

# American Computer Science League

2018-2019

Contest #2

## SENIOR DIVISION

考号/Exam Code: \_\_\_\_\_ 姓名/Name: \_\_\_\_\_ 学校/School: \_\_\_\_\_

### 1. Pre/Post/Infix Notation

Given  $a \# b = \max\{a, b\}$ , evaluate this prefix expression:

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

Note: all numbers are single digits.

1.

### 2. Pre/Post/Infix Notation

Convert this prefix expression to postfix:

$- + / * A + B C \uparrow B 2 / * B C A / + \uparrow A 2 \uparrow B 2 C$

2.

### 3. Bit-String Flicking

Evaluate the following:

$(\text{LSHIFT-2 } 01101) \text{ AND } ((\text{RCIRC-3 } 10010) \text{ OR } 01100)$

3.

### 4. Bit-String Flicking

Solve for X (5-bit string):

$(\text{LCIRC-2 } (\text{RSHIFT-1 } (\text{LCIRC-2 } X))) = 01001 \text{ OR } (\text{NOT } 10110)$

4.

### 5. LISP

Simplify the following:

$(\text{SETQ } X \text{ '}((1 (2 3)) (2 3) 4 (2 3 (1)) 2 3 ((1 (2 3) 4) 1)))$   
 $(\text{CAR } (\text{CDR } (\text{CAR } (\text{CAR } (\text{REVERSE } (\text{CDR } (\text{CDR } (\text{CDR } X))))))))$

5.