American Computer Science League

Recursion Practice Round

Answers must be left in this column

Short Problems

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1. Recursion

Find F(12), given

$$F(x) = \begin{cases} F(x\text{-}2) - F(x\text{-}3) + 