**What is an Operating System?**

An **Operating System (OS)** is **system software** that acts as an **interface between the user and the computer hardware**. It manages **hardware resources** and provides **services to run application software**.

**Key Functions of an Operating System:**

1. **Process Management** – Handles creation, scheduling, and termination of processes.
2. **Memory Management** – Allocates and manages the system's RAM (e.g., virtual memory, paging).
3. **File System Management** – Controls how data is stored and retrieved.
4. **Device Management** – Manages input/output devices through drivers.
5. **Security and Access Control** – Ensures only authorized access to data and resources.
6. **User Interface** – Provides CLI (Command Line Interface) or GUI (Graphical User Interface).

**Components of an Operating Systems**

There are two basic components of an Operating System.

* [Shell](https://www.geeksforgeeks.org/difference-between-shell-and-kernel/)
* [Kernel](https://www.geeksforgeeks.org/kernel-in-operating-system/)

**What is a Shell?**

* The **Shell** is the **interface between the user and the kernel**.  
  It **takes commands from the user**, sends them to the **kernel**, and **shows the output**.
* Shell is the outermost layer of the Operating System and it handles the interaction with the user. The main task of the Shell is the management of interaction between the User and OS

**Types of Shells:**

* **Command Line Shell** – e.g., **Bash**, **sh**, **zsh**
* **Graphical Shell** – e.g., **Windows desktop**, **macOS Finder**

**Definition of Kernel:**

* A **Kernel** is the **core part of an Operating System** that has complete control over the system.  
  It **manages hardware** (CPU, memory, devices) and allows software to use the hardware safely and efficiently.
* The rest of the components depends on Kernel for the supply of the important services that are provided by the Operating System.

**The OS = Kernel + Other Components**

The **Operating System** includes:

1. **Kernel** – Core part that interacts with hardware ⚙️
2. **Shell** – Interface for user commands (like Terminal or GUI) 💬
3. **File System** – Helps you organize and manage files 📁
4. **Device Drivers** – Allows OS to talk to devices (keyboard, printer) 🖨️
5. **Utilities & Applications** – Tools like Task Manager, File Explorer 🛠️