Operating Systems Questions Compilation

1. Operating System Basics

- Define Operating System. What are the services of an operating system?

- What are the computer system architectures? Briefly describe the multiprocessor system.

- What is a system call? Mention different types of system calls.

- Write the fundamental approaches for users to interface with the operating system and explain briefly.

- What is a virtual machine? List its advantages and disadvantages.

2. Process Management

- Define process states and draw a process state diagram.

- Mention five components of a process's PCB (Process Control Block).

- Differentiate between short-term and long-term schedulers.

- What are the reasons that a parent process may terminate the execution of one of its child processes?

- Differentiate between process and program.

- What is a thread? What are the benefits of multithreading over single-threading?

- Discuss concurrent processes and reasons for allowing process cooperation.

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3. CPU Scheduling

- What are the scheduling criteria?

- Differentiate preemptive scheduling from non-preemptive scheduling.

- Find the average waiting time (AWT) and average turnaround time (ATAT) for processes using SJF scheduling.

- Draw Gantt charts illustrating FCFS, preemptive SJF, non-preemptive priority, and Round-Robin scheduling.

- Explain the effect of increasing/decreasing time quantum in Round-Robin scheduling.

4. Synchronization and Deadlock

- What is a semaphore? Demonstrate a semaphore's execution in mutual exclusion.

- A cycle in the graph is a necessary but not a sufficient condition for the existence of deadlock - explain with resource allocation graph.

- Define deadlock and explain the necessary conditions for deadlock.

- What are preemptable and non-preemptable resources? Give examples.

- What is a safe state? Write the pseudocode for the safety algorithm.

5. Memory Management

- What is the fragmentation problem in memory management? Define internal and external fragmentation.

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- What is paging? Explain paging with an example.

- Describe first-fit, best-fit, and worst-fit strategies with examples.

- Explain swapping and describe the standard swapping process.

- Discuss the paging method and show with an example.

6. File Management

- What are the file access methods? Briefly describe them.

- Discuss file sharing methods.

- Explain the difference between sequential and direct file access methods.

- Define paging method and demonstrate with an example.

- In Unix, Linux, and Windows file systems, describe the purpose of multiple timestamps associated with files.