

CS 162, Spring, 2007  
Prof. Alan Jay Smith  
Midterm 1, Wednesday, February 28, 2007

1. Within the implementation of P & V, we used both *Test and Set* and *Disable Interrupts*. Why are *both* used? Is each necessary? Explain. (10)

2. In class, it was stated that the **SRPT** algorithm was optimal according to a specific and well defined metric.

A. What is the SRPT algorithm and how does it work? (6)

B. By what metric is it optimal? (6)

C. Explain in some plausible manner (don't try to give us any sort of mathematical proof) why it is optimal according to the metric. (6)

D. Consider now a more realistic system in which jobs need both memory and CPU time; assume that the jobs allocated memory in one contiguous region each. Is it optimal? Why or why not? If not, show an example. (6)

3. Explain how virtual memory schemes serve to provide protection in a computer system. (8)

4. Given the following processes and their resource allocations, use the banker's algorithm to determine if a deadlock is inevitable; show your calculations. The system has 10 units of X and 15 units of Y. (12)

Process	has_X	max_need_X	has_Y	max_need_Y
1	3	10	2	4
2	0	6	6	7
3	5	5	2	6
4	1	2	5	5

5. State and explain the four conditions for deadlock. (16)



7. Suppose that your program Zork calls a separately compiled procedure Biff at an entry point called Snick. Explain why the reference within Zork to Snick needs help from the linker/loader to work correctly. Explain (in as much detail as necessary) what the linker/loader must do to make this work correctly. (Specify any necessary information that must be provided in the load modules (i.e. the compiler output) for Zork and Biff.) Discuss any necessary tables. (14)