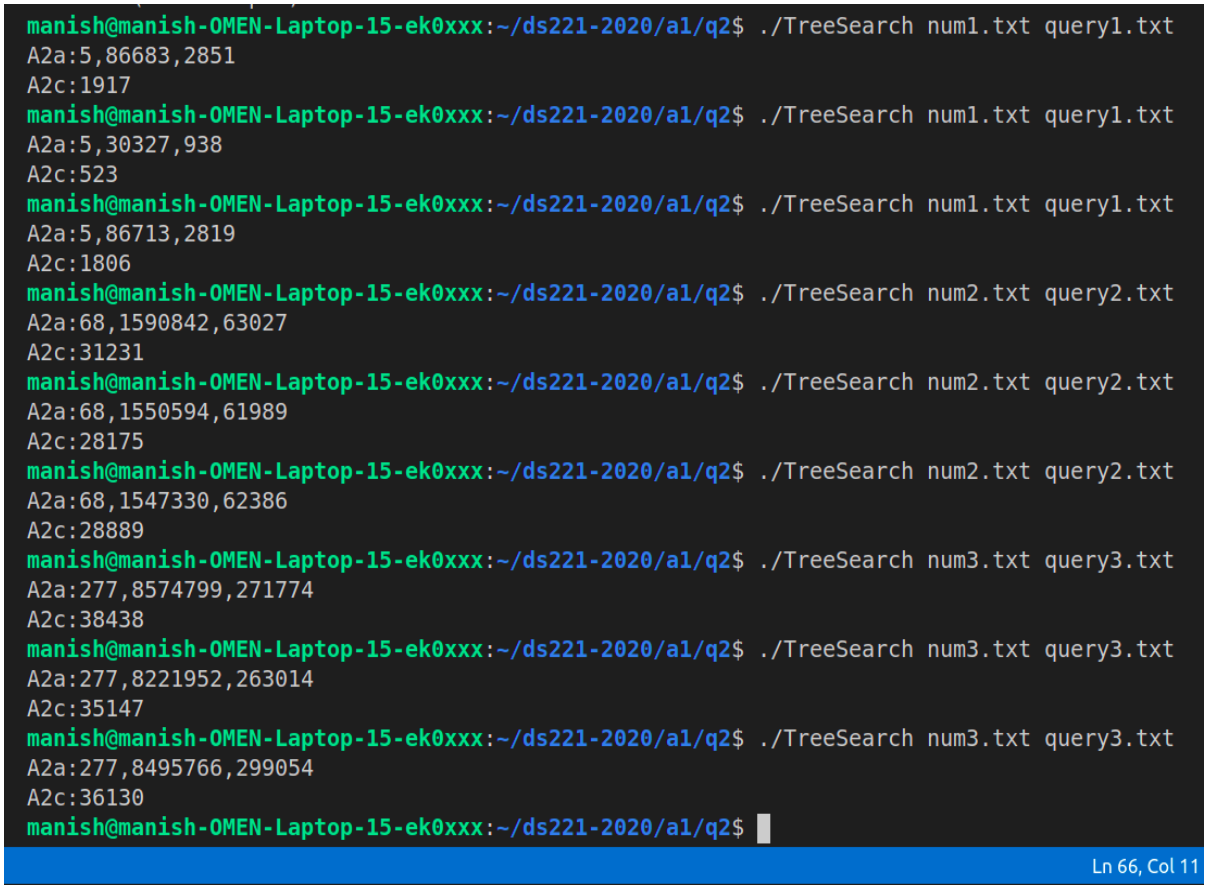
Name : MANISH JAYSWAL

S.R. No. : 18844

Subject : Assignment#1 - DS 221

#Analysis of results



Figure(i)

Q2(a):

Space Complexity for in order traversal : O(logn) ; n being number of entries in the tree

Space complexity for level order traversal : O(1)

Expected Time Complexities for In Order and Level Order should be the same. The time taken to perform these operations increased as inputs to query increased.

For increase in search elements from 5 to 99 (i.e. increasing numbers by 20 times) time has increased from approximately

50,000 to 1,000,000 (that is ~ 20 times). For 99 to 366(~3.5 times), the time has increased like (~10 times).

So it has to be O(n) time complexity to have this effect which is true. Because, both implementations go through the elements until it finds query number. In the worst case, (that is negative result = number not found) it goes through all elements of the tree.

Therefore, O(n) time complexity.

The in order traversals uses stack and level order uses queue in its implementation to have same order.

Q2(c):

We can see from figure(i), in all the test cases, the time taken by binary search is always less than the time taken by searching using in-order traversal and level order traversal. Because the time complexity of binary search is of O(logn).