Student Name: _____ Student ID # _____

UOSA Statement of Academic Integrity

On my honor I affirm that I have neither given nor received inappropriate aid in the completion of this exercise.

Signature: _____ Date: _____

Question 1: Resource Management (30 points)

A. Give an example of a computer resource managed by an OS that can be time-multiplexed but not space-multiplexed. **Justify** your answer.

B. Give an example of a computer resource managed by an OS that can be space-multiplexed but not time-multiplexed. **Justify** your answer.

C. Give an example of a computer resource managed by an OS that can be time-multiplexed and space-multiplexed. **Justify** your answer.

Question 2: Resource Management & I/O (10 points)

Explain one good reason that all I/O on modern computers is ultimately carried out by system calls.

Question 3: Process Scheduling & Hardware Support (10 points)

Explain one hardware component required for preemptive (involuntary) process scheduling strategies that is not required for non-preemptive (voluntary) process scheduling strategies.

Question 4: I/O & Hardware Support (10 points)

Explain one way in which direct memory access (DMA) improves average turnaround time.

Question 5: Process Scheduling (20 points)

Suppose you have the following processes on a the same uni-processor computer: P_a which alternates between needing 39 time units of processing and 100 time units of I/O, and 25 other processes, P_b through P_z, each of which alternates between needing 24 time units of computation time and 5 units of I/O. Which is likely to dispatch P_a to the CPU more times during one million time units of execution, round robin or virtual round robin? **Justify** your answer.

Question 5: Disk Scheduling (20 points)

Give one disk scheduling algorithm for which starvation is possible. **Justify** your answer.

Give one disk scheduling algorithm for which starvation is *not* possible. **Justify** your answer.