Operating Systems

Computer Engineering and Control Systems Dept.,
Faculty of Engineering,
Mansoura University

Lecture 1

Operating system
CSE 257 (CIE Program)

- Lecture 2 sec 2
- Degree work year 50
  - 20 mid term exam
  - 20 Lab exam
    - 10 sec
  -
- final Exam 50
- Dr. Labib Mohamed Labib
- Labibm@Hotmail.com

Operating system 1

- Lecture 2 sec 2
- Degree work year 50
  - 20 mid term exam
  - 20 practical exam
    - 10 sec
  - final Exam 100
- Total Degree 150
- Dr. Labib Mohamed Labib
- Labibm@Hotmail.com

Course Outlines

- مقدمة عن هندسة نظم التشغيل – نظم الملفات – طرق الوصول وتحديد مواقع البيانات – نظم إدارة المصادر – المهام – طرق أدارة وجدولة تشغيل : العمليات – المعالج – وحدة التخزين – الذاكرة – الذاكرة الافتراضية- التنفيذ المتزامن – معايير اختيار النظام – دراسة عملية لمكونات احدي نظم التشغيل الحالية

An introduction to operating system engineering - file systems - methods of accessing and locating data - resource management systems - tasks - management and scheduling methods of operation: processes - processor - storage - memory - virtual memory - simultaneous implementation - system selection criteria - a4practical study of components of a system Operating current

components of a computer system

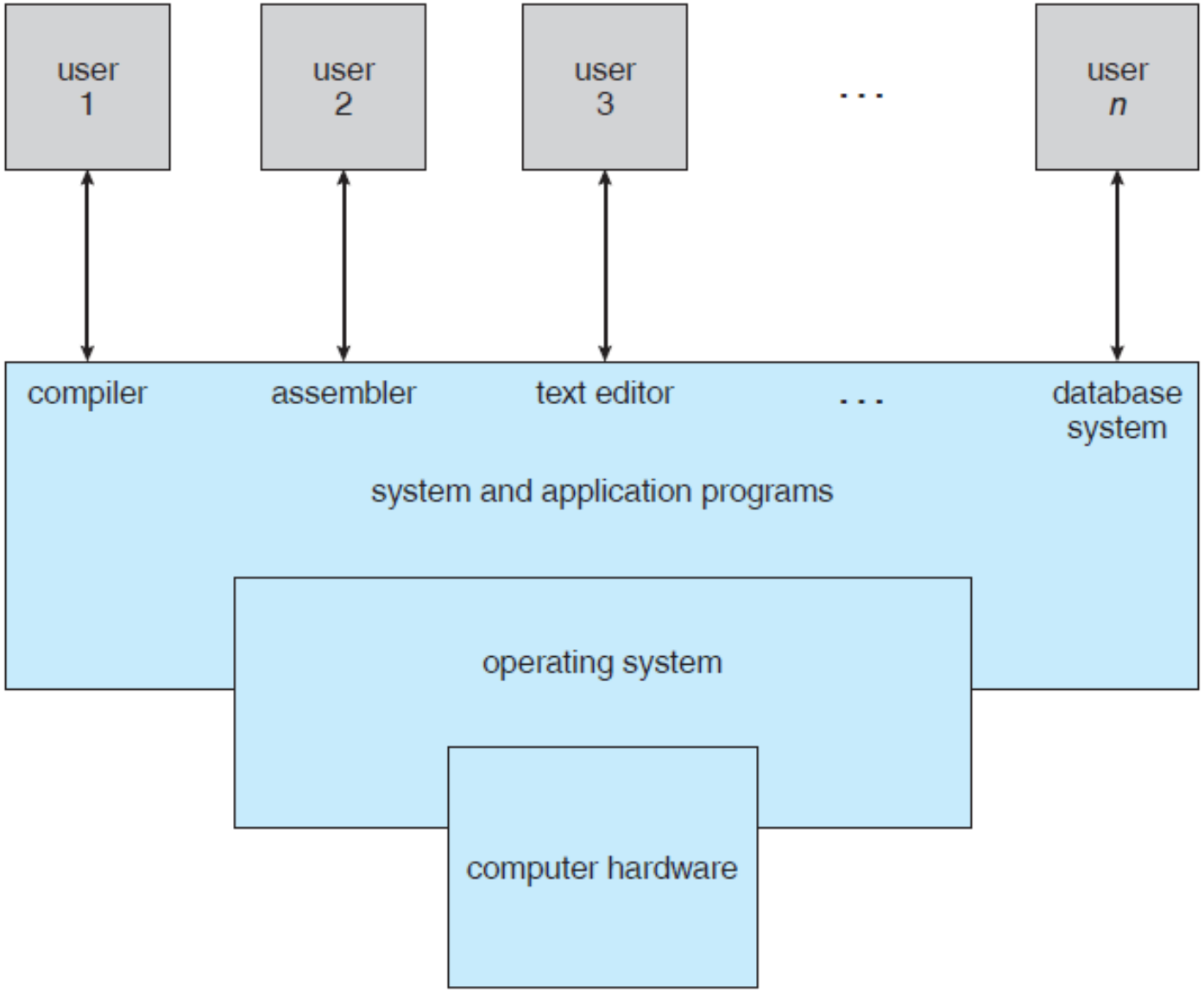


Figure 1.1 Abstract view of the components of a computer system.

