FUNCTIONAL UNIT

Chapter : 2

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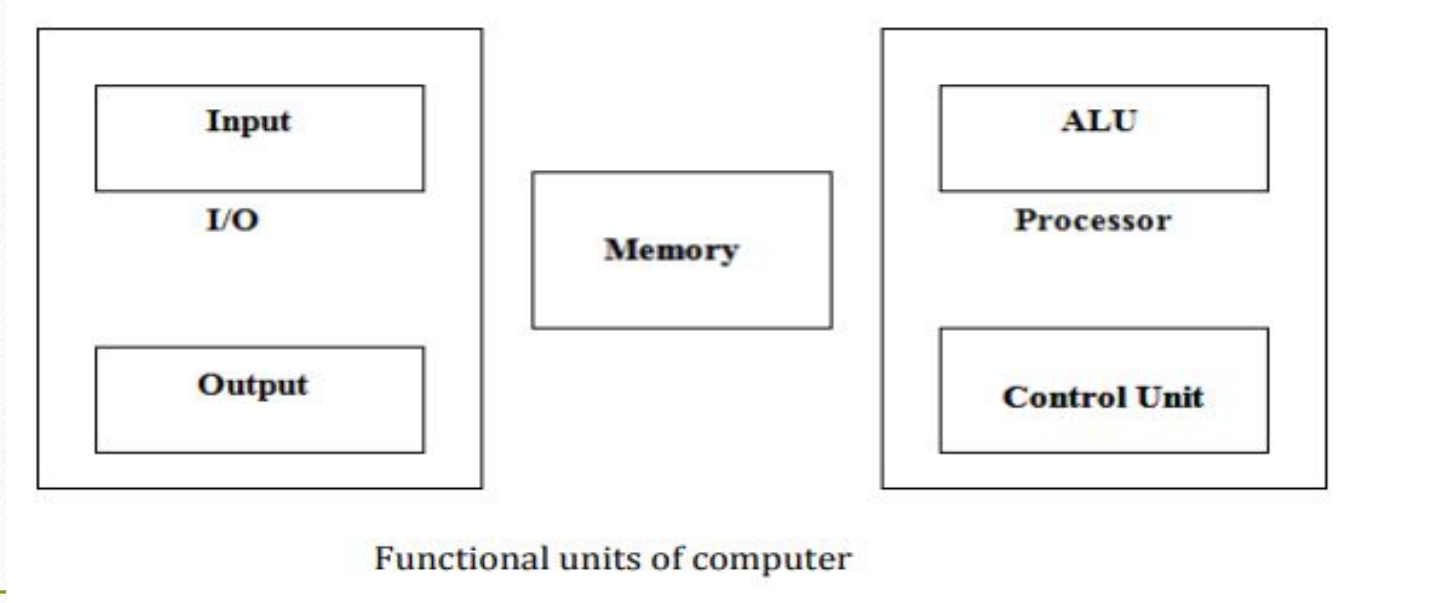
FUNCTIONAL UNIT

