



**BRITISH INTERNATIONAL
SCHOOL OF SULAYMANIYAH**

October
2024

Information & Communication Technology

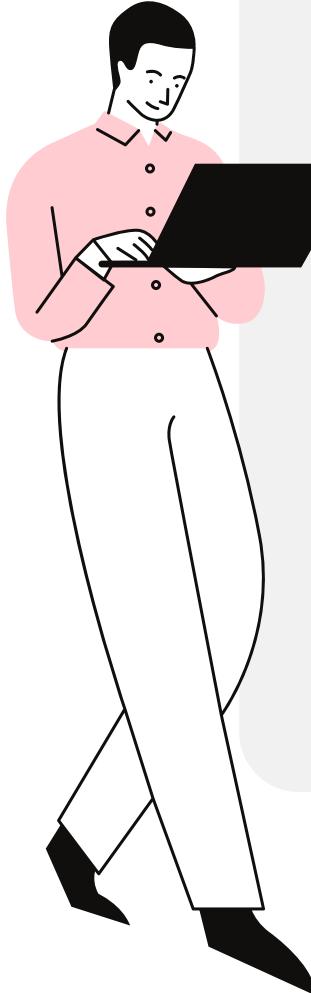


Hardware & Software



Computer Systems

- **Definition:** A computer system combines hardware and software to process data.
- **Relevance:** Computers are integral to modern life, from education to business.
- **Components Covered:** Hardware, software, CPU, memory, input/output devices, and emerging technologies like AI.

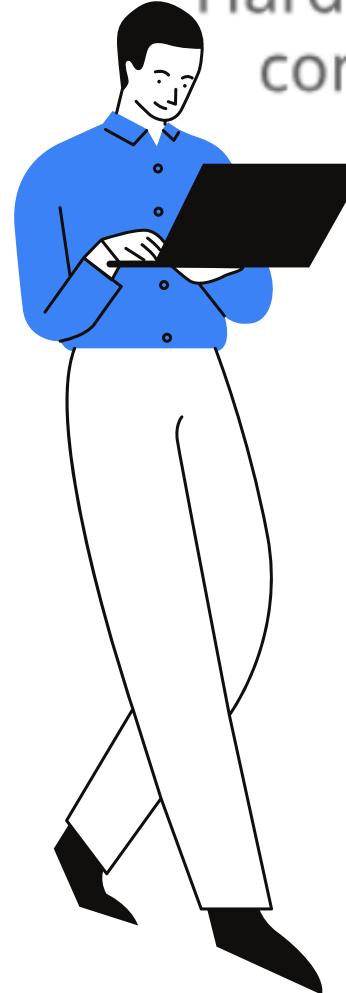


Computer Hardware



Definition of Hardware

Hardware refers to the physical components of a computer system.



Categories

Includes internal hardware (e.g., CPU, RAM) and external hardware (e.g., keyboard, mouse).

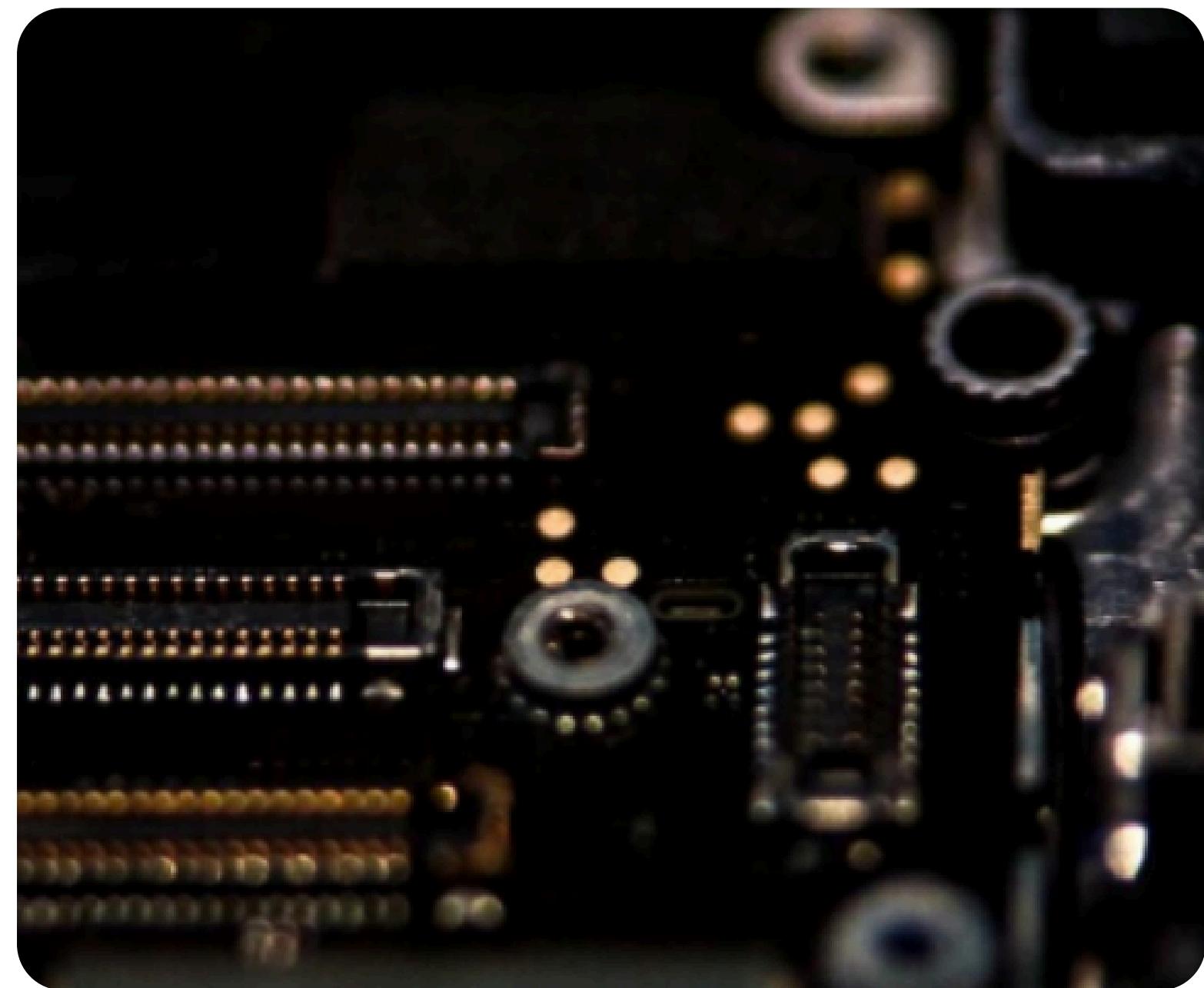
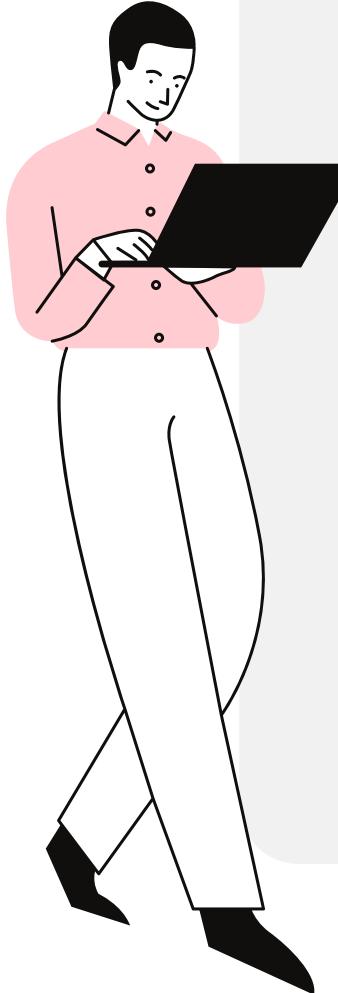


Importance

Hardware enables data input, processing, and output, forming the core of computing systems.

Computer Systems

- **Internal Hardware:** Components like CPU, RAM, and motherboard that reside inside the computer's casing.
- **External Hardware:** Includes devices like monitors, keyboards, and printers that are connected externally.
- **Integration:** Internal and external hardware work together to allow a computer system to function effectively.

