

ROBOTICS FOR TEENS

ROOKIE | 0X03-COMPUTER

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- **Review**
- **Types of Computers**
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WHAT IS COMPUTER

- **Definition:**
 - **Compute + er**
 - Is an electronic device that receives inputs, process it, stores data, and produce outputs.
 - An electric machine that process data and performs tasks according to instructions (programs).
 - It performs arithmetic and logical operations automatically.

COMPUTER AS A SYSTEM

- **Definition:**
 - Is a **complex system composed of multiple subsystems that work together to receive, store, process and output data.**
 - **Computer goal is processing and storing data, communication, etc.**
- **Computer system has:**
 - **Inputs (what it receives): Mouse, Keyboard, Microphone, Scanner, Cam, ...**
 - **Processes (what it does): Arithmetic and Logic**
 - **Outputs (what it produces): Monitor, Speaker, Printer, ...**

Feedback ???

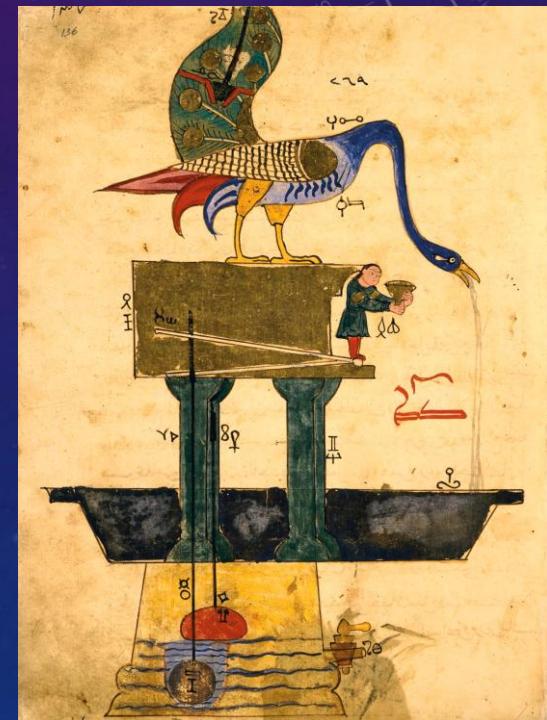
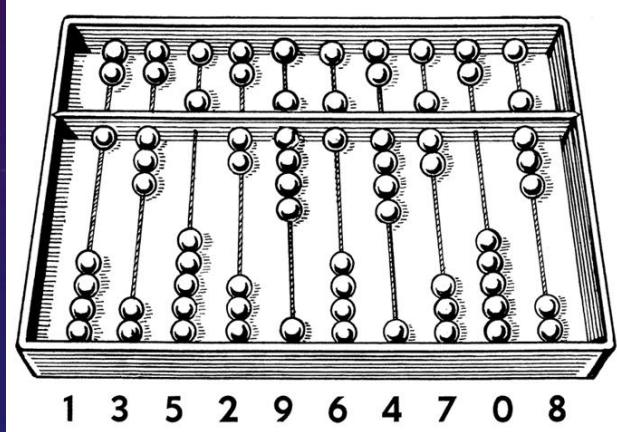
COMPUTER SUBSYSTEMS

- **Input**
 - Mouse, Keyboard, Touch, Microphone, Scanner, ...
- **Processing**
 - CPU, GPU
- **Memory & Storage**
 - RAM, SSD, HDD, ...
- **Output**
 - Monitor, Printer, Speaker, ...
- **Power Management**
- **Communication**

COMPUTER HISTORY RECAP

- **Abacus (China 2700 BC): First known calculator for basic math operations.**
- **Antikythera (Greek 100 BC): First known analogue computer, used for astronomical calculations.**
- ...
- **Al-Jazari's (1200 AD): Automata were mechanical devices, often powered by water, that were designed to perform specific tasks or entertain.**

