BRAC University (Department of Computer Science and Engineering)
Summer 2022 Semester

CSE-220 (Data Structure)
Section 14

Quiz 4
29 August, 2022

Student ID: **Full Marks: 20**
Name: **Duration: 30 minutes**

[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.]

Answer all the questions

1. The array representation of a **binary search tree (BST)** is given below [None value means the node is empty]:

   [None, 6, 4, 11, 2, 5, 8, 12, None, None, None, None, None ,10, None, 20]

   (The first None value indicates a dummy node of the tree)

   Answer the following questions-

   A. Draw the BST. **[2.5]**

   B. A specific type of traversal prints out the node values in sorted order. What is the traversal's name? Write that particular traversal sequence of the tree in part A. **[2.5]**

   C. Write the **post order traversal** sequence of the tree in part A. Use that traversal sequence to insert the elements in that order in an initially empty BST, and show the resulting BST. **[3]**

   Note: Consider the first element of the post order sequence as the root.

   D. Perform the following operations step by step on the Binary Search Tree you created in **part C**.

   i. Delete node 6 with the help of its successor.

   ii. Delete node 8 with the help of its predecessor. **[2]**

2. What is the maximum height of a tree with N nodes? Justify your answer with an example. **[2]**

3. If we insert nodes into a BST in different orders, will it generate different binary trees? Justify your answer with examples. **[3]**

4. Write a recursive function that counts the total number of nodes in a Binary Tree. Consider the node class and Binary tree class are already defined.

```
def count_node(root):
        #TO DO
```

[5]