Infix Postfix Prefix Conversion using stack

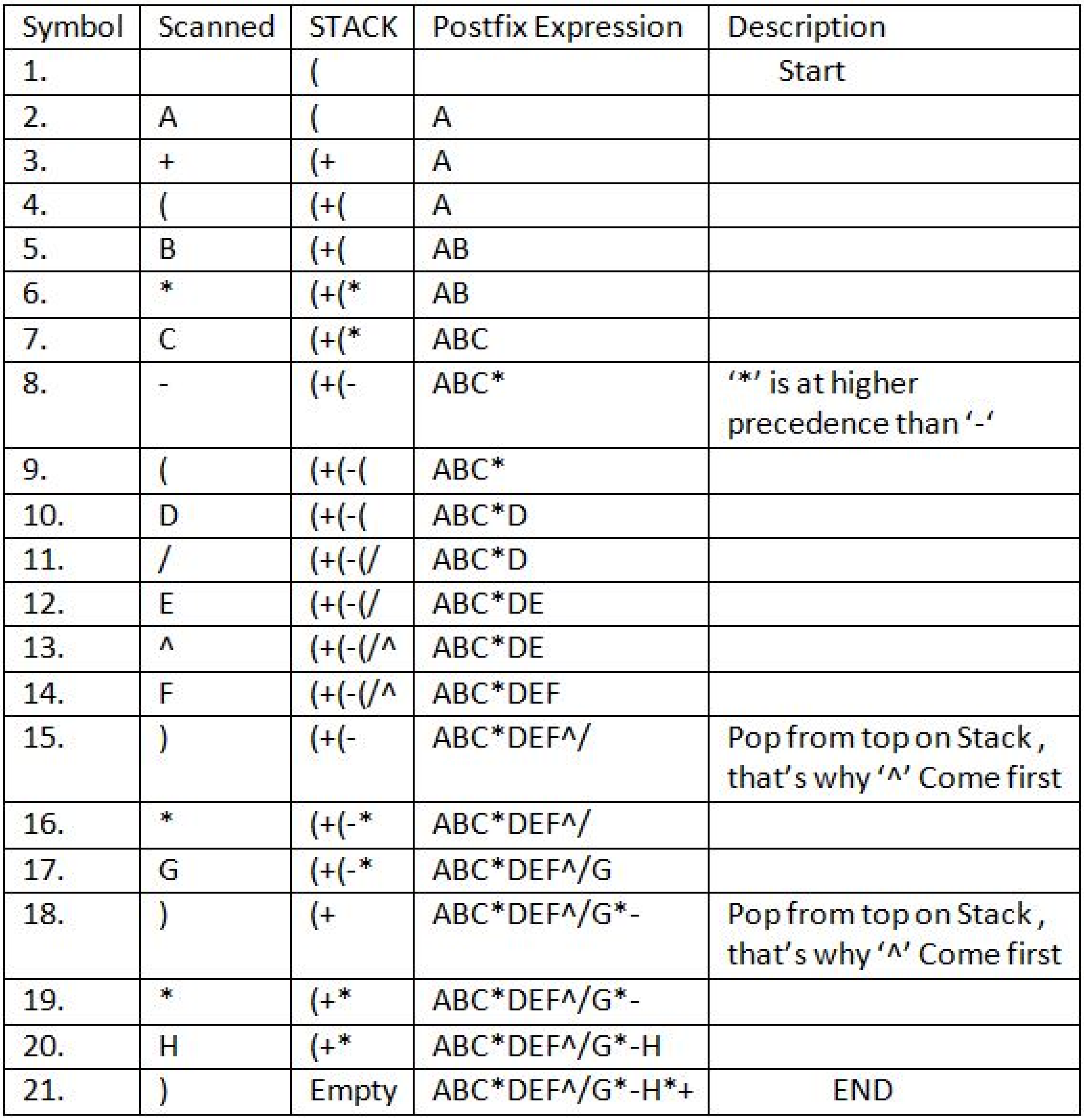
Infix Expression	Prefix Expression	Postfix Expression
A + B	+ A B	A B +
A + B * C	+ A * B C	A B C * +
(A + B) * C	* + A B C	A B + C *
A + B * C + D	+ + A * B C D	A B C * + D +
(A + B) * (C + D)	* + A B + C D	A B + C D + *
A * B + C * D	+ * A B * C D	A B * C D * +
A + B + C + D	+ + + A B C D	A B + C + D +

Algorithm to convert Infix To Postfix

Let, X is an arithmetic expression written in infix notation. This algorithm finds the equivalent postfix expression Y.

1. Push “(“onto Stack, and add “)” to the end of X.
2. Scan X from left to right and repeat Step 3 to 6 for each element of X until the Stack is empty.
3. If an operand is encountered, add it to Y.
4. If a left parenthesis is encountered, push it onto Stack.
5. If an operator is encountered, then:
    1. Repeatedly pop from Stack and add to Y each operator (on the top of Stack) which has the same precedence as or higher precedence than operator.
    2. Add operator to Stack.
[End of If]
6. If a right parenthesis is encountered, then:
    1. Repeatedly pop from Stack and add to Y each operator (on the top of Stack) until a left parenthesis is encountered.
    2. Remove the left Parenthesis.
[End of If]
[End of If]
7. END.

Infix Expression: **A+ (B*C-(D/E^F)*G)*H**, where **^** is an exponential operator.



Symbol	Scanned	STACK	Postfix Expression	Description
1.		(		Start
2.	A	(	A	
3.	+	(+	A	
4.	(	(+(	A	
5.	B	(+(	AB	
6.	*	(+(*	AB	
7.	C	(+(*	ABC	
8.	-	(+(-	ABC*	‘*’ is at higher precedence than ‘-‘
9.	(	(+(-(	ABC*	
10.	D	(+(-(	ABC*D	
11.	/	(+(-(/	ABC*D	
12.	E	(+(-(/	ABC*DE	
13.	^	(+(-(/^	ABC*DE	
14.	F	(+(-(/^	ABC*DEF	
15.	)	(+(-	ABC*DEF^/	Pop from top on Stack , that’s why ‘^’ Come first
16.	*	(+(-*	ABC*DEF^/	
17.	G	(+(-*	ABC*DEF^/G	
18.	)	(+	ABC*DEF^/G*-	Pop from top on Stack , that’s why ‘^’ Come first
19.	*	(+*	ABC*DEF^/G*-	
20.	H	(+*	ABC*DEF^/G*-H	
21.	)	Empty	ABC*DEF^/G*-H*+	END

Resultant Postfix Expression: ABC*DEF^/G*-H*+

Infix Expression: **A+ (B*C-(D/E^F)*G)*H**, where **^** is an exponential operator.

Resultant Postfix Expression: ABC*DEF^/G*-H*+

(A + B * C + D)

A + BC* + D

ABC*+ + D

ABC*+D+

A + *BC + D

+A*BC + D

++A*BCD

A*B + (C/D) / E-F

Prefix: -+*AB//CDEF

Postfix: AB*CD/E/+F-

X^Y/(5*Z) + 2

Prefix: +/^XY*5Z2

Postfix: XY^5Z*/2+