**CHAPTER-1**

**INTRODUCTION**

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* An operating system is a program that manages a computer’s hardware.
* It also provides a basis for application programs and acts as an intermediary between the computer user and the computer hardware.
* An amazing aspect of operating systems is how they accomplish these tasks.
* Mainframe operating systems are designed primarily to optimize utilization of hardware.
* Personal computer (PC) operating systems support complex games, business applications and everything in between.
* Operating systems for mobile computers provide an environment in which a user can easily interface with the computer to execute programs.
* Thus, some operating systems are designed to be **convenient**, others to be **efficient**, and others to be some combination of the two.
* Before we can explore the details of computer system operation, we need to know something about system structure.
* We thus discuss the basic functions of system startup, I/O, and storage early in this chapter.
* We also describe the basic computer architecture that makes it possible to write a functional operating system.
* Because an operating system is large and complex, it must be created piece by piece.
* Each of these pieces should be a well-delineated portion of the system, with carefully defined inputs, outputs, and functions.
* In this chapter, we provide a general overview of the major components of a contemporary computer system as well as the functions provided by the operating system.
* Additionally, we cover several other topics to help set the stage for the remainder of this text: data structures used in operating systems, computing environments and open-source operating systems.

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**1.1 What Operating Systems Do**

* We begin our discussion by looking at the operating system’s role in the overall computer system.
* A computer system can be divided roughly into four components: the **hardware**, the **operating system**, the **application programs** and the **users**.
* The hardware – the **central processing unit (CPU)**, the **memory** and the **Input/Output I/O devices** – provides the basic computing resources for the system.
* The application programs – such as word processors, spreadsheets, compilers and web browsers – define the ways in which these resources are used to solve users’ computing problems.
* The operating system controls the hardware and coordinates its use among the various application programs for the various users.
* We can also view a computer system as consisting of hardware, software, and data.
* The operating system provides the means for proper use of these resources in the operation of the computer system.
* An operating system is similar to a government.
* Like a government, it performs no useful function by itself.
* It simply provides an environment within which other programs can do useful work.
* To understand more fully the operating system’s role, we next explore operating system from two viewpoints: that of the user and that of the system.

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**1.1.1 User View**

* The user’s view of the computer varies according to the interface being used.
* Most computer users sit in front of a PC, consisting of a monitor, keyboard, mouse and system unit.
* Such a system is designed for one user to monopolize its resources.
* The goal is to maximize the work (or play) that the user is performing.
* In this case, the operating system is designed mostly for **ease of use**, with some attention paid to performance and none paid to **resource utilization** – how various hardware and software resources are shared.
* Performance is, of course, important to the user, but such systems are optimized for the single-user experience rather than the requirements of multiple users.