Chapter 1 – Introduction

Reading pp. 6-15

This textbook deals with both computer architecture and computer organization. We can define each in the following way:

computer architecture – "refers to those attributes of a system visible to a programmer..."[STAL96]. Examples include: the instruction set, the number of bits in a floating point number, memory addressing modes.

computer organization – "refers to the operational units and their interconnections that realize the architectural specifications "[STAL96]. Examples include: CPU control signals, address and data buses, memory organization.

We will examine both the architectural and organization aspects of a computer in this class, so let's get cooking!!!

In general, we will take a top down approach in defining a computer system. In particular, we will start with the major components and refine our discussion to lower layer discussions. At each level, we are interested in discussions that revolve around structure (the interrelationship of components) and function (the operation of the particular component).

Fundamentally, a computer must be able to:

- Process data
- Store data
- Move data
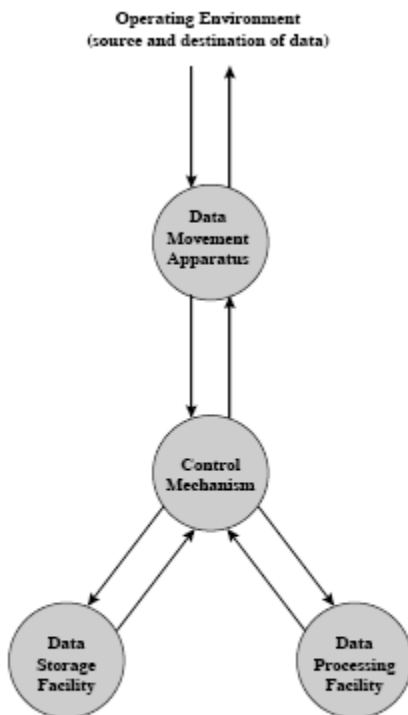- Control the above operations

Figure 1.1 A Functional View of the Computer

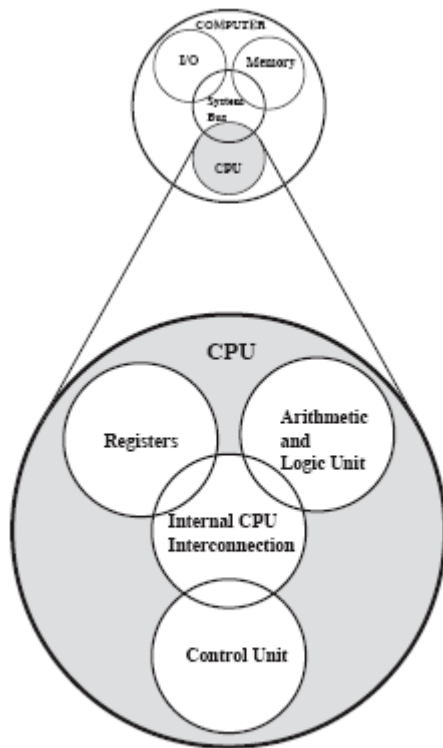At its highest level, we know a computer system is structurally as follows:

- Central Processing Unit (CPU) – controls the computer's operation and often referred to a the processor
- Memory – used for storing data
- I/O – used to move data to/from the computer and its external environment
- System Interconnection - allows communication between CPU, memory, and I/O
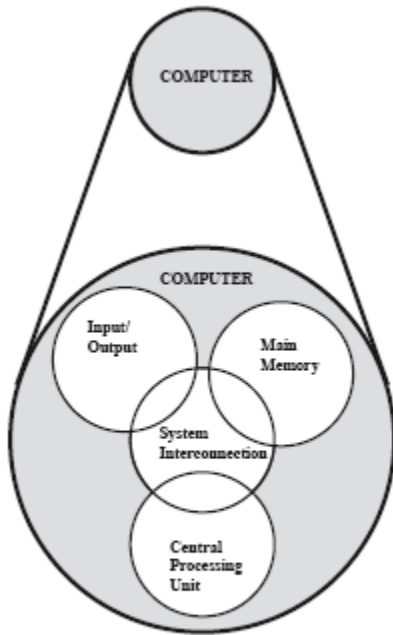
Figure 1.4 The Computer: Top-Level Structure

We will examine each of these areas in detail and refine our discussion of each area.

An example of refinement is when we take a look at the CPU as follows:

Figure 1.5 The Central Processing Unit (CPU)

STAL96 Stallings, W. Computer Organization and Architecture, Fourth Edition.Englewood Cliffs, NJ: Prentice Hall, 1996.