


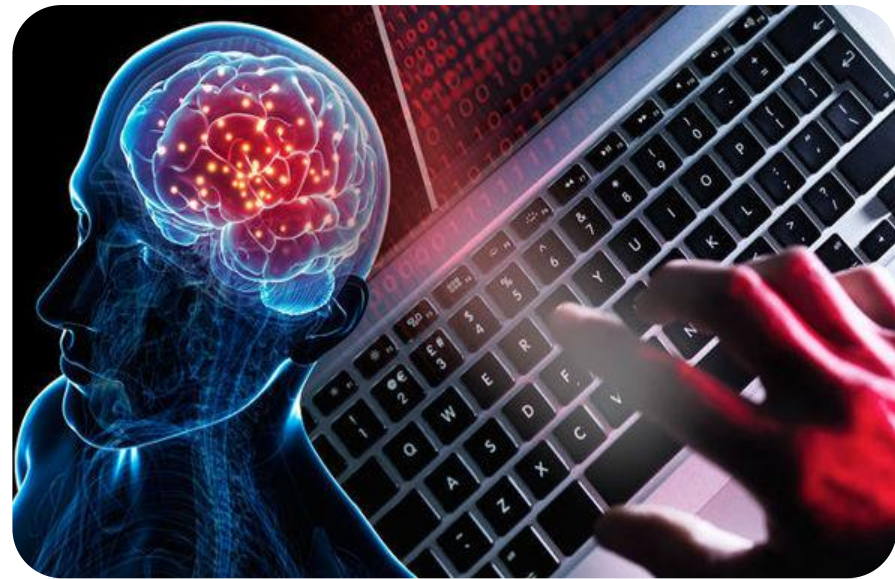
SYSTEM COMPONENTS

CONTENTS

- ✓ 1- What are the similarities between the human brain and computers?
 - ✓ 2- List hardware components inside the system unit.
 - ✓ 3- List roles of each component on motherboard.
 - ✓ 4- How does the CPU process data?
 - ✓ 5- List types of memory with purpose.
 - ✓ 6- Define “Algorithms and Flowcharts”
 - ✓ 7- Discuss factors that determine processor performance.
- 

1- WHAT ARE THE SIMILARITIES BETWEEN THE HUMAN BRAIN AND COMPUTERS

- Both use electrical signals to send messages.
- Both transmit information.
- Both have a memory that can grow.
- Both can adapt and learn.
- Both need energy.
- Both can be damaged.
- Both can do math and other logical tasks.



1- WHAT ARE THE SIMILARITIES BETWEEN THE HUMAN BRAIN AND COMPUTERS

Multi-Tasking

Humans will not even notice that a process has been suspended and then resumed because human response time is greater than the millisecond range.

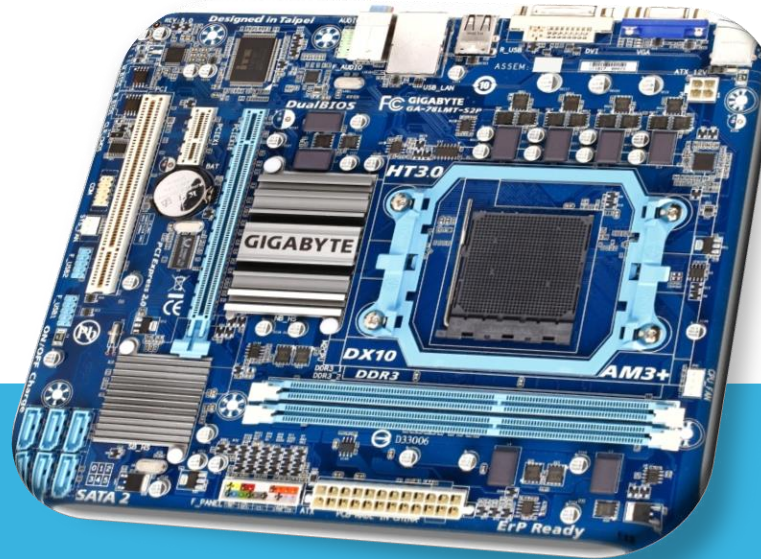
Therefore, although the computer appears to be executing several programs simultaneously with multitasking, the truth is that the computer is executed the processes in a *concurrent*, or overlapping, fashion.

Concurrent? a form of process management where multiple processes are active at a time but where the CPU switches off between them.

2- LIST HARDWARE COMPONENTS INSIDE THE SYSTEM UNIT

MOTHERBOARD

The motherboard provides the connections between the CPU, memory, and other components. The motherboard is a piece of fiberglass or plastic on which sockets and bus lines are attached.



DISK DRIVES

The hard disk is the standard unit of long-term storage. The hard disk drive contains several hard disk platters onto which information is stored as magnetic charges.



