

OPERATING SYSTEM




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Operating System

An operating system (OS) is system software that manages computer hardware, software resources, and provides common services for computer programs. It acts as an intermediary between users and the computer hardware. Operating systems are essential for running applications and managing system resources like memory, processing power, and storage.



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Types of Operating System

1. Batch Operating System
2. Time-Sharing Operating System
3. Real-Time Operating System
4. Distributed Operating System
5. Network Operating System
6. Embedded Operating System
7. Mobile Operating System
8. Multiprogramming OS
9. Multiprocessing OS
10. Single-User OS
11. Multi-User OS



Batch Operating System

Users prepare jobs offline (e.g., on punch cards) and submit them to the operator. The OS groups similar jobs into batches and executes them without user interaction.

- Use Case: Suitable for repetitive tasks like payroll processing.
- Example: Early mainframe systems.

Time-Sharing Operating System



Allows multiple users to share system resources simultaneously by dividing CPU time into small intervals (time slices). Each user gets the illusion of having their own system.

- Use Case: Used in environments where multiple users need access to the same system.**
- Example: UNIX, Linux.**



Distributed Operating System

Manages a group of independent computers and makes them appear as a single system.

Resources are shared across multiple machines.

- Use Case: Used in distributed computing environments like cloud computing.**
- Example: Google's Borg, Apache Hadoop.**



Network Operating System

Designed to manage and facilitate communication between multiple computers in a network. It provides shared access to files, printers, and other resources.

- Use Case: Used in local area networks (LANs).
- Example: Microsoft Windows Server, Novell NetWare.



Real-Time Operating System (RTOS)

Processes data and responds to inputs in real-time with minimal delay. It is used in systems where timing is critical.


- Use Case: Embedded systems, robotics, and industrial automation.**
- Example: VxWorks, FreeRTOS.**



Mobile Operating System

Designed specifically for mobile devices like smartphones and tablets. Optimized for touchscreens, battery life, and wireless connectivity.

- Use Case: Smartphones, tablets, and wearable devices.**
- Example: Android, iOS, Harmony OS.**




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Embedded Operating System

Designed for embedded systems, which are specialized computing systems that perform dedicated functions.

- Use Case: IoT devices, automotive systems, and home appliances.
- Example: Embedded Linux, Windows IoT.



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Multiprogramming Operating System

Allows multiple programs to reside in memory simultaneously and share CPU time. Improves resource utilization.


- **Use Case: General-purpose computing.**
- **Example: IBM OS/360.**



Multiprocessing Operating System

Supports multiple CPUs or cores to execute tasks simultaneously, improving performance and efficiency.

- **Use Case: High-performance computing and servers.**
- **Example: Windows 10, Linux.**



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Single-User Operating System

Supports only one user at a time. Can be single-tasking or multitasking.

- Use Case: Personal computers.
- Example: MS-DOS, Windows 95.



Multi-User Operating System

Allows multiple users to access the system simultaneously. Each user has their own session and resources.

- **Use Case: Servers and mainframes.**
- **Example: UNIX, Linux, Windows Server.**