SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A’ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IOT Including CS&BCT

COURSE NAME : 23ITB201- DATA STRUCTURES AND ALGORITHMS

II YEAR / III SEMESTER

Unit IV- **Tree ADT**

Topic : AVL Trees – Problem

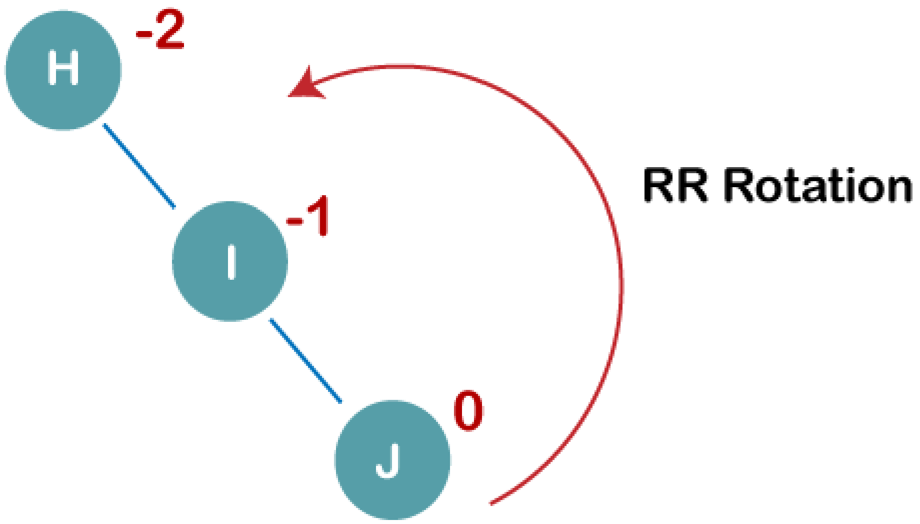
Problem

- Construct an AVL tree having the following elements

  H, I, J, B, A, E, C, F, D, G, K, L

AVL Tree –Cont..

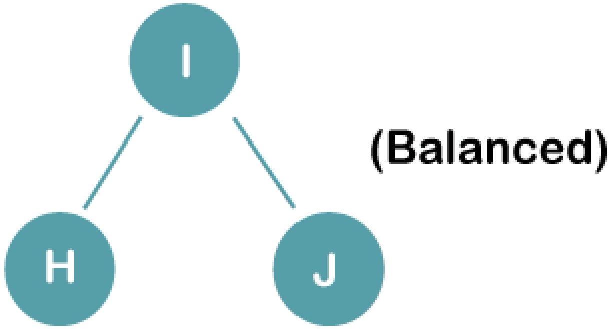
1. Insert H, I, J



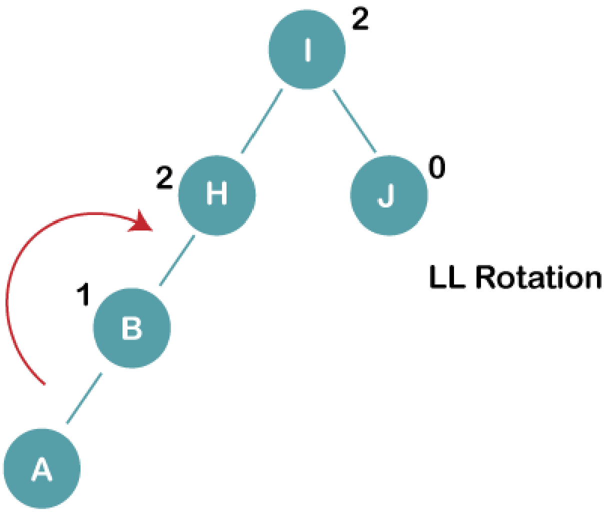
On inserting the above elements, especially in the case of H, the BST becomes unbalanced as the Balance Factor of H is -2. Since the BST is right-skewed, we will perform RR Rotation on node H.

AVL Tree –Cont..

