Viva question for OS

Unit I: Introduction and Operating Systems Structures

1. **What is an operating system?**
    - An operating system is software that manages computer hardware and software resources and provides common services for computer programs.
2. **What are the main functions of an operating system?**
    - Process management, memory management, file system management, device management, and user interface.
3. **What is batch processing?**
    - Batch processing is the execution of a series of jobs on a computer without manual intervention.
4. **What is time-sharing in operating systems?**
    - Time-sharing allows multiple users to share system resources simultaneously, giving the illusion of dedicated access.
5. **What is multiprogramming?**
    - Multiprogramming is the ability of an operating system to execute multiple programs simultaneously by managing their execution.
6. **What is multitasking?**
    - Multitasking allows multiple tasks to be performed by the CPU concurrently, often within the same program.
7. **Define real-time operating systems.**
    - Real-time operating systems are designed to process data as it comes in, typically used in systems requiring immediate response.
8. **What are the components of an operating system?**
    - Kernel, shell, file system, device drivers, and user interfaces.
9. **What is a system call?**
    - A system call is a way for programs to request services from the operating system's kernel.
10. **What is a virtual machine?**
    - A virtual machine is an emulation of a computer system that provides the functionality of a physical computer.

Unit II: Process Management and CPU Scheduling

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11. **What is a process?**
    - A process is an instance of a program in execution, including its code, data, and current activity.
12. **What are the different states of a process?**
    - New, ready, running, waiting, and terminated.
13. **What is process control?**
    - Process control involves managing the creation, execution, and termination of processes.
14. **What is a thread?**
    - A thread is the smallest unit of processing that can be scheduled by the operating system.
15. **What is multithreading?**
    - Multithreading allows multiple threads to exist within the context of a single process, enabling parallel execution.
16. **What are the types of scheduling algorithms?**
    - First-Come, First-Served (FCFS), Shortest Job Next (SJN), Round Robin (RR), and Priority Scheduling.

Unit III: Concurrency Control

17. **What is mutual exclusion?**
    - Mutual exclusion is a property that ensures that multiple processes do not access a shared resource simultaneously.
18. **What are semaphores?**
    - Semaphores are synchronization tools used to control access to shared resources by multiple processes.
19. **What is the readers-writers problem?**
    - The readers-writers problem is a classic synchronization problem that involves coordinating access to a shared resource by readers and writers.
20. **What is deadlock?**
    - Deadlock is a situation where two or more processes are unable to proceed because each is waiting for the other to release a resource.
21. **What strategies can be used to handle deadlock?**

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- Deadlock prevention, deadlock avoidance, deadlock detection, and recovery.

22. **What is the Dining Philosophers problem?**

- The Dining Philosophers problem is a classic synchronization problem that illustrates the challenges of resource sharing among multiple processes.

Unit IV: Memory Management

23. **What is memory management?**

- Memory management is the process of coordinating computer memory, including allocating, using, and freeing memory.

24. **What is paging?**

- Paging is a memory management scheme that eliminates the need for contiguous allocation of physical memory and eliminates external fragmentation.

25. **What is virtual memory?**

- Virtual memory is a memory management technique that allows the execution of processes that may not be completely in memory.

Unit V: Input/Output and File Management

26. **What is I/O management?**

- I/O management involves controlling and coordinating input and output devices and operations.

27. **What are some common disk scheduling algorithms?**

- First-Come, First-Served (FCFS), Shortest Seek Time First (SSTF), SCAN, and C-SCAN.

28. **What is a file system?**

- A file system is a method and data structure that an operating system uses to manage files on a disk or partition.

29. **What is file sharing?**

- File sharing allows multiple users to access the same file concurrently, facilitating collaboration and data exchange.

Unit VI: Advanced Operating Systems

30. **What is a mobile operating system?**

- A mobile operating system is an OS designed specifically for mobile devices, such as smartphones and tablets.

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31. **What are the differences between ARM and Intel architectures?**
    - ARM architecture is known for its energy efficiency, while Intel architecture is often associated with higher performance.
32. **What is power management in mobile operating systems?**
    - Power management involves optimizing the use of battery power in mobile devices to extend operational time.
33. **What is kernel structure?**
    - The kernel is the core component of an operating system, managing system resources and communication between hardware and software.
34. **What is native-level programming?**
    - Native-level programming involves writing software that directly interacts with the underlying operating system and hardware.

Lab Contents and Practical Applications

35. **What is shell programming?**
    - Shell programming involves writing scripts for command-line interfaces to automate tasks.
36. **What is a zombie process?**
    - A zombie process is a process that has completed execution but still has an entry in the process table.
37. **What is the purpose of the fork() system call?**
    - The fork() system call is used to create a new process by duplicating the calling process.
38. **What does execve() do?**
    - execve() replaces the current process image with a new process image specified by the file path.
39. **What is a producer-consumer problem?**
    - The producer-consumer problem is a classic synchronization issue where one process produces data and another consumes it.
40. **What are pipes used for in inter-process communication?**
    - Pipes are used for communication between processes, allowing the output of one process to be used as the input for another.