

Lab Assignment 4: CS2233

4th September, 2023

Question:

Construct a binary search tree over the following keys (assuming you read the numbers from left to right).

12, 31, 34, 56, 78, 89, 91, 32, 56, 81, 100, 2, 55, 21, 99, 121, 67.

Each node of the tree should use the following **struct** data type:

```
struct node
{
    int data;
    struct node *left;
    struct node *right;
};
```

You can assume that you have stored the pointer to the **root** node. Please, write the functions for:

1. **search (root, key)** – this function takes the pointer to the **root** node, and **key** as input, and returns the pointer to the node where **key** is present. If **key** is not present in BST, then the code should output an error message. Please run your function for searching nodes 32, 56, 90.
2. **insert (root, key)** – this function takes the pointer to the **root** node, and **key** as input, and inserts the node at the appropriate position. Please run your function for inserting nodes 32, 56, 21, 90.
3. **successor (root, key)** – this function takes the pointer to the **root** node and **key** as input and returns the pointer to the successor node. If **key** is not present in BST, then the code should output an error message. Please run your function to find the successor of key 32, 56, 21, 90. Recall that the successor of a node in BST is the smallest node that is bigger than the given node.
4. **delete (root, key)** – this function takes the pointer to the **root** node, and the **key** as input, and deletes the corresponding node. Please run

your functions for deleting nodes 332, 51, 71, 67. Your code should output an error message if the **key** is not present in the BST.

5. In points 2, and 4, the output should be the tree obtained after node insertion/deletion. Please output the tree by printing the nodes level-by-level.