Name: _____   **Student ID #:** _____

Quiz #3 Solutions
COMP 3000B: Operating Systems
February 9, 2006

You have 10 minutes to answer the following questions. Please circle the letter of the most appropriate answer. When you are finished, you may turn in your quiz and leave.

1. Why is it possible to create "zombie" processes (i.e. processes that have exited but still exist)?

    (a) Because main() has a return value.

    (b) Because every process must have a parent process.

    (c) Because processes decide when to run the **wait** system call.

    (d) **All of the above**

2. Disabled interrupts are effective at enforcing mutual exclusion in which of the following contexts?

    (a) an OS kernel on a a symmetric multiprocessor (SMP) system

    (b) an OS kernel on a cluster of networked computers

    (c) **an OS kernel on a single processor system**

    (d) a web-based distributed application

3. The test-and-set machine language instruction can be used to implement:

    (a) kernel spinlocks on SMP systems

    (b) kernel semaphores on SMP systems

    (c) userspace spinlocks on SMP systems

    (d) **All of the above**

4. Which of the following strategies would prevent deadlock with respect to shared data structures A, B, and C?

    (a) Organizing A, B, and C such that concurrent access to them is always safe.

    (b) A background watchdog thread that automatically releases locks on A,B, or C if they are held but not used for 60 seconds.

    (c) A strictly-enforced coding convention where A, B, and C are always locked in reverse-alphabetical order

    (d) **All of the above**

5. Which of the following is an example of a bounded-buffer producer consumer problem?

    (a) **UNIX pipes, e.g. the command "ls | more"**

    (b) two threads sharing access to struct foo

    (c) browsing and buying a plane ticket online

    (d) All of the above