UNIVERSITY OF VIRGINIA, DEPARTMENT OF COMPUTER SCIENCE

Concurrency - Concurrency Analysis

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1 SUMMARY

The goal of this homework is to write a report analyzing the efficiency of your concurrent queue. Specifically, we are interested in how efficient your queue is compared to a sequential queue as you increase the number of items being added / removed and as you increase the number of threads accessing the queue in parallel.

You will perform an experiment by doing the following:

1. Write some test code (or use/modify what we provided) so that you can test the efficiency of your queue sequentially and concurrently.

2. Run a small experiment where you increase the number of elements added/removed to the queue until the queues start to become noticeably slow. Time how long your sequential vs concurrent queue took to complete.

3. Do a second experiment where you increase the number of threads accessing the concurrent queue at once. Time how long each test case takes to complete. For this test, keep the number of insertions / deletes constant.

4. Write a report summarizing and analyzing your findings

5. **FILES TO DOWNLOAD:** None

6. **FILES TO SUBMIT:** ConcurrentQueueAnalysis.pdf

1.1 Report

Summarize your experiment and your findings in a report. Make sure to adhere to these general guidelines:

- Your submission MUST BE a pdf document. You will receive a zero if it is not.
- Your document MUST be presented as if submitted to a professional publication outlet. You can use the template posted in the course repository or follow Springer's guidelines for conference proceedings.
- You should write your report as if it is original novel research.
- The grammar / spelling / professionalism of this document should be sound.
- When possible, do not use the first person. Instead of "I ran the code 60 times", use "The code was executed 60 times...".

In addition to the general guidelines above, please follow the following rough outline for your paper:

- **Abstract**: Summarize the entire document in a single paragraph
- **Introduction**: Present the problem, and provide details regarding the two strategies you implemented.
- **Methods**: Describe your methodology for collecting data. How many method calls, how many executions, how you averaged things, etc.
- **Results**: Describe your results from your execution runs.
- **Conclusion**: Interpret your results. What happens as inserts / deletes in increased? What about number of threads? Did anything about the times you reported seem odd? If so, why do you think that might be?

Lastly, your paper MUST contain the following things:

- A table (methods section) summarizing the experiments and how many execution runs were done in each group.

- A table (results section) summarizing the results of experiment 1 (number of inserts / deletes).
- A table (results section) summarizing the results of experiment 2 (number of threads).
- Some kind of graph visualizing the results of the table from the previous bullet.