1. The resultant balance tree is:



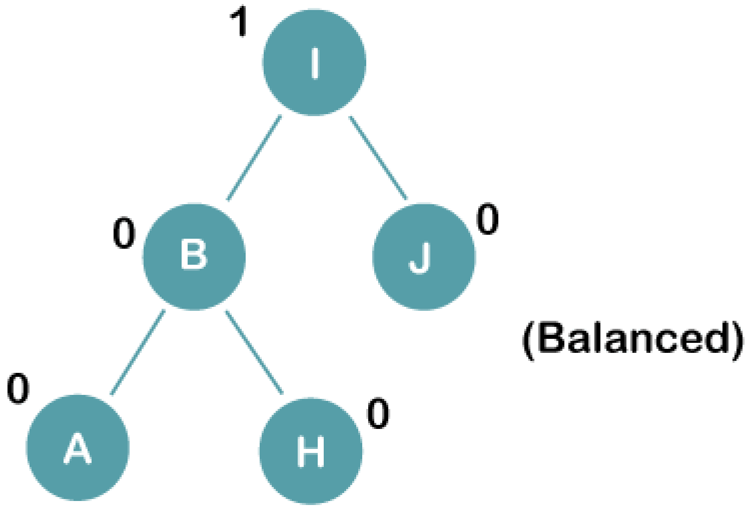
2. Insert B, A.



On inserting the above elements, especially in case of A, the BST becomes unbalanced as the Balance Factor of H and I is 2, we consider the first node from the last inserted node i.e. H. Since the BST from H is left-skewed, we will perform LL Rotation on node H.

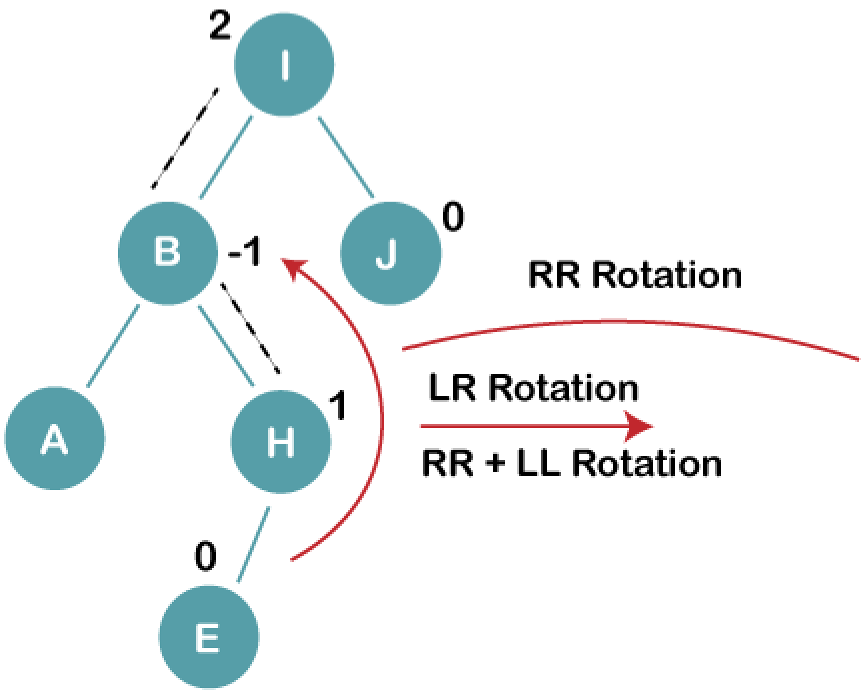
AVL Tree –Cont..

1. The resultant balance tree is:



AVL Tree –Cont..

1. Insert E



On inserting E, BST becomes unbalanced as the Balance Factor of I is 2, since if we travel from E to I we find that it is inserted in the left subtree of right subtree of I, we will perform LR Rotation on node I. LR = RR + LL rotation

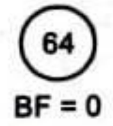
AVL Tree –Cont..

Example 3.44:

Construct an AVL search tree by inserting the following elements in order of their occurence.

