PROBLEM SESSION 7

15th October 2019

Exercise 1. *Weight: 10%*

How many binary search trees can you build with the following elements: $\{3, 5, 8, 12\}$? Draw them.

Exercise 2. *Weight: 15%*

Let $f(n)$ denote the number of different binary search trees that can be built using n distinct keys. Give a recursive definition of function f. Use this definition to compute $f(6)$.

Exercise 3. *Weight: 10%*

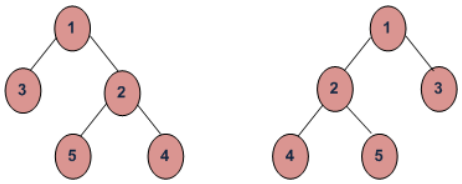
How many AVL trees can you build with the following elements: $\{1, 2, 3, 4, 5\}$? Draw them.

Exercise 4. *Weight: 20%*

1. Draw the binary tree which would be created by inserting the following numbers in the order given $42, 53, 12, 16, 8, 2, 60, 57, 65, 22, 19$.
2. Remove node 65 from the tree.
3. Remove node 16 from the tree.
4. Remove node 12 from the tree.
5. Remove node 42 from the tree.

Exercise 5. *Weight: 20%*

Write an algorithm to convert a binary tree into its mirror tree. The figure below shows two trees that are each others mirror trees.



Mirror Trees

Exercise 6. *Weight: 25%*

Each node in a binary search tree has three attributes p, *left*, *right* to store pointers. Prove that, for each binary search tree with $n > 0$ nodes, the total number of attributes with value NIL equals $n + 2$.