

INFIX, POSTFIX and PREFIX notations

INFIX notation: An expression is said to be in INFIX notation if the operator is in between the operands. For example: $A + B$ is in INFIX notation.

POSTFIX notation: An expression is said to be in POSTFIX notation if the operator is after the operands. For example: $A B +$ is in POSTFIX notation.

PREFIX notation: An expression is said to be in PREFIX notation if the operator is before the operands. For example: $+ A B$ is in PREFIX notation.

INFIX to POSTFIX conversion

The following conversion logic will work only for the INFIX expression, which is fully parenthesized according to **BEDMAS** (Brackets, Exponents, Divide, Multiply, Add, Subtract) rule.

Order of operations

Order	Operator	Remarks
1	()	
2	^	
3	* or /	Whichever occurs first
4	+ or -	Whichever occurs first

Conversion Logic

1. If Operator, PUSH to stack
2. If Operand, Output as POSTFIX
3. If), POP from stack and output as POSTFIX

Example1 $A+B*C=(A+(B*C))$

INFIX	STACK	POSTFIX
(
A		A
+	+	A
(+	A
B	+	A B
*	+ *	A B
C	+ *	A B C
)	+	A B C *
)		A B C * +

Example2 $A-B+C/D=((A-B)+(C/D))$

INFIX	STACK	POSTFIX
(
(
A		A
-	-	A
B	-	A B
)		A B -
+	+	A B -
(+	A B -
C	+	A B - C
/	+ /	A B - C
D	+ /	A B - C D
)	+	A B - C D /
)		A B - C D / +

Example3 $P*Q-R/S=((P*Q)-(R/S))$

INFIX	STACK	POSTFIX
(
(
P		P
*	*	P
Q	*	P Q
)		P Q *
-	-	P Q *
(-	P Q *
R	-	P Q * R
/	- /	P Q * R
S	- /	P Q * R S
)	-	P Q * R S /
)		P Q * R S / -

Example4 $S-T+U=((S-T)+U)$

INFIX	STACK	POSTFIX
(
(
S		S
-	-	S
T	-	S T
)		S T -
+	+	S T -
U	+	S T - U
)		S T - U +

Evaluation of expression in POSTFIX notation

Evaluation Logic

1. If Operand, PUSH to stack
2. If Operator,
 - (a) Op2=POP from Stack
 - (b) Op1=POP from Stack
 - (c) Operate Op1 and Op2
 - (d) PUSH the result back in Stack
3. At the end of expression, POP the final result from the stack

Example 1 2 10 + 5 2 - *

POSTFIX	Steps	STACK
2	PUSH	2
10	PUSH	2 10
+	POP, POP, Operate, PUSH	12
5	PUSH	12 5
2	PUSH	12 5 2
-	POP, POP, Operate, PUSH	12 3
*	POP, POP, Operate, PUSH	36

Final Result 36

Example 2 T F AND T F NOT AND OR

POSTFIX	Steps	STACK
T	PUSH	T
F	PUSH	T F
AND	POP, POP, Operate, PUSH	F
T	PUSH	F T
F	PUSH	F T F
NOT	POP, Operate, PUSH	F T T
AND	POP, POP, Operate, PUSH	F T
OR	POP, POP, Operate, PUSH	T

Final Result T

Example 3 20, 5, /, 5, 2, 3, ^, *, -

POSTFIX	Steps	STACK
20	PUSH	20
5	PUSH	20 5
/	POP, POP, Operate, PUSH	4
5	PUSH	4 5
2	PUSH	4 5 2
3	PUSH	4 5 2 3
^	POP, POP, Operate, PUSH	4 5 8
*	POP, POP, Operate, PUSH	4 40
-	POP, POP, Operate, PUSH	-36

Final Result -36

Example 4 50, 16, 2, 4, *, /, -

POSTFIX	Steps	STACK
50	PUSH	50
16	PUSH	50 16
2	PUSH	50 16 2
4	PUSH	50 16 2 4
*	POP, POP, Operate, PUSH	50 16 8
/	POP, POP, Operate, PUSH	50 2
-	POP, POP, Operate, PUSH	48

Final Result 48