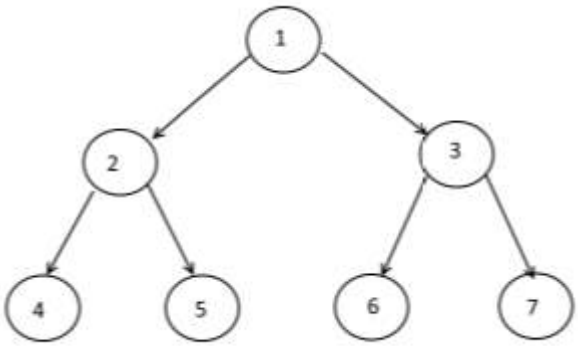
Chapter 7: Binary Tree traversals

Visiting a node of a binary tree in some particular order is called traversals.

Section 7.1: Level Order traversal - Implementation

For example if the given tree is:



Level order traversal will be

1 2 3 4 5 6 7

Printing node data level by level.

Code:

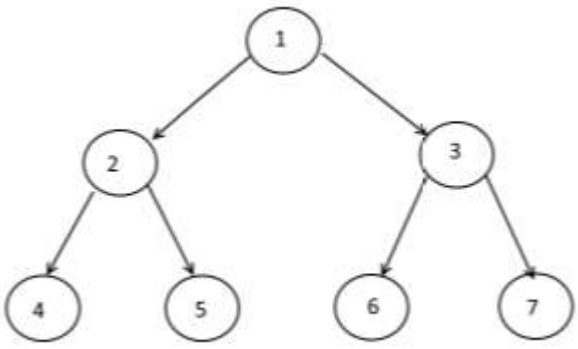
```
#include<iostream>
#include<queue>
#include<malloc.h>

using namespace std;

struct node{

    int data;
    node *left;
    node *right;
};

void levelOrder(struct node *root){

        if(root == NULL)    return;

        queue<node *> Q;
        Q.push(root);

        while(!Q.empty()){
        struct    node* curr = Q.front();
            cout<< curr->data <<" ";
            if(curr->left != NULL) Q.push(curr-> left);
                if(curr->right != NULL) Q.push(curr-> right);

                Q.pop();


        }
```

```
}
struct node* newNode(int data)
{
    struct node* node = (struct node*)
                        malloc(sizeof(struct node));
    node->data = data;
    node->left = NULL;
    node->right = NULL;

    return(node);
}

int main(){

    struct node *root = newNode(1);
    root->left        = newNode(2);
    root->right       = newNode(3);
    root->left->left  = newNode(4);
    root->left->right = newNode(5);
    root->right->left  = newNode(6);
    root->right->right = newNode(7);


    printf("Level Order traversal of binary tree is \n");
    levelOrder(root);

    return 0;


}
```

Queue data structure is used to achieve the above objective.

Section 7.2: Pre-order, Inorder and Post Order traversal of a Binary Tree

Consider the Binary Tree:



Pre-order traversal(root) is traversing the node then left sub-tree of the node and then the right sub-tree of the node.

So the pre-order traversal of above tree will be:

1 2 4 5 3 6 7

In-order traversal(root) is traversing the left sub-tree of the node then the node and then right sub-tree of the

node.

So the in-order traversal of above tree will be:

4 2 5 1 6 3 7

Post-order traversal(root) is traversing the left sub-tree of the node then the right sub-tree and then the node.

So the post-order traversal of above tree will be:

4 5 2 6 7 3 1