Stack

Saturday, March 20, 2021 11:26 AM

Stack: is a list with a restriction: insertions and deletions can be performed only on one position - The end of the list - called the top.

Stack known as LIFO: Last In First Out.

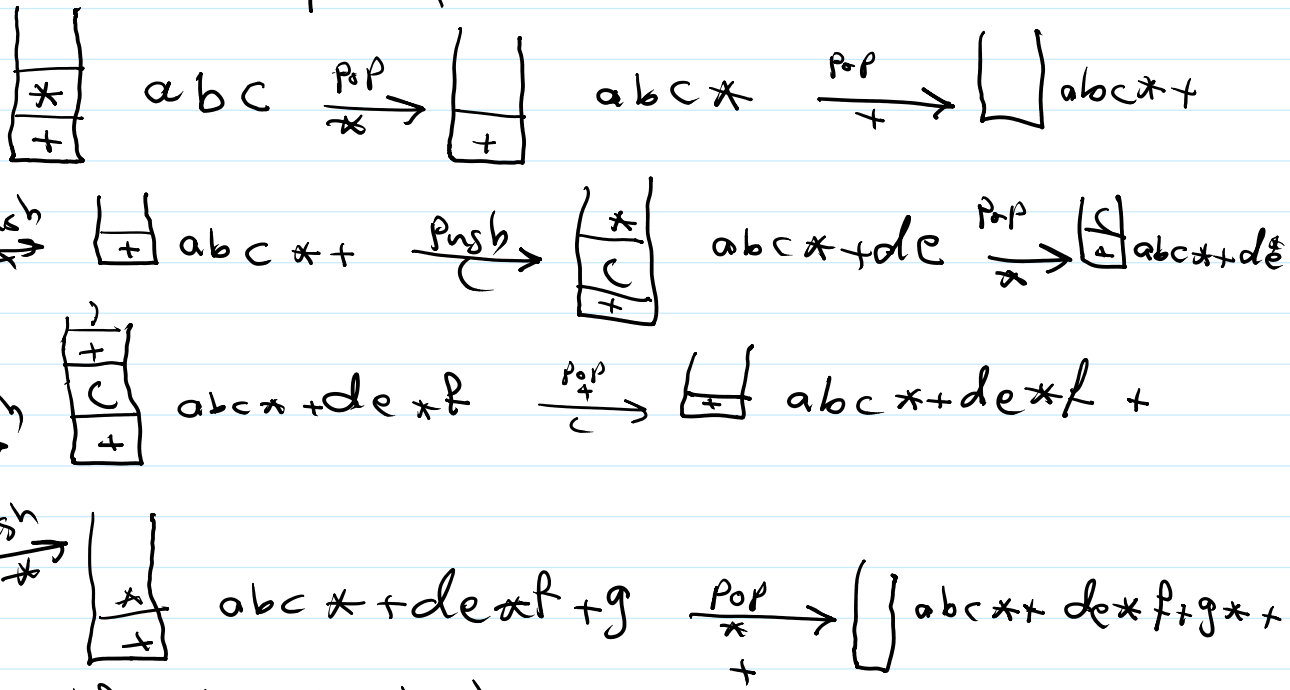
* Operations on Stack:
  1- push: insert 2- Pop: delete
  3- Top: return the value at the top of stack.

* Usage of stacks:
  1- Web links
  2- Compilers: function calls, exp. evaluation
  3- Undo/Redo

* Application on stacks

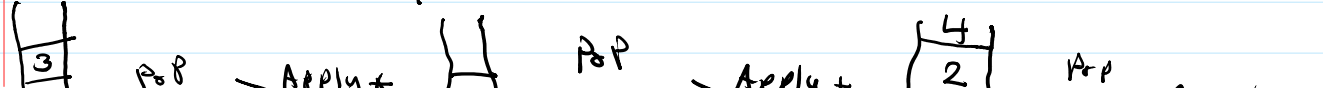
① Conversion of Infix Exp. to Postfix Exp.

