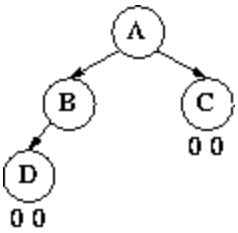
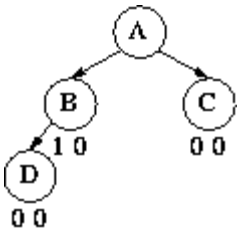
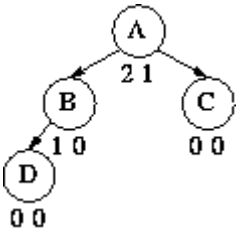
Adelson, Velski & Landis, AVL trees

Is it height-balanced?

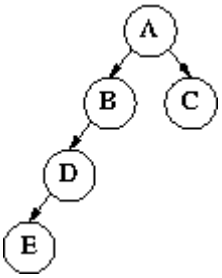
Ex1



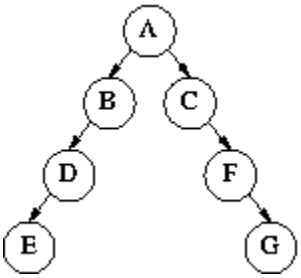




Ex2

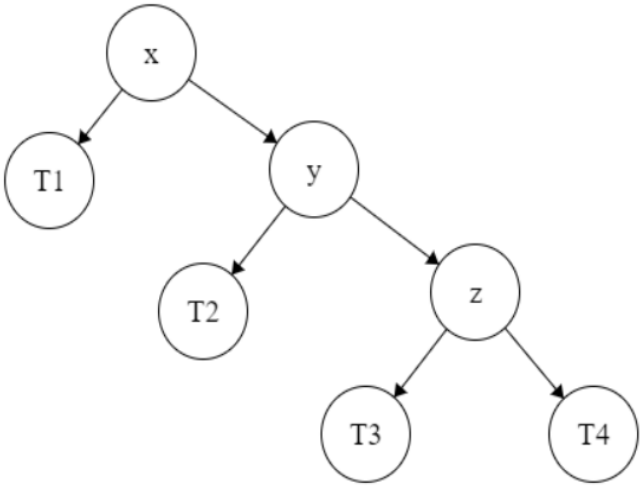


Ex3



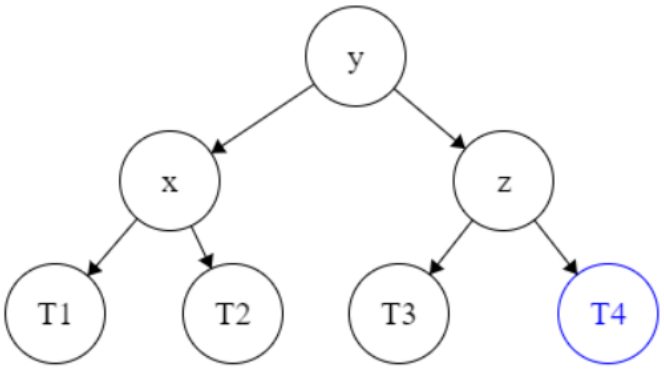
Right Right Case

Unbalanced



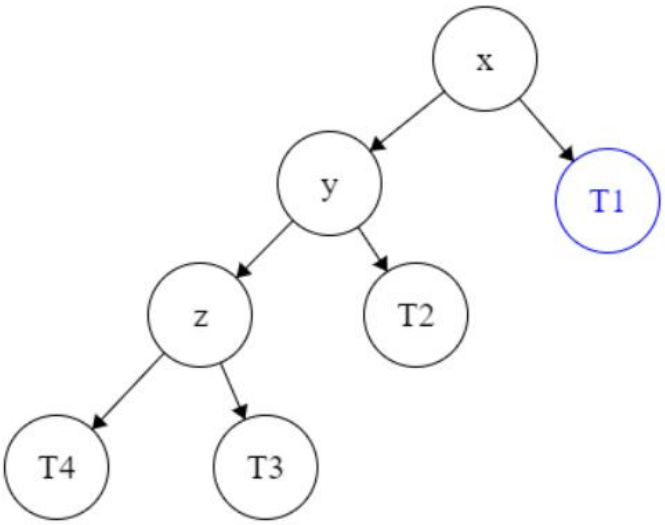

```
Node rotateLeft(Node x)
{
    Node y = x.right;
    Node T2 = y.left;


    y.left = x;
    x.right = T2;

     return y;
}
```

