

# Advanced Programming Practices

## Lab - 12

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T is a tree if:

- T is empty, or
- T has a node and zero or more non-empty subtrees (each of which is also a tree.)

### Binary Tree:

In a binary tree, each node has two subtrees, either of which can be empty.

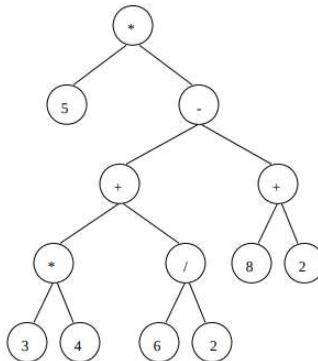
we can represent such a tree with a `TreeNode` struct that contains two child pointers -- left and right -- like so:

```
struct TreeNode
{
    int value;
    TreeNode *left;
    TreeNode *right;
};
```

1. Using linked list representation, create a binary tree for the expression:

$$5 * ((3 * 4) + (6 / 2)) - (8 + 2)$$

2. For the tree created in Program 1, that is,



Write the program for the function(s) to traverse the tree in preorder, postorder and inorder traversal.

3. For the tree created in program 1, write a program for counting the number of leaf nodes.
4. Write a program to evaluate the expression given in Program 1, using its tree.