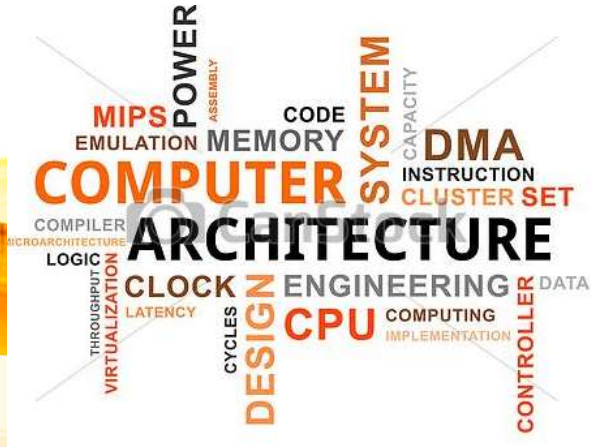
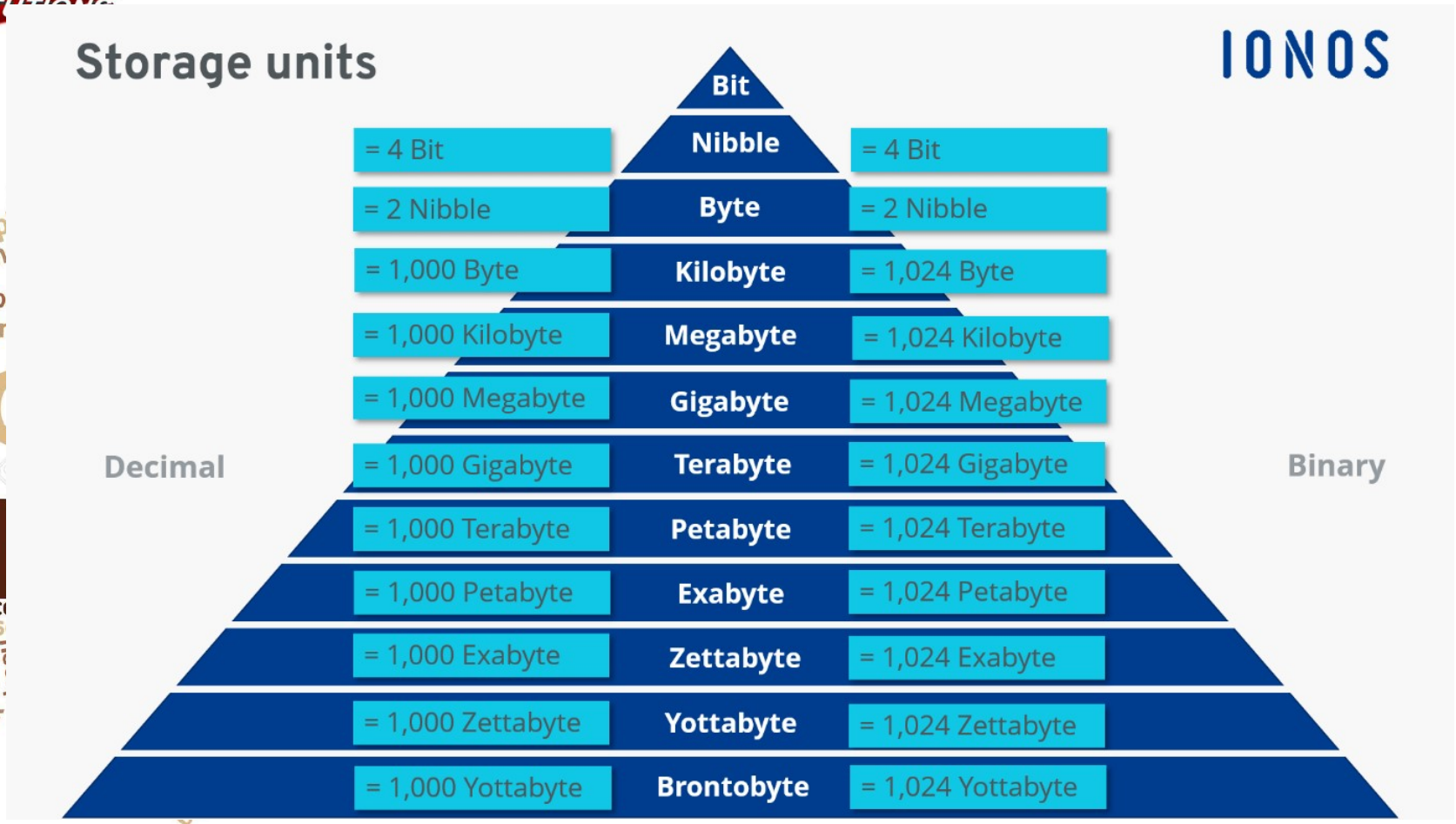
# UNIT I
# BASIC STRUCTURE OF COMPUTERS

