CALIFORNIA STATE UNIVERSITY
FULLERTON

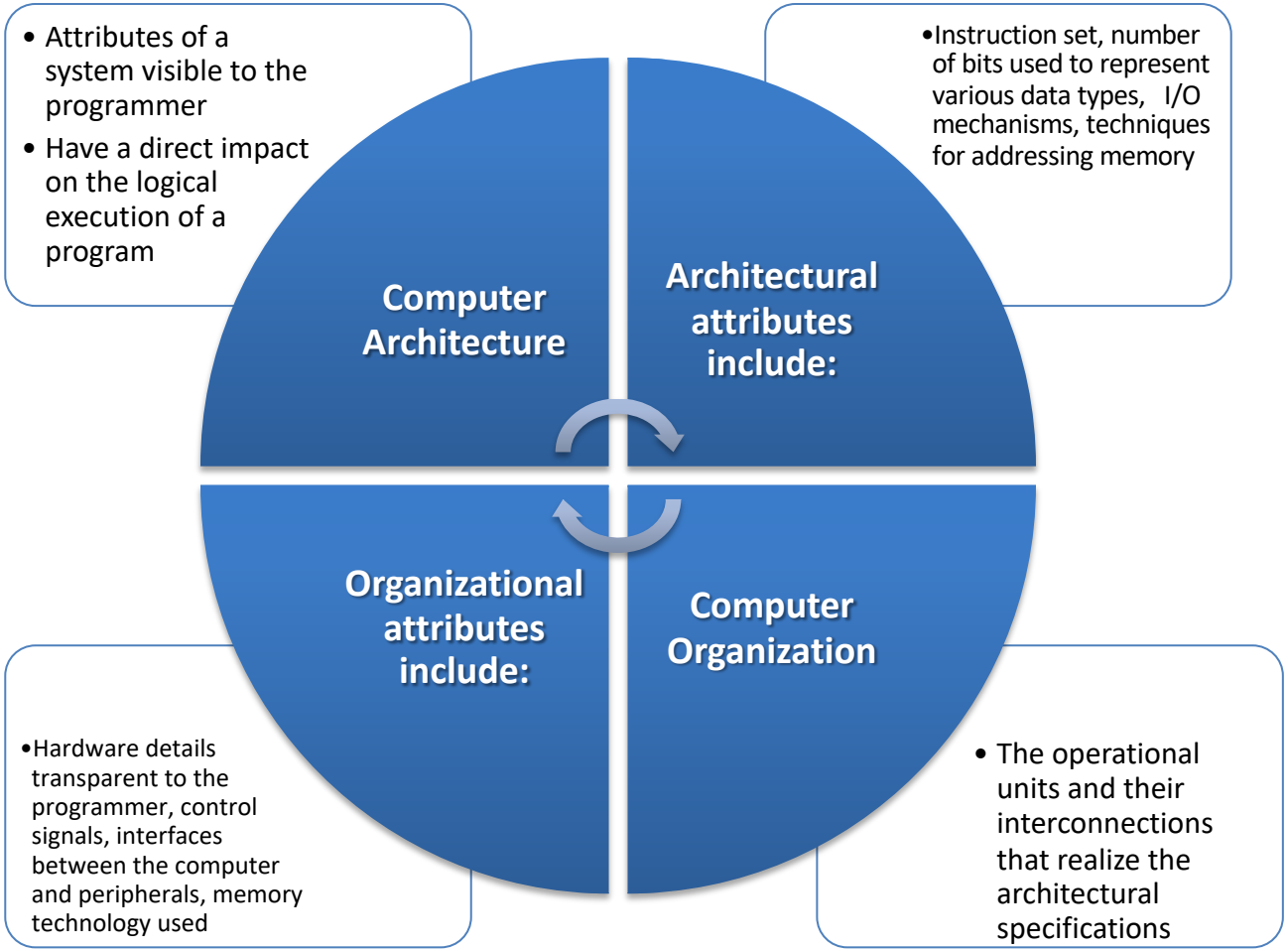
CPSC-440 Computer System Architecture

Lecture 1

Introduction

Introduction

Computer Architecture
Computer Organization



Structure and Function

- Hierarchical system
  - Set of interrelated subsystems
- Hierarchical nature of complex systems is essential to both their design and their description
- Designer needs to only deal with a particular level of the system at a time
  - Concerned with structure and function at each level
- Structure
  - The way in which components relate to each other
- Function
  - The operation of individual components as part of the structure

