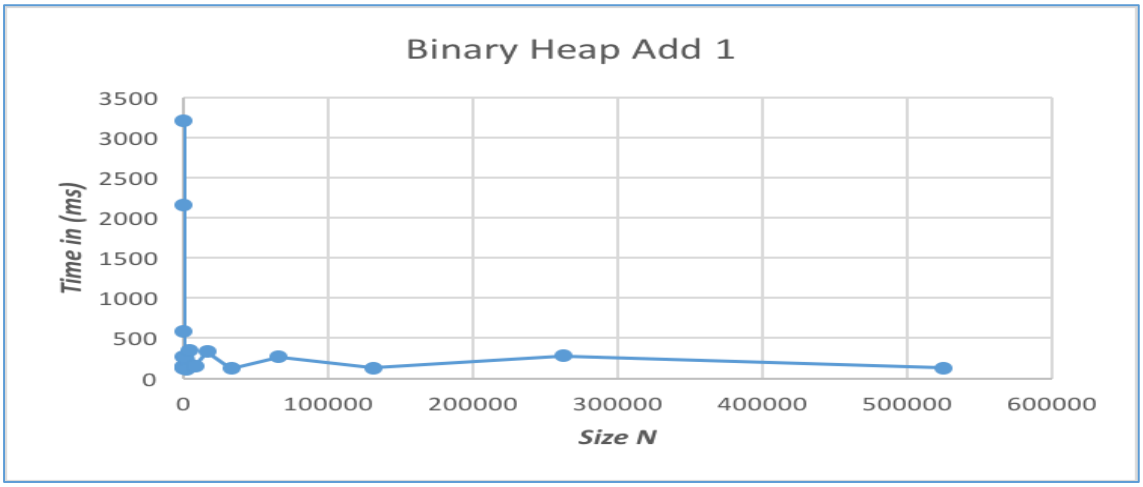
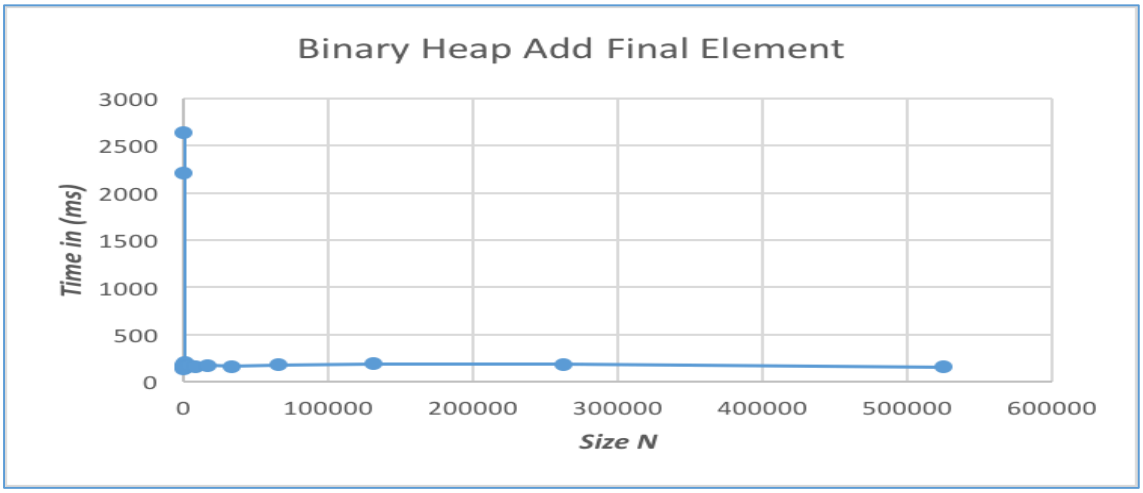
1. Design and conduct an experiment to assess the running-time efficiency of your priority queue. Carefully describe your experiment, so that anyone reading this document could replicate your results. Plot the results of your experiment. Since the organization of your plot(s) is not specified here, the labels and titles of your plots(s), as well as, your interpretation of the plots is critical.

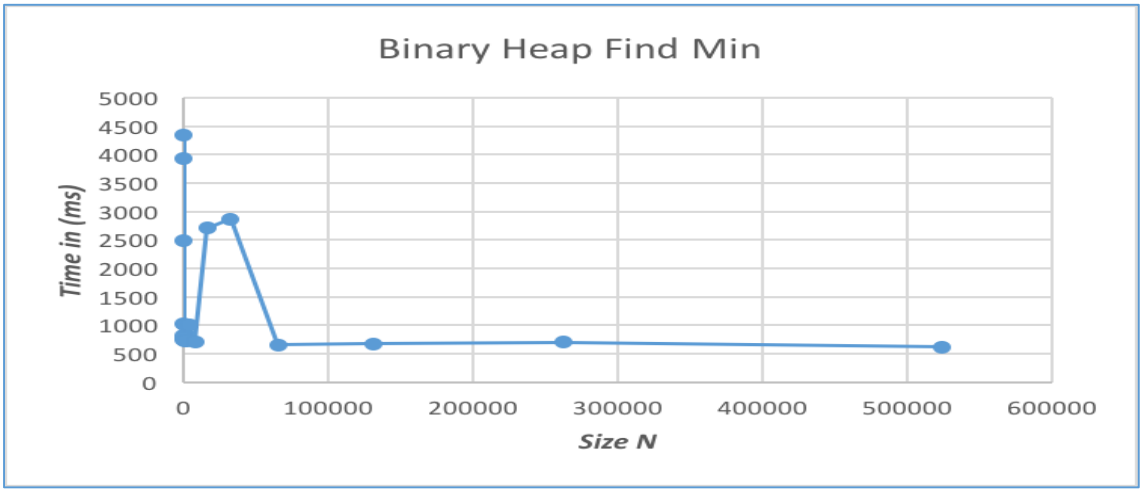
For my experiment, I would use the normal timing class from lab 2 class to time my Binary Heap. From there I would create a random set of integers and sequentially add them into the BinaryHeap. Within this class, I would time each individual method and print the time in nanoseconds to the console.

