

# American Computer Science League

## Flyer Solutions

### 1. Boolean Algebra

$$\overline{(A+B)} (\overline{AB} + \overline{BC}) = \overline{AB} (\overline{AB} + \overline{BC}) = \\ \overline{AAB} + \overline{ABB\overline{C}} = 0 + 0 = 0$$

1. 0

### 2. Computer Number Systems

$1_8 = 1$ ,  $100_2 = 4$ ,  $11_8 = 9$ ,  $10_{16} = 16$  so the sequence is  
1, 4, 9, 16 ...  $n^2$ . The 10<sup>th</sup> term is  $10^2 = 100 = 144_8$

2.  $144_8$

### 3. LISP

$(\text{EXP} (\text{DIV} (\text{MULT} (\text{ADD} 2 (\text{SUB} 4 2)) 3) 2) 4) =$   
 $(\text{EXP} (\text{DIV} (\text{MULT} (\text{ADD} 2 2) 3) 2) 4) =$   
 $(\text{EXP} (\text{DIV} (\text{MULT} 4 3) 2) 4) =$   
 $(\text{EXP} (\text{DIV} 12 2) 4) =$   
 $(\text{EXP} 6 4) = 1296$

3. 1296

### 4. Prefix/Infix/Postfix

$4 3 + 7 5 - * 2 ^ =$   
 $(4 + 3) (7 - 5) * 2 ^ =$   
 $7 * 2 2 ^ = 14 ^ 2 = 196$

4. 196

### 5. Bit String Flicking

$(\text{LCIRC-3} (\text{RSHIFT-2 X})) = 10001$   
Let  $X = abcde$   
 $\text{RSHIFT-2 } abcde = 00abc$   
 $\text{LCIRC-3 } 00abc = bc00a$   
 $bc00a = 10001$   
 $b = 1, c = 0, a = 1, d = *$  and  $e = *$   
 $abcde = 110**$

5. = 110\*\*