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COMPUTER ARCHITECTURE & ORGANIZATION

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CAO – Chapter 1 – P2 . Mritha Ramalingam

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Faculty of Computer Systems & Software Engineering

Chapter 1-   Continues…

- Computer and System

- Computer Architecture and Organization

- Components of a Computer System

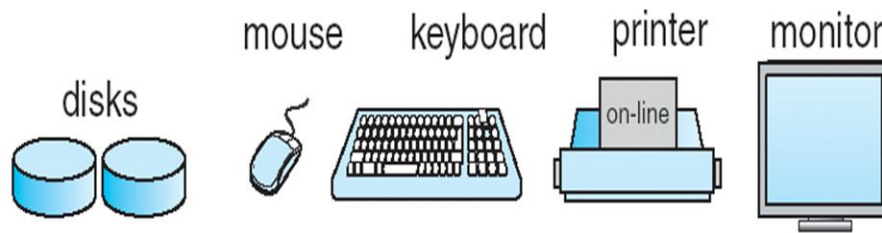- Interaction Between Computer Components

- Computer Language

Components of a computer system

- A computer system consists of two major components: **Hardware** and **software**

Hardware

- The I/O of computer system is the computer interface to the outside world. Example of I/O are keyboard, monitor, disk drives and floppy drives.

Components of a computer system

Software

are the series of instructions which are used to run computer hardware

- Designed by a programmer
- Visible
- Special Languages are used

Components of a computer system

- System software - Operating system is an integrated set of systems programs that manages resources (including processor(s), I/O devices and main memory), controls overall operations of computer, functions as an interface between computer and users
- example
    - Man and Motor Cycle
    - Current and Fan

- Application software – software that meet user needs
- Example:
    - Microsoft word
    - ??

Communitising Technology

- Computer and System

- **Computer Architecture and Organization**

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Interaction between Computer Components

The interaction between computer components is viewed as **structural** components and their **functions**

A **structure** is the interrelation of the components are interrelated

Interaction between Computer Components

A **function** is the operation of each individual component as part of structure

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Communitising Technology

Interaction between Computer Components

Basic **Structure**

- Central Processing Unit (CPU) : Controls computer operations and performs data processing
- Main Memory : stores data
- I/O: transmits data between computer and its external environment
- System interconnection (BUS): mechanism for communication between CPU, main memory and I/O
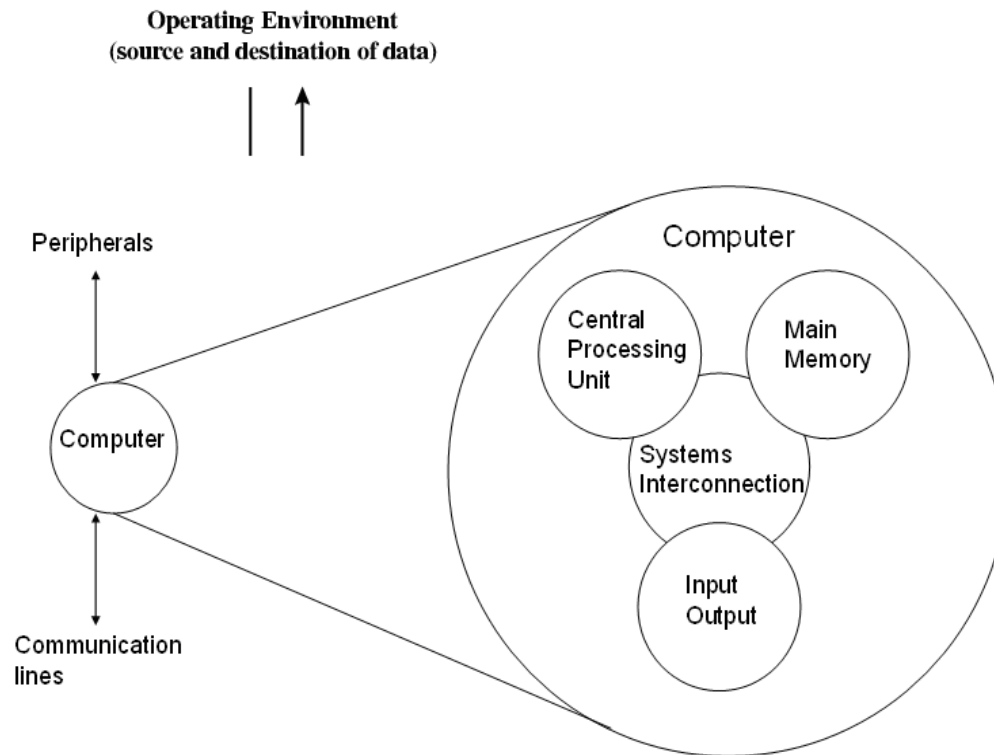
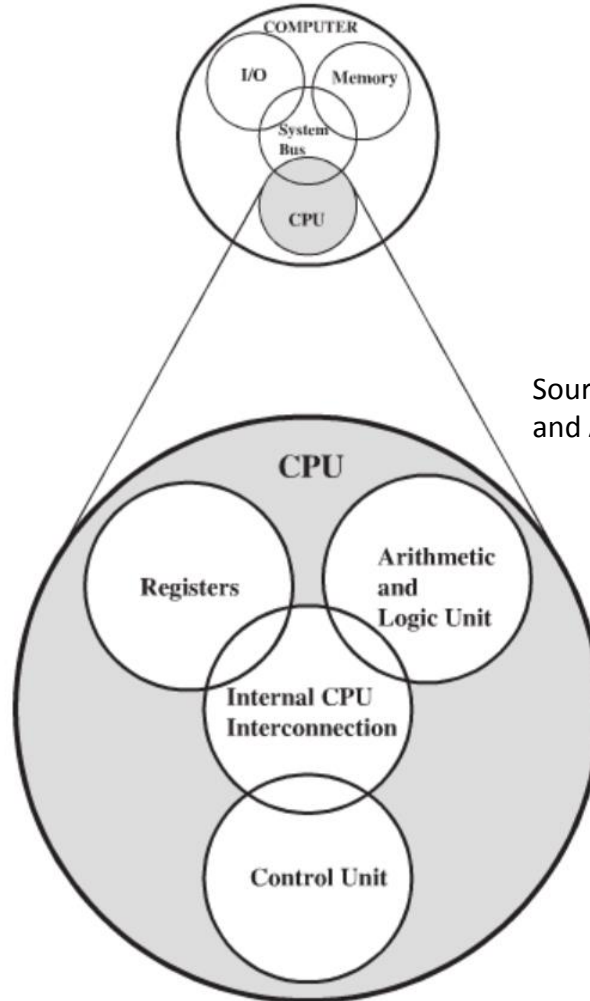Source: William Stallings, Computer Organization
and Architecture,10th Edn

