

OPERATING SYSTEMS

Introduction

An operating system is a collection of software designed to manage hardware resources, and run software applications and programs on the computer. It connects the hardware resources to the software programs and manages the whole system. It acts as a communications manager between each component or area of the computer's system, it runs the operations for the system, controls the memory storage and peripherals, provides the interface of the computer for the user, and finally, it organises the processing time of programs for the user.

Types Of Operating Systems

Single-User, Single-Task

These were initially developed by companies like IBM, which required purpose-built, single-user operating systems when operating systems were in their infancy, and are now almost extinct.

These are basic operating systems, built for a single purpose and for a single user. This type of operating system is most commonly associated with DOS, but a modern example of these operating systems is the 'Palm OS' which was built for the Palm mobile phones (which have been discontinued since 2009).



Single-User, Multi-Tasking

Designed to be used by a single user, but allows for multiple applications to run at the same time. These tasks share common processing resources.

For example, Windows 10 is capable of writing a document in a word processing software program, while downloading a file from the Internet and printing a document concurrently.

These operating systems are the most common type these days. For example, Windows 7, 8 and 10, Macintosh OSX.



Multi-User

This type of operating system allows for multiple users using different computers, to access a mainframe with a single operating system and its resources, at the same time.

The operating system must make sure that each of the programs they are using has sufficient resources so that a problem with one user doesn't affect the entire community of users.

Examples: Unix, VMS and mainframe operating systems such as MVS.



Embedded

This type of operating system is designed to operate small computer systems, such as smartphones and other consumer or automotive electronic devices such as cameras, TVs and car computer systems.

They're able to operate with a limited number of resources, and are designed to be efficient and easy to use.

For example, Minix, Windows CE, Android, iOS.



Real-Time

Real-time operating systems are used to manage and command machinery, such as scientific equipment and industrial systems.

A real-time operating system does not usually rely heavily on a user-interface accessories and has no end-user capabilities.

The most important part of a real-time operating system is resource management, to allow for a particular operation to be executed in precisely the same amount of time, every time it occurs – this is vital in a complex machine.

Examples, QNX, RTLinux.



Functions Of An Operating System

- ❖ **Security** - The operating system creates backups and controls permission and access rights (if there are multiple users) and maintains the systems security.
- ❖ **File management** - The operating system controls where data is saved and allows users to copy, rename, delete files and use folders.
- ❖ **Hardware Management** - This function allows the operating system to load programs, allocate resources to different programs and carry instructions back and forth from the software to the hardware.
- ❖ **Resource Allocation** - This allows the operating system to send data and instructions from input devices (such as a keyboard) to programs, as well as installing and accessing peripheral devices and other resources such as printers and hard disk drives.