Computer Science 245

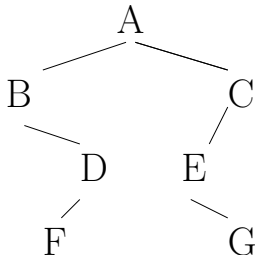
Homework 5

BSTs, Trees and Traversals

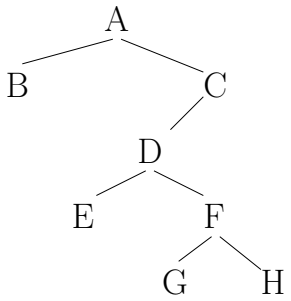
Due Wednesday, March 1st, 2017

1. For each of the following trees (which are NOT Binary Search Trees!), give the PREORDER, POSTORDER, and INORDER traversals

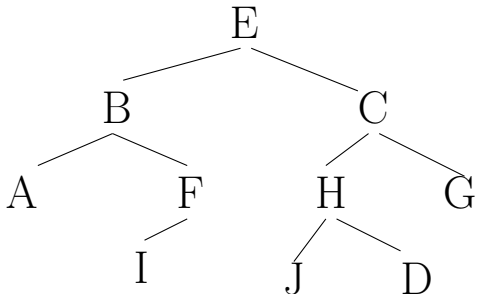
   (a) (2 points)



   (b) (2 points)



   (c) (2 points)



2. Draw the following trees

   (a) (2 points) A tree with the INORDER traversal DBECGAFG and the PREORDER traversal GBDCEAGF

   (b) (2 points) A tree with the PREORDER traversal ABDECFG and the POSTORDER traversal DEBFGCA

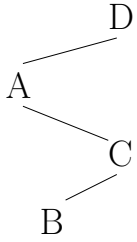
   (c) (2 points) A tree with the INORDER traversal ABIECDHFG and the POSTORDER traversal ABCDEFGHI

3. (2 points) Draw two *different* binary trees that have the *same* PREORDER *and* POSTORDER traversals. That is, draw two different trees T_1 and T_2 such that the PREORDER traversal of T_1 is the same as the PREORDER traversal of T_2, **and** the POSTORDER traversal of T_1 is the same as the POSTORDER traversal of T_2. *HINT:* T_1 and T_2 don't need to be BSTs! (in fact, they can't both be BSTs!)

4. Binary Search Trees

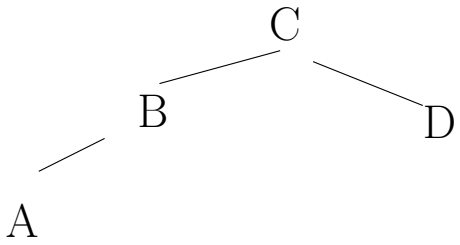
The shape of a Binary Seach Tree is determined by the order in which elements are inserted.

(a) (1 points) Give the ordering of the elmeents A, B, C, and D, so that when they are inserted into an empty BST in that order they produce the following tree.

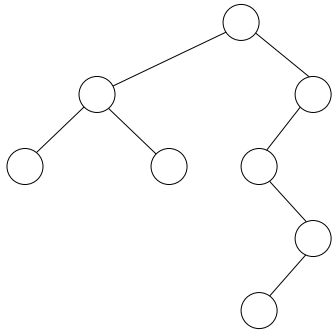


Is the ordering unique? (That is, is there any other ordering that gives the same BST?)

(b) (2 points) Give *all* orderings of the elements A, B, C, D that produce the following BST, when inserted in that order:



(c) For a Binary Search Tree with the following shape:



i. (2 points) Give an ordereing of the elements A, B, C, D, E, F, G, H to insert into an empty tree to get that shape

ii. (1 point) Draw the resulting tree