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IT Teacher



**CHAPTER
2.1**

COMPUTER HARDWARE



HARDWARE (H/W)

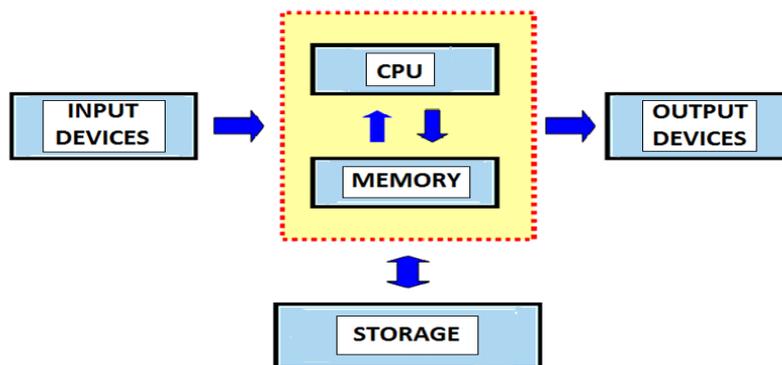
All the physical components of a computer system, all the mechanical and electronic elements of a computer, all the parts we can see and touch e.g. devices, components, cables, circuits etc. are called hardware.

In order for each computer to be able to function as a **computing system** a number of units are connected and communicate with each other in order for each of the components to work together.



COMPUTING SYSTEM

INPUT DEVICES	CENTRAL UNIT	STORAGE DEVICES	OUTPUT DEVICES
Keyboard Mouse Scanner Microphone Digital Camera Web Camera Light Pen Joystick	Microprocessor (CPU) Memory (Ram) Motherboard	<u>Magnetic Devices</u> Hard Disk Floppy Disk <u>Optical Devices</u> Cd-Rom, Cd-R, Cd-Rw Dvd-Rom, Dvd-R <u>Other Devices</u> Memory Sticks, Flash USB	Monitor Printer Speakers Plotter



KEYBOARD

- Data input in text format (characters).
- The most common type is **QWERTY**.
- It contains alphanumeric and command keys which facilitate the navigation in a computer.
- Special buttons: **Enter, Shift, Del, Ctrl, Alt, F1-F12** etc.



QWERTY KEYBOARD

~	Q	W	E	R	T	Y	U	I	O	P	~	Delete
Tab	A	S	D	F	G	H	J	K	L	;	'	Enter
Shift	Z	X	C	V	B	N	M	,	.	/	Shift	
Ctrl	Alt							Alt	Ctrl			

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MOUSE

- A **mouse** is a pointing device that functions by detecting two-dimensional motion relative to its supporting surface.
- A **mouse** commands the computer by selecting some features in the display with the help of a cursor.
- A **mouse** is the most necessary device in a GUI environment.
- A **mouse** contains two buttons and a scroll wheel (a third button) to navigate on the screen.
- Mouse Types: **Trackball, Optical & Laser, Wireless**



SCANNER

- A **scanner** is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image.
- A **scanner** usually has an **OCR** program (optical character recognition) for recognizing text and transforming it into graphics.
- Scanner Types: **Flatbed** with high resolution and low speed
Handheld with low resolution and high speed



MICROPHONE

- A **microphone** is an acoustic-to-electric device that converts sound into an electrical signal.
- The process of voice digitalization is called **sampling**.



DIGITAL CAMERA

- A digital camera is a video camera which feeds its images in real time to a computer.
- A digital camera permits computer to act as a videophone in a teleconference service.
- It connects to computer with USB/Ethernet cable or wirelessly with Wi-Fi.



MONITOR (Screen – Display)

- A monitor is a screen that displays the output of a computer.
- Basic features of a monitor are: **size**, **colors**, **resolution**, **refresh rate**, **radiation**, **response time**.
- The display consists of many small bright dots called **pixels**.
- **Size** is expressed in inches diagonally e.g. 13", 14", 15", 17", 19", 21", 22".
- **Resolution** is the number of pixels in two dimensions e.g. 1024x768, 1280x1024.
- **Refresh rate** is the number of times/second that a display is illuminated e.g. 85Hz, 100Hz.
- **Response time** is the time a pixel in a monitor takes to go from active to inactive and back to active again, measured in msec (10^{-3} sec).
- Types: **CRT** (Cathode Ray Tubes) and **LCD/TFT** (Liquid Crystal Display), **LED** (Light Emitting Diodes).



PRINTER

- A printer is a peripheral which produces a text or graphics of documents stored in electronic form, usually on physical print media such as paper or transparencies.
- The printing speed is measured in **ppm** (pages per minute).
- The printing quality (resolution) is measured in **dpi** (dots per inch).
- Types: **Dot-Matrix** low resolution and speed (for invoices & receipts)
Inkjet high resolution and speed (for documents, images, transparencies)
LaserJet best resolution and speed, but more expensive (for documents, pictures, graphics)
- Dot-Matrix and Inkjet are line printers, whereas LaserJet are page printers.



SPEAKERS

- Speakers are audio devices that manage computer audio output.
- External speakers improve the low fidelity of built-in speakers.
- There is a wide range of speakers based in quality and price.
- Audio power in speakers is measured in **Watt** e.g. 40W, 70W, 100W.
- Speakers are connected to the computer with a **usb** or **jack cable**.



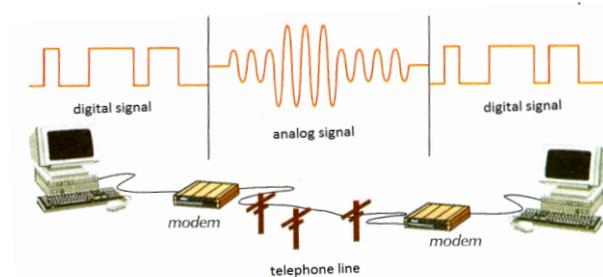
TOUCH SCREEN

- A touch screen is a device that works both as input and output peripheral.
- A touch screen can detect the presence and location of a touch within the display area.
- A touch screen is applicable in many devices, such as **laptops**, **tablets**, **PDA's** etc.



MODEM (Modulator / Demodulator)

- A modem supports the connection of PC to the Internet using the existed telephone line.
- It converts the digital data of computer into analog to send them through the analog telephone network (**modulation**).
- A modem similarly converts the analog signals of telephone network into digital in order to be understandable by the computer (**demodulation**).



ROUTER

- It **roots** (drive) the incoming data of Internet (web-pages, emails, file transfers etc) to the appropriate computers of a network.
- Mainly, this device is available in a **modem-router** form.



PLOTTER

- A plotter is a **computer printer** for printing graphics on larger sized paper.
- A plotter is much more expensive than smaller printers but follows the same printing technology with other common types(inkjet).
- Categories: **Pen - Flat Bed Plotters** (a pen moves horizontally and vertically across the surface of the paper).
Inkjet Plotter (tiny droplets of ink are sprayed on the surface of paper).



POWER SUPPLY

- The power supply converts the **high-voltage** electric power (AC 220-240 Volt) to a **low-voltage** power (DC 5 – 12 Volt) that computer circuits can resist and work with.



UPS (Uninterruptible Power Supply)

- It is an electrical device that provides **emergency power** to the computer when the input power source typically fails.
- In case of a blackout, it provides electric power to the computer for a few minutes.



CPU (Central Processing Unit)

- It is the **brain** of the computer which executes all the commands in digital form (0 or 1).
- It accesses RAM directly to find specific commands to execute them.
- Its speed is measured in **GHz** (billions of commands per second).