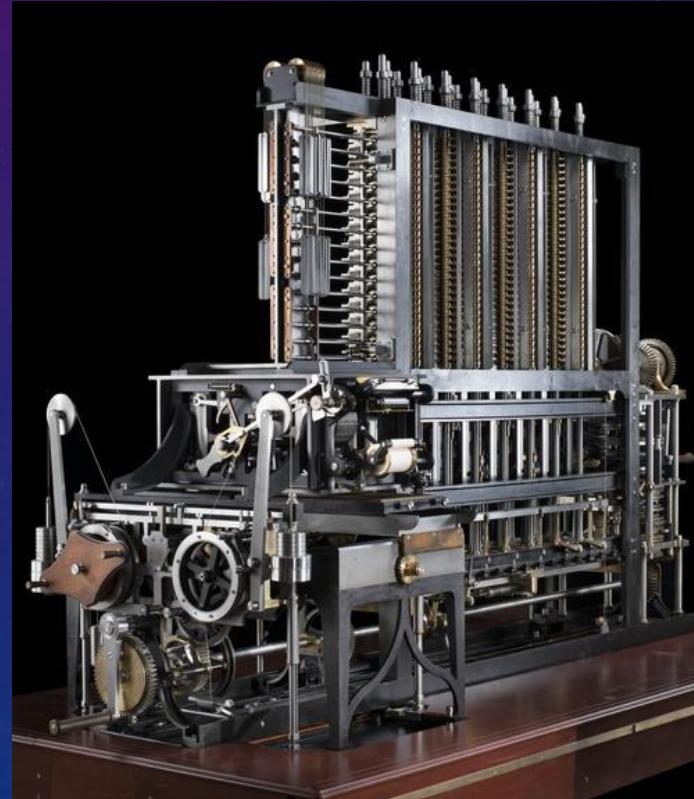
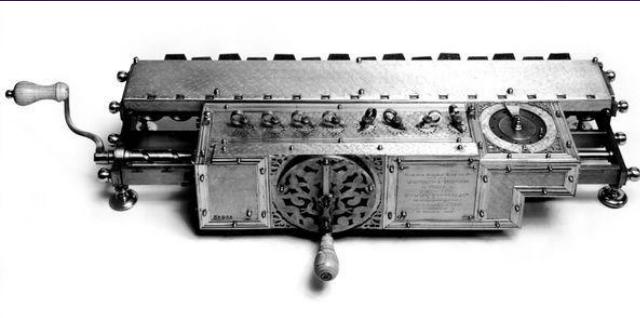
COMPUTER HISTORY RECAP



COMPUTER HISTORY RECAP - 2

- **Pascaline (Blaise Pascal 1640s): Automating arithmetic operations, designed for addition and subtraction.**
- **Step Reckoner (Gottfried Wilhelm Leibniz 1670s): perform all four basic arithmetic operations.**
- **Babbage's Difference Engine (Charles Babbage 1822): Analytical engine (first concept of programmable computer)**
- **Ada Lovelace (1830s): First computer programmer**

COMPUTER HISTORY RECAP - 2

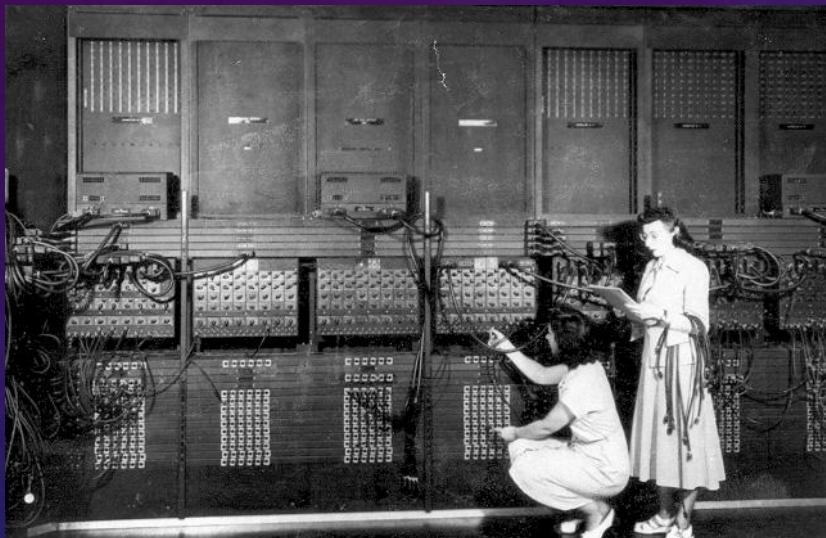


COMPUTER HISTORY RECAP - 3

- ENIAC (1946): First general purpose electronic computer
- Mainframe Computers (1950s): Very large systems
- Transistors: Replaced vacuum tubes (smaller and faster)
- Integrated Circuits (IC)
- Microprocessors: Invented in 1970s.



