Worksheet 28 - Group 1

Worksheet Group 1 Members

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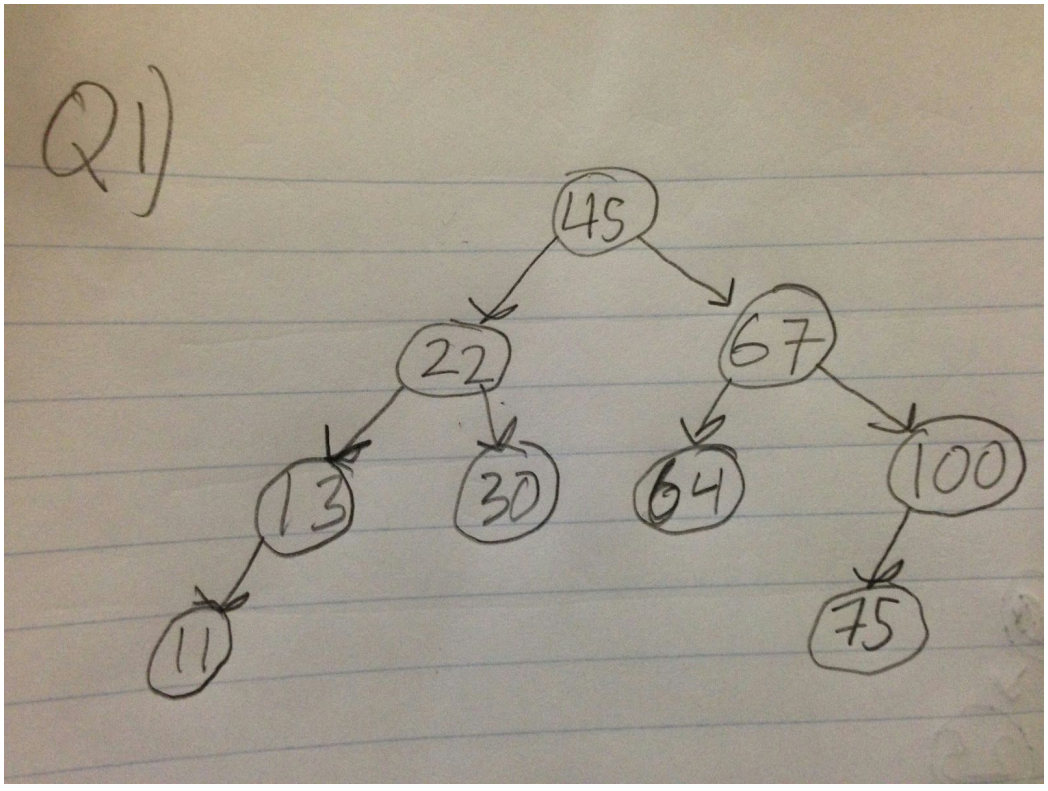
Worksheet 28: Binary Search Trees

In this worksheet we will practice the concepts of using a Binary Search Tree for the Bag interface. For each of the following problems, draw the resulting Binary Search Tree.

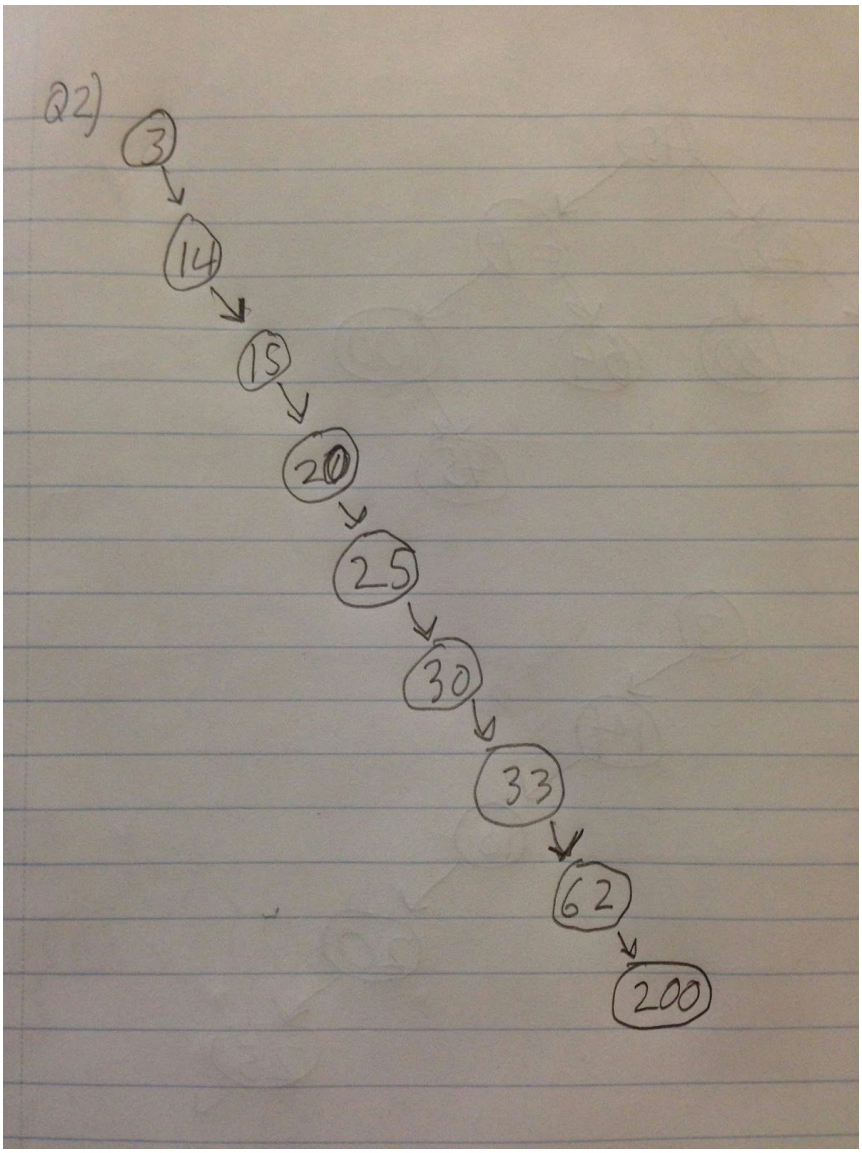
1. Add the following numbers, in the order given to a binary search tree. 45, 67, 22, 100, 75, 13, 11, 64, 30



