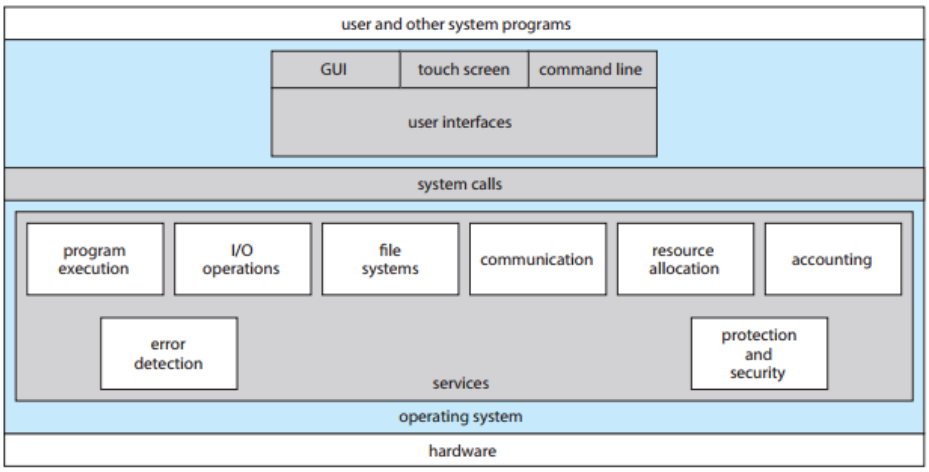
Q1. Explain the role of Operating System as a facilitator for application programmers.

The Operating System controls and manages the computing hardware and input/output devices of a PC/Server. This not only facilitates application programmers but avoids learning and later recalling recall complex hardware details and "system programming" techniques. These programmers very conveniently make library calls (same across platforms) that gives them the ability to utilize hardware optimally with the help of many virtual abstractions like process, threads, and filesystems.

Q2. Draw a labelled diagram to explain various OS services.



Explanation required for at least four services to get full weightage.

Figure 2.1 A view of operating system services.

Q3. Compare and contrast monolithic and microkernel architecture for OS. Draw both architectures first.

A monolithic kernel is one large executable that runs in one address space. This helps optimal execution times but an error result in OS crash. On the other hand, a microkernel approach only keeps the bare minimum functions in the kernel and implements all other OS services as separate sub-systems that run in the user space. Here, any errors in the sub-systems will only crash the sub-system and not the kernel. The key drawback of microkernel is the delay in processing system calls as the kernel now must interact with many sub-systems (each running in its own address space) before returning the call.

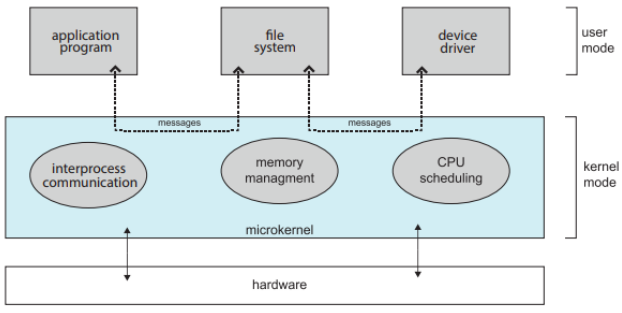


Figure 2.15 Architecture of a typical microkernel.

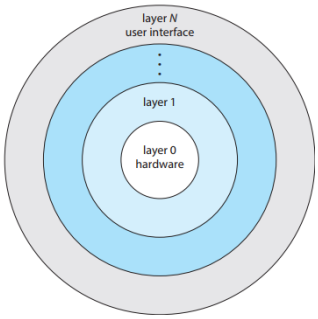


Figure 2.14 A layered operating system.

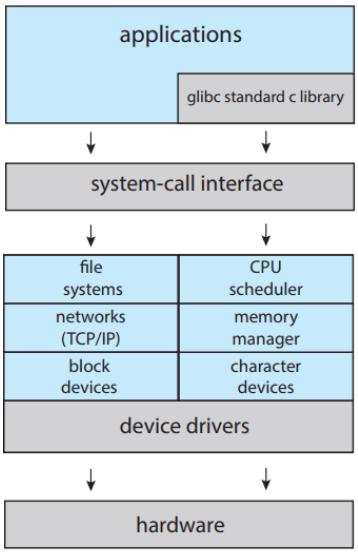


Figure 2.13 Linux system structure.