Function

- A computer can perform four basic functions:
  - Data processing
  - Data storage
  - Data movement
  - Control

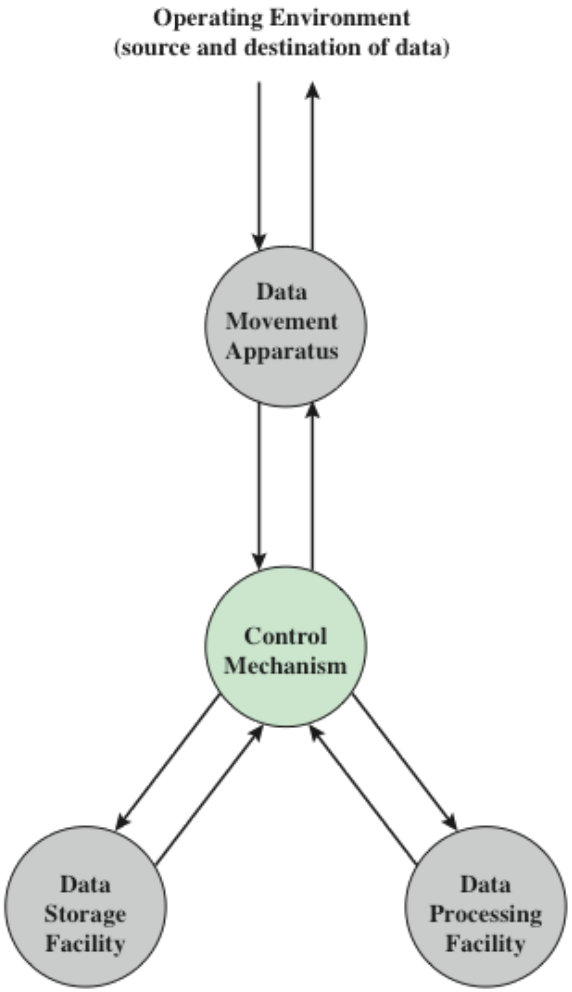
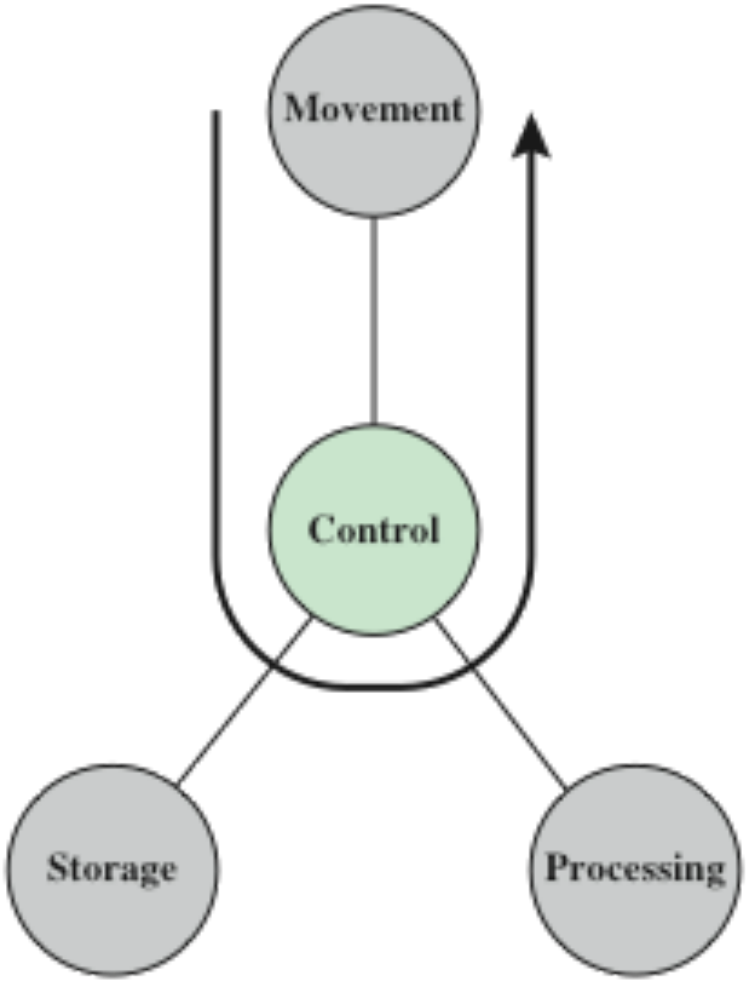


