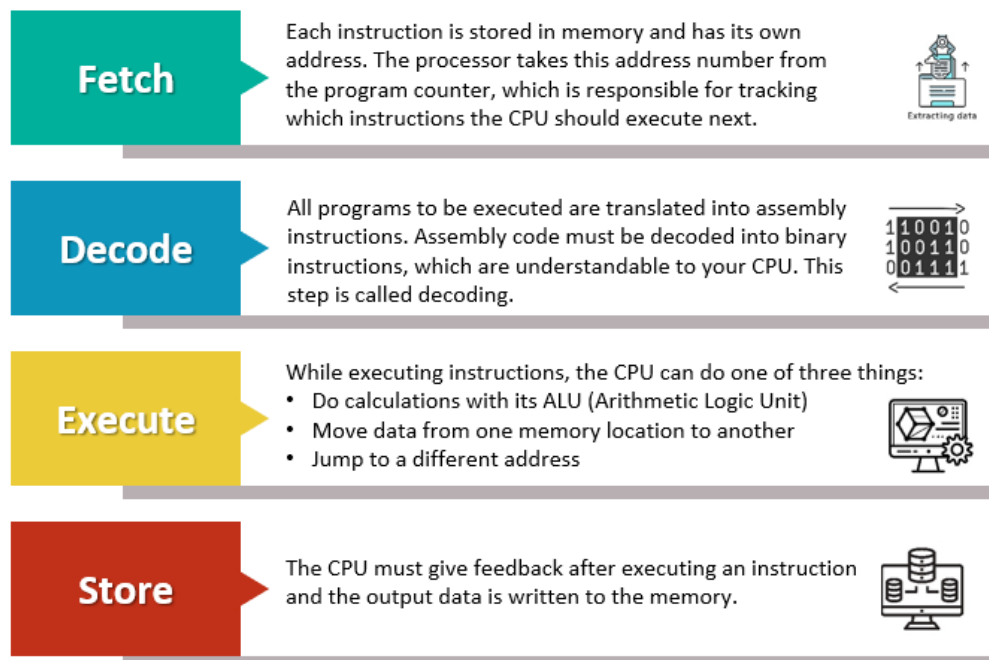
<b>Keyboard</b>		<ul style="list-style-type: none"> <li>Most commonly used input device to enter data by pressing of keys.</li> <li>A keyboard can be connected to a computer either by USB (wired) or Bluetooth (wireless).</li> </ul>
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<b>Mouse</b>		<ul style="list-style-type: none"> <li>Simplest handheld device used to move a cursor or pointer across the screen.</li> <li>It is normally used on a flat surface and has two buttons – right and left and a scroll wheel in the centre.</li> </ul>
<b>Joystick</b>		<ul style="list-style-type: none"> <li>It is a pointing device similar to a mouse.</li> <li>It has a handle with a spherical ball at upper and lower ends.</li> <li>The movement of the joystick controls the cursor or pointer on the screen.</li> <li>It can move in all the four directions and enables the user to easily control the cursor movement.</li> </ul>
<b>Light Pen</b>		<ul style="list-style-type: none"> <li>It is also a pointing device that looks like a pen.</li> <li>It is a light-sensitive device used to draw or write on the screen.</li> </ul>
<b>Touch Screen</b>		<ul style="list-style-type: none"> <li>It allows users to select, swipe, drag, tap and do many other things by simply touching the screen with fingers or stylus.</li> </ul>
<b>Microphone</b>		<ul style="list-style-type: none"> <li>It is an input device to transfer sound into the computer.</li> <li>Microphones are used for adding sound to the presentation, gaming, chatting, voice recognition, etc.</li> </ul>
<b>Scanner</b>		<ul style="list-style-type: none"> <li>It is an input device, which reads an image or character from a hard copy document and converts it into a digital file (pdf).</li> <li>Optical character recognition techniques are used in scanners to convert images into digital files.</li> <li>The digital image can be saved, edited, printed and also can be shared via email.</li> </ul>
<b>Magnetic Ink Character Reader (MICR)</b>		<ul style="list-style-type: none"> <li>It is a device which can recognise the characters or details on documents that are printed with a special magnetic ink.</li> <li>It is mainly used in banks because it can process a large number of cheques within minutes with accuracy and is practically tamperproof.</li> </ul>
<b>Optical Character Reader (OCR)</b>		<ul style="list-style-type: none"> <li>It is a technology capable of reading handwritten or printed text on documents and converts them into digitised text or electronic files (pdf).</li> <li>OCR copies the details using a scanner and the inbuilt software converts the document into a two-colour black and white bitmap version.</li> </ul>
<b>Barcode Reader (BR)</b>		<ul style="list-style-type: none"> <li>It is an automatic input device that uses visible red light to scan or 'read' the barcode.</li> <li>The reflected light is translated into an analog signal that is decoded by the computer to identify the product details from the database.</li> </ul>
<b>Webcam</b>		<ul style="list-style-type: none"> <li>A webcam is a hardware input device, which is</li> </ul>

		<p>either connected to the computer by a USB or inbuilt in laptops and is capable of taking still pictures or motion videos of the user or an object in front of it.</p> <ul style="list-style-type: none"> <li>The photos taken are of compact digital type, which can be uploaded or used over the internet.</li> </ul>
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### Central Processing Unit (CPU) and its Functions

The CPU processes instructions it receives in the process of decoding data. In processing this data, the CPU performs four basic steps:



### Memory types - Primary and Secondary

#### Primary memory

- Is the main memory of the computer system
- Accessing data from primary memory is faster because it is internal memory of the computer.
- The primary memory is most volatile. This means data in primary memory will not exist if it is not saved when a power failure occurs.



