

Kerry Ojakian's CSI 33 Class
Class Work #5

1. Suppose S is a Stack that starts out empty. Describe S after the following sequence of Stack operations are performed, showing what happens at each step (clearly indicate the top of the Stack):

$S.push(5)$, $S.push(3)$, $S.push(5)$, $S.pop()$, $S.push(3)$, $S.pop()$

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2. Consider a stack for checking if a string has its parentheses matching correctly (as discussed in class). For the following strings indicate if its parentheses are matched correctly or not. Then show every modification to the stack that the algorithm would go through.

(a) $()\{\}$

(b) $[A(B\{CC\}D)EE]$

(c) $\{4 * [7 \div (1 + 1)] - [4 * (8 + 7)]\}$

3. (a) Evaluate the following **postfix** expression, showing all steps *using a stack* (you will get no credit for simply giving the answer):

$$5 \ 2 \ * \ 8 \ 2 \ / \ +$$

- (b) Evaluate the following **prefix** expression, showing all steps *using a stack* (you will get no credit for simply giving the answer):

$$* \ + \ * \ 4 \ 5 \ 1 \ - \ 2 \ 3$$

- (c) For each of the above find an equivalent infix expression: The answer final number should be the same, and the series of calculations should also be identical.

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4. Create your own example of a context free grammar. Then create at least 2 different valid sentences from your grammar, *showing the usage of a stack*.
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