Figure 1.1 A Functional View of the Computer

Operations

(a)

Data Movement



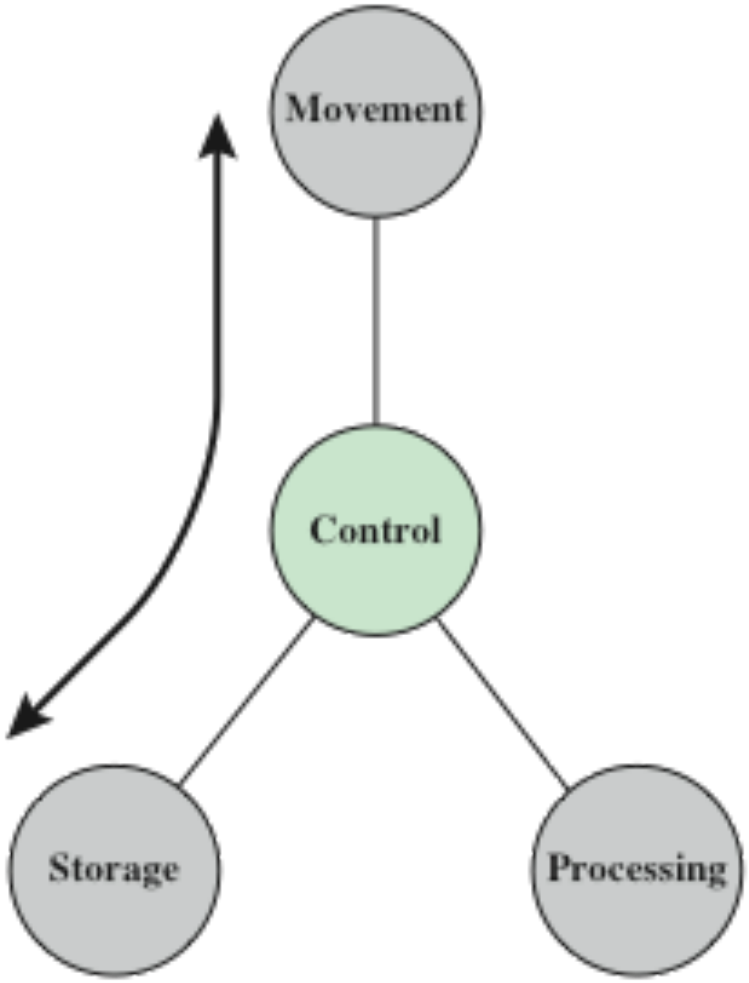
(a)

Figure 1.2 Possible Computer Operations

Operations

(b)

