

Name:

CS318, Final Exam

Fall 2001

Pledge:

Directions:

- Please answer each question in the space provided. The amount of space should be sufficient for a correct answer. If you need more space, please use the backs of pages, and make a note to that effect. If you run out of space, exam books are provided at the front of the room.
- This exam is closed-book, closed-notes, and is covered by the Honor Code. Please write and sign the pledge after you finish your exam.
- There are a total of five sections, with the number of points for each shown by the question number.
- To be fair, I will try to avoid answering content-related questions during the exam, unless it's to correct a mistake on my part.
- If you feel that a question **requires** additional assumptions or information to answer, please state them. Your guiding principle should be *Occam's razor*, which loosely translated states that you should allow as few assumptions as necessary to explain the situation.
- Unless otherwise stated/implied, assume a C-like language running on a Unix-like operating system.
- Please write legibly

1. (14 points) True or False – under each statement, write true or false. If you believe that there is some confusion, feel free to defend your choice with a one-sentence or two-sentence explanation.

- Spinning on a highly-contended lock is a good idea
- Network connections are described using the triple (source IP address, dest IP address, port number)
- Scheduling ready processes at random eliminates priority inversion
- Events are processes created by the kernel
- Test-And-Set can be used to develop **efficient** Acquire/Release operations
- User processes use signals to inform the kernel about state changes
- The select system call can be used to check the state of threads

3. (20 points) Assume you have to design a multiple-process server with behavior similar to what was assigned for project 5. However, all you have are sockets - no locks, no shared memory. Assuming a master/slave approach, describe the design/behavior of the relevant parts of the server.

4. (20 points) You have been asked to design a stateful version of NFS. What changes could you make, and what would be the impact of each? Be sure to describe the impact on the user, the server, and the overall system.

5a. (10 points) Under a set of conditions, the “shortest job first” policy is known to have “optimal” behavior. Provide details about the set of conditions and explain why this policy achieves optimal performance.

5b. (10 points) Pick two of the conditions and assume they are violated. Describe what tweaks are needed to achieve the same sort of behavior in these new scenarios.