Data Structures

Implementation of Deapth first Traversal

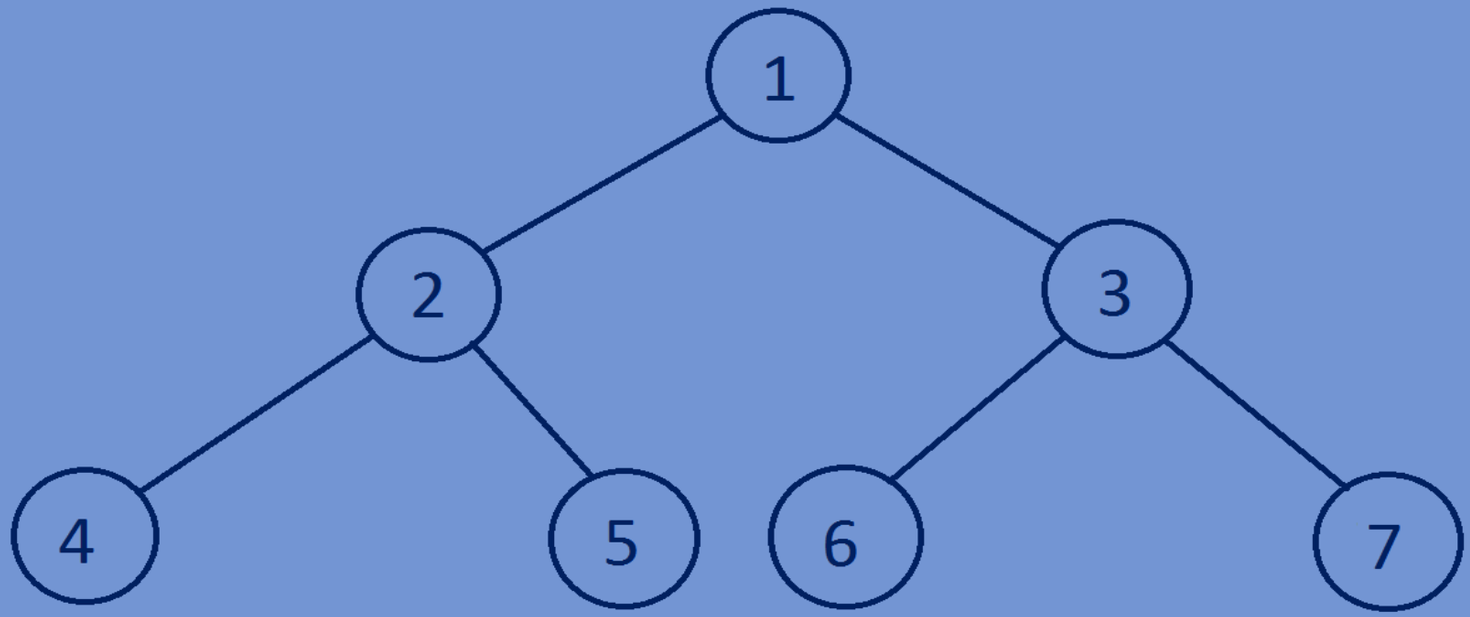
Depth first traversal:

- There are three ways of traversing in case of depth first traversal

  1)Preorder traversal(root->left->right).

  2)Inorder traversal(left->root->right).

