CS110 Practice Midterms

Midterm Details

- Friday, May 12th, 2017
- CEMEX Auditorium
- 1:30pm - 2:50pm

The exam is closed book, closed note, closed electronic device. I will provide you with all of the C function prototypes and C++ classes that might be relevant to a particular problem, and you can always ask a CS110 staff member during the exam if you want to use a core C function or C++ class that we didn't provide. Local SCPD students are encouraged to come to campus if at possible. (Caveat: You are permitted to populate both sides of a single 8.5" x 11" sheet of paper with as much material as you can cram into it).

The exam will, of course, focus on the concepts we've learned during the first 9 lectures of the course (everything up to and including our discussion of virtual memory and the OS scheduler, but no threading or related concurrency issues).

Material

Here's the impressive list of topics you should be familiar with:

- You should understand how `open`, `read`, `write`, `close`, `dup`, `dup2`, `stat`, and `lstat` all work.
- You should understand file descriptor tables, the file entry table, the vnode table, and what type of information is store in each.
- You should be familiar with the basic concepts of layering and naming in computer systems.
- You should understand the UNIX v6 file system concepts, data structures, and layers you coded against for Assignment 2.
- You should be familiar with `fork`, `waitpid`, all of the various status macros, `execvp`, `signal`, signal handlers, signal blocking and unblocking, `kill`, process ids, and process groups, `pipe`, and pipes.
- You should be familiar with the various concurrency issues that can come up as a result of a single code base controlling multiple processes.
- You should have a basic understanding of how virtual-to-physical memory mapping works and how it's used to allow all processes to operate under the illusion that each owns its full virtual address space.
- You should have a basic understanding of how the OS scheduler works.
- You should understand your implementations of `pipeline`, `subprocess`, `farm`, `trace`, and `stsh` from Assignments 3 and 4.

- You should understand all of the material in the lab handouts (although I will not test you only anything regarding tools —i.e. `g++-5`, `gdb`, `valgrind`, `info`, the `/sys/proc` pseudo filesystem, etc. will not come up).

Practice Midterms

I'm presenting a collection of problems across three sample midterms that represent the type I might give on May 12th. I'll write the exam with the idea that it can be completed in 60 minutes, but I'll allow you 80 with the hope that there's virtually no time pressure.

Understand that I'm under no obligation to replicate the structure of these practice midterms while writing yours, as I'm only trying to give you a sense of what some CS110 midterm problems have looked like in the past. The first two of the three practice midterms are longer than the one you'll see, since they were constructed from some two-hour midterms I've given in prior quarters. The third is one I gave earlier this year, when I held an in-class midterm that lasted 80 minutes, just like yours will be. Some of the problems from the practice exams have been cannibalized to contribute to your lab handouts. But that's fine, because I should be able to ask you any of those questions again and hold you responsible for their answers.

Here are links to three practice midterm and their solutions:

- Practice Midterm 1 [Solution]
- Practice Midterm 2 [Solution]
- Practice Midterm 3 [Solution]