WEEK- 1

Chapter 1

Introduction

1.1 Overview

Why study computer organization and architecture?

 – Design better programs, including system software such as

 compilers, operating systems, and device drivers.

 – Optimize program behavior.

 – Evaluate computer system performance.

 – Understand time, space, and price tradeoffs.

It is imperative that we understand how hardware interacts with software. We must become familiar with how various circuits and components fit together to create working computer systems.

We do this through the study of computer organization.
Computer organization addresses issues such as control signals, signaling methods, and memory types.
It encompasses all physical aspects of computer systems.
It helps us to answer the question:

(***How does a computer work?***)

The study of computer architecture, on the other hand, focuses on the structure and behavior of the computer system and refers to

the logical aspects of system implementation as seen by the programmer.

Computer architecture includes many elements such as instruction sets and formats, operation codes, data types, the number and types of registers, addressing modes, main memory access methods, and various I/O mechanisms. The architecture of a system directly affects the logical execution of programs. Studying computer architecture helps us to answer the question:

(How do I design a computer?)

1.2 Computer Components

• There is no clear distinction between matters related to computer organization and matters relevant to computer architecture.

• Principle of Equivalence of Hardware and Software:

– *Anything that can be done with software can also be done with hardware, and anything that can be done with hardware can also be done with software.**

• At the most basic level, a computer is a device consisting of three pieces:

– A processor to interpret and execute programs.

– A memory to store both data and programs,

– A mechanism for transferring data to and from the outside world.