Balanced (left rotate x)



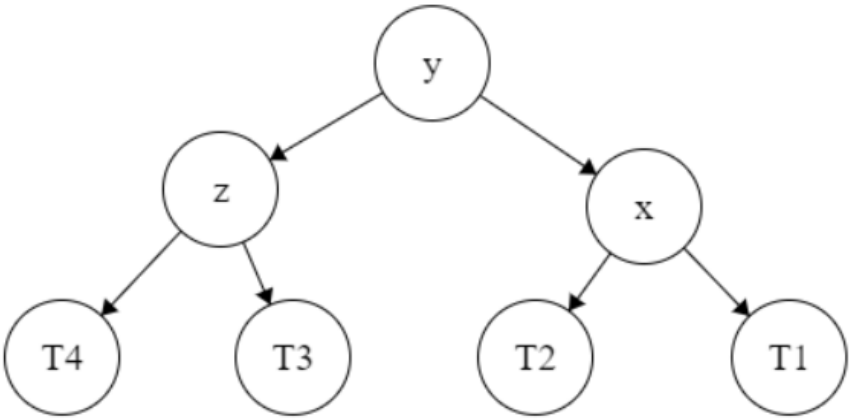
Left Left Case

Unbalanced



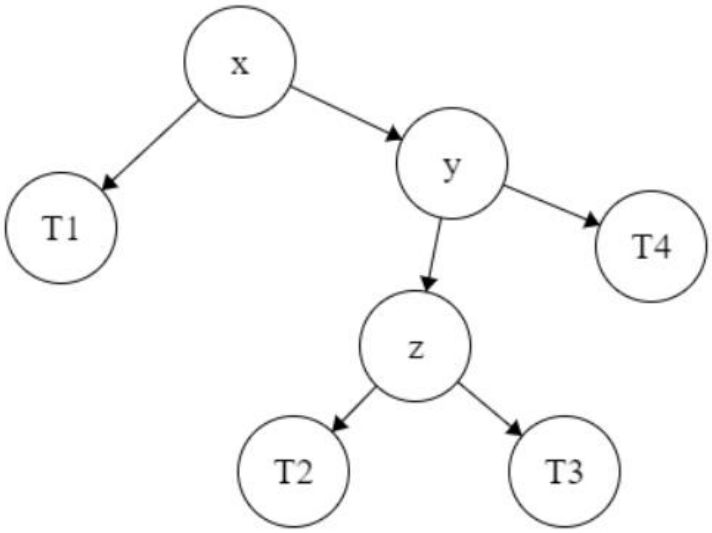

```
rotateRight (Node x) {
      Node y = x.left;
      Node T2 = y.right;

      y.right = x;
      x.left = T2;

      return y;
  }
```

Balanced (right rotate x)