Computer System

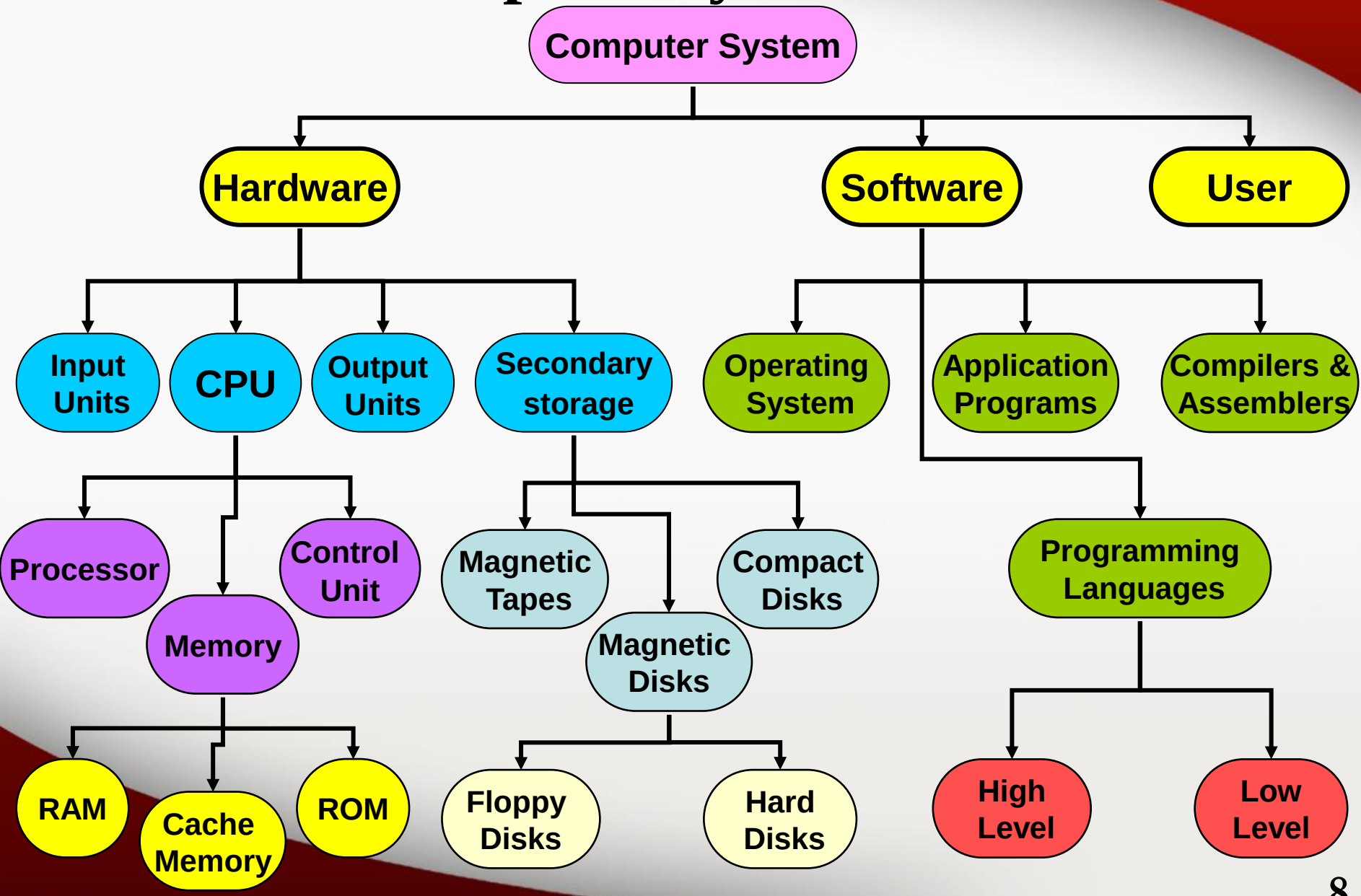
It consists of three main parts:

1. **Computer Hardware.**
   All the machinery and equipment in a computer system
2. **Computer software.**
   All the instructions that tell the computer how to perform a task
3. **Users.**

Computer System Components

1. Hardware – provides basic computing resources (CPU, memory, I/O devices).
2. Software **All the instructions that tell the computer how to perform a task (application program, programming Languages, Operating system)**
3 Users (people, machines, other computers).