FAN UNITS

Used for cooling.



POWER SUPPLY

Provides power for the internal components.



3- LIST ROLES OF EACH COMPONENT ON MOTHERBOARD

- The CPU : for processing.
- A cooling unit for the CPU.
- Possibly extra processors (for instance, for graphics).
- Memory chips for RAM, ROM.
- Connectors for peripherals (sometimes known as ports).
- Expansion slots for other peripheral device cards
- The **ROM BIOS** for booting and basic input and output instructions
- Power supply connector
- IC intergrated circuit
- Transistor
- Buses

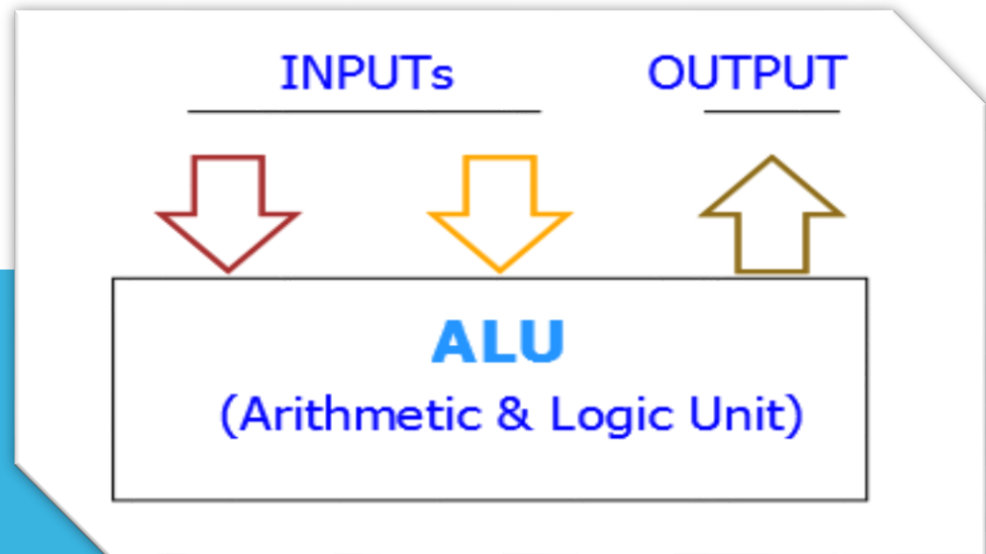
4- HOW DOES THE CPU PROCESS DATA

It does so using **two** different pieces of hardware:

1) ALU

The first is the ALU, which executes all arithmetic and logic operations. An adder is used to perform both addition and subtraction. A multiplier is used for multiplication. A divider is used for division.

A comparator is used to compare two values (for instance, to determine if $a > b$). Other circuits perform shifting, rotating, and parity computation.



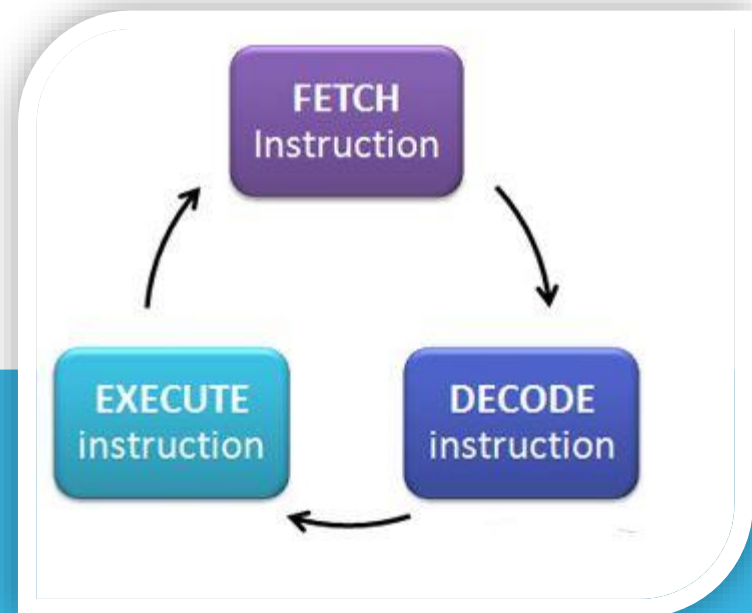
2) CONTROL UNIT

The control unit is responsible for controlling (commanding) all of the components in the computer.

