

ASSIGNMENT 2

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

- id – the identity of a song (String value) , which is **the key of the tree**.
- name – the name of a song (String value)
- rating – the rating of a song (double value).

Song information is stored in the input file “song.txt”, each song information in one line as format: **id | name | rating**

For example:

```
A6 | Mama mia | 4.0
A2 | Panama | 3.4
A1 | Paradise | 4.5
A5 | Tomorrow we fight | 4.5
A4 | Hello | 3.9
A3 | Colors of the wind | 4.0
B8 | Summer in Paris | 5.0
A7 | In a Persian Market | 4.5
A9 | Love in Paris | 3.8
A9 | Sang pour sang | 4.8
A8 | Memories | 4.7
```

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

Question 1. Read each song information from file “song.txt”, if the name contains “Paris”, or the rating < 3, do nothing, otherwise insert that song information to the tree.

Question 2. Calculate level of all nodes. Display all node with level having the rating >= 4 by in-order traverse to the file “q2.out”.

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

(A1,Paradise,4.5,3)
(A3,Colors of the wind,4.0,5)
(A5,Tomorrow we fight,4.5,3)
(A6,Mama mia,4.0,1)
(A7,In a Persian market,4.5,2)
(A8,Memories,4.7,4)
(A9,Sang pour sang,4.8,3)

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,Mama mia,4.0)
(A1,Paradise,4.5)
(A7,In a Persian market,4.5)
(A5,Tomorrow we fight,4.5)
(A9,Sang pour sang,4.8)
(A4,Hello,3.9)
(A8,Memories,4.7)
(A3,Colors of the wind,4.0)

Question 4. Balance a binary search tree by simple balancing algorithm. Display all node by breadth-first traverse.

For example, the output must be:

(A5,Tomorrow we fight,4.5)
(A3,Colors of the wind,4.0)
(A7,In a Persian market,4.5)
(A1,Paradise,4.5)
(A4,Hello,3.9)
(A6,Mama mia,4.0)

(A8,Memories,4.7)

(A9,Sang pour sang,4.8)