ALMUSTAQBAL UNIVERSITY
Department of Radiology Technologies

Introduction to Computers
First lecture
by Hasan Faez

1. Introduction to Computers:

Computers are electronic devices designed to process data and perform complex calculations. They have transformed nearly every aspect of our lives, including education, communication, healthcare, and entertainment. A computer system operates based on two essential components: **hardware** and **software**, which work together to achieve various tasks.

2. Concepts of Hardware and Software and Their Components

a. Hardware

Hardware refers to the tangible, physical components of a computer system. These components are classified into different categories:

Input Devices:

Input device is any peripheral (piece of computer hardware equipment to provide data and control signals to an information processing system such as a computer or other information appliance. Input device Translate data from form that humans understand to one that the computer can work with. Most common are keyboard and mouse (e.g., keyboard, mouse, scanner).


Input Devices
Mouse
OCR
Keyboard
Scanner
Trackball
Bar Code Reader
Joystick
Touch Panel
Touchpad
MICR

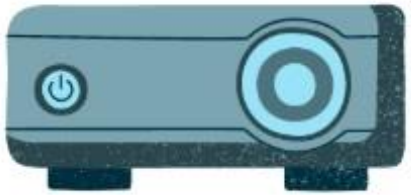
Output Devices:

An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) which converts the electronically generated information into humanreadable form. Devices that display or provide results from the computer (e.g., monitor, printer, speakers).

Output Devices

Monitor

Speaker



Projector

Headphone

Printer

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)
- * Control Unit (CU)
- * Registers


CPU

- **Memory and Storage :**

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

RAM AND ROM

- **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.

