Program 8

Write a program

a) To construct a binary Search tree.

b) To traverse the tree using all the methods i.e., in-order, preorder and post order

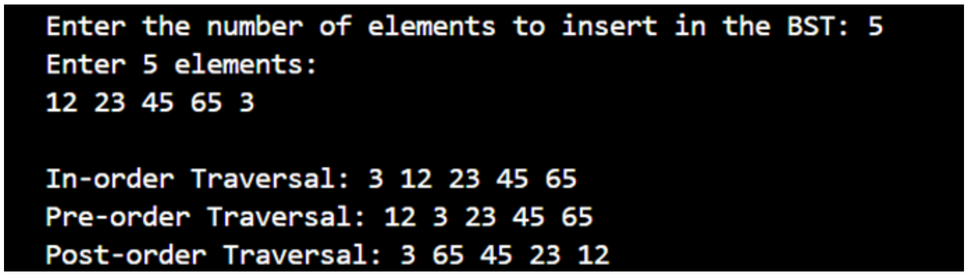
c) To display the elements in the tree.

Code:

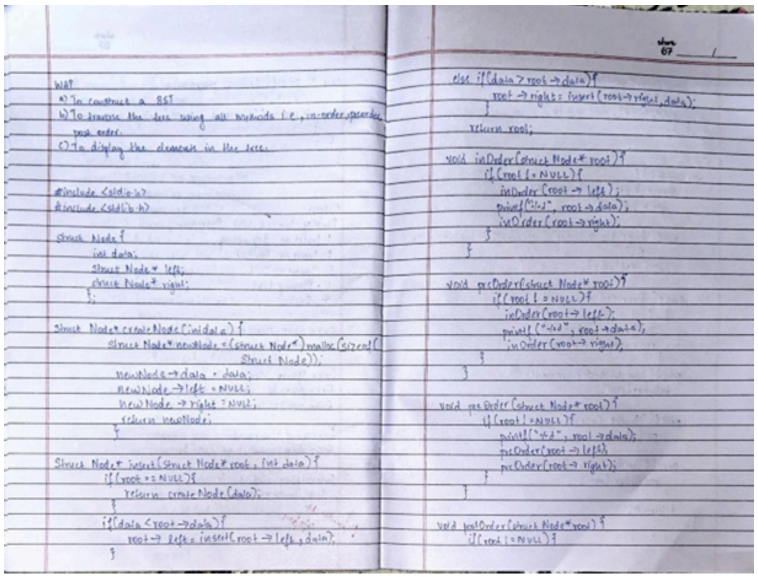
```
#include <stdio.h>

#include <stdlib.h>

 struct Node {

            int data;

            struct Node* left;

            struct Node* right;

};

 struct Node* createNode(int data) {

            struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));

   newNode->data = data;

   newNode->left = NULL;

   newNode->right = NULL;

            return newNode;

}

 struct Node* insert(struct Node* root, int data) {

            if (root == NULL) {

       return createNode(data);
```

```
            }
            if (data < root->data) {
        root->left = insert(root->left, data);
            } else if (data > root->data) {
        root->right = insert(root->right, data);
            }
            return root;
}
 void inOrder(struct Node* root) {
            if (root != NULL) {
        inOrder(root->left);
        printf("%d ", root->data);
        inOrder(root->right);
            }
}
 void preOrder(struct Node* root) {
            if (root != NULL) {
        printf("%d ", root->data);
        preOrder(root->left);
        preOrder(root->right);
            }
}
```

```
void postOrder(struct Node* root) {
        if (root != NULL) {
     postOrder(root->left);
     postOrder(root->right);
     printf("%d ", root->data);
        }
}
 int main() {
        struct Node* root = NULL;
        int n, value;
 printf("Enter the number of elements to insert in the BST: ");
   scanf("%d", &n);
      printf("Enter %d elements:\n", n);
        for (int i = 0; i < n; i++) {
     scanf("%d", &value);
     root = insert(root, value);
        }
 printf("\nIn-order Traversal: ");
   inOrder(root);
 printf("\nPre-order Traversal: ");
   preOrder(root);
        printf("\nPost-order Traversal: ");
        postOrder(root);
        return 0;

}
```



```
Enter the number of elements to insert in the BST: 5
Enter 5 elements:
12 23 45 65 3

In-order Traversal: 3 12 23 45 65
Pre-order Traversal: 12 3 23 45 65
Post-order Traversal: 3 65 45 23 12
```



WAP
a) To construct a BST
b) To traverse the tree using all methods i.e, in-order, preorder, post order.
c) To display the elements in the tree.

