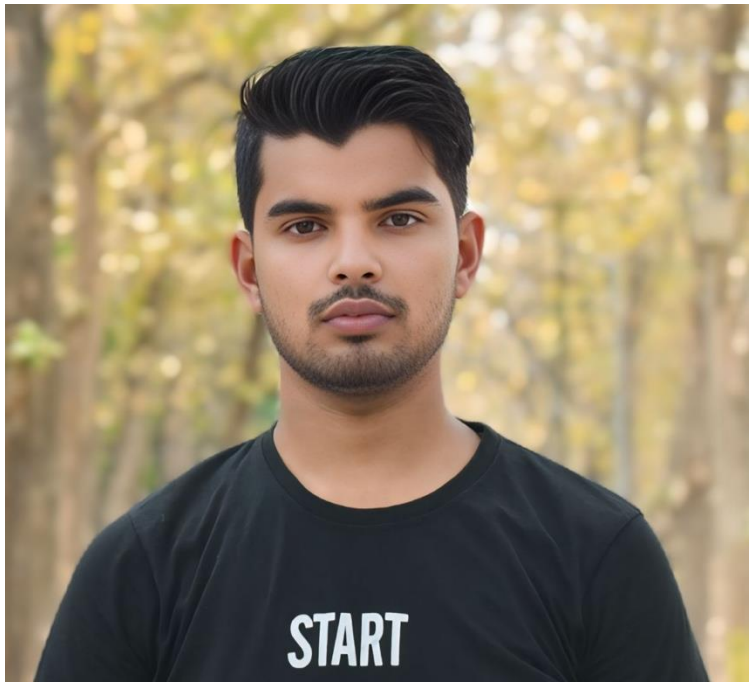
DSA through C++

Polish Notation



Mohammad Tasin (Tasin Coder)

Agenda

- Introduction to Polish Notation
- Infix Notation
- Prefix Notation
- Postfix Notation

Introduction to Polish Notation

- The method of writing operators of an expression either before their operands or after them is called the **Polish Notation**

  - **Infix Notation** → **A+B**
  - **Prefix Notation** → **+AB**
  - **Postfix Notation** → **AB+**

Practice

- Infix : A + B * C
- Prefix : +A*BC
- Postfix : ABC*+
- Infix : A * B + C /(D - E)
- Prefix : ++*AB/C-DE
- Postfix : AB*CDE-/+
- Infix : A - B * (C + D) - E
- Prefix : --A*B+CDE
- Postfix : ABCD+*-E-

Practice

A*B+C/(D-E)

A*B+C/DE-

AB*+C/DE-

AB*+CDE-/

AB*CDE-/+

Infix to Postfix

Suppose Q is an arithmetic expression written in infix notation. This algorithm finds the equivalent postfix expression P.

1. PUSH '(' onto the STACK and add ')' to the end of Q.
2. Scan Q from left to right and repeat steps 3 to 6 for each element of Q until the STACK is empty.
3. If an operand is encountered add it top
4. If a left parenthesis is encountered, PUSH it onto the STACK.

5. If an operator (say #) is encountered, then :-
    a. Repeatedly pop from STACK and add to P each operator which has the same or high precedence than #
    b. Add # to STACK
6. If a right parenthesis is encountered, then :-
    a. Repeatedly pop from the STACK and add to P each operator until a left parenthesis is encountered
    b. Remove the left parenthesis
7. Exit.