a + b * c + (d * e + f) * g



② Postfix-Exp. Evaluation

5 2 3 * + 2 4 * 10 + 2 * +



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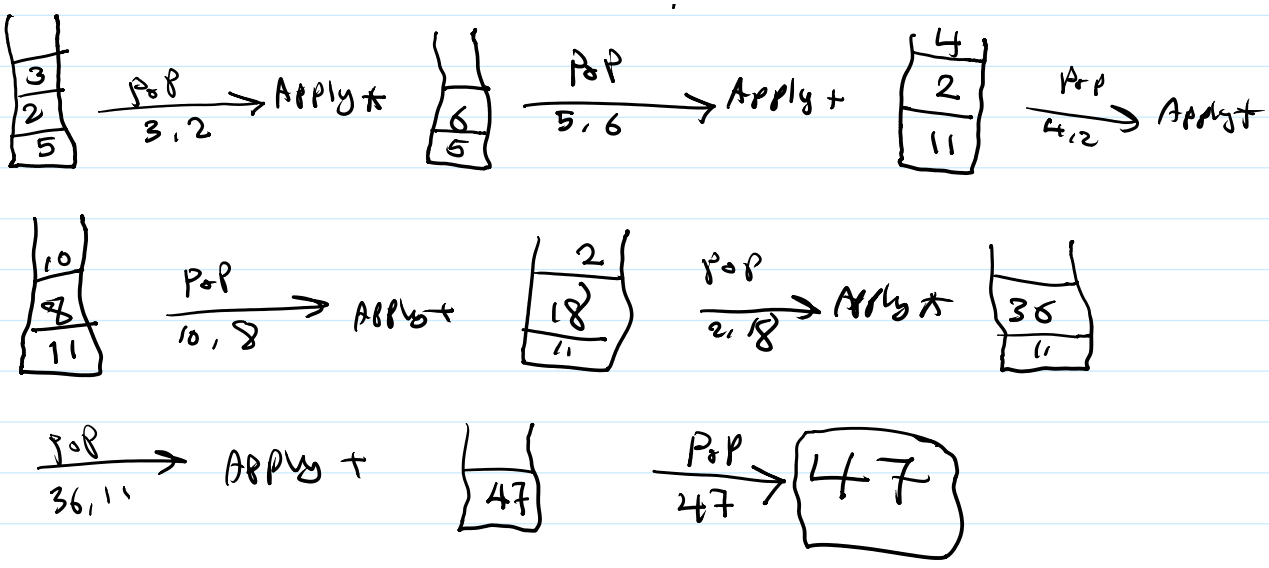
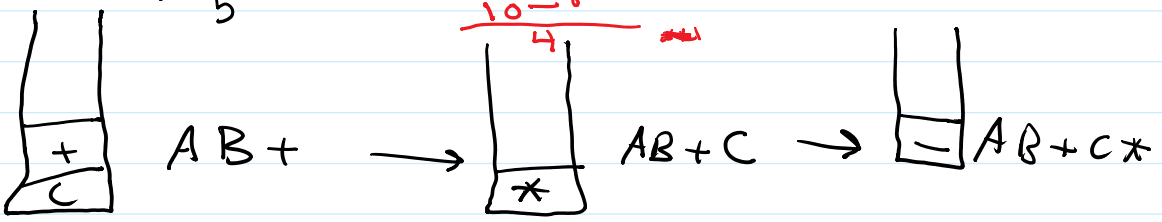
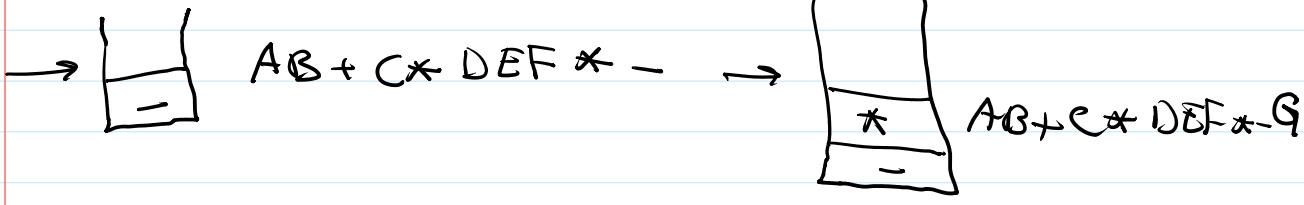


