CS 45: Operating Systems
Lab 1: Xv6 & Processes

DUE September 19th at 11:59 PM

In this lab we will be introduced to `xv6` and work with processes. Write your answers in `README.md`. Create a `COLLAB.md` file to keep track of any outside resources you might use. Be sure to push to **both** repos.

1   Part 0: C/UNIX Warm-up

Answer the following *Theory of the Program* questions about the code from the intro chapter of OSTEP.

1. How many binary executables are created when you run `make` in the `intro/` directory?
2. The book's code uses `char *argv[]` not `char **argv`, does it matter? why?
3. When you run a few versions of `cpu`, where does the ordering of the output come from?

   ```
   $ ./cpu A & ./cpu B & ./cpu C & ./cpu D &      # NOTE: killall -2 cpu
   ```

4. Why is `fprintf` used in `cpu.c` rather than `printf` on line 8?
5. Modify `cpu.c` so that it prints the string continuously on the same line:

   ```
   $ ./cpu hello
   hellohellohello...
   ```

6. What is the purpose of `atoi` in `mem.c`?
7. How many versions of `atoi` are shown when you look at its `man` page?
8. Why are both `"%d"` and `"%p"` used in the format string on line 14 of `mem.c`?
9. What's the purpose of the | on line 10 of `io.c`?
10. How would the program change if you removed the `assert` on line 15 of `io.c`?

2   Part 1: xv6

Complete the following tasks from the *xv6 and Unix Utilities* lab from MIT. Write a sentence or two under each bullet about what you were able to accomplish. Be prepared to demo it to me next lab period.

- boot xv6

- `sleep`

- `sixfive` (optional)

- `memdump`

- `find`

- `exec`

- `pingpong`

- `xargs`

- add features (e.g. history, job control) from your `cs31sh` to the `xv6` shell (optional)