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University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY

Course Code and Name : 19IT301 COMPUTER ORGANIZATION AND ARCHITECTURE

Unit 1 : BASIC STRUCTURE OF COMPUTER

Topic 1: FUNCTIONAL UNITS





Basic Structure of Computers

Computer Architecture

- The design of the internal workings of a computer system, including the CPU, memory, and other hardware components.
- It involves decisions about the organization of the hardware, such as the instruction set architecture, the data path design, and the control unit design.
- It comes before the computer organization while designing a computer.



Computer Organization



- The physical implementation of the architecture design and includes decisions about the interconnection and communication between components, such as
 - 1) Bus structure,
 - 2) Memory hierarchy, and
 - 3) Input/output systems
- It deals with how the components of a computer system are arranged and how they interact to perform the required operations.



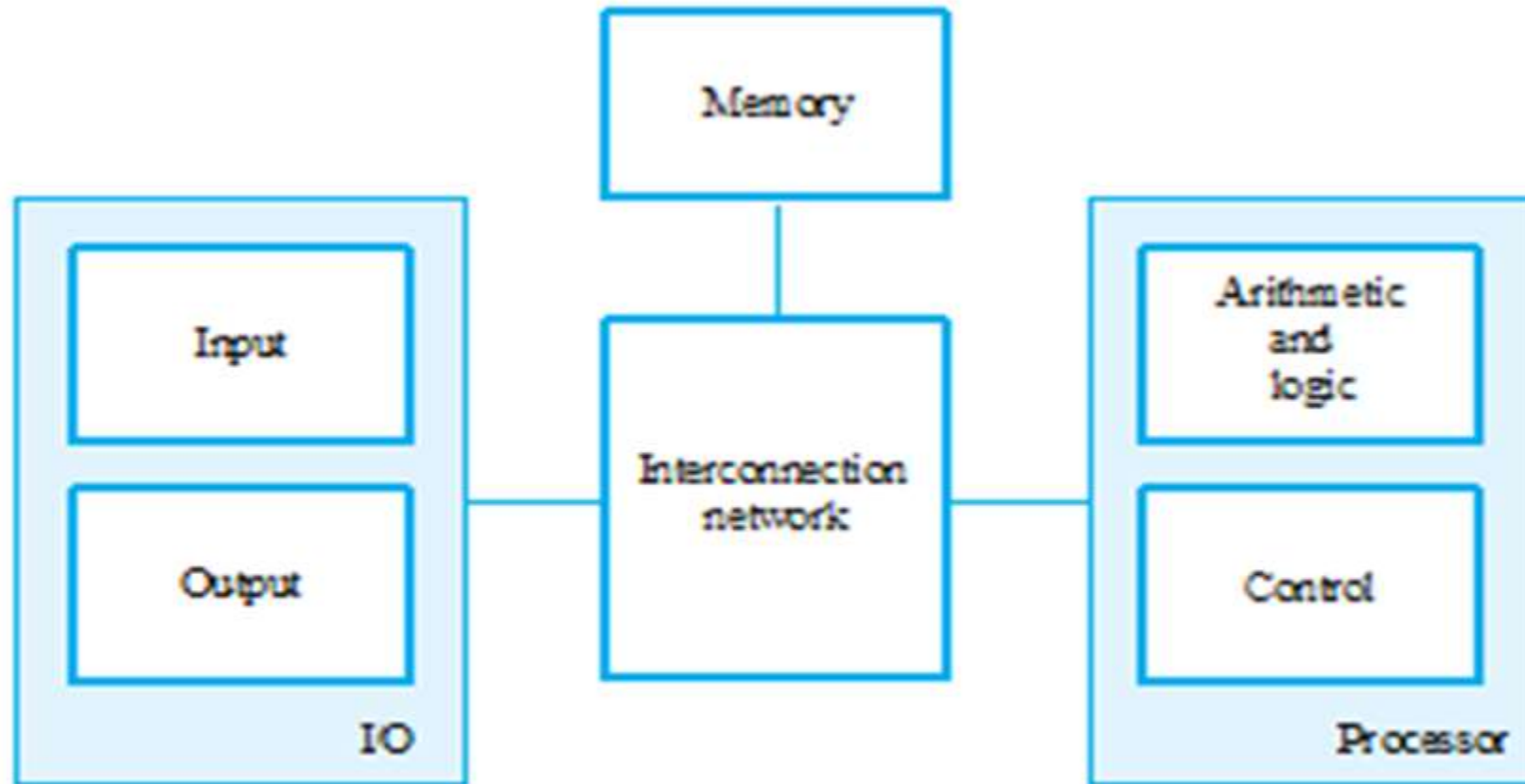
Functional Units

A computer consists of five functionally independent main parts:

1. Input Unit
2. Memory Unit
3. Arithmetic and Logic Unit
4. Control Unit
5. Output Unit



Basic Functional Units of a computer



Basic functional units of a computer.



