**ACSL**

**American Computer Science League**

#### Contest #1

**2015 - 2016**

### Junior Division Solutions

# 1. Recursive Functions

(0) = 2 \*(2) − 3 = 2 \* 187 – 3 = 371

(2) = 2 \*(4) − 3 = 2 \* 95 – 3 = 187

(4) = 2 \*(6) − 3 = 2 \* 49 – 3 = 95

(6) = 2 \*(8) − 3 = 2 \* 26 – 3 = 49

(8) = 3 \* 8 + 2 = 26

Now substitute backwards.

1. 371

1. **Recursive Functions**

(1) = 1

(2) = (2\*2+1) \*(1) = 5\*1 = 5

(3) = (2\*3+1) \*(2) = 7\*5 = 35

(4) = (2\*4+1) \*(3) =9\*35 = 315

(5) = (2\*5+1) \*(4) =11\*315 = 3465

2. 3465

**4. Computer Number Systems**

(7438 – AF16 + 1101001010002) \* 25610

= (1111000112 – 101011112 + 1101001010002)\*1000000002

= 1110010111002\*1000000002

= 111001011100000000002 7 1’s

**3. Computer Number Systems**

4148 = 1000011002 3 1’s

1B516 = 1101101012 6 1’s

17810 = 101100102 4 1’s

20016 = 10000000002 1 1

6008 = 1100000002 2 1’s

3. 1B5 or 1B516

5. 34

4. 7

1. **What Does This Program Do?**

The table contains the values of a, b, c, and d after each line.

|  |  |  |  |
| --- | --- | --- | --- |
| a | b | c | d |
| 4 | 10 | 1 | 2 |
| 14 | 10 | 1 | 2 |
| 14 | 10 | -1 | 2 |
| 14 | 12 | -1 | 2 |
| 14 | 12 | 2 | 2 |
| 14 | 2 | 2 | 2 |

a / b + c \* (a \* b – c / d) / b = 14 / 2 + 2 \* (14 \* 2 – 2 / 2 ) / 2

= 7 + 2 \* 27 / 2 = 7 + 27 = 34