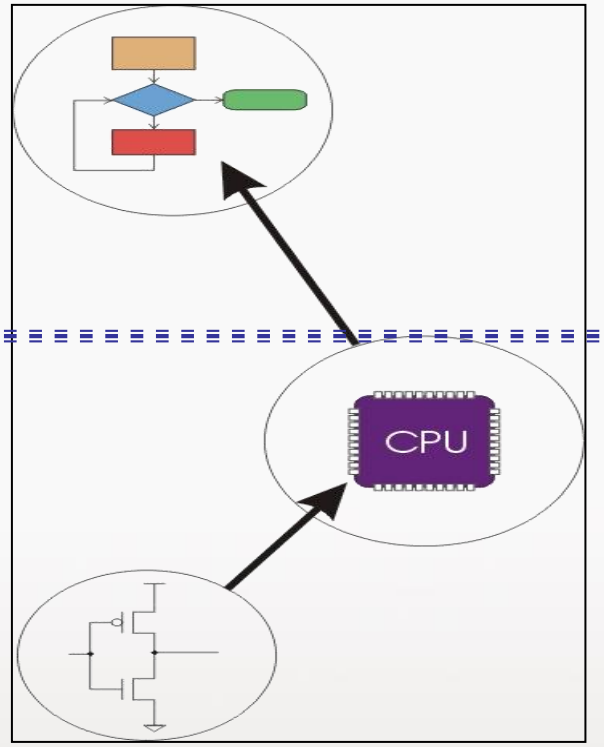
Contents of computer system



Computer System

Software

Hardware



Application Program

Algorithms

Language

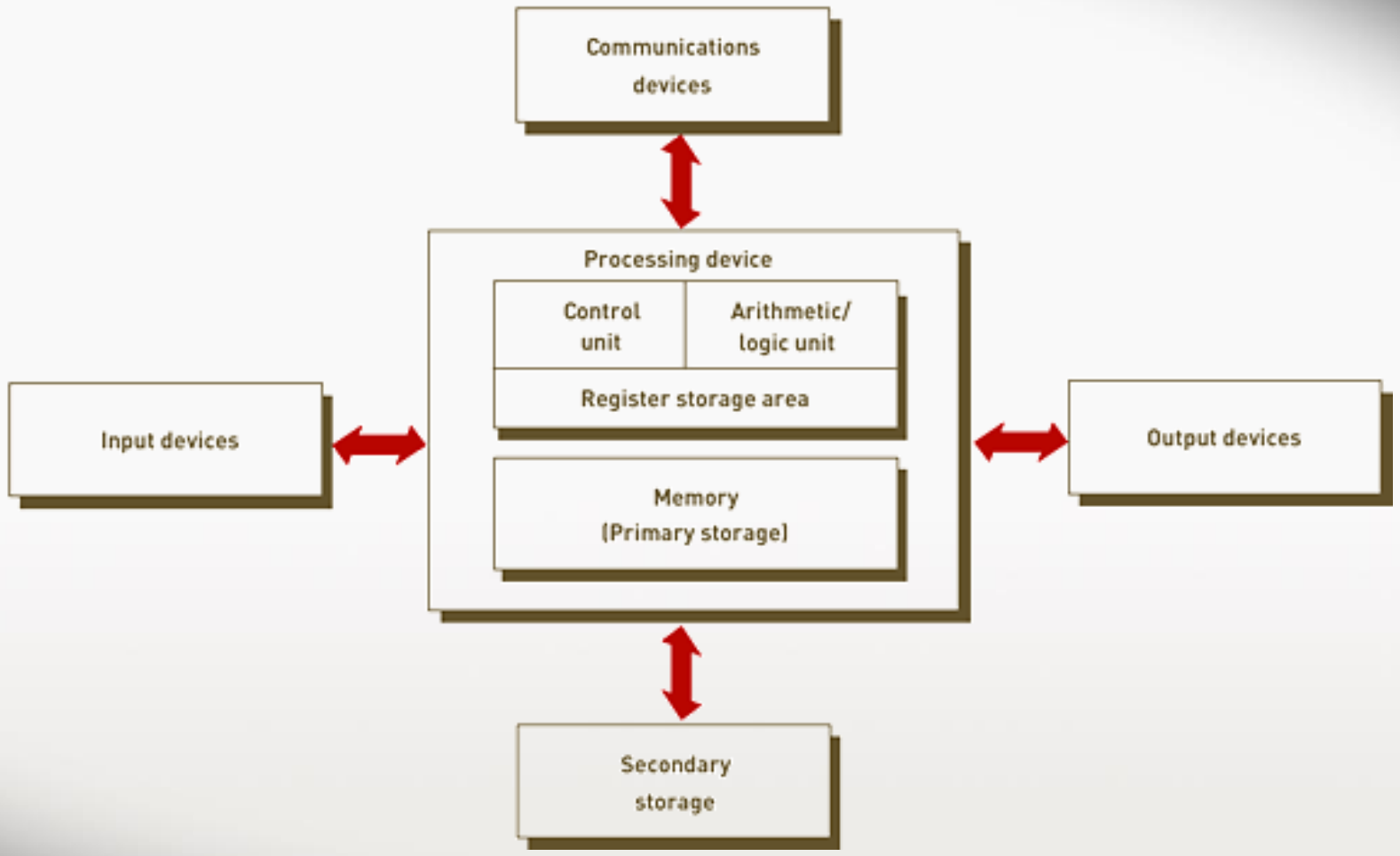
Instruction Set Architecture (and I/O Interfaces)

