Homework Assignments 6

Due date: April 6, 11:55PM EST.

You do not have to write the actual programs for any of the problems, but you may want to experiment with some code to verify your own answers.

Problem 1

Write a contains method for a binary search tree. You should provide an iterative implementation of the method (we went over the recursive implementation in class). Remember the similarities of such search to the binary search algorithm. Your method should use the following node for the tree:

```java
class BSTNode <T extends Comparable <T> >
    implements Comparable < BSTNode<T> > {

    private T data;
    private BSTNode <T> left;
    private BSTNode <T> right;
    ...
    public compareTo ( BSTNode <T> other ) {
        return this.data.compareTo ( other.data );
    }
}
```

Assume that all getters and setters are provided as well.
The tree class has a private data field

```
BSTNode<T> root;
```

Your method should take an item of type T as a parameter and return a Boolean value indicating whether the item is stored in a BST.

Make sure that you method is properly indented and commented.

Problem 2

Implement an inorder traversal of a binary tree (this method should work for binary search tree as well) that uses iterative approach. Your method should be a method of a binary tree class. You can assume that there is a private data field called root that points to the root of the tree. You may specify this method using pseudocode, but make sure you are specific. You can assume that on visiting the node you print its content to the standard output.
Problem 3

For each of the following trees state what kind of a tree it is (check all that apply).

1) ![Tree 1](image1.png)
2) ![Tree 2](image2.png)
3) ![Tree 3](image3.png)
4) ![Tree 4](image4.png)
5) ![Tree 5](image5.png)
6) ![Tree 6](image6.png)

<table>
<thead>
<tr>
<th>Tree #</th>
<th>Not a tree</th>
<th>General tree</th>
<th>Binary tree</th>
<th>Binary search tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>

How and what to submit

You can use the template provided at
https://docs.google.com/document/d/1fQEaboeAByjRUyOJnYOseLbp3YCdDUm-H4t1_GQQxT8/edit?usp=sharing
to complete your solution.

The completed solutions should be submitted as PDF documents to NYU Classes.