ACSL

2005 - 2006 **American Computer Science League** **Contest #2**

Intermediate Division Solutions

1. Bit- String Flicking

(RCIRC - 3 (LSHIFT – 4 (CAT – 2,3 0110111)))
(RCIRC - 3 (LSHIFT – 4 0110111110))
(RCIRC - 3 1111100000) = 0001111100

1. 0001111100

2. Bit-String Flicking

(RCIRC–2 (LSHIFT–1(NOT 01101))) OR (RSHIFT-3 (LCIRC-2 11100))
00001 OR 00010 = 00011

2. 00011

3. Boolean

$\overline{(\overline{A}+\overline{B})}(A\overline{B}+C)(B+\overline{C}) = \overline{A}B(A\overline{B}+C)(B+\overline{C}) =$
$\overline{A}B(A\overline{B}B+A\overline{B}\overline{C}+CB+\overline{C}C) = \overline{A}B(A\overline{B}\overline{C}+CB) =$
$\overline{A}BA\overline{B}\overline{C}+\overline{A}BC = \overline{A}B\overline{C}$

3. $\overline{A}BC$

4. Boolean Algebra

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

Both factors must =1. Therefore $\overline{C} = 1 \Rightarrow C = 0$
$(\overline{A}+\overline{B}) = 1 \Rightarrow$ (0,0) OR (0,1) OR (1,0)
The ordered triples are: (0,0,0), (0,1,0) and (1,0,0)

4. 3

5. Computer Number Systems

A. 231_{16}= 1000110001
B. 73_8= 111011
C. 10111011_2= 10111011
D. 84_{10} = 1010100

5.

C
B
A
D