

ACSL

2013 - 2014

American Computer Science League

Contest #1

Junior Division

1. Recursive Function

Find $f(9)$ given:

$$f(x) = \begin{cases} f(x-1) + 2 * f(x-2) & \text{if } x > 5 \\ 2 & \text{if } x = 5 \\ -2 & \text{if } x < 5 \end{cases}$$

2. Recursive Functions

Find $f(8,14)$ given:

$$f(x,y) = \begin{cases} f(y,x) - 1 & \text{if } x < y \\ f(x-2,y+1) + 2 & \text{if } x > y \\ (x+y)/2 & \text{if } x = y \end{cases}$$

3. Computer Number Systems

Which is the largest?

F_{16} , 375_8 , $10F_{16}$, 264_{10} , 11111000_2

4. Computer Number Systems

Simplify the following and convert answer to binary.

$$101_2 * 3_{10} + 11_{16} - 52_8 / 6_{10}$$

5. What Does This Program Do?

What is printed when this program is run?

$a = 100$; $b = 10$; $c = 5$; $d = 4$; $e = 2$

if $b * c > c * d$ then $b = c * d$ else $c = b * c$

if $a / b = b / d$ then $a = a / b$ else $b = b * d$

if $a + d > b / e$ then $e = d * e$ else $d = d / e$

if $a * e > c ^ e$ then $b = a - e$ else $c = b - c$

print $a + b * c - d / e$

end