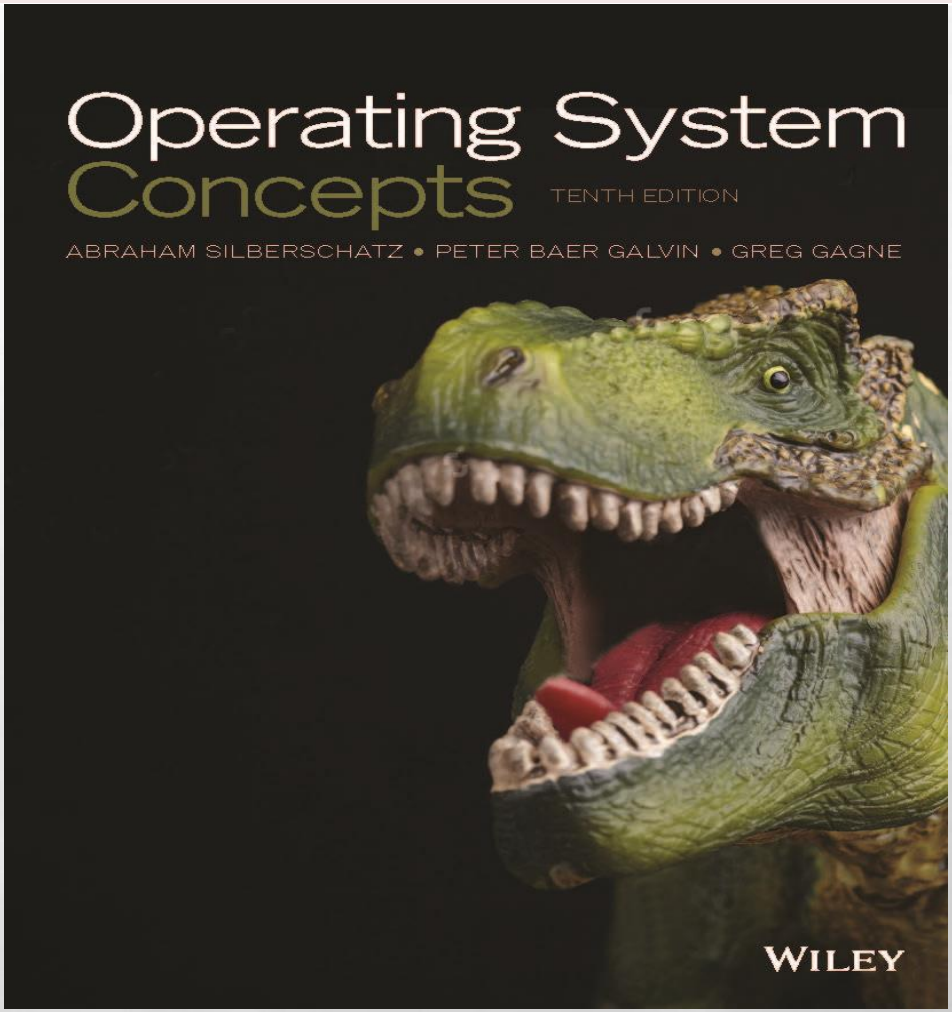
Mustansiriayah University
Collage of Education
Computers Science Department

Chapter One
Part 1



Fourth Class

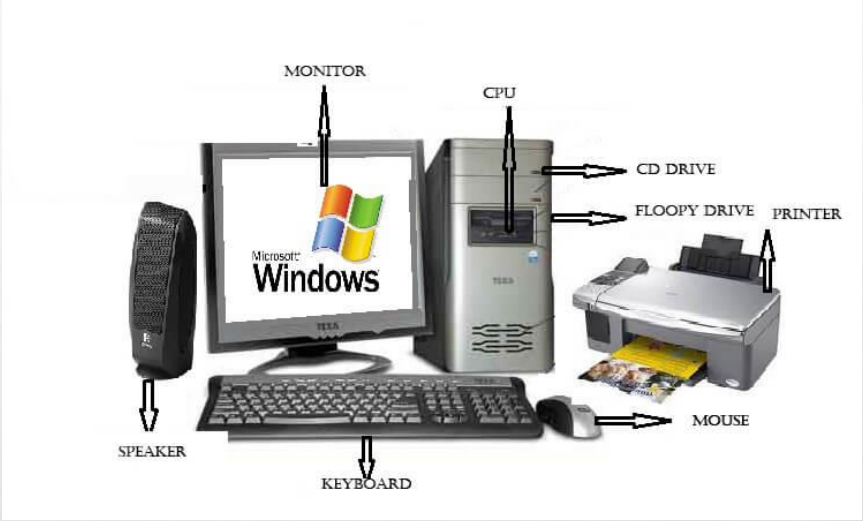
2019-2020

1. Introduction

- A modern computer system consists of:

  One or more processors, Main memory, Disks, Printers, a keyboard,

  a display, Network interfaces, and other Input/output devices (Hardware).