#### Secondary memory

- It is non-volatile. This means that it retains its data with or without electrical power.
- It is used to store "permanent data," such as the operating system, applications and user files.







### What happens if you run out of storage in a computer?





- Computer will start to work less efficiently as it will start to use the hard drive space for "virtual memory" to compensate.
- If the computer runs out of virtual memory and no programs crash any more, the operating system will start killing programs one by one until enough memory is available.
- Usually, background programs are the first to go. But if the low memory situation continues, the currently active program will also be closed.
- Once all things are gone and there still is no enough memory, the operating system will shutdown with an 'out of memory' error.

#### Measures:

- Clear RAM at regular intervals
- Upgrade RAM to higher capacity and increase the hard disk space
- Delete unwanted data at regular intervals

### Function of Output Devices

<b>Monitor</b>		<ul style="list-style-type: none"> <li>• A monitor displays data from a computer on a screen so the user can interact with the data via a digital interface.</li> </ul>
<b>Printer</b>		<ul style="list-style-type: none"> <li>• The function of a printer is to create a copy of whatever is sent from the computer to the printer. Printers take electronic data sent from a computer and generate a hard copy.</li> </ul>
<b>Headphones</b>		<ul style="list-style-type: none"> <li>• Headphones output audio from a computer through two individual headphones for a single listener.</li> </ul>
<b>Computer Speakers</b>		<ul style="list-style-type: none"> <li>• Computer speakers are hardware devices that transform the signal from the computer's sound card into audio. Speakers create sound using internal amplifiers that vibrate at different frequencies according to data from the computer. This produces sound.</li> </ul>

<b>Projector</b>		<ul style="list-style-type: none"> <li>This output device "projects" computer images or video on a wall or screen.</li> </ul>
<b>GPS</b>		<ul style="list-style-type: none"> <li>GPS is a radio-based navigation system that is composed of a sender computer and a receiver.</li> <li>The sender broadcasts signals to 24 satellites that ping to the sender the exact location of the sender computer in the form of latitude and longitude coordinates.</li> <li>The satellites use microwave signals to "talk" to the GPS, giving information on location, vehicle speed and a number of other pieces of data.</li> </ul>
<b>Sound Card</b>		<ul style="list-style-type: none"> <li>The sound card controls the output of sound signals, enabling devices like speakers and headphones to work.</li> <li>The sound card is known as an expansion card, which means it can be added to the motherboard.</li> <li>Although a sound card is not essential to a computer's basic functionality, you need one if you wish to play games, watch movies, listen to music and use audio and video conferencing.</li> </ul>
<b>Video Card</b>		<ul style="list-style-type: none"> <li>As with the sound card, the video card is an expansion card that slots into the motherboard.</li> <li>The video card processes images and video, enabling visuals to be seen on a display.</li> <li>Most computers have basic video and graphics capabilities built into the computer's motherboard, but for faster, more detailed graphics, a video card is required.</li> </ul>

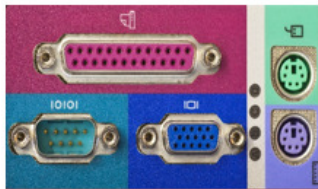
### Ports Connected to Output Devices

A computer port is an interface or a point of connection between the computer and its peripheral devices.

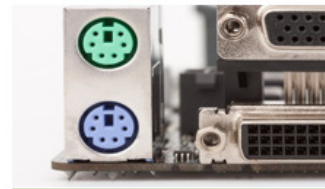
Different types of ports are:



**Serial ports**



**Parallel ports**



**PS/2 ports**



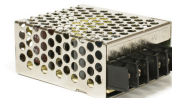
**Universal serial bus ports**



**VGA ports**

### Switched-Mode Power Supply

- An electronic power supply that incorporates a switching regulator to convert electrical power efficiently.
- It transfers power from a DC or AC source to DC loads, such as a personal computer, while converting voltage and current characteristics.



What if one or more components are missing or become faulty in a computer?

- Understanding that your computer has a hardware problem is just the first step.
- If you are dealing with a hardware issue and not a software issue, the next step is determining what hardware problem the computer is having.
- If you have purchased a laptop or pre-built desktop PC and it is still under warranty, you don't need to worry about these issues. Have the manufacturer fix the PC for you — figuring it out is their problem.
- If you have built your own PC or you want to fix a computer that is out of warranty, then you need to do something on your own. The following are a few basics that can be checked:
  - ❖ Blue Screen 101: Search for the error message
  - ❖ Check hard drive SMART status
  - ❖ Test the RAM
  - ❖ Check heat levels

- ❖ Stress test the CPU
- ❖ Stress test the Graphics Card
- ❖ Swap it out

### Activity

Match the components with its description.

Component		Description
Mouse		It is used to store "permanent data," such as the operating system, applications, and user files.
Light pen		It takes electronic data sent from a computer and generate a hard copy.
Secondary memory		It projects computer images or video on a wall or screen.
Printer		It is normally used on a flat surface and has two buttons – right and left and a scroll wheel in the center.
Projector		It is a light-sensitive device used to draw or write on the screen.

### Key Learning Outcomes

- Hardware is any physical device used in or with a computer. Software is a collection of codes installed on the computer's hard drive.
- A few input devices are:
  - Keyboard
  - Mouse
  - Touch screen
  - Barcode reader
  - Scanner
- A few output devices are:
  - Monitor
  - Computer speakers
  - Printer
  - Projector
  - Headphones
- Switched-mode power supply transfers power from a DC or AC source to DC loads, such as a personal computer, while converting voltage and current characteristics.