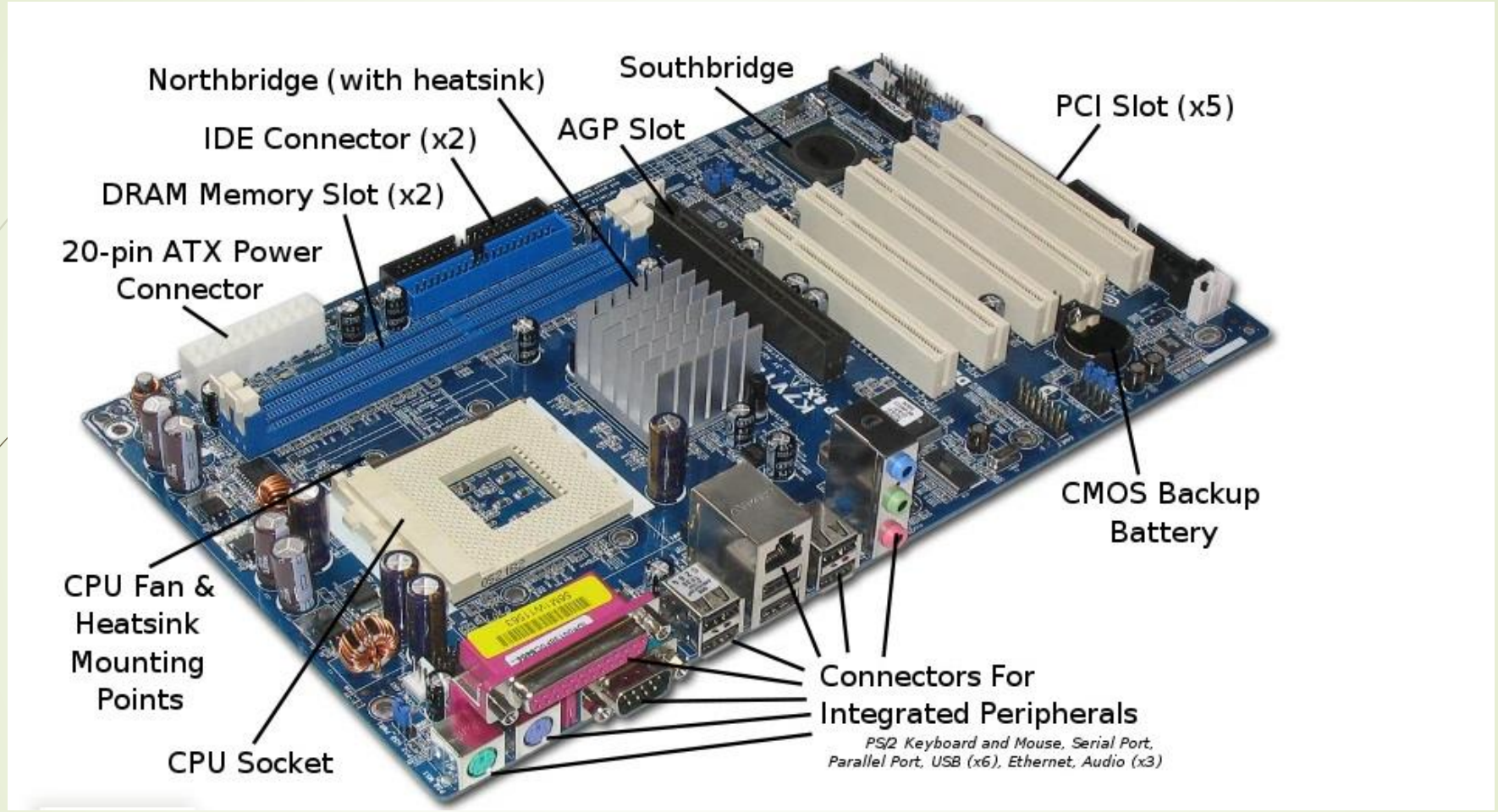

Spindle
Head
Platter
Actuator Arm
Actuator Axis
Power Connector
Actuator
Jumper Block
IDE Connector
USB

- **motherboard**:

A motherboard is the main circuit board in a computer system. It connects all of the internal components, like the memory, processor, graphics card and other hardware. It also provides power to each component and allows them to communicate with each other.

- Types of Motherboards

1. Advanced Technology (AT) motherboard
2. Standard ATX motherboard
3. Micro ATX motherboard
4. eXtended ATX motherboard
5. Flex ATX motherboard


Northbridge (with heatsink)
Southbridge
PCI Slot (x5)
IDE Connector (x2)
AGP Slot
DRAM Memory Slot (x2)
20-pin ATX Power Connector
CMOS Backup Battery
CPU Fan & Heatsink Mounting Points
Connectors For Integrated Peripherals
PS/2 Keyboard and Mouse, Serial Port, Parallel Port, USB (x6), Ethernet, Audio (x3)
CPU Socket

Power Supply Unit (PSU):

A Power Supply Unit PSU : is an internal IT hardware component. Despite the name, Power Supply Units (PSU) do not supply systems with power - instead they convert it. Specifically, a power supply converts the alternating high voltage current (AC) into direct current (DC), and they also regulate the DC output voltage to the fine tolerances required for modern computing components.


EPP
750W
94% efficiency
EPP
750W
EPP
750W

b. Software

Software refers to a set of instructions or programs that tell the computer how to perform specific tasks. It is divided into two main types:

System Software: Includes the operating system (e.g., Windows, Linux, macOS) that manages hardware and software.

Application Software: Programs designed for specific tasks, such as word processors, web browsers, and media players.

Middleware: Acts as a bridge between the operating system and applications.

Both hardware and software must work in harmony to ensure smooth operation of a computer.

3. Concept of Computing

Computing involves using computer systems to solve problems and process data efficiently. It is the foundation of modern technology and is defined by several operations:

Input: Accepting data or instructions.

Processing: Performing calculations or making decisions based on inputs.

Storage: Saving data for later use.

Output: Producing results, such as displaying text or printing a document.

4. Concept of Data and Information

Data: Raw facts and figures that have no inherent meaning until processed (e.g., numbers, text).

Information: Processed data that is meaningful and useful for decision-making (e.g., a sales report).

Importance: Transforming data into information helps organizations and individuals make informed decisions.

5. Applications of Information, Electronics, and Communication Technology (IECT)

IECT integrates technology to enhance communication, manage information, and automate processes. Key applications include:

Education: Online learning platforms, digital libraries, and virtual classrooms.

Healthcare: Patient records management, telemedicine, and medical imaging.

Finance: Online banking, fraud detection systems, and digital wallets.

Entertainment: Streaming services, gaming, and virtual reality experiences.

Communication: Email, video conferencing, and instant messaging.

6. Connecting Input/Output Devices and Peripherals to the CPU

To build a functioning computer system, peripherals (input/output devices) are connected to the CPU, the core component responsible for processing data.

a. Common Input Devices

Keyboard: Connects via USB or wireless technology.

Mouse: Allows navigation and interaction; can be optical or wireless.

Microphone: For audio input.

Scanner: Digitizes physical documents into electronic form.

b. Common Output Devices

Monitor: Displays visual output using HDMI, VGA, or USB-C connections.

Printer: Produces physical copies of documents.

Speakers: Output audio from the system.

c. Peripheral Connections

USB Ports: Standard interface for most peripherals.

HDMI/VGA Ports: For monitors and projectors.

Audio Jacks: For headphones and microphones.

Bluetooth and Wi-Fi: Wireless connections for modern devices.

Thank you for listening