Programming Assignment 5

Q1. Discuss the advantages and disadvantages of using BST vs. using a linked list. Present

your argument with respect to running time in big O notation, memory efficiency, etc.

Advantages of using BST are fast access, search, with Big O(log(n)) compared to Linked lists which have a Big O(n) for access and searching. BSTs also allow us to traverse the tree in any order to get a sorted list of area codes if needed.

Some of the disadvantages of using BST is slower insertion and deletion which have a running time of Big O(log n)) while Linked Lists have a running time of Big O(1) which is always wanted.

Q2. Discuss your strategy in dealing with duplicates. As was mentioned above, it must be one

of the two ideas outlined. Explain your reasoning, and specify the running time, memory cost and

any other relevant factor in your decision.

I used the first strategy of using tally array to deal with duplicates. This method is costly for the memory cost because of how big the tally array size is and running time of Big O(n) which is a little slow, but what makes up for it is how easy and straightforward it is and only needs to be done once at the beginning of the program.

Q3. In an unlikely event of the need for rehashing such a Hash Table of BST’s, give your

thoughts on this process in this specific scenario.

If rehashing is needed, we would need to expand the array size and go through the old array in sequence, node by node and inserting each area code again into the new larger array using the insert method. To come up with a new prime array size, we would need to make a set of methods and check if its prime or not.

Q4. How did you come up with the average size of the BST’s in the occupied cells of the Hash Table? Explain your strategy.

To come up with the average size of the BSTs in the occupied cells in the Hash Table, I simply divided the total nodes which is the number of area codes that was given by the user at the beginning of making the Hash Table, then divided by number of occupied cells or in this case the number of BSTs with non-null roots.