

# DSA THEORY ASSIGNMENT-WEEK4

Due: 01-09-2020

## 1. Convert the following infix to prefix and postfix

S.No	Infix	Prefix	Postfix
1.	$A + (B * C - (D / E - F) * G) * H$	$+A^*- *BC^*- /DEFGH$	$ABC^*DE / F - G^* - H^* +$
2.	$(A + B) * C - (D - E) * (F + G)$	$- * + ABC^* - DE + FG$	$AB + C^* DE - FD + ^* -$
3.	$A + B * C + (D * E + F) * G$	$+A + ^* BC + ^* DEFG$	$ABC^* + DE^* F + G^* +$

## 2. Convert given infix to prefix using stack

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

Reversed Infix expression	Stack	Reversed Prefix Expression
H		H
*	*	H
(	*(	H
G	*(	HG
*	*(	HG
(	*(	HG
F	*(	HGF
-	*(	HGF
E	*(	HGFE
/	*(	HGFE
D	*(	HGFED
)	*	HGFED/-

-	*(-	HGFED/-*
C	*(-	HGFED/-*C
*	*(-*	HGFED/-*C
B	*(-*	HGFED/-*CB
)	*	HGFED/-*CB*-
+	+	HGFED/-*CB*-*
A		HGFED/-*CB*-*A+

AFTER CONVERSION TO PREFIX: +A\*-\*BC\*-/DEFGH

### 3. Convert given infix to postfix using stack

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

Infix Expression	Stack	Postfix Expression
(	(	
(	((	
A	((	A
+	((+	A
B	((+	AB
)	(	AB+
^	(^	AB+
C	(^	AB+C
-	(-	AB+C^
(	(-(	AB+C^
D	(-(	AB+C^D
*	(-(*	AB+C^D

E	(-(*	AB+C^DE
)	(-	AB+C^DE*
/	(-/	AB+C^DE*
F	(-/	AB+C^DE*F
)		AB+C^DE*F/-

AFTER CONVERSION TO POSTFIX: AB+C^DE\*F/-

**4. Evaluate the infix using stack (Hint: Convert to infix to postfix)**

$$3 * 2 ^ 2 ^ 2 / 4 + 2 - 5$$

Infix	Stack	Postfix
3		3
*	*	3
2	*	32
^	*^	32
2	*^	322
^	*^^	322
2	*^^	3222
/	/	3222^^*
4	/	3222^^*4
+	+	3222^^*4/
2	+	3222^^*4/2
-	-	3222^^*4/2+

5		$3222^{4/2+5-}$
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Now  $3222^{4/2+5-}$  has to be evaluated :

3	3	
2	3 2	
2	3 2 2	
2	3 2 2 2	
^	3 2 4	$2^2=4$
^	3 16	$2^4=16$
*	48	$16*3=48$
4	48 4	
/	12	$48/4=12$
2	12 2	
+	14	$12+2=14$
5	14 5	
-	<b>9</b>	$14-5=9$

After evaluation the answer is 9