Project 4 Report

Discussion Log information:

Progress:

* Began coding recursive methods 11/1 (1 hr)
* Began coding iterative methods 11/8 (2 hr)
* Began coding remove method 11/11 (3 hr)
* Troubleshooting and editing remove method 11/13-14 (6 hr)
* Total time: ~ 12 hours
* Expected time at start of the project: 12 hours

Collaborations/references:

* Discussed the logic of the code with Sebastian, Robin, Michale, and Kurt
* Watched a video about how deletion from a binary tree works

**Challenges / What I learned:**

This was my first time doing anything with the code for a binary search tree. I had a lot of trouble getting the remove() method to work, but after many hours I finally got it. I learned a lot from this project, especially how binary search trees are coded, and how in-depth the code is.

The output was very surprising because I was expecting the code a lot more searches to find nodes than the output reflected. Looking back on it, however, our estimated run time of O(logn) was not too far off, as log(147311) is about 17. The program made more comparisons than we would expect on average, as our average number of comparisons for both successful and unsuccessful searches exceeded 23. I also got some very strange outputs when my remove method was not working correctly – sometimes it would remove only 40,000 elements, sometimes 106,000, sometimes 3. I also found it incredible the amount of work the program did in the 1 second it took to run.

My main challenge was accounting for all possibilities since there were so many. I always seemed to be missing just one. Other than that, however, the logic made a lot of sense to me and I didn’t have much trouble mapping the pointers.

I am absolutely convinced that a binary search tree is a good data structure for the add, delete, and search operations. While deletion is hairy, It still does not take long. For a set of 147,311 elements, the program always took about a second to run. I don’t have much frame of reference, but that seems impressive to me.