Interaction between Computer Components

CPU structure

- **Control Unit** : Controls the operations 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.

Interaction between Computer Components

Source: William Stallings, Computer Organization and Architecture,10th Edn

Interaction between Computer Components

Function
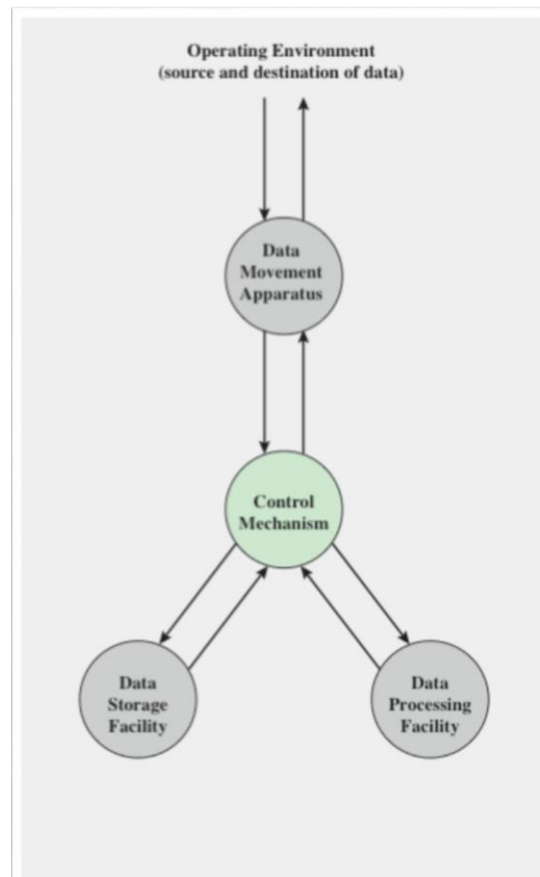
A computer can perform four basic functions

- **Data processing**
- **Data Storage**
- **Data movement**
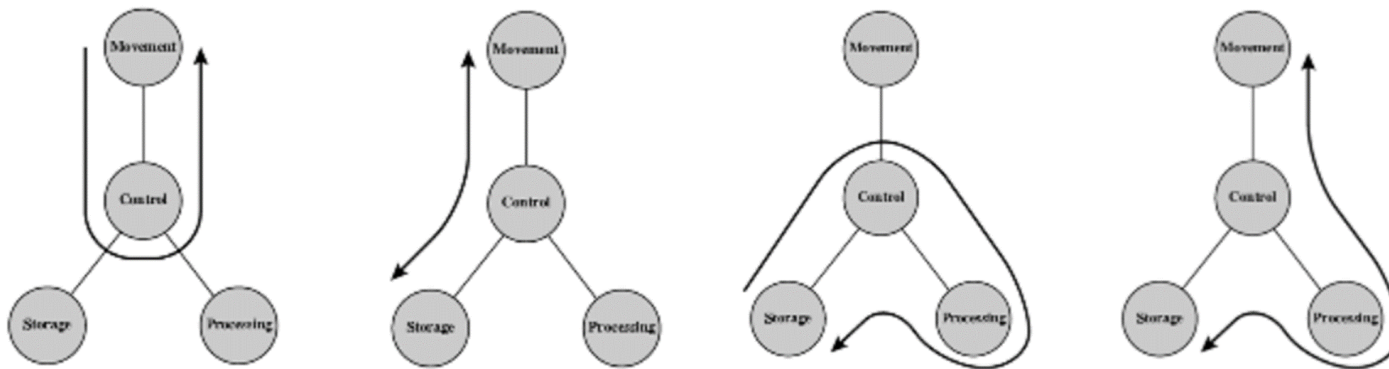- **Control Mechanism**

