

1. What Does This Program Do? — Strings

What is printed when the following program is run?

```
c = 0
a$ = "LAKEPLACIDNEWYORK"
for j = 1 to len(a$)-1
  if mid$(a$,j,1)<mid$(a$,j+1,1) then c=c+1
next j
print c
end
```

2. Prefix/Infix/Postfix Notation

Evaluate the following postfix expression,
given that a=10, b=4, and c=2:

$$a b * c / a c + b c + / +$$

3. Prefix/Infix/Postfix Notation

Translate the following into prefix:

$$a * b + c / (a + b * c)$$

4. Elementary Bit String Flicking

Evaluate: 101010 OR NOT 100011 AND 101101

5. Elementary Bit String Flicking

Evaluate: (RCIRC-3 (RSHIFT-1 (LCIRC-2 10110)))

<p>1. This program compares adjacent letters in a\$, keeping count in variable c of the number of pairs that are in alphabetical order. The program prints the final value of c.</p>	8
<p>2. The expression converts to infix as follows (an expression is boxed after it has been converted):</p> $\boxed{a * b} \ c / \boxed{a + c} \ \boxed{b + c} \ / +$ $\boxed{\frac{a * b}{c}} \ \boxed{\frac{a + c}{b + c}} +$ $\boxed{\frac{a * b}{c} + \frac{a + c}{b + c}}$ <p>Substitute the values of the variables:</p> $\frac{a * b}{c} + \frac{a + c}{b + c} = \frac{10 * 4}{2} + \frac{10 + 2}{4 + 2} = 20 + 2 = 22$	22
<p>3. The expression translates into prefix as follows. At each step, we put a box around the part of the expression that has been converted.</p> $\boxed{* a b} + c / (a + \boxed{* b c})$ $\boxed{* a b} + c / \boxed{+ a \boxed{* b c}}$ $\boxed{* a b} + \boxed{/ c \boxed{+ a \boxed{* b c}}}$ $\boxed{+ \boxed{* a b} / c \boxed{+ a \boxed{* b c}}}$	+ * a b / c + a * b c
<p>4. The order of precedence of operators is NOT, AND, and then OR. So the fully parenthesized expression is</p> $101010 \text{ OR } ((\text{NOT } 100011) \text{ AND } 101101)$ <p>The evaluation is as follows:</p> $\begin{aligned} &101010 \text{ OR } ((\text{NOT } 100011) \text{ AND } 101101) \\ &= 101010 \text{ OR } (011100 \text{ AND } 101101) \\ &= 101010 \text{ OR } 001100 \\ &= 101110 \end{aligned}$	101110
<p>5. The evaluation is as follows:</p> $\begin{aligned} &(\text{RCIRC-3 (RSHIFT-1 (LCIRC-2 10110)))) \\ &= (\text{RCIRC-3 (RSHIFT-1 11010)}) \\ &= (\text{RCIRC-3 01101}) \\ &= 10101 \end{aligned}$	10101