

**BRAC University (Department of Computer Science and Engineering)**  
**Summer 2022 Semester**  
**CSE-220 (Data Structures)**  
**Makeup Quiz**  
**31 August, 2022**

Student ID:

Full Marks: 20

Name:

Duration: 30 minutes

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**[No extra sheet will be provided. Write your answer to the questions in this answer script.]**  
**[Marks allocated to each question is given in the statement of corresponding question.]**

1. Given the array representation of a binary tree: [None value means the node is empty]

[None., 17, 20, 8, 30, 18, None, 28, None, 3, None, 5, None, None, 0, -4]

- a) Draw the binary tree. [2.5]
- b) Write the post order and inorder traversal sequence of the tree. [3]
- c) Use the post order traversal sequence in **part b** to insert the elements in that order in an initially empty binary search tree, and show the resulting binary search tree.  
Note: Consider the first element of the post order sequence as the root. [2.5]
- d) Perform the following operations **step by step** on the Binary Search Tree you created in **part c**.
  - i. Delete node 3 with the help of its successor.
  - ii. Delete node 18 with the help of its predecessor. [3]

2. Your task is to implement a recursive function that checks for a given string if the following property is maintained - the difference between the first character of the string and the last character of the string is 1; the difference between the second character of the string and the second last character of the string is 12 and so on. If the property is maintained, the recursive function returns true, otherwise false. Consider the characters case insensitive. [10]

Sample Input:	Sample Output:	Explanation
a5fKgc3B	True	The difference between the first character 'a' and the last character 'B' is 1, The difference between the second character '5' and second last character '3' is 2 and so on.
5py83xn6	False	The difference between the third character 'x' and third last character 'y' is not 3.