

Part 1: True False (Answer + Explain)

1. If there is very high CPU utilization, then it is likely that *thrashing* is occurring.

2. If a particular IO device implements a *blocking interface*, then you will need multiple threads to have concurrent operations which use that device.

3. Reading 100Mb in random 1kb chunks will take slightly longer than reading 100Mb in a single sequential scan.

4. For IO devices which receive new data very frequently, it is more efficient to interrupt the CPU than to have the CPU poll the device.

5. Nachos is an easy-to-understand, fun way to learn about Operating Systems - or - I am really going to miss Nachos when we finish the second assignment.

Part 2: Short answer

6. Disk requests come into the disk driver for cylinders: 10, 22, 20, 2, 40, 6, and 38, in that order. The disk head is currently positioned over cylinder 20. A seek takes 6 milliseconds per cylinder moved. What is the sequence of reads and total seek time using each of the following algorithms?

i) First-come, first-served:

ii) Shortest Seek Time First:

iii) SCAN (initially moving upwards):

7. Two-level Page Tables:

i) Give a two to three sentence description of a two-level page table.

ii) Briefly (2 sentences) state one advantage AND one disadvantage of two-level page tables.

8. What is Belady's anomaly and which page replacement algorithm(s) could display it?

9. What is priority donation? What sort of information must the OS track to allow it to perform priority donation?

10. We looked at disabling CPU interrupts as a simple way to create a critical section in the kernel. Name two drawbacks of this approach. One of them should be a problem that is exacerbated by trends in modern computer hardware.