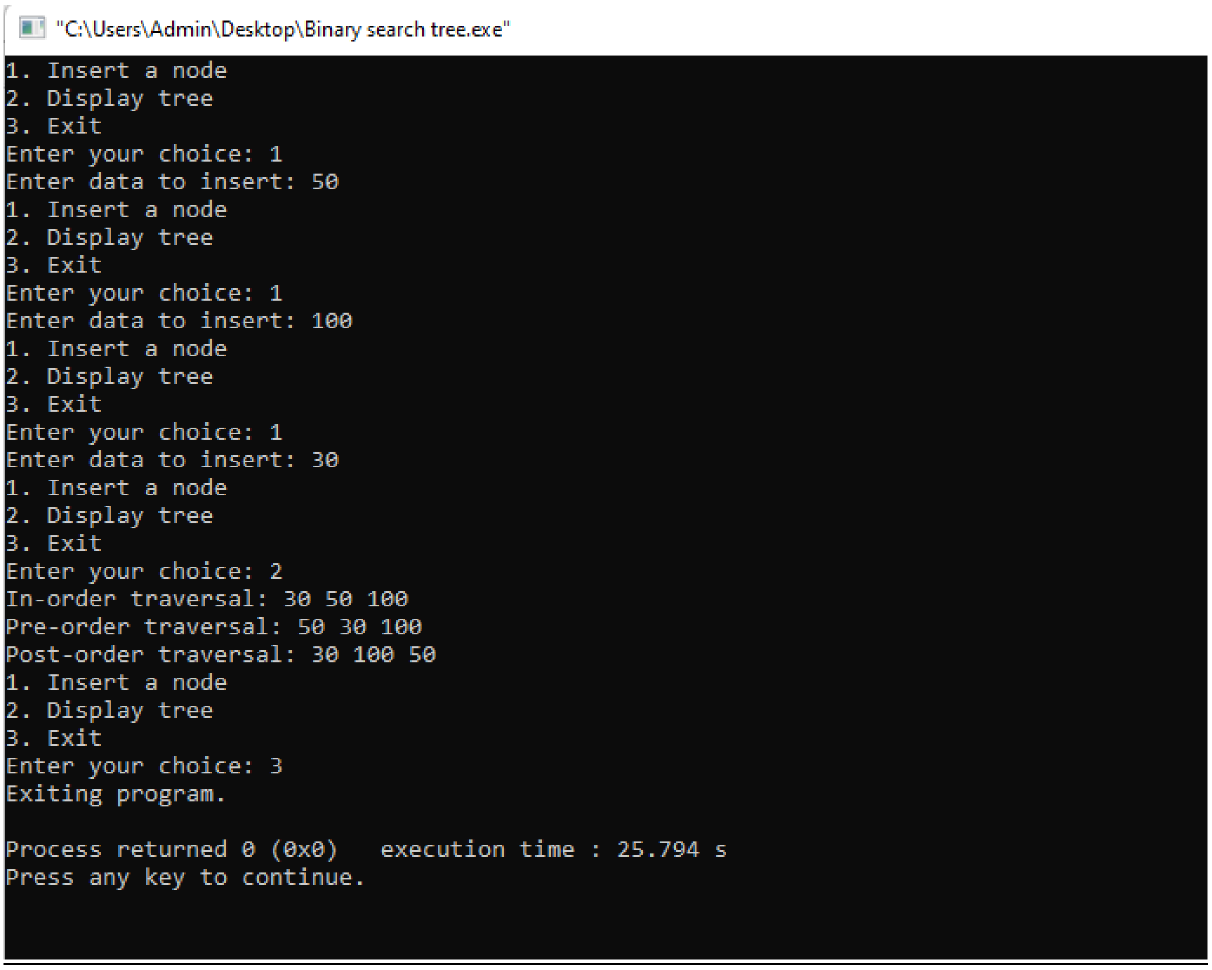
LAB -8 (Write a program
a. To construct a binary Search tree.
b. To traverse the tree using all the methods i.e., in-order, preorder and postorder
c. To display the elements in the tree.)

SOURCE CODE:

```
#include <stdio.h>
#include <stdlib.h>
struct TreeNode {
   int data;
   struct TreeNode* left;
   struct TreeNode* right;
};
struct TreeNode* createNode(int data) {
   struct TreeNode* newNode = (struct TreeNode*)malloc(sizeof(struct TreeNode));
   newNode->data = data;
   newNode->left = newNode->right = NULL;
   return newNode;
}
struct TreeNode* insertNode(struct TreeNode* root, int data) {
   if (root == NULL) {
      return createNode(data);
   }
   if (data < root->data) {
      root->left = insertNode(root->left, data);
   } else if (data > root->data) {
      root->right = insertNode(root->right, data);
   }
   return root;
}
void inOrderTraversal(struct TreeNode* root) {
   if (root != NULL) {
      inOrderTraversal(root->left);
      printf("%d ", root->data);
      inOrderTraversal(root->right);
   }
}
void preOrderTraversal(struct TreeNode* root) {
   if (root != NULL) {
      printf("%d ", root->data);
      preOrderTraversal(root->left);
      preOrderTraversal(root->right);
   }
}
void postOrderTraversal(struct TreeNode* root) {
   if (root != NULL) {
      postOrderTraversal(root->left);
```

```
        postOrderTraversal(root->right);
        printf("%d ", root->data);
    }
}
void displayTree(struct TreeNode* root) {
    printf("In-order traversal: ");
    inOrderTraversal(root);
    printf("\n");
    printf("Pre-order traversal: ");
    preOrderTraversal(root);
    printf("\n");
    printf("Post-order traversal: ");
    postOrderTraversal(root);
    printf("\n");
}
int main() {
    struct TreeNode* root = NULL;
    int choice, data;
    do {
        printf("1. Insert a node\n");
        printf("2. Display tree\n");
        printf("3. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);
        switch (choice) {
            case 1:
                printf("Enter data to insert: ");
                scanf("%d", &data);
                root = insertNode(root, data);
                break;
            case 2:
                if (root == NULL) {
                    printf("Tree is empty.\n");
                } else {
                    displayTree(root);
                }
                break;
            case 3:
                printf("Exiting program.\n");
                break;
            default:
                printf("Invalid choice. Please try again.\n");
        }
    } while (choice != 3);
    return 0;
}
```

OUTPUT:



"C:\Users\Admin\Desktop\Binary search tree.exe"

```
1. Insert a node
2. Display tree
3. Exit
Enter your choice: 1
Enter data to insert: 50
1. Insert a node
2. Display tree
3. Exit
Enter your choice: 1
Enter data to insert: 100
1. Insert a node
2. Display tree
3. Exit
Enter your choice: 1
Enter data to insert: 30
1. Insert a node
2. Display tree
3. Exit
Enter your choice: 2
In-order traversal: 30 50 100
Pre-order traversal: 50 30 100
Post-order traversal: 30 100 50
1. Insert a node
2. Display tree
3. Exit
Enter your choice: 3
Exiting program.

Process returned 0 (0x0)   execution time : 25.794 s
Press any key to continue.
```