14-10-2020
Batch 3

ADS LAB

AVL Trees

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Insertion:

```
struct node * insert (struct node *n, int data)
  {
    if (r==NULL)
    {
     struct node *n;
     n=new struct node;
      n->data = data;
       r=n;
      r-> left = r-> right = NULL;
       r-> height = 1;
       return r;
    }
  else
   {
    if (data < r->data)
          r -> left = insert (r-> left, data);
      else
          r-> right = insert(r -> right, data);
    }
```


clrf.

```
r->height = calheight(r);
if (bf(r)==2 && bf(r->left)==1)
    r = rotation(r);
else if (bf(r)==-2 && bf(r->right)==-1)
    r = rrotation(r);
else if (bf(r)==-2 && bf(r->right)==1)
    r = lrotation(r);
else if (bf(r)==2 && bf(r->left)==-1)
    r = lrrotation(r);
return r;
}
```

Deletion

```
Struct node * deleteNode (struct node *P, int data)
{
if (P->left==NULL && P->right==NULL)
{
    if (P== this->root
        this->root = NULL;
    delete P;
    return NULL;
}
```


chf.

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```
struct node *t;
struct node *q;
if (P->data < data)
  P->right = deleteNode (P->right, data);
else if (P->data > data)
    P->left = deleteNode (P->left, data);

else
{
  if (P->left != NULL)
  {
    q = inpre (P->left)
    P->data = q->data);
  }
else
{ q = insert (P->right);
  P->data = q->data;
  P->right = deleteNode ( P->right, q->
  data);
}
if ( bf (P) == 2 && bf (P->left) == 1)
    P = LL rotation (P);
else if (bf (P) == 2 && bf (P->left) == -1)
```


clf.

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```
        P = RRrotation(P);
    else if (bf(P) == 2 && bf(P->left) == 0)
        P = LLrotation(P);
    else if (bf(P) == -2 && bf(P->right) == -1)
        P = RRrotation(P);
    else if (bf(P) == -2 && bf(P->right) == 0)
        P = LLrotation(P);

    return P;
}
```