CS 202 - HW 3 - Ahmet Faruk Ulutaş - 21803717 - Section 1

Discussion of the Results

In case of adding sorted values for Ascending and Descending states, a new note is always added to the rightmost and leftmost child, respectively. In this case, approximately O(n) rotations are made when the height is higher than 2. The results I got from the test cases also agree with this theoretical knowledge. For example, when n = 1000, ascending 990 is descending 987. That is, the values are approximately O(n).

For the random case, the values are not always rotated when the height is greater than 2. It is more likely to fill other nodes. In this case, our value will be greater than O(n/2) and less than O(n). Since this will be the average situation, it would be more correct to say (n/2 + n)/2. In this case, it is O(3n/4). Theoretical values are directly proportional to this. For example, n = 2000, the random value is 1369. That is, the values are approximately O(3n/4).

The insertion process in different ways affected the number of rotations. Because the situation of being random is more average and close to reality. Sorted inserted values always create a worst-case. This increases the number of rotations.

In addition, as the number of n increases, the increase in the number of rotations in random, ascending and descending insertions is linear.

Result:

Array Size	Random	Ascending	Descending
1000	729	990	987
2000	1369	1989	1969
3000	2051	2988	2924
4000	2755	3988	3918
5000	3441	4987	4862
6000	4124	5987	5802
7000	4882	6987	6763
8000	5517	7987	7675
9000	6275	8986	8606
10000	6881	9986	9495