

# Operating System

## Week 1 - Long Descriptive Questions

### Q1. Explain the main purpose of operating system ?

Ans. The purpose of operating systems is to manage computer memory, processes and the operation of all hardware and software. An operating system is the most important software on a computer as it enables the computer hardware to communicate effectively with all other computer software.

1. **Program Execution:** The Operating System is responsible for execution of all types of programs whether it be user programs or system programs. The Operating System utilises various resources available for the efficient running of all types of functionalities.
2. **Handling Input/Output Operations:** The Operating System is responsible for handling all sort of inputs, i.e, from keyboard, mouse, desktop, etc. The Operating System does all interfacing in the most appropriate manner regarding all kind of Inputs and Outputs.
3. **Manipulation of File System:** The Operating System is responsible for making of decisions regarding the storage of all types of data or files, i.e, floppy disk/hard disk/pen drive, etc. The Operating System decides as how the data should be manipulated and stored.
4. **Error Detection and Handling:** The Operating System is responsible for detection of any types of error or bugs that can occur while any task. The well secured OS sometimes also acts as countermeasure for preventing any sort of breach to the Computer System from any external source and probably handling them.
5. **Resource Allocation:** The Operating System ensures the proper use of all the resources available by deciding which resource to be used by whom for how much time. All the decisions are taken by the Operating System.
6. **Accounting:** The Operating System tracks an account of all the functionalities taking place in the computer system at a time. All the details such as the types of errors occurred are recorded by the Operating System.
7. **Information and Resource Protection:** The Operating System is responsible for using all the information and resources available on the machine in the most protected way. The Operating System must foil an attempt from any external resource to hamper any sort of data or information.

### Q2. Discuss in detail about the two architectures of the Operating system.

Ans.

#### \* **Microkernel Architecture :**

The basic ideology in this architecture is to keep the kernel as small as possible. We know that kernel is the core part of the operating system and hence it should be meant for handling the most important services only. In microkernel architecture, only the most

important services are put inside the kernel and rest of the OS service are present in the system application program.

Now the user can easily interact with those not-so important services within the system applications and kernel i.e., microkernel is solely responsible for the three most important services of operating system namely: Inter-Process communication , Memory management, CPU scheduling.

\* **Monolithic architecture**

It is the oldest architecture of the operating system. We know that all the core software components of the operating system are collectively known as the kernel. The kernel can access all the resources present in the system. In the monolithic systems, each component of the operating system is contained within the kernel.

All the basic services of OS like process management, file management, memory management, exception handling, process communication etc. are all present inside the kernel only. Linux is a good example of monolithic kernel.

### **Q3. Differentiate Multitasking Operating systems from Time sharing Operating system.**

\* **What is Time Sharing Operating System :**

Time sharing is a method that allows multiple users to share resources at the same time. Multiple users in various locations can use a specific computer system at a time. Several terminals are attached to a single dedicated server with its own process. Therefore, the processor executes multiple user programs simultaneously.

\* **What is Multitasking Operating System :**

Multitasking is the process of performing multiple tasks at the same time. For example, multiple applications execute in a computer simultaneously.

\* **Difference Between Time Sharing and Multitasking**

Time sharing is the sharing of a computing resource among many users by means of multiprogramming and multitasking at the same time whereas multitasking is the concurrent execution of multiple tasks or processes over a certain period of time. Thus, this is the main difference between time sharing and multitasking.

While time sharing allows multiple users to use a computer system at a time, multitasking allows multiple tasks or processes to use a computer system at a time. Hence, this is the functional difference between time sharing and multitasking.

\* **Conclusion**

The main difference between time sharing and multitasking is that time sharing allows multiple users to share a computer resource simultaneously using multiprogramming and multitasking while multitasking allows a system to execute multiple tasks or processes simultaneously.

### **Q4. Define an Operating system. Explain few roles of an OS.**

Ans. An operating system (OS) is basically a collection of software that manages computer hardware resources and provides common services for computer programs. The Primary purpose of an OS - acts as an interface between the user and the computer hardware components

**Roles of Operating System**

1. Program Execution : The Operating System is responsible for execution of all types of programs whether it be user programs or system programs.
2. Handling Input/Output .
2. Operations : The Operating System is responsible for handling all sort of inputs, i.e, from keyboard, mouse, desktop, etc. e
3. Manipulation of File System: The Operating System is responsible for making of decisions regarding the storage of all types of data or files, i.e, floppy disk/hard disk/pen drive, etc. T
4. Error Detection and Handling: The Operating System is responsible for detection of any types of error or bugs that can occur while any task.
5. Resource Allocation: The Operating System ensures the proper use of all the resources available by deciding which resource to be used by whom for how much time. All the decisions are taken by the Operating System.

6.Accounting: The Operating System tracks an account of all the functionalities taking place in the computer system at a time. All the details such as the types of errors occurred are recorded by the Operating System.

7.Information and Resource Protection:The Operating System is responsible for using all the information and resources available on the machine in the most protected way. The Operating System must foil an attempt from any external resource to hamper any sort of data or information.