CSc 332 - Operating Systems

Task 4 - System Calls Summary

Max Points: 30 **Due**: March 19, 2020 11:59 PM

PART 1: Simple Command Interpreter

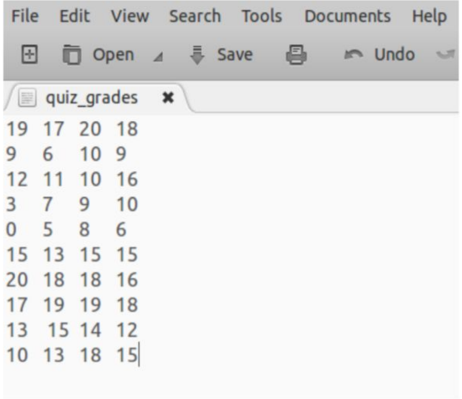
Recall: In Task 3, we worked with exec() system calls for specific commands such as date, and ls.

Write a special simple command interpreter that takes a command and its arguments. This interpreter is a program where the main process creates a child process to execute the command using exec() family functions. After executing the command, it asks for a new command input (i.e., parent wait for child). The interpreter program will get terminated when the user enters quit.

PART 2: Average Grade Calculator

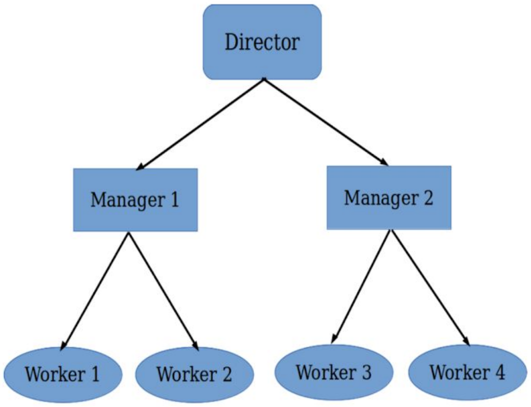
There are 10 students enrolled in a course. The course covers x number of chapters from a textbook (x > 1). In each chapter y number of homework(s) are assigned (y ≥ 1). The average grade for each homework in all the chapters need to be found out.

To solve this, write a program that has the main process as Director process, which reads a file containing grades of all homework of all chapters and creates x number of Manager processes. Each Manager process will take care of solving a chapter. Each manager process will create y number of Worker processes and pass one homework to each of them and they calculate and print the average. The input text file and the process tree for x = 2 and y = 2 will look like the following:



```
19  17  20  18
9   6   10  9
12  11  10  16
3   7   9   10
0   5   8   6
15  13  15  15
20  18  18  16
17  19  19  18
13   15 14  12
10  13  18  15
```

(a)



(b)

The Director process is responsible for opening and closing the input text file. It stores the values in a two dimensional integer array with 10 rows. You may need to use the following C functions (in addition to the necessary file & process management system calls): fopen(), fscanf(), fseek(), fclose().

Submission Instructions

- Save your programs in a single folder and zip as: task4_*firstname*_lastname.zip. Make sure your programs compile and run without any errors.

- Email your code with subject line "Task 4 – CSc 332 (L) – firstname
lastname"

******