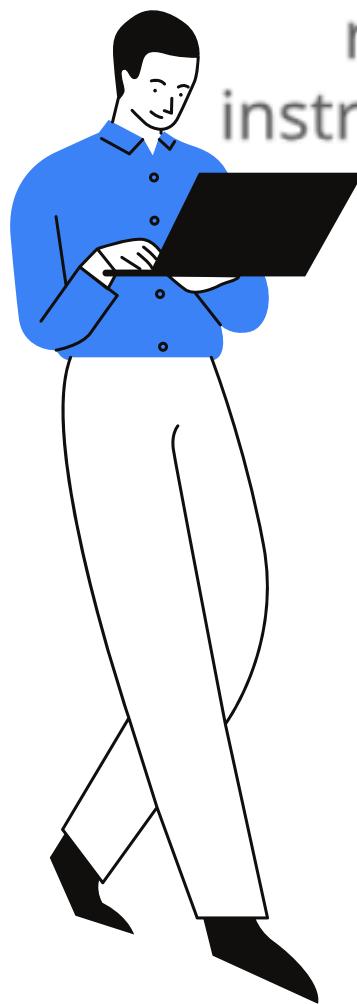


Internal Hardware



Central Processing Unit (CPU)

The 'brain' of the computer, responsible for executing instructions and processing data.



Random Access Memory (RAM)

Temporary storage that holds data currently in use, enabling quick access by the CPU.

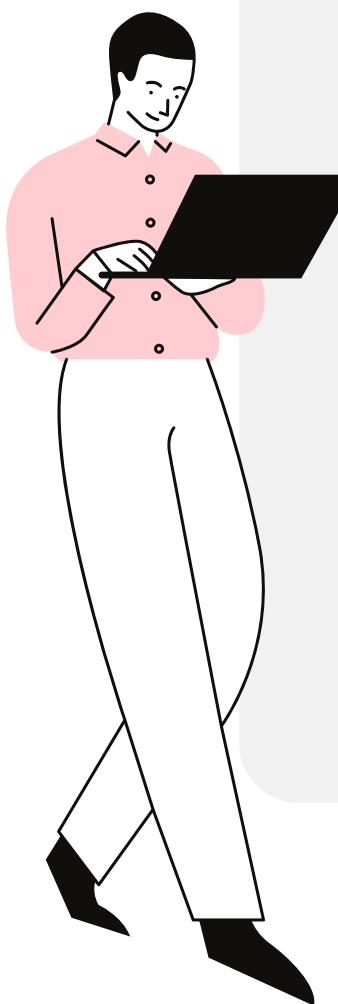


Motherboard

Connects and allows communication between all internal components and peripherals.

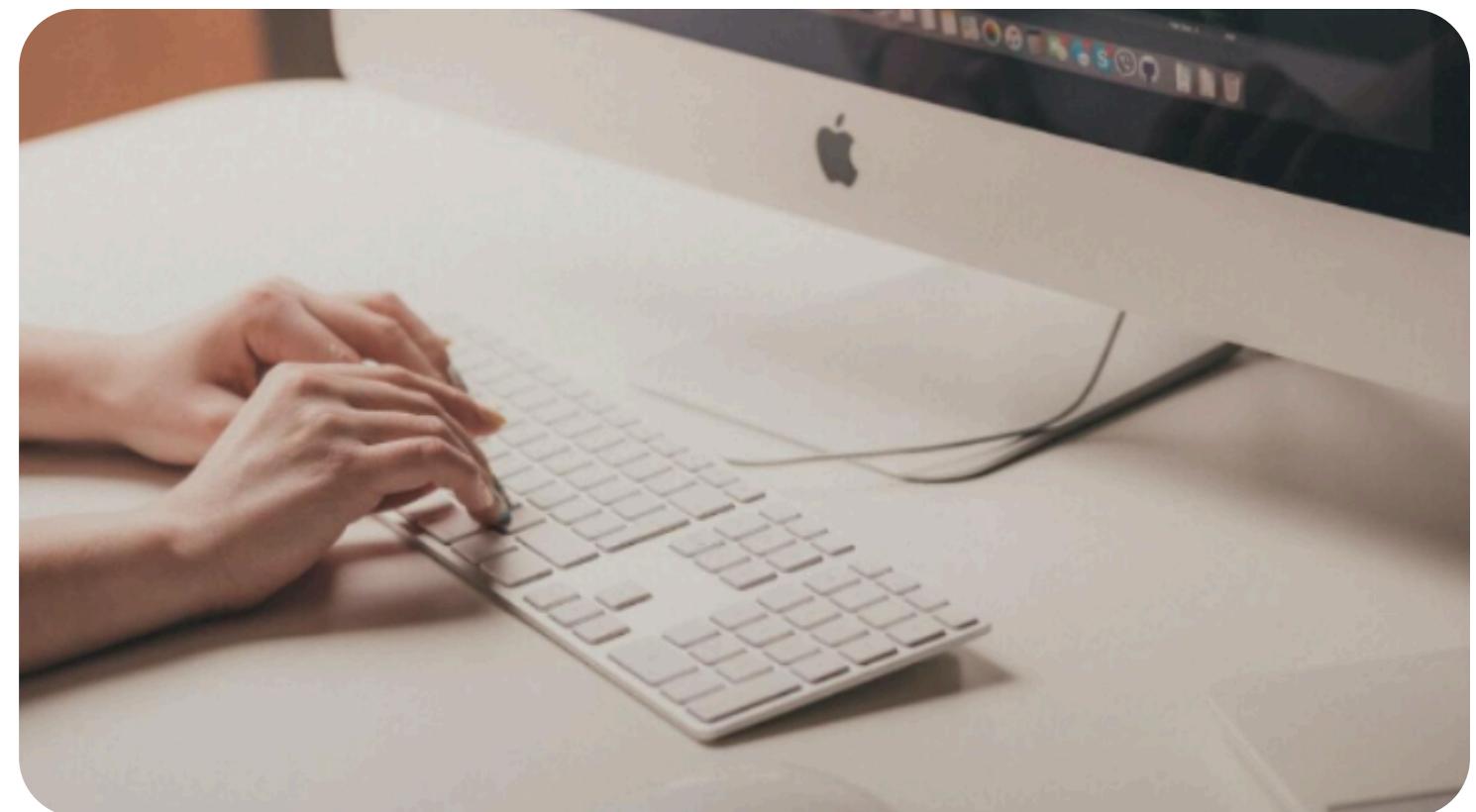
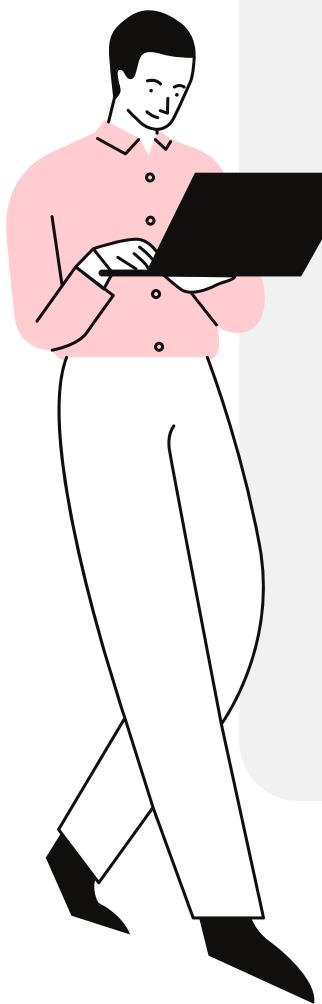
External Hardware

- **Input Devices:** Devices like keyboards, mice, and cameras that allow users to input data into the computer.
- **Output Devices:** Devices such as monitors, printers, and speakers that present data from the computer to the user.
- **Dual Functionality:** Some devices, like touch screens, can function as both input and output devices.



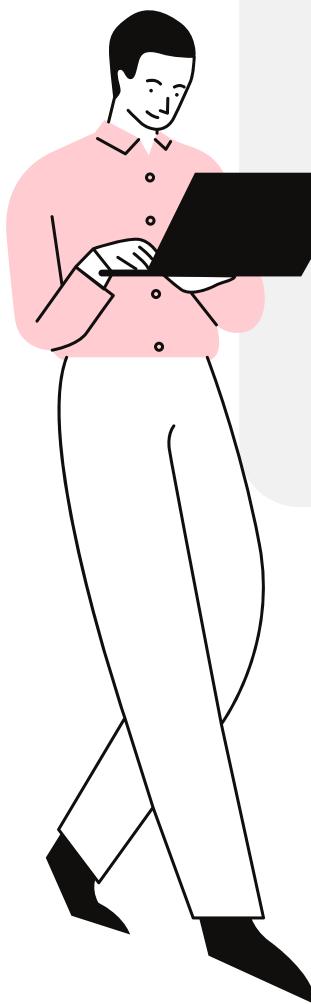
Types of Software

- **Applications Software:** Includes programs like word processors, spreadsheets, and media players used to accomplish specific tasks.
- **System Software:** Essential software such as operating systems and device drivers that enable hardware and applications to work together.
- **Purpose:** System software manages hardware, while applications software enables users to complete productive tasks. Photo



Analogue & Digital Data

- **Analogue Data:** Continuous data with infinite possible values, such as sound waves.
- **Digital Data:** Data represented in binary (0s and 1s), with discrete values.
- **Conversion:** Analogue data needs to be converted to digital form for computer processing.