**Functional units – Basic operational concepts** – Bus Structures – Performance – Memory locations and addresses – Memory operations – Instruction and Instruction sequencing –– Addressing modes – Assembly language – Case study : RISC and CISC Architecture.



# Recall the prior Knowledge

Computer ?


Storage units
IONOS
Bit
Nibble
= 4 Bit
= 4 Bit
Byte
= 2 Nibble
= 2 Nibble
Kilobyte
= 1,000 Byte
= 1,024 Byte
Megabyte
= 1,000 Kilobyte
= 1,024 Kilobyte
Gigabyte
= 1,000 Megabyte
= 1,024 Megabyte
Terabyte
Decimal
= 1,000 Gigabyte
= 1,024 Gigabyte
Binary
Petabyte
= 1,000 Terabyte
= 1,024 Terabyte
Exabyte
= 1,000 Petabyte
= 1,024 Petabyte
Zettabyte
= 1,000 Exabyte
= 1,024 Exabyte
Yottabyte
= 1,000 Zettabyte
= 1,024 Zettabyte
Brontobyte
= 1,000 Yottabyte
= 1,024 Yottabyte


throughput
efficien
machine
elements
architecture
changing
definition
registers
millionsemulation
function
integrators
modern
validations
designers
debuggers
abstract
compiler
bottleneck