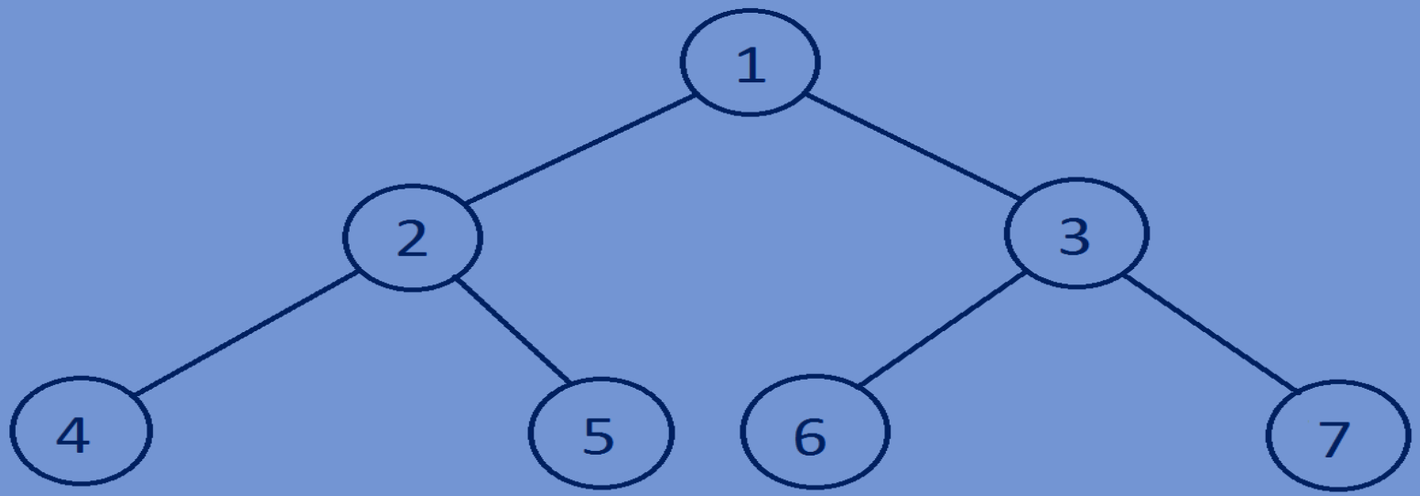
  3)Postorder traversal(left->right->root).



Function for printing all the elements of a tree in Preoder fashion:

- In this traversal the root node is visited first and then the left subtree and Finally the right subtree.
- Preorder traversal for the following binary tree is 1 2 4 5 3 6 7.

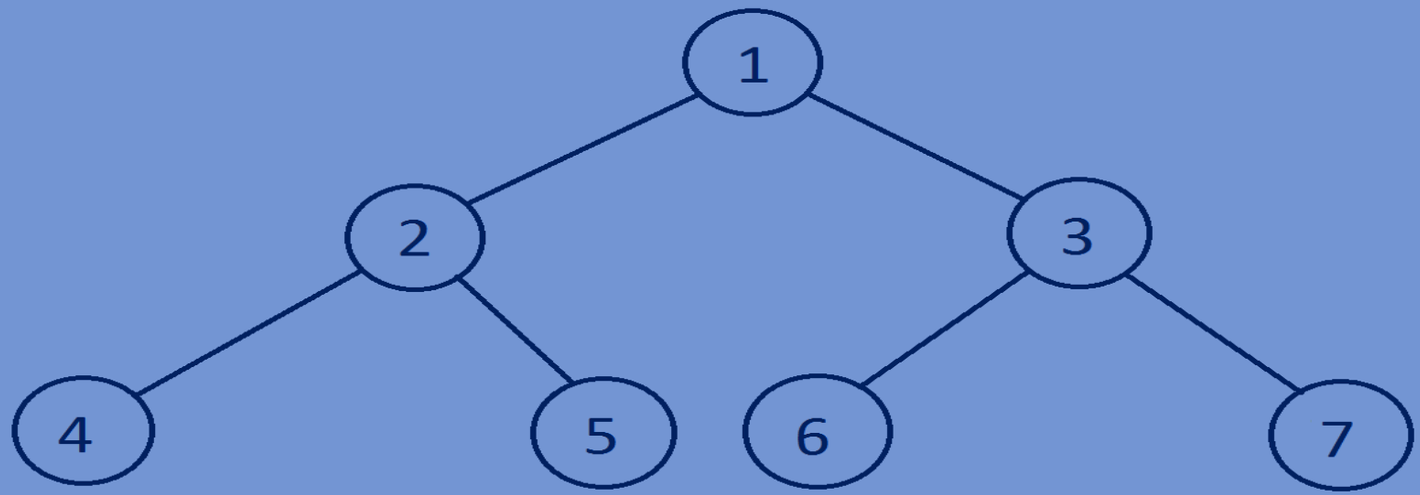
```
//preorder traversal
void preorderTraversal(Btree *tree){
    if(tree){
        printf("%d ",tree->data);
        preorderTraversal(tree->left);
        preorderTraversal(tree->right);
    }
}
```



Function for printing all the elements of a tree in Inorder fashion:

- In this traversal the left subtree is visited first and then the root node and finally The Right subtree .
- Inorder traversal for the following binary tree is 4 2 5 1 6 3 7.