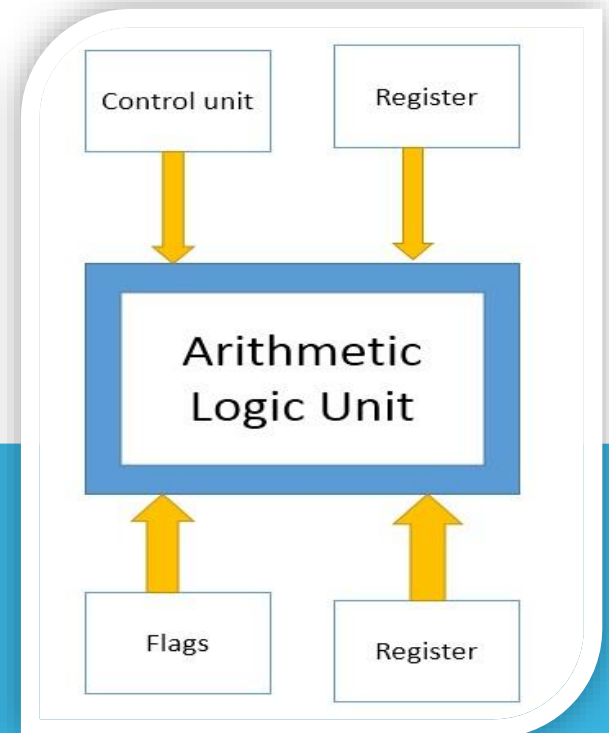
The control unit sends out signals as a memory read or a memory write.

It also sends signals to the **ALU** such as to perform a subtraction or a comparison.

The control unit controls the fetch–execute cycle. First, it accomplishes the **fetch** stage. Then it **decodes** the fetched instruction into **microcode**.



The Control Unit sends out control signals to all of the components in the computer. This might be a signal to memory to perform a read, or a signal to the ALU to perform an add, or a signal to move a datum from one location (ex:- say the output of the adder) to a 'temporary storage in the CPU '(Register)

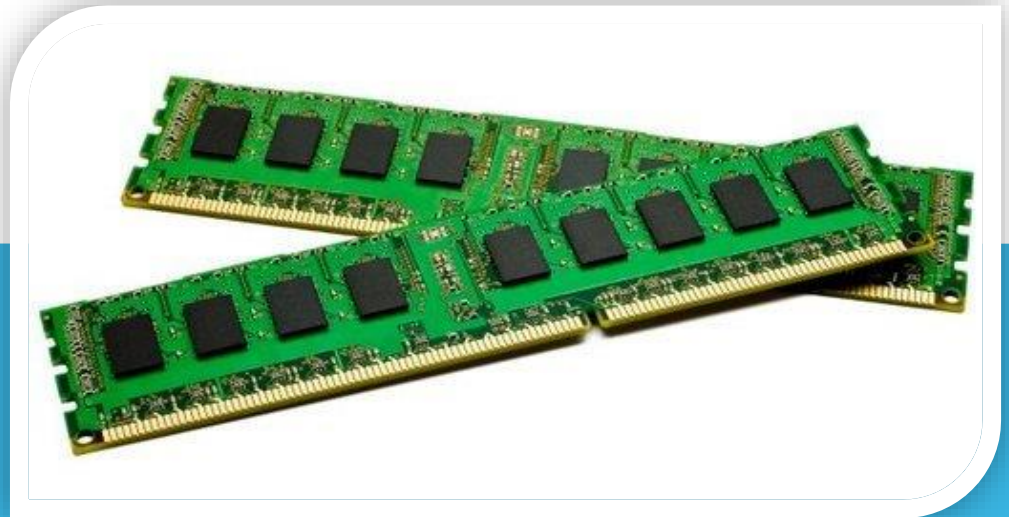


5- LIST TYPES OF MEMORY WITH PURPOSE

RAM : Random-access memory :

Dynamic RAM (DRAM) or (Main Memory) : DRAM is the Oldest. It can handle a great deal of memory storage, however, it's access time is much slower than the CPU.

Static RAM (SRAM) : We use SRAM to build registers in the CPU and cache memory.




ROM : ROM is read-only memory. It is memory where the information being stored is permanently fused into place, so it can only be read, not written to.



CACHE (L1,L2,L3)





