

CMPS 111 Midterm

October 30, 2003

This exam is ?? pages long.**NOTE: This is not a full-length exam!**

This exam is closed-book and closed-note. You may use a calculator without any alphanumeric memory. There are two sections of the exam: multiple-choice and longer answers. On the first part of the exam, you either get the question right or you don't. On the second part, partial credit may be given for partially correct answers. You may use the back of the exam sheets if you need extra space.

Your grade on the exam is out of 100 points; extra credit can raise your grade above 100.

Please do the following things before starting (NOW!):

- Write your name and CATS account legibly on the top of each page. **Omitting your name & CATS account from a page will result in the loss of 5 points for each page without this information.**
- Read over the entire exam and do the easy questions first.

Multiple choice

Each question is worth 2 points. Indicate your choice to the left of the question.

1. (2 points) Which of the following is *not* a condition necessary for deadlock:
 - A. Circular wait
 - B. Starvation
 - C. Mutual exclusion
 - D. Hold and wait
2. (2 points) Which of the following are *all* UNIX system calls?
 - A. time(), chdir(), createdir(), execve()
 - B. chmod(), main(), waitpid(), exit()
 - C. open(), fork(), delete(), read()
 - D. lseek(), stat(), link(), kill()
3. (2 points) What are the two functions of an operating system?
 - A. Resource abstraction and resource preemption
 - B. Resource sharing and resource preemption
 - C. Resource abstraction and resource management
 - D. Resource management and resource sharing
4. (2 points) Assuming process execution times are known in advance, for which of the following algorithms can the maximum wait time for a given process be computed at the time the job is submitted?
 - A. Shortest job first
 - B. First-come, first-served
 - C. Priority-based
 - D. Lottery scheduling
5. (2 points) Which of the following is most likely to be the time required to retrieve a block from disk?
 - A. 100 ms
 - B. 10 ms
 - C. 1 ms
 - D. 100 μ s

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Longer Answer

6. (10 points) **DLXOS**

A student in CMPS 111 wants to use semaphores to synchronize a collection of cooperating user programs running in DLXOS. How would you suggest that she do this? You may modify any part of the user program or OS you like; however, your solution should involve as little code as possible and should not adversely affect other programs running in DLXOS. What additional code would you need, and where would the code run (user program or OS, and which part of the OS)?

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7. (10 points) **Process Scheduling**

Show the schedules that would result given the following processes with each of the following scheduling algorithms: first-come first-serve, round-robin (quantum = 4, new processes scheduled first), shortest remaining time next, priority-based (preemptive), and lottery scheduling. In the table below, higher numbers are higher priorities.

Process	Arrival Time	Processing Time	Priority
A	0	6	8
B	1	4	1
C	5	8	9
D	10	4	5