

The text spends the first section of Chapter 1 discussing the definition of an operating system. Specifically, it describes how no one definition of an operating system is adequate because of the multitude of applications in which operating systems are utilized. The most basic definition of an operating system, as defined by the text, is that it is software that is responsible for managing a computer's hardware. The specific functionality of each operating system depends on the device it is intended to control, but its core function is to enable a user to solve problems using the computational resources available on the device. It achieves this goal by creating an environment in which application programs can be executed and system resources can be allocated.

A typical general-use computer system consists of a central processing unit (CPU), memory, and several other devices connected via a common bus, or a communication system that enables the transfer of data between components. Device drivers are programs provide operating systems a uniform interface with each device, enabling the entire system to work in concert with one another to achieve a task. All these devices compete for system resources, and the operating system is what enables them to appear to function concurrently. Operating systems handle the concurrent demand for system resources by coordinating and dispatching interrupts to the CPU.

Upon powering-up a computer, a bootstrap program, which is typically stored within the system's firmware, loads the operating system and begins its execution. Once the operating system is running and no devices require servicing, it idles and awaits input from a user. When executing a program, an operating system may schedule the component processes in such a way that maximizes the efficiency of the CPU, thereby decreasing execution time and increasing instruction throughput. This is called multiprogramming, and it is just one of a myriad of functions of a modern operating system.