

# Stack

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:

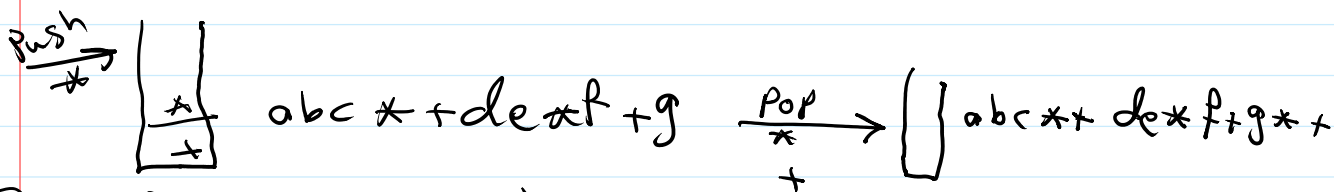
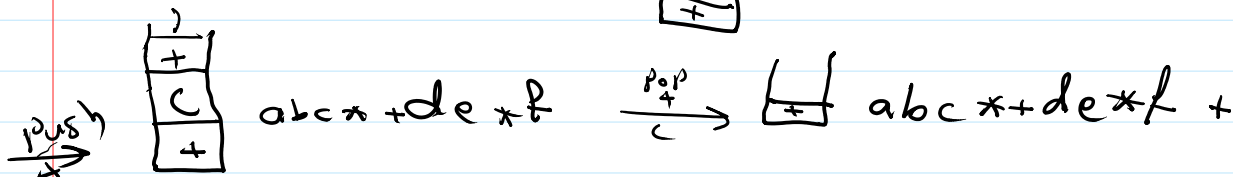
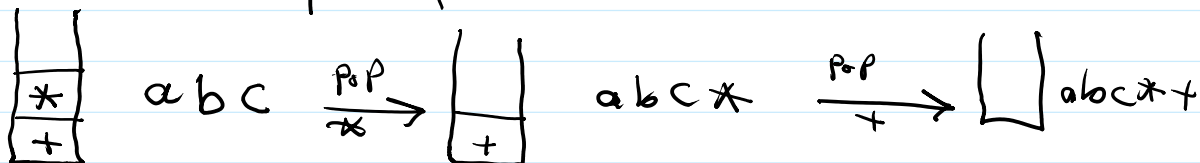
1. web links
2. Compilers: function calls, exp. evaluation
3. Undo/Redo

\* Application on stacks

① Conversion of Infix Exp. to Postfix Exp.

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

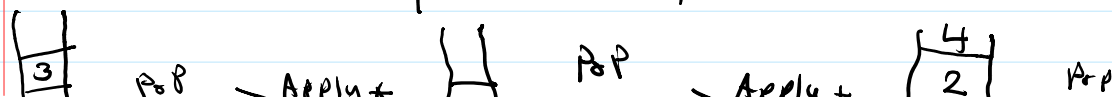
↑    ↑
↑    ↑

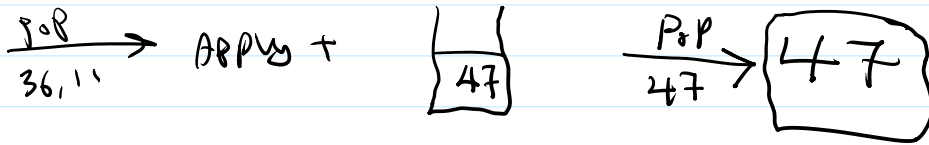
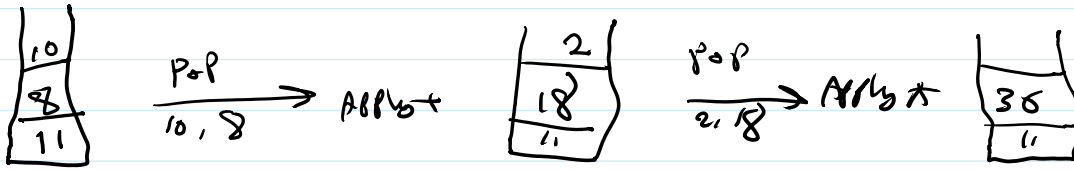
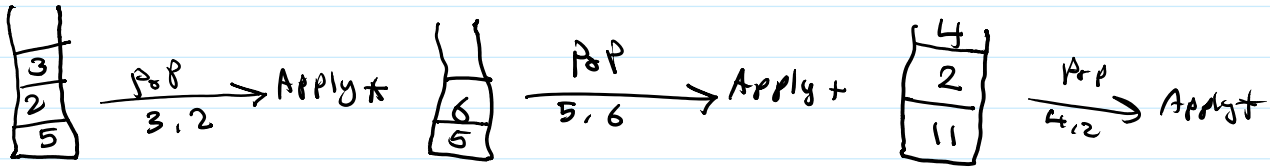


