Homework One: System Calls

* Part 1: The speed of system calls vs. library calls

- **Task 1:** Write a script that calls the program 1000 times, and record the patterns of interleaving of “f1” and “f2” calls.
- **Task 2:** How many times do you see an “f1” before an “f2” vs. an “f2” before an “f1”? Do you always see the same pattern?
- **Task 3:** Is this behavior guaranteed to happen across runs? Why or why not?

* Part 2: Understanding the differences

- **Task 1:** Use ‘/usr/bin/time’ to measure the execution time of version1.c and version2.c, by writing a script that invokes these programs 1000 times and recording the time it takes to run each program.
- **Task 2:** Plot a figure for the CDF (cumulative distribution function) curves for the two programs’ execution times. What do you observe? Please explain the underlying reason.
- **Task 3:** Plot a figure with the CDFs for time spent in the userspace, and time spent in the kernel space. Please explain the differences between version1.c and version2.c
- **Task 4 (Only required for graduate students).** Do you see the same execution times across runs? What are some methods that you can use to make the execution times more stable across runs? Name at least five of them.

Homework submission: Please provide all scripts you have written and a PDF file describing the results, and put them in a zip file. In your PDF file, please include a) your name, b) your Rice NetID, and c) your student ID (that starts with ‘S’).

Due date: See instructor announcement. **Late policy:** -20% of the scores for each late day.

Environment: You can use the CLEAR machines, or alternatively any Linux system.