Input Unit

- Computer accepts encoded information through input unit. The standard input device is a keyboard.
- Whenever a key is pressed, keyboard controller sends the code to CPU/Memory.
- Examples include Mouse, Joystick, Tracker ball, Light pen, Digitizer, Scanner etc..

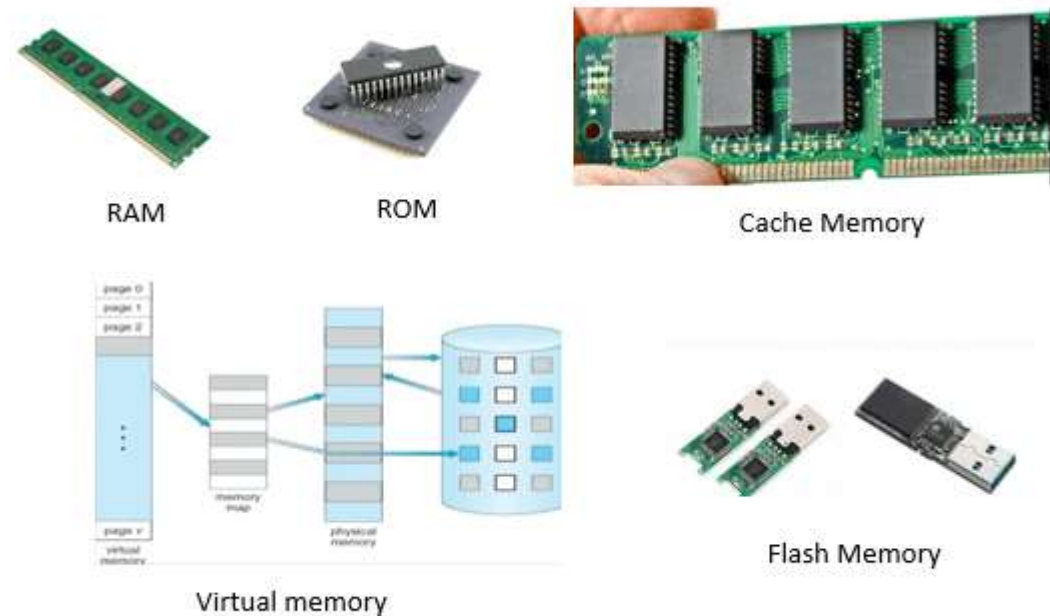


Memory Unit

- Memory unit stores the program instructions (Code), data and results of computations etc.

Memory unit is classified as:

- Primary /Main Memory
- Secondary /Auxiliary Memory



Memory Unit

Primary Memory

RAM SRAM
DRAM



Primary Memory

ROM

PROM
EPROM

EEPROM

Electrically Erasable Programmable ROM



Secondary Memory

Magnetic Tape
Magnetic Disk
Optical Disk

FDD HDD

CD 700 MB
DVD 4.7 GB

BRD (Blu-ray Disc) (BD) 25 GB

HVD (Holographic Versatile Disc) 3 - 5 TB

Flash Memory Memory Card Pen Drive





Primary / Main memory:

- It is volatile and temporary memory.
- It is directly accessed by the processor.
- It is basically used to store data on which computer is currently working.
- It has lesser storage than Secondary Memory. It is basically of two types:
 - Random Access Memory (RAM)
 - Read Only Memory (ROM)



Random Access Memory (RAM)



- It is temporarily store data that the computer is currently using or processing.
- RAM is volatile memory, which means that the data stored in it is lost when the power is turned off.
- RAM is typically used to store the operating system, application programs, and data that the computer is currently using.



RAM



Read Only Memory (ROM)

- It is permanently store data that does not need to be modified.
- ROM is non-volatile memory, which means that the data stored in it is retained even when the power is turned off.
- ROM is typically used to store the computer's BIOS (basic input/output system).



ROM



Secondary memory

- Secondary memory is a type of computer memory that is used to store data and programs that can be accessed or retrieved even after the computer is turned off.
- It is non-volatile and can store data and programs for extended periods of time.

Disadvantages :

- It is slower access times and lower read/write speeds compared to primary memory.

Secondary memory



Secondary Memory / Storage Device





Arithmetic and logic unit

- It performs arithmetic or logic operations. For Example:(addition, subtraction, multiplication, division operations or comparison of numbers.)
- When operands are brought into the processor, they are stored in high speed storage elements called **register**.
- Each register can store **one word of data**.



Control Unit

- Control unit co-ordinates activities of all units by issuing control signals.
- Control signals issued by control unit govern the data transfers and then appropriate operations take place.
- Control unit interprets or decides the operation/action to be performed.



Output Unit

- Computer after computation returns the computed results, error messages, etc. via output unit.
- The standard output device is a video monitor, LCD/ Thin Film Transistor(TFT) monitor.
- Other output devices are printers, plotters etc.



ASSESSMENT

- 1.What is Computer architecture?
- 2.What are the Functional Units?
- 3.What is primary memory?
- 4.Expand RAM, ROM & ALU.



Reference

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Thank You!