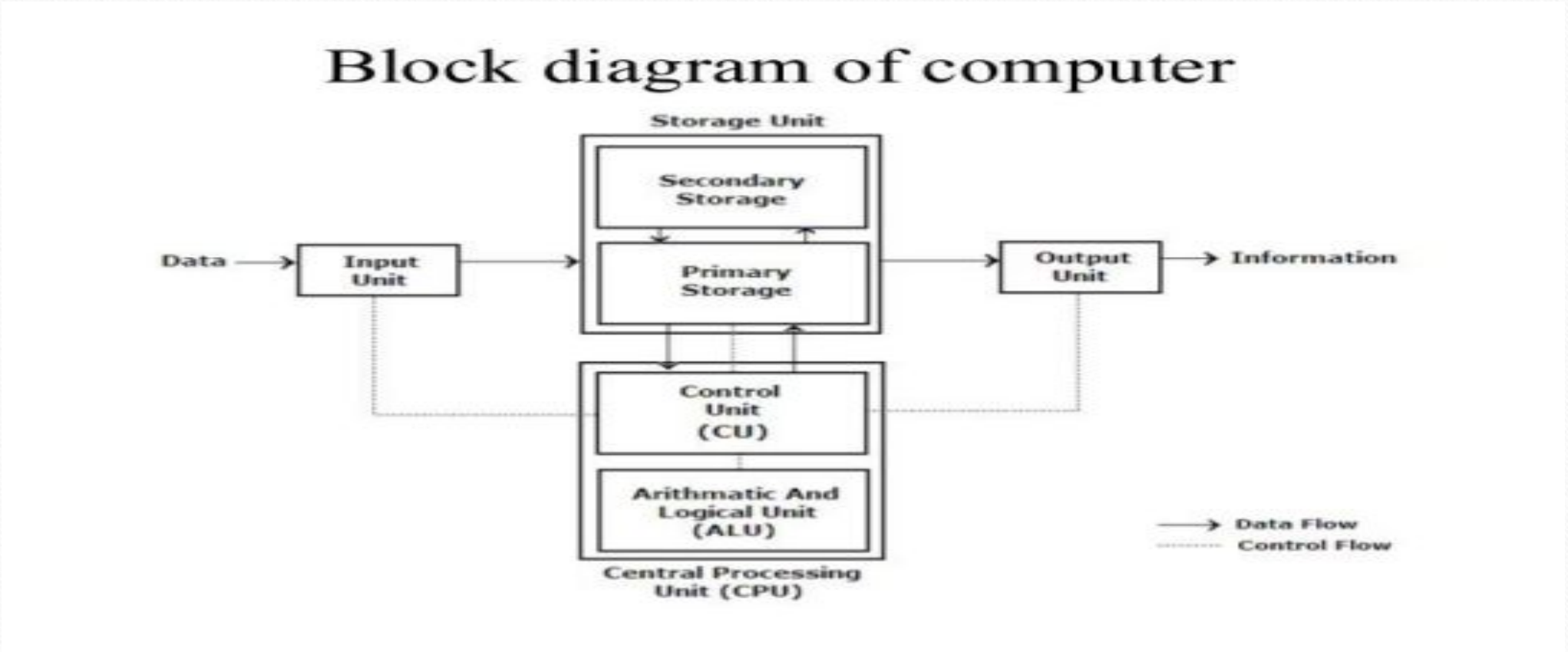
- A computer consists of five functionally independent main parts input, memory, arithmetic logic unit (ALU), output and control unit.



Functional units of computer

- Input device accepts the coded information as source program i.e. high level language. This is either stored in the memory or immediately used by the processor to perform the desired operations. The program stored in the memory determines the processing steps. Basically the computer converts one source program to an object program. i.e. into machine languag

- Finally the results are sent to the outside world through output device. All of these actions are coordinated by the control unit.



Input unit

- The source program/high level language program/coded information/simply data is fed to a computer through input devices keyboard is a most common type. Whenever a key is pressed, one corresponding word or number is translated into its equivalent binary code over a cable & fed either to memory or processor. Joysticks, trackballs, mouse, scanners etc are other input devices

