**Q1. What is the main purpose of an operating system? Discuss different types?**

***Answer*** *:* An **Operating System (OS)**is a software that acts as an interface between computer hardware components and the user. Every computer system must have at least one operating system to run other programs. Applications like Browsers, MS Office, Notepad Games, etc., need some environment to run and perform its tasks.

The OS helps you to communicate with the computer without knowing how to speak the computer’s language. It is not possible for the user to use any computer or mobile device without having an operating system.

**Types of Operating System (OS)**

Following are the popular types of OS (Operating System):

* Batch Operating System
* Multitasking/Time Sharing OS
* Multiprocessing OS
* Real Time OS
* Distributed OS
* Network OS
* Mobile OS

### **Batch Operating System**

Some computer processes are very lengthy and time-consuming. To speed the same process, a job with a similar type of needs are batched together and run as a group.

The user of a batch operating system never directly interacts with the computer. In this type of OS, every user prepares his or her job on an offline device like a punch card and submit it to the computer operator.

### **Multi-Tasking/Time-sharing Operating systems**

Time-sharing operating system enables people located at a different terminal(shell) to use a single computer system at the same time. The processor time (CPU) which is shared among multiple users is termed as time sharing.

### **Real time OS**

A real time operating system time interval to process and respond to inputs is very small. Examples: Military Software Systems, Space Software Systems are the Real time OS example.

### **Distributed Operating System**

Distributed systems use many processors located in different machines to provide very fast computation to its users.

### **Network Operating System**

Network Operating System runs on a server. It provides the capability to serve to manage data, user, groups, security, application, and other networking functions.

### **Mobile OS**

Mobile operating systems are those OS which is especially that are designed to power smartphones, tablets, and wearables devices.

Some most famous mobile operating systems are Android and iOS, but others include BlackBerry, Web, and watchOS.

**Q2. What is a socket, kernel and monolithic kernel ?**

***Answer:*** **Kernel** is the core part of an operating system which manages system resources. It also acts like a bridge between application and hardware of the computer. It is one of the first programs loaded on start-up (after the Bootloader).

**Kernel mode and User mode of CPU operation**  
The CPU can execute certain instruction only when it is in the kernel mode. These instruction are called privilege instruction. They allow implementation of special operation whose execution by the user program could interface with the functioning of operating system or activity of another user program. For example, instruction for managing memory protection.

* The operating system puts the CPU in kernel mode when it is executing in the kernel so, that kernel can execute some special operation.
* The operating system puts the CPU in user mode when a user program is in execution so, that user program cannot interface with the operating system program.
* User-level instruction does not require special privilege. Example are ADD,PUSH,etc.

**What is Microkernel?**  
Microkernel is one of the classification of the kernel. Being a kernel it manages all system resources. But in a microkernel, the **user services** and **kernel services** are implemented in different address space. The user services are kept in **user address space**, and kernel services are kept under **kernel address space**, thus also reduces the size of kernel and size of operating system as well.