

This test is closed book and closed notes!!!

As usual undergraduates should mark one question to be OMITTED.

1. Signals

- (a) Explain **in detail** what happens when the system call “`retval = signal(SIGINT, intrfunc);`” is made.
- (b) Write a section of code that will temporarily block the SIGINT signal.
- (c) Write a section of code that will check to see if there is a SIGINT pending.

2. (a) What are the major differences between a fifo and a pipe?

- (b) Explain how a “DOS” attack is accomplished.
- (c) What is meant by a buffer overflow attack?

3. The lockf system call is smart enough to avoid a two process deadlock, where

- (a) process1 locks secA
- (b) process2 locks secB
- (c) process1 attempts to lock secB
- (d) process2 attempts to lock secA

However, lockf cannot avoid a three way deadlock.

- (a) What happens when “process2 attempts to lock secA”?
- (b) Why does lockf not look to detect a three way deadlock?
- (c) What does locking a segment of size zero really mean? i.e., `lockf(fd,F_LOCK,0);`

4. Qt

- (a) Why is the meta object compiler (moc) needed in the development of Qt interfaces?
- (b) Explain the signal-slot mechanism of Qt.
- (c) Give the connect function call to hook up a pushButton pb1 to the method startOver of the Object A so that when the button is “clicked” the method A.startOver is called.
- (d) Describe the steps involved in the creation of a user interface shown on the board with Designer.
- (e) Describe the steps involved in the compilation of a user interface using both qmake and Designer.

5. (a) Give a section of code that will remap standard error to the standard output.

- (b) Give a section of code that will create a pipe between a mother and child and configure it so that the parent can read results written on the standard output of the child.

6. (a) Give a sequence of code to memory map the file “f1”.

- (b) If one were at a current record and new the record was 1000 bytes how would one move our record pointer “rp” to the next record.
- (c) If the file were not memory mapped what function would you use to move to the next record?

7. Substitutions

- (a) Assume you have parsed a command into a list list give a section of code that will search the command and perform variable substitutions.
 - (b) What does !str mean?
 - (c) Explain how one would implement “alias substitutions.”
8. (a) Write a section/line of code that will execute “ls -l -t” using execlp.
- (b) Write a section/line of code that will execute “ls -l -r -t” using execvp.
- (c) Describe in english the sequence of system calls necessary to implement the call popen(“ls -l”, “r”). Include things such as creating processes, dups, closings etc.