Al-Mustaqbal University

College of Science

Artificial Intelligence Sciences Department

Computer Science

Lecture 1

Introduction to Computers

By

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What is a Computer?

A **computer** is an electronic device that manipulates information, or data. It has the ability to **store**, **retrieve**, and **process** data. You may already know that you can use a computer to **type documents**, **send email**, **play games**, and **browse the Web**. You can also use it to edit or create **spreadsheets**, **presentations**, and even **videos**.

Why Computers?

Speed and Accuracy

Computers process millions of calculations per second with precision. Human errors are eliminated.

Wide Storage

Modern computers store terabytes of data. This capacity continues to grow exponentially.
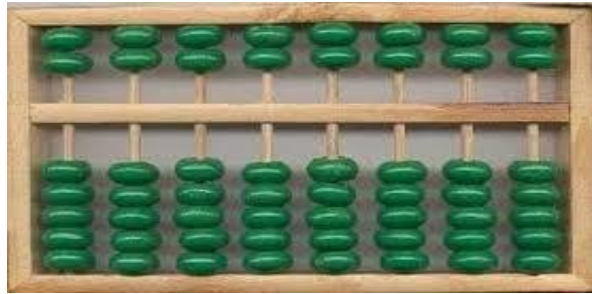

Automation

Repetitive tasks can be programmed once. Computers execute these without fatigue or boredom.

Connectivity

Computers enable instant global communication. Information sharing occurs at unprecedented scales.

History of Computers: Early Beginnings

Abacus (2400 BC) — 1

Humanity's first calculating device. Beads on rods allowed merchants to track transactions efficiently.
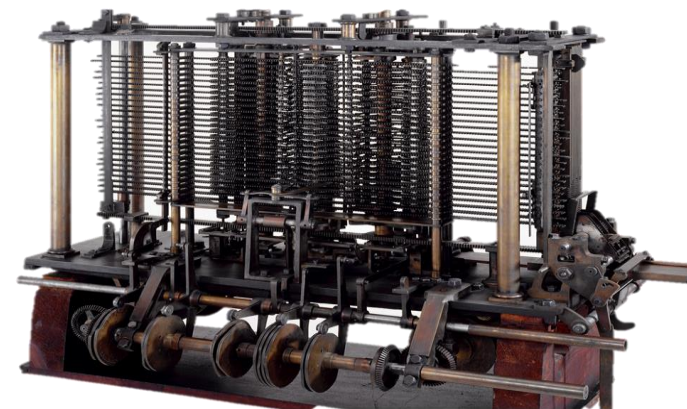

2 — **Pascaline (1642)**

Blaise Pascal's mechanical calculator. It used gears and dials to perform arithmetic operations.

Analytical Engine (1837) — 3

Charles Babbage's mechanical computer design. It introduced programming concepts still used today.

History of Computers: Modern Era

1

ENIAC (1946)

The Electronic Numerical Integrator and Computer. It filled an entire room and weighed 30 tons.

2

UNIVAC I (1951)

First commercial computer for business and government use. It predicted Eisenhower's election victory.

3

Personal Computers (1970s+)

Apple, IBM, and others brought computing into homes. Computing power became widely accessible.

Types of Computers: By Size and Power

Computers come in various sizes and processing capabilities to serve different needs:

Supercomputers

Fastest processing capabilities for complex simulations and scientific calculations. These massive systems often fill entire rooms and require specialized cooling infrastructure.

Mainframe Computers

Handle massive data processing for organizations like banks, insurance companies, and government agencies. These reliable systems can process millions of transactions daily.

