American Computer Science League

2021-2022 ● Contest 2: Shorts ● Senior Division

1. Prefix/Infix/Postfix

Convert the following postfix expression into a prefix expression:

A C + A 2 ^ / C A B − / −

A. − + / A C ^ A 2 / C − A B
B. − / + A C ^ A 2 C / − A B
C. − / + A C ^ A 2 / C − A B
D. − / + C A ^ A 2 / C − A B
E. − / A + C ^ A 2 / C − A B

2. Prefix/Infix/Postfix

Evaluate the following prefix expression if x% = |x| (absolute value) and x! = x*(x-1)*(x-2)*...3*2*1 (factorial). Note: these are both unary operators and all numbers are single digits.

% − ! 5 / ! 8 ! + 2 4

A. 64
B. 120
C. 20
D. 1
E. 56

3. Bit-String Flicking

Evaluate the following:

(LCIRC-2 01101) OR (RSHIFT-1 11011) AND 01000

A. 10101
B. 01101
C. 01000
D. 10110
E. 11101

4. Bit-String Flicking

Solve for X as a 5-bit string:

(LSHIFT-1 (01101 OR (RCIRC-2 10010))) XOR X = 10110

A. 11101
B. 01100
C. 10100
D. 01101
E. 10010

5. LISP

Evaluate the following LISP expression:

(CAADDR '((1 2 (3)) (4 (5) 6) ((5 4) (3 (2)))))

A. ((5 4))
B. (3 (2))
C. (1 2 (3))
D. (5 4)
E. 5