Data Storage



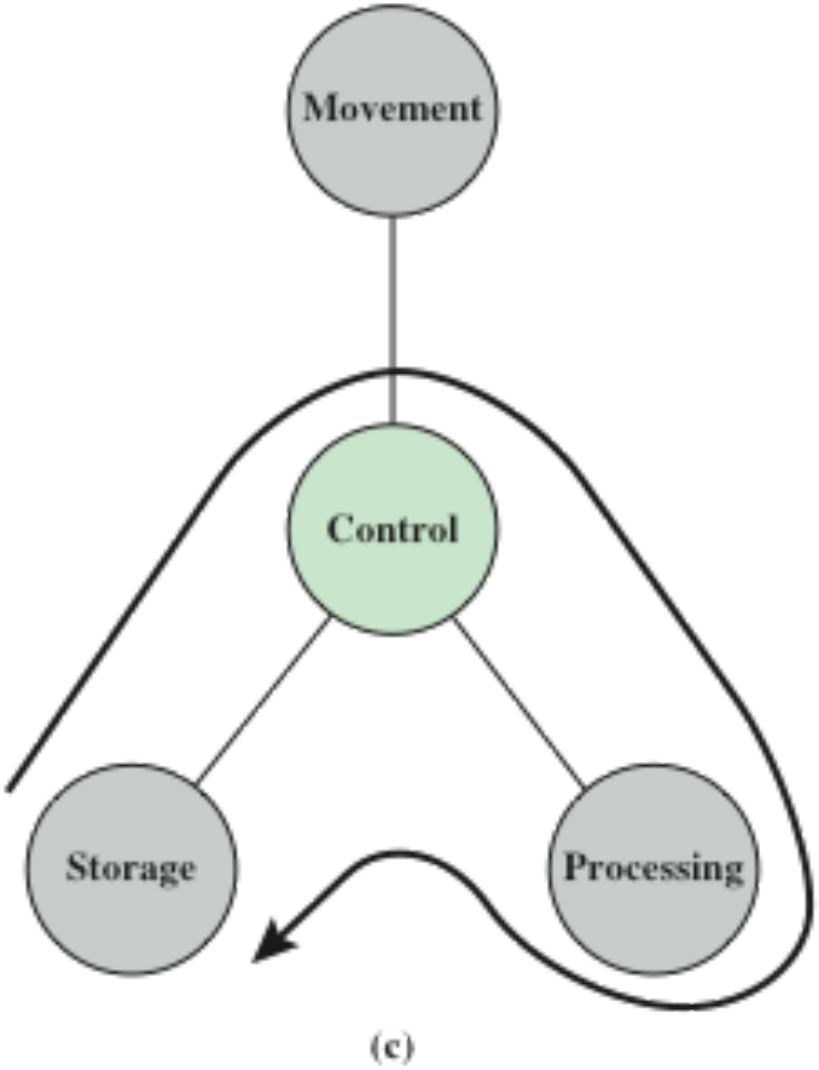
(b)

Figure 1.2 Possible Computer Operations

Operations

(C)

Data Processing



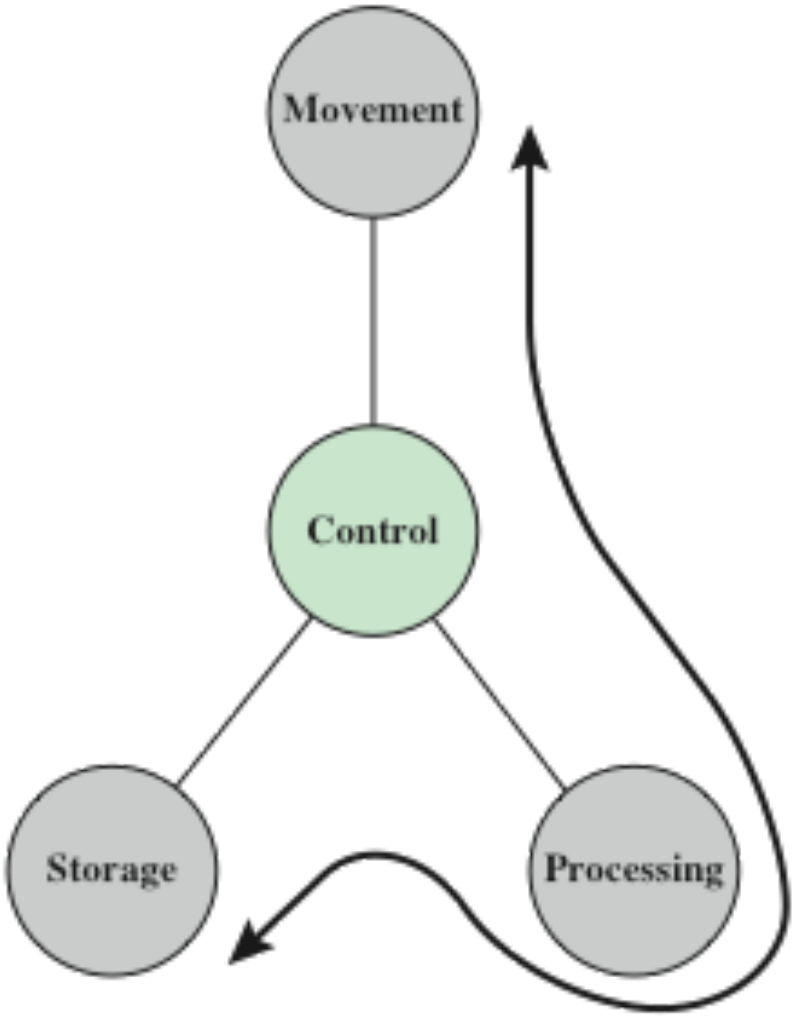
(c)

