

**COSC 6360 FIRST MIDTERM FEBRUARY 21, 2008**

This exam is **closed book**. You can have **two pages** of notes. UH expels cheaters.

1. **Advantages and disadvantages:** You will get no credit if you mention a disadvantage when an advantage is asked and vice versa. I will read the first three lines of each answer. (6×5 points)
  - a) What is the major advantage of *clustered page tables* over other hashed page tables?
  - b) What is the main disadvantage of the *LRU cache replacement policy*?
  - c) What is the main disadvantage of *very large block sizes* in a file system?
  - d) What is the main disadvantage of using the *valid bit* to simulate the *page-referenced bit*?
  - e) What is the main advantage of Munin’s *shared write protocol*?
  - f) What is the main advantage of *shared libraries*?
2. What is the main disadvantage of using a `fork()`/`exec()` pair to create new processes? (5 points) Why is this problem more severe today than it was when UNIX was running on a small minicomputer? (5 points) What does Mach do to solve this problem? (5 points)
3. What is disk fragmentation? (5 points) How does it happen? (5 points) What does the UNIX Fast File System do to fight disk fragmentation? (5 points)
4. Check the properties that apply to each of these three approaches to kernel security. (3 points per correct line, no partial credit)

<i>Property</i>	<i>SPIN</i>	<i>PCC</i>	<i>Nooks</i>
<i>Allows extensions to be written in any programming language</i>		X	X
<i>Protects against malicious extensions</i>	X	X	
<i>Has a very low run-time overhead</i>	X	X	
<i>Restarts extensions that crashed</i>			X
<i>Works with existing extensions</i>			X

5. Munin is said to have an *eager release* policy. Describe this policy (10 points) and explain how it differs from a *lazy release* policy. (5 points)
6. What is the difference between *partial subblocking* and *complete subblocking*? (10 points)
 

Partial subblocking requires all pages of a subblock to occupy contiguous locations (page frames) in main memory while complete subblocking does not have that restriction.