COMPUTER HISTORY RECAP - 3



COMPUTER HISTORY RECAP - 3

MOORE'S LAW "Transistor density on integrated circuits doubles about every two years." *

1950s

Silicon
Transistor



1
Transistor

1960s

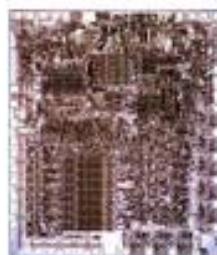
TTL
Quad Gate



16
Transistors

1970s

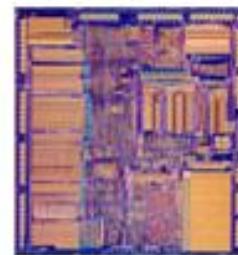
8-bit
Microprocessor



4500
Transistors

1980s

32-bit
Microprocessor



275,000
Transistors

1990s

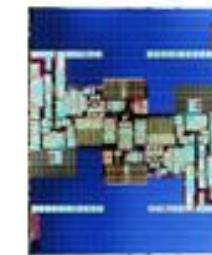
32-bit
Microprocessor



3,100,000
Transistors

2000s

64-bit
Microprocessor

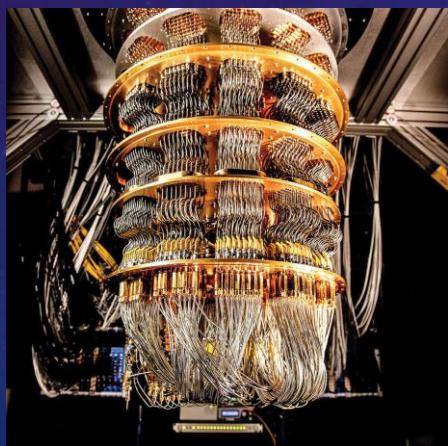


592,000,000
Transistors

MODERN COMPUTERS

- **Personal Computers: Desktop, All-in-One, Laptop, Notebook, Thin Client**
- **Smart Phones: Phone and Tablets**
- **IoT and Embedded Devices (+ SoC)**
- **Servers and Cloud**
- **Supercomputers**
- **Quantum Computer (Future)**

MODERN COMPUTERS



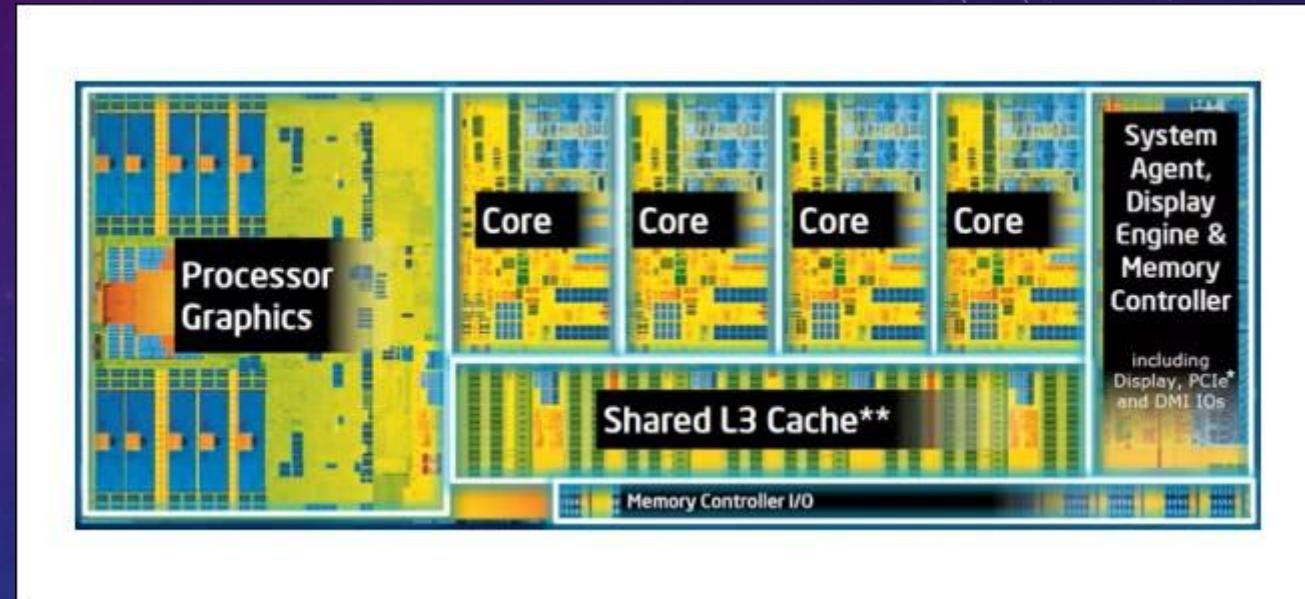
GENERAL COMPUTER HARDWARE

- CPU
- Motherboard
- RAM
- Storage
- GPU
- Network
- Power Supply Unit
- ...

