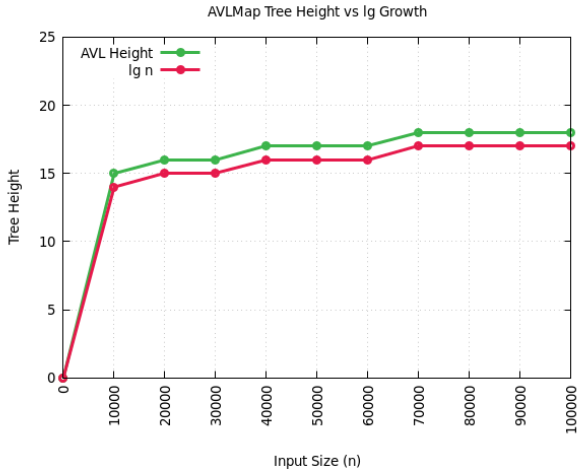
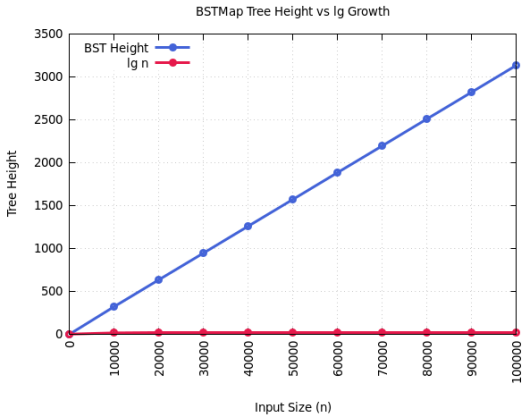
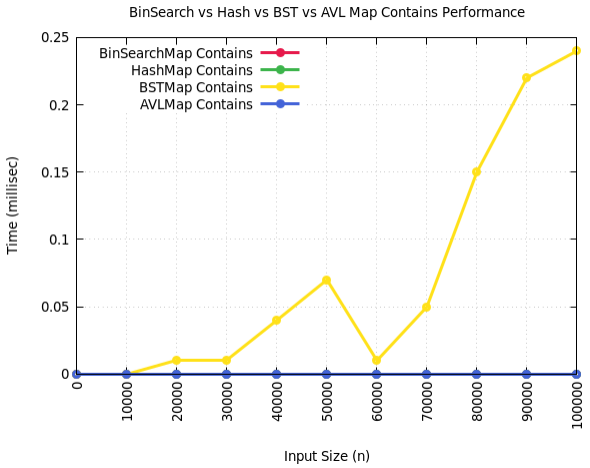
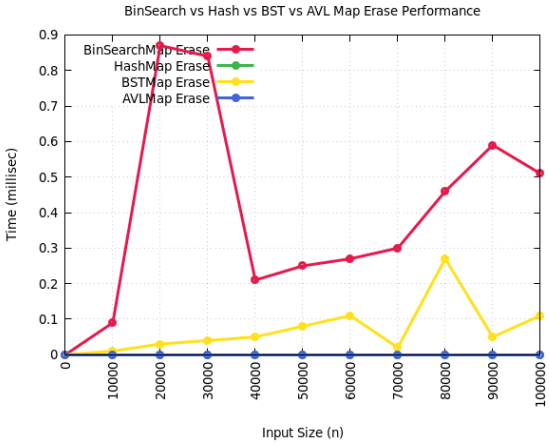
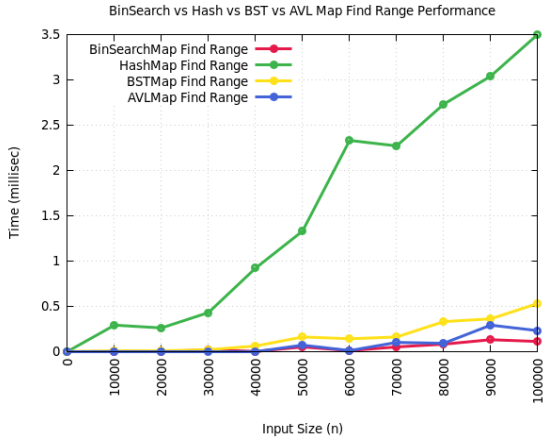
Samuel Sovi
CPSC 223
HW-9

