

Computing: Introduction to Computer Systems

Understanding how computers work,
store, and process data

Learning Objectives

By the end of this lesson, you will be able to:

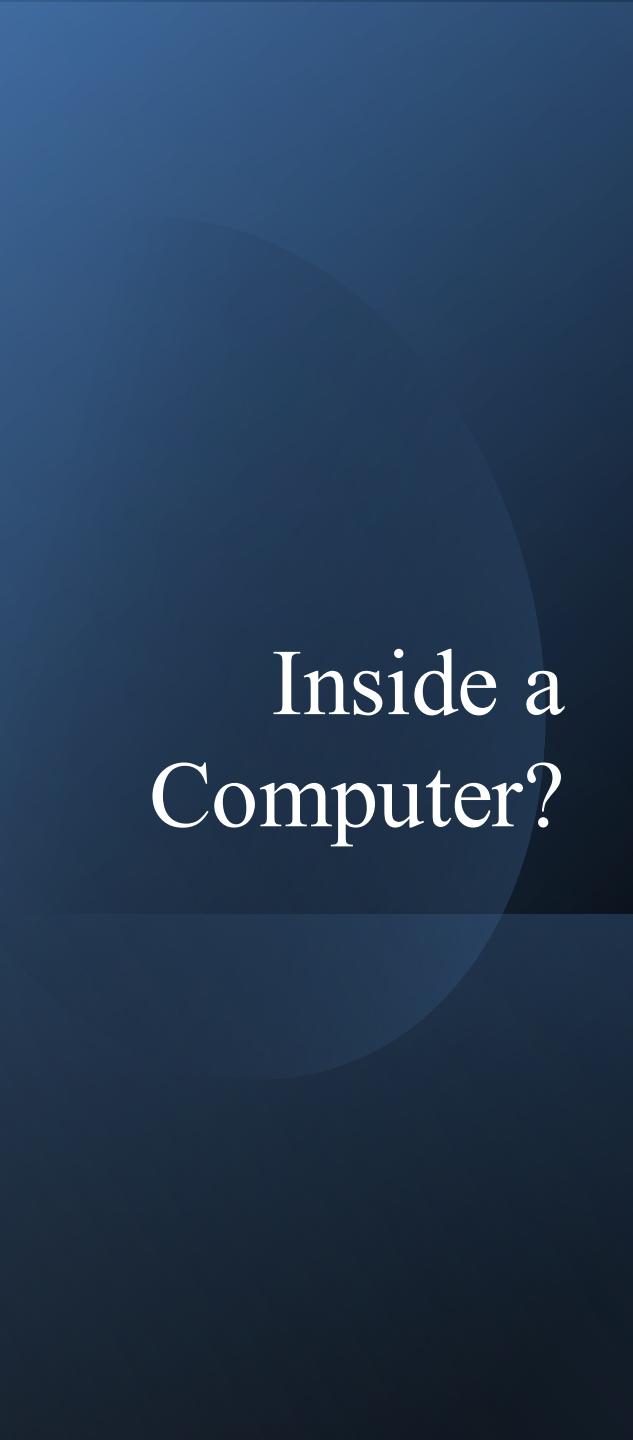
- Explain the difference between data and information
- Identify key hardware components inside a computer
- Describe the function of RAM, ROM, and the CPU
- Recognise types of software and input/output devices
- Understand basic storage units and their sizes

What is a Computer?

Computers are electronic devices that process data.

They can be used for many different tasks, such as:

