CSci 402 - Operating Systems

Quiz 1

Fall 2023

Friay, Sep 1

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(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) What kind of hardware is usually **NOT directly connected** to the **bus** in a general purpose computer that uses a **bus architecture**?

(1) display
(2) CPU
(3) memory (RAM)
(4) disk controller
(5) USB thumb drive

Answer (just give numbers): _____

(Q2) (2 points) Which of the following statements are **incorrect** about **things in the address space**?

(1) local variables "live" inside stack frames
(2) if a pointer points to somewhere inside the text segment, then it's an "invalid pointer"
(3) once a variable name is mapped to a virtual address, it will map to the same virtual for the remaining life time of the process
(4) for this class, an "object" can refer to a poiner to a pointer to a pointer to a C data structure
(5) uninitialized global variables "live" inside the BSS memory segment

Answer (just give numbers): _____

(Q3) (2 points) Which of the following statements are correct about **process-related system calls**?

(1) when a thread calls the **wait()** system call, the thread's process goes into the zombie state temporarily
(2) the **fork()** system call is a "blocking" call
(3) if a thread calls **exit(status)**, the **status** value will be stored inside a TCB (thread control block) kernel data structure that's associated with the corresponding process
(4) the **wait()** system call can return two values
(5) none of the above is a correct answer

Answer (just give numbers): _____

(Q4) (2 points) Which of the following statements are **incorrect** about **process and file abstractions**?

(1) **stdin** refers to the file descriptor that's "mapped/connected" to the keyboard
(2) **stderr** refers to file descriptor 2
(3) when you call one of the **exec** system calls to run a different program, the address space will change but the "extended address space" basically stays the same
(4) the cursor position of an opened file is stored directly in the file descriptor table
(5) **stdout** can be remapped to refer to a file

Answer (just give numbers): _____

(Q5) (2 points) Which of the following statements are **incorrect** about the **address space**?

(1) your program's executable machine code is put inside the data segment
(2) if you have a 32-bit address space, the highest possible address is 0xffffffff
(3) some of your program's global variables are put inside the stack memory segment
(4) the stack memory segment contain stack frames
(5) your program's executable machine code is stored inside the text segment

Answer (just give numbers): _____