

CSC248: FUNDAMENTALS OF DATA STRUCTURES
STACK: CLASS EXERCISE

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QUESTION #1

Convert the following expression into postfix notation:

- (a) $(A * B + C - D) + E / F$
(b) $H + (J / K * L) * M * N$

(a) $(A * B + C - D) + E / F$
STEP 1: AB^*
STEP 2: AB^*C^+
STEP 3: $AB^*C^+D^-$
STEP 4: $EF/$
STEP 5: $AB^*C^+D^-EF/+$

ANSWER : $AB^*C^+D^-EF/+$

(b) $H + (J / K * L) * M * N$
STEP 1: $JK/$
STEP 2: JK/L^*
STEP 3: JK/L^*M^*
STEP 4: $JK/L^*M^*N^*$
STEP 5: $HJK/L^*M^*N^*+$

ANSWER : $HJK/L^*M^*N^*+$

QUESTION #2

Convert the following expression into prefix notation:

(a) $(D - E / F) * (G / H - J)$

(b) $U - V - W + X / (Y * Z)$

(a) $(D - E / F) * (G / H - J)$

STEP 1: $/EF$

STEP 2: $-D/EF$

STEP 3: $/GH$

STEP 4: $-/GHJ$

STEP 5: $*-D/EF-/GHJ$

ANSWER : $*-D/EF-/GHJ$

(b) $U - V - W + X / (Y * Z)$

STEP 1: $*YZ$

STEP 2: $/X*YZ$

STEP 3: $+W/X*YZ$

STEP 4: $-V+W/X*YZ$

STEP 5: $-U-V+W/X*YZ$

ANSWER : $-U-V+W/X*YZ$

QUESTION #3

Convert the following POSTFIX expression to infix expression:

(a) $A B * C * D E - *$

(b) $P Q * R S + / U V + -$

(a) $AB * C * DE - *$

A : A

B : A,B

* : A,B,*

C : $A*B$,C

* : $A*B$,C,*

D : $(A*B)*C$,D

E : $(A*B)*C$,D,E

- : $(A*B)*C$,D,E,-

* : $(A*B)*C(D-E)$,*

ANSWER : $(A*B)*C*(D-E)$

(b) $PQ * RS + / UV + -$

P : P

Q : P,Q

* : P,Q,*

R : $P*Q$,R

S : $P*Q$,R,S

+ : $P*Q$,R,S,+

/ : $(P*Q)/(R+S)$,/

U : $(P*Q)/(R+S)$,U

V : $(P*Q)/(R+S)$,U,V

+ : $(P*Q)/(R+S)$,U,V,+

- : $(P*Q)/(R+S)$, $(U+V)$, -

ANSWER : $(P*Q)/(R+S)-(U+V)$

QUESTION #4

Convert the following expression to PREFIX and POSTFIX expressions:

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

Hint: \$ is representing power.

1. POSTFIX : $A + B * (C ^ D - E) ^ (F + G + H) - I$

STEP 1: FG+

STEP 2: FG+H+

STEP 3: CD^

STEP 4: CD^E-

STEP 5: CD^E-FG+H+^

STEP 6: BCD^E-FG+H+^*

STEP 7: ABCD^E-FG+H+^*+

STEP 8: ABCD^E-FG+H+^*+1-

ANSWER : ABCD^E-FG+H+^*+1-

2. PREFIX : $A + B * (C ^ D - E) ^ (F + G + H) - I$

STEP 1: +F

STEP 2: +F+GH

STEP 3: ^CD

STEP 4: -^CDE

STEP 5: ^-^CDE+F+GH

STEP 6: *B^-^CDE+F+GH

STEP 7: -*B^-^CDE+F+GHI

STEP 8: +A-*B^-^CDE+F+GHI

ANSWER : -*B^-^CDE+F+GHI