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1 //David Schmidt
2 //CIS1154
3 //2-13-2017
4 //This program converts infix notation into postfix notation.
5
6 import java.util.Scanner; //To read the infix expression in
7
8 public class StackTester
9 {
10     private static boolean isOperand(char c)
11     {
12         return (c >= 'a') && (c <= 'z') || (c >= 'A') && (c <= 'Z') || (c >= '0') && (c <= '9');
13     } //isOperand
14
15     private static boolean isOperator(char c)
16     {
17         return (c == '+') || (c == '-') || (c == '*') || (c == '/');
18     } //isOperator
19
20     private static boolean higherPrec(char a, char b)
21     {
22         return ((a == '*') || (a == '/')) && ((b == '+') || (b == '-'));
23     } //higherOrEqualPrec
24
25     private static boolean isParen(char c)
26     {
27         return (c == '(') || (c == ')');
28     } //isParen
29
30     public static void main (String [] args)
31     {
32         //Read the expression
33         CharStack s = new CharStack();
34         Scanner scan = new Scanner(System.in);
35
36         System.out.println("Enter infix expression: ");
37         String inFix = scan.nextLine();
38         String postFix = "";
39         char current;
40
41         //Conversion from infix to postfix
42         for (int i = 0; i < inFix.length(); i++)
43         {
44             current = inFix.charAt(i);
45
46             //Process the parentheses
47             if (isParen(current))
48             {
49                 if (current == '(') //if left paren, push
50                     s.push(current);
51                 else if (current == ')') //if right paren, pop
52                     until matching '(' is found
53                     {
54                         if (!s.isEmpty())
55                             while(s.peek() != '(')
56                             {
57                                 postFix = postFix+s.pop();
58                                 //discard '('
59                                 if (!s.isEmpty())
60                                     s.pop(); //Error-if you want to
61                                     pop an empty stack too many right parens
62                             } //else if
63                         } //if isParen
64
65             //Process the operators
66             if (isOperator(current))
67             {
68                 if ((s.isEmpty() || s.peek() == '(')) //if empty or '(', push
69                     current

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67         s.push(current);
68     else if
        (higherPrec(current,s.peek())) //if
        current is higher precedence push it
69
        s.push(current);
        //current must be lower or equal precedence so pop until
70
    else
        //top of stack is empty or current has higher precedence
71
        {
            //...and push current
72            while((!s.isEmpty())&&(!higherPrec(current,s.peek())))
73                postFix = postFix+s.pop();
74            s.push(current);
75        } //else
76    } //if isOperator
77
78    //Process the operands
79    if (isOperand(current))
80        postFix = postFix+current;
81
82    } //for
83
84    //All characters have been read so pop and write until empty
85    while (!s.isEmpty())
86        postFix = postFix+s.pop();
87
88
89    //Write the postfix expression out
90    System.out.println("Converted to postfix: "+postFix);
91
92    } //main
93
94    } //StackTester
95

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