Figure 1.2 Possible Computer Operations

Operations

(D)

Data Processing



(d)

Figure 1.2 Possible Computer Operations

The Computer

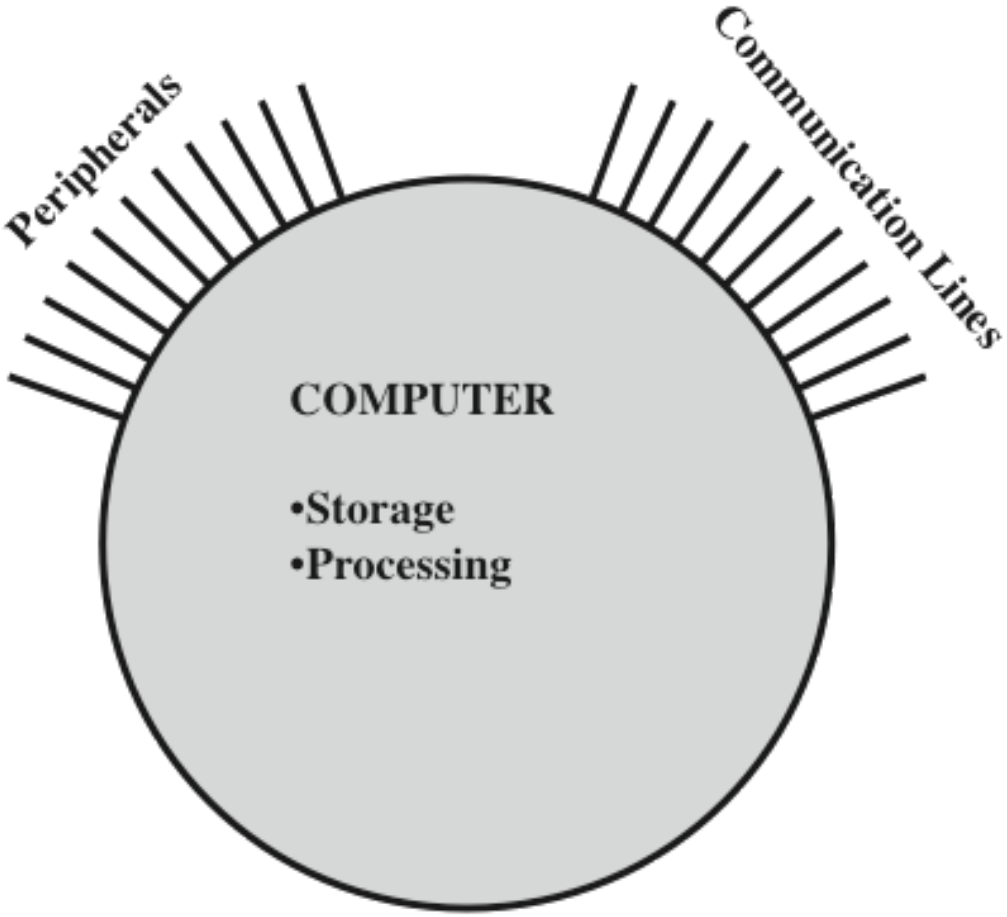


Figure 1.3 The Computer

Structure

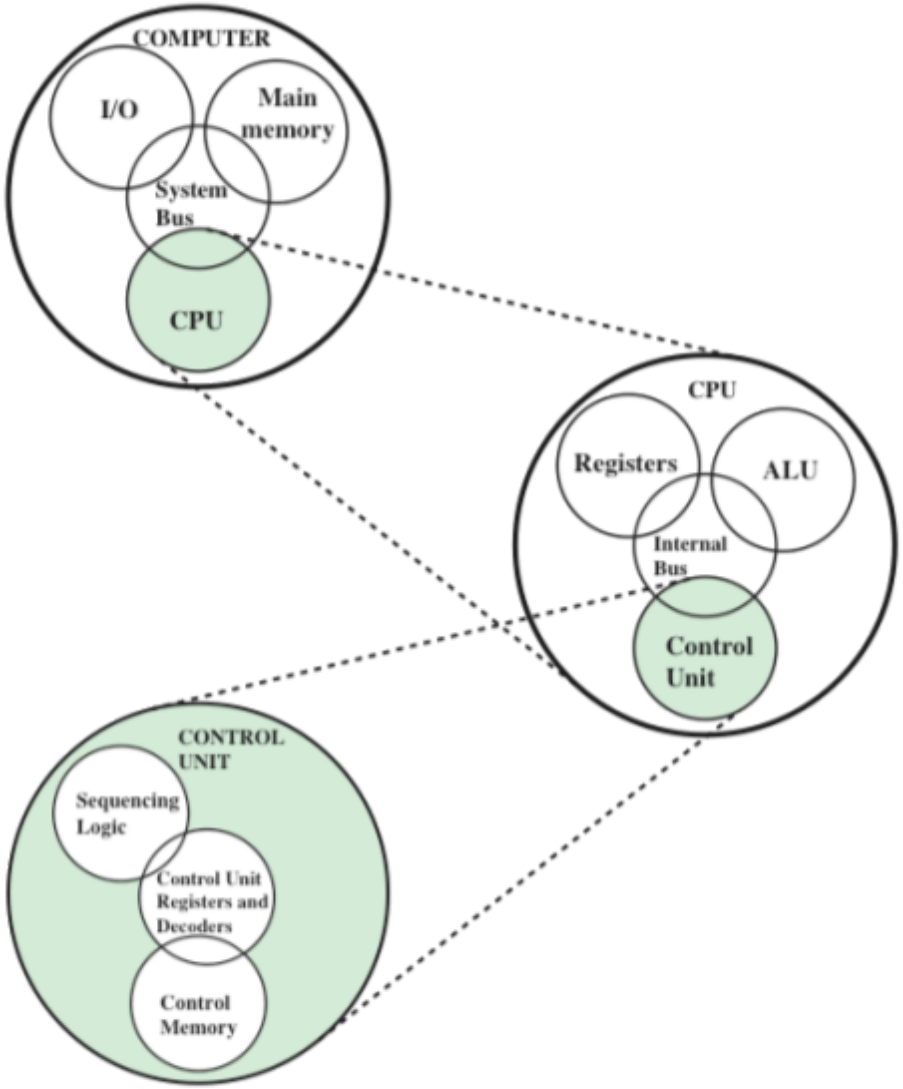
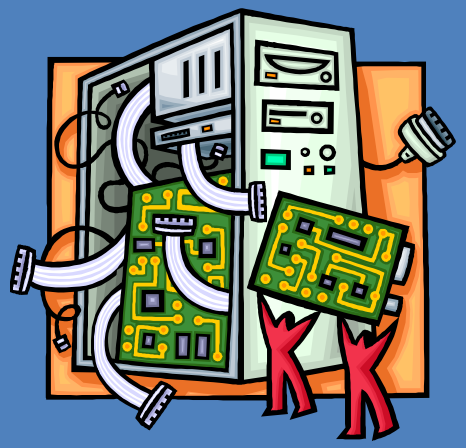


Figure 1.4 A Top-Down View of a Computer

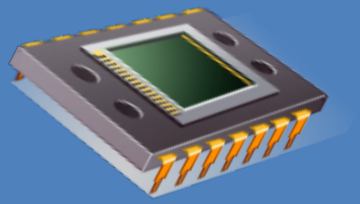
There are four main structural components of the computer:

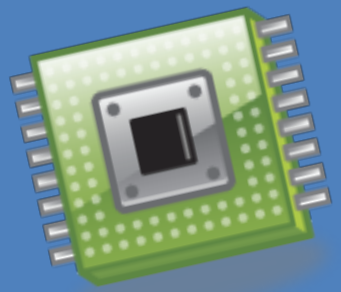


- CPU
  - Controls the operation of the computer and performs its data processing functions
- Main Memory
  - Stores data
- I/O
  - Moves data between the computer and its external environment
- System Interconnection
  - Some mechanism that provides for communication among CPU, main memory, and I/O

CPU

Major structural components:





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

Questions

1. **What, in general terms, is the distinction between computer organization and computer architecture?**

2. **What, in general terms, is the distinction between computer structure and computer function?**

3. **What are the four main functions of a computer?**

4. **List and briefly define the main structural components of a computer.**

5. **List and briefly define the main structural components of a processor.**

HW 1

- Problems 1 to 5
- HW template with problems will be available on Canvas