Minicomputers

Mid-range processing for departments or small businesses. More powerful than personal computers but smaller than mainframes, providing a balance of performance and cost.
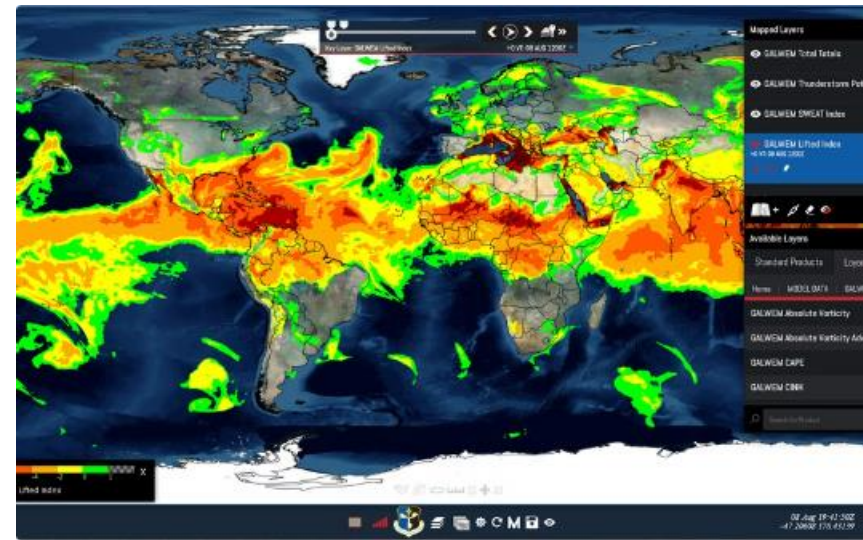
Microcomputers

Personal use computers including desktops and laptops that individuals use for work, entertainment, and communication. The most common type of computer in everyday use.

Types of Computers: By Purpose

General-Purpose Computers

Designed to perform a variety of tasks. Personal computers and smartphones fall into this category.

Special-Purpose Computers

Built for specific functions. Examples include scientific calculators and weather forecasting systems.
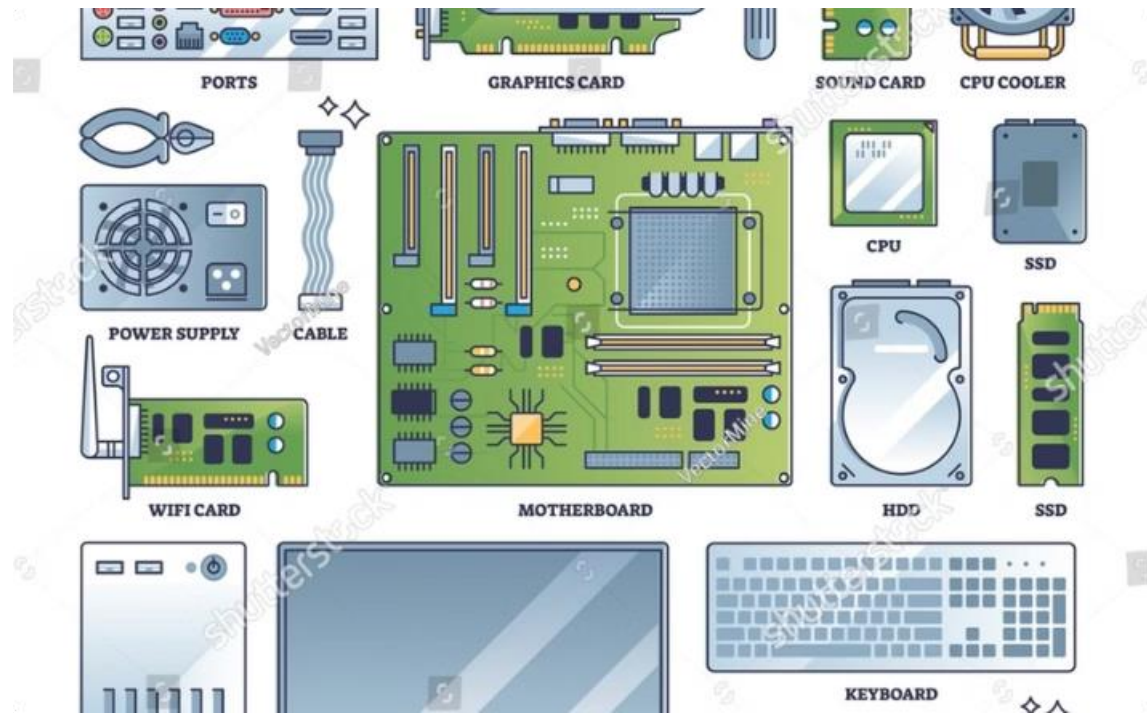
Embedded Systems

Computers integrated within other devices. Found in cars, appliances, and medical equipment.

