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

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

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

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

4. 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 time to find the In Order Successor of a given key in a Binary Search Tree (if it exists).

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

5. 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).

Insert a key into a Binary Search Tree (not necessarily AVL)

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