

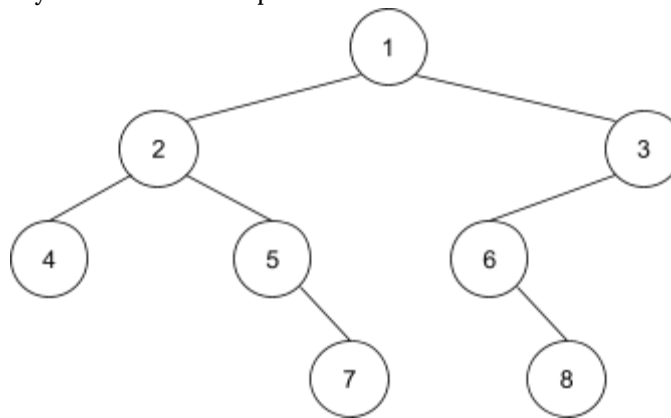
CSE 2341 – Fall 2020 – The Online Edition – Homework 01

Due: April 3, 2020 at 11:59 pm
Upload to Canvas

Submission Checklist:

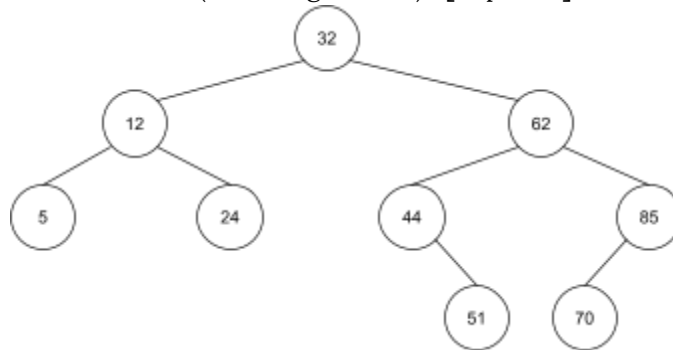
- ☐ Am I submitting a PDF?
- ☐ Does the name of the file I'm submitting start with my last name?
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- ☐ Is my name inside the document header?
- ☐ Are all the diagrams contained in my submission computer created (and not hand-drawn)?
- ☐ Is any code that I've included as part of my submission typeset in a fixed-point font such as courier?

Use the following Binary Tree to answer questions 1 - 5.



1. List all of the leaves of the tree. [1 pt]
2. List all of the ancestors of 7. [1 pt]
3. Provide an inorder traversal of the tree. [2 pts]
4. Provide a preorder traversal of the tree. [2 pts]
5. Provide a postorder traversal of the tree. [2 pts]
6. Draw a binary search tree resulting from the insertion of the following values from left to right:
20, 10, 40, 50, 5, 15, 24, 23, 25 [11 points]
 - 6a. Perform a preorder traversal of the resulting tree.
 - 6b. Perform a postorder traversal of the resulting tree.

7. Beginning with the AVL tree below, insert the additional values below from left to right.
 55, 54, 6, 7, 8, 99, 98, 97
- After each insertion, indicate under the tree which nodes are checked for imbalance.
 - If a node is found to be imbalanced,
 - indicate it as alpha and
 - indicate the case (1, 2, 3, or 4). These requirements mean you'll need to redraw the tree after each insertion (use Google Draw) [16 points]



Use as much space as needed for all of the trees. Make sure you're clear about labeling the order of the trees.

8. Assume a Binary Tree Node is described by the class below:

```

class BinTreeNode
{
private:
    int data;
    BSTreeNode* left, * right;

friend class BinTree;
};
  
```

Assume class Binary Tree contains a single pointer to the root of the tree. Implement a recursive member function for class BinTree that returns true if the object is a binary search tree and false otherwise. This function will be a private function **isBinSearchTree** that would be called from a public interface function.

[10 points]