Ex. Convert Infix to postfix

$$\underbrace{(A+B)}_{5} * C - \underbrace{(D - E * F)}_{4} * G$$





$\rightarrow$ AB+C*DEF*−G*−

A=2, B=3, C=4, D=10, E=2, F=3, G=1

Ex. → 2 3 + 4 * 10 2 3 * − 1 * −

$A + B = B + A$

$A - B \neq B - A$

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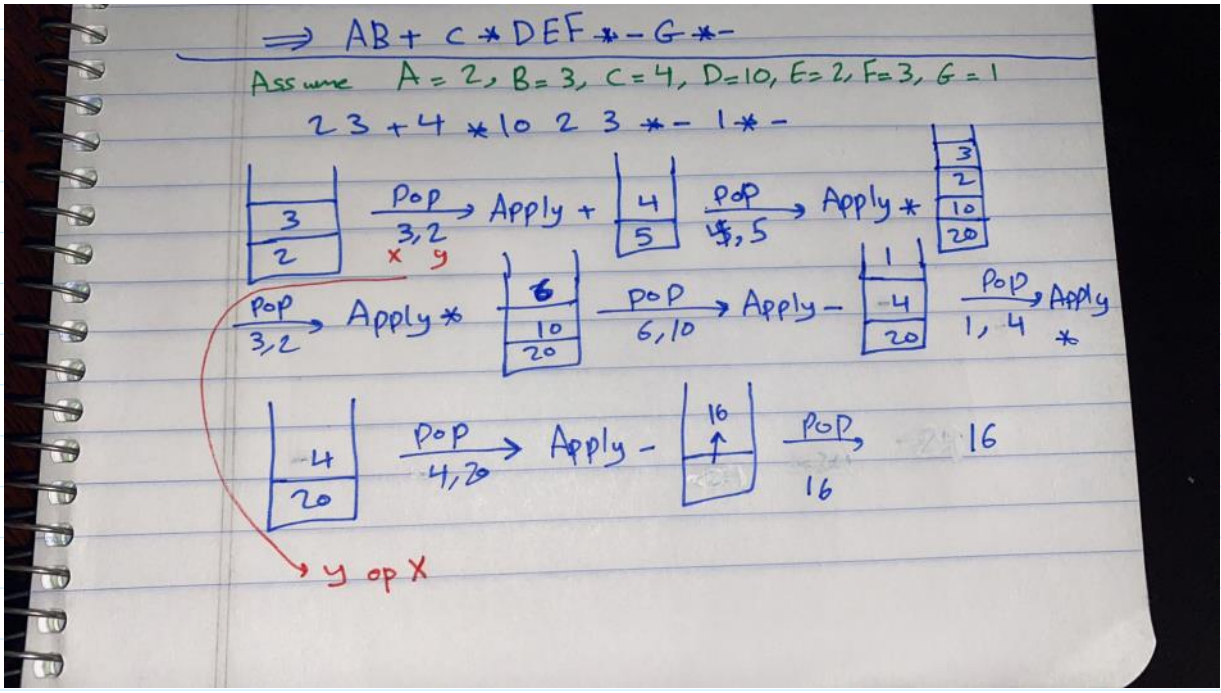
⇒ AB+C*DEF*-G*-
Assume A=2, B=3, C=4, D=10, E=2, F=3, G=1
2 3 + 4 * 10 2 3 * - 1 * -
Pop 3,2 x y
Apply +
Pop 4,5
Apply *
Pop 3,2
Apply *
Pop 6,10
Apply -
Pop 1,4
Apply *
Pop 4,20
Apply -
Pop 16
16
y op x