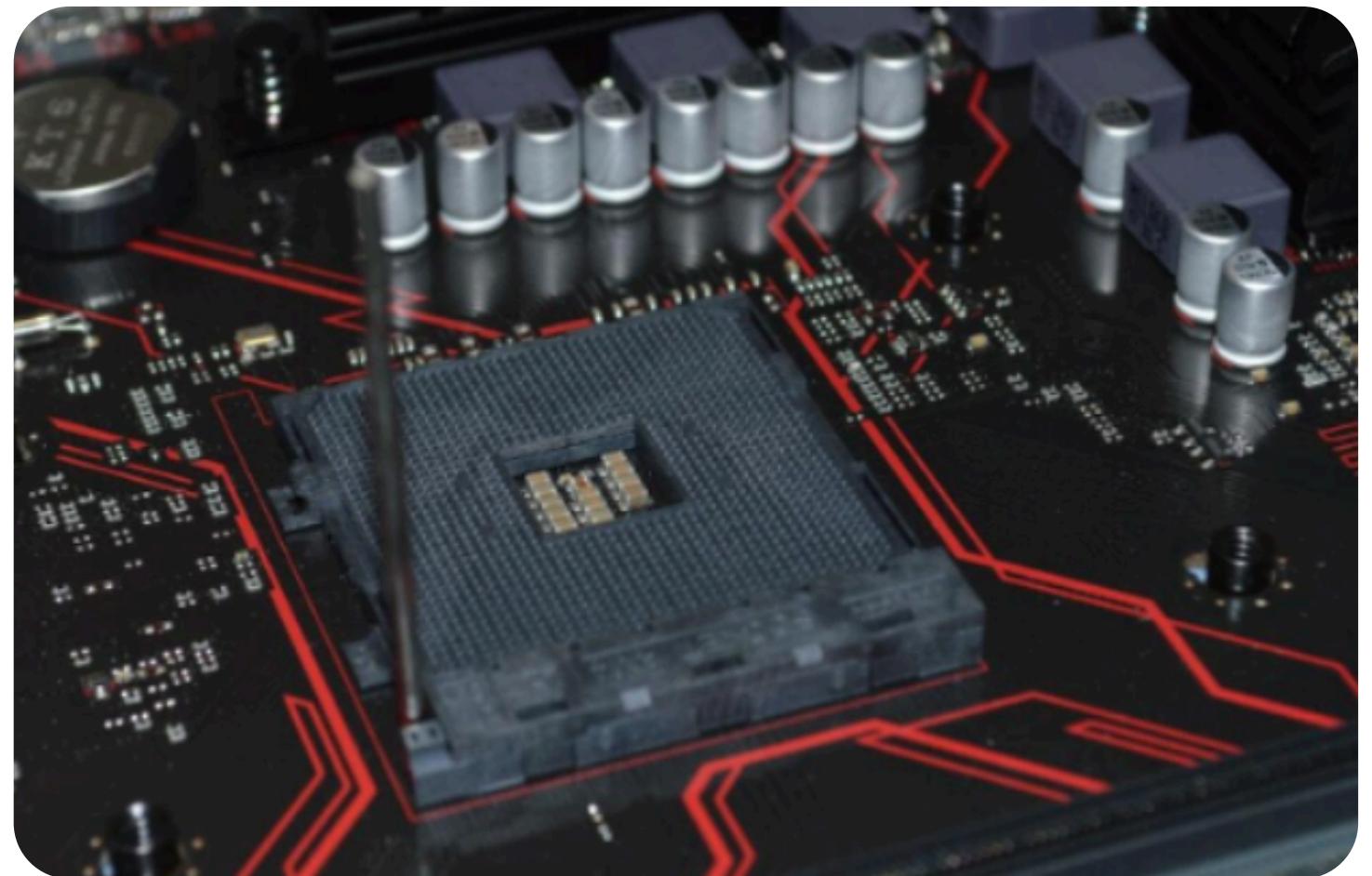
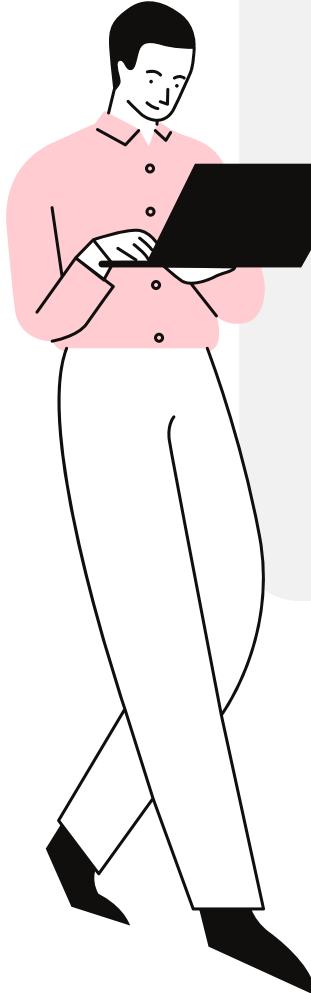


Components of Computer Systems



Central Processing Unit

- **Role of the CPU:** Executes instructions and processes data, controlling all computer operations.
- **Key Components:** Includes the Arithmetic Logic Unit (ALU) and Control Unit (CU).
- **Modern CPUs:** Use advanced architecture to support multi-core processing and energy efficiency.

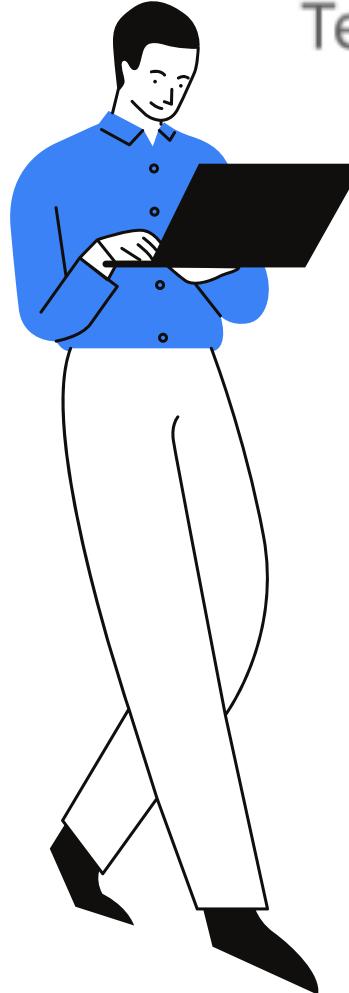


RAM & ROM



Random Access Memory (RAM)

Temporary memory that stores data for active applications; volatile in nature.



Read-Only Memory (ROM)

Permanent storage for crucial boot-up information; non-volatile memory.

