GIT Department of Computer Engineering
CSE 222/505 - Spring 2018
Homework 06
Deadline: 21.05.2018 - 23:55

Q1: Create and plot the worst RedBlack Tree with height of 6.

Q2: Code the binarySearch method of the BTree.

Q3: Complete the AVL Tree class by adding a new constructor that takes a binary tree and checks whether this tree is AVL tree or not. Complete the AVL Tree class by providing the missing methods for removal. Demonstrate that these methods work. Review the changes required for methods decrementBalance, incrementBalance, rebalanceleft, and rebalanceRight discussed at the end of Section 9 .2. Also, modify rebalanceleft (and rebalanceRight) to consider the cases where the left (right) subtree is balanced. This case can result when there is a removal from the right (left) subtree that causes the critical imbalance to occur. This is still a Left-Left (RightRight) case, but after the rotation the overall balances are not zero. This is illustrated in Figures 9.70 and 9.71 where an item is removed from subtree c.

FIGURE 9.70
Left–Left Imbalance with Left Subtree Balanced

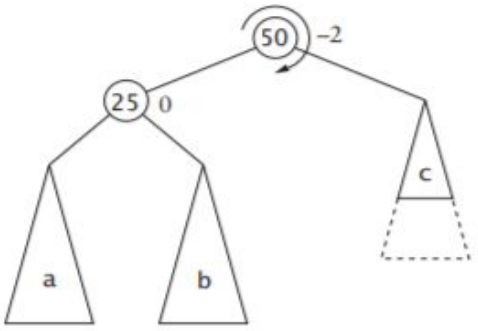
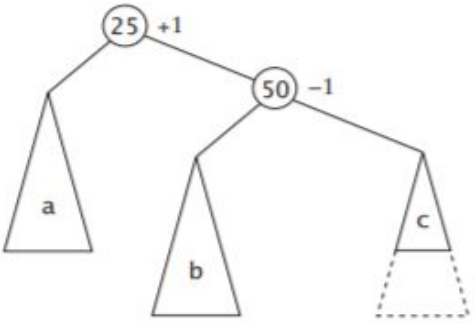


FIGURE 9.71
All Trees Unbalanced after Rotation



In addition, the Left–Right (or Right–Left) case can have a case in which the Left–Right (Right–Left) subtree is balanced. In this case, after the double rotation is performed, all balances are zero. This is illustrated in Figures 9.72 through 9.74.

FIGURE 9.72
Left–Right Case with Left–Right Subtree Balanced

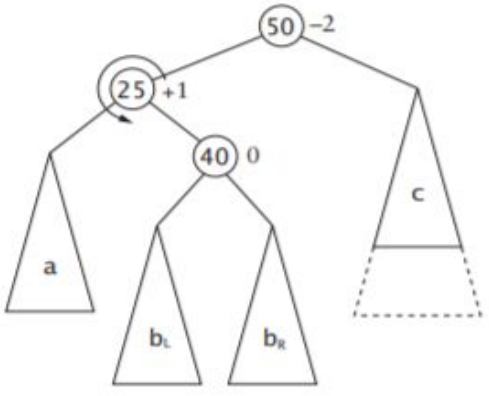


FIGURE 9.73
Imbalance after Single Rotation

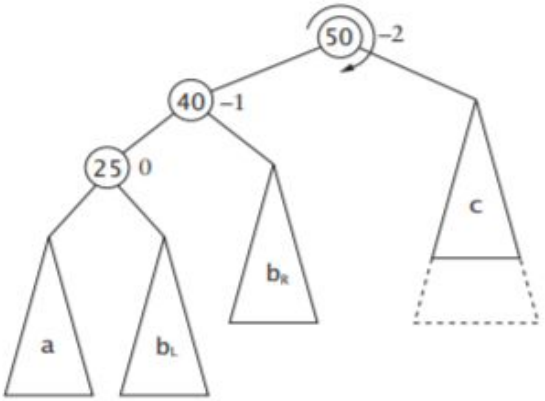
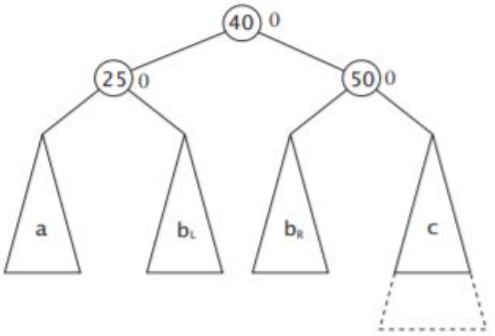


FIGURE 9.74
Complete Balance after Double Rotation



In addition, the Left-Right (or Right-Left) case can have a case in which the Left-Right (Right-Left) subtree is balanced. In this case, after the double rotation is performed, all balances are zero. This is illustrated in Figures 9.72 through 9.74.

Book Student source code:
http://bcs.wiley.com/he-bcs/Books?action=resource&bcsId=5643&itemId=0470128704&resourceId=21295

Note:

- Obey OOP principles and clean code standarts.
- Write a main and maintest classes for each question.
- Your submission is studentnumber.zip and include following files:
- o intelliJ project file
    - Q1 folder
    - Q2 folder
    - Q3 folder
- o Report.pdf
- o Javadoc
- The report must be in format “ReportFormat_hw6”
- For contact and questions “fesirci@gtu.edu.tr”