

American Computer Science League

2018-2019

Contest #2

JUNIOR DIVISION

考号/Exam Code: _____ 姓名/Name: _____ 学校/School: _____

1. Pre/Post/Infix Notation

Evaluate this prefix expression given all numbers are single digits.

$$+ - / * 2 + 3 5 4 / 9 - \uparrow 2 2 1 / + * 3 5 * 6 2 \uparrow 3 2$$

1.

2. Pre/Post/Infix Notation

Convert this infix expression to postfix.

$$3(a + 2b) / (a^2 - b/4) + a(ab + b^2) / 2$$

2.

3. Bit-String Flicking

Evaluate the following:

$$10011 \text{ OR } 01110 \text{ AND } 10101$$

3.

4. Bit-String Flicking

Evaluate the following:

$$(\text{LCIRC}-2 \ 01101) \text{ OR } (\text{RSHIFT}-1 \ 11111)$$

4.

JUNIOR DIVISION**5. What Does This Program Do? - Loops**

What is the output when this program is executed?

```
a = 0: c = 0: t = 0
```

```
for i = 1 to 5
```

```
    a = a + i ↑ 2
```

```
next i
```

```
b = a / 11
```

```
for j = 2 to 10 step 2
```

```
    c = c + j * b
```

```
next j
```

```
d = c / b - a / 11
```

```
for k = 2 to d
```

```
    if a / k == int(a / k) then
```

```
        t = t + 1
```

```
    end if
```

```
    if b / k == int(b / k) then
```

```
        t = t + 1
```

```
    end if
```

```
    if c / k == int(c / k) then
```

```
        t = t + 1
```

```
    end if
```

```
    if d / k == int(d / k) then
```

```
        t = t + 1
```

```
    end if
```

```
next k
```

```
output t
```

```
end
```

5.

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1. Pre/Post/Infix Notation

当每个数字是单个数字时，计算下述前缀表达式的值：

$$+ - / * 2 + 3 5 4 / 9 - \uparrow 2 2 1 / + * 3 5 * 6 2 \uparrow 3 2$$

1.

2. Pre/Post/Infix Notation

将下述中缀表达式转换为后缀表达式：

$$3(a + 2b) / (a^2 - b/4) + a(ab + b^2) / 2$$

2.

3. Bit-String Flicking

计算下式的值：

$$10011 \text{ OR } 01110 \text{ AND } 10101$$

3.

4. Bit-String Flicking

计算下式的值：

$$(\text{LCIRC}-2 \ 01101) \text{ OR } (\text{RSHIFT}-1 \ 11111)$$

4.

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5. What Does This Program Do? - Loops

执行此程序时的输出是什么？

```
a = 0: c = 0: t = 0
```

```
for i = 1 to 5
```

```
    a = a + i ↑ 2
```

```
next i
```

```
b = a / 11
```

```
for j = 2 to 10 step 2
```

```
    c = c + j * b
```

```
next j
```

```
d = c / b - a / 11
```

```
for k = 2 to d
```

```
    if a / k == int(a / k) then
```

```
        t = t + 1
```

```
    end if
```

```
    if b / k == int(b / k) then
```

```
        t = t + 1
```

```
    end if
```

```
    if c / k == int(c / k) then
```

```
        t = t + 1
```

```
    end if
```

```
    if d / k == int(d / k) then
```

```
        t = t + 1
```

```
    end if
```

```
next k
```

```
output t
```

```
end
```

5.