CSE 411: Assignment 2

Evaluating Concurrent Set Implementation in Synchrobench

Due date: Friday October 1 (individuals)

- Download Synchrobench from the following link, and follow the instructions to setup and run it: https://github.com/gramoli/synchrobench

- Use Synchrobench to compare 6 different *Concurrent Set* implementations

  - 3 of them should be the linked-list based implementations that we discussed in lectures: hand-over-hand (named lock-coupling), lazy, and lock-free.
  - 3 of them should be based on other data structure implementations of your choice (you can find plenty of implementations based on balanced trees, skip-lists, hash maps, …, etc)
  - It is better to get an overall idea (without diving into details) about the implementations you select in order to have a better interpretation of your results. To do so, you can refer to either the code or the publication (links of corresponding publications are available in Synchrobench).
- You should compare those 6 implementations on different workloads of your choice
  - To do so, before you start, make sure you understand the different command-line parameters provided by Synchrobench as well as its output format (ask if you are not sure!).
  - Your choice of workloads should aim at depicting the strengths/weaknesses of each implementation. Part of your grade will be on the selection of proper workloads.
- Synchrobench provides both Java and C/C++ libraries. You are allowed to use any of them (C/C++ is preferred).
- You must produce a 2-3 page write-up of your experience. List the approaches you use and the workloads you test. Include graphs showing performance in those different workloads.
  - **Required:** scalability evaluation -- threads on the X axis and time on the Y axis.
  - **Optional (with possible bonus marks):** evaluating memory overhead, single-threaded overhead, cache-locality, … (Hint: you can use tools like Perf to collect some of those results).
- All results should be the average of 5 trials, and should discuss variance.
- If testing on Sunlab, keep in mind that the machines are shared. If you wait until the last minute, you may not have exclusive access to the machine, and your results will be invalid.