Course SE 350

Redo-Final Exam

May 6, 2010

1. What material did you **mainly** use to prepare for the quiz? Pick only one; any selection will get you full points. *[2p]*

   □Printed book □Electronic book □Own notes on slides □Abstain

2. The I/O subsystem receives the following track read requests: 132, 44, 139, 163, 22, 129, 180, 133, and 70. The read head is currently located at track 150. Schedule the I/O using SCAN. Show the access behaviour in a figure with time on the x-axis and the track number on the y-axis. The disk's read head moves 3 tracks per millimetre on the x-axis. Write down how much many millimetres have passed between the initial and the last read request on the x-axis. *[20p]*

3. Assume a set of processes with periodic execution (i.e., the processes execute for their service time and restart again after the period has passed) on a single-processor machine.

   Define four processes with their name, periods, and service times. The total utilization must be higher than 0.55, each process must contribute more than 0.1 to the system utilization, no two process periods should be the same.

   Define the four processes in such a way that the resulting system is not schedulable with rate-monotonic (RM) scheduling but is schedulable with earliest-deadline first (EDF) scheduling. Draw the EDF schedule. *[20p]*

4. Explain the advantages of kernel-level threads over user-level threads. *[10p]*

5. Explain the conceptual differences between a process and a thread. *[6p]*

6. Explain the dining philosophers problem and give a solution in pseudocode with five philosophers using the primitives of `eat()` and `think()`. Choose the concurrency control mechanism you prefer. *[25p]*

7. Explain compaction in memory management and whether it tackles internal or external fragmentation. *[10p]*

8. Discuss the effect of increasing the page size vs the number of page faults. *Hint: Draw a figure with one on the x-axis and the other on the y-axis, and then discuss the figure.* *[10p]*

End of quiz. Total points: 103