Micro architecture

Circuits

Devices

Hardware Components

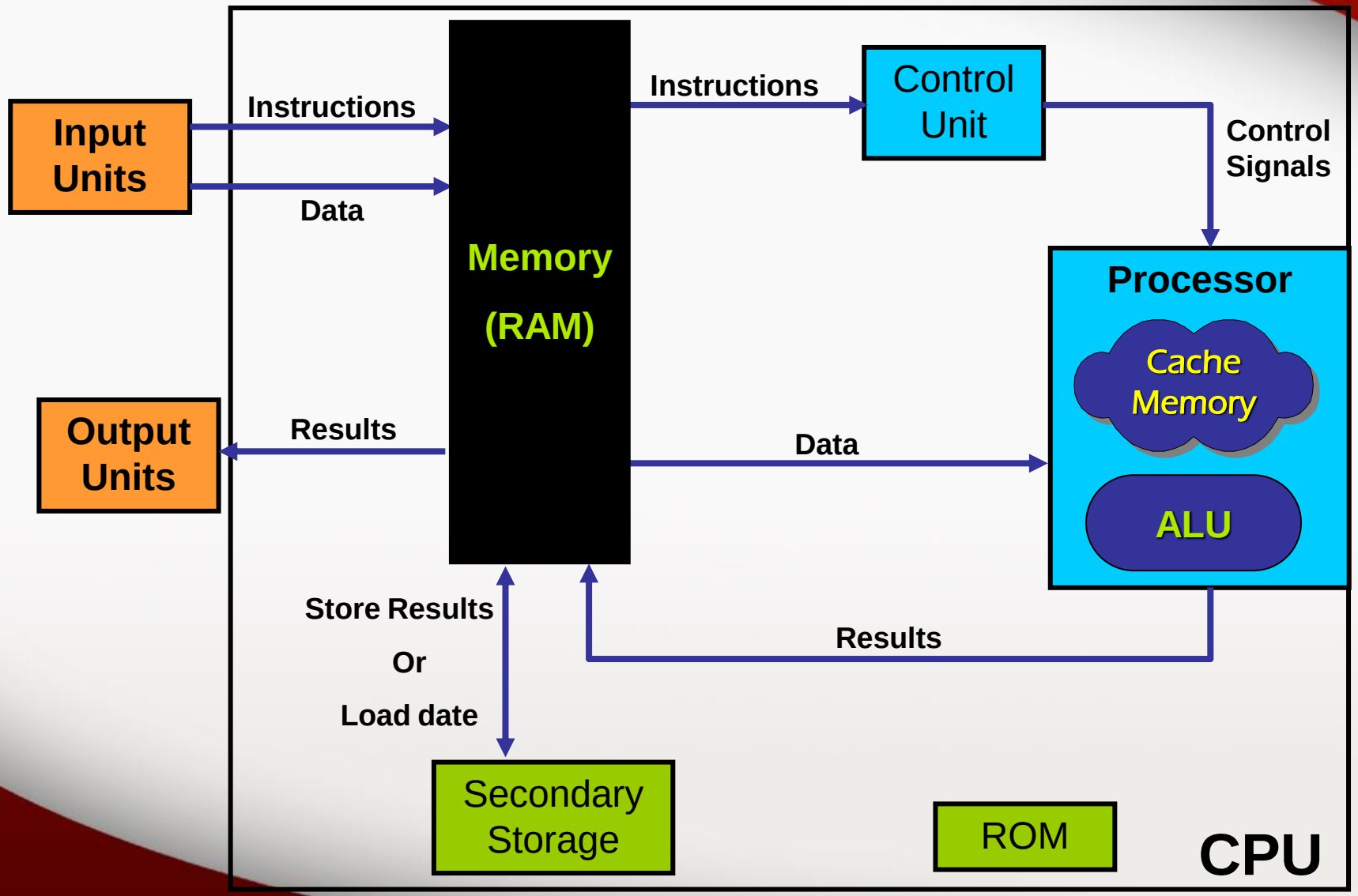


Computer Basic units

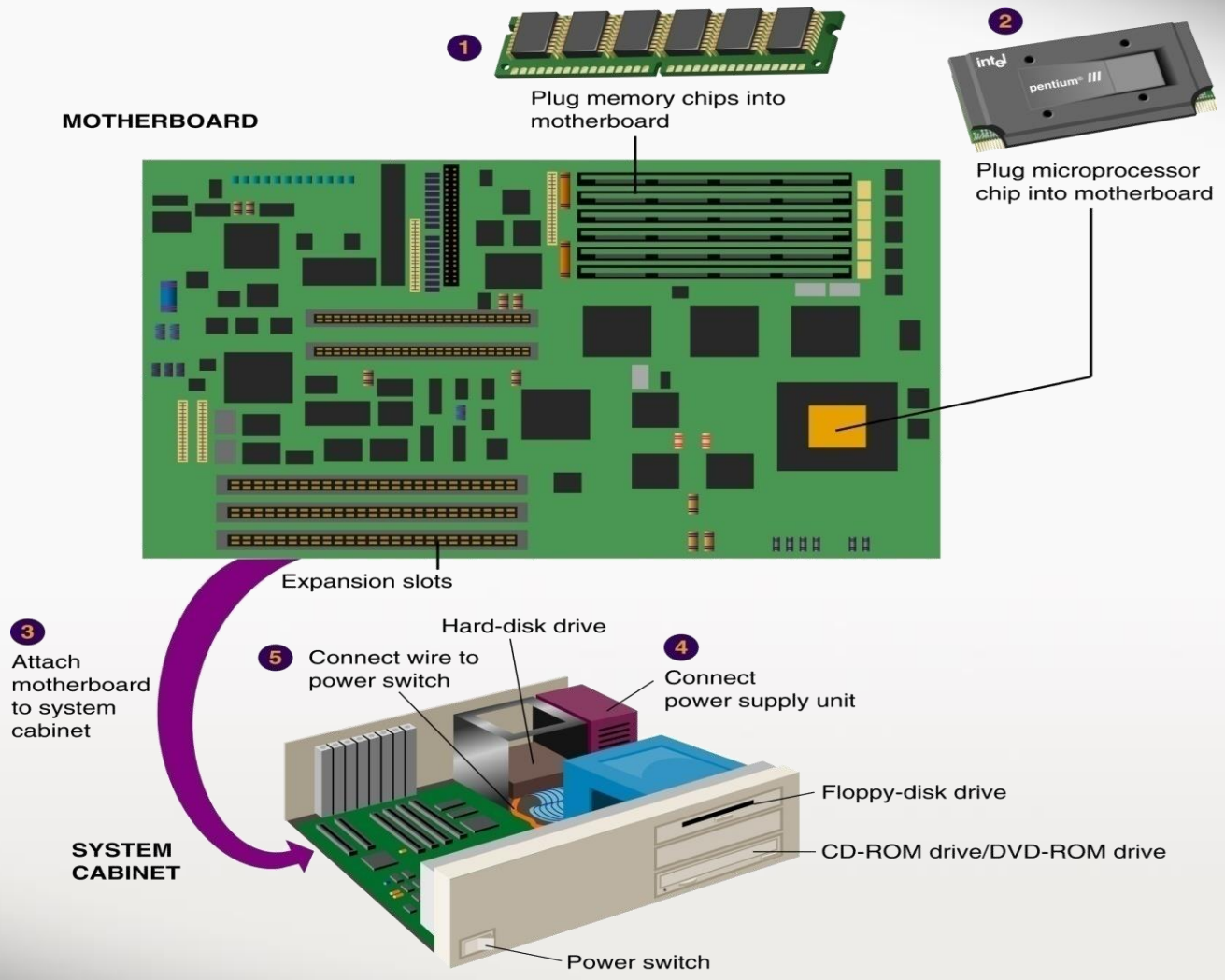
The basic units of the computer are:

1. **Input Units:** **used to input the data and instructions into the computer memory.**
2. **Output Units:** **used to output the final results to the user.**
3. **Memory Unit:** **used to store the user data and instructions as well as the final results.**
4. **Control Unit:** **used to control the sequence of operations that will be performed by the processor.**
5. **Processor:** **perform all the required operations.**

