1. What is the difference between a monolithic kernel and a microkernel, and what are the advantages and disadvantages of each architecture?
2. Explain the concept of process synchronization in operating systems. Why is it necessary, and what mechanisms are commonly used to achieve it?
3. What is a deadlock in the context of operating systems? How does it occur, and what strategies can be employed to prevent or resolve deadlocks?
4. Describe the role of the shell in operating systems. What are some common shell commands, and how do they interact with the underlying system?
5. What is a file descriptor, and how is it used in the context of file I/O operations within an operating system?
6. Can you explain the concept of interrupts in operating systems? How do they facilitate multitasking and handle hardware events?
7. What is a page replacement algorithm, and why is it necessary for virtual memory management? Provide examples of commonly used page replacement algorithms and their characteristics.
8. Describe the differences between symmetric multiprocessing (SMP) and asymmetric multiprocessing (AMP) systems. What are the advantages and disadvantages of each approach?
9. How does an operating system manage input and output (I/O) operations efficiently? Discuss buffering, caching, and spooling in this context.
10. What are the key components of a process control block (PCB), and how does it facilitate process management within an operating system?