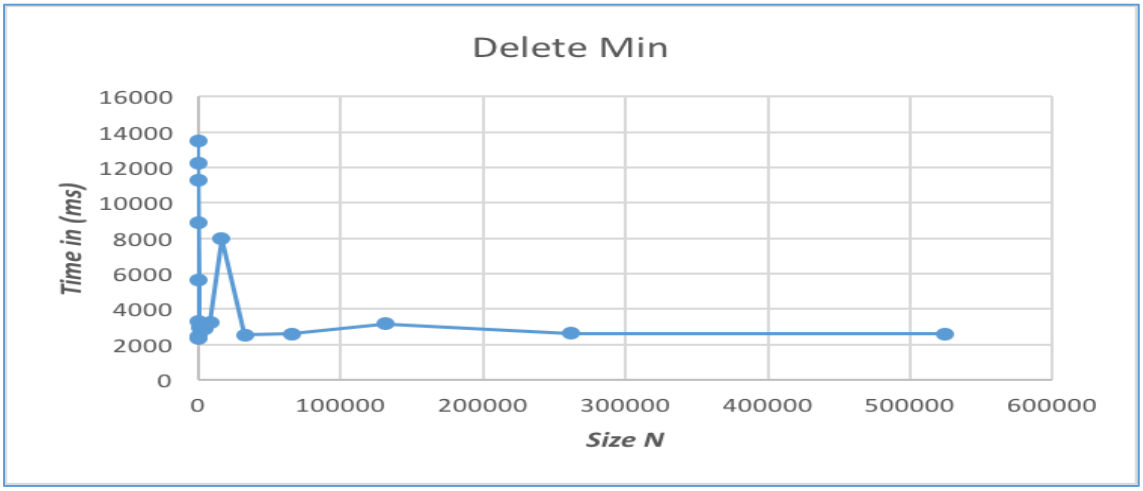
2. What is the cost of each priority queue operation (in Big-O notation)? Does your implementation perform as you expected? (Be sure to explain how you made these determinations.)

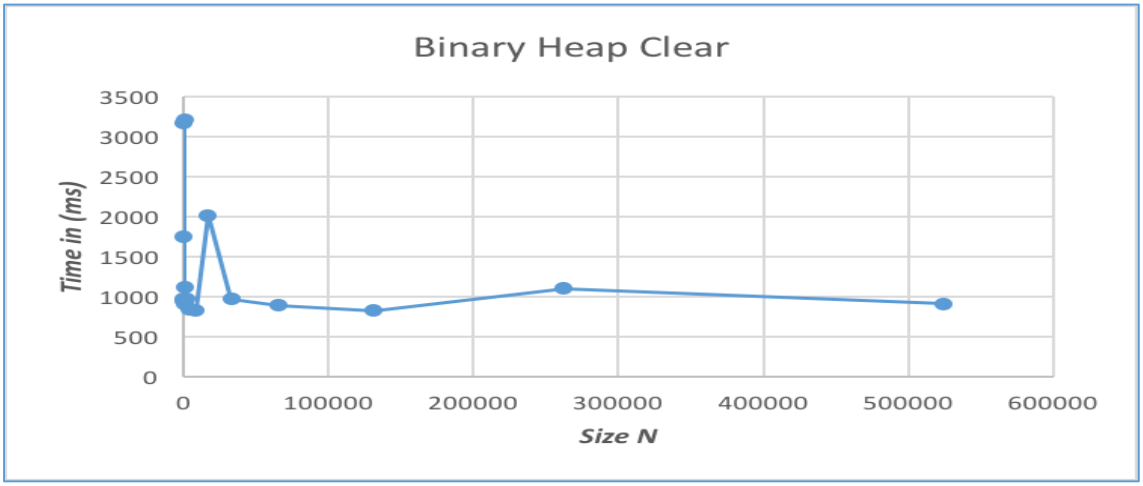
For the add, clear and find min operations based upon the timing experiments these performed as expected as O(c). The deleteMin operation also performed as expected with an expected runtime of O(log(N)) based on the timing experiments these runtimes took slightly more time than compared to our other operations.






Binary Heap Find Min
Time in (ms)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
100000
200000
300000
400000
500000
600000
Size N


Delete Min
Time in (ms)
16000
14000
12000
10000
8000
6000
4000
2000
0
0
100000
200000
300000
400000
500000
600000
Size N


Binary Heap Clear
Time in (ms)
3500
3000
2500
2000
1500
1000
500
0
0
100000
200000
300000
400000
500000
600000
Size N

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)

One important application of a priority queue would be like the queue we use for T.A. hours. It prioritizes students by the time they have entered the queue and represents them with the appropriate priority.

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

I spent 15 hours on this assignment.