Data Structures.

Assignment #3.

Ahmad Saqib (18k-0279) SEC: 2B.

Q2).

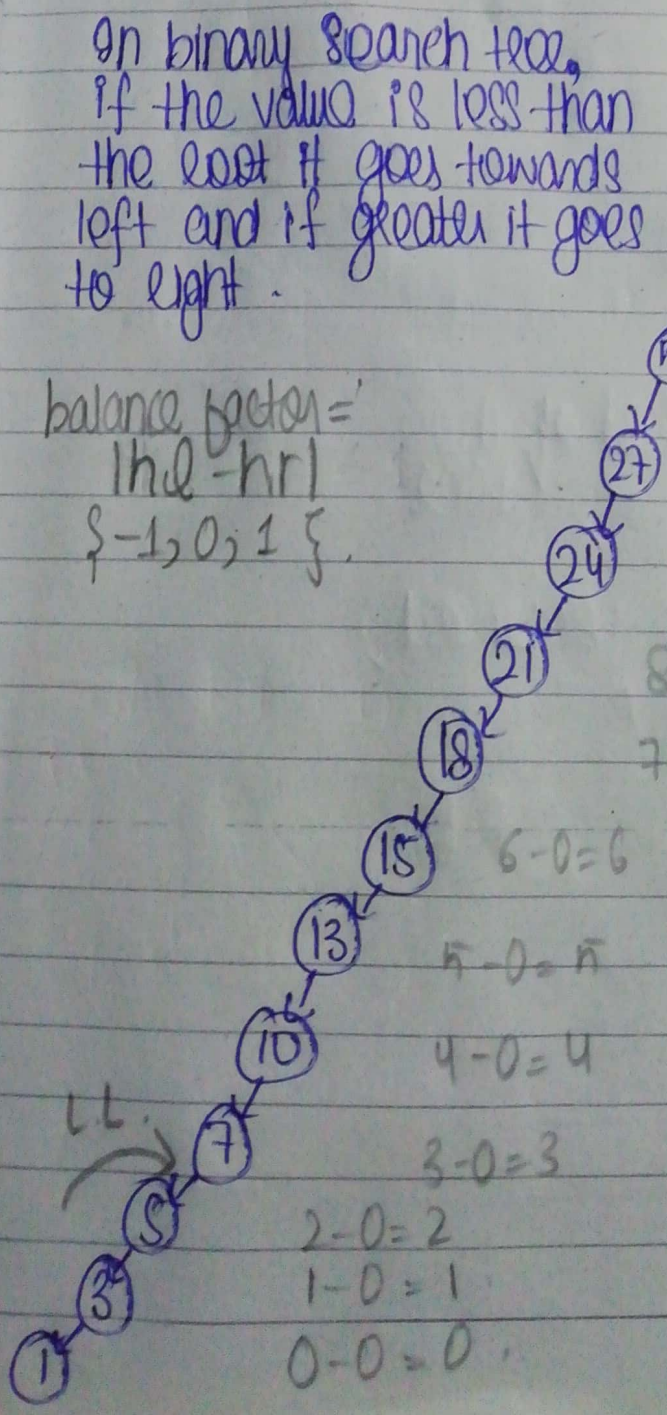
78, 61, 57, 55, 27, 24, 21, 18, 15, 13, 10, 7, 5, 3, 1.

Binary Search Tree.

In binary search tree, if the value is less than the root it goes towards left and if greater it goes to right.

balance factor = |h_l - h_r|

{-1, 0, 1}.



