# CSc 332 - Operating Systems

Lab – Fall 2015

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## Project 1 - System Calls

October 16, 2015

**Max Points**: 30 **Due**: October 29, 2015 11:59 PM

*(**Max Points**: 20 **Due**: November 5, 2015 11:59 PM)*

### PART 1 Client - Server

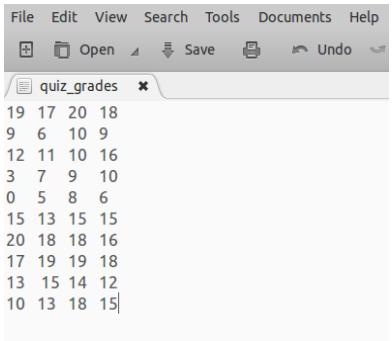
Write two C programs: one called `client.c`, the other called `server.c`. The client program displays a prompter and reads from the keyboard two integers and one of the characters $'+'$ or $'-'$. The read information is transmitted with the help of the system call *execl* to a child process, which executes the server's code[1]. After the child (server) process finishes the operation, it transmits the result to the parent process (client) with the help of the system call *exit*. The client process prints the result on the screen and also reprints the prompter, ready for a new reading.

### PART 2 Average Grade Calculator

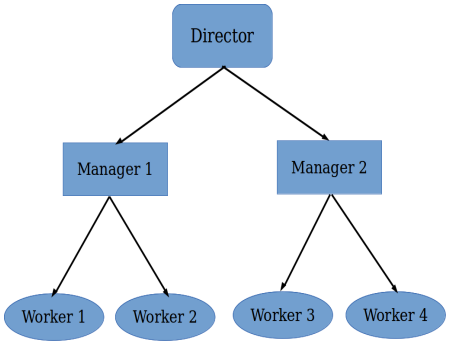
There are 10 students enrolled in a course. The course covers $x$ number of chapters from a textbook ($x > 1$). In each chapter $y$ number of homework(s) are assigned ($y \geq 1$). The average grade for each homework in all the chapters need to be found out.

To solve this, write program which has the main process as *Director* process, which reads a file containing grades of all homeworks 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* process and pass one homework to each of them and they calculate and print the average.

The input file should contain the data according to the value of $x$ and $y$. For example, the input text file and the process tree for $x = 2$ and $y = 2$ will look like the following:




(a)




(b)

[1]The server code takes three arguments – operator ('+' or '-') and two operands – compute & return the result

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: *project1_lastname.zip*. Make sure your programs compile and run without any errors.
- Email your code with subject line "Project 1 – CSc 332 – *lastname*"

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