64, 1, 14, 26, 13, 110, 98, 85

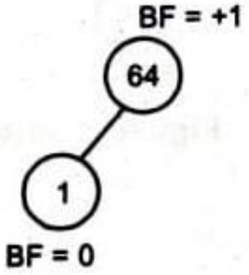
Insert 64:



Balanced Tree

Figure 3.90(a)

Insert 1:



Balanced Tree

Figure 3.90(b)

Insert 14:

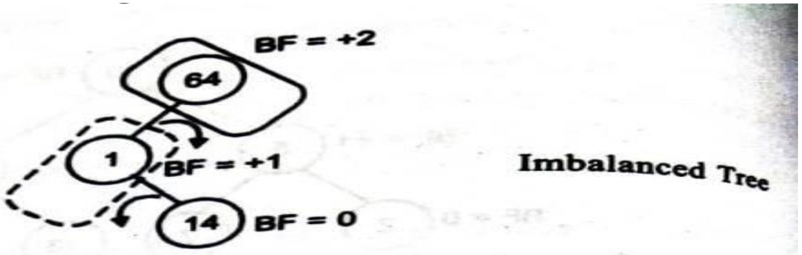


Figure 3.90(c)

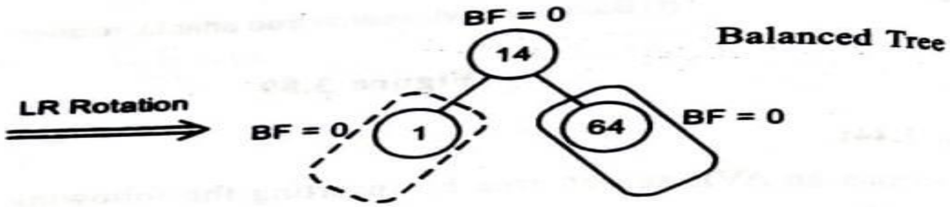


Figure 3.90(d)

Insert 26:

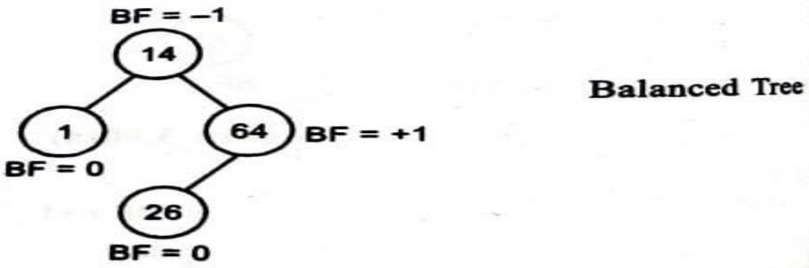
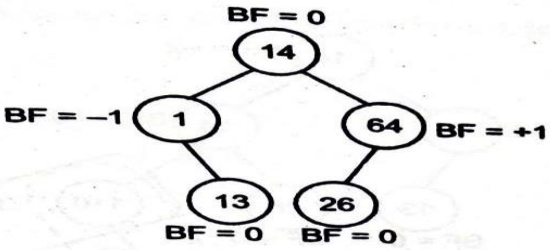


Figure 3.90(e)

AVL Tree –Cont..

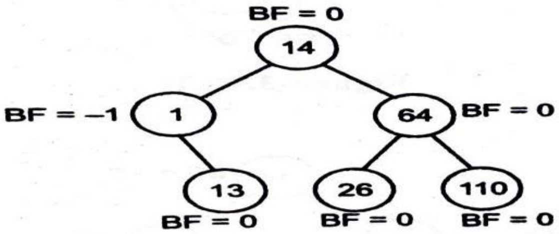
nsert 13:



Balanced Tree

Figure 3.90(f)

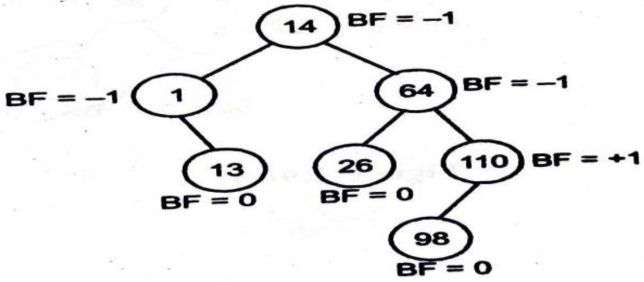
Insert 110:



Balanced Tree

Figure 3.90(g)

Insert 98:

