Aaron Bellis

Assignment 3 Analysis

1. Who is your programming partner? Which of you submitted the source code of your program?

Matthew Canova is my programming partner and I am submitting the source code.

2. How often did you and your programming partner switch roles? Would you have preferred to switch less/more often? Why or why not?

We switched off mainly based on the problem we were working on. I would say it was infrequent and it worked out well for us.

3. Evaluate your programming partner. Do you plan to work with this person again?

Matt is awesome, I definitely plan on working with him again.

4. If you had backed the sorted set with a Java List instead of a basic array, summarize the main points in which your implementation would have differed. Do you expect that using a Java List would have more or less efficient and why? (Consider efficiency both in running time and in program development time.)

The biggest implementation to our change would have been using the built in methods for a Java List, such as the lookup or add methods. I would imagine that it would be just as efficient in running time, but would have been a lot quicker in implementing.

5. What do you expect the Big-O behavior of MySortedSet's contains method to be and why?

I would expect the Big-O behavior of MySortedSet's contain method to be logN, because at its core is a binary search algorithm which is logN.

6. Plot the running time of MySortedSet's contains method for sets of sizes 100000 to 2000000 by steps of 100000. Use the timing techniques demonstrated in Lab 1. Be sure to choose a large enough value of timesToLoop to get a reasonable average of running times. Include your plot in your analysis document. Does the growth rate of these running times match the Big-oh behavior you predicted in question 5?

The Behavior does match what I predicted in question 5.
See page 2 for plot and graph.

7. Consider your add method. For an element not already contained in the set, how long does it take to locate the correct position at which to insert the element? Create a plot of running times. Pay close attention to the problem size for which you are collecting running times. Beware that if you simply add N items, the size of the sorted set is always changing. A good strategy is to fill a sorted set with N items and time how long it takes to add one additional item. To do this repeatedly (i.e., timesToLoop), remove the item and add it again, being careful not to include the time required to call remove() in your total. In the worst-case, how much time does it take to locate the position to add an element (give your answer using Big-oh)?

It was an order N operation to add an element in the worst case.

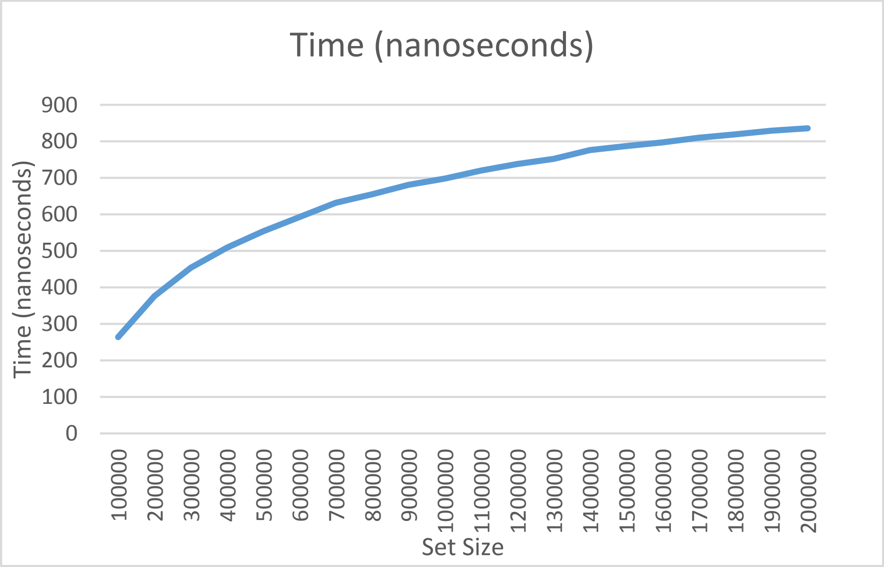
8. How many hours did you spend on this assignment?

My partner and I took about 10 hours on this assignment.

MySortedSet Contains Method Plot and Chart

100,000,000 Calls to contains() per set

Set Size	Time (nano)
100000	264
200000	376
300000	454
400000	509
500000	554
600000	593
700000	632
800000	655
900000	681
1000000	698
1100000	720
1200000	738
1300000	752
1400000	776
1500000	787
1600000	797
1700000	810
1800000	819
1900000	829


Time (nanoseconds)
Time (nanoseconds)
Set Size