14-0=14 → root node

13-0=13

12-0=12

11-0=11

10-0=10

9-0=9

8-0=8

7-0=7

6-0=6

5-0=5

4-0=4

3-0=3

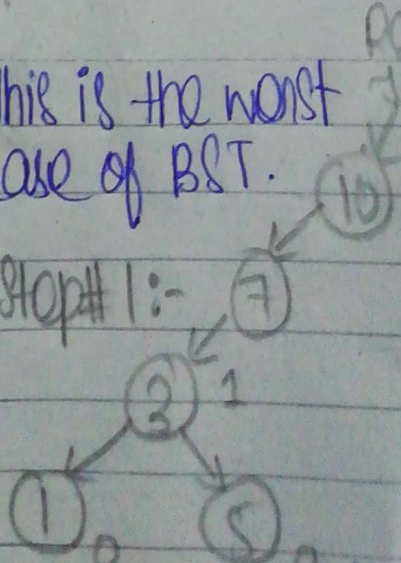
2-0=2

1-0=1

0-0=0.

* This is the worst case of BST.

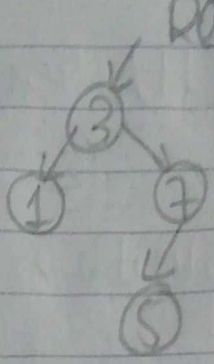
Post Tree



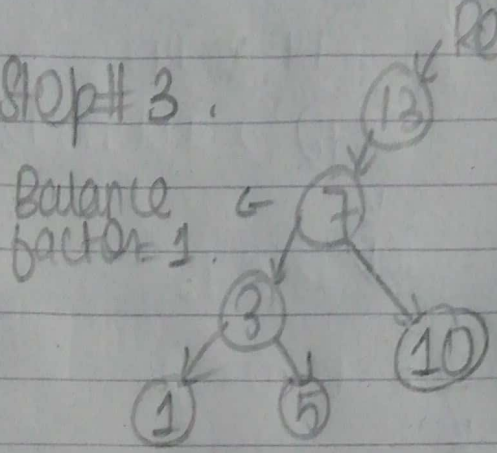
Step#1:-

Step#2.

L.L Rotation.

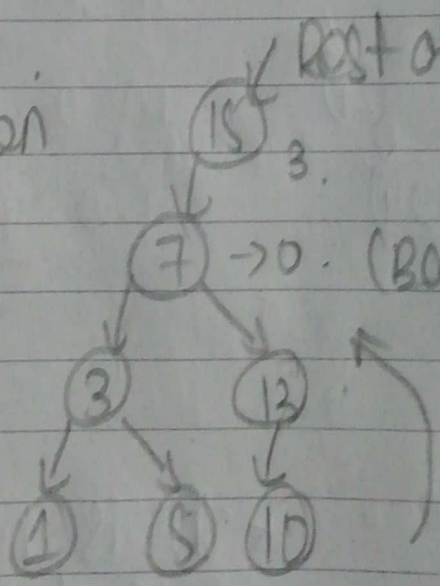


Step#3.



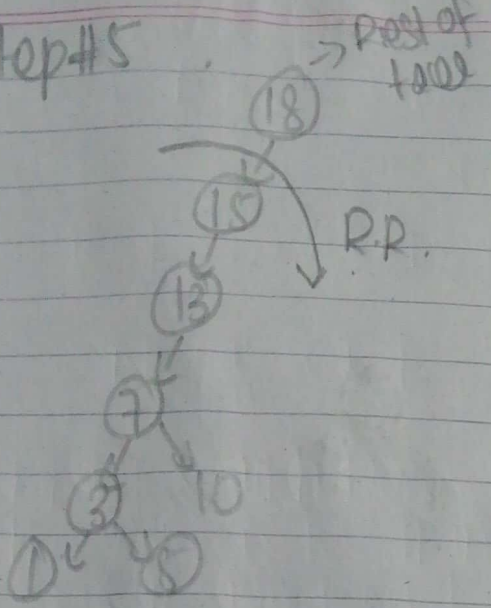
Step#4.

