1. Write a C program to implement the Tree Traversals (Inorder, Preorder, Postorder)

#include <stdio.h>

#include <stdlib.h>

struct node {

int data;

struct node \*leftChild;

struct node \*rightChild;

};

struct node \*root = NULL;

void insert(int data) {

struct node \*tempNode = (struct node\*) malloc(sizeof(struct node));

struct node \*current;

struct node \*parent;

tempNode->data = data;

tempNode->leftChild = NULL;

tempNode->rightChild = NULL;

if(root == NULL) {

root = tempNode;

} else {

current = root;

parent = NULL;

while(1) {

parent = current;

if(data < parent->data) {

current = current->leftChild;

if(current == NULL) {

parent->leftChild = tempNode;

return;

}

}

else {

current = current->rightChild;

if(current == NULL) {

parent->rightChild = tempNode;

return;

}

}

}

}

}

struct node\* search(int data) {

struct node \*current = root;

printf("Visiting elements: ");

while(current->data != data) {

if(current != NULL)

printf("%d ",current->data);

if(current->data > data) {

current = current->leftChild;

}

else {

current = current->rightChild;

}

if(current == NULL) {

return NULL;

}

}

return current;

}

void pre\_order\_traversal(struct node\* root) {

if(root != NULL) {

printf("%d ",root->data);

pre\_order\_traversal(root->leftChild);

pre\_order\_traversal(root->rightChild);

}

}

void inorder\_traversal(struct node\* root) {

if(root != NULL) {

inorder\_traversal(root->leftChild);

printf("%d ",root->data);

inorder\_traversal(root->rightChild);

}

}

void post\_order\_traversal(struct node\* root) {

if(root != NULL) {

post\_order\_traversal(root->leftChild);

post\_order\_traversal(root->rightChild);

printf("%d ", root->data);

}

}

int main() {

int i;

int array[7] = { 27, 14, 35, 10, 19, 31, 42 };

for(i = 0; i < 7; i++)

insert(array[i]);

i = 31;

struct node \* temp = search(i);

if(temp != NULL) {

printf("[%d] Element found.", temp->data);

printf("\n");

}else {

printf("[ x ] Element not found (%d).\n", i);

}

i = 15;

temp = search(i);

if(temp != NULL) {

printf("[%d] Element found.", temp->data);

printf("\n");

}else {

printf("[ x ] Element not found (%d).\n", i);

}

printf("\nPreorder traversal: ");

pre\_order\_traversal(root);

printf("\nInorder traversal: ");

inorder\_traversal(root);

printf("\nPost order traversal: ");

post\_order\_traversal(root);

return 0;

}