# Operating System Labs: Student Instructions

## Lab 1: View and Inspect Running Processes

Objective: Learn to view running processes and understand key fields.

* Instructions:

1. Run `ps aux` to list all processes.
2. Identify:  
    - Your shell process (bash)  
    - A background service (e.g. systemd, ssh)  
    - Any process with high CPU usage
3. Use `ps -o pid,ppid,ni,stat,cmd` to see parent/child and priority info.
4. Run `top`, sort by memory and CPU (press M, then P), then quit (q).

## Lab 2: Foreground and Background Jobs

Objective: Practice managing foreground and background jobs.

* Instructions:

1. Run `sleep 120 &` to launch a background job.
2. Use `jobs` to check the job status.
3. Bring the job to foreground with `fg %1`.
4. Press CTRL+Z to suspend it, then use `bg %1` to resume it in background.

## Lab 3: Kill and Signals

Objective: Send signals to processes.

* Instructions:

1. Start `sleep 200 &`, get its PID using `ps`.
2. Use `kill -15 <PID>` for graceful termination.
3. Restart it, then use `kill -9 <PID>` to force kill it.
4. Try `killall sleep` to terminate all sleep commands.

## Lab 4: Nice and Renice

Objective: Adjust process priority.

* Instructions:

1. Run `nice -n 10 sleep 300 &`.
2. Use `ps -o pid,ni,cmd` to check the nice value.
3. Use `renice 5 <PID>` to change it.
4. Try renicing a root-owned process (should fail).

## Lab 5: Trap Signals in a Script

Objective: Catch and handle a signal in a script.

* Instructions:

1. Create `trap\_test.sh` to catch SIGINT.
2. Use `trap` to print a message when CTRL+C is pressed.
3. Add a loop that prints 'Running...' every 2 seconds.
4. Run it and press CTRL+C.

## Lab 6: Create a Custom systemd Service

Objective: Create a service that logs the current time.

* Instructions:

1. Write a script logging time to `/tmp/log.txt` every 10s.
2. Make it executable.
3. Create `/etc/systemd/system/timerlog.service`.
4. Run:  
    - `sudo systemctl daemon-reload`  
    - `sudo systemctl enable timerlog`  
    - `sudo systemctl start timerlog`
5. Check logs with `systemctl status` and `tail -f /tmp/log.txt`.