Components of OS:

**A shell, also known as a command interpreter, is that part of the operating system that receives**

**commands from the users and gets them executed.**

* USER SPACE - Apps are run here
  + NO hardware access
  + Convinient Hardware access
  + Interacts wwith Kernal
  + Windows ON - > Desktop -> ICON so f application ( This is in User Space) AKA . GUI
    - GUI - Graphical User Interface (App Screen , Website)
      * Right Click ->New -> Folder
    - CLI – Command Line Interface (Terminal, Command PROMPT, Powershell)
      * Eg. MKDIR(System Call for making new folder / directory)
* KERNEL – acces of underlying hardware
  + Heart of OS
  + Interacts of OS

**OS** - >

USER SPACE

KERNEL

HARDWARE

Functions of Kernel:

* Process Management:

-Process Creation and termination

-Process and thread schedule

-process Syncronisation and communication

-Process communication

* Memory Mnagement
* Allocate/Delocating Memory
* Free Space mgmt.
* File management:
* Create/deete File
* Directory Management
* I/O Management
* I/O mgmt.:
* Mgmt. and controlling of all I/O devices
* Spooling
* Buffering
* Caching

Types of Kernel:

* Monolithic Kernel:
  + All The Function done by kernel
  + Software Interrupt – Interrupt generated by software needs(Eg: MKDIR conversation from User mode to Hardware mode
  + Fast Communication between as communication is fast
  + Less Reliable, more bulky
  + E.g.: MSDOS,
* Microkernel:
  + Major functions in Kernel, rest in user space
    - Kernel -> Memory Management, Process Management
    - User Space -> File m, I/O m
    - Less Bulky, more reliable compared to monolithic
    - More stable as more reliable
    - Performance degradation as communication becomes time consuming
    - Take time in context switching. increase in overhead
  + Eg. L4 Linux, Symbian OS

Interview Question:

1. How does communicate between User Method and Kernel method?

* IPC -> Inter process Communication
* P1 (UM) -> p2(KM)
  + Shared Memory
  + Message passing – communication pipeline

Solving the discrepancies in both by mixing both the model

* Hybrid Kernel
  + Advantages of both Monolithic and microkernel
  + Us -> File Management | KM-> Process, Memory, I/O, mgt
  + Eg: MacOs, Windows NT| 7+
  + 