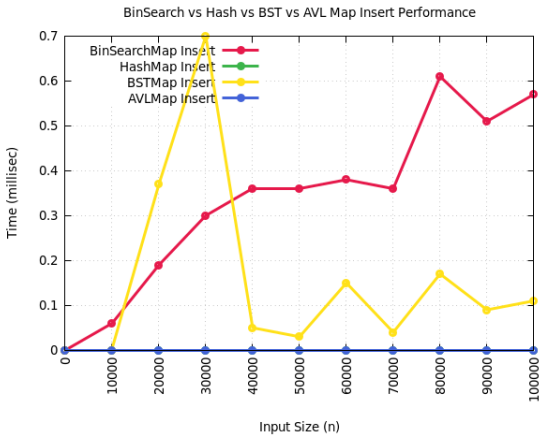


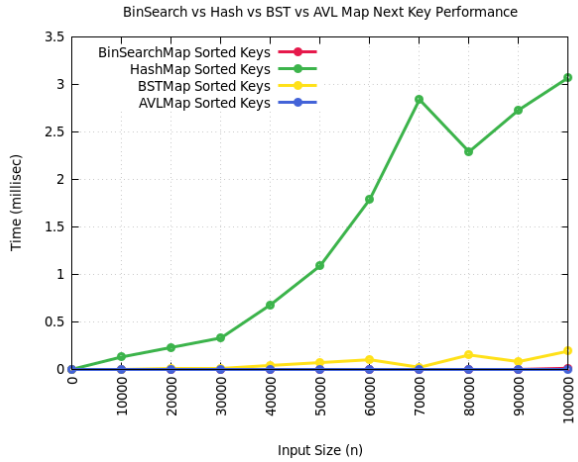


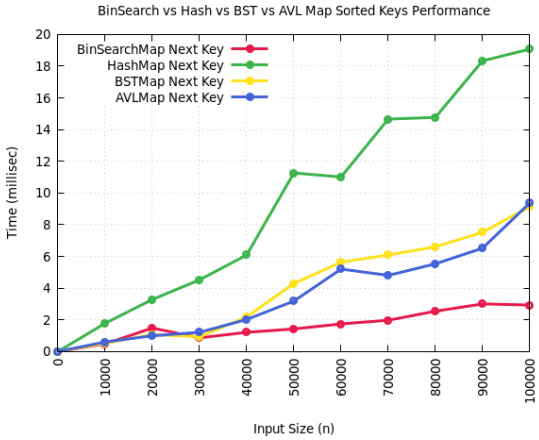












Shown above are my graphs comparing my AVLMap, BSTMap, HashMap and BinsearchMap. These are some of the fastest data structures I have used so far and the graphs show this. My first two graphs show a comparison between my AVLMap with log(n) growth and my BSTMap with log(n) growth. Since my BSTMap is not balanced, it is easily seen that BSTMap grows at a much faster pace than my AVLMap which should have a max of log(n) time. In the third graph, we can see that all my data structures have insanely fast speed with HashMap having the slowest due to it having a capped height up to n. Erase is much faster in my AVLMap and HashMap because my HashMap is O(1) while my AVLMap is balanced, which is faster than both other binary search data structures. My hashmap struggles in the find range performance test due to it needing to check every element since all elements are hashed. BinSearchMap and BSTMap also have long insert times due to their height only being capped by the number of elements inserted whereas hashmap is O(1) and AVLMap is balanced and faster than the other two binary search data structures. HashMap takes a while to find the next key because it is not guaranteed that the next key will be in the same bucket as the previous one. HashMap also takes a while to return sorted keys due to it needing to sort the keys since the keys are not already sorted, but rather hashed.

During this project I struggled with quite a few things. I forgot to break so many node chains where they were needed and rebalanced in very incorrect ways. I also realized part way through that I misunderstood the separate cases for rebalancing and which ones called for which. I now have a better understanding of these structures which will hopefully help me on tomorrow's quiz and in the future. As always, I am quite grateful for this class and everything I have learned from it. Upon further reflection, I probably should have saved that ending statement for my next homework since it is the last one.