Lab Assignment 5: CS2233

11th September, 2023

Question:

Construct an AVL tree over the following keys (assuming you read the numbers from left to right).

$9, 8, 5, 4, 99, 78, 31, 34, 89, 90, 21, 23, 45, 77, 88, 112, 32.$

The AVL tree should be constructed by calling the `insert (root, key)` listed below.

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

```
struct node
{
int data;
int height; /* stores the height of subtree rooted current node */
struct node *left;
struct node *right;
struct node *parent;
};
```

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 the AVL tree, 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. `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 absent in the AVL tree.

4. In points 2, and 3, the output should be the tree obtained after node insertion/deletion. Please output the tree by printing the nodes level-by-level.