LL Rotation

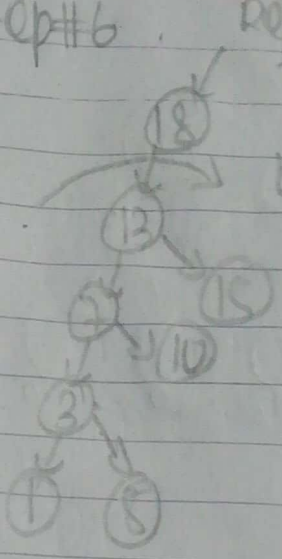


Step#5

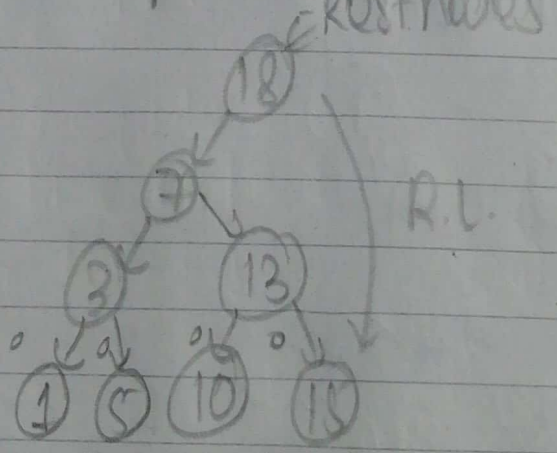
Step#5



Step#6.

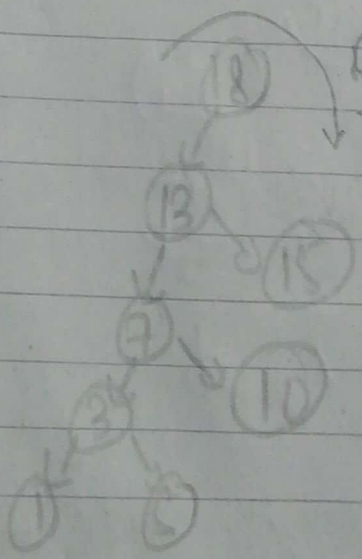


Step#7.

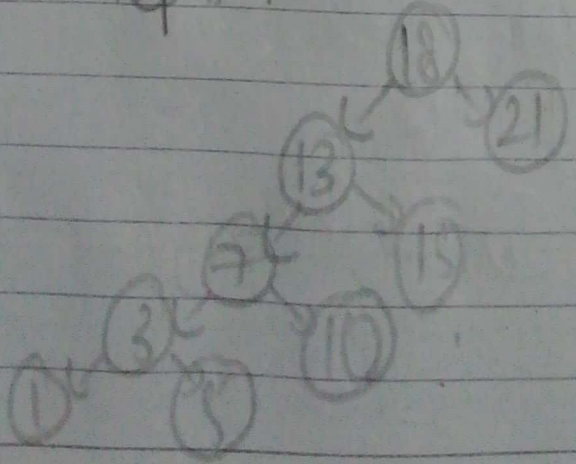


Balanced

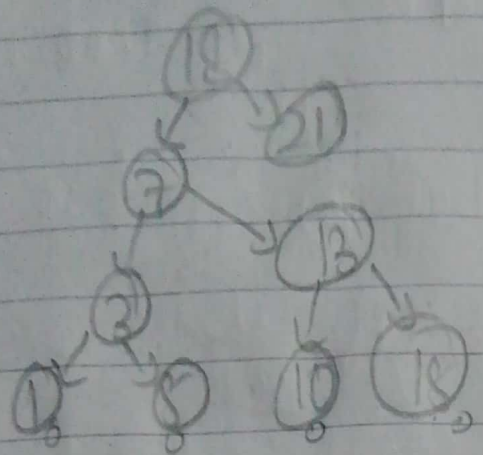
Step#8.



