



1.2.1 Types of Operating Systems

Types of operating system

Distributed

A distributed operating system manages multiple networked computers so that their processing resources can be combined to work on tasks.

The operating system coordinates the computers by dividing a job into tasks that can be processed across multiple computers.

For example, rendering a CGI scene for a movie can require a large amount of processing power, so the work can be distributed across multiple computers to reduce the time required.

Embedded

An embedded operating system is designed for a specific device or purpose and is stored within the device.

It is often stored in non-volatile memory such as ROM or flash memory so that it is retained when power is removed.

For example, microwaves, washing machines. Any device with a very specific purpose.

Multi-tasking

A system where multiple processes appear to run simultaneously by rapidly switching the processor between them.

For example, a computer can play music while the user writes Python code and checks emails.

Multi-user

A multi-user operating system allows multiple users to access the same computer system and its resources at the same time.

Users may access the system through terminals or other networked devices, while the operating system manages the users' access to processor time, memory, files and other resources

For example, a company may have employees accessing a central mainframe through terminals.

Real time

A real-time operating system is designed to respond to inputs within a specified time limit.

A predictable and sufficiently fast response is critical because delays could cause the system to fail or become unsafe.

It may need to respond to multiple inputs from sensors and devices within the required time limits.





Real-time systems used in safety-critical situations may require fail-safe mechanisms and redundant hardware so that the system can continue operating if a component fails.

For example, hospital equipment. Nuclear power systems. Aircraft systems.

Comparison Table

Type	Main purpose/characteristic	Example
Distributed	Coordinates multiple networked computers to work on tasks	CGI rendering
Embedded	Designed for a specific device or purpose	Washing machine
Multi-tasking	Allows multiple processes to share processor time	Desktop PC
Multi-user	Allows multiple users to access a computer system	Mainframe system
Real-time	Responds to inputs within required time limits	Aircraft system