Computer Categories: Hardware & Software

Hardware

The physical components of a computer that you can see and touch. This includes processors, memory, storage devices, input/output devices, and all tangible parts of the system.

The distinction between hardware and software is fundamental to understanding how computers function—hardware provides the platform while software provides the functionality.
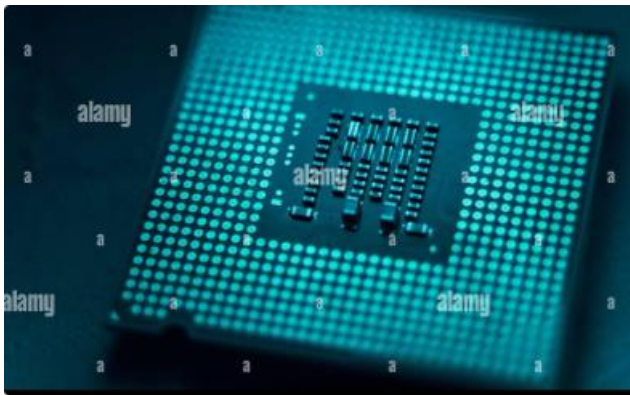
Software

The programs and instructions that tell the hardware what to do. This includes operating systems, applications, utilities, and all non-physical components that control computer operations.

Hardware Components

Central Processing Unit (CPU)

The brain of the computer. It executes instructions and performs calculations.

Memory

RAM provides temporary storage. ROM contains permanent startup instructions.

Storage Devices

Hard drives and solid-state drives store data permanently.
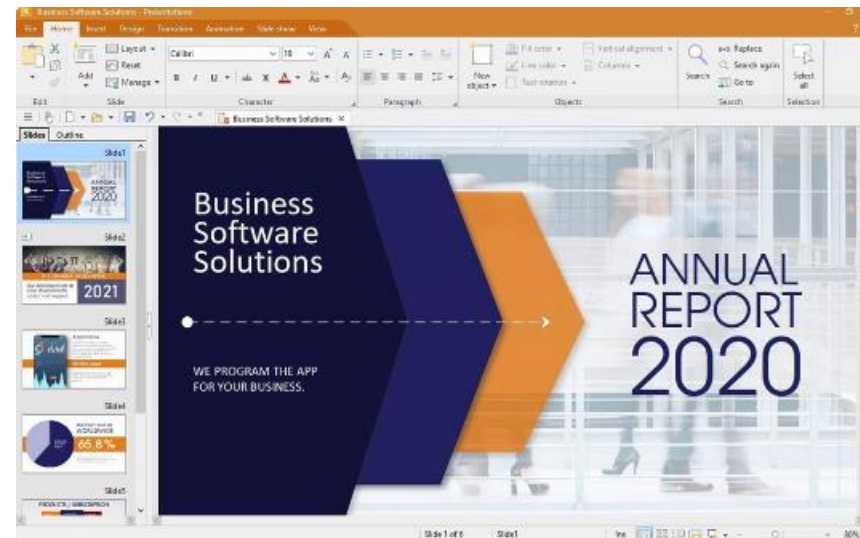

