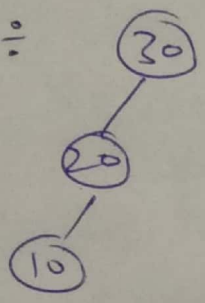
Assignment (Binary tree & binary search tree

Insert (using recursion)

1.) LL Rotation

Let insert 30, 20, 10

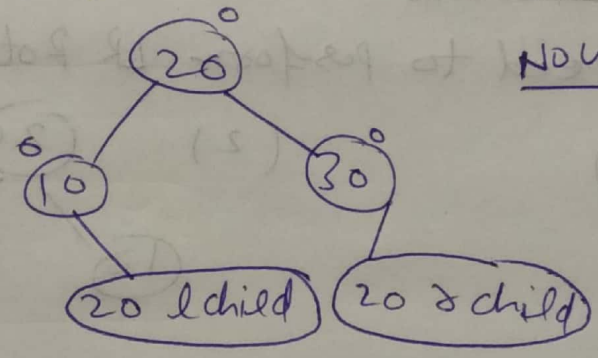
Ex :-



Bf (30) = 2
& Bf (20) = 1

∴ LL Imbalance

To solve this we need to perform ll rotation.



Now balanced

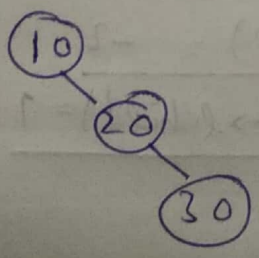
as we know

$$BF = \{-1, 0, 1\}$$

2.) RR Rotation

Lets insert 10, 20, 30

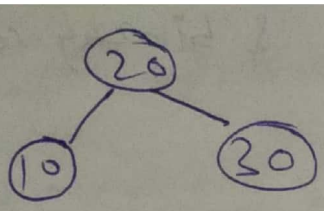
Ex :-



Bf (10) = -2
Bf (20) = -1

∴ RR Imbalance

To solve this we need to Perform RR rotation.

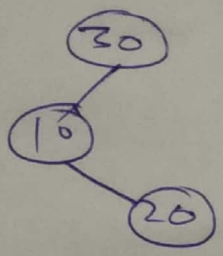


now Bf of each node is '0'.

10 → rchild = 20 → lchild
30 → lchild = 20 → rchild

3.) LR Rotation

Lets insert 30, 10, 20.



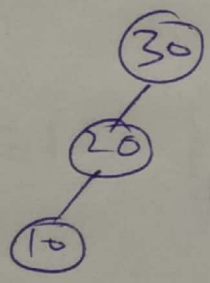
Bf (30) = 2

Bf (10) = -1

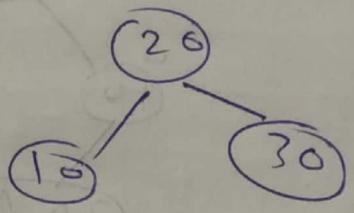
∴ LR Imbalance

So we need to perform LR Rotation.

(1)



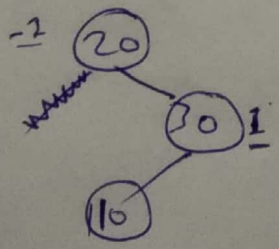
(2)



10 → rchild = 20 → lchild
30 → lchild = 20 → rchild

4.) RL Rotation

Lets insert 20, 30, 10.

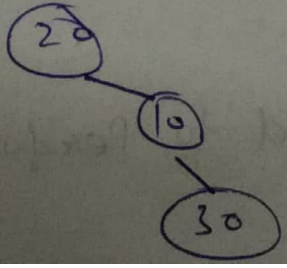


Bf (P) = -2

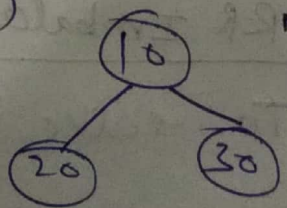
Bf (P → lchild) = 1

Now

(a)



(b)



Now balanced

20 → rchild = 10 → lchild

30 → lchild = 10 → rchild

Data Structure used

```
Struct node
{
    struct node *lchild;
    int data;
    int height;
    struct node *rchild;
}* root;
```