

American Computer Science League

2021-2022 • Contest 2: Shorts • Junior Division Solutions

1. Prefix/Infix/Postfix $\begin{aligned} + / 9 3 + * 4 - 8 3 ^ 5 2 &= + (/ 9 3) + * 4 (- 8 3) (^ 5 2) \\ &= + 3 + (* 4 5) 25 \\ &= + 3 (+ 20 25) \\ &= (+ 3 45) \\ &= 48 \end{aligned}$	C. 48
2. Prefix/Infix/Postfix $\frac{(A^2 + B)(B^2 - C)}{B + D^2} = ((A^2 + B) * (B^2 - C)) / (B + D^2)$ $= ((A 2 ^ B +) * (B 2 ^ C -)) / (B D 2 ^ +)$ $= (A 2 ^ B + B 2 ^ C -*) / (B D 2 ^ +)$ $= A 2 ^ B + B 2 ^ C -* B D 2 ^ + /$	D. $A 2 ^ B + B 2 ^ C -*$ $B D 2 ^ + /$
3. Bit-String Flicking $\begin{aligned} 01100 \text{ OR } 11011 \text{ AND } 01010 &= 01100 \text{ OR } (11011 \text{ AND } 01010) \\ &= 01100 \text{ OR } 01010 \\ &= 01110 \end{aligned}$	B. 01110
4. Bit-String Flicking $\begin{aligned} (\text{LCIRC-2 } 01100) \text{ AND NOT } 11010 \text{ OR } (\text{RSHIFT-1 } 01100) \\ &= 10001 \text{ AND } 00101 \text{ OR } 00110 \\ &= 00001 \text{ OR } 00110 \\ &= 00111 \end{aligned}$	C. 00111

5. What Does This Program Do? (Loops)

This program counts the number of factors of the numbers from 1 to 10. There are 27 of them

D. 27
