

DATA STRUCTURE

□ APPLICATION OF STACK

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OVER VIEW

- APPLICATIONS OF STACKS
- POSTFIX EXPRESSIONS CALCULATOR

APPLICATIONS OF STACKS

- STACKS CAN BE USED TO REVERSE A SEQUENCE. FOR EXAMPLE, IF A STRING "COMPUTERS" IS ENTERED BY THE USER THE STACK CAN BE USED TO CREATE AND DISPLAY THE REVERSE STRING "SRETUPMOC" AS FOLLOWS.
- THE PROGRAM SIMPLY PUSHES ALL OF THE CHARACTERS OF THE STRING INTO THE STACK. THEN IT POPS AND DISPLAY UNTIL THE STACK IS EMPTY

POSTFIX EXPRESSIONS CALCULATOR

- POSTFIX: $A\ B\ +$
- INFIX: $A\ +\ B$ (WHAT WE USE IN GRAMMAR SCHOOL)
- PREFIX: $+ A\ B$

IN HIGH LEVEL LANGUAGES, INFIX NOTATION CANNOT BE USED TO EVALUATE EXPRESSIONS A COMMON TECHNIQUE IS TO CONVERT A INFIX NOTATION INTO POSTFIX NOTATION, THEN EVALUATE IT.

PRIORITY :

4	\wedge (POWER), UNARY(-), UNARY(+), NOT
3	*, / , AND, DIV ,MOD
2	+, - , OR
1	= , < , > , != , <= , >=

CONVERTING INFIX EXPRESSION TO POSTFIX EXPRESSION:

- INITIALIZE AN EMPTY STACK AND A POSTFIX STRING S.
- READ THE TOKENS FROM THE INFIX STRING ONE AT A TIME FROM LEFT TO RIGHT

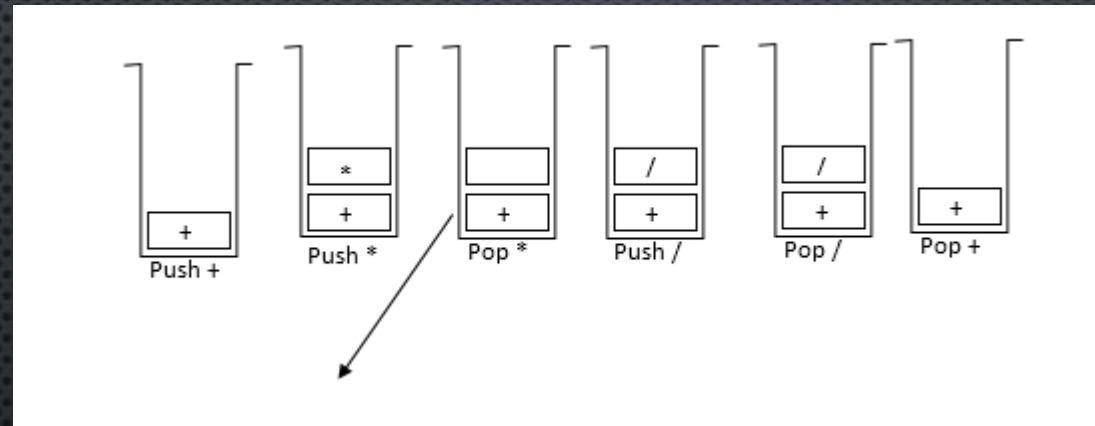
IF THE TOKEN IS AN **OPERAND**, ADD IT TO THE POSTFIX STRING S.

- IF THE TOKEN IS A LEFT **PARENTHESES**, PUSH IT ON TO THE STACK.

ALGORITHM FOR CONVERTING INFIX EXPRESSION TO POSTFIX EXPRESSION:

- IF THE TOKEN IS **AN OPERATOR**
- IF THE STACK IS EMPTY PUSH THE OPERATOR IN TO THE STACK
- IF THE STACK IS NOT EMPTY COMPARE THE PRECEDENCE OF THE OPERATOR WITH THE ELEMENT ON TOP OF THE STACK
- IF THE OPERATOR IN THE STACK HAS HIGHER PRECEDENCE THAN THE TOKEN POP THE STACK AND ADD THE POPED OUT ELEMENT IN TO THE STRING *S*.
- ELSE PUSH THE OPERATOR IN TO THE STACK
- REPEAT THIS STEP UNTIL THE STACK IS NOT EMPTY OR THE OPERATOR IN THE STACK HAS HIGHER PRECEDENCE THAN THE TOKEN
- REPEAT THIS STEP TILL ALL THE CHARACTERS ARE READ.
- AFTER ALL THE CHARACTERS ARE READ AND THE STACK IS NOT EMPTY THEN POP THE STACK AND ADD THE TOKENS TO THE STRING *S*
- RETURN THE POSTFIX STRING *S*

EXAMPLE : CONVERT INFIX INTO POST FIX EXPRESSION 3+4*5/6



Out put string : 3 4 5 *6/+

EXAMPLE: CONVERT THE FOLLOWING INFIX EXPRESSION
TO POSTFIX USING STACK:
 $A + (B / C) \#$

ch	opstack	Postfix	commentary
	#		Push # to opstack read ch
A	#	A	Add ch to postfix read ch
+	#	A	Push + to opstack read ch
		A	
	#		
	+		
(#	A	Push (to opstack read ch
		A	
	+		
	#		
	+		
B	(
	# + (A	
	# + (A B	
/	# + (A B	Push / to opstack read ch
	# + (/	A B	
C	# + (/	A	Add ch to postfix read ch
	# + (/	B	
		A	
		B	
		C	
)	# + (/	A B	Pop and add to postfix until (is reached.
	# +	C A	
		B C	
#		/	Read ch
#	# +	A B C /	Pop and add to postfix until the

REFERENCES

- : INTRODUCTION TO ALGORITHMS, 3RD EDITION BY THOMAS H. CORMEN ,CHARLES E. LEISERSON, RONALD L. RIVEST, CLIFFORD STEIN
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- [HTTPS://GITHUB.COM/CAREERMONK/DATASTRUCTURESANDALGORITHMSMADEEASY](https://github.com/careermonk/DataStructuresAndAlgorithmsMadeEasy)