2. What is the height of the tree from #1? What is the height of the subtree rooted at the node holding the value 22? What is the depth of the node holding the value 22?

   The height of the tree is 3. The height of the subtree rooted at the node holding the value 22 is 2. The depth of the node holding the value 22 is 1.

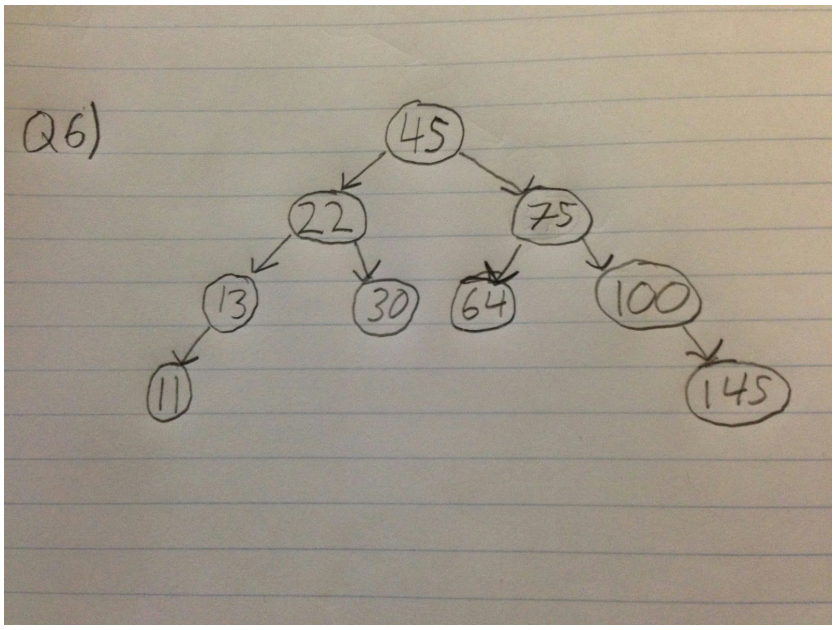
3. Add the following numbers, in the order given to a binary search tree. 3, 14, 15, 20, 25, 30, 33, 62, 200.



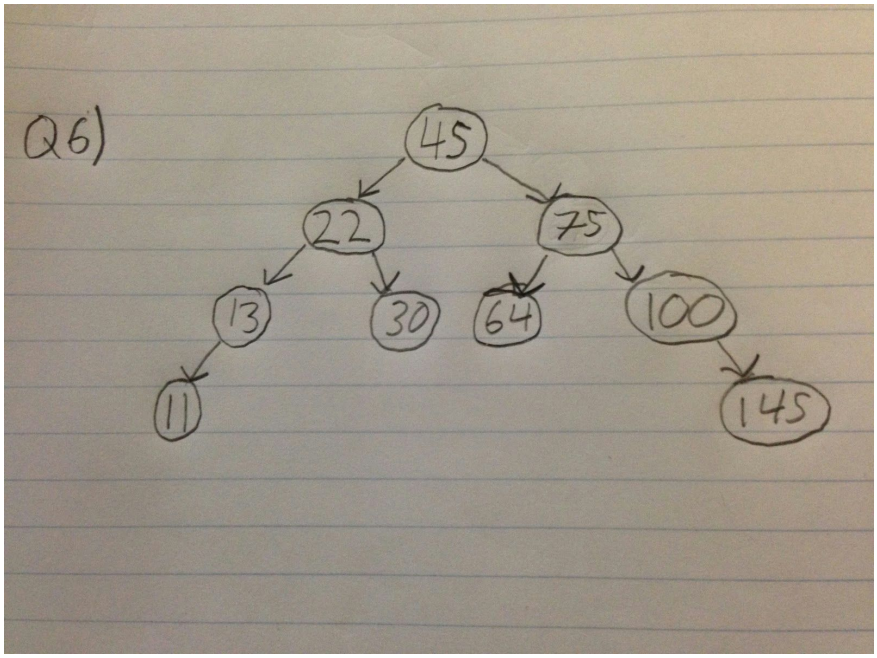
4. Is the tree from #3 balanced? Why not? What is the execution time required for searching for a value in this tree?

   The tree is not balanced. None of the nodes have a left node. The execution time to search for a value in this tree is O(n). The reason that the execution time to search for a value in this tree is O(n) instead of O(log n) is because the values were entered in order; we're essentially working with a linked list.

5. Add a new value, 145, to the tree from #1



6. Remove the value 67 from the tree from #1. What value did you replace it with and why?



The value 67 was replaced with the value 75 because it was the the leftmost child from 67's right node.

Piazza Discussion Post

https://piazza.com/class/ib2kus4hsie528?cid=173