# Why to study computer Architecture?

Structure an internal component of a computer

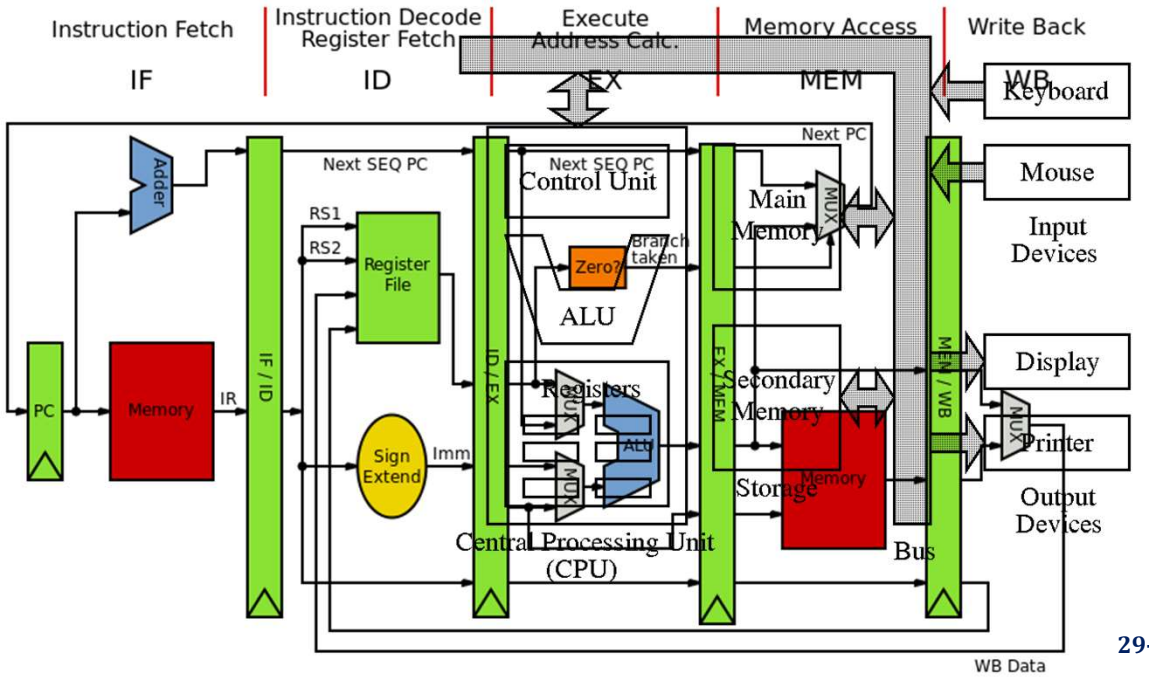
Program to realize the logics

Runs more efficiently on a real time machine

# Introduction

## Computer

## Architecture

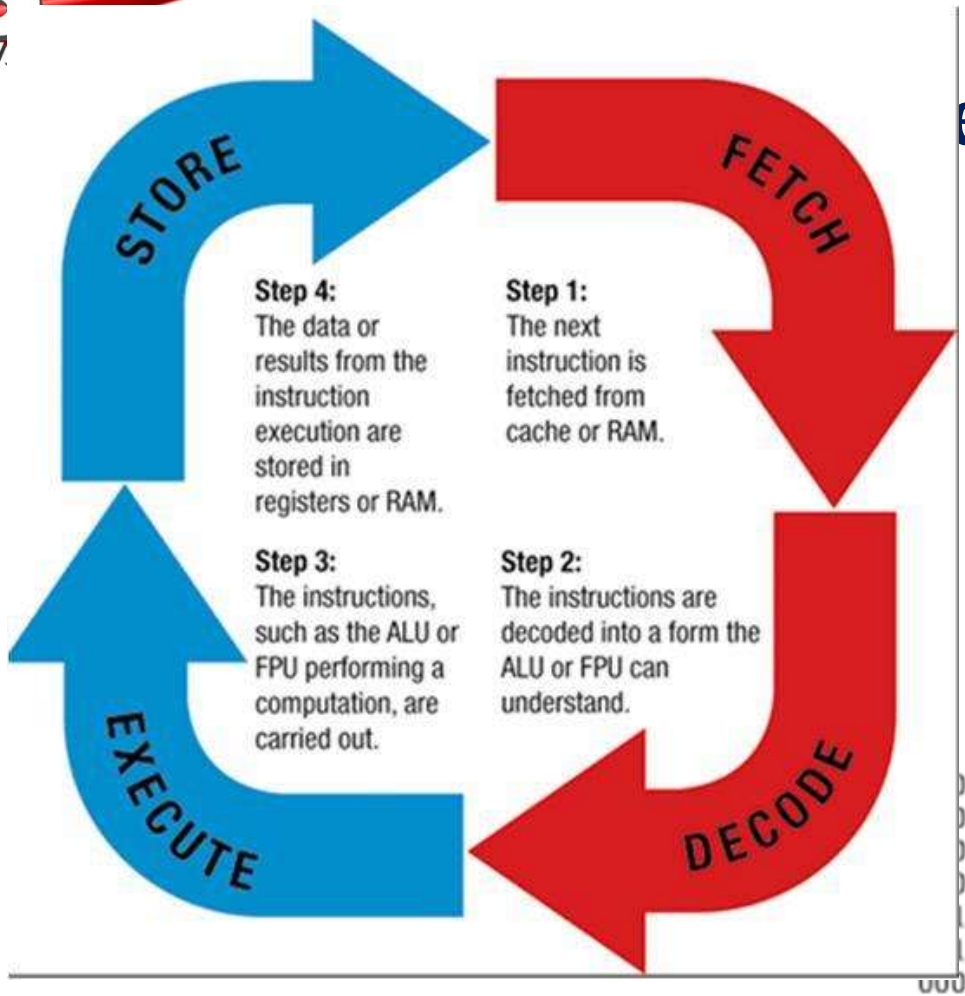


# Definition

- Concerned with the structure and behavior of the various functional modules computer and how they interact to provide the processing needs of the user.
- Refers to the operational units and their interconnections
- Computer is a fast electronic calculating machine which accepts digital input, processes it according to the internally stored instructions (Programs) and produces the result on the output device.

