

COMPUTER ARCHITECTURE

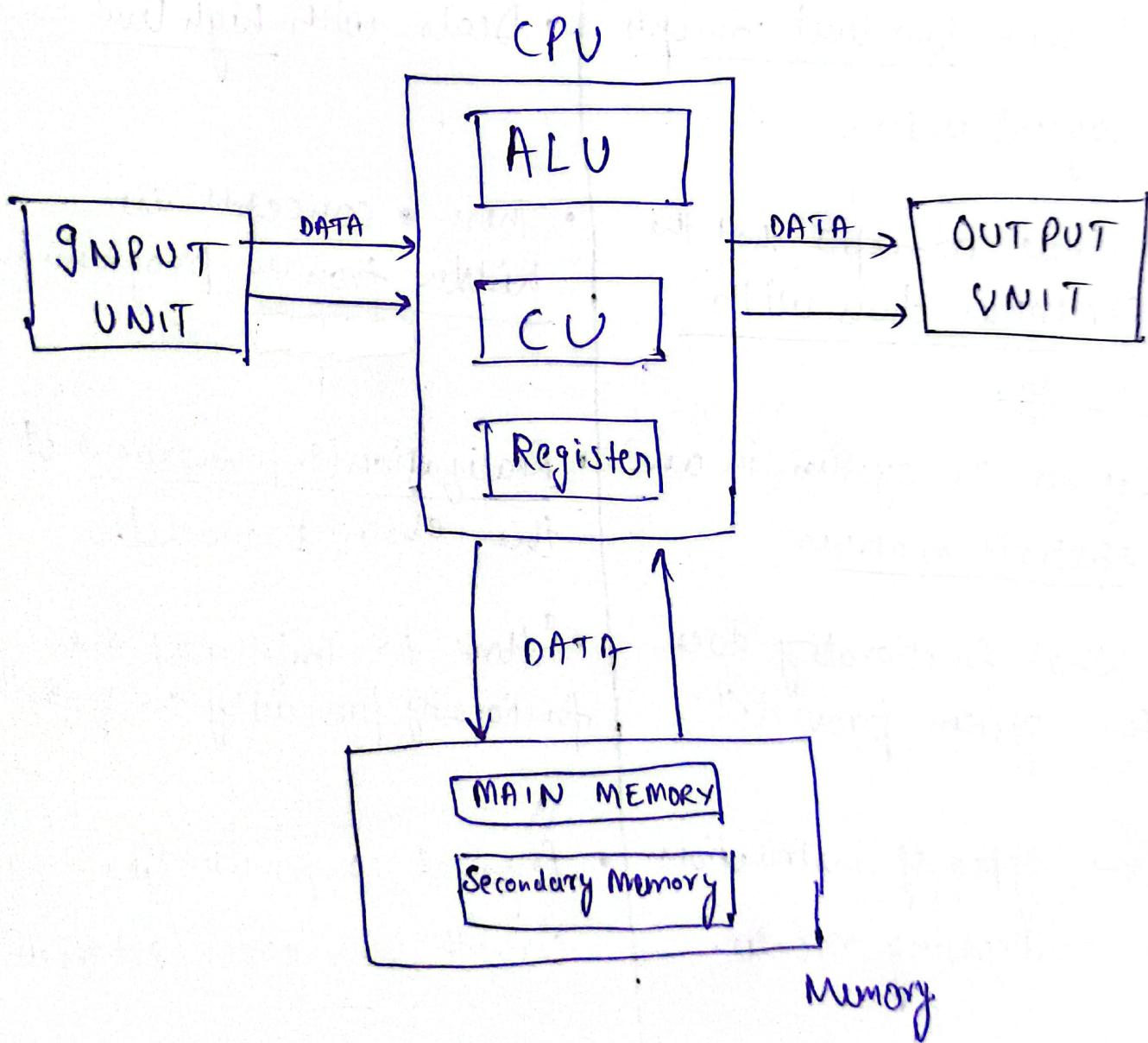
- It refers to those attributes of a system that are visible to the programmer and have a direct impact on logical execution of a program.
- Deals with low level concepts or logical units.
- Includes concepts that the programmer deals with directly.
- Defines the system in an abstract manner.
- "What functionality does the system provide"
- Ex- types of instruction or addressing modes.

COMPUTER ORGANISATION

- It refers to the operational units and the interconnection between them that achieve the architectural specification.
- Deals with high level concepts.
- These concepts are hidden from the programmer.
- Realization (Implementation) of the abstract model.
 - "How to implement the functionality provided by the system"
- Physical components like circuits with adder/subtractor.

* FUNCTIONAL BLOCKS OF A COMPUTER

- COMPONENTS that aids the working cycle of a computer i.e. the "INPUT- PROCESS- OUTPUT" cycle are called the functional blocks of a computer.



* A computer consists of five functional blocks namely:

- 1) Input UNIT
- 2) MEMORY UNIT
- 3) ALU
- 4) CPU
- 5) Output unit

→ Covered in later topics.