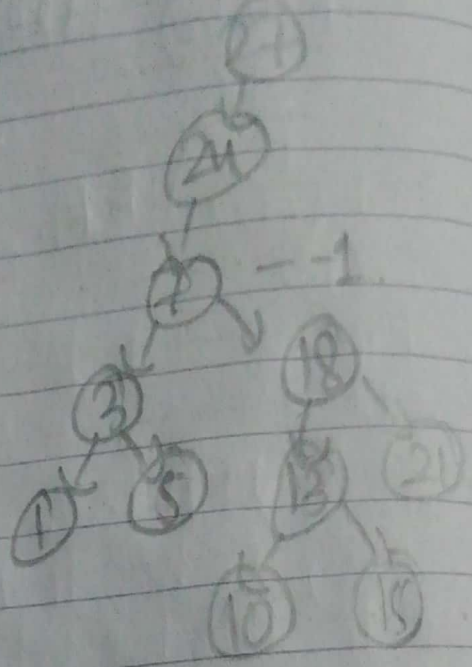
Step#9.



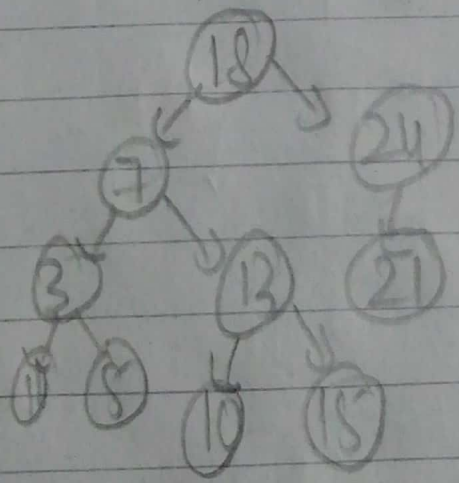
Step#10



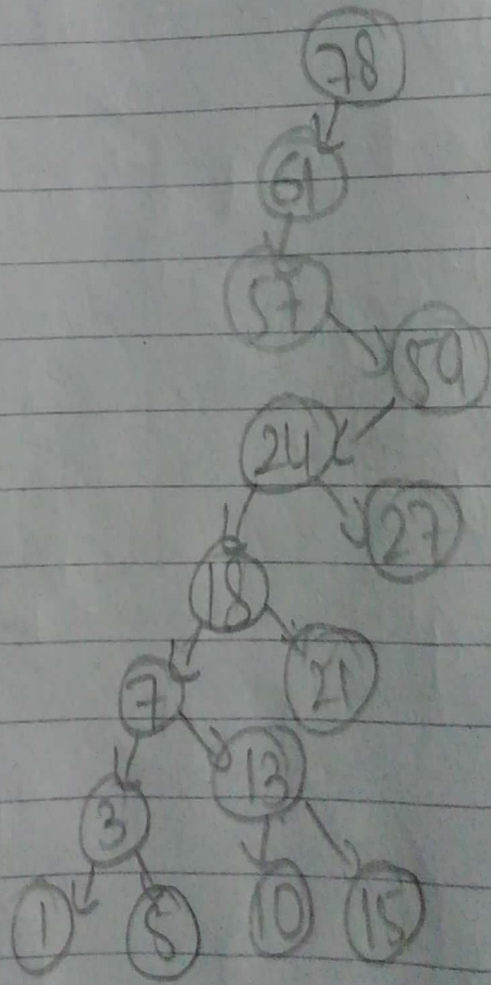
Step#11



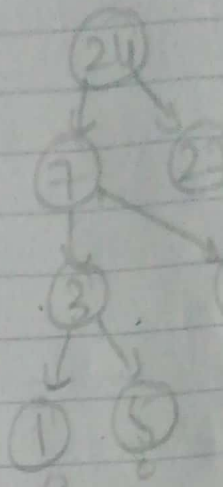
