OPERATING SYSTEM

Introduction to Operating Systems

An **Operating System (OS)** is the main software that manages computer hardware and provides services for computer programs. It acts as a bridge between the **user**, the **application software**, and the **hardware**.

Why Do We Need an Operating System?

Without an OS:

- You would have to directly control hardware using complex instructions.
- Running multiple programs at once would be extremely difficult.
- There would be no user-friendly interface (no desktop, icons, apps, etc.).

The OS makes the computer usable by handling tasks automatically.

Functions of an Operating System

1. Process Management

- Manages running programs (processes).
- Allocates CPU time to each process.
- Ensures multitasking.

2. Memory Management

- Keeps track of which program uses which part of memory.
- Allocates and deallocates memory.

3. File System Management

- Organizes data into files and folders.
- Controls permissions and storage.

4. Device Management

- Controls hardware (keyboard, mouse, printer, etc.).
- Uses drivers to help hardware communicate with the system.

5. Security and Access Control

- Protects data and resources from unauthorized access.

6. User Interface

- Provides CLI (Command Line Interface) or GUI (Graphical User Interface).

Types of Operating Systems

• Batch OS

Executes jobs in batches without user interaction.

• Time-Sharing OS

Multiple users share system resources simultaneously.

• Real-Time OS

Used for tasks that must be done on time (robots, aircraft systems).

• Distributed OS

Manages multiple computers connected in a network.

• Mobile OS

For smartphones (Android, iOS).

Examples of Operating Systems

- Windows
- Linux
- macOS
- Android
- iOS