NAME: _____ (FIRST NAME FIRST) **SCORE**: _____

COSC 4330 FIRST MIDTERM SEPTEMBER 29, 2008

*This exam is **closed book**. You can have **one page** of notes. UH expels cheaters.*

1. Find the ***single sentence*** that applies best to each property: (10×3 points)
(***Hint:*** *Several of the choices offered are **plain wrong**.*)

Main disadvantage of microkernels	***n***
Main advantage of dual-mode CPUs	***f***
Main disadvantage of master-slave organization	***a***
Main advantage of modular kernels	***j***
Main advantage of delayed writes	***c***
Main advantage of memory protection	***g***
Main disadvantage of monolithic kernels	***m***
Main advantage of DMA controllers	***i***
Main advantage of timer interrupts	***e***
Main disadvantage of layered kernel organizations	***h***

a) Introduces a potential bottleneck in the computer system.

b) Make the kernel much less reliable.

c) Reduce the number of disk accesses.

d) Are written in a high-level language.

e) Prevent processes from monopolizing the CPU.

f) Prevent user processes from executing I/O instructions.

g) Prevents user processes from modifying the kernel.

h) Very difficult to find the right decomposition of kernel tasks.

i) Allow faster data transfers between the main memory and the disk.

j) Allow system users to add new features to the OS without recompiling the kernel.

k) Allow user processes direct access to the disk drive.

l) Are faster than other kernel organizations.

m) Are hard to maintain.

n) Are slower than other kernel organizations.

T: _____

2. Complete the following sentences: (5×5 points)

A running process that gets preempted goes to the _____**READY**_____ state.

We can safely swap out processes that have remained a long time in the

____**WAITING**_____ state.

To issue a system call, a process must be in the _____**RUNNING**_____ state.

When a process does a non-blocking system call, it does not stay in the

____**WAITING**_____ state but is immediately returned to the

_____**READY**_____ state.

3. What are the three conditions that must be present to ensure that user processes and files are protected against unauthorized access? (3×5 points)

a) A dual-mode CPU so user processes cannot directly access the data stored on disk_

_____

_____

b) Memory protection so user processes cannot modify the kernel._____

_____

_____

c) Something preventing users from rebooting the system with a doctored kernel.____

_____

_____

4. Are all ***timesharing systems*** also ***interactive systems***? (5 points) Justify your answer. (5 points) Is the reverse true? (5 points) Justify your answer (5 points)

- YES, all time sharing systems are interactive because the key idea of time-sharing is to let several interactive users share the same system.
- NO, an interactive system might be a single-user system. Think of our personal computers!

5. Why was it so important that UNIX was ***written in a high-level languag***e and that universities could obtain ***access to its source code***? (2×5 points)

- Because UNIX was written in a high-level language, it could be—and was several times—ported to different architectures.
- Because universities could obtain access to its source code, they started improving it.