

Exercises for “Computer Science II” — SS 2003

No. 5

Due: June 6, 2003

Operating Systems

1. What are the two main functions of an operating system? **(1 point)**
2. List some differences between personal computer operating systems and mainframe operating systems. **(2 points)**
3. What is multiprogramming? What is a process and a thread? What is a critical region? **(3 points)**
4. Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 10, 6, 2, 4, and 8 minutes. They (externally determined) priorities are 3, 5, 2, 1, and 4, respectively, with 5 being the highest priority. For each of the following scheduling algorithms, determine the mean process turnaround time. Ignore process switching overhead.
 - (a) Round robin.
 - (b) Priority scheduling.
 - (c) First-come, first-served (run in order 10, 6, 2, 4, 8).
 - (d) Shortest job first.

For (a), assume that the system is multiprogrammed, and that each job gets its fair share of the CPU. For (b) through (d) assume that only one job at a time runs, until it finishes. All jobs are completely CPU-bound (“CPU-bound” means a job spends most of its time in computing instead of waiting for I/O). **(4 points)**