

Operating System

DR. GHADA FATHY

Course Information

Lecturers:

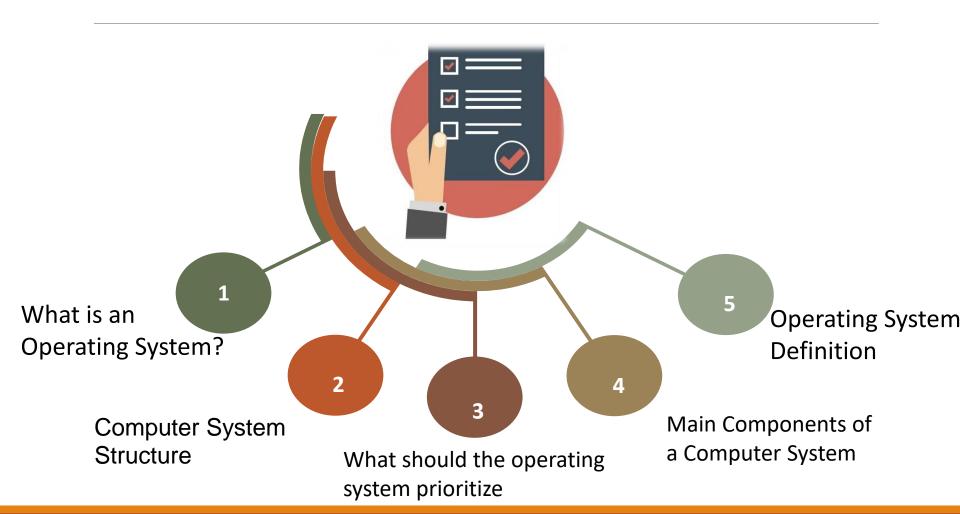
- Dr. Ghada Fathy

Credit hours (2)

Requirements & Grading (Total 100 marks)

- Class work and attendance (30 marks)
- Midterm exam (20 marks)
- Final Exam during finals week (50 marks)
- Book Reference
 - Operating System Concepts (9th Edition)

Outlines



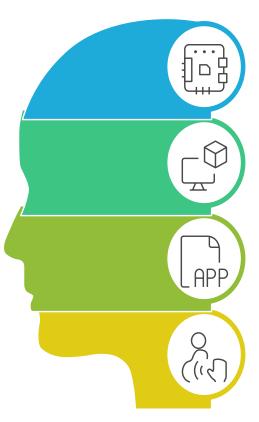
What is an Operating System?

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

Computer System Structure



Hardware

Provides basic computing resources CPU, memory, I/O devices

Operating System

Controls and coordinates use of hardware among various applications and users

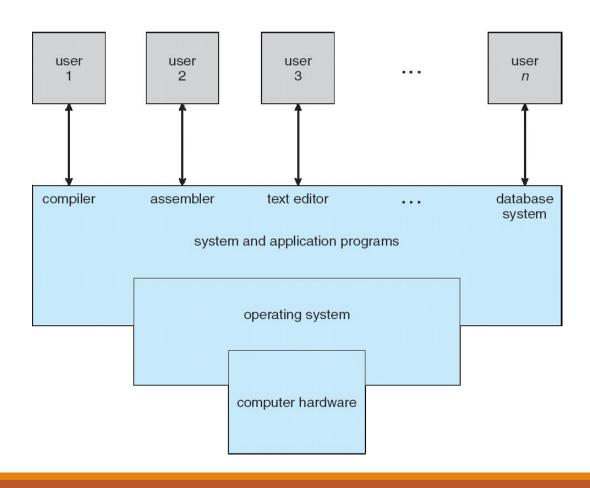
Application Programs

Defines how system resources are used to solve the computing problems of the users

Users

People, machines, or other computers interacting with the system

Four Components of a Computer System



What should the operating system prioritize?



User Convenience

Focus on ease of use and performance for individual users.





Shared Resource Management

Balance user satisfaction with efficient resource allocation in shared systems.





Dedicated Resource Utilization

Optimize for dedicated resources while integrating shared server resources.





Resource Efficiency

Prioritize usability and battery life for resourceconstrained devices.



