CSci 402 - Operating Systems

Quiz 5

Fall 2023

Friay, Sep 29

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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

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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 1**? Please note that since the weenix kernel is one process per thread, we may use the words "process" and "thread" interchangeably.

     (1)   your job in bootstrap() is to create the INIT process and get the INIT process to start running the code in initproc_run()

     (2)   one goal of the INIT process is to create the IDLE process and get the IDLE process to start running the code in idleproc_run()

     (3)   in Phase 1 of your Kernel 1 assignment, you should not change the code in either idleproc_run() or initproc_run()

     (4)   when the IDLE process dies, it should wake up the INIT process

     (5)   the IDLE process is the process that "turns off the machine"

Answer (just give numbers): _____

(Q2)   (2 points) Which of the following statements are correct about **memory allocators**?

     (1)   user space memory allocators typically use the "best-fit" algorithm

     (2)   in the "first-fit" memory allocator, free blocked are maintained in a doubly linked list

     (3)   when you call **malloc()**, you are allocating memory using the "buddy list/system"

     (4)   the slab allocator is also known as the "array allocator"

     (5)   none of the above is a correct answer

Answer (just give numbers): _____

(Q3)   (2 points) Which of the following statements are correct about **compiler, linker, and loader**?

     (1)   the address of a global variable is determined by the loader

     (2)   the content of an initialized global variable is determined by the linker

     (3)   the compiler figures out the addresses of all functions in a program

     (4)   the content of a local variable is determined by the loader

     (5)   none of the above is a correct answer

Answer (just give numbers): _____

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

    (1)   for an IBM PC, BIOS is used to configure which device to boot from
    (2)   for an IBM PC, some device drivers are provided by the CMOS
    (3)   for an IBM PC that runs Linux, the code to create process 0 is mainly written in C
    (4)   for weenix, the code to create process 0 is mainly written in C
    (5)   none of the above is a correct answer

Answer (just give numbers): _____

(Q5)   (2 points) Which of the following statements are correct about **memory maps**?

    (1)   a memory mapping can be either a file mapping or an anonymous mapping but not both
    (2)   a memory mapping can be either a read-only mapping or a shared mapping but not both
    (3)   a memory mapping can be either an anonymous mapping or a shared mapping but not both
    (4)   a memory mapping can be either a private mapping or a shared mapping but not both
    (5)   none of the above is a correct answer

Answer (just give numbers): _____