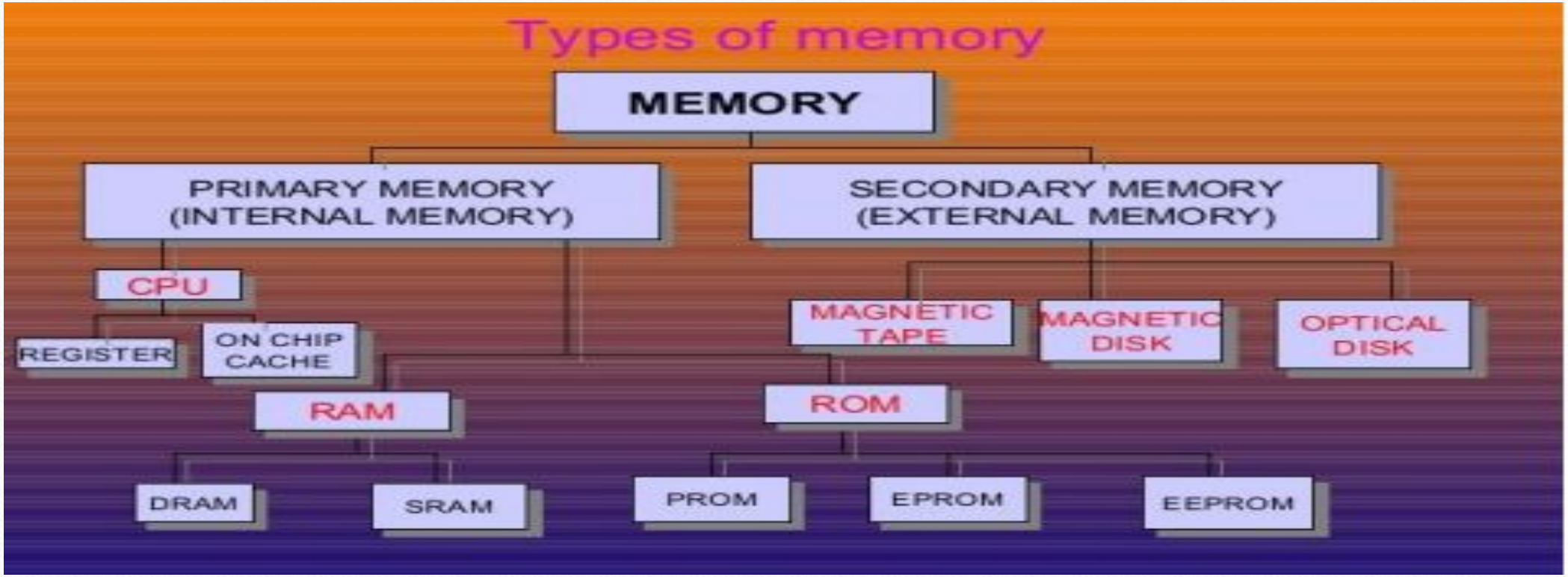
- **Memory unit:** - Its function into store programs and data. It is basically to two types
- 1. Primary memory
- 2. Secondary memory

Word: In computer architecture, a word is a unit of data of a defined bit length that can be addressed and moved between storage and the computer processor. Usually, the defined bit length of a word is equivalent to the width of the computer's data bus so that a word can be moved in a single operation from storage to a processor register. For any computer architecture with an eight-bit byte, the word will be some multiple of eight bits. In IBM's evolutionary System/360 architecture, a word is 32 bits, or four contiguous eight-bit bytes. In Intel's PC processor architecture, a word is 16 bits, or two contiguous eight-bit bytes. A word can contain a computer instruction, a storage address, or application data that is to be manipulated (for example, added to the data in another word space).

Cont.

- The number of bits in each word is known as word length. Word length refers to the number of bits processed by the CPU in one go. With modern general purpose computers, word size can be 16 bits to 64 bits.
- The time required to access one word is called the memory access time. The small, fast, RAM units are called caches. They are tightly coupled with the processor and are often contained on the same IC chip to achieve high performance

Types of memory



Primary memory

- Is the one exclusively associated with the processor and operates at the electronics speeds programs must be stored in this memory while they are being executed. The memory contains a large number of semiconductors storage cells. Each capable of storing one bit of information. These are processed in a group of fixed site called word

To provide easy access to a word in memory, a distinct address is associated with each word location. **Addresses** are numbers that identify memory location.

Number of bits in each word is called word length of the computer. Programs must reside in the memory during execution. Instructions and data can be written into the memory or read out under the control of processor. 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 (RAM). The time required to access one word in called memory access time. Memory which is only readable by the user and contents of which can't be altered is called read only memory (ROM) it contains operating system.

Caches are the small fast RAM units, which are coupled with the processor and are often contained on the same IC chip to achieve high performance. Although primary storage is essential it tends to be expensive.

Secondary Memory

- Is used where large amounts of data & programs have to be stored, particularly information that is accessed infrequently.

  Examples: - Magnetic disks & tapes, optical disks (ie CD-ROM's), floppies etc.,

Arithmetic logic unit (ALU):-

- Most of the computer operators are executed in ALU of the processor like addition, subtraction, division, multiplication, etc. the operands are brought into the ALU from memory and stored in high speed storage elements called register. Then according to the instructions the operation is performed in the required sequence.

- The control and the ALU are may times faster than other devices connected to a computer system. This enables a single processor to control a number of external devices such as key boards, displays, magnetic and optical disks, sensors and other mechanical controllers.

- Output unit:- These actually are the counterparts of input unit. Its basic function is to send the processed results to the outside world.

Examples:- Printer, speakers, monitor etc.

Control unit:- It effectively is the nerve center that sends signals to other units and senses their states. The actual timing signals that govern the transfer of data between input unit, processor, memory and output unit are generated by the control unit.