- Creating documents
- Browsing the Internet
- Sending messages

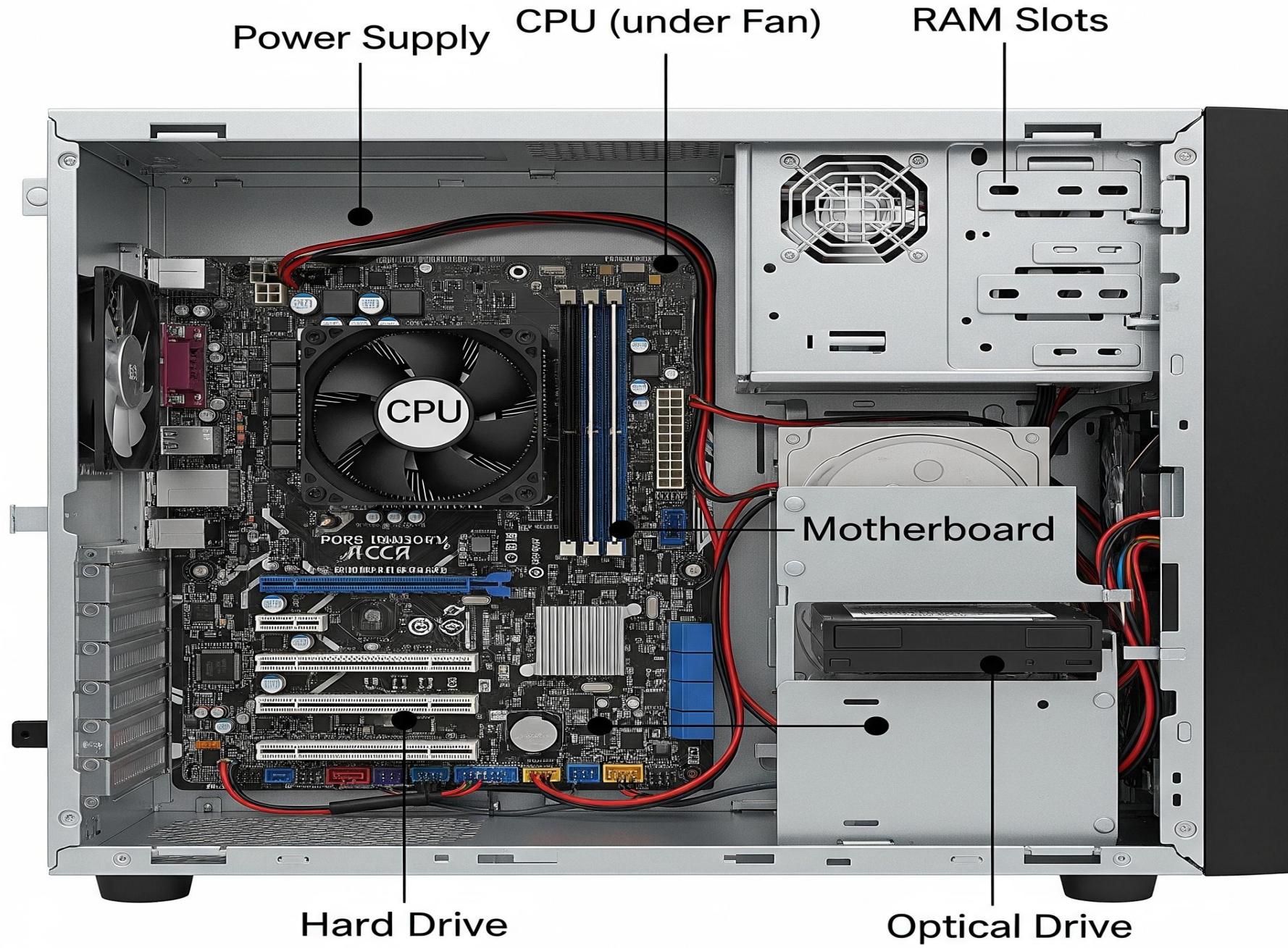


Inside a
Computer?

Data & information

Hardware & internal
components

- Input & output devices
- Memory
- Storage



What is Data?

Data = facts and figures with no context

Information = data + meaning

Examples:

- 3460 = data
- 3460 miles between London and New York = information



Bits and Bytes

Bit = binary digit (0 or 1)

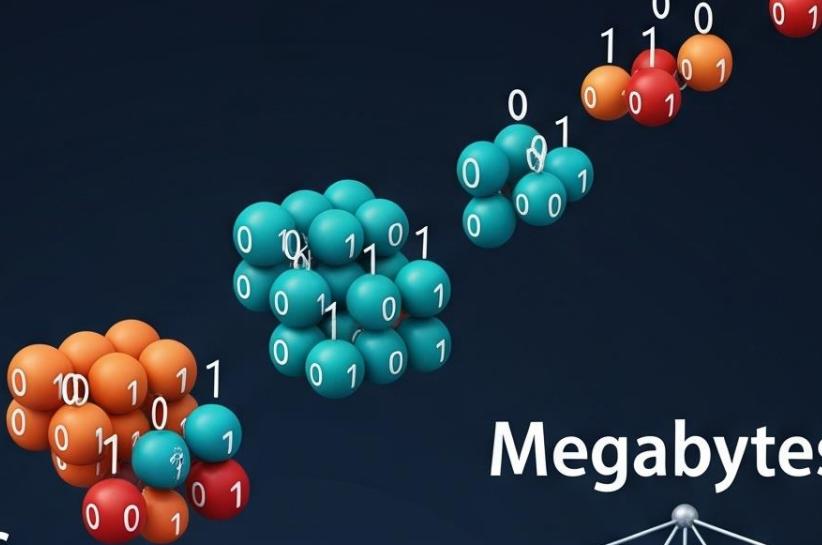
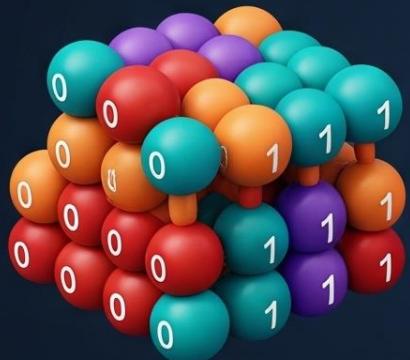
Byte = 8 bits

