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1. (10 points) How does DMA increase system concurrency? How does it complicate the hardware and system design?

2. (10 points) What problems could occur if a system allowed a file system to be mounted simultaneously at more than one location?

3. (10 points) Why are segmentation and paging sometimes combined into one scheme?

4. (10 points) In the consumer-producer example program, a ring buffer queue is used to store the produced item that will be take off by the consumer later. In what conditions the program need not to use the lock synchronization primitive to support the correct processing?

5. (10 points) Define the difference between preemptive and nonpreemptive scheduling. Explain why strict nonpreemptive scheduling is unlikely to be used in a computer center.

6. (20 points) Suppose that a scheduling algorithm (at the level of short-term CPU scheduling) favors those processes that have used the least processor time in the recent past. (a) Will this scheduling algorithm favor CPU-bound processes or I/O-bound processes? Why? (b) Please discuss if the starvation situation will permanently occur in this scheduling algorithm?

7. (10 points) Suppose a thread is running in a critical section of code. It means that the thread has acquired all the locks through proper arbitration. Can this thread get context switched? Please explain the reasons.

8. (10 points) What is the difference between deadlock prevention and deadlock avoidance?

9. (10 points) Explain why doubling the speed of the systems on an Ethernet segment may result in decreased network performance. What changes could help solve this problem.