OS CS3500

Lab 1 - Utilities

due by 11:59pm **Aug 10**
Course: CS3500, Aug-Nov 2025
Instructor: Chester Rebeiro

Instructions:

1. The deadline will not be extended under any circumstances.
2. Late Submission Penalty:
   - 10% penalty for submission until 1 day after deadline.
   - 30% penalty for submission until 2 days after deadline.
   - 50% penalty for submission until 3 days after deadline.
   - No marks for submission after 3 days post deadline.
3. Marking scheme for each lab:
   - 30% for correctly executing submission. Depending on the lab goals, the partial marks will be staggered accordingly. Please note that a submission that does not run will be given no marks in this category; no partial marking for such submissions will be considered.
   - 70% for per lab viva. You need to be present during the lab slot for your viva with your system; no alternative times will be offered under any circumstances.
4. Any requests that can affect the entire class should be made by the class reps only.

Assignment Prerequisite:

1. Install Docker on your host system from here. For MacOS users, you can follow the instructions here.
2. Once Docker is installed, pull the riscv-tools Docker image using:
   `docker pull svkv/riscv-tools:v1.0`
3. Run the Docker image using:
   `docker run -it svkv/riscv-tools:v1.0`
4. Clone the xv6 repo:
   `git clone https://github.com/mit-pdos/xv6-riscv`
5. To run the xv6 repo inside the docker use:
   `docker run -it -v`
   `<path to xv6-riscv in your host system>/xv6-riscv:/home/os-iitm/xv6-riscv`
   `svkv/riscv-tools:v1.0`
6. Inside the Docker run:
   `cd xv6-riscv && make qemu`
   Rin Ctrl + a, followed by x to exit qemu.

7. Setup gdb for debugging:
   `cd xv6-riscv && make qemu-gdb`

8. On another terminal in host system, run the following and get the container id of svkv/riscv-tools:v1.0:
   `docker ps`

9. Run a replica of the container using:
   `docker exec -it <container-id> bash`

10. Connect the two bash shells:
    `riscv64-unknown-elf-gdb xv6-riscv/kernel/kernel`
    `target remote localhost:<tcp port id>`

Submission:

1. Write, compile, and run a HelloWorld.S program which prints "Hello ⟨ Your Roll No ⟩! Welcome to CS3500" inside xv6 qemu. Submit the following:
   - The assembly code.
   - The screenshots showing this executing on your system.
2. Submit a detailed report containing the following:
   - Any issues faced during installation and their solutions.
   - Steps to run your HelloWorld.S code and an explanation of each of the lines in your code.