Kilobyte = 1000 bytes

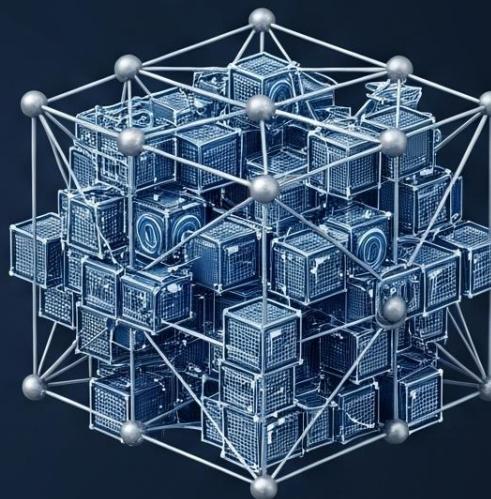
Gigabyte = 1000 MB

Terabyte = 1000 GB

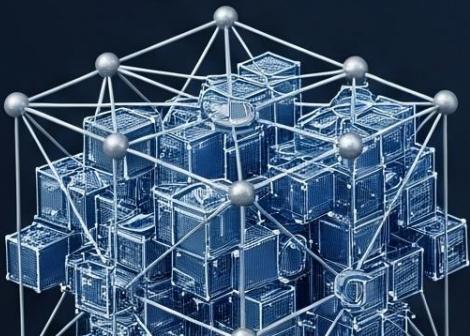
Kilobytes



Megabytes



Megabytes



Gigabytes



Types of Computers

General Purpose: PCs,
smartphones

Dedicated Computers:
traffic lights

Embedded Systems: inside
microwaves, TVs



Hardware vs Software?

Hardware = physical parts

Software = programs/instructions

Examples of hardware:

- CPU, RAM, hard drive (internal)
- Mouse, keyboard (external)

Input Devices?

Allow users to interact with computers.

Examples:

- Mouse, keyboard
- Touchpad, touchscreen
- Microphone, scanner, camera
- Concept keyboards, eye trackers



Output Devices

Return data to users.

Examples:

- Monitor, projector
- Speakers, buzzers
- Printers
- Actuators (motors, robots)