* INPUT UNIT

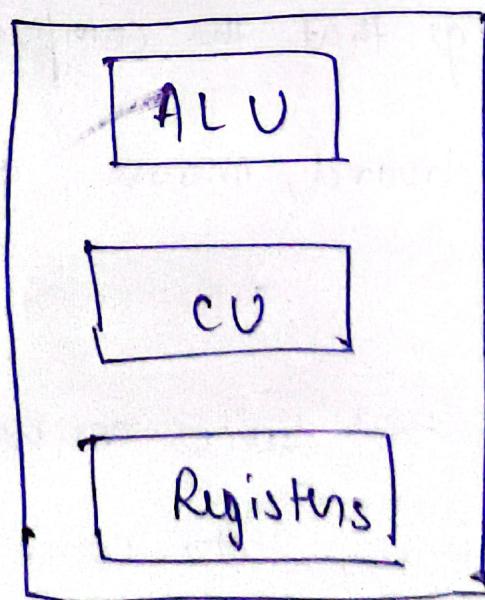
- It consists of input devices connected to a computer.
- These devices takes input and convert it into binary language that the computer understands.
- Ex → Keyboard, mouse, joystick, scanner etc..

* OUTPUT UNIT

- It consists of output devices connected to a computer
- It converts binary data coming from CPU to human understandable form.
- Ex → Monitor, printer etc.

* CPU

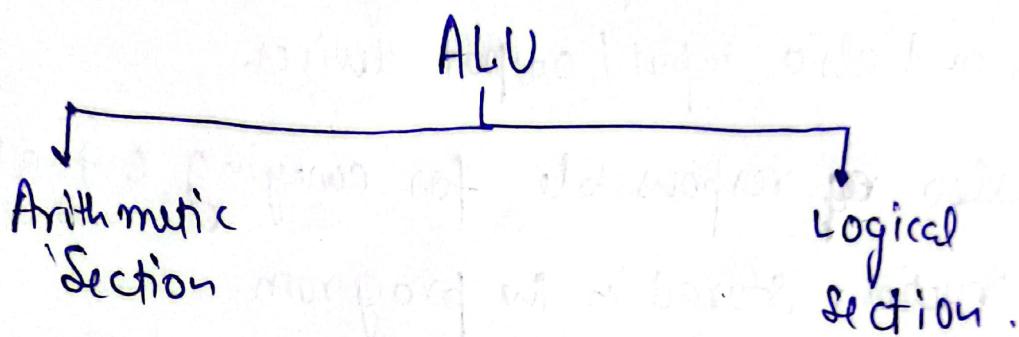
- Gets the CENTRAL PROCESSING UNIT.
- The primary function of the CPU is to execute a set of instructions stored in computer's Memory.
- A typical CPU has three major components:
 - 1) Arithmetic Logic Unit (ALU)
 - 2) CONTROL UNIT (CU)
 - 3) Register Set



Overview of a CPU .

① Arithmetic Logic Unit (ALU)

- All the arithmetic and logical operations are performed by ALU and these operations are initiated once the operands are brought into the processor.



→ Arithmetic Section

- It performs arithmetic operations such as, +, -, /, *
- All complex operations are done by making repetition use of above operations.

→ Logical Section

- It performs the logic operations such as comparing, selecting, matching and merging of data.

② CONTROL UNIT

- The control unit coordinates and controls the data flow in and out of CPU.
- It controls all the operations of ALU, memory registers, and also input/output devices.
- It is also responsible for carrying out all the instructions stored in the program.
- It decodes the fetched instruction, interprets it and sends control signals to input/output devices until the required operation are done.

③ MEMORY UNIT

- Its main function is to store data and programs or instructions.
- It's mainly of three types.
 - 1) Primary memory
 - 2) Secondary memory
 - 3) Cache memory

(not covered)
now

① PRIMARY MEMORY

- Primary memory holds only those data and instructions on which the computer is currently working.
- It has limited capacity and data is generally lost when power is switched off.
- Not as fast as registers.
- Data and instructions required to be processed resides in the main memory.
- It is of two types:
 - ① Random Access Memory (RAM)
 - ② Read only memory (ROM).

① RAM: Memory in which any location can be reached in a short and fixed amount of time after specifying its address is called random Access memory.

② ROM: Memory which is only readable by the user and can't be altered is called ROM.
→ It contains the Operating System.

② SECONDARY MEMORY

- It is also called external memory or non volatile memory
- Slower than main memory.
- CPU directly doesn't access them , instead they are accessed via input - output routines.
- The contents are first transferred to main memory and then CPU can access them.
- For ex → CD-ROM, DVD etc

③ Cache Memory

- Cache memory is a very high speed semiconductor memory which can speed up the CPU.
- Acts as a buffer b/w CPU and main memory.
- "It is used to hold those parts of data and programs which are most frequently used by the CPU."
- Data is transferred to cache memory by the OS. and the CPU can access it from there.