CIS 313, Intermediate Data Structures
Fall 2020

Assignment 3

due Wednesday, November 18, 2020

1. Exercise 6.5-9, p 166. **[8 points]**
2. Draw the binary tree whose inorder traversal is *abcdefgh* and whose postorder traversal is *acbegfhd*. **[6 points]**
3. Consider the tree of figure 1. How many different permutations of the values 1 through 10, when inserted in that order, will yield this particular tree? Briefly explain your answer. **[8 points]**

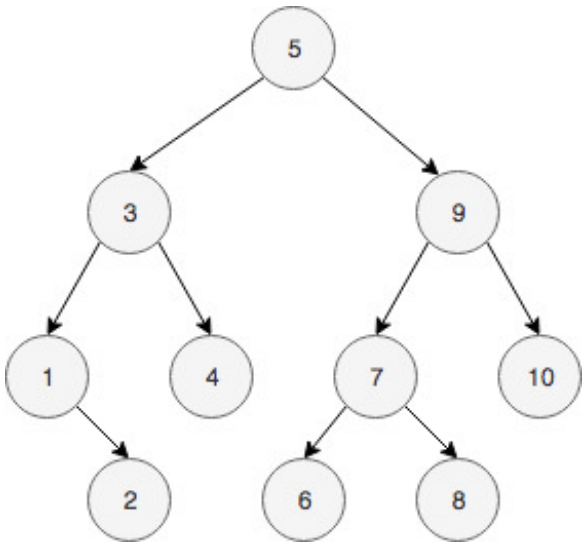

Figure 1: The BST for problem 3.

4. How many permutations of $1, 2, \ldots, n$ yield a skew tree (i.e., a tree width depth n)? (Since any one skew tree is generated by just one permutation, this question is asking for the number of skew trees of n nodes.) Explain your formula. **[6 points]**
5. Insert the following values above into an initially empty red-black tree:

   12, 13, 17, 10, 4, 6, 9, 15, 30, 25, 20, 40.

   Show the tree after each insertion that causes any color shifts or rotations. **[8 points]**
6. From the tree derived at the end of the previous problem, delete 13 and then 12. **[8 points]**
7. 13.3-5 **[6 points]**

Total: 50 points