Operating Systems Laboratory (CS39002)
Spring Semester 2018-2019

Assignment 1: Familiarization with Unix system calls on process creation and management

Assignment given on: January 07, 2019

Assignment deadline: January 14, 2019, 1:00 PM

1a. Write a program in C/C++ under the Linux environment that would perform the following:

- Create five processes A, B, C, D, and E.
- The processes A, B and C will each generate 50 pseudo-random non-zero integers. The processes A and B will forward the numbers in sorted order to process D (through pipes). The process C will forward the numbers in sorted order to process E (through pipes).
- The process D will read the numbers received from the two pipes in sorted order, merge them, and forward the numbers in sorted order to process E (through pipes).
- The process E will read the numbers received from the two pipes in sorted order, merge them, and print all the numbers in sorted order.

Use pipes for inter-process communication.

1b. Write a program in C/C++ under the Linux environment that would perform the following:

- In a loop, read a character string containing the name of an executable program with command-line arguments, if any.
- Fork a child process, and execute the program.
- The loop will terminate if the command "quit" is entered.

Submission Guidelines:

- Create two separate programs for the two assignments, and name them **Ass1_<groupno>_1a** and **Ass1_<groupno>_1b** (replace <groupno> by your group number).
- You must show the running version of the program(s) to your assigned TA during the lab hours.

Things to study:

- fork() system call
- pipe() system call
- execlp() / execvp() / execve() system call

Evaluation Guidelines:

Total marks for this assignment are 50. While entering marks, the partwise break up should also be entered according to the marking guidelines given below. There is a

separate component for individual assessment, based on how the student answers questions.

Sl	Items for 1a	Marks
(a)	Process creation	8
(b)	Pseudo random number generation	5
(c)	Pipe creation	8
(d)	Reading from pipe	5
(e)	Writing to pipe	5
(f)	Merging of numbers	4
	Total	35

	Items for 1b	Marks
(g)	Reading of arguments in a loop	5
(h)	Spawning the new processes using fork	5
(i)	Passing the command line arguments to the new process	5
	Total	15