NetID: hxie13 QuizID: 95689 Score: 5 / 5 Answer Source: PrairieLearn

1. Choose the appropriate running time from the list below.

The variable n represents the number of items (keys, data, or key/data pairs) in the structure. In answering this question you should assume the best possible implementation given the constraints, and also assume that every array is sufficiently large to handle all items (unless otherwise stated).

Determine if a Binary Tree is a Binary Search Tree

A. [Correct Answer] [Your Answer] $O(n)$
B. $O(\log n)$
C. $O(1)$
D. $O(n^2)$
E. $O(n \log n)$

2. Given the following string of characters:

```
b a b a c a d a c a b a b
```

what is the length of the Huffman encoding for character `c`?

A. 2 binary digits
B. [Correct Answer] [Your Answer] 3 binary digits
C. None of the other answers
D. 4 binary digits
E. 1 binary digit

3. Choose the appropriate running time from the list below.

The variable n represents the number of items (keys, data, or key/data pairs) in the structure. In answering this question you should assume the best possible implementation given the constraints, and also assume that every array is sufficiently large to handle all items (unless otherwise stated).

Worst case for removal from a Binary Search Tree (not necessarily AVL).

A. $O(\log n)$
B. [Correct Answer] [Your Answer] $O(n)$
C. $O(1)$
D. $O(n^2)$
E. $O(n \log n)$

4. Consider the Binary Search Tree built by inserting the following sequence of integers, one at a time, in the given order.

`5, 4, 7, 9, 8, 3, 1`

If the existing node with a key of `9` is removed from this BST, what node would be updated to take the place of `9` after removal?

A. [Correct Answer] [Your Answer] the node with key `8`
B. the node with key `10`
C. the node with key `7`
D. â€˜9â€™ needs no replacement
E. the node that is the in-order successor of `9`

5. Which of the following **CANNOT** be a valid sequence of nodes from the root to a leaf of a `binary search tree`?

A. `492, 125, 418, 197, 223`
B. [Correct Answer] [Your Answer] `121, 9, 107, 4, 100`
C. `254, 103, 199, 154, 190`
D. None of the options is correct.
E. `128, 735, 209, 245, 223`