

CSE 536 Spring 2024 Midterm

Your name: _____

You have an hour and 15 minutes (a regular class period) to complete this exam. Mark on this sheet of paper with a pen or pencil, and then turn it in at the front of the room to the TA or I. This test is closed book (note that there is no textbook for the course) and closed note except that you can have one 8.5" by 11" sheet of notes (written on front and back if you like). You may not use any electronic device (not even a calculator) and you may not communicate in any way with any individuals other than the instructor of the course and the TA during the exam. Any violation of these policies will result in a 0 on the exam and will be treated as an act of academic dishonesty as per the syllabus. Every question is worth 10 points. For multiple choice questions, circle the best answer. For short answer questions, write at least one word and at most one sentence in the blank space provided.

1. Under which one of the following circumstances might a process find itself in the “pipe wait” state, waiting for I/O before it can be scheduled on the CPU again?

- A. When it reads from a pipe
- B. When it tries to access protected memory and then doesn't handle the SIGSEGV signal
- C. When the machine is turned off
- D. When the process is hogging the CPU

2. What is a named pipe?

- A. A pipe that is given a name in the virtual file system, *e.g.*, using mkfifo
- B. A process that has a different name than its parent process
- C. The inode of a file that has been deleted
- D. The dentry of a directory that has been removed

3. Which of these is **NOT** something I would expect to see in an inode (*e.g.*, that would be visible with the commands `stat` or `ls`).

- A. The name of the file
- B. The last time the file was modified
- C. A file descriptor table
- D. The permissions for the file

4. Which one of these is the best way tell what TTY belongs to which user?

- A. When users are typing (*e.g.*, during town discussion), the inode will be updated
- B. Every user is the owner of the special device file in `/etc` for their TTYs
- C. The moderator prints the TTYs in the log file
- D. The TTYs are encrypted with a simple Caesar cipher that is easy to break

5. If a process wants to refer to an open file in a system call, it passes an integer to the kernel. This integer is indexed into a table to decide which file the process is trying to operate on. Each process has its own table. What is this table called?

- A. A page table
- B. A file descriptor table
- C. A superblock
- D. A dentry

6. Suppose a process opens a file, and then reads from it. When are the permissions in the file's inode checked to make sure the process is allowed to read from the file?

- A. The process can't possibly know the file's name without read permissions for it
- B. When it is read
- C. When it is opened
- D. Never, because UNIX has no file protection mechanisms

7. During the command injection attack for Werewolves, a child process is forked and then a semicolon, or other character sequence that can split commands, causes that child process to interpret whatever comes after it to be interpreted as a separate command from echo. What does the child process execv to that causes the command injection vulnerability to exist?

- A. bash
- B. ls
- C. lsof
- D. ps

8. Which of these commands would be the best one to give a regular townspeople an advantage in the Werewolves game (*e.g.*, help them find out who the werewolves are)?

- A. ls /home/moderator
- B. chmod 777 /home/moderator/log/*
- C. echo haha
- D. stat /home

9. In the game for Homework 1, Werewolves, there's a special user that moderates the game. What is that user's username on the system?

10. What programming language is the game that we used for Homework 1, Werewolves, programmed in?