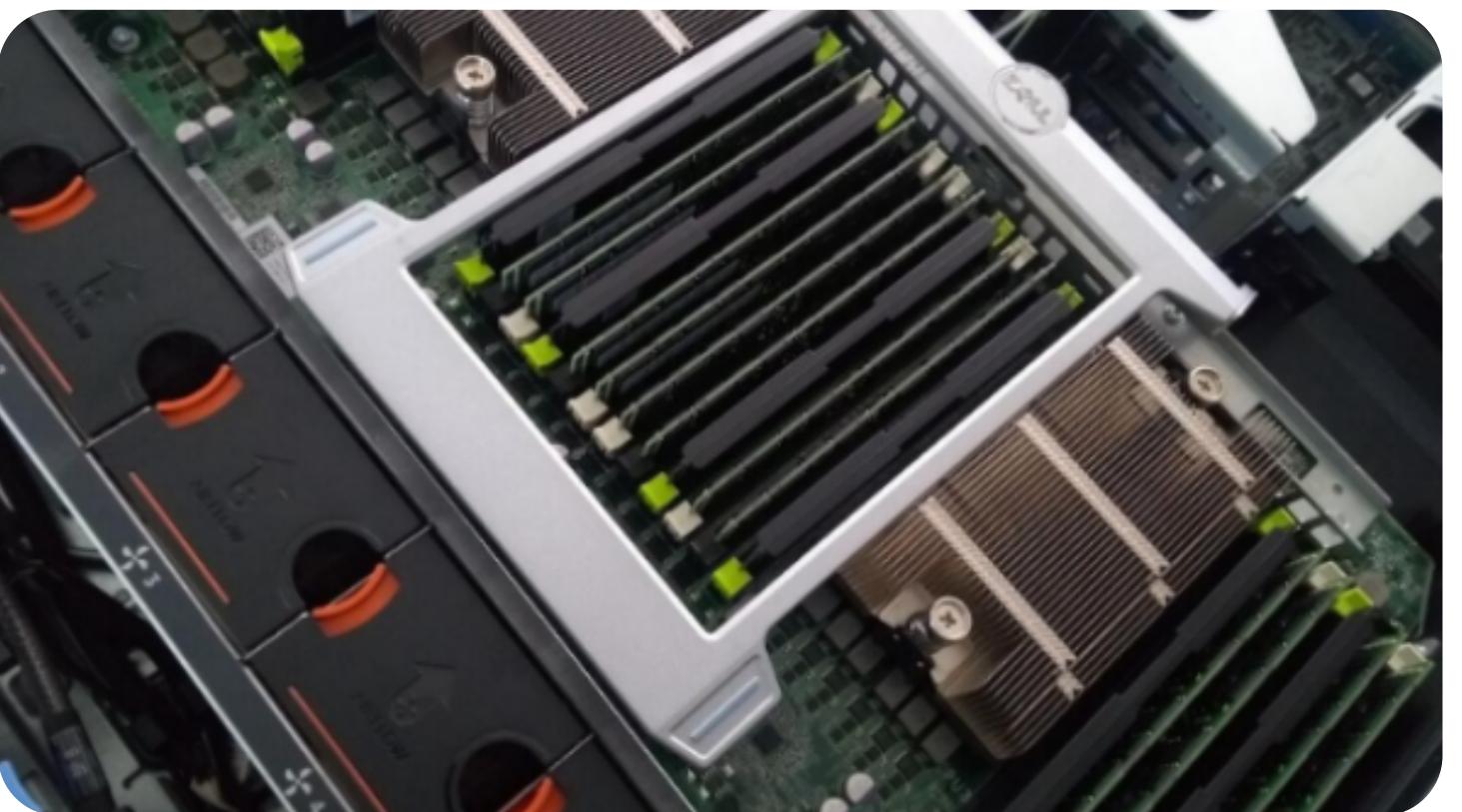
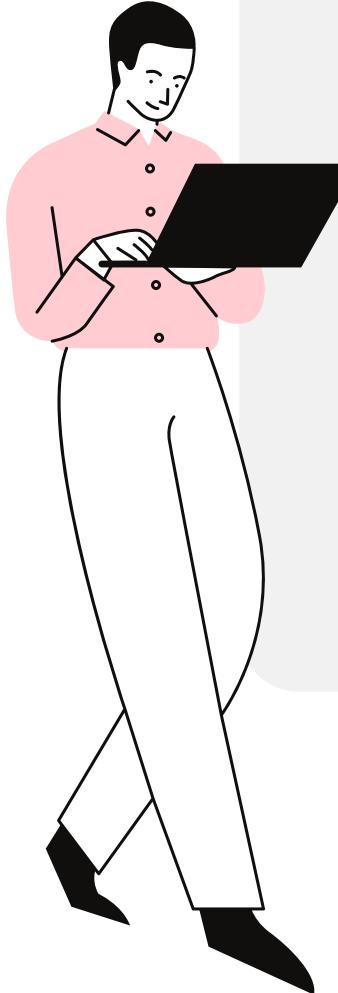


Key Differences

RAM is writable and temporary, while ROM is read-only and retains data even when powered off.

RAM & ROM Cont.

- **RAM (Random Access Memory):** Volatile memory; used for temporary data storage while applications are running.
- **ROM (Read-Only Memory):** Non-volatile memory; stores critical data such as BIOS, not easily alterable.
- **Use Cases:** RAM enhances speed and multitasking, while ROM ensures essential instructions are always available.

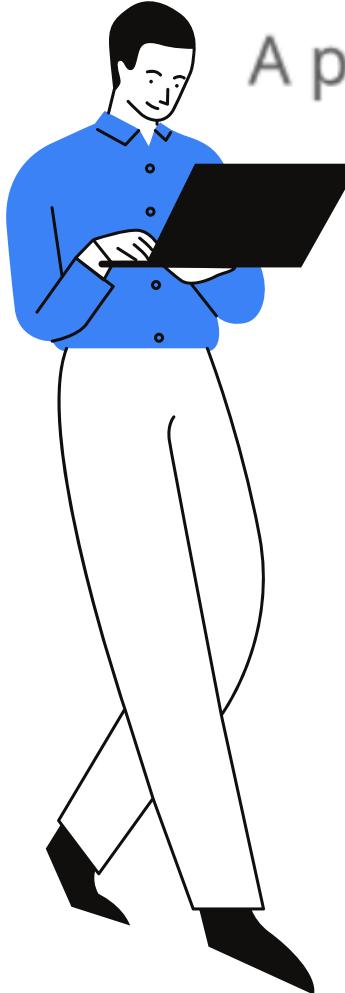


Input Devices



Keyboard

A primary input device used for typing and data entry.



Mouse

Allows users to navigate graphical user interfaces with ease.



Microphone

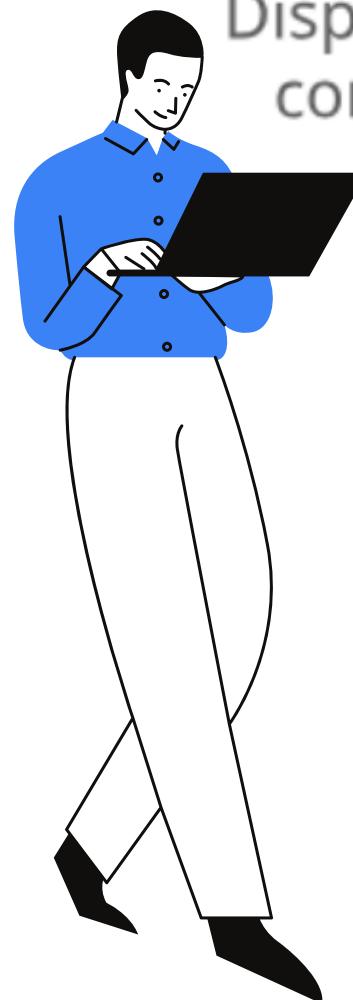
Captures audio for voice commands, recording, or communication.

Output Devices



Monitor

Displays visual output from the computer, essential for user interaction.



Printer

Produces physical copies of digital documents and images.