Memory: RAM and ROM

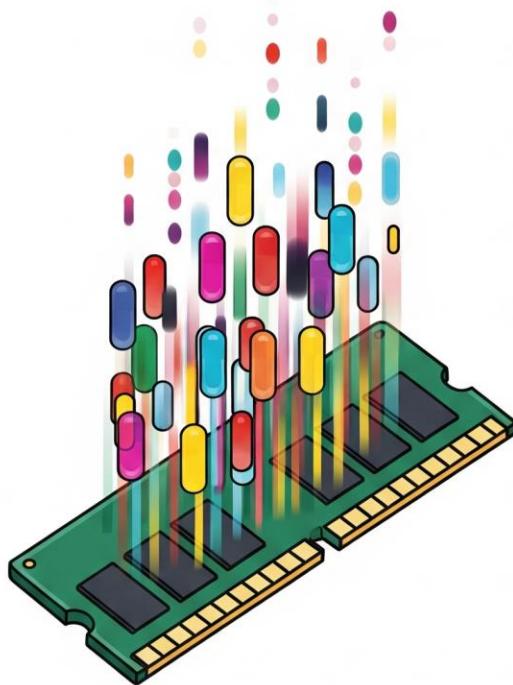
RAM = Random Access Memory

- Volatile, fast read/write
- Stores active data/programs

ROM = Read Only Memory

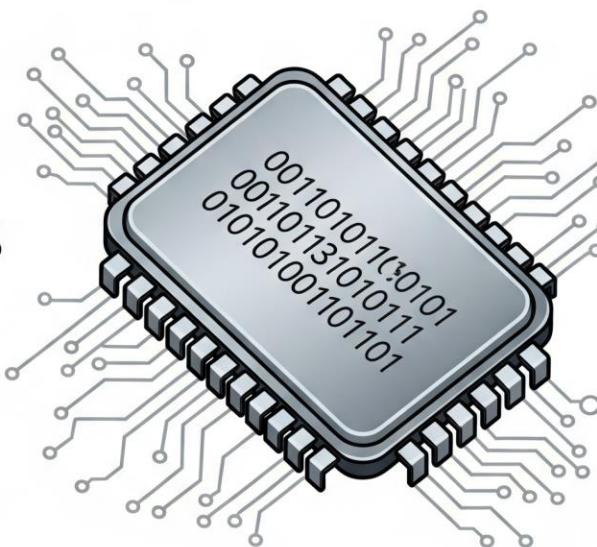
- Non-volatile, read-only
- Stores boot instructions

RAM



ROM

VS



Internal Storage

Primary Storage = RAM (fast, temporary)

Secondary Storage = HDD, SSD

HDD:

- Magnetic, moving parts, high capacity

SSD:

- No moving parts, faster, more expensive

Primary Storage = RAM

(fast, temporary)

Secondary Storage = HDD, SSD



HDD:
Magnetic,
moving parts



SSD:
No moving
parts, faster
more expensive

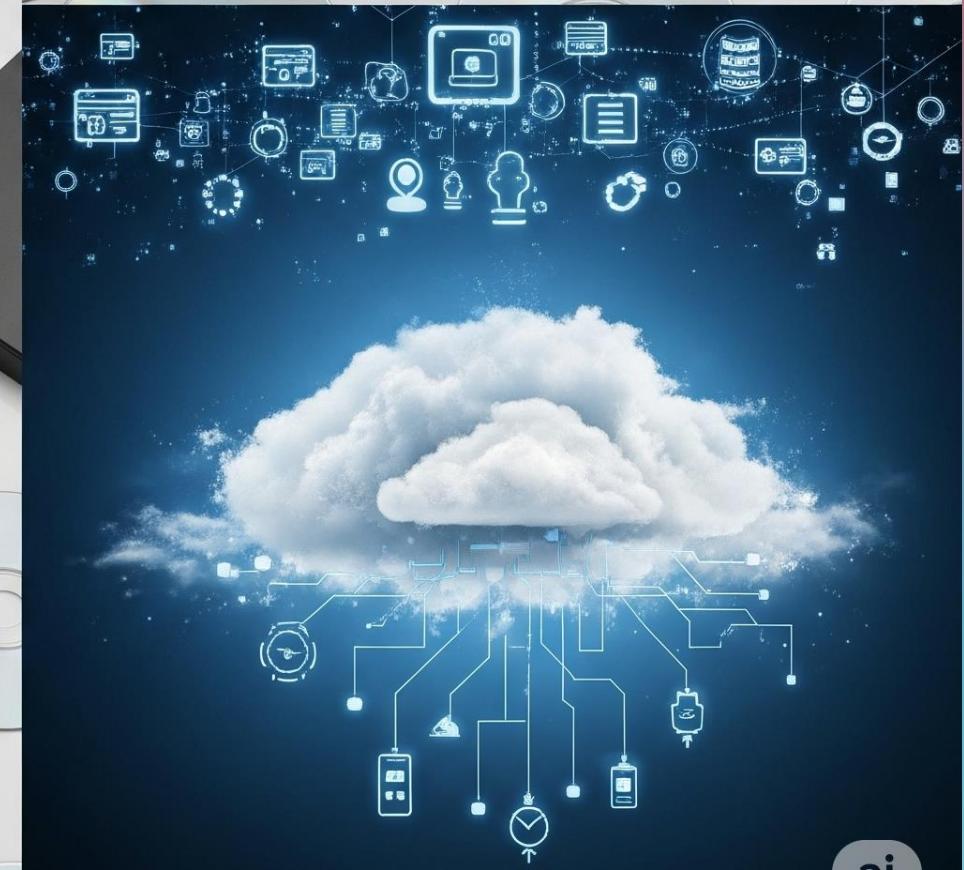
External Storage

Optical Discs:

- CD, DVD, Blu-Ray
- External HDDs and SSDs
- USB sticks, SD cards

Cloud Storage:

- Access anywhere
- Needs internet
- May involve fees



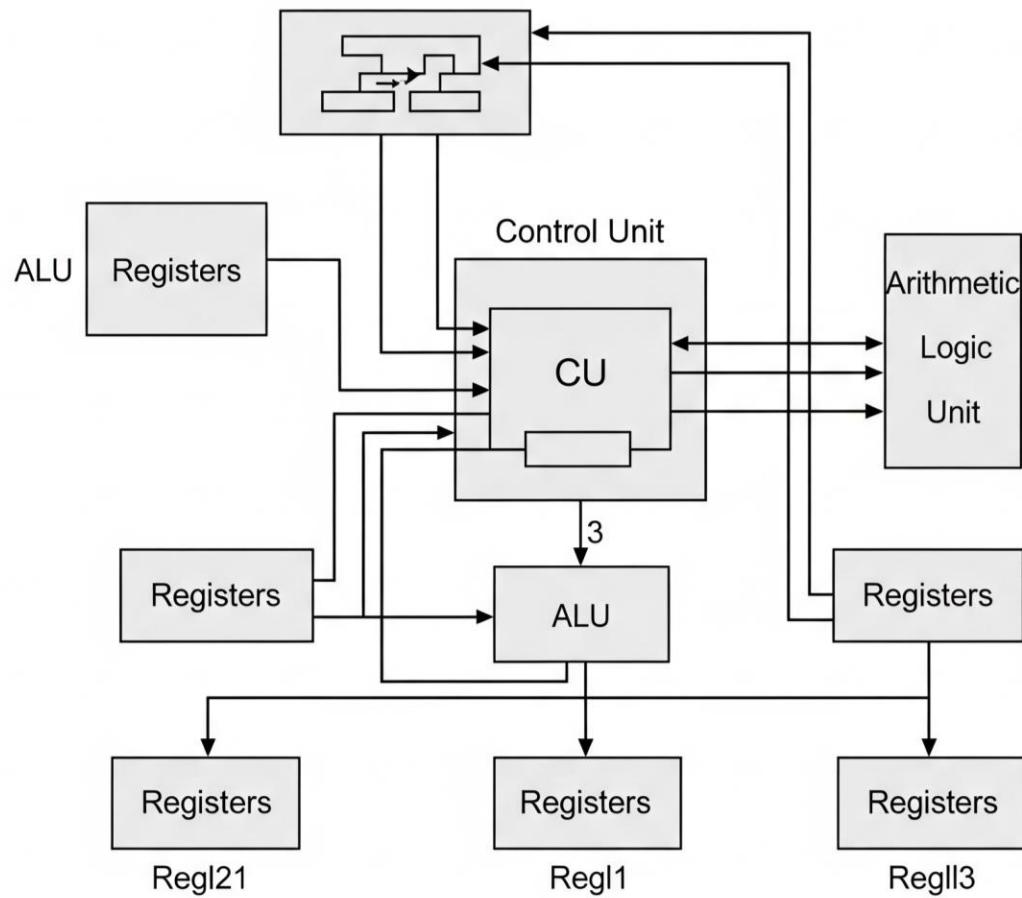
The CPU?

