CMSI 387-01

Operating Systems

Spring 2013

Assignment 0321

Now that you've gone past the major "baptism of fire" that is building and modifying an operating system kernel, we move on with some exploration and programming in the process and threads realm.

Outcomes

This assignment will affect your proficiency measures for outcomes *1a*, *1b*, *3a* (CSI: Process), *2c*, (A Shell of Your Own and Points to Ponder), *1d* (Points to Ponder #2 and #3, nudge nudge hint hint), *4a–4c* (A Shell of Your Own), and *4d–4f* (all).

Not for Submission

If you have it, read SGG Chapters 3 and 4.

For Submission

"CSI: Process"

Use long-running invocations (i.e., huge numbers) of the `thread-java` and/or `thread-posix` sample programs to do the following on at least two operating systems chosen from Linux, Mac OS X, and Microsoft Windows. The chosen two can be different for each task, depending on what is possible or easy for each operating system:

1. Invoke the long-running program, send it to the background, and run another program that produces output. Take a screenshot of that big hot terminal mess.
2. Invoke the long-running program, and use a process monitor on the operating system platform to see that program's threads. How do the different operating systems represent the threads? Note any major similarities and differences, accompanied by screenshot evidence.

Commit your "evidence," along with a README with your responses and descriptions of the committed files, under *homework/csi-process*.

A Shell of Your Own

Implement your own command-line operating system shell. You may extend the *fork-exec.c* sample program or start from scratch.

In addition to the basic command prompt loop for entering a command then executing it (including its arguments), implement the following two features:

- Let a command ending with `&` run concurrently with the shell (i.e., just like *bash*).
- Make sure that the `cd` command works correctly.
- Add an "easter egg" to your shell so that, if the user types `secret-system-call`, it invokes the system call that you added to the kernel in Assignment 0312.

Commit and push your code to your `git` repository under *homework/myshell*.

Points to Ponder

Answer the following questions:

1. Why did the `cd` command get special mention in this assignment?
2. Can your shell run scripts? Why or why not?
3. Does `Ctrl-D` exit your shell? Why or why not?

Commit and push your answers to your `git` repository as a file in some widely-readable document format within the *homework/myshell* directory.