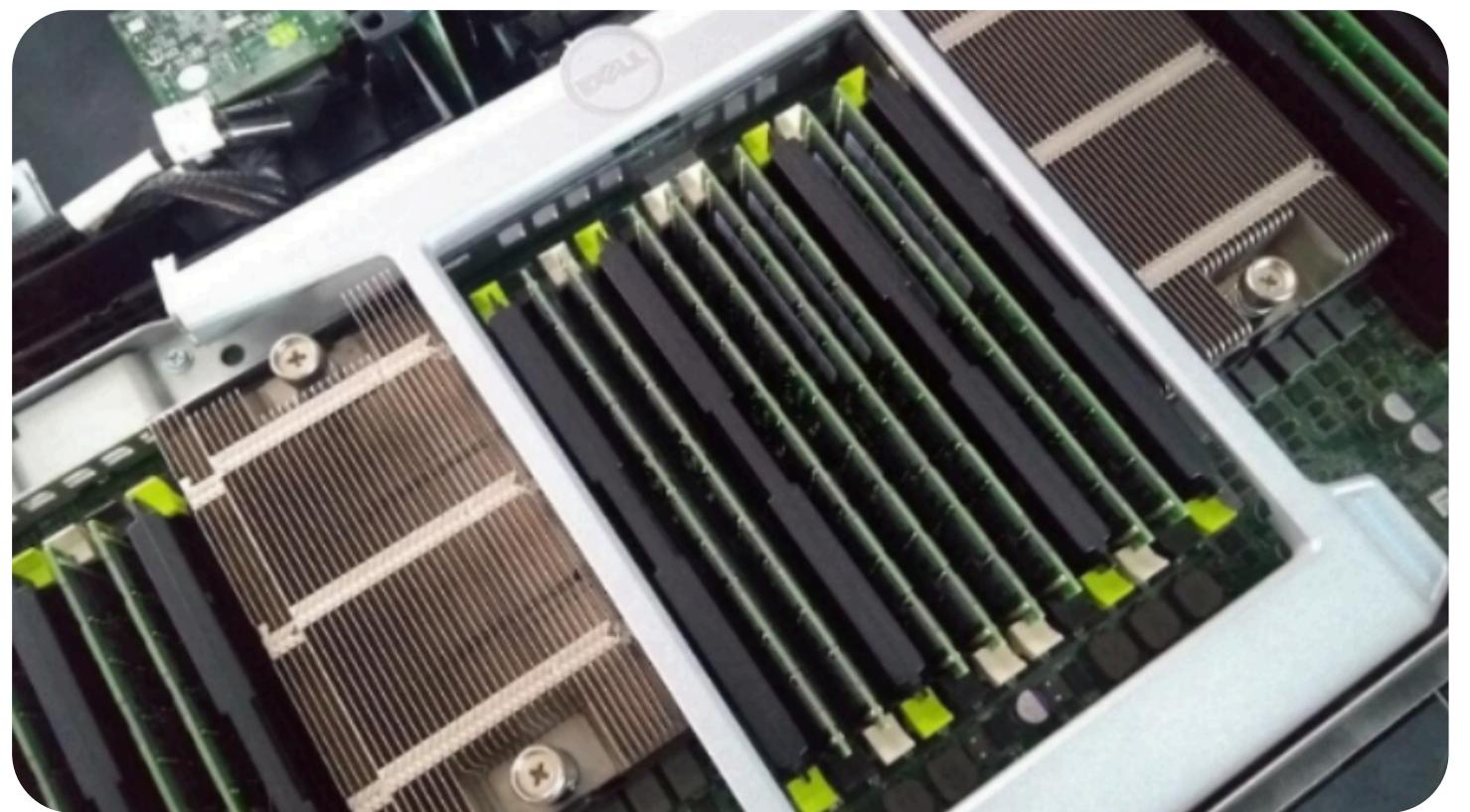
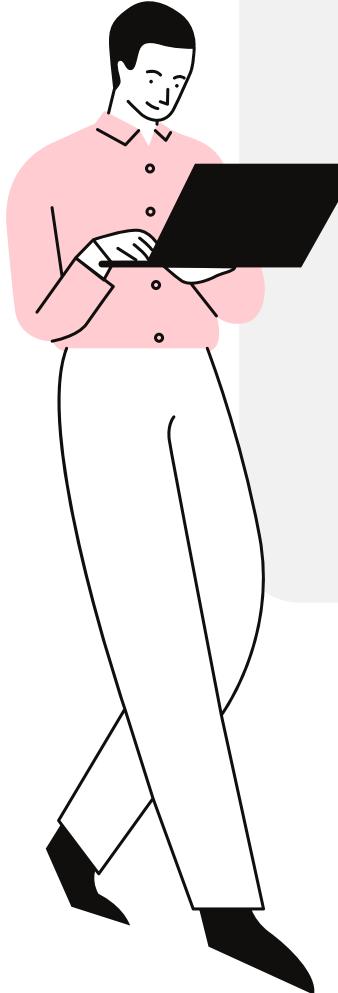


Speakers

Output audio, enhancing multimedia experiences like music and video playback.

RAM & ROM Cont.

- **Hard Disk Drive (HDD):** Uses magnetic storage to save large amounts of data permanently.
- **Solid-State Drive (SSD):** Faster than HDDs, using flash memory for storage without moving parts.
- **Removable Storage:** Devices like USB flash drives and external hard drives offer portable storage options.



Operating Systems

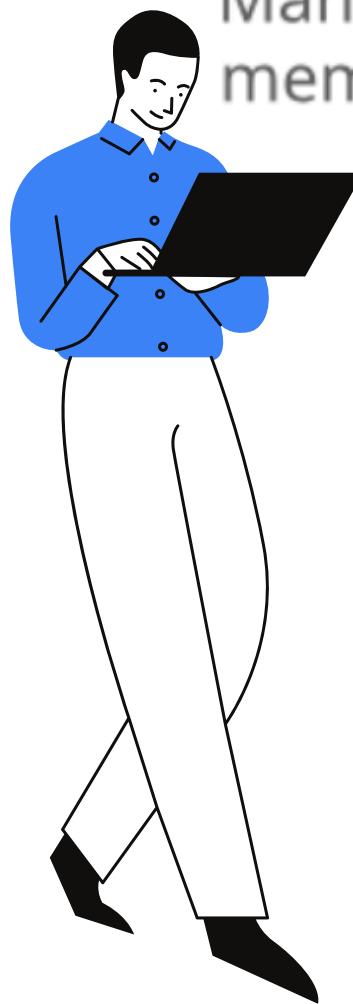


Operating Systems



System Management

Manages hardware resources like memory, storage, and processing power.



User Interface

Provides a way for users to interact with the computer through GUI or CLI.

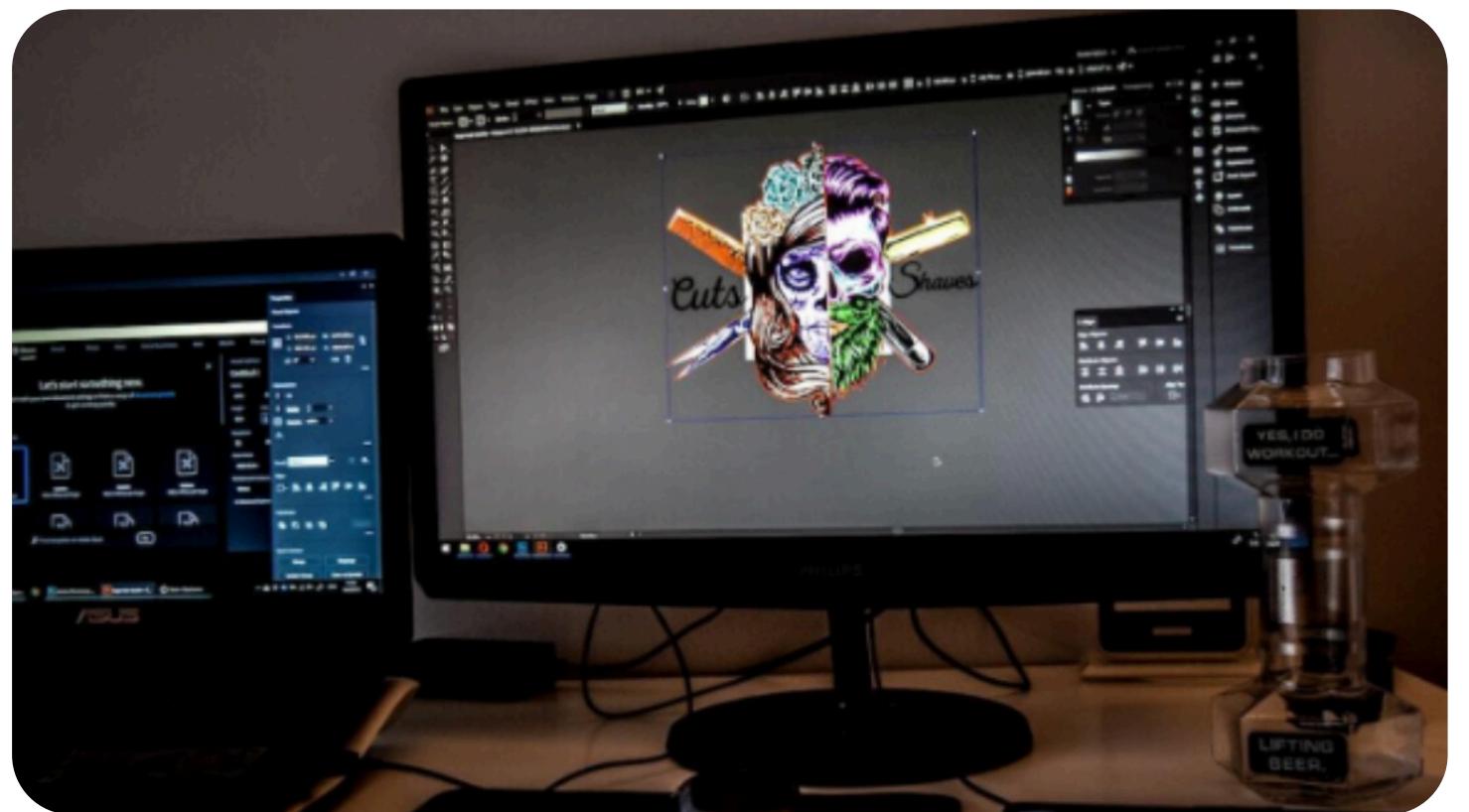
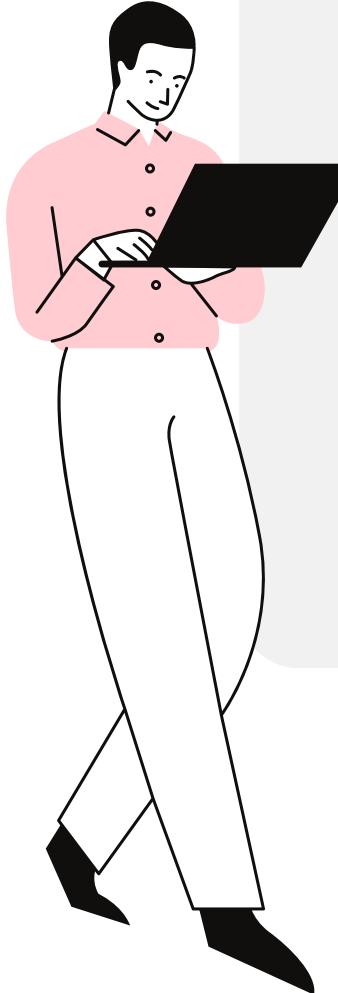


