

ASSIGNMENT 2

Write a program in Java using Binary Search Tree data structure to manage information about cars. Variables used to store information about a car are:

- id - the identity of a car (String value) , which is **the key of the tree**.
- price - the price of a car (integer value).

Car information is stored in the input file “car.txt”, each car information in one line as format: **id | price**

For example:

A6 | 1

A2 | 4

B6 | 1

A1 | 4

A5 | 5

A4 | 7

A3 | 9

B8 | 3

A7 | 3

A9 | 30

A9 | 6

A8 | 8

You should write the BSTree class, which is a binary search tree data structure to store car information.

Question 1. Read each car information from file “car.txt”, if the first letter of the id is ‘B’, or the price > 20, do nothing, otherwise insert that car information to the tree.

Question 2. Calculate balance factor of all nodes. Display all node with balance factor by breadth-first traverse. Display also the information about whether a given binary search tree is height balanced (AVL tree) or not.

For example, the content of file “q2.out” must be:

(A6,1,-1) (A2,4,2) (A7,3,2) (A1,4,0) (A5,5,-2) (A9,6,-1) (A4,7,-1) (A8,8,0) (A3,9,0)

Question 3. Perform breadth-first traverse from the root and delete by copying the first node having both 2 sons and height < 5 , write the tree to file “q3.txt”.

For example, the file “q3.txt” must be:

(A6, 1) (A1,4) (A7, 3) (A5, 5) (A9, 6) (A4, 7) (A8, 8) (A3, 9)

Question 4. Balance a binary search tree by simple balancing algorithm and display the tree to the output screen by pre-order traverse.

For example, the output must be:

(A5, 5) (A3, 9) (A1, 4) (A4, 7) (A7, 3) (A6, 1) (A8, 8) (A9,6)