CSci 402 - Operating Systems

Quiz 10

Fall 2023

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Instructor: Bill Cheng

Teaching Assistant: Zhuojin Li

(This exam is open book and open notes.
Remember what you have promised when you signed your
Academic Integrity Honor Code Pledge.)

Time: (N/A) minutes

_____-
Name (please print)

Total: 10 points

_____-
Signature

Instructions

1. This is the first page of your exam. The previous page is a title page and does not have a page number. Since this is a take-home exam, no need to sign above since you won't submit this file.
2. Read problem descriptions carefully. You may not receive any credit if you answer the wrong question. Furthermore, if a problem says *"in N words or less"*, use that as a hint that N words or less are expected in the answer (your answer can be longer if you want). Please note that points may get *deducted* if you put in wrong stuff in your answer.
3. If a question doesn't say `weenix`, please do not give `weenix`-specific answers.
4. Write answers to all problems in the **answers text file**.
5. For non-multiple-choice and non-fill-in-the blank questions, please show all work (if applicable and appropriate). If you cannot finish a problem, your written work may help us to give you partial credit. We may not give full credit for answers only (i.e., for answers that do not show any work). Grading can only be based on what you wrote and cannot be based on what's on your mind when you wrote your answers.
6. Please do *not* just draw pictures to answer questions (unless you are specifically asked to draw pictures). Pictures will not be considered for grading unless they are clearly explained with words, equations, and/or formulas. It's very difficult to draw pictures in a text file and you are not permitted to submit additional files other than the answers text file.
7. For problems that have multiple parts, please clearly *label* which part you are providing answers for.
8. Please ignore minor spelling and grammatical errors. They do not make an answer invalid or incorrect.
9. During the exam, please only ask questions to *clarify* problems. Questions such as "would it be okay if I answer it this way" will not be answered (unless it can be answered to the whole class). Also, you are suppose to know the definitions and abbreviations/acronyms of *all technical terms*. We cannot "clarify" them for you. We also will **not** answer any clarification-type question for multiple choice problems since that would often give answers away.
10. Unless otherwise specified and stated explicitly, multiple choice questions have one or more correct answers. You will get points for selecting correct ones and you will lose points for selecting wrong ones.
11. When we grade your exam, we must assume that you wrote what you meant and you meant what you wrote. So, please write your answers accordingly.

(Q1) (2 points) Which of the following statements are correct about **Kernel 3**?

(1) open(), read(), write(), and close() are some of the system calls made by the "hello" user space program
(2) in gdb, you can set a breakpoint at a virtual address
(3) a "pagenum" is the leading 20 bits of a virtual address or a physical address
(4) the fork() system call would execute the "trap" machine instruction (i.e., "int 0x2e") two times before fork() returns
(5) the "objdump" program can be used to print the content of the stack space of a user space program

Answer (just give numbers): _____

(Q2) (2 points) Which of the following statements are correct about **file system performance**?

(1) in FFS, cylinder groups are used to reduce rotational latency
(2) in FFS, block interleaving is used to reduce seek time
(3) in the Sprite file system, a log structured file system is used to improve performance of disk-read operations
(4) in Windows, the NTFS file system uses a multiple level extents to reduce internal fragmentation
(5) none of the above is a correct answer

Answer (just give numbers): _____

(Q3) (2 points) Which of the following statements are correct about **directories**?

(1) in S5FS, the component name of a directory entry can be 32 bytes long
(2) in FFS, the component name of a directory entry can be 128 bytes long
(3) if directory entries in a directory file is managed by a B+ tree, the worst case performance of adding a directory entry into a directory having N directory entries is O(N) if N is large
(4) if directory entries in a directory file is managed by a hash table, the worst case performance of adding a directory entry into a directory having N directory entries is O(N) if N is large
(5) none of the above is a correct answer

Answer (just give numbers): _____

(Q4) (2 points) Which of the following statements are correct about **file systems**?

(1) the byte device interface makes the disk looks smaller than it actually is
(2) the buffer cache makes the disk looks much bigger than it actually is
(3) the block device interface makes the disk looks like an array of disk blocks
(4) the logical volumn manager makes the disk looks faster than it actually is
(5) none of the above is a correct answer

Answer (just give numbers): _____

(Q5) (2 points) Which of the following statements are correct about **device drivers**?

(1) the line discipline module manages the partial line queue and the completed line queue to handle input from the keyboard
(2) when the <Backspace> key is pressed, a character inside the completed line queue would get deleted
(3) when a user thread calls fgets() to read a line from the keyboard and the completed line queue in the kernel is empty, fgets() would appear to be blocked inside the kernel
(4) the line discipline module is usually part of a network device driver
(5) none of the above is a correct answer

Answer (just give numbers): _____