Step#12



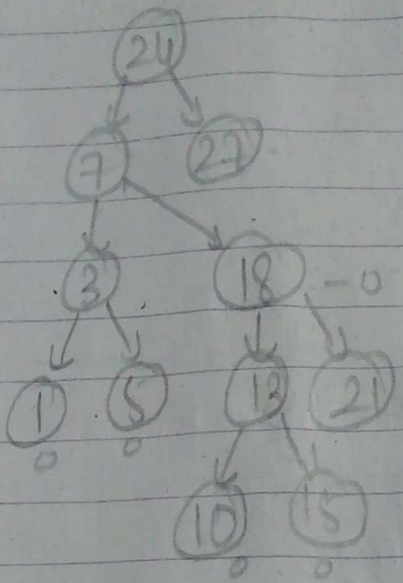
Step#13



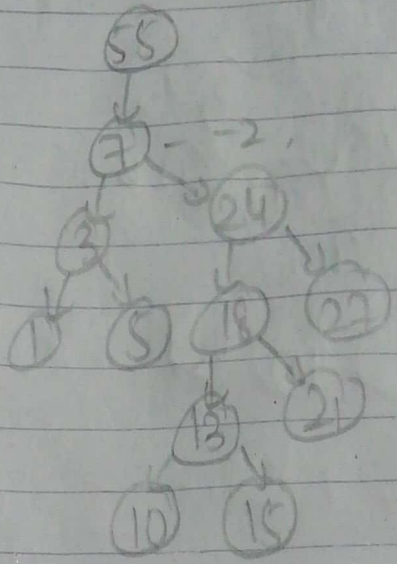
Step#14



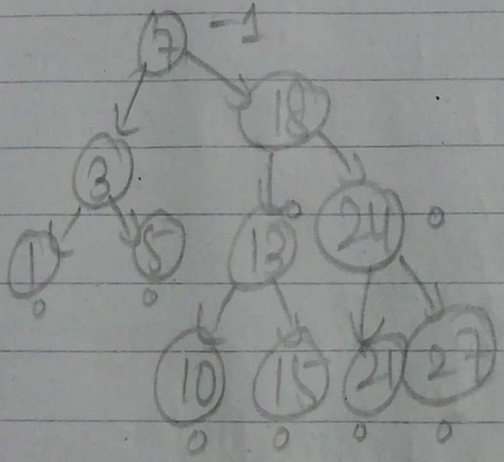
Step#14.