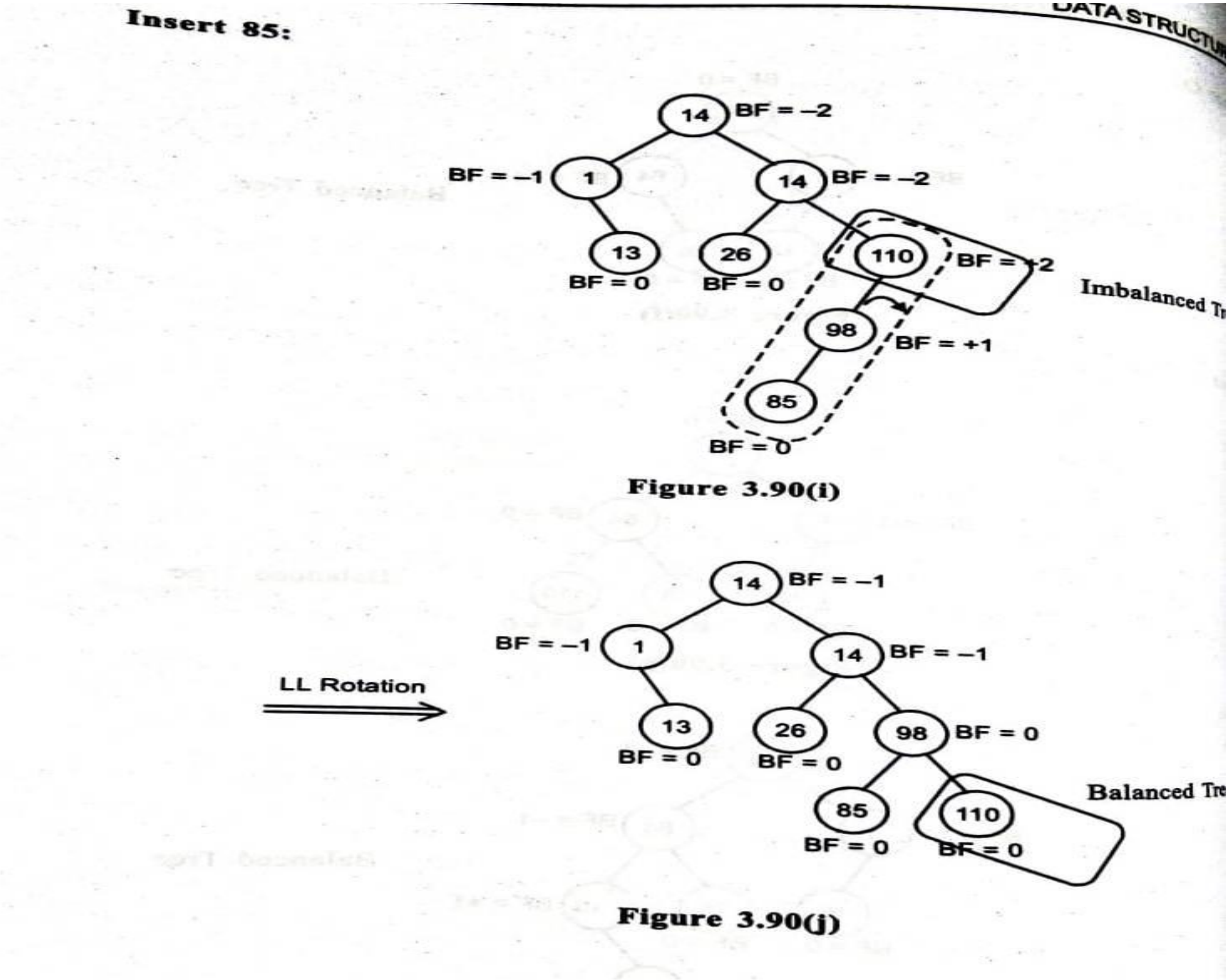


Balanced Tree

Figure 3.90(h)

AVL Tree –Cont..

Insert 85:



Imbalanced Tr

Figure 3.90(i)

LL Rotation

Balanced Tre

Figure 3.90(j)

REFERENCES

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, Pearson Education, 8th Edition, 2007. [Unit I, II, III, IV,V]

2. A. V. Aho, J. E. Hopcroft and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, 2nd Edition, 2007 [Unit IV].

3. A.M.Tenenbaum, Y. Langsam and M. J. Augenstein, “Data Structures using C”,PearsonEducation, 1st Edition, 2003.(UNIT I,II,V)

4. https://www.javatpoint.com/avl-tree

THANK YOU