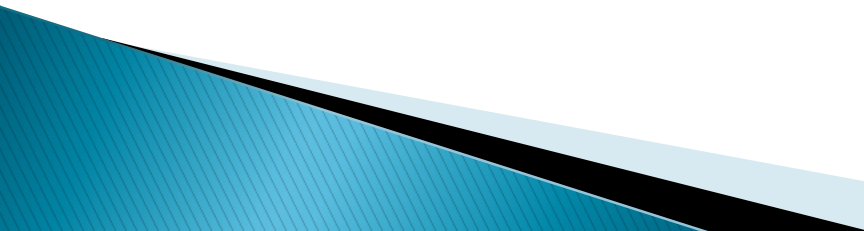# Introduction to computer architecture

Lecturer Dalia Adil

Organization and Architecture

- **Computer architecture** refers to those attributes of a system visible to a programmer or, put another way, those attributes that have a direct impact on the logical execution of a program.

    ex: I/o mechanism.

- **Computer organization** refers to the operational units and their interconnections that realize the architectural specifications.

    ex:control signals.

Structure and Function

- **Function**: The operation of each individual component as part of the structure.

    Data Processing

    Data Storage

    Data Movement

    Control

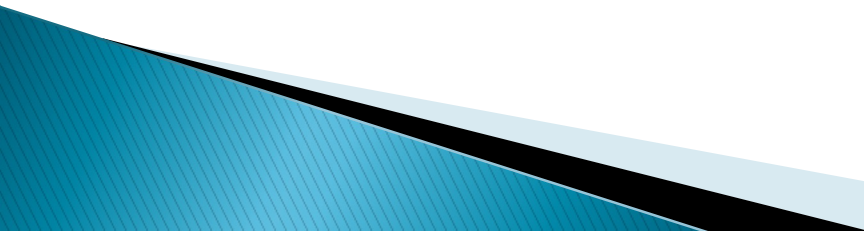- **Structure**: The way in which the components are interrelated.

    Central Processing Unit (CPU): Controls the operation of the computer and performs its data processing functions; often simply referred to as *processor.*

    Main Memory: Stores data.

    I/O: Moves data between the computer and its external environment.

    System interconnection: Some mechanism that provides for communication among CPU, main memory, and I/O.

CPU Component

- **Control Unit:** Controls the operation of the CPU and hence the computer.
- **Arithmetic and Logic Unit (ALU):** Performs the computer's data processing functions.
- **Registers:** Provides storage internal to the CPU.
- **CPU interconnection:** Some mechanism that provides for communication among the control unit, ALU, and registers.

The von Neumann Machine

- **Memory**: stores both program instructions and data
- **PC**: *program counter*: points to the next instruction to be fetched
- **IR**: *instruction register* stores current instruction
- **Control unit**:decodes current instruction, manages processing unit to carry out instruction