

PHASE 1 DAY 24

How does a CPU work?

- CPU stands for central processing unit [brain of the computer]
- It operates in a cycle known as fetch-decode-execute cycle:-

Fetch:- getting instructions from the memory (RAM)

decode:- performing the operations

execute:- executes decoded instruction. [Using ALU]

Every CPU consists of a clock that determines the speed of execution.

For a program to run all the components and registers must work at a very high speed.

Scott CPU is a design that is used:-

- CPU is connected to the mother board through pins [Input/output]:
- Mother board connects all the components.

• RAM - data being processed.

- List of addresses
- CPU requests data from the RAM.
- Enable wire $\rightarrow 1$:- RAM automatically sends data to CPU.
- Set wire \rightarrow to store data.
- data is stored as 1s and 0s.
- RAM consists of instructions, addresses, numbers, letters.

• Instruction Set.

- CPU has its own set of instructions
LOAD, ADD, STORE, JUMP, COMPARE, JUMP if, IN, OUT

• CONTROL UNIT :- Instructions that are received from the RAM are broken down into commands for other components. eg ALU.

↳ ALU :- performs mathematical operations [+ , - , comparison]

↓
2 inputs :- Perform operations based on type of operations.

- ALU uses flags when comparison has to be performed between these 2 inputs.

• Output is stored in a Register :- Register's job is to store a number temporarily inside the CPU.

- Faster and easier to store temporary data.

Set wire of register :- Saves the data in the input wire.

To move data that is saved in register :- enable wire

CPU BUS :- group of wires that connect multiple components

The control unit decides where to save the numbers.

~~Bus advantage~~

advantage of using a bus is that simply by changing the values of some wires we can move data between registers.

disadvantage :- only 1 number on it at a time.

Instruction register :- instruction from RAM to control unit.

Flag register :- to store ALU flag

Memory address to RAM register :- Once the work is done the control unit sends for another instruction address to RAM. This register tells the RAM which memory address to access next.

data is transferred between the instruction, memory address and flag registers through the bus.

Port address is used to connect variable devices [monitor, keyboard]

Inside the hardware drive is spinning disc with magnets and an arm on it.

The arm moves around to different part of the disc where data is stored and retrieved.

The CPU's role is to execute instructions by repeatedly performing these in order.

Instruction from memory [RAM, ROM] is fetched and this instruction is brought into its internal registers for processing.