**Program 10:**

**Develop a menu driven Program in C for the following operations on Binary Search Tree (BST) of Integers .**

**a. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2**

**b. Traverse the BST in Inorder, Preorder and Post Order**

**c. Search the BST for a given element (KEY) and report the appropriate message**

**d. 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)

{

/\*Note: if newnode->data == root->data it will be skipped. No duplicate nodes are allowed \*/

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);

}

}

}