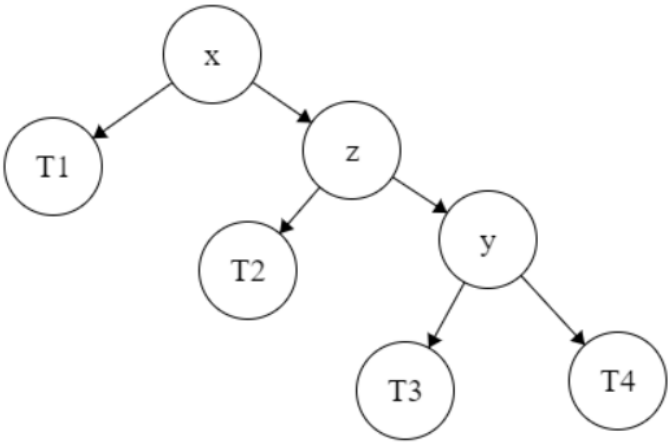
Right Left Case

Unbalanced

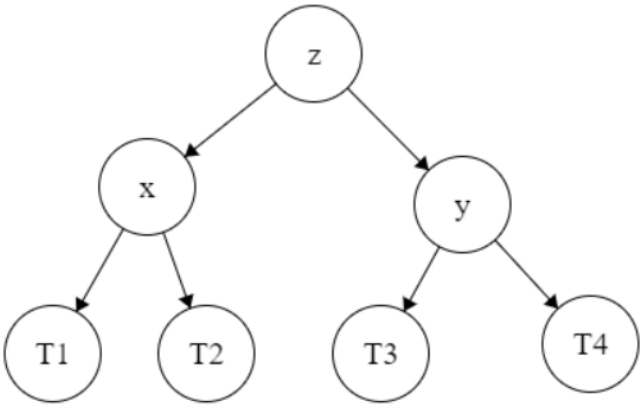


Balanced (right rotate y & left rotate x)

