***Introduction to Data Structure and Algorithm in C++ (*TREES*)***

Activities for this lab:

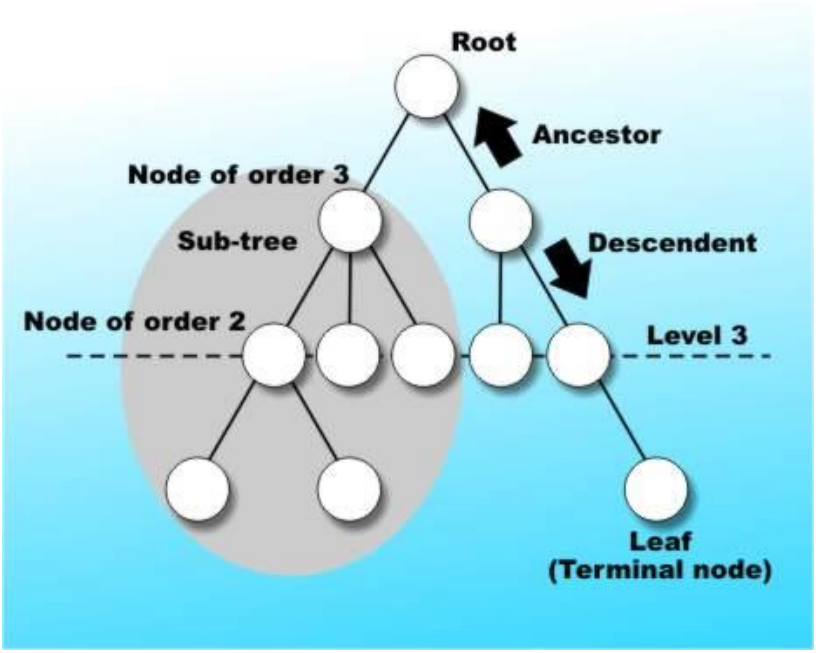
- **Explain the concepts of TREE/BST**
- ***TREE creation and implementation using BST***
- ***B-TREE Traversal methods, inoder, post order and predorder***
- ***Recursive Algorithms for above mentioned lab exercise***

# TREES

**OVERVIEW**

A tree is a data structure consisting of nodes organized as a hierarchy. A tree T is a set of nodes storing elements such that the nodes have a parent-child relationship that satisfies the following :

- if T is not empty, T has a special tree called the root that has no parent
- each node v of T different than the root has a unique parent node w; each node with parent w is a child of w

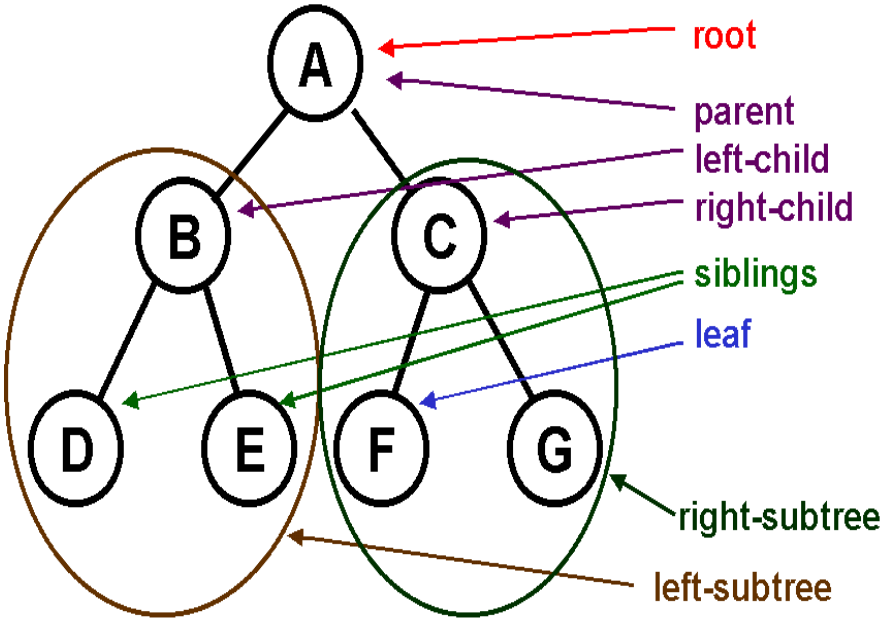


**AIM:**

- To perform all tree operation:

## Binary Tree:

A tree whose elements have at most 2 children is called a binary tree. Since each element in a binary tree can have only 2 children, we typically name them the left and right child.




## Inorder Traversal

1. Traverse left subtree
2. root node,
3. traverse right subtree

## Sample Algorithm of Inorder

```
1. Initialize current as root
 2. While current is not NULL
Traverse the leftsubtree,  current = current->left
  If current does not have left child
   a. Print current's data
   b. Go to the right, (Traverse Right Subtree)i.e., current =
current->right
  Else
```

```
   a. In current's left subtree, make current the right child of
the rightmost node
   b. Go to this left child, i.e., current = current->left
```

## Post Order Traversal

- Traverse left subtree,
- traverse right subtree,
- visit node

## Pre-order Traversal

In a preorder traversal, a node is visited before its descendants

- Visit node(Root),
- traverse left subtree,
- traverse right subtree

## Lab Exercise

Modify the code given in the lab session, split the code into three subcodes: tree.cpp, tree.h and main.cpp. Complete the Post order and pre order traversal of the tree.

Create a Menu that enable user to add node to the tree and an enter option for following operations

- PostOrder Traversal ()
- Preorder Traversal ()
- Preorder Traversal ()
- exit

## Group Assignment

Modify/Extend the given code in class, (BST) to enable user insert some nodes, Size of the tree() and find a given target node from the list of nodes.

SUBMIT BEFORE or By 20th November 2015