Name : Rajkumar B L
Reg.No : 2047120
Course : MCS 271 Data Structure (Lab 12 – BST)

Code:-

```c
/**********************
 * Name : Rajkumar B L
 * Reg  : 2047120
 * Lab  : 12
 * Program : BST
 * ********************/

#include <stdio.h>
#include <stdlib.h>

struct node
{
    int key;
    struct node *left, *right;
};

struct node *newNode(int item)
{
    struct node *temp = (struct node *)malloc(sizeof(struct node));
    temp->key = item;
    temp->left = temp->right = NULL;
    return temp;
}

void traversetree(struct node *root)
{
    if (root != NULL)
    {
        traversetree(root->left);
        printf("%d \t", root->key);
        traversetree(root->right);
    }
}

struct node *search(struct node *root, int key)
{
    if (root == NULL || root->key == key)
        return root;
    if (root->key < key)
```

```
        return search(root->right, key);
    return search(root->left, key);
}

struct node *insert(struct node *node, int key)
{
    if (node == NULL)
        return newNode(key);
    if (key < node->key)
        node->left = insert(node->left, key);
    else if (key > node->key)
        node->right = insert(node->right, key);
    return node;
}

int main()
{
    int ch, i, num;
    struct node *root = NULL;
    printf("\n*****************************\n*  Name : Rajkumar B L     *\n*  Reg  : 2047120
 *\n*  Lab  : 12              *\n*  Prg  : BST             *\n*****************************\n\n");
    do
    {
        printf("\n========================\n\tMenu\n========================\n");
        printf("1. Insert a node. \n");
        printf("2. Search for a node. \n");
        printf("3. Traverse the BST. \n");
        printf("4. Exit \n");
        printf("========================\n");
        printf("Enter your choice: ");
        scanf("%d", &ch);

        switch (ch)
        {
        case 1:
            printf("Enter the number to be inserted: ");
            scanf("%d", &num);
            if (root == NULL){
                root = insert(root, num);
                printf("%d inserted successfully!\n",num);
            }
            else{
                insert(root, num);
                printf("%d inserted successfully!\n", num);
            }
            break;

        case 3:
            printf("The tree is :\n");
```

```
            traversetree(root);
            printf("\n");
            break;

        case 2:
            printf("Enter the number to be searched: ");
            scanf("%d", &num);

            printf("Searching for %d in the tree ", num);
            if (search(root, num))
                printf("\nElement found!\n");
            else
                printf("\nElement not found!\n");
            break;

        case 4:
            printf("Bye!\n\n");
            exit(0);

        default:
            printf("Invalid Input!\n");
        }
    } while (ch != 4);

    return 0;
}
```

Output:

```
Ubuntu 20.04 LTS
kumarraj@kumarraj:~/MCS_271/Labs/Lab12$
kumarraj@kumarraj:~/MCS_271/Labs/Lab12$

*****************************
*  Name : Rajkumar B L      *
*  Reg  : 2047120           *
*  Lab  : 12                *
*  Prg  : BST               *
*****************************


=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 1
Enter the number to be inserted: 50
50 inserted successfully!

=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 1
Enter the number to be inserted: 20
20 inserted successfully!
```

```
=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 1
Enter the number to be inserted: 70
70 inserted successfully!

=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 2
Enter the number to be searched: 50
Searching for 50 in the tree
Element found!

=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 2
Enter the number to be searched: 80
Searching for 80 in the tree
Element not found!
```

```
=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 2
Enter the number to be searched: 80
Searching for 80 in the tree
Element not found!

=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 3
The tree is :
20      50      70

=========================
        Menu
=========================
1. Insert a node.
2. Search for a node.
3. Traverse the BST.
4. Exit
=========================
Enter your choice: 4
Bye!

kumarraj@kumarraj:~/MCS_271/Labs/Lab12$
```