ACSL

2006 - 2007 **American Computer Science League** **Contest #2**

Intermediate Division Solutions

1. Boolean Algebra

$\overline{A}(B+\overline{A})+\overline{A}(\overline{B}+A)= \overline{A}B+\overline{A}\overline{A}+\overline{A}\overline{B}+\overline{A}A=\overline{A}B+\overline{A}+\overline{A}\overline{B}=$
$\overline{A}(B+1+\overline{B})=\overline{A}$

1. $\overline{A}$

2. Boolean Algebra

The expression simplifies to: $A\overline{B}+AC+\overline{A}\overline{B}C$

A	B	C	$A\overline{B}$	AC	$\overline{A}\overline{B}C$	+
0	0	0	0	0	0	0
0	0	1	0	0	1	1
0	1	0	0	0	0	0
0	1	1	0	0	0	0
1	0	0	1	0	0	1
1	0	1	1	1	0	1
1	1	0	0	0	0	0
1	1	1	0	1	0	1

2.
(0,0,1)
(1,0,0)
(1,0,1)
(1,1,1)

3. Computer Number Systems

$A37E_{16}$ = 1010001101111110 ⇒ 10 1's
67541_8 = 110111101100001⇒ 9 1's

3. 1

4. Bit-String Flicking

(RSHIFT-2 (10110 AND 10010)) = 00100
(LCIRC-3 (01101 OR 10001)) = 01111
(00100 OR 01111) = 01111

4. 01111

5. Bit-String Flicking

(LSHIFT-2 (RCIRC-1 (NOT X))) = 10000
Let X= a b c d e and NOT X = A B C D E
(RCIRC-1 ABCDE) = E A B C D
(LSHIFT-2 EABCD) = B C D 0 0
B C D 0 0 = 1 0 0 0 0 ⇒ B=1, C=0 and D=0.
X= * 0 1 1 *

5. * 0 1 1 *