# ersion

High-level language program (in C)




```
swap:
        multi   $2, $5,4
        add     $2, $4,$2
        lw      $15, 0($2)
        lw      $16, 4($2)
        sw      $16, 0($2)
        sw      $15, 4($2)
        jr      $31
```

Assembler

```
00000010100010000000100011000
00000010000010000100000100001
00110111100010000000000000000
00111000010010000000000000100
10111000010010000000000000000
10110111100010000000000000100
00000011111000000000000000001000
```


# Types of Computer

## Based On Size

- ✓ Super
- ✓ Mainframe
- ✓ Mini
- ✓ Micro
  - Desktop
  - Laptop
  - Palmtop

## Based On Mechanism

- ✓ Analog
- ✓ Digital
- ✓ Hybrid

## Based On Purpose

- ✓ General Purpose
- ✓ Special Purpose

# Computer Types

Mainframe Computer



many

Super Computer



lculations

Workstatio Computer

k purpose.

**Personal Co**

It is a low cap

**Apple Macin**

It is a sort of

y.

**Laptop comp**

It is a handy

**Tablet and S**

Tablet

Smartphone

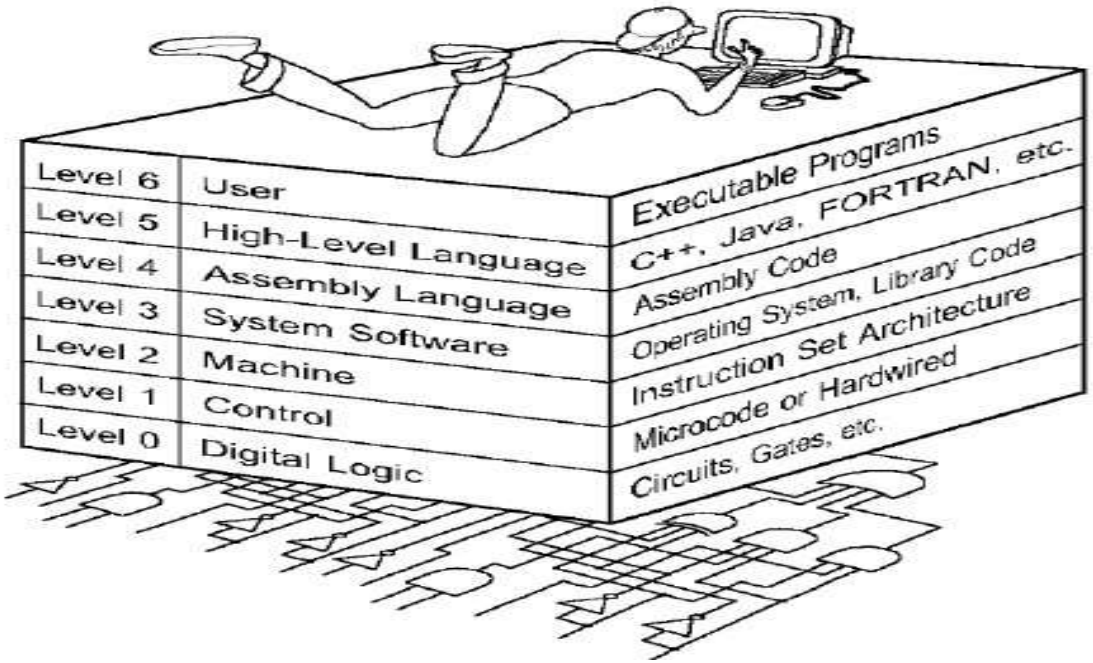
Modern technology has advanced further. It has helped develop computers that are pocket-friendly.