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

struct Node{
        int data;
        struct Node* left;
        struct Node* right;
    };

struct Node* createNode(int data){
        struct Node* newNode = (struct Node*)malloc(sizeof(
                                        struct Node));
        newNode→data = data;
        newNode→left = NULL;
        newNode→right = NULL;
        return newNode;
    }

struct Node* insert(struct Node* root, int data){
        if(root == NULL){
            return createNode(data);
        }
        if(data < root→data){
            root→left = insert(root→left, data);
        }
```

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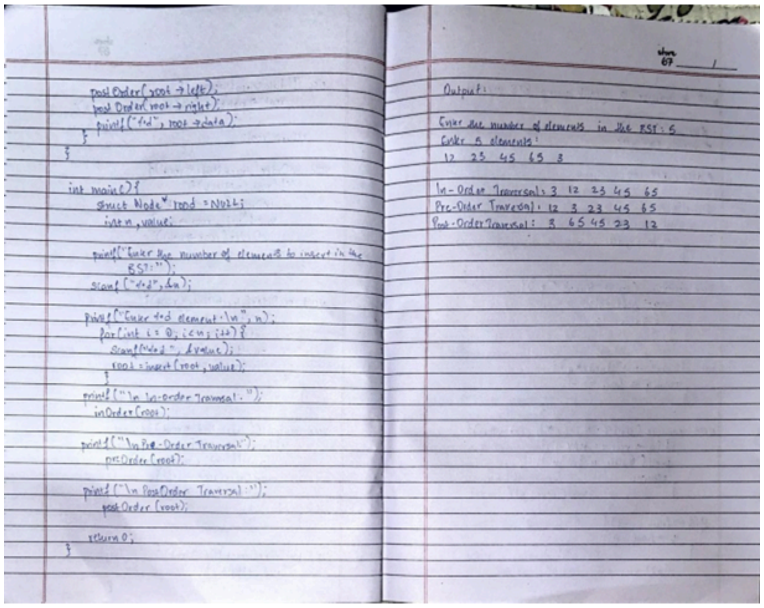
```
    else if(data > root→data){
            root→right = insert(root→right, data);
        }
    return root;

void inOrder(struct Node* root){
        if(root != NULL){
            inOrder(root→left);
            printf("%d", root→data);
            inOrder(root→right);
        }
    }

void preOrder(struct Node* root){
        if(root != NULL){
            inOrder(root→left);
            printf("%d", root→data);
            inOrder(root→right);
        }
    }

void preOrder(struct Node* root){
        if(root != NULL){
            printf("%d", root→data);
            preOrder(root→left);
            preOrder(root→right);
        }
    }

void postOrder(struct Node* root){
    if(root != NULL){
```



```
        postOrder(root→left);
        postOrder(root→right);
        printf("%d", root→data);
    }
}

int main(){
    struct Node* root = NULL;
    int n, value;

    printf("Enter the number of elements to insert in the
            BST: ");
    scanf("%d", &n);

    printf("Enter %d element:\n", n);
    for(int i = 0; i<n; i++){
        scanf("%d", &value);
        root = insert(root, value);
    }
    printf("\n In-order Traversal: ");
    inOrder(root);

    printf("\n Pre-Order Traversal: ");
        preOrder(root);

    printf("\n PostOrder Traversal: ");
        postOrder(root);

    return 0;
}
```

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Output:

```
Enter the number of elements in the BST: 5
Enter 5 elements:
12  23  45  65  3

In-Order Traversal: 3  12  23  45  65
Pre-Order Traversal: 12  3  23  45  65
Post-Order Traversal: 3  65 45  23  12
```