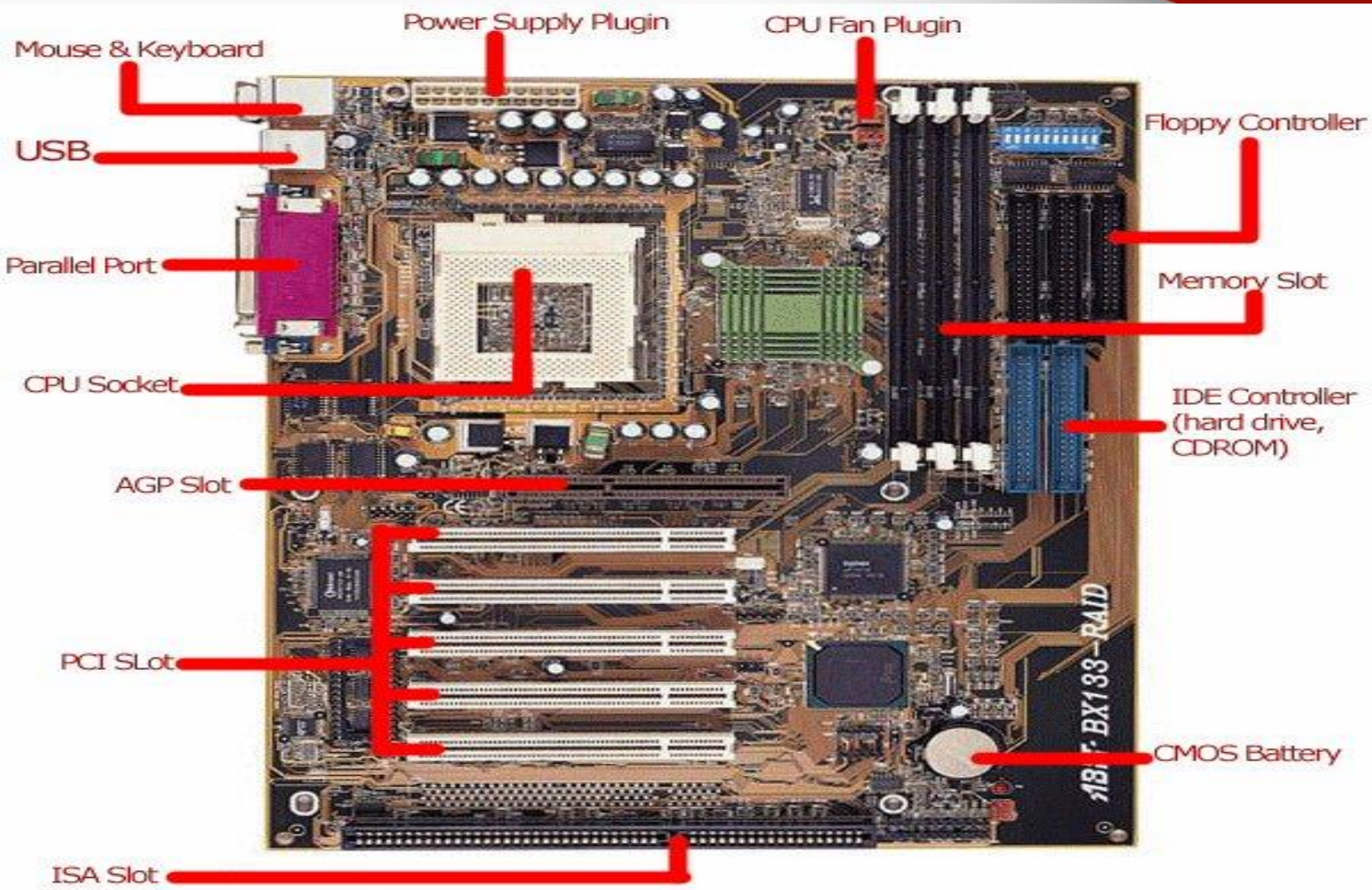
Computer Basic units



Computer Basic units



Mother board اللوحة الام

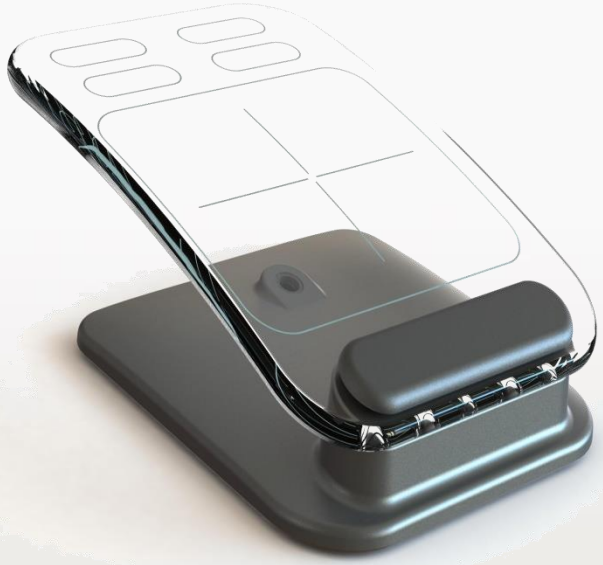



Designed in Taipei
PCI Express 3.0
All Solid Capacitors
DualBIOS
HDMI
GIGABYTE
GA-Z77P-D3
mSATA
Intel
Smart Response
Technology
Socket 1155
LGA1155
GIGABYTE
USB 3.0
ErP Ready

