CptS 122 – Data Structures October 17, 2016

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**Take-Home: Quiz 6 (15 pts) – Binary Search Trees**

**Print out, and provide your solutions to your TA in lab this week!**

1. **(4 pts)** What is a binary search tree (BST)? Describe the properties of a BST in your answer.

A Binary Search Tree is a data structure where all the nodes are sorted into a tree. There exists a “root” node. Which is the first node in the tree and all nodes in the tree point to at most two other nodes. A node that is smaller than the current node it is comparing itself to goes to the left of a node and a node that is larger than the current node that it is comparing itself to goes to the right of a node.

1. **(5 pts – 1 pt/number)** Given the following sequence of numbers: 42, -1, 67, 33, 53. If the numbers are inserted into a BST in the sequence provided, then what would the tree look like? Draw a diagram for the BST. Be sure to show both branches of a given node.

42

-1

67

NULL

NULL

53

33

NULL

NULL

NULL

NULL

1. **(6 pts)** Using the BST constructed in question (2), answer the following questions:

* 1. **(2 pts)** How many comparisons are required to find the number 53? \_\_3\_\_\_
  2. **(2 pts)** How many children does the node containing the number 67 have? \_1\_\_

**iii.(2 pts)** The tree may consist of multiple leaf nodes. Provide the number in the leaf node stored in the leftmost subtree. \_\_\_\_\_33\_\_\_

Instructor: Andrew S. O’Fallon