

Pre/Post/Infix Notation

ICT Officers

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1 Introduction

Prefix, Postfix, and Infix notations are different ways of writing math expressions.

1.1 Infix

Infix notation is the notation that is regularly used. The operators are in between the operands. Ex: $A + B$

1.2 Prefix

In prefix notation, the operators are before the operands. Ex: $+ A B$

1.3 Postfix

In postfix notation, the operators are after the operands. Ex: $A B +$

2 Evaluating

An easy way to evaluate postfix and prefix is to insert parentheses whenever an operation occurs.

2.1 Postfix

$AB*CD/+ = ((A B *) (C D /) +)$

Multiply A and B, Divide C by D, then add the results.

2.2 Prefix

$-*DA/+BCD = (- (* D A) (/ (+ B C) D))$

Multiply A and D, and subtract the quotient of the sum of B and C and D.

3 Converting between any notation

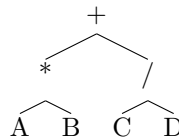
1. Inserting parentheses so that each term has an operator and its corresponding operands
2. write down the operand in the same order
3. look at each term from the inner parenthesis pair to outer, left to right
4. add the operator before (after or in between) the operands

Converting postfix to infix:

$$AB*CD/+ = ((A B *) (C D /) +) \rightarrow ((A * B) + (C / D)) = A*B + C/D$$

Another way of converting is creating a binary tree where operators are parents and operands are children. Different traversals of the tree result in different notations.

Starting expression: $A*B + C/D$



Pre-order Traversal: $+*AB/CD$

In-order Traversal: $A*B + C/D$

Post-order Traversal: $AB*CD/+$

4 Practice Problems

1. If the binary operator @ is the average of its two operands, evaluate $3\ 2\ 4\ @\ * \ 4\ 6\ @\ 3\ *\ @ :$
2. Let # represent the unary operation, greatest integer less than or equal to the value of its operand. Evaluate the following expression.
 $+ \# / * \ 2\ 3\ 4 \ / \# - \ 1\ 3 \ \# / - \uparrow \ 6\ 2\ 4\ 6$
3. Convert $ABC^*D/E+GH-+$ to prefix

5 Answers

1. 12
2. .6
3. $++/*A^BCDE-GH$