AVL Tree

Insertion: 15, 10, 20, 8, 12, 17, 25

|  |  |
| --- | --- |
| Initiate: 15, insert 10  Smaller than 15, no search result, insert left |  |
| Balance? Yes | BF: 15=-1, 10=0 |
| Insert 20  Bigger than 15, no search result,  Insert right |  |
| Balance? Yes | BF: 15=0, 10=0, 20=0 |
| Insert 8 |  |
| Balance? Yes | BF: 15=-1, 10=-1, 8=0, 20=0 |
| Insert 12 |  |
| Balance? Yes | BF: 15=-1, 10=0, 8=0, 12=0, 20=0 |
| Insert 17 |  |
| Balance? Yes | BF: 15=0, 10=0, 8=0, 12=0, 20=-1, 17=0 |
| Insert 25 |  |
| Balance? Yes | BF: 15=0, 10=0, 8=0, 12=0, 20=0, 17=0, 25=0 |

Deletion

|  |  |
| --- | --- |
| Initiate |  |
| Delete leaf node  Delete 25 as it has no child |  |
| Balance? Yes | BF: 15=0, 10=0, 8=0, 12=0, 20=-1, 17=0 |
| Delete node with 1 child  Delete 20 with 17 as child  15 adopt 17 |  |
| Balance? Yes | BF: 15=-1, 10=0, 8=0, 12=0, 17=0 |
| Delete node with 2 children  Delete 15 with 2 children  17 inherit 15 |  |
| Balance? No | BF: 17=-2, 10=0, 8=0, 12=0 |
| So we use right rotation so that the balance factor is now within -1 to 1 |  |

The height is not closely balance as both left and right side starting from the root are closely balance.