Introduction to Operating Systems (CS-GY6233)
Spring 2020

Assignment 3

Modify the Fibonacci function you created in your previous assignment such that it takes NO parameters and has storage only for the previous two Fibonacci values (and any other values you need to implement the function of course). It shall return the value of the next number in the sequence, i.e. when you call it the first time it returns 1, when you call it the second time it also returns 1 (second element), you call it again and it returns 2 (third element), then 3, then 5 and so on.

Create the main routine of your program, in which a length parameter n is obtained from the user as an argument that is passed to your program when it started (i.e. when you invoke your program from the shell, you pass it one parameter, n). The program shall then create a shared memory of size n*sizeof(int) and then spawn (i.e. create) a child process using the fork() system call.

The child process shall then wait for a random time (between 0 and 1 second) and then call the Fibonacci function to obtain the next number in the sequence. It needs to pass that number to the parent process via the shared memory (created earlier by the parent). The child process repeats this n times and then exits (n obtained from the user as previously stated).

After spawning the child process, the parent waits till an entry (i.e. a number from the sequence) is produced in the shared memory, and prints that entry to the screen as soon as it becomes available. When n entries are obtained and printed, it then waits for the child process to exit, destroys the shared buffer and then exits.

Note that the shared buffer (or memory) shall be administered without using any OS supported synchronization primitives (i.e. mutexes, semaphores, monitors, etc.). This can be done as explained in the lecture 4, slides 5 - 8.

What to hand in (using NYU Classes):

- Your ".c" and ".h" files (with appropriate comments). Do not attach project or make files.
- A file containing any comments you would like to add (if any) in word of pdf format.
- A screen shot(**s**) of your terminal window (possibly in the same file) showing the current directory, the command used to compile your program, the command used to run your program and the output of your program.

RULES:

- You may consult with other students about GENERAL concepts or methods, but copying code (or code fragments) or algorithms is NOT ALLOWED and is considered cheating (whether copied form other students, the internet or any other source).
- If you are having trouble, please ask your teaching assistant for help.
- You must submit your assignment prior to the deadline.