② Postfix-Exp. Evaluation

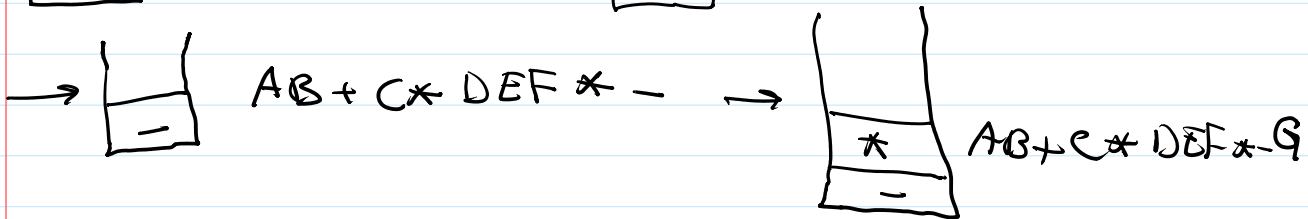
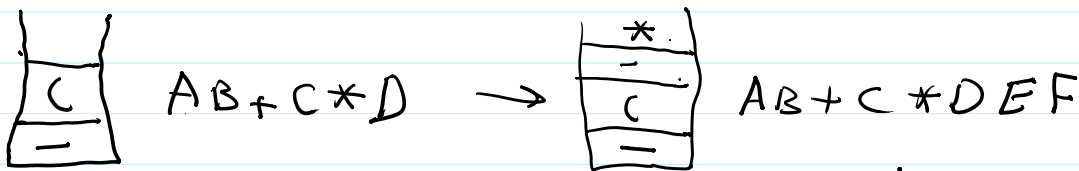
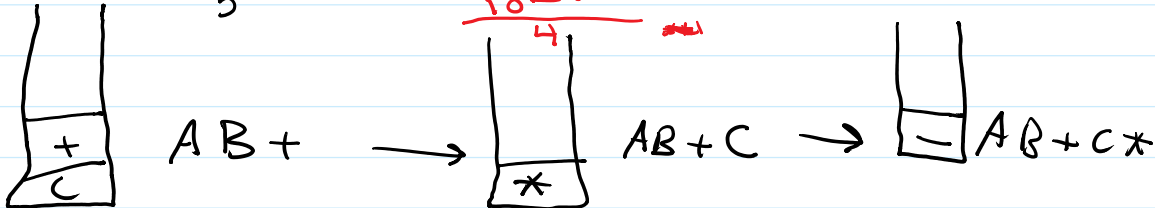
$$5 \quad 2 \quad 3 \quad * \quad + \quad 2 \quad 4 \quad * \quad 10 \quad + \quad 2 \quad * \quad +$$

↑    ↑
↑





Ex. Convert Infix to Postfix

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


→  $\boxed{\quad} AB+C * DEF * - G * -$

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

Ex. → 2 3 + 4 \* 10 2 3 \* - 1 \* -

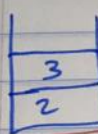
$$A+B = B+A$$

$$A-B \neq B-A$$

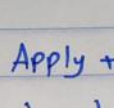
$\Rightarrow AB + C * DEF * - G * -$

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

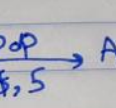
$23 + 4 * 10 2 3 * - 1 * -$



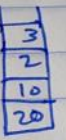
Pop  
3,2  
x y



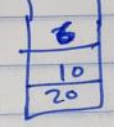
Pop  
4,5



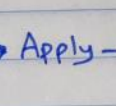
Apply +



Pop  
3,2



Pop  
6,10

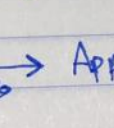


Apply \*

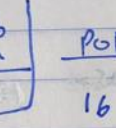
Pop  
1,4



Pop  
4,20



Pop  
16



Apply -

Pop  
16



y op x