CPU = Central Processing Unit

Brain of the computer

Made of CU (Control Unit), ALU (Arithmetic Logic Unit), Registers

Executes instructions



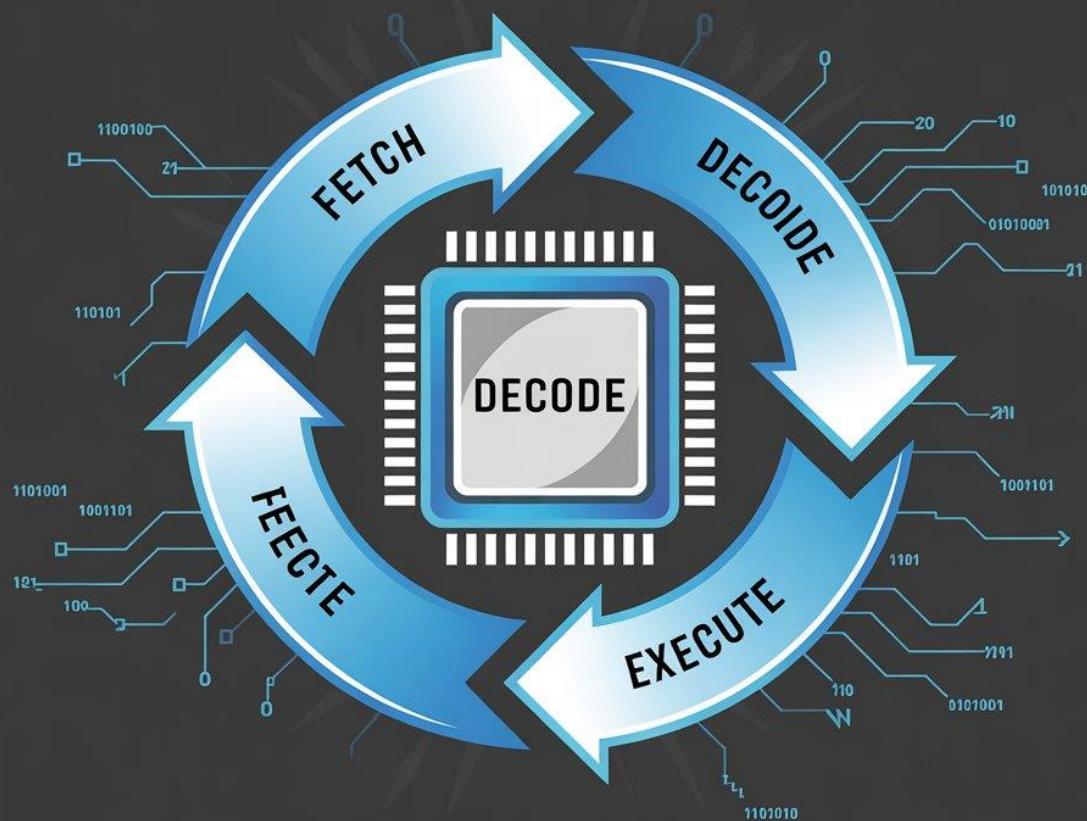
Fetch- Decode- Execute Cycle

How the CPU processes instructions:

- Fetch – Get instruction from memory
- Decode – Understand the instruction
- Execute – Carry out the instruction

Happens millions of times per second

FETCH-DECODE-EXECUTE CYCLE



Assistive Technology

Helps people with disabilities use computers:

- Braille keyboards
- Eye-tracking software
- Screen readers
- Voice recognition



Software?

Software = programs on a computer

Application Software:

- browsers
- games

System Software:

- OS
- utilities

SOFTWARE

OVERVIEW



Application Software
(e.g. Word, Browsers, Games)

System Software
(e.g. Operating System, Utilities)

Utility Software

Helps maintain computer performance:

- Backup
- Virus scanning
- Compression
- Encryption
- Defragmentation



Operating Systems?

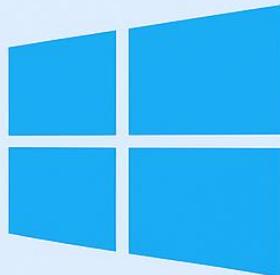
Manages hardware and software

Examples:

- Windows, macOS, Linux
- Manages memory, users, and files

Operating Systems

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User Interfaces?

GUI:

- uses icons, windows, easier for users

CLI:

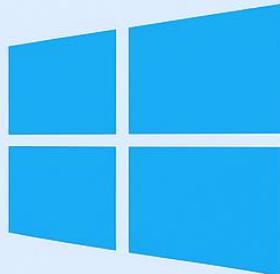
- text-based, used by programmers

Touch Interfaces:

- gestures (e.g. iOS, Android)

Operating Systems

- Manages hardware and software
- Examples:
- Windows, macOS, Linux
 - Manages memory, users, and files



Files and Directories

- File = block of data
- Directory = folder containing files
- Filepath = location of the file
- Extension = tells file type (.docx, png)



Managing Files

- File operations:
 - New, Save, Save As
 - Rename, Delete, Copy, Move
- Use folders and subfolders to stay organized



Lesson Summary

Let's review what we've learned:

- Computers process input, perform tasks, and produce output
- RAM is fast but temporary; ROM stores boot data
- The CPU carries out the Fetch–Decode–Execute cycle
- Hardware is physical; software is instructions
- Data needs context to become information