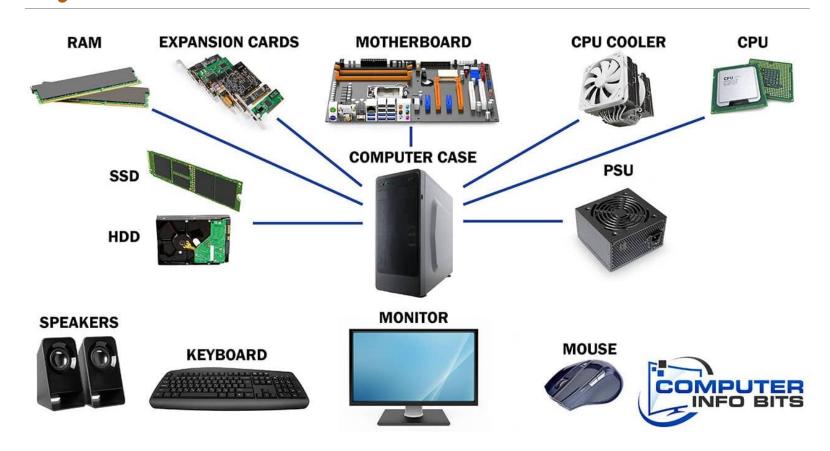


No User Interface

Design for embedded systems with minimal or no user interaction.



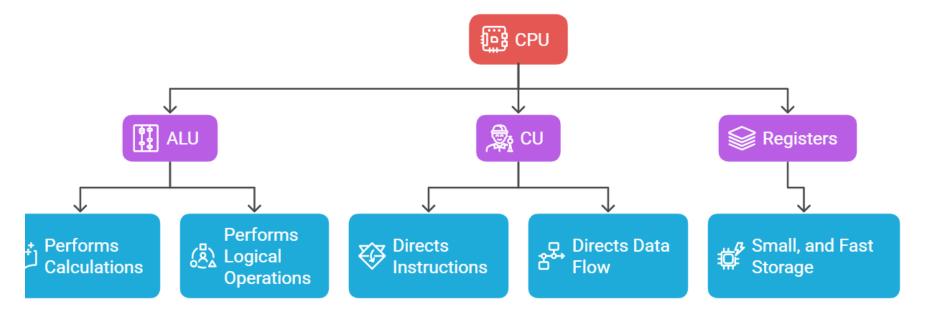
Main Components of a Computer System



Central Processing Unit (CPU)

Brain of the computer.

Works with the **system clock** to execute instructions.



Memory (Storage Hierarchy)



Fastest, smallest memory inside the CPU.

Small, fast memory located near the CPU.





Temporary storage for running programs and data.

Permanent storage for firmware and boot instructions.

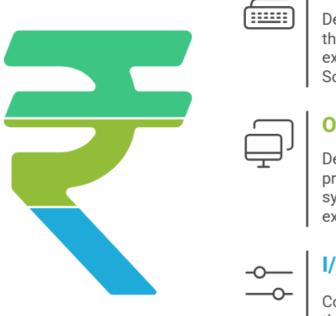




Secondary Storage

Long-term data storage on hard disks or SSDs.

Input/output (I/O) Devices



Input Devices

Devices that feed data into the system ex: keyboard, mouse, Scanner

Output Devices

Devices that display or produce data from the system

ex: Monitor, Printer

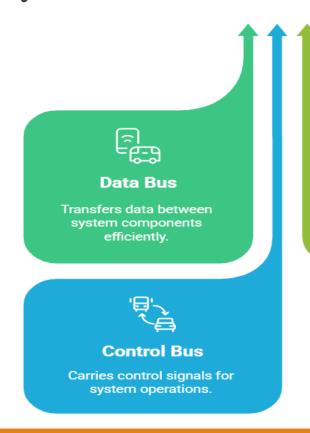
I/O Controllers

Components that manage the flow of data between devices

System Bus (Communication Pathways)

Connects CPU, memory, and I/O.

• Types of buses:



Address Bus

addresses for data

Network Interfaces

Controlled by **network controllers**



LAN Cards

Enable wired communication





Wi-Fi Cards

Enable wireless communication

Operating System Definition

OS is a resource allocator

- Manages all resources
- Decides between conflicting requests for efficient and fair resource use

OS is a control program

 Controls execution of programs to prevent errors and improper use of the computer