An-Najah National University

جامعة النجاح الوطنية

Faculty of Engineering and IT

كلية الهندسة وتكنولوجيا المعلومات

Computer Engineering Department

Data Structures and Algorithms (10636211)

HW 3

Due to: 15/12/2022	**10 points**

Given the following structure that represents the building block of a binary tree.

```
const int MAX_CHILD=2;
struct Node{
        int index;
        int data;
        int child_count;
        int children[MAX_CHILD];
        int color;  // -1(uncolored) , 1(White), 0(Black)
        int bf;      // balance factor
};
```

Write complete C program to do the following:

1. Implement a function to create two binary search trees (BST) from a file already arranged to include BST.
   Use the following file (as an example) to construct each tree.

6 (count of nodes in tree)
Index/ data/count_child/ child0…/ initial-color

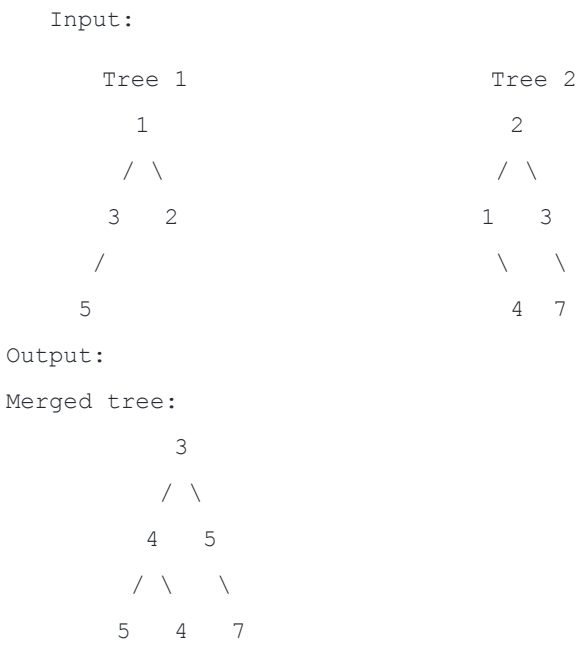
0	65	2	1	2	0
1	14	2	3	4	0
2	97	1	5	-	1
3	10	0	-	-	0
4	25	0	-	-	1
5	101	0	-	-	-1

2. Implement an **iterative** function that returns the closest value in the constructed BST to an external double value. For example the closest value to the double value= 13.67 is 14.

3. Implement a function that computes the height of any given tree.

4. Implement a function that stores the balance factor (bf) for each node in any given tree.

5. Implement a function that takes two binary search trees as parameters. Your function should merge them using the following property: if two nodes are overlapped, then you should sum them in a new node, otherwise you should use the none NULL node as is.



6. You should test all functions in main.

Good Luck