Computer Basic units

The basic units of the computer are:

Input Units: **used to input the data and instructions into the computer memory.**



Computer Memory

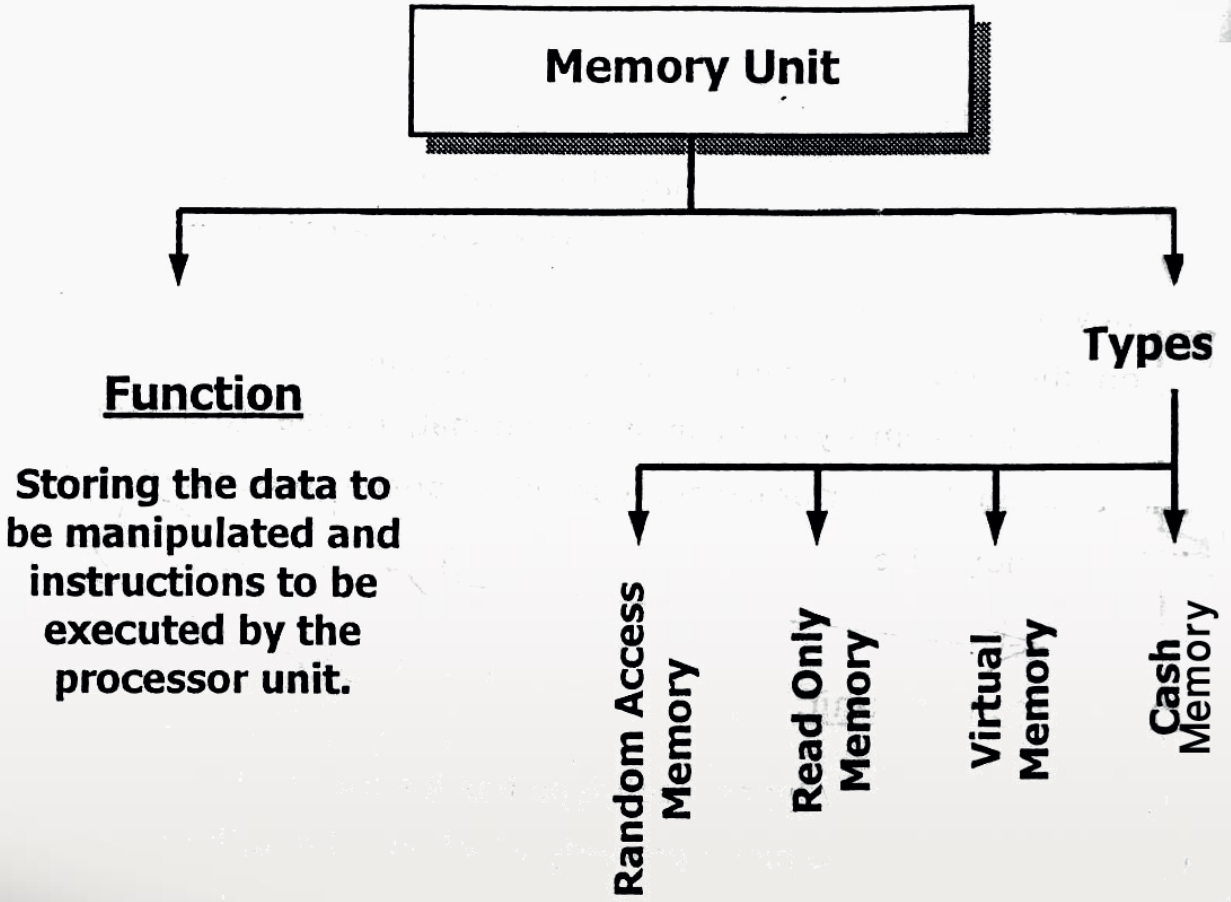
Can be divided into 2 Categories

- **RAM (Random Access Memory)**
- **ROM (Read Only Memory)**
- **Cash Memory**
- **Virtual Memory**

Memory in Computer

- Main Memory
  - Much faster
  - More expensive
  - Volatile
- Secondary Memory
  - Slower
  - Less expensive
  - Permanent

