Rajalakshmi Engineering College

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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>

// Definition for a BST node
struct Node {
    int val;
    struct Node* left;
    struct Node* right;
};

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

```
// Function to insert a node into the BST
struct Node* insert(struct Node* root, int key) {
    if (root == NULL)
        return newNode(key);

    if (key < root->val)
        root->left = insert(root->left, key);
    else
        root->right = insert(root->right, key);

    return root;
}

// Function to search for a value in the BST
int search(struct Node* root, int key) {
    if (root == NULL)
        return 0;  // Value not found
    if (key == root->val)
        return 1;  // Value found
    if (key < root->val)
        return search(root->left, key);
    else
        return search(root->right, key);
}

// Main function
int main() {
    int n, search_value;

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

    // Create an empty tree
    struct Node* root = NULL;

    // Read the values and insert them into the tree
    for (int i = 0; i < n; i++) {
        int value;
        scanf("%d", &value);
        root = insert(root, value);
    }
```

```
    // Read the value to be searched
    scanf("%d", &search_value);

    // Search the value in the tree
    if (search(root, search_value)) {
        printf("Value %d is found in the tree.\n", search_value);
    } else {
        printf("Value %d is not found in the tree.\n", search_value);
    }

    return 0;
}
```

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