# Generation of Computers

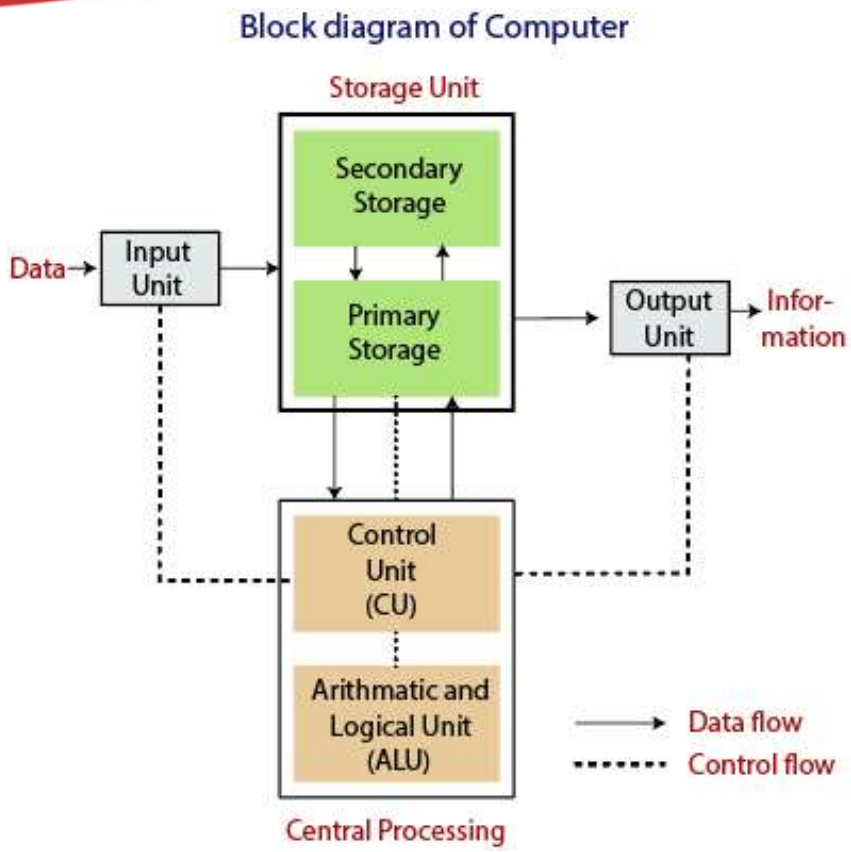
| Generations of computers | Generations timeline | Evolving hardware |
|---|---|---|
| First generation | 1940s-1950s | Vacuum tube based |
| Second generation | 1950s-1960s | Transistor based |
| Third generation | 1960s-1970s | Integrated circuit based |
| Fourth generation | 1970s-present | Microprocessor based |
| Fifth generation | The present and the future | Artificial intelligence based |

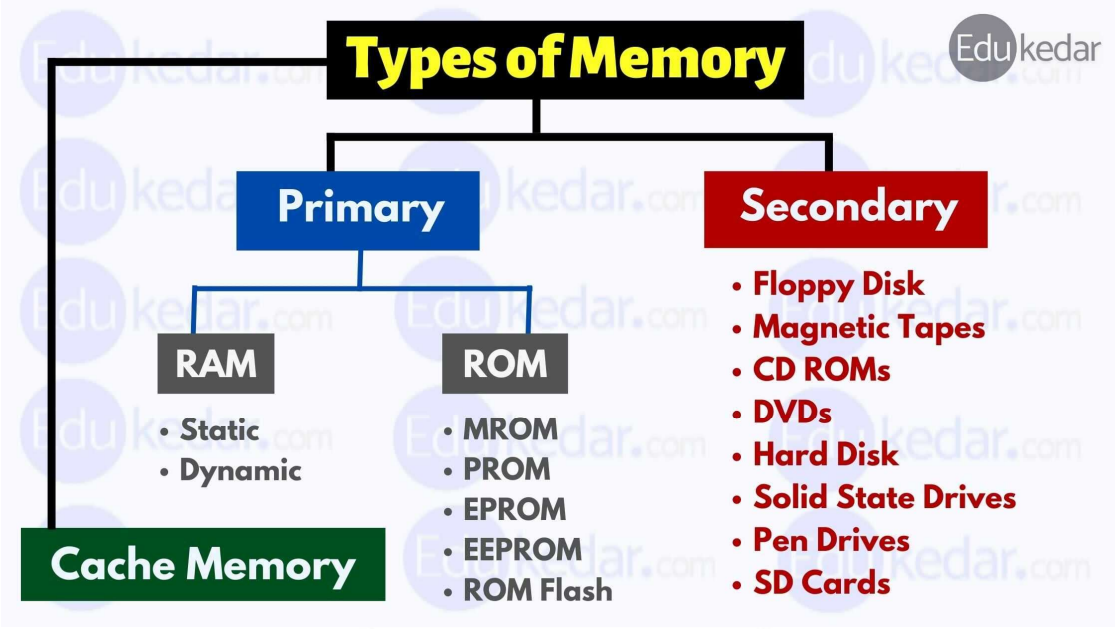
# Functional Unit

## Computer Level Hierarchy



# Functional Unit



# Functional units of a computer



Input unit accepts information:
- Human operators,
- Electromechanical devices (keyboard)
- Other computers

