San Jose State University

Department of Computer Science

Data Structures and Algorithms (CS 149-01)

Instructor: Ahmed Ezzat

Homework #6 (10 pts)

UNIX I/O

The purpose of this assignment is to practice making UNIX I/O system calls in C. In a multiplexed manner, your main process will read from multiple files and also from the standard input (the terminal).

Procedure

Create five pipes and spawn five child processes. Connect a pipe to each child process. Each child process should write to its pipe, and the parent process should read from all the pipes. Recall that you read and write a pipe as if it were a file.

Each of the first four child processes should generate time stamped messages to the nearest 1000th of a second (time starts at 0):

0:00.123: Child 1 message 1
0:02.456: Child 1 message 2
etc.

Each process should sleep for a random time of 0, 1, or 2 seconds between messages. Terminate the process after 30 seconds.

Meanwhile, the fifth child process should repeatedly prompt at the terminal (standard out) and read one line of input (standard in) typed by the user. The process should write the message (with time stamp) to its pipe and then immediately prompt for the next message. Terminate the process after 30 seconds.

After spawning the child processes, the parent process should repeatedly read lines from the pipes. It must use the **select**() system call to determine whether any of the pipes has any input. It should write the messages that it read from the pipes to an output file **output.txt** in the order that it read them. It should prepend each line with a time stamp to the nearest 1000th of a second. Therefore, each output line

will have two time stamps: the first time stamp from the parent process, and the second time stamp from the child process. **File output.txt** will contain a mixture of lines from the child processes.

Tip: Read the "man" pages about the **select**() system call.

Terminate the parent process (and the program) after all the child processes have terminated.

What to turn in

Email a zip file to your corresponding Grader, Name the zip file after your team name, for example, **AhmedEzzat.zip**. The file should contain:

- Your C source files
- Your **output.txt** file
- A brief report describing any issues you encountered.

Section-1: Email your answers to Sahil Kaw, Email: sahil.kaw@sjsu.edu

Your subject line should be "**CS 149**-Section-n **Assignment #6**, **Group-n**" for example **CS 149-Section-1 Assignment #6, Group-3**. Cc all your group members so that the grader can do a "Reply all" when needed. This is a group assignment; all group members will receive the same score.