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CS 4/53201 Exam #1

Operating Systems

Friday 4 October 2002

- 1. An important innovation in bringing computing to the masses was interactive timesharing.
 - a. Define timesharing. (5 points)

b. How does interactive timesharing compare to using a personal computer? (10 points)

- 2. A CPU can communicate with I/O devices in a variety of ways, one of which is software-polling synchronous I/O.
 - a. Briefly define software-polling synchronous I/O. (5 points)

b. Why is this technique not ideal? (5 points)

3. In the five-state process model, two of the states are "ready" and "blocked". How do these two states differ, in terms of what it means to be in that state, how that state is entered, how that state is left, etc.? (20 points)

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- 4. Message-passing between processes can be classified as direct or indirect.
 - a. Briefly define indirect communication. (5 points)

b. What advantage does indirect communication provide over direct communication? (5 points)

5. Why might threads be particularly useful in writing a server, for example a server that provides access to items from a database? (15 points)

6. Semaphores can be implemented using a variety of techniques, including busy-waiting, disabling interrupts, and test-and-set instructions. What are the disadvantages of each of these three techniques? (20 points)

7. Explain the similarities and differences between a monitor and a class (in an object-oriented language). (10 points)