Input/Output Devices

Keyboards, mice, monitors, and printers allow human-computer interaction.
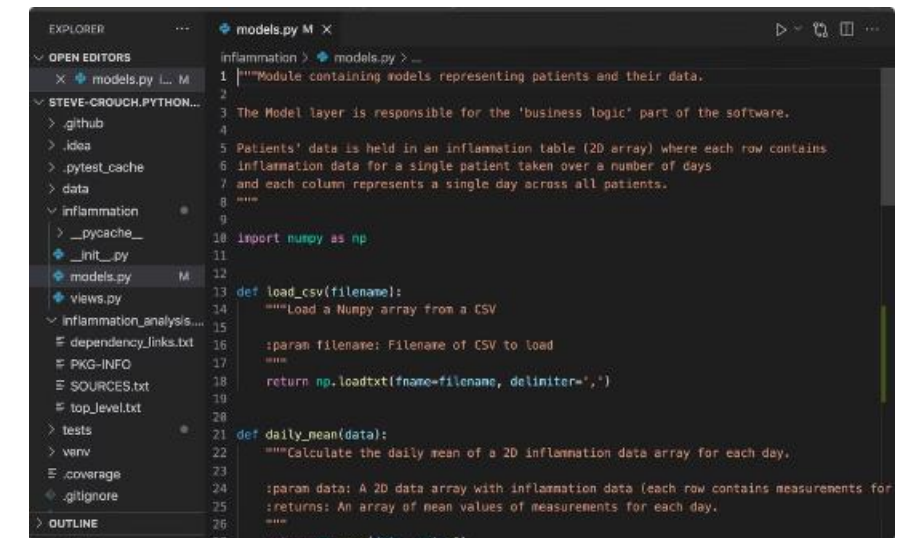
Software Components

System Software

Operating systems manage hardware resources. Device drivers enable hardware compatibility.

Application Software

Programs that help users perform specific tasks. Examples include word processors and games.

Programming Software

Tools for creating new software. Compilers translate code into machine-readable instructions.

Data vs. Information

Data

Raw, unprocessed facts and figures. Examples include numbers, text, images, and sounds.

Information

Data that has been processed, organized, and structured. It provides meaning and value.

Information helps in decision-making and problem-solving.

Transformation Process

Computers process data through operations like sorting, calculating, and analyzing.

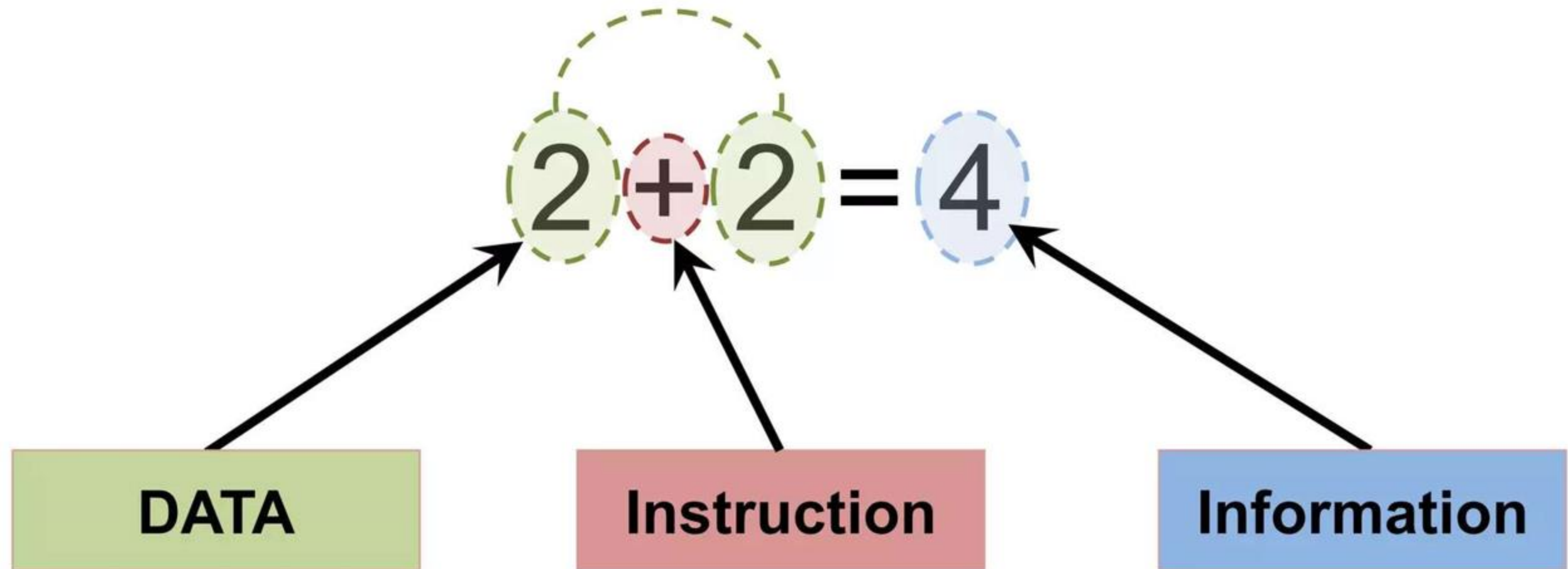This transformation creates useful information for human consumption.

