Feedback — Binary Search Trees

You submitted this quiz on **Tue 23 Feb 2016 11:32 AM PST**. You got a score of **3.00** out of **3.00**.

To specify an array or sequence of values in an answer, separate the values in the sequence by whitespace. For example, if the question asks for the first ten powers of two (starting at 1), then the following answer is acceptable:

```
1 2 4 8 16 32 64 128 256 512
```

If you wish to discuss a particular question and answer in the forums, please post the entire question and answer, including the seed (which can be used by the course staff to uniquely identify the question) and the explanation (which contains the correct answer).

Question 1

(seed = 219665)
Give the level-order traversal of the BST that results after inserting the following sequence of keys into an initially empty BST:

```
29 39 52 35 66 31 70 65 37 18
```

Your answer should be a sequence of 10 integers, separated by whitespace.

You entered:

29 18 39 35 52 31 37 66 65 70

Your Answer		Score	Explanation
29 18 39 35 52 31 37 66 65 70	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

The correct answer is: 29 18 39 35 52 31 37 66 65 70

Here is the level-order traversal of the BST after each insertion:

```
29:  29
39:  29 39
52:  29 39 52
35:  29 39 35 52
66:  29 39 35 52 66
31:  29 39 35 52 31 66
70:  29 39 35 52 31 66 70
65:  29 39 35 52 31 66 65 70
37:  29 39 35 52 31 37 66 65 70
18:  29 18 39 35 52 31 37 66 65 70
```

Question 2

(seed = 844075)
Given a BST whose level-order traversal is:

47 18 60 15 21 51 94 14 49 54 97 96

What is the level-order traversal of the resulting BST after Hibbard deleting the following three keys?

54 15 60

Your answer should be a sequence of 9 integers, separated by whitespace.

You entered:

47 18 94 14 21 51 97 49 96

Your Answer		Score	Explanation
47 18 94 14 21 51 97 49 96	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

The correct answer is: 47 18 94 14 21 51 97 49 96

Here is the level-order traversal of the BST after each deletion:

```
54:  47 18 60 15 21 51 94 14 49 97 96
15:  47 18 60 14 21 51 94 49 97 96
60:  47 18 94 14 21 51 97 49 96
```

Question 3

(seed = 854453)
Which of the following statements about binary search and binary search trees are true? Check all that apply. Unless otherwise specified, assume that the binary search and binary search tree implementations are the one from lecture.

Your Answer		Score	Explanation
☑ Given a sorted array of N keys (not necessarily distinct) and a key x, it is possible to find the index of the first occurrence of x (or determine that x does not appear in the array) in logarithmic time in the worst case.	✔	0.20	Can be done with a modified version of binary search.

☐ `If the same N keys are inserted into two initially empty BSTs, then the two BSTs will have the same shape if and only if the keys are inserted in the same order.`	✔	0.20	Inserting the sequence of keys { 2, 1, 3 } results in the same BST as inserting the sequence of keys { 2, 3, 1 }.
☑ `Given a BST, it is possible to obtain a sorted list of the keys in linear time.`	✔	0.20	Use an inorder traversal.
☑ `Suppose that we first insert a key x into a BST that does not already contain the key x and then immediately Hibbard delete x from the BST. Then, the resulting BST is the same as the original BST.`	✔	0.20	The node containing the newly inserted key x will be a leaf node (two null children), so Hibbard deletion will simply remove that node.
☐ `To efficiently implement a BST, you need at least three BST node references per BST node (to a left child, right child, and parent).`	✔	0.20	Our implementation uses only two node references per BST node - it does not use a parent pointer.
Total		1.00 / 1.00	