

## 4. OBJECTIVE AND FUNCTIONS OF OPERATING SYSTEM

Let's first get a little understanding of the objectives of the operating system, so that understanding of the functions of the operating system can be easier. The primary objectives that an operating system serves are as follows:

1. **Convenience:** An operating system works on the utilization of a machine. It lets the user start with the processes that the user wants to accomplish using the machine in a very quick manner without having the stress of configuring the system first.
2. **Efficiency:** An operating system helps utilise the resource capacity in the best way possible. This is because it reduces the time to configure the system.
1. **Ability to Evolve:** An operating system is supposed to be developed in a way that it must have the space to test and adopt new features without going through a complete restructuring of the whole interface.
2. **Management of Systems Resources:** It ensures that the power of resources is distributed equally among the various processes.

# What are the Functions of Operating Systems?

Following are some of the very basic and main functions of operating system:

## 1. Security

The operating system helps in keeping the user data safe with help of protection like passwords and some other similar methods, it is also capable of avoiding unauthorized access to user data and programs.

## 2. Control Over System Performance

The operating system acts as a watchdog over the system performance so that it can be improved. It also keeps a record of the response time between when the user has requested the service till the system responds back to have a complete overview of the system's health. This data can help improve the performance of the system by providing crucial information required for troubleshooting the problems.

## 3. Job Accounting

The operating system keeps a track record of the time and resources consumed by various tasks and users. That can further assist whenever there is a demand for specific information.

## 4. Error Detecting Aids

The operating system is the one that is in charge of the detection of any error or bugs that can happen while performing any task. A well-secured OS sometimes also acts as protection for preventing any type of breach of the computer system from any external source.

## 5. Coordination Between Other Software and Users

Operating systems also connect and assign interpreters, editors, compilers, and other software to a variety of computer programming users.

## 6. Memory Management

The operating system manages Basic Memory or Primary Memory. The main memory is made up of a large array of bytes where each byte is given a specific address. The main memory is fast storage and can be directly accessed by the CPU.

In order to run a program, it must first be loaded into the main memory. The **operating system performs the following functions** of memory control:

- It keeps track of basic memory, like, as which bytes of memory are being used by which user program. The memory addresses that are being used and being unallocated.
- In multiprogramming, the operating system is the one that decides the chronology for granting memory to the process. It provides the memory for a process when the process demands that and afterwards deallocates the memory when the process is completed or the process is terminated.

## 7. Processor Management/Scheduling

In a multitasking environment, the operating system performs a function called process scheduling, in which the OS decides the order in which different processes will have access to the processor, and how much power each process will have.

An operating system carries out the following activities in order to manage the processor:

1. Keeps track of the status of processes and the program which performs this task is called by the name of the traffic controller.
2. Allocates the CPU's power, a processor that carries out the process. De-allocation of the processor's power when a process is no longer required.

**Algorithms that are used for CPU scheduling are as follows:**

1. First Come First Serve (FCFS)
2. Shortest Job First (SJF)
3. Round Robin Scheduling
4. Priority-based scheduling etc.

## 8. Device Management

An operating system manages communication between the device and the system with the help of specific drivers. It performs certain activities for managing devices such as keeping track of all such devices that are connected with the system. It specifically appoints a program that is responsible for communicating with every device which is known as the **Input/Output controller**. This control is designated to decide which process gets access to a certain device and for how

long. It allocates devices in an efficient manner with high effectiveness and as well deauthorizes the devices when they are no longer needed.

There are **three major techniques** that are used for managing and allocating devices:

- (1) **Dedicated** – It is a technique in which the device is assigned to a single task at a time.
- (2) **Shared** – It is a technique in which the device is assigned multiple tasks at a time.
- (3) **Virtual** – It is a technique in which one physical device is simulated on another physical device.

## 9. File Management

A file management system is an organised collection of data into directories so that it can be easily navigated and used. These may contain other directories and files as well. An operating system carries out certain tasks for file management activities like tracking where the information is stored, the status of every file and user settings and many more. All these facilities are collectively known as file management systems.

## Additional Functions of Operating System

Besides the basic functions of operating systems, there are some other services that an operating system offers and those are as follows. Go through the other functions of OS for more clarity:

### 1. Program Execution

There are several types of programs that are constantly running on a system whether those are user programs or system programs, OS is the one that is responsible for the smooth running of those programs. The operating system utilizes various resources in order to run all the programs and functionalities efficiently and effectively.

### 2. Handling Input/Output Operations

The operating system is the one that is responsible for handling all sorts of input commands for devices like keyboard, mouse etc. It is the one that performs all the operations related to interfacing in the most efficient manner possible regarding all kinds of Inputs and Output functions. For instance, the nature of peripheral devices are different from each other such as mouse input and output are different from that of the keyboard, OS is liable to handle data and communication between them.

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### **3. Manipulation of File System**

The operating system is liable to decide on the storage of all sorts of data or files or folders i.e. a floppy disk, hard disk, pen drives, etc. Manipulation and storage of data are being handled by the operating system.

### **4. Booting Process**

The procedure of starting and restarting the computer is known as the process of booting. When the system is first turned off and then turned on is known as the process of cold booting whereas, if the system is restarted only then that is called warm booting. The operating system is the one that is in charge of booting the system.

### **5. Resource Allocation**

The operating system ensures the optimum utilization of the available resources by deciding which resource to be used for which task and for how much interval of time. The operating system is the one that takes on this task.

### **6. Job Accounting**

The Operating System keeps track of all activity that takes place in the computer system on time. All details such as the types of errors that occur are recorded in the Application. The journal accounting information system value (QACGLVL) determines what type of system usage information is journaled to the system accounting journal (QACGJRN).

### **7. Information and Resource Protection**

The Operating System is responsible for using all the information and resources available on the machine in a highly secure manner. The Application should block any attempt by any external resource to block any kind of data or information.