- Computers are equipped (مسلح) with a layer of software called the operating system, whose job is to manage all these devices and provide user programs with a simpler interface to the hardware.

أجهزة الكمبيوتر تضم مستوى من البرامج تسمى نظام التشغيل ، وتتمثل مهمتها في إدارة جميع هذه الأجهزة وتزويد برامج المستخدم بواجهة مبسطة لهذه المكونات المادية

1.1 What is an Operating System?

- A program that acts as an intermediary (وسيط) between a user of a computer and the computer hardware.
- The purpose of an operating system is to provide the environment (بيئة) in which the user can execute programs.

- OS is a **resource allocator**
  - Manages all resources
  - Decides between conflicting requests for efficient and fair resource use

يقرر بين الطلبات المتضاربة للحصول على الكفاءة والاستخدام العادل للموارد

- OS is a **control program**
  - Controls execution of programs to prevent (منع) errors and improper (غير مناسب) use of the computer

1.2 Computer System Components

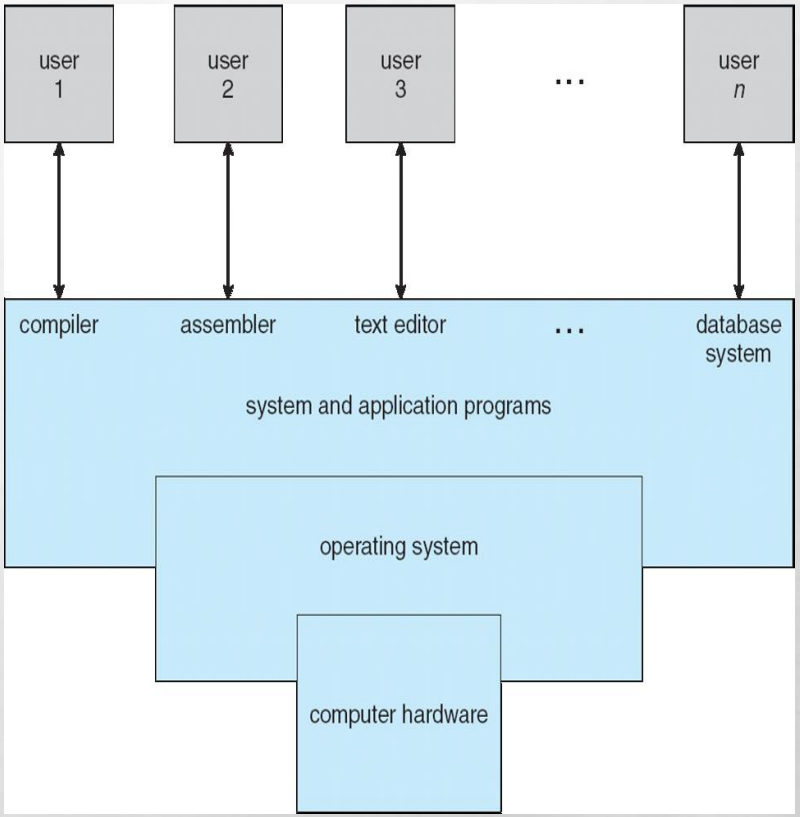
- Computer system can be divided into four components:

1- Hardware: (CPU, memory, I/O devices), provides basic computing resources

2- Operating system: Controls and coordinates (ينسق) use of hardware among various applications and users

3- Application programs: (Word processors, compilers, web browsers, database systems, video games

4- Users: People, machines, other computers



1.3. The Operating System Goals

1. The primary goal of an O.S. is to make the Computer System convenient (ملائم, مقنع) to use.

2. A secondary goal is to use the computer H/W in an efficient manner (بطريقة فعالة).

1.4 The operating Functions

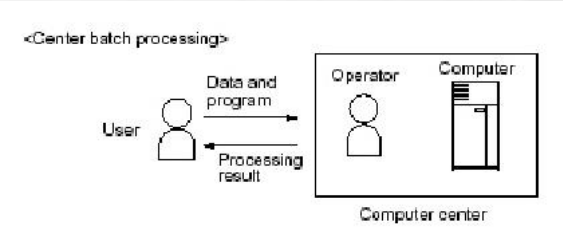
A more common definition: **Operating system is the one program running at all times on the computer**, usually called the **kernel.**

O.S. performs many functions such as:

1. Implementing the user interface.
2. Sharing H/W among users.
3. Allowing users to share data among themselves.
4. Preventing users from interfering with one another.
5. Scheduling resources among users
6. Facilitating (تسهيل) I/O.
7. Recovering from errors.
8. Accounting for resource usage.
9. Facilitating parallel operations.
10. Organizing data for secure and rapid access.
11. Handling network communications.