Arithmetic and logic unit(ALU):
- Performs the desired operations on the input information as determined by instructions in the memory


Output unit sends results of processing:
- To a monitor display,
- To a printer

Stores information:
- Instructions,
- Data

Control unit coordinates various actions
- Input,
- Output
- Processing

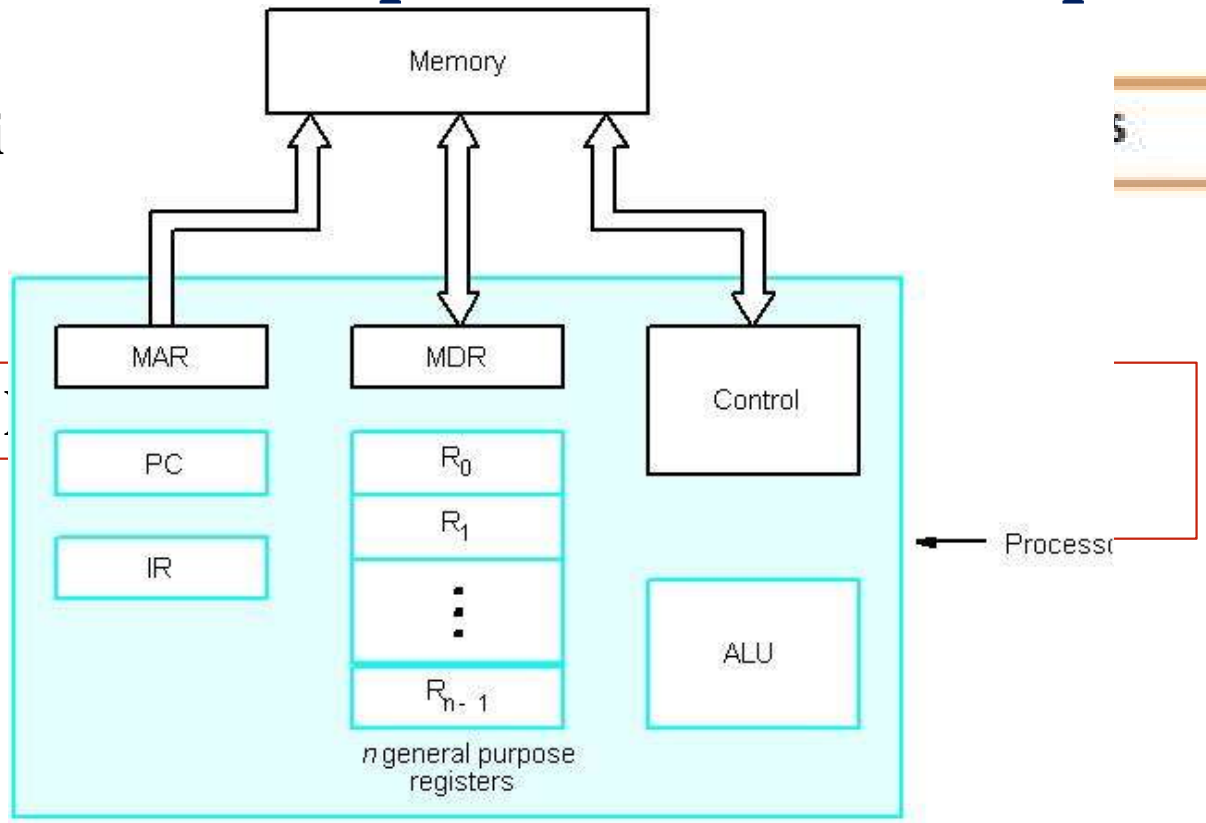
# Input and Output devices


# Basic Operational Concepts

- Instruction consi

- Example

ADD LOCA,




a). What is computer Architecture?

_____

_____

_____

b) Mention the purpose of Functional units of a computer

Ans:

1.ALU_____

2. Control _____

3.Input device _____

4. Output device _____

5. Memory _____


Thank You