CSC 4320: Operating Systems

50 Points

Homework 1

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Work on the following problems and submit your own answers. You are allowed to discuss with other students. However, do not copy the solutions from peers or other sources. If the assignment has programming component, your program(s) must compile with **gcc** and execute on **snowball.cs.gsu.edu**! Please see https://cscit.cs.gsu.edu/sp/guide/snowball for more details.

Instructions:

- Upload an electronic copy (MS word or pdf) of your answer sheet to the folder named "HW1" in iCollege.
- Please add the course number, homework number, and your name at the top of your answer sheet.
- Please write down your answers with the question number only in the answer sheet.
- Name your file in the format of CSC4320_HW1_FisrtnameLastname (.docx/.pdf)
- Deadline: Submit by January 31, 2025, 11:59 pm

1. (16 points) Which of the following instructions should be privileged?
   (a) Set value of timer
   (b) Read the clock
   (c) Clear memory
   (d) Issue a trap instruction
   (e) Turn off interrupts
   (f) Modify entries in device-status table
   (g) Switch from user to kernel mode
   (h) Access I/O device.

2. (14 points) Rank the following storage systems from slowest to fastest:
   i. Hard-disk drives
   ii. Registers
   iii. Optical disk
   iv. Main memory
   v. Nonvolatile memory
   vi. Magnetic tapes
   vii. Cache

3. (5 points) What is the purpose of system calls and system programs? How are they related? How do they differ?

4. (5 points) The main function of the command interpreter is to get and execute the next user-specified command. What are the ways these commands can be implemented? Which approach do UNIX systems use? What are the advantages of this approach?

5. (10 points) Write down the functions of the following system calls in Unix and name the corresponding Windows system calls:

   i. `fork()`
   ii. `exit()`
   iii. `wait()`
   iv. `open()`
   v. `read()`
   vi. `write()`
   vii. `close()`
   viii. `ioctl()`
   ix. `getpid()`
   x. `pipe()`

6. (5 points (bonus)) What system calls have to be executed by a command interpreter or shell in order to start a new process on a UNIX system?

Question:	1	2	3	4	5	6	Total
Points:	16	14	5	5	10	0	50
Bonus Points:	0	0	0	0	0	5	5
Score:							