PC four major functions are:

➔ Input data

➔ Process data

➔ Output information

➔ Store data and information
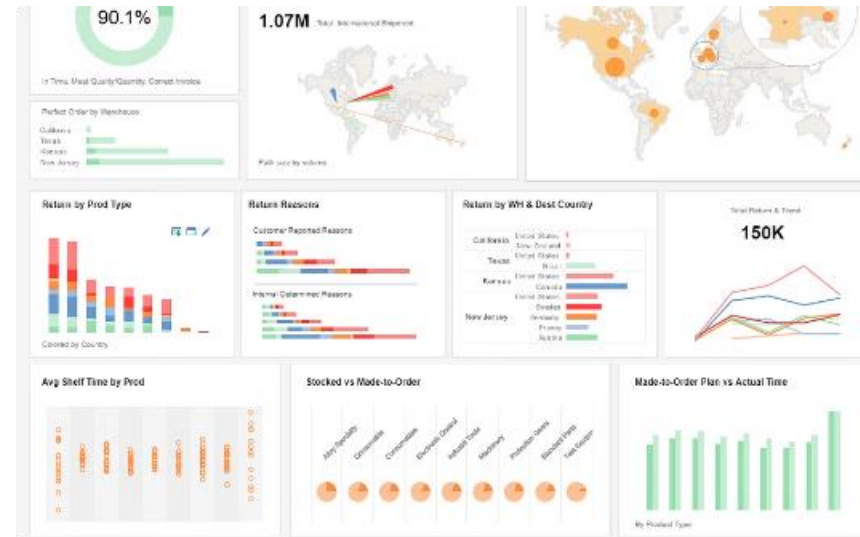
INFORMATION OUT

