

10.Design, Develop and Implement a menu driven Program in C for the following operations on Binary Search Tree(BST) of Integers

- 1. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2**
- 2. Traverse the BST in Inorder, Preorder and Post Order**
- 3. Search the BST for a given element (KEY) and report the appropriate message**
- 4. Exit**

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
struct BST
```

```
{  
    int data;  
    struct BST * lchild;  
    struct BST * rchild;  
};
```

```
typedef struct BST * NODE;
```

```
NODE create()
```

```
{  
    NODE temp;  
    temp = (NODE) malloc(sizeof(struct BST));  
    printf("\nEnter The value: ");  
    scanf("%d", & temp -> data);  
  
    temp -> lchild = NULL;  
    temp -> rchild = NULL;  
    return temp;  
}
```

```
void insert(NODE root, NODE newnode);
```

```

void inorder(NODE root);
void preorder(NODE root);
void postorder(NODE root);
void search(NODE root);

void insert(NODE root, NODE newnode)
{

    if (newnode -> data < root -> data)
    {
        if (root -> lchild == NULL)
            root -> lchild = newnode;
        else
            insert(root -> lchild, newnode);
    }
    if (newnode -> data > root -> data)
    {
        if (root -> rchild == NULL)
            root -> rchild = newnode;
        else
            insert(root -> rchild, newnode);
    }
}

void search(NODE root)
{
    int key;
    NODE cur;
    if (root == NULL)
    {
        printf("\nBST is empty.");
    }
}

```

```

        return;
    }
    printf("\nEnter Element to be searched: ");
    scanf("%d", & key);
    cur = root;
    while (cur != NULL)
    {
        if (cur -> data == key)
        {
            printf("\nKey element is present in BST ");
            return;
        }
        if (key < cur -> data)
            cur = cur -> lchild;
        else
            cur = cur -> rchild;
    }
    printf("\nKey element is not found in the BST ");
}

```

```

void inorder(NODE root)
{
    if (root != NULL)
    {
        inorder(root -> lchild);
        printf("%d ", root -> data);
        inorder(root -> rchild);
    }
}

```

```

void preorder(NODE root)

```

```

{
    if (root != NULL)
    {
        printf("%d ", root -> data);
        preorder(root -> lchild);
        preorder(root -> rchild);
    }
}

```

```

void postorder(NODE root)
{
    if (root != NULL)
    {
        postorder(root -> lchild);
        postorder(root -> rchild);
        printf("%d ", root -> data);
    }
}

```

```

void main()
{
    int ch, key, val, i, n;
    NODE root = NULL, newnode;
    while (1)
    {
        printf("\n-----BST MENU-----");
        printf("\n1.Create a BST ");
        printf("\n2.Search ");
        printf("\n3.BST Traversals: ");
        printf("\n4.Exit");
        printf("\nEnter your choice: ");
    }
}

```

```

scanf("%d", & ch);
switch (ch)
{
case 1:
    printf("\nEnter the number of elements: ");
    scanf("%d", & n);
    for (i = 1; i <= n; i++)
    {
        newnode = create();
        if (root == NULL)
            root = newnode;
        else
            insert(root, newnode);
    }
    break;

case 2:
    if (root == NULL)
        printf("\nTree Is Not Created ");
    else
    {
        printf("\nThe Preorder display: ");
        preorder(root);
        printf("\nThe Inorder display: ");
        inorder(root);
        printf("\nThe Postorder display: ");
        postorder(root);
    }

    break;

case 3:
    search(root);

```

```

        break;

    case 4:
        exit(0);
    }
}
}

```

OUTPUT

-----BST MENU-----

1.Create a BST

2.Search

3.BST Traversals:

4.Exit

Enter your choice: 1

Enter the number of elements: 12

Enter The value: 6

Enter The value: 9

Enter The value: 5

Enter The value: 2

Enter The value: 8

Enter The value: 15

Enter The value: 24

Enter The value: 14

Enter The value: 7

Enter The value: 8

Enter The value: 5

Enter The value: 2

-----BST MENU-----

1.Create a BST

2.Search

3.BST Traversals:

4.Exit

Enter your choice: 3

The Preorder display: 6 5 2 9 8 7 15 14 24

The Inorder display: 2 5 6 7 8 9 14 15 24

The Postorder display: 2 5 7 8 14 24 15 9 6

-----BST MENU-----

- 1.Create a BST
- 2.Search
- 3.BST Traversals:
- 4.Exit

Enter your choice: 2

Enter Element to be searched: 66
Key element is not found in the BST

-----BST MENU-----

- 1.Create a BST
- 2.Search
- 3.BST Traversals:
- 4.Exit

Enter your choice: 2

Enter Element to be searched: 14
Key element is present in BST

-----BST MENU-----

- 1.Create a BST
- 2.Search
- 3.BST Traversals:
- 4.Exit

Enter your choice: 4