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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 5_COD_Question 3

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

You are required to implement basic operations on a Binary Search Tree (BST), like insertion and searching.

Insertion: Given a list of integers, construct a Binary Search Tree by repeatedly inserting each integer into the tree according to the rules of a BST.

Searching: Given an integer, search for its presence in the constructed Binary Search Tree. Print whether the integer is found or not.

Write a program to calculate this efficiently.

Input Format

The first line of input consists of an integer n, representing the number of nodes

in the binary search tree.

The second line consists of the values of the nodes, separated by space as integers.

The third line consists of an integer representing, the value that is to be searched.

Output Format

The output prints, "Value <value> is found in the tree." if the given value is present, otherwise it prints: "Value <value> is not found in the tree."

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 7
8 3 10 1 6 14 23
6
Output: Value 6 is found in the tree.

Answer

```
// You are using GCC
#include <stdio.h>
#include <stdlib.h>

// Structure for BST node
typedef struct Node {
    int data;
    struct Node* left;
    struct Node* right;
} Node;

// Function to create a new node
Node* createNode(int value) {
    Node* newNode = (Node*)malloc(sizeof(Node));
    newNode->data = value;
    newNode->left = newNode->right = NULL;
    return newNode;
}
```

```
// Function to insert a node into BST
Node* insert(Node* root, int value) {
    if (root == NULL) return createNode(value);
    if (value < root->data) root->left = insert(root->left, value);
    else root->right = insert(root->right, value);
    return root;
}

// Recursive function to search for a value in BST
int search(Node* root, int key) {
    if (root == NULL) return 0;  // Key not found
    if (root->data == key) return 1;  // Key found
    if (key < root->data) return search(root->left, key);
    else return search(root->right, key);
}

int main() {
    Node* root = NULL;
    int n, key, value;

    // Read number of nodes
    scanf("%d", &n);

    // Insert elements into BST
    for (int i = 0; i < n; i++) {
        scanf("%d", &value);
        root = insert(root, value);
    }

    // Read the key to search
    scanf("%d", &key);

    // Perform search and print result
    if (search(root, key))
        printf("Value %d is found in the tree.\n", key);
    else
        printf("Value %d is not found in the tree.\n", key);

    return 0;
}
```

Status : Correct ***Marks : 10/10***