Functional view of a computer

Source: William Stallings, Computer Organization and Architecture,10th Edn

Interaction between Computer Components

Function

Four (4) types of operations

the computer can function as data movement device (a), transferring data or as strorage device (b), data processing involve storage data (c) and between stroage and external environment

Source: William Stallings, Computer Organization
and Architecture,10th Edn

Chapter 1

Introduction

- **Computer and System**

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- **Components of a Computer System**

- **Interaction Between Computer Components**

- **Computer Language**

Computer Language

o A computer user interacts with a computer in a language that the user understands, but software must convert that instruction into a form that hardware can "understand"

o Hardware stores data and communicates with software by only one fundamental language- " binary" -speaks a **language that only has two words**, "off" and "on"

o In this binary system, only two digits or **bit** are used, 0 and 1

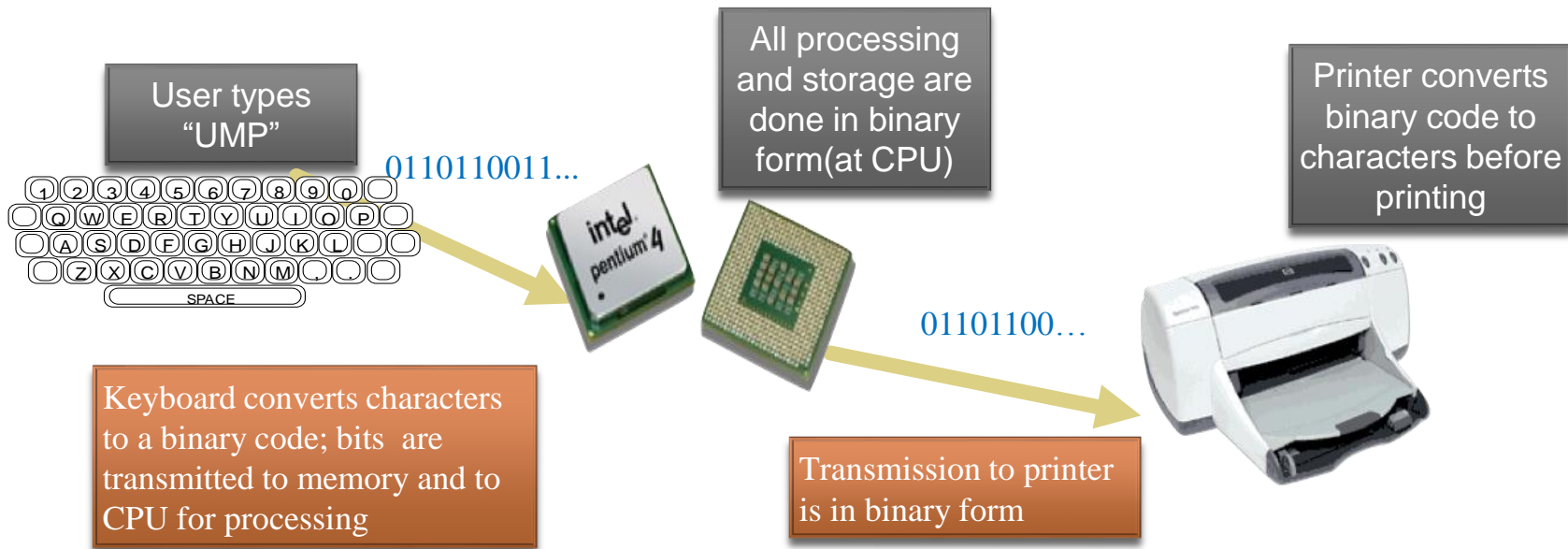o Every communication that software has with hardware is reduced to series of these two words.

OFF
"0"

ON
"1"

Computer Language

User types
"UMP"

0110110011...

All processing
and storage are
done in binary
form(at CPU)

Printer converts
binary code to
characters before
printing

Keyboard converts characters
to a binary code; bits are
transmitted to memory and to
CPU for processing

01101100…

Transmission to printer
is in binary form

Chapter 1 Review - Introduction

- **Computer and System**

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- **Interaction Between Computer Components**

- **Computer Language**

Chapter 1 Ends!