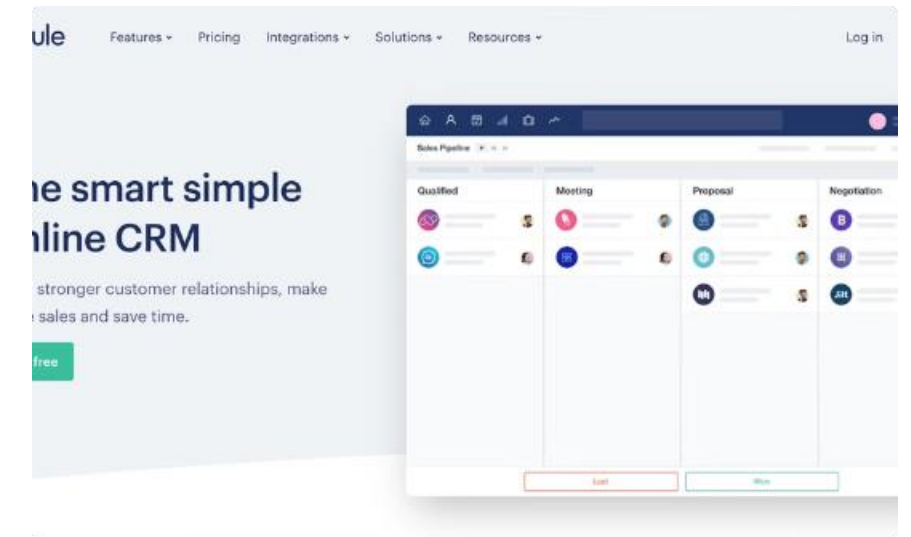**DATA IN**

ICT Applications: Business and Finance

Office Productivity

Word processing, spreadsheets, and presentation software streamline daily business tasks.

ERP Systems

Enterprise resource planning (ERP) Integrated management of core business processes. They connect departments through shared databases.
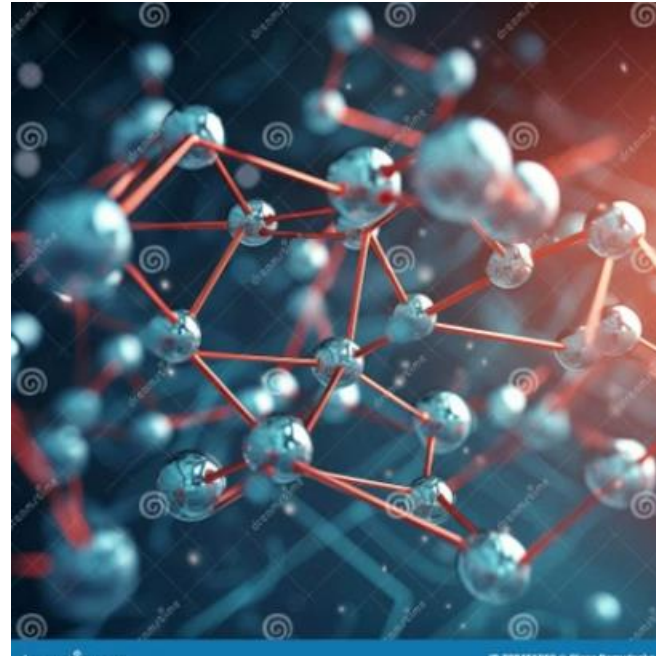
CRM Software

Customer Relationship Management (CRM) Tools for managing customer interactions. They help build stronger client relationships.

ICT Applications: Education and Research

Technology transforms education through interactive learning platforms, advanced research tools, and virtual classrooms.

Digital resources make knowledge more accessible to students worldwide.

ICT Applications: Entertainment and Communication

2.9B
Social Media Users
Platforms like Facebook, Instagram, and Twitter connect people globally.

1.1B
Streaming Subscribers
Services like Netflix and Spotify deliver personalized content on demand.

3.2B
Gamers Worldwide
Video games and virtual reality create immersive entertainment experiences.

Connecting Input/Output Devices to CPU

USB 2.0

Transfer rate of 480 Mbps. Still widely used for basic peripherals like keyboards, mice, and older external devices. Recognizable by its black connector.

USB 3.0

Delivers speeds up to 5 Gbps, ten times faster than USB 2.0. Ideal for external storage devices, high-resolution cameras, and data-intensive peripherals. Features a blue connector for easy identification.

HDMI 2.1

Offers impressive bandwidth of 48 Gbps. Supports 8K resolution, dynamic HDR, and enhanced gaming features including variable refresh rates. Essential for modern multimedia setups and gaming rigs.

Wi-Fi 6

Advanced wireless standard reaching 9.6 Gbps. Offers improved performance in crowded environments, reduced latency, and better power efficiency. Enables seamless connectivity for smart home devices, laptops, and mobile peripherals.

Modern computing systems feature a diverse array of connection interfaces, each optimized for specific peripheral types and use cases. Understanding these connection standards helps users select the appropriate interface based on speed requirements, device compatibility, and intended applications.

Thank you…

Any questions??