right rotate z

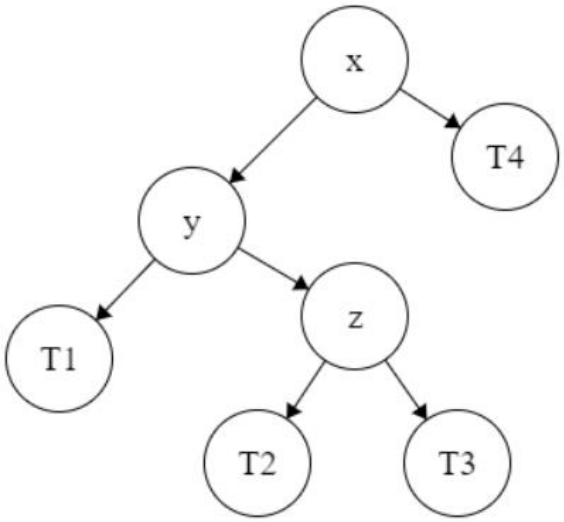


left rotate x



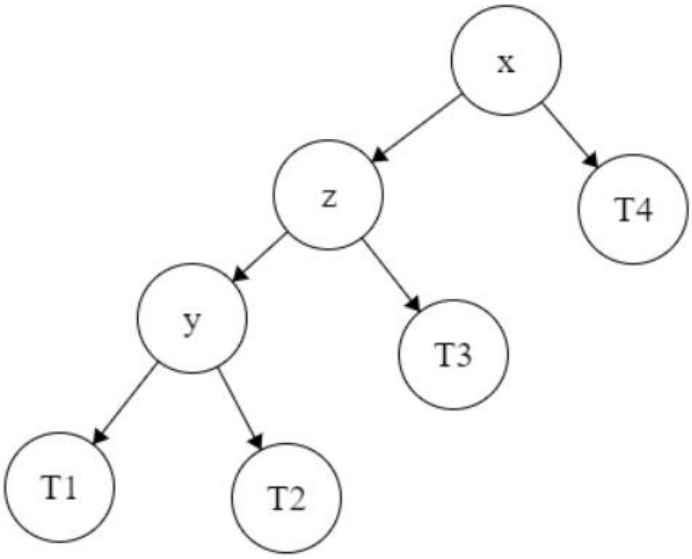
Left Right Case

Unbalanced

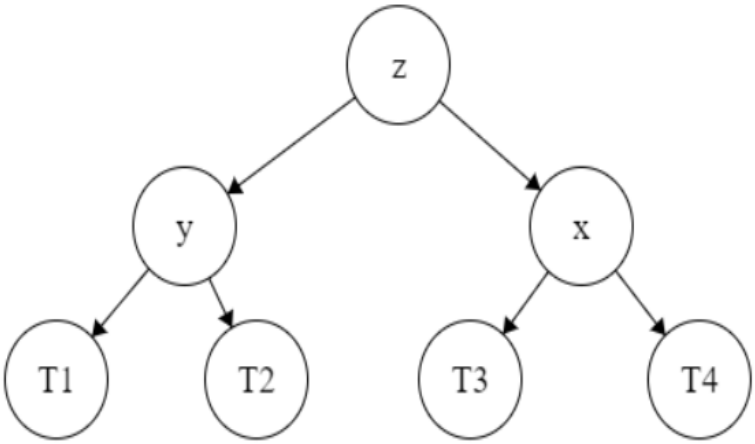


Balanced (left rotate y & right rotate x)

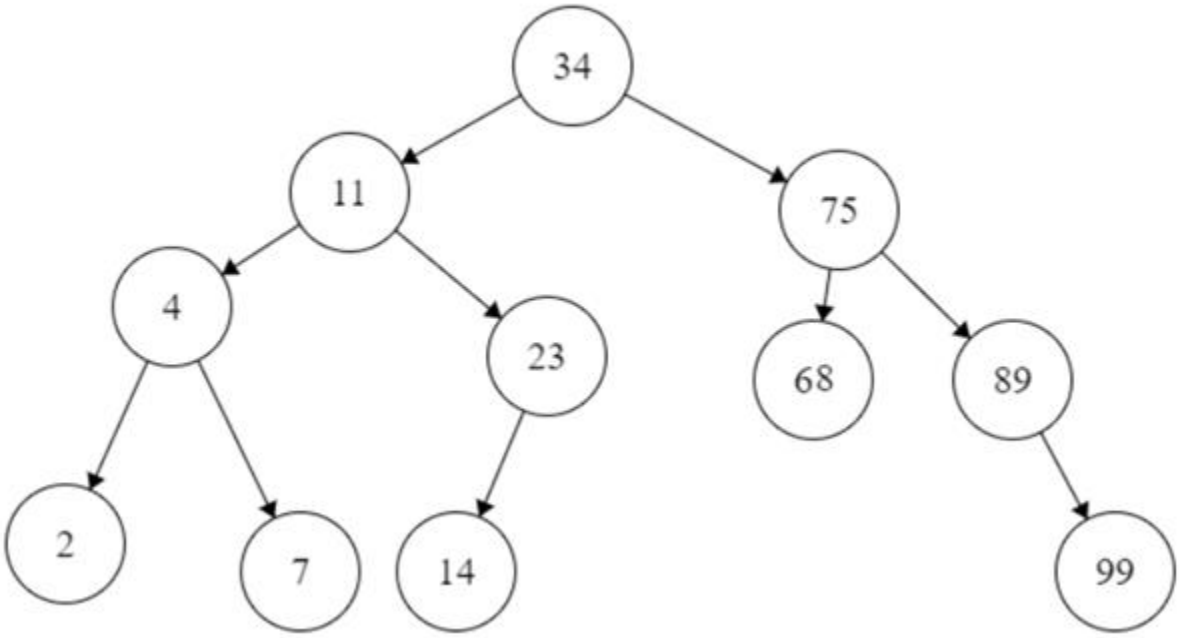
left rotate y



right rotate x



Insert following keys into an initially empty AVL tree. Discuss the cases of balancing that appear. Keys are: 4, 23, 11, 89, 34, 2, 7, 14, 75, 68, 99.



RR case -> rotate to left node

RL case -> rotate to right node

rotate to left node

LL case -> rotate to right node

LR case-> rotate to left node

rotate to right node