## **LEC-10 Height Balanced Tree(s)**

## **(AVL)**

* **Problem with BST?**
* **Solution:**
  + Height Balanced Tree(s)-AVL
  + Balancing factor(bf) of a Node:
    - Bf=H2-H1
    - H2 =height of left sub-tree
    - H1 =height of right sub-tree
    - Values of bf should be :
      * -1,0,+1

**E: g**

**10**

**7**

**13**

**6**

**11**

Is it balanced?? Answer: Yes

**E: g**

**8**

**9**

**10**

Is it balanced?? Answer: No

**What Steps are required to make a BST a balanced tree by following rules of AVL:**

* **Case I: (Right Right)**

**8**

**9**

**10**

* + Solution:
    - Make an anti-clockwise rotation.
  + Result:

**9**

**10**

**8**

* **Case II: (Left Left)**

**E: g**

**10**

**9**

**8**

* + Solution:
    - Make a clockwise rotation.
  + Result:

**9**

**10**

**8**

* **Case III: (Right Left)**

**1**

**3**

**2**

* + Solution:
    - Convert the tree in RR case.

**1**

**2**

**3**

* + Result:

**2**

**1**

**3**

* **Case IV: (Left Right)**

**5**

**1**

**3**

* + Solution:
    - Convert the tree in LL case.

**5**

**3**

**1**

* + Result:

**3**

**1**

**5**