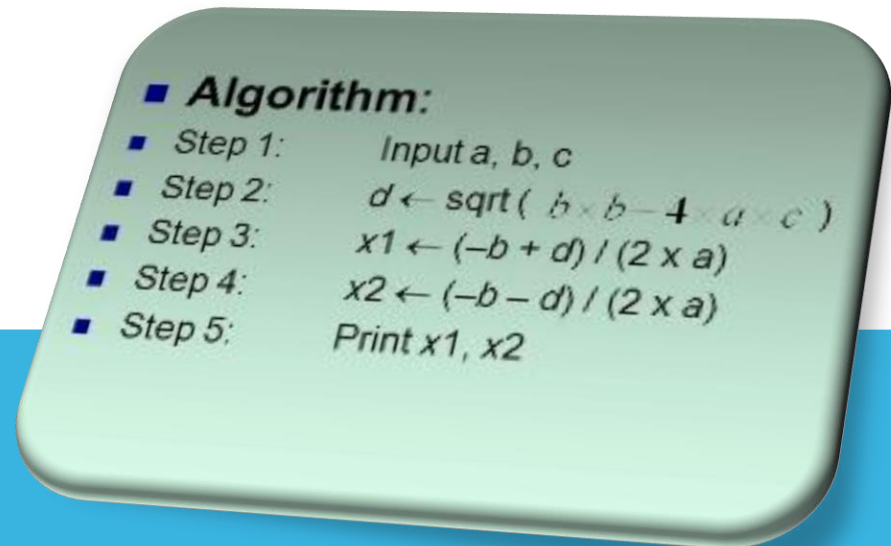
Main memory (DRAM) and cache/register memory (SRAM) are **volatile** forms of memory. Once you turn the power off, the contents are lost.

Nonvolatile memories include ROM, flash drives, hard disk, and optical disk.

6- DEFINE “ALGORITHMS AND FLOWCHARTS”

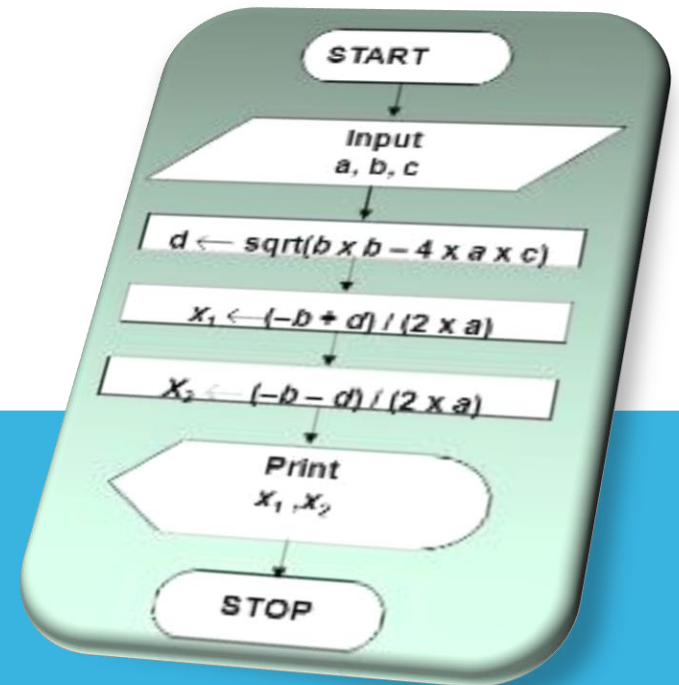
1) ALGORITHMS

- An algorithm is a step by step method of solving a problem. It is commonly used for data processing, calculation and other related computer and mathematical operations.



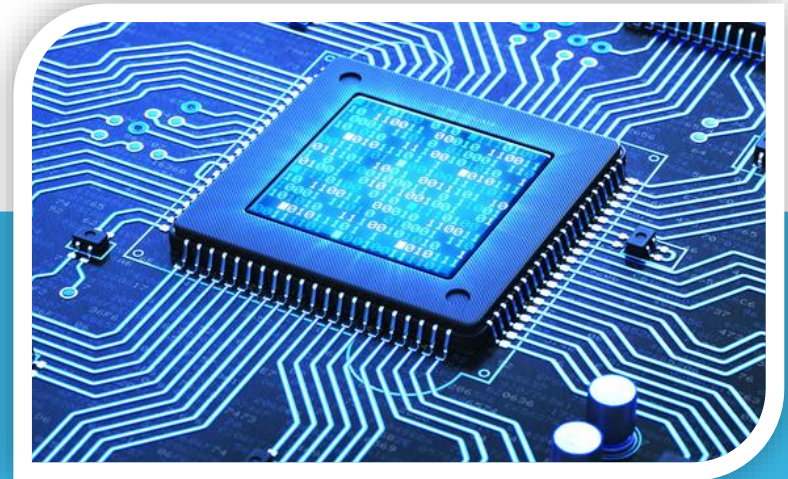
2) FLOWCHARTS

- A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flow chart symbols are linked together with arrows showing the process flow direction.



7- DISCUSS FACTORS THAT DETERMINE PROCESSOR PERFORMANCE

- Word size, which limits the size of data moved at a time. Smaller word sizes usually mean more data transfers over the bus and lengthier execution times to compute large values).
- Cache performance and memory speed and size
- The program itself (some programs require resources that are slower or more time consuming than others)
- Whether the computer is running multiple programs at a time versus running on an unloaded system
- The impact of the operating system on performance
- The impact of virtual memory on performance
- Many other issues



THANK YOU FOR WATCHING 😊

Done by: Fahed Ben Omran