Computer Memory

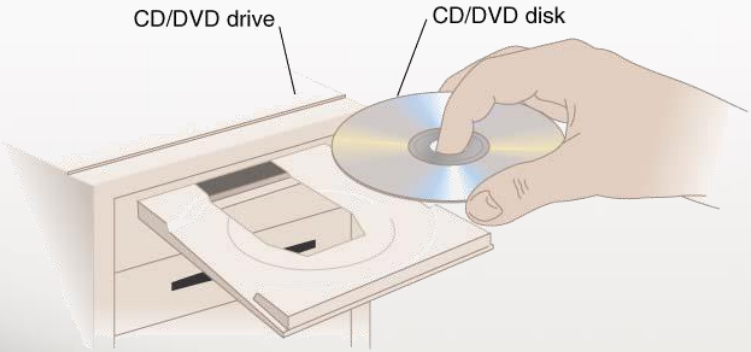


Storage Hardware

- **Storage capacity**
  - **Byte – 1 character = 8 bits**
  - **Kilobyte – 1024 byte = 2^{10} byte**
  - **Megabyte – 1024 Kilobyte = 2^{10} Kilobyte**
  - **Gigabyte – 1024 Megabyte = 2^{10} Megabyte**
  - **Terabyte – 1024 Gigabyte = 2^{10} Gigabyte**

Storage Hardware

- **Floppy drive**
- **Hard drive**
- **CD-ROM**
- **DVD**



Output Units

- Monitors.
- Printers
- Speakers
- Floppy Disks.
- Hard Disks.
- Compact Disks.
- Secondary Storage Devices.

Put all the hardware together

Software

- Software : **Computer Software are programs that tell the computer what to do.**

Software categories

- - Programming languages
- - application programs
- - operating systems

Programming languages

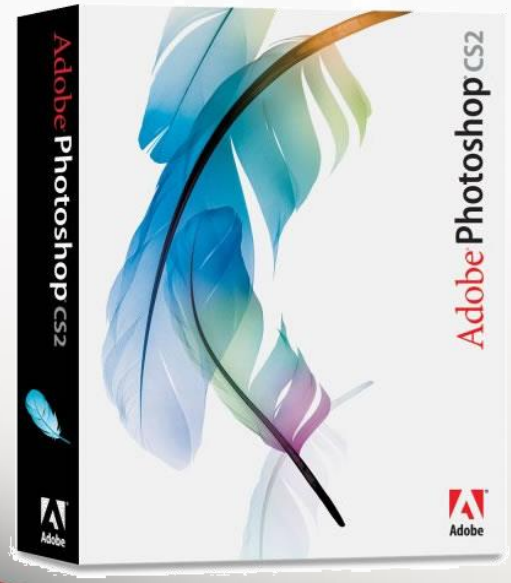
- Machine languages
- Assembly languages
- High level languages (Fortran – basic – java – C – C++ - C# - ….)

- Compiler & Interpreter

You still need the software!

Application software

- –Enables you to perform specific tasks , perform work, or entertain yourself
- –Ex. MS. Office, photo shop, 3D Max, …….



Operating system

- A program that acts as an intermediary between a user of a computer and the computer hardware.

- Ex. Windows, UNIX, LINUX, …….

What is an Operating System?

- A program that acts as an intermediary between a user of a computer and the computer hardware.
- Operating system goals:
  - Execute user programs and make solving user problems easier.
  - Make the computer system convenient to use.
- Use the computer hardware in an efficient manner.

Cont. What is an Operating System?

- An operating system is software that manages the computer hardware.
- Internally, operating systems vary greatly in their makeup, since they are organized along many different lines.
- The design of a new operating system is a major task.

- It is important that the goals of the system be well defined before the design begins.
- These goals form the basis for choices among various algorithms and strategies.
- Because an operating system is large and complex, it must be created piece by piece. Each of these pieces should be a well delineated portion of the system, with carefully defined inputs, outputs, and functions

- Mainframe operating systems are designed primarily to optimize utilization of hardware. Personal computer (PC) operating systems support complex games, business applications, and everything in between
- Operating systems for handheld computers are designed to provide an environment in which a user can easily interface with the computer to execute programs

Definitions

- **Kernel :** is the one program running at all times on the computer
- **Systems programs**, which are associated with the operating system but are not part of the kernel,

The attributes of system programming

- Using system programming, a programmer can make assumptions about the hardware of the system that the program runs on.
- A low level programming language is used in system programming normally. This is so that the programs can operate in low resource environments easily.
- Most system programs are created to have a low runtime overhead. These programs may have small runtime library.

- Some parts of the system programs may be directly written in assembly language by the programmers.
- A debugger cannot be used on system programs mostly. This problem can be solved by running the programs in

- Amore common definition, and the one that we usually follow, is that the operating system
- is the one program running at all times on the computer—usually called the **kernel**. (Along with the kernel, there are two other types of programs:
- **systems programs**, which are associated with the operating system but are not
- part of the kernel, and **application programs**, which include all programs not
- associated with the operation of the system.)

- **application programs**, which include all programs not associated with the operation of the system.
- perform a particular function directly for the users. Some of the common application programs include Email, web browsers, gaming software, word processors, graphics software, media player etc.

Thanks for your attention!