PUNE INSTITUTE OF COMPUTER TECHNOLOGY

INFORMATION TECHNOLOGY

ACADEMIC YEAR -2020_21

SUB: DSA 2019 course Semester – I

DSFL ASSIGMENT NO 4 WRITUP OUTLINE

<table>
<tr><td>1</td><td>Title</td><td>Assignment 4: Expression Tree Creation and Traversal</td></tr>
<tr><td>2.</td><td>Aim</td><td>To implement a expression tree using stack data structures</td></tr>
<tr><td>3.</td><td>Problem statement</td><td>Construct an expression tree for postfix expression and perform recursive and non- recursive Inorder, Preorder and Postorder traversals.</td></tr>
<tr><td>4.</td><td>Objective</td><td></td></tr>
<tr><td>5.</td><td>Outcome</td><td></td></tr>
<tr><td>6.</td><td>Theory</td><td>C. Theory ::
1. Concept of Non Linear Data structure with example
2. Binary tree concept ,definition, terminology with diagram
3. Binary tree ADT
4. Realization of ADT with Array and linked list
5. Binary Tree applications
6. Expression tree concepts
7. Examples with postfix and prefix expression’
8. Application of Expression tree</td></tr>
<tr><td>7.</td><td>Algorithms /Pseudocode:</td><td>Write down the pseudocode for the following operations and explain each of them with appropriate examples and data structure
i. Expression tree creations (postfix/prefix expression)
ii. Recursive inorder, preorder , postorder traversal
iii. non Recursive inorder, preorder , postorder traversal</td></tr>
<tr><td>8.</td><td>Test cases/validation</td><td>Validations :
1. No of operator and Operand relationship
Test Cases:
<table>
<tr><th>Sr. No.</th><th>Sample Infix Expression</th><th>Postfix</th><th>Prefix</th></tr>
<tr><td>1.</td><td>A+B*C</td><td>ABC*+</td><td>+A*CB</td></tr>
<tr><td>2.</td><td>A*B-C</td><td>AB*C-</td><td>-*ACB</td></tr>
<tr><td>3.</td><td>A^B-C</td><td>AB^C-</td><td>-^ABC</td></tr>
<tr><td>4.</td><td>A+B*C^E</td><td>ABCE^*+</td><td>+A*B^CE</td></tr>
<tr><td>5.</td><td>A-B*C+A</td><td>ABC*-A+</td><td>-+A*BCA</td></tr>
<tr><td>6.</td><td>(A+B)/(C+D)^E^F-D*F-D</td><td>AB+CD+EF^^/DF*-D-</td><td>/+AB+CD^EF*DFD</td></tr>
<tr><td>7.</td><td>A+B+C</td><td>AB+C+</td><td>++ABC</td></tr>
<tr><td>8.</td><td>A*B/C</td><td>AB*C/</td><td>/*ACB</td></tr>
<tr><td>9.</td><td>A^B^C</td><td>ABC^^</td><td>^A^BC</td></tr>
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09	**Program**	Printout /Softcopy
10.	**Results /output**	Including test cases , validations and valid inputs based results .
11.	**Conclusion**	

Subject coordinator
Seema Chandak
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