CENTRAL PROCESSING UNIT (CPU)

- The brain of computer, executes instructions and calculations
- Register > Cache L1 > ...
- CPU cores for multitasking (Process, Thread)
- Clock speed (GHz) means how fast it works
- Cache memory for faster access
- Intel or AMD ? Generation ? Cores ? Frequency ?

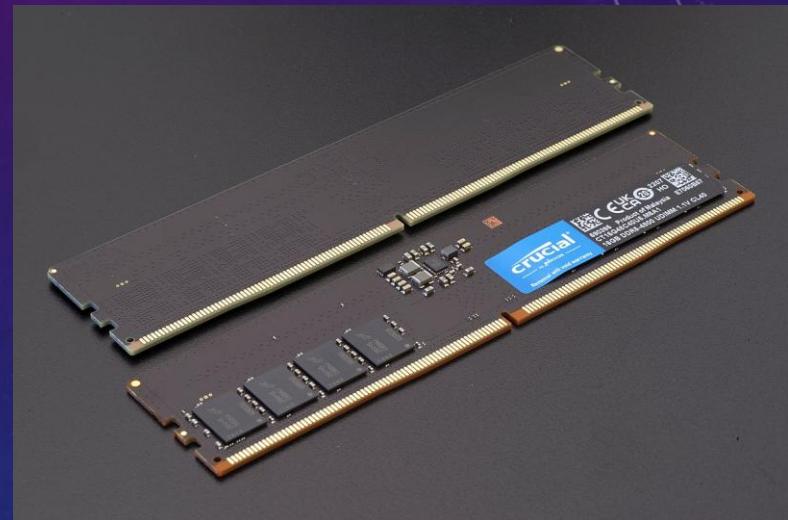
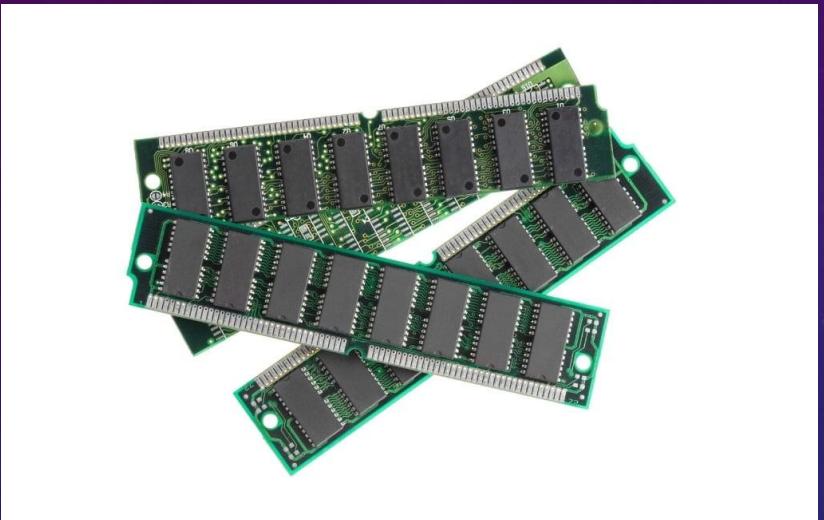
CENTRAL PROCESSING UNIT (CPU)



RANDOM ACCESS MEMORY (RAM)

- The short-term memory, stores data temporarily for fast access
- More RAM means better multitasking, better GPU shared ram, ...
- It's memory capacity is measured in Giga Bytes (GB)
- It's Speed (MHz) and Type (DDR5, ...) matters
- Data erased when the power is off
- Capacity ? Speed ? Type ?

RANDOM ACCESS MEMORY (RAM)



GENERAL COMPUTER – INPUT OUTPUT / PERIPHERAL DEVICES

- **Monitor**
- **Mouse**
- **Keyboard**
- **Speaker**
- **Webcam**
- **Printer**
- **Scanner**
- ...

COMPUTER SHOPPING GUIDE

- Choose purpose
- Budget
- Portability
- Peripherals
- Benchmarks