

Quiz on Applications of Stack

Q1) $5\ 8\ 3\ *^A + 6 + 7 / 4\ 2 -^C *$

⇒ a) scanning elements from left to right and pushing them into the stack until we get an operator

b) is obtained

3
8
5

∵ '*' operator is encountered so pop two operands from stack evaluating. $8 * 3 = 24$

c)

24
5

∵ '+' operator encountered so popping two operands and evaluating.
 $5 + 24 = 29$

d)

6
29

∵ '+' operator ⇒ popping ⇒ evaluating
⇒ pushing back : $29 + 6 = 35$

e)

7
35

∵ '/' → popping ⇒ evaluating
⇒ pushing : $35 / 7 = 5$

f)

2
4
5

∵ '-' ⇒ popping ⇒ evaluating
⇒ pushing : $4 - 2 = 2$

g)

2
5

∵ '*' ⇒ popping ⇒ evaluating
⇒ pushing : $5 * 2 = 10$

At A	At B	At C
24	7	2
5	35	5

i) value of expression = 10

j) Infix expression = $((5 + 8 * 3) + 6) / 7 * (4 - 2)$

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8.2. 2 6 8 * 2 5 ^A * 3 ^B - + / 9 3 ^C / + *

$$\Rightarrow \begin{bmatrix} 8 \\ 6 \\ 2 \end{bmatrix} \Rightarrow 6 * 8 = 48 \Rightarrow \begin{bmatrix} 5 \\ 2 \\ 48 \\ 2 \end{bmatrix} \Rightarrow 2 * 5 = 10 \Rightarrow \begin{bmatrix} 1 \\ 3 \\ 10 \\ 48 \\ 2 \end{bmatrix}$$

↓

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$$\begin{bmatrix} 12 \\ 48 \\ 2 \end{bmatrix} \leftarrow 10 + 2 = 12 \leftarrow \begin{bmatrix} 2 \\ 10 \\ 48 \\ 2 \end{bmatrix} \leftarrow \begin{matrix} 10/3 = 3 \\ 3-1 = 2 \end{matrix}$$

↓

$$48 / 12 = 4 \Rightarrow \begin{bmatrix} 3 \\ 9 \\ 4 \\ 2 \end{bmatrix} \Rightarrow 9 / 3 = 3 \Rightarrow \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix}$$

↓

$$14 \leftarrow \begin{bmatrix} 14 \end{bmatrix} \leftarrow 7 * 2 = 14 \leftarrow \begin{bmatrix} 7 \\ 2 \end{bmatrix} \leftarrow 4 + 3 = 7$$

At A		At B		At C
5		2		3
2		10		9
48		48		4
2		2		2

∴ Value of the expression = 14

∴ Infix expression :- $2 * (6 * 8 / (2 * 5 + (3 - 1))) + 9 / 3$

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$$Q.3.a) ((2 + 3 * 6) / (9 - 8 / 2) + 1) * 7$$

⇒ a. Putting operands in output string and pushing operators and parentheses in the stack.

b.	*	Output string: 236 ⇒ Encountered '('
	+	⇒ popping element till '(' ⇒
		Output string: 236 * +

⇒ (Note: Since '*' has more precedence than '+' it is placed before '+' in output string).

c.	/	Output string: 236 * + 982 ⇒ Encountered '('
	-	⇒ popping till '(' ⇒
		Output string: 236 * + 982 / -
	/	

d.	*	Output string: 236 * + 982 / - 9
	/	Encountered '(' ⇒ popping till '(' ⇒
		Output string: 236 * + 982 / - 9
		Encountered '+' with lower precedence than
		'/' ⇒ pop till equal or lower precedence is
		obtained ⇒ push '+' ⇒
		Output string: 236 * + 982 / - /

e.		Output string: 236 * + 982 / - / 9
	+	Encountered '(' ⇒ pop till '(' ⇒
		Output string: 236 * + 982 / - / 9 +

d.	*	O/P string: 236 * + 982 / - / 9 + 7 ⇒
		End of expression ⇒ pop all ⇒
		O/P string: 236 * + 982 / - / 9 + 7 *

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∴ Final expression: $236 * 982 / - / 9 + 7 *$

At A		At B		At C
*		/		*
+		-		
C		C		
C		/		
C		C		

3-b) Value of expression at ~~A~~ part a = 91

Q. 4 a) $3 + 52 / (2 + 7 - 12 / (9 - 5)) * ((5 + 2 * 3) - 15 / (1 + 4))$

At A =

C
+
C
/
+

O/P: ~~3 52 2~~
 ' / ' has more precedence thus push on stack

-
7
-
C
+
C
/
+

↓
 O/P: 3 52 2 7 12 9 5
 ' - ' ⇒ pop till ' / '

/
-
C
+
C
/
+

O/P: 3 52 2 7 12 9 5 -

↓
 ' - ' ⇒ pop till ' / '

O/P: 3 52 2 7 12 9 5 - / -

A+B =

*
+
C
C
*
+
C
/
+

O/P: 3 52 2 7 12 9 5 - / - 5 2 3

' * ' has higher precedence than ' + ' thus push ' * ' encountered. Therefore pop till ' C '

O/P: 3 52 2 7 12 9 5 - / - 5 2 3 * +





	+
	C
	/
	-
At C =	C
	*
	+
	C
	/
	+

O/P: 3 52 2 7 12 9 5 - / - 5 2 3 * + 15 14

'/' \Rightarrow pop till 'C'

O/P: 3 52 2 7 12 9 5 - / - 5 2 3 * + 15 14 +



	/
	C
	*
	+
	C
	/
	+

O/P: 3 52 2 7 12 9 5 - / - 5 2 3 * +

15 1 4 +

'/' \Rightarrow pop till 'C'

O/P: 3 52 2 7 12 9 5 - / - 5 2 3 * + 15 1 4 +

-

	*
	+
	C
	/
	+

'/' \Rightarrow pop till 'C'

O/P: 3 52 2 7 12 9 5 - / - 5 2

3 * + 15 1 4 + / - * +

	/
	+

End of string \Rightarrow pop all operators.

O/P: 3 52 2 7 12 9 5 - / - 5 2

3 * + 15 1 4 + / - * + / +

~~Final postfix~~

Final postfix expression:

3 52 2 7 12 9 5 - / - 5 2 3 * + 15 / 4 + / - * + / +

b) value of part a = 4.529