

Write-up	Correctness of Program	Documentation of Program	Viva	Timely Completion	Total	Dated Sign of Subject Teacher
2	2	2	2	2	10	

**Assignment No. 04**

Date of Performance: .....

**AIM:** Construct and expression tree from postfix/prefix expression and perform recursive and non-recursive In-order, pre-order and post-order traversals.

**OBJECTIVE:**

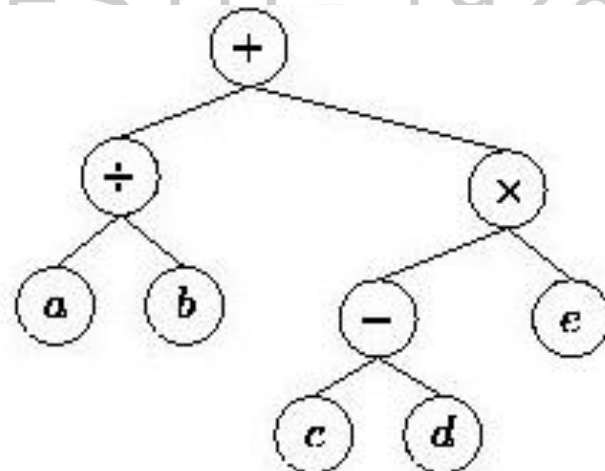
1. Understand the concept of expression tree and binary tree.
2. Understand the different type of traversals (recursive & non-recursive).

**THEORY:**

**Definition of an expression tree with diagram.**

Algebraic expressions such as  $a/b + (c-d) e$

The terminal nodes (leaves) of an expression tree are the variables or constants in the expression (a, b, c, d, and e). The non-terminal nodes of an expression tree are the operators (+, -, x, and /). Notice that the parentheses which appear in Equation do not appear in the tree. Nevertheless, the tree representation has captured the intent of the parentheses since the subtraction is lower in the tree than the multiplication.



**Show the different type of traversals with example** to traverse a non-empty binary tree in **preorder**,

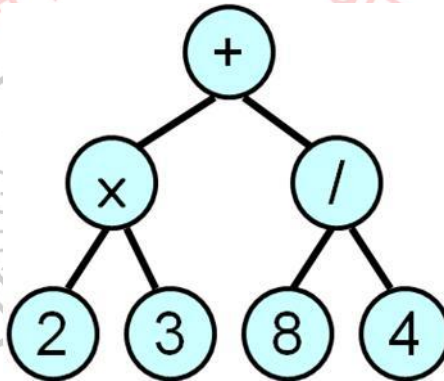
1. Visit the root.
2. Traverse the left subtree.
3. Traverse the right subtree.

To traverse a non-empty binary tree in **inorder**:

1. Traverse the left subtree.
2. Visit the root.
3. Traverse the right subtree.

To traverse a non-empty binary tree in **postorder**,

1. Traverse the left subtree.
2. Traverse the right subtree.
3. Visit the root.



- **Pre-order (prefix)**

+ x 2 3 / 8 4

- **In-order (infix)**

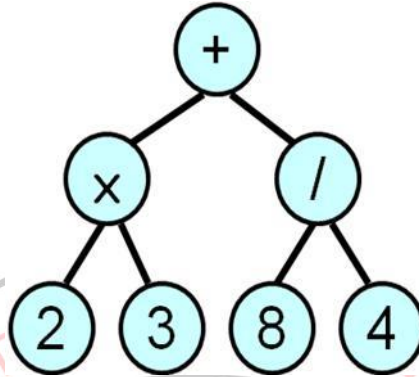
2 x 3 + 8 / 4

- **Post-order (postfix)**

2 3 x 8 4 / +

**Write algorithm**

1. Create Expression Tree:
2. Inorder Traversal Recursive:
3. Postorder Traversal Recursive:
4. Preorder Traversal Recursive:
5. Postorder Traversal Nonrecursive:
6. Preorder Traversal Nonrecursive:

**Inorder Traversal Nonrecursive:****INPUT: Postfix Expression: 2 3 x 8 4 / +****OUTPUT:** Display result of each operation with error checking.**Expression tree**

**OUTCOME:** After successful implementation of this assignment, we understood

**FAQS:**

1. What is tree? What are properties of trees?
2. What is Binary tree, Binary search tree, Expression tree & General tree?
3. What are the members of structure of tree & what is the size of structure?
4. What are rules to construct binary tree?
5. What is preorder, postorder, inorder traversal?
6. Difference between recursive & Nonrecursive traversal?
7. What are rules to construct binary search tree?
8. What are rules to construct expression tree?
9. How binary tree is constructed from its traversals?