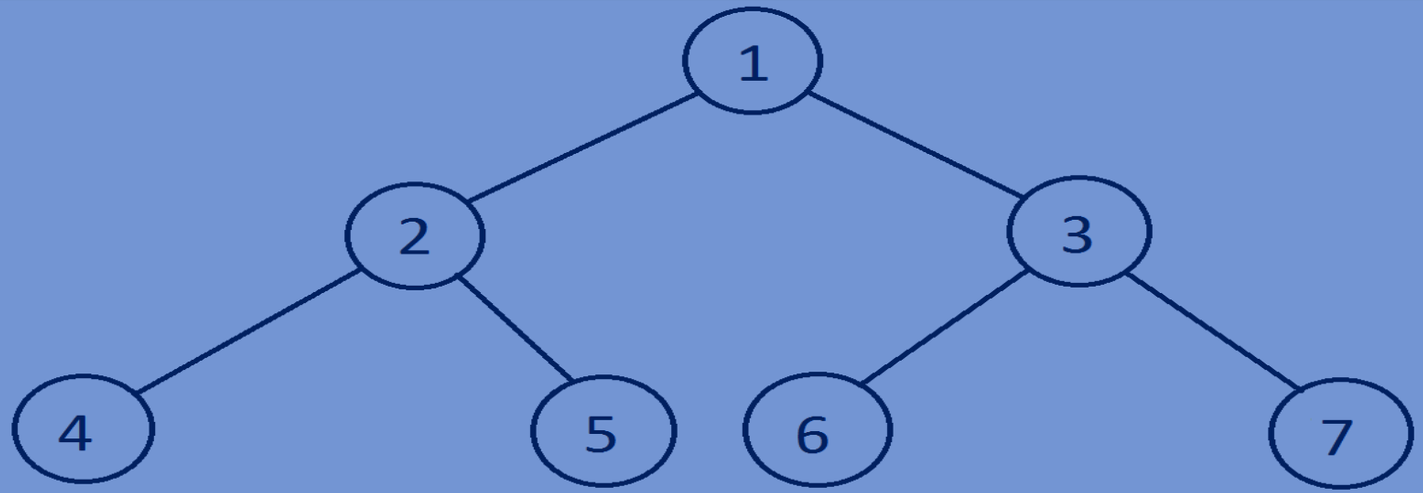
```
//inorder traversal
void inorderTraversal(Btree *tree){
    if(tree){
        inorderTraversal(tree->left);
        printf("%d ",tree->data);
        inorderTraversal(tree->right);
    }
}
```



Function for printing all the elements of a tree in Postorder fashion:

- In this traversal the left subtree is visited first and then the right subtree and Finally the root node.
- postorder traversal for the following binary tree is 4 5 2 6 7 3 1.

```
//postorder traversal
void postorderTraversal(Btree *tree){
    if(tree){
        postorderTraversal(tree->left);
        postorderTraversal(tree->right);
        printf("%d ",tree->data);
    }
}
```



Whole program:

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

//creating a Binary tree node.
typedef struct Btree{
    int data;
    struct Btree *left;
    struct Btree *right;
}Btree;
//create newnode
Btree *newnode(int data){
    Btree *tree=(Btree*)malloc(sizeof(Btree));
    tree->data=data;
    tree->left=NULL;
    tree->right=NULL;
    return tree;
}
//preorder traversal
```

```c
void preorderTraversal(Btree *tree){
    if(tree){
        printf("%d ",tree->data);
        preorderTraversal(tree->left);
        preorderTraversal(tree->right);
    }
}
//inorder traversal
void inorderTraversal(Btree *tree){
    if(tree){
        inorderTraversal(tree->left);
        printf("%d ",tree->data);
        inorderTraversal(tree->right);
    }
}
//postorder traversal
void postorderTraversal(Btree *tree){
    if(tree){
        postorderTraversal(tree->left);
        postorderTraversal(tree->right);
        printf("%d ",tree->data);
    }
```

```
}
//main function
int main(){
    Btree *tree;
    tree=newnode(1);
    tree->left=newnode(2);
    tree->right=newnode(3);
    tree->left->left=newnode(4);
    tree->left->right=newnode(5);
    tree->right->left=newnode(6);
    tree->right->right=newnode(7);
    preorderTraversal(tree);printf("\n");
    inorderTraversal(tree);printf("\n");
    postorderTraversal(tree);
    return 0;
}
```

Output:

```
1 2 4 5 3 6 7
4 2 5 1 6 3 7
4 5 2 6 7 3 1
```