Operating System[1]

An *operating system* (OS) is the master control software program required in order for a general-purpose computer to function [1]. It manages all of the computer's software and hardware [2]. For example, it allows the user to communicate with the hardware by, among other methods, entering input into the keyboard and receiving output on the screen. It also acts as a "traffic cop" to make sure each *application* (non-operating-system program) gets the hardware resources it needs without interfering with another application [3].

The operating system comes preinstalled on the computer. It launches when the computer is turned on, runs in the background, and stays on until the computer is turned off.

This discussion describes the essential operations that operating systems perform: how users and applications communicate with the OS; types of OSs; and examples and market share of common OSs.

Operating System Tasks

The operating system performs a number of essential operations, including:

- Receiving input from the user via input devices such as the keyboard, mouse or touchscreen.

- Sending output to an output device such as the screen or printer.

  Note: Operations such as these are *input/output operations* or *I/O.*

- Controlling other *peripheral devices* (auxiliary devices connected to the computer) such as disk drives, scanners, cameras, and microphones.

  Note: Peripheral devices are also I/O devices.

- Managing access to hardware resources, specifically, the *central processing unit* (CPU, the "brain" of the computer), memory, and storage.

- Establishing a user interface.

- Managing files and directories (sometimes called folders).

- Communicating with a computer network.

- Allowing access only to authorized users.

Communication with the Operating System

Users and applications communicate with the operating system in order to make requests and receive results.

User interface. Users interact with the operating system through either a *command line interface* (CLI, sometimes called a *shell*), which accepts text commands and displays output

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[1] The audience for this extended definition is made up of marketing professionals new to the computer field and needing background information on how computers work. They are college educated and familiar with using desktop computers and mobile devices, but typically without an understanding of what goes on "under the hood."

as plain text, or through a *graphical user interface* (GUI). The GUI has superseded the command line for general use; typically only developers and administrators use CLIs. Some operating systems offer voice recognition, most notably on smartphones.

Application interface. Applications communicate with the operating system through the *application program interface* (API), which lays out a set of requirements for the developer to use when writing the application code.

Types of Operating Systems

Desktop versus server. For the purpose of categorization, the term *desktop computer* also refers to laptops. *Servers* are dedicated machines with powerful operating systems and hardware, which handle networking, email, web hosting, file sharing, and databases, among other things [4]. They provide these services to other computers, including desktops. Desktops receive these services by way of *client software* (such as an email client or web browser) in what is referred to as the *client-server model*.

Proprietary versus open source. While *proprietary software* is copyrighted and made for sale, *open source software* (OSS) is typically free and can be copied, changed and distributed.

User and task capability. Operating systems can be classified by whether they can run multiple programs concurrently (multitasking) and by whether they can accommodate multiple users. A single-user OS *may* allow multitasking; a multi-user OS requires multitasking [5].

Examples of Operating Systems

Although there are many operating systems in use today, this section discusses the most common ones. The table below outlines basic information about each OS.

Desktops. Microsoft Windows is the de facto standard operating system for desktops made by various manufacturers, such as Dell [6]. The current version is Windows 10. Apple OS X ("oh es ex") is the current version of Apple's OS for the Mac. Linux, an open-source implementation of Unix, is one of the most powerful of operating systems.

Servers. The most common operating systems for use on servers are Linux and other Unix-like OSs. Microsoft Windows Server commands about a third of the market [7]. The current version is Windows Server 10.

Mobile devices. Mobile OSs allow smartphones and tablets to run applications. Examples are Google Android[2] and Apple iOS.[2]

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[2] OS X and iOS are based on NetBSD Unix.

	Operating System	Primary User Interface	Type	Approximate Market Share 2016 [7]
Desktop	Microsoft Windows	GUI	Proprietary Single-user Multi-tasking	90%
	Apple OS X	GUI	Proprietary Single-user Multi-tasking	8%
	Linux	Command Line	Open-source Multi-user Multi-tasking	2%
Server	Linux	Command Line	Open-source Multi-user Multi-tasking	37%
	Windows Server	GUI	Proprietary Multi-user Multi-tasking	33%
	Unix	Command Line	Open-source Multi-user Multi-tasking	30%
Mobile	Google Android	GUI	Proprietary Single-user Multi-tasking	65%
	Apple iOS	GUI	Proprietary Single-user Multi-tasking	24%

References

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