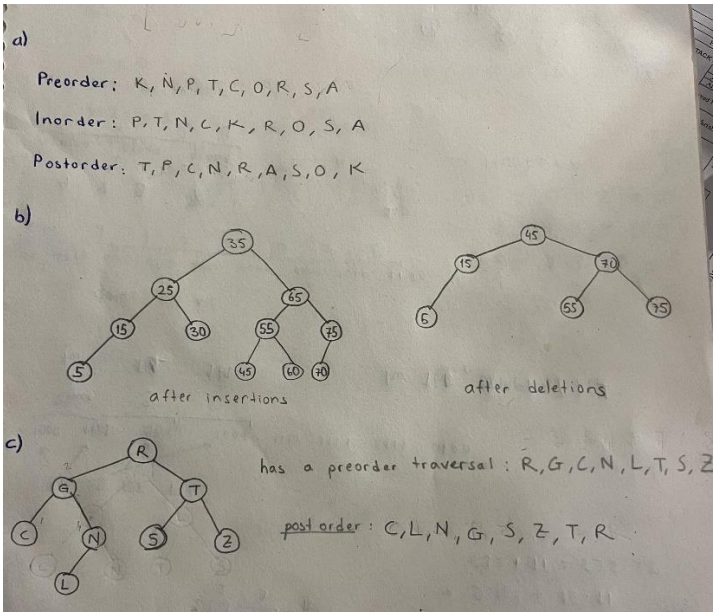
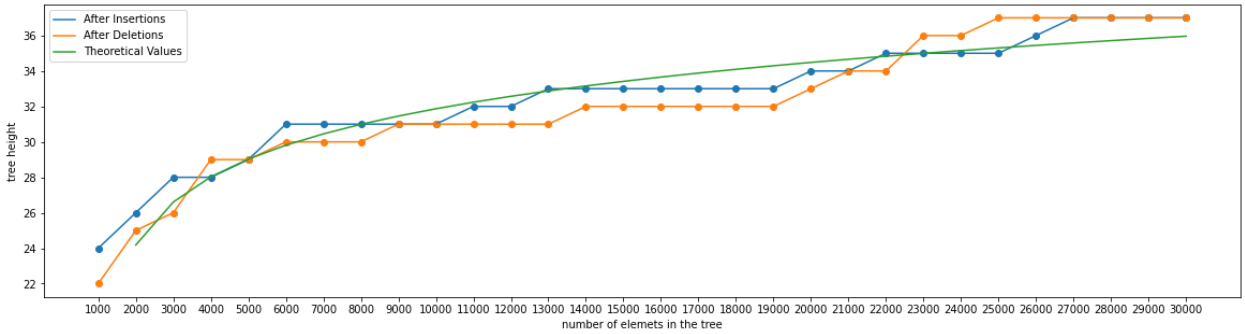
İdil Atmaca 22002491 CS202 HW2

Question 1



Question 3



As seen in the above graph, theoretical values are near to findings. Deleting and inserting items in a random order created a BST with height near $\log_2(n+1)$. If the theoretical average height is multiplied by a small constant (in the above graph k = 3.5), we see the shape of the graph is very similar to our experimental value graphs. Since we use randomly generated arrays, there is no certainty that it does not contain any sorted sub parts or repeating elements. This can contribute to the small deviations on the graph.

If already sorted keys were inserted to BST, maximum height would be expected. In a n node binary tree, max height is n. If we insert items in an already sorted order, all the new items would be the right child of the previous item which would produce a height h = n. Since, random key orders were used; it produced near minimum height which is $\log_2(n+1)$.