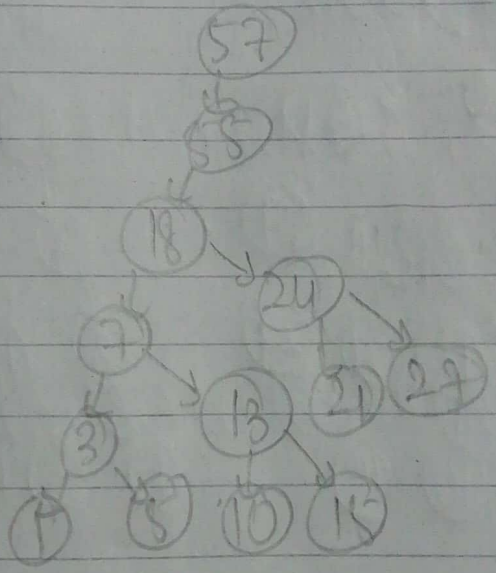
Step#15:-



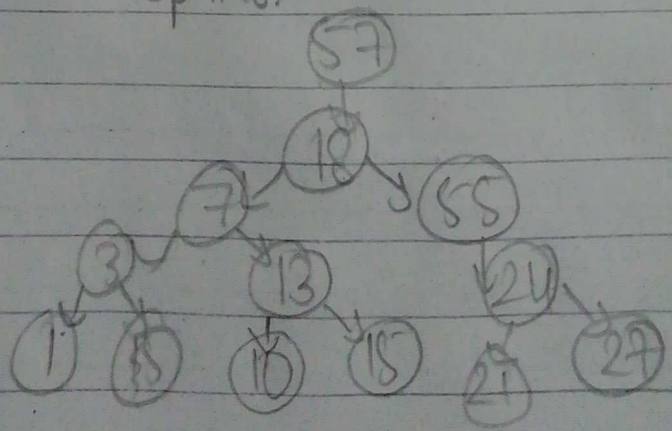
Step#16:-



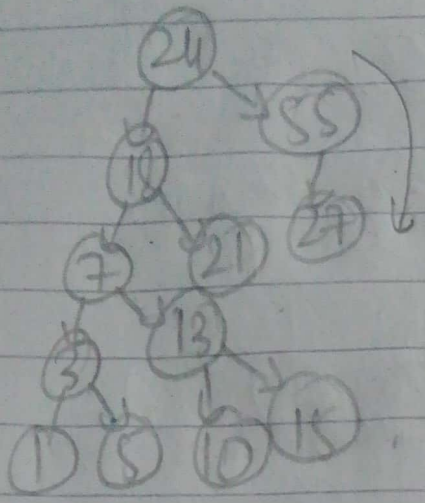
Step#17:-



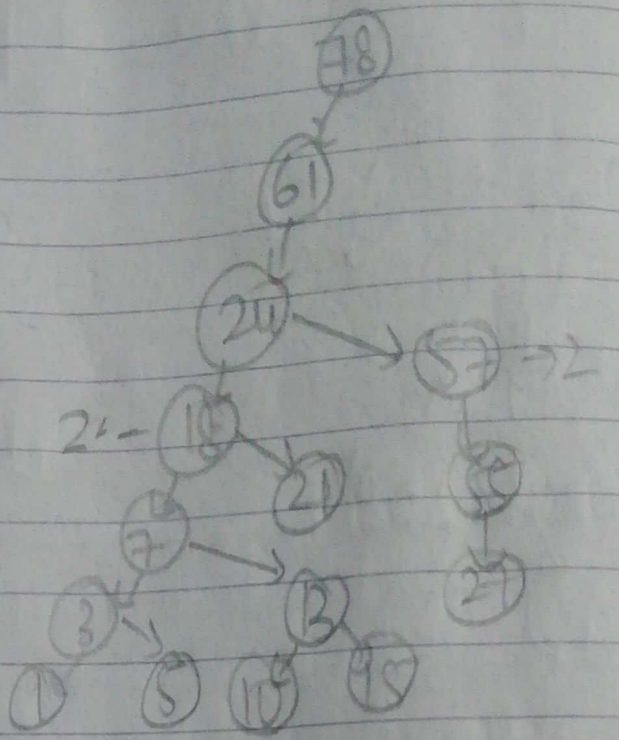
Step#18:-



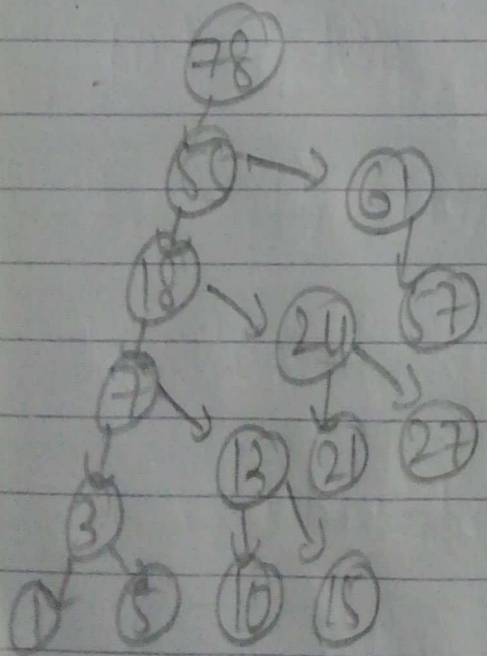
Step#18



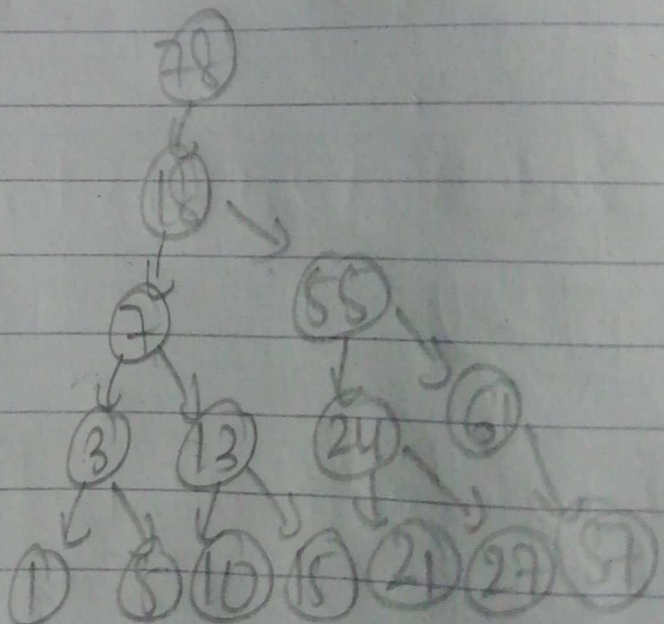
Step# 19



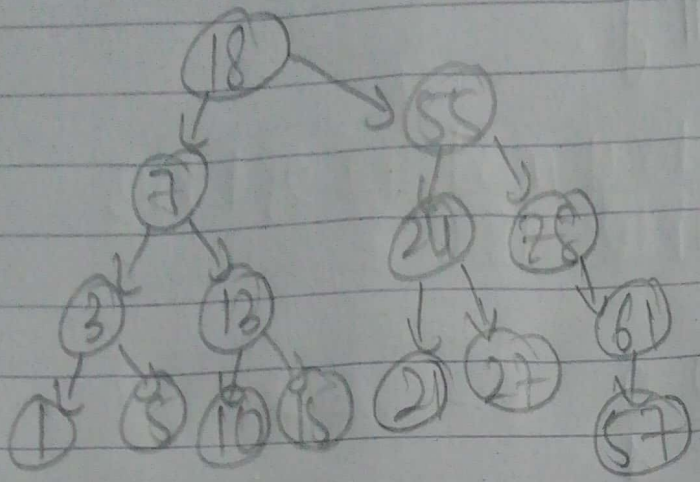
Step#20.



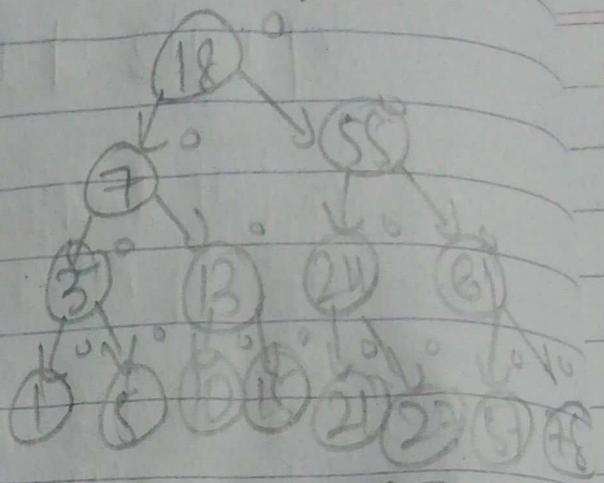
Step#21



Step#22.



Step#23



Balanced BST.

Pre-order :-

18, 7, 3, 1, 5, 13, 10, 15, 55, 24, 21, 27, 61, 57, 78.

Post-Order:

1, 5, 3, 10, 15, 13, 7, 21, 27, 24, 57, 78, 61, 55, 18

In order:-

1, 3, 5, 7, 10, 13, 15, 18, 21, 24, 27, 55, 57, 61, 78.

* Application of AVL trees:-

- AVL trees are used for security concerns and to parallel code.
- AVL trees are used to create new type of data structure.
- AVL trees are used in compiler Design.
- It is used for indexing large records in database to improve searches and are used in memory management systems.