1.5 Operating System Categories

Classified into three groups, based on the nature of interaction between the computer and the user:



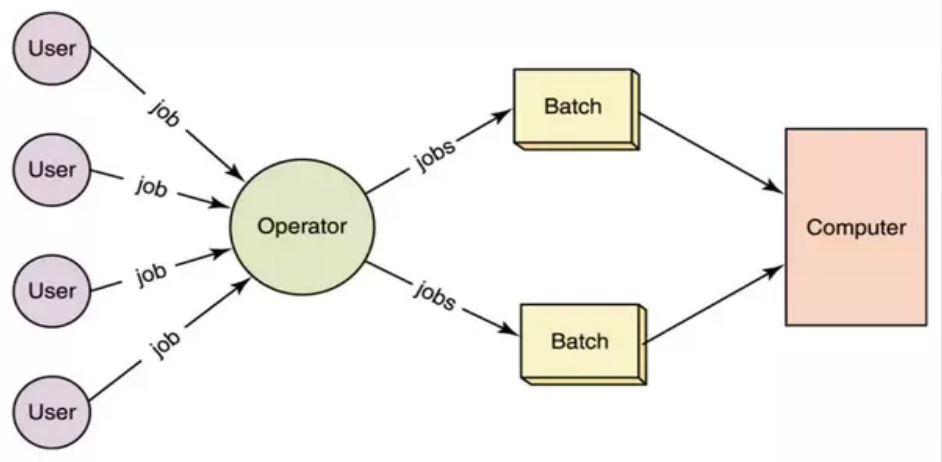
1. **Batch System**

2. **Time-sharing System**

3. **Real Time System**

1.5.1 Batch System

- Users submit jobs on a regular (منتظم) schedule (e.g. daily, weekly, monthly) to a central place where the user of such system did not interact directly with C/S.



- To speed up processing, jobs with similar needs were batched together and were run through the computer as a group.

  Thus, the programmers would leave their programs with the operator.

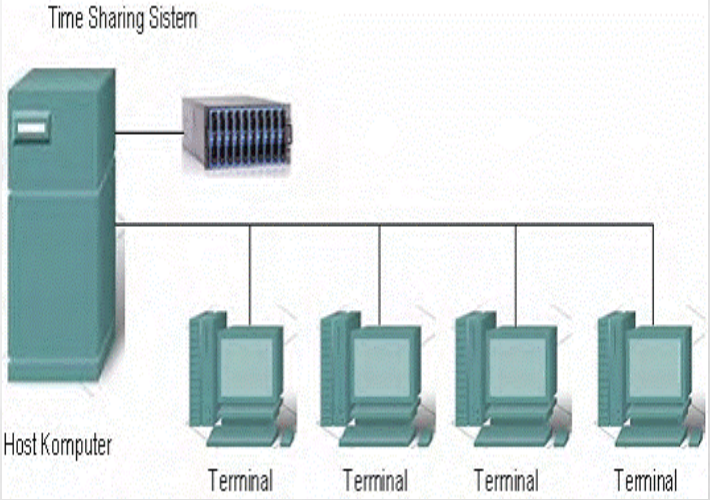
- The output from each job would be send back to the appropriate programmer.
- The major task of this type was to transfer control automatically from one job to the next

Advantages: batch system is very simple.

Disadvantages: There is no direct interaction between the user and the job while that job is executing.

1.5.2. Time sharing System

- Provides online communication between the user and the system
- User gives instruction to the O.S. or to the program directly and receives an immediate response, therefore some time called an interactive system.



- Allows many users simultaneously (في نفس الوقت) share the computer system where little CPU time is needed for each user.
- The system switches rapidly(بسرعة) from one user to the next user, This gives the impression (أنطباع) that they each have their own computer, while actually one C/S shared among the many users.

Advantages: Reduce the CPU idle time

Disadvantages: More Complex

1.5.3. Real Time System

- Used when there are rigid time requirements on the operation of a processor or the flow of data

تستخدم عندما تكون هناك متطلبات زمنية صارمة على تشغيل المعالج أو تدفق البيانات

- A Real-time system guarantees that critical tasks complete on time انظمة

الوقت الحقيقي تضمن أكمال المهمات الحرجة في الوقت المطلوب.

- The Radar system is a good example for the real time system

End of Part 1