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CS 2420
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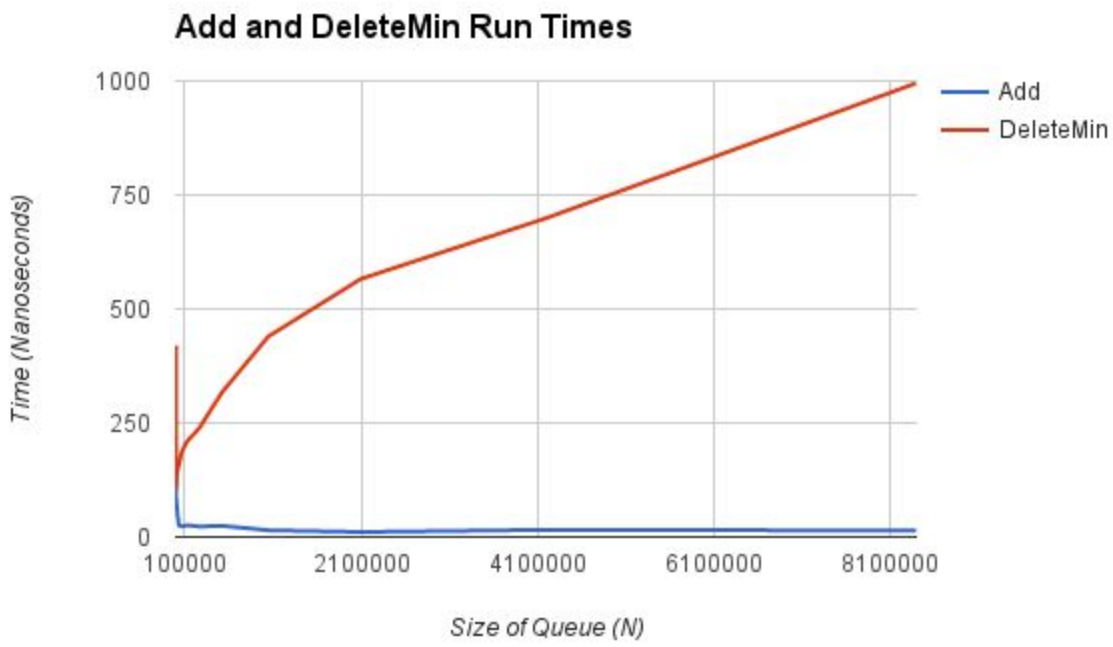
Assignment 11 Analysis

1. Design and conduct an experiment to assess the running-time efficiency of your priority queue. Carefully describe your experiment, so that anyone reading this document could replicate your results. Plot the results of your experiment.



So for this experiment I created a new priority queue every time I increased the size (N) of the queue. Then I tested the time that it took to add a single item to the queue and then the time it took to delete a single item from the queue. This experiment was performed in nanoseconds because it is very fast. I also performed 10,000 iterations every time I added or deleted an item to ensure the time was a good representation.

2. What is the cost of each priority queue operation (in Big-O notation)? Does your implementation perform as you expected? (Be sure to explain how you made these determinations.)

Based on the experiment I performed I can determine that my implementation of Add is O(c) complexity. Regardless of the size of the queue, it always performs with a constant run time. DeleteMin performs with O(Log(N)) complexity. As the list increases size, it does take longer but not much longer. And I know that my implementation of FindMin is O(c) because it is only one line that returns the first element in the array and I know array access is of constant complexity.

3. Briefly describe at least one important application for a priority queue. (You may consider a priority queue implemented using any of the three versions of a binary heap that we have studied: min, max, and min-max)

A priority queue can be used to determine the lowest cost of the paths in a pathfinding algorithm. This way the lowest cost path could always be found by accessing the minimum values in a min heap priority queue.

4. How many hours did you spend on this assignment?

4 hours, at most.