TREE TRAVERSALS

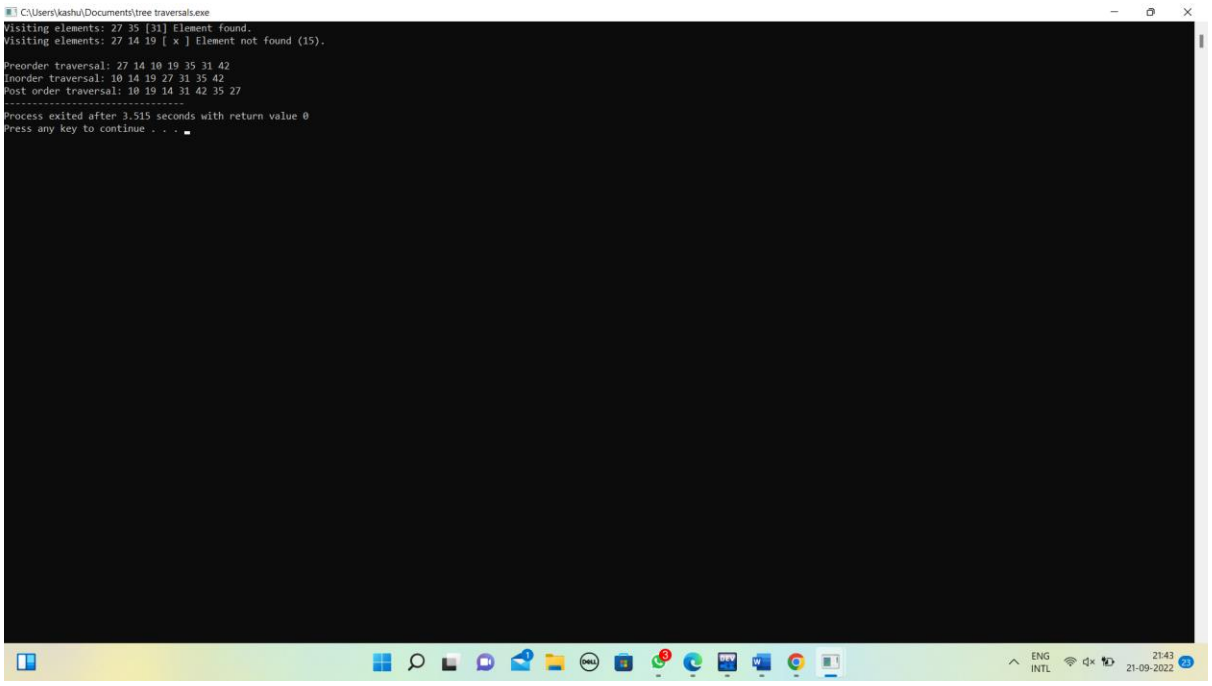
```
#include <stdio.h>
#include <stdlib.h>

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 tree is empty
  if(root == NULL) {
    root = tempNode;
  } else {
    current = root;
    parent = NULL;
```

```
      while(1) {
        parent = current;

        //go to left of the tree
        if(data < parent->data) {
          current = current->leftChild;

          //insert to the left
          if(current == NULL) {
            parent->leftChild = tempNode;
            return;
          }
        }  //go to right of the tree
        else {
          current = current->rightChild;

          //insert to the right
          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);

      //go to left tree
      if(current->data > data) {
         current = current->leftChild;
      }
      //else go to right tree
      else {
         current = current->rightChild;
      }

      //not found
      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;
}
```

OUTPUT:


C:\Users\kashu\Documents\tree traversals.exe

```
Visiting elements: 27 35 [31] Element found.
Visiting elements: 27 14 19 [ x ] Element not found (15).

Preorder traversal: 27 14 10 19 35 31 42
Inorder traversal: 10 14 19 27 31 35 42
Post order traversal: 10 19 14 31 42 35 27
--------------------------------
Process exited after 3.515 seconds with return value 0
Press any key to continue . . .
```