Security and Stability

Ensures data protection, user authentication, and smooth system operation.

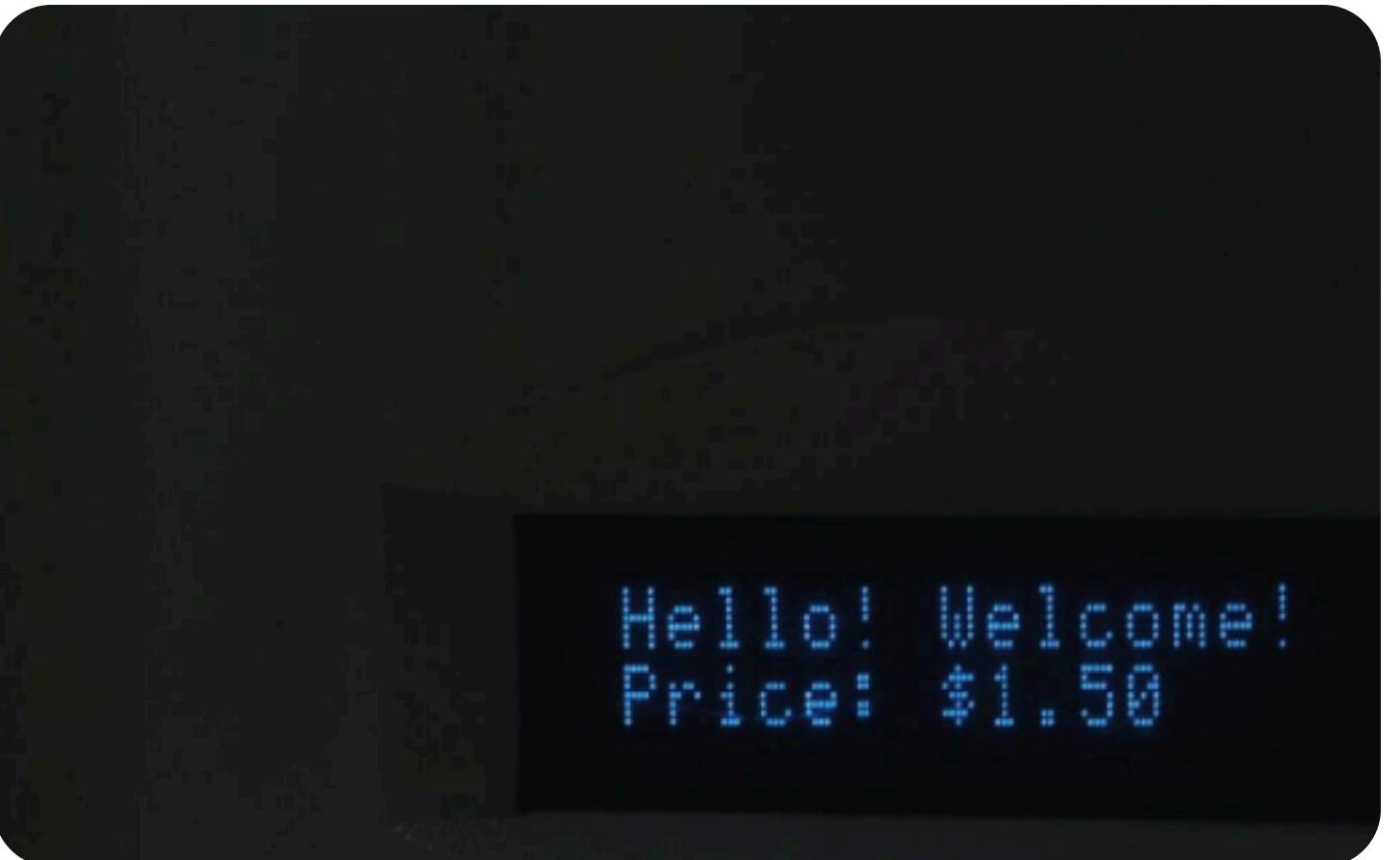
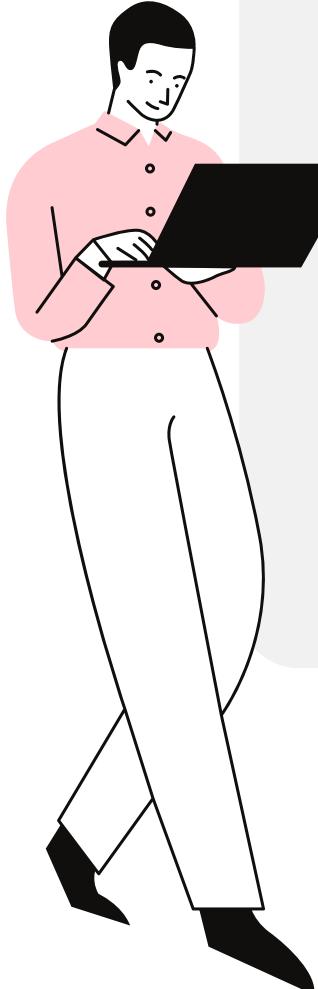
CLI & GUI

- **Command Line Interface (CLI):** User interacts by typing commands; requires knowledge of specific commands.
- **Graphical User Interface (GUI):** Uses icons and visual indicators; more intuitive but requires more system resources.
- **Use Cases:** CLI is favored by system administrators, while GUI is preferred by general users for ease of use.



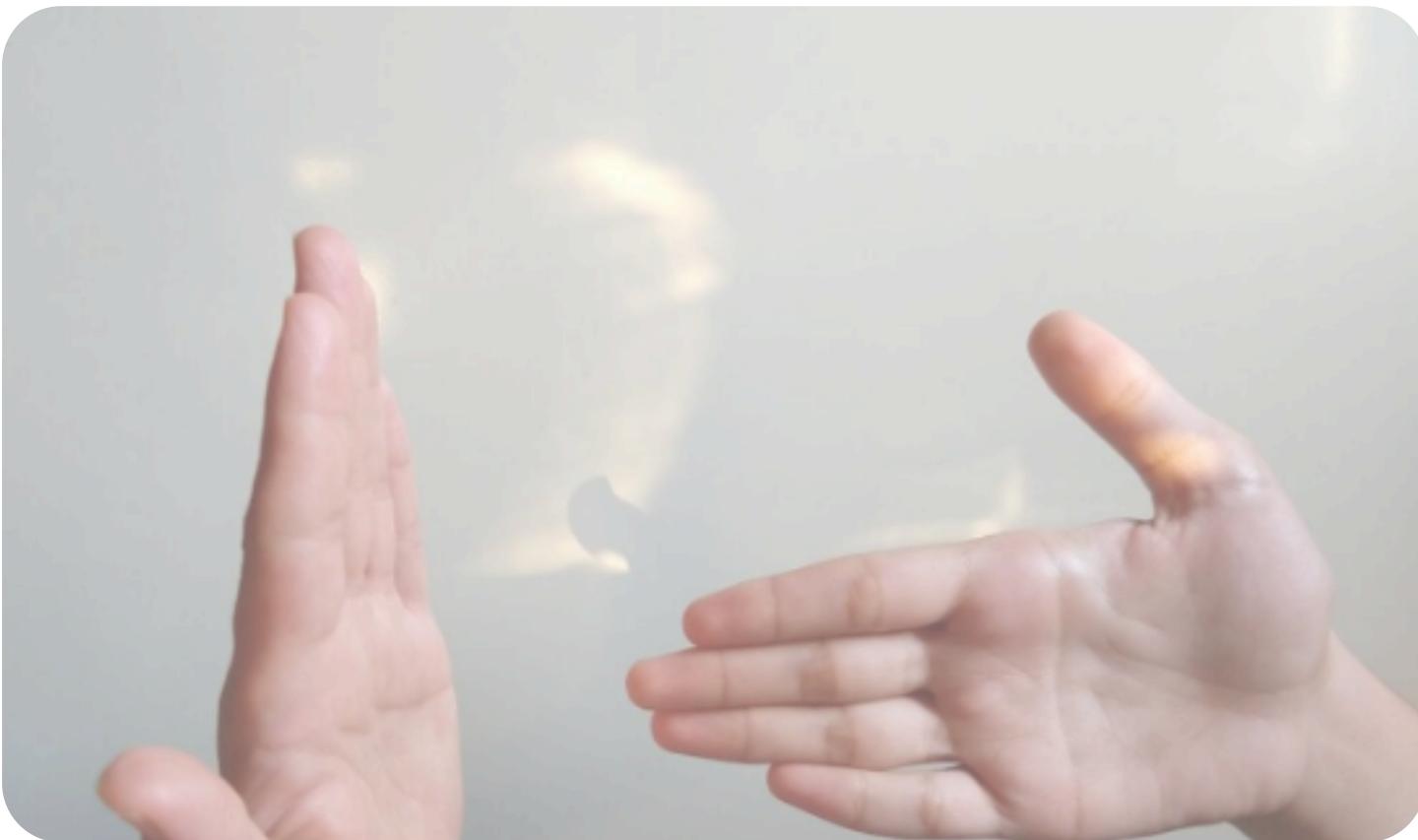
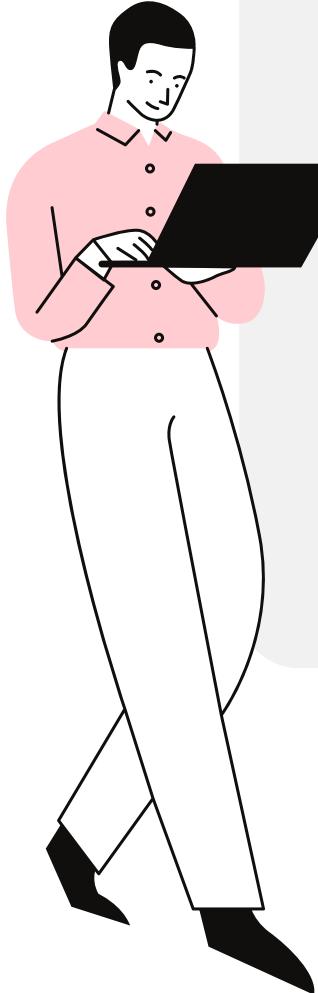
Dialogue User Interfaces

- **Definition:** Allows users to interact with computers using voice commands.
- **Applications:** Used in smart home devices, virtual assistants like Alexa, and in-car systems.
- **Advantages:** Hands-free interaction, beneficial for accessibility and multitasking. Hello



Gesture User Interfaces

- **Definition:** Enables users to control devices through physical gestures like hand movements.
- **Examples:** Used in gaming (e.g., Kinect), smart TVs, and automotive controls.
- **Advantages:** Natural and intuitive; no need for physical contact with devices.



Computer Types

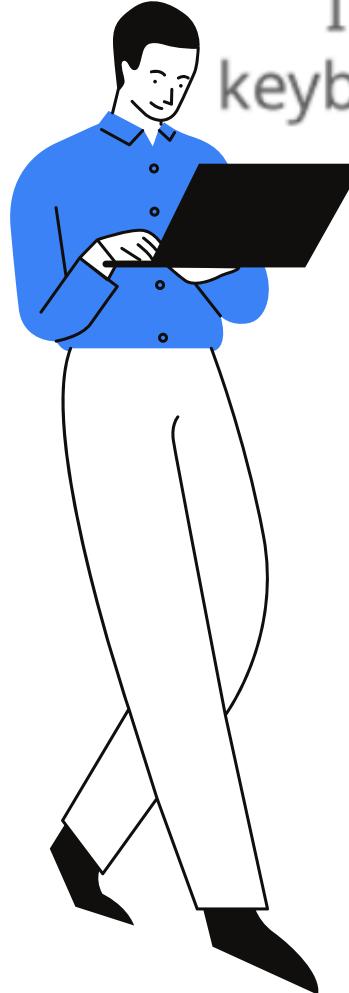


Desktop Computers



Key Features

Includes separate monitor, keyboard, and processor unit; not easily portable.



Advantages

Easier to upgrade and repair compared to laptops; generally more powerful for the same price.

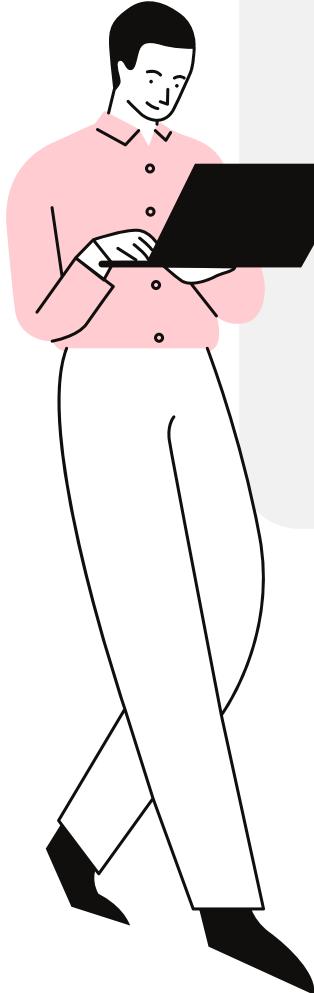


Use Cases

Commonly used for office work, gaming, and educational purposes.

Laptop Computers

- **Portability:** Laptops are designed to be portable with built-in screens, keyboards, and batteries.
- **Battery Life:** Allows users to work on the go, but requires recharging after several hours.
- **Uses:** Ideal for mobile office work, online learning, and multimedia consumption.

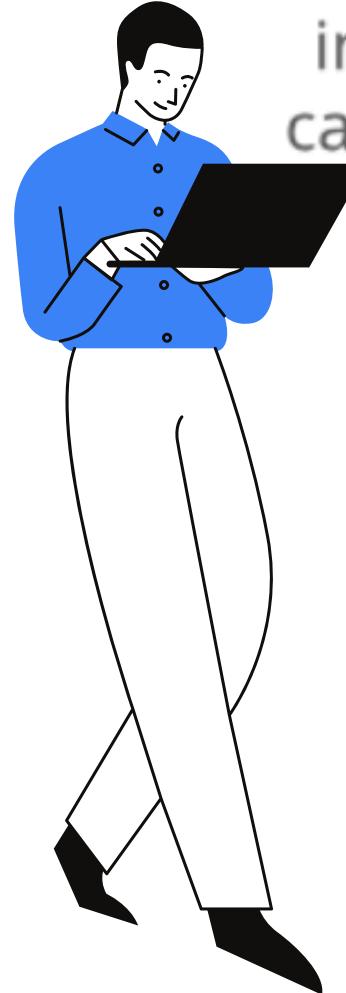


Smartphones



Features

Smartphones offer phone calls, internet access, apps, and cameras in a compact form.



Connectivity

Supports Wi-Fi and mobile networks (3G, 4G, 5G) for internet access on the go.



Applications

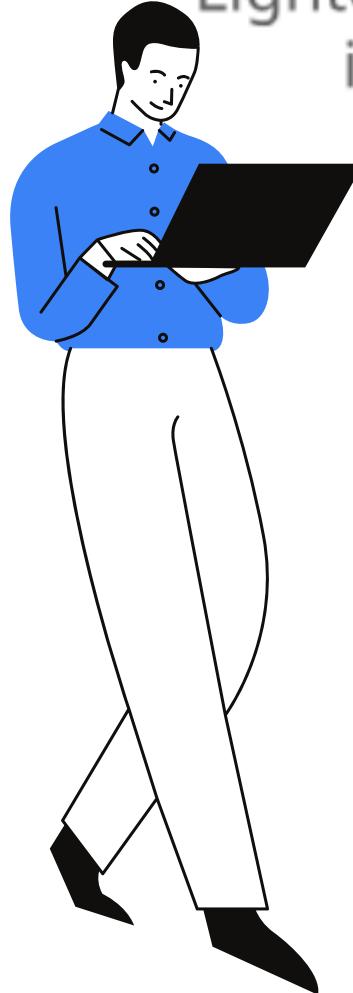
Used for communication, navigation, social media, and multimedia consumption.

Tablets



Portability

Lighter and thinner than laptops, ideal for on-the-go use.



Touchscreen Interface

Allows direct interaction with apps and media using touch gestures.



Use Cases

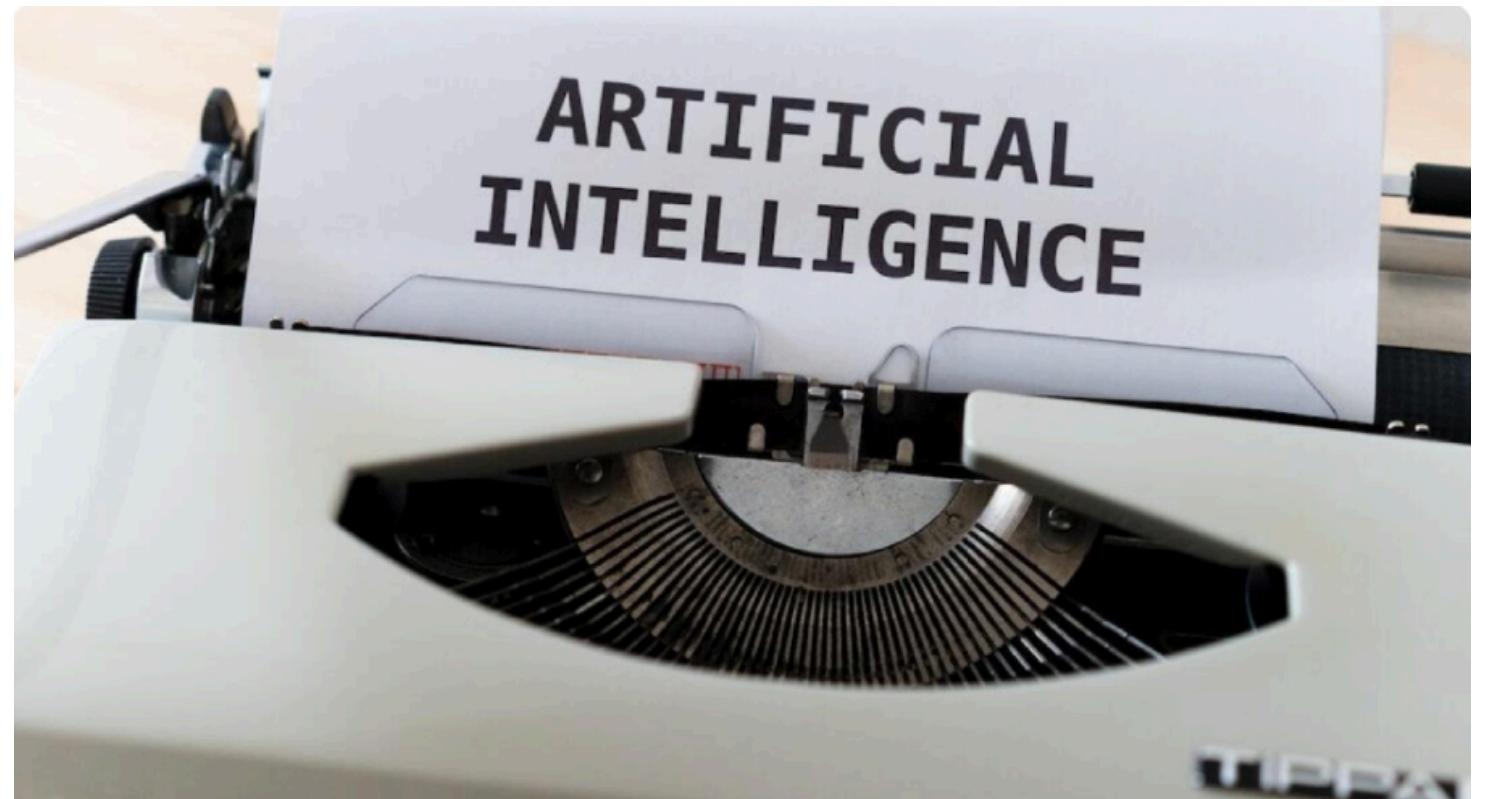
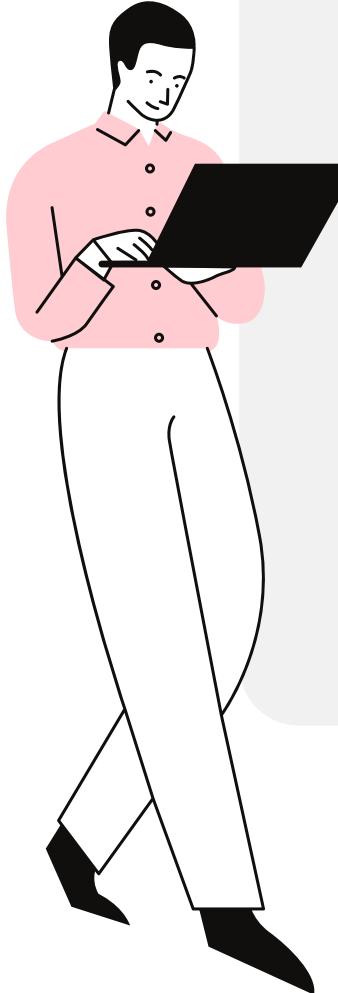
Popular for reading, streaming, note-taking, and light productivity tasks.

Emerging Technologies



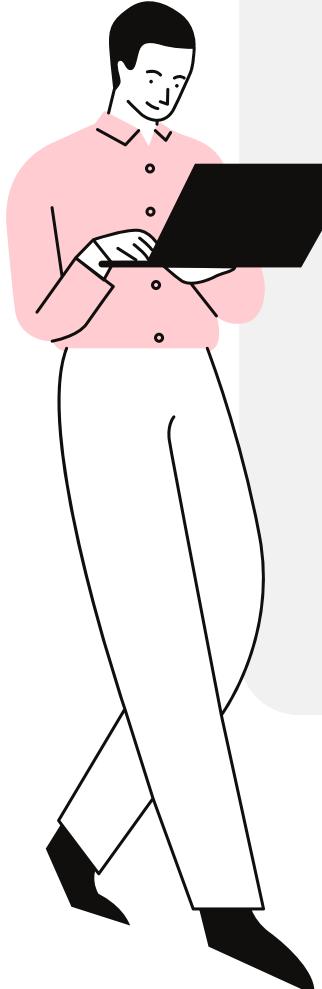
Artificial Intelligence

- Refers to machines and software capable of performing tasks that typically require human intelligence.
- **Applications:** Includes areas like natural language processing, autonomous vehicles, and robotics.
- **Impact:** AI is revolutionizing industries by enhancing efficiency, automation, and decision-making processes.



AR & VR

- **Augmented Reality (AR):** Superimposes digital information onto the real world using devices like smartphones and AR glasses.
- **Virtual Reality (VR):** Creates a fully immersive digital environment, experienced through VR headsets.
- **Applications:** Used in gaming, education, training, and simulations for enhanced user experiences.



Future of Computer Systems

- **Artificial Intelligence:** AI continues to evolve, driving automation and smart systems across industries.
- **Quantum Computing:** Promises to solve complex problems beyond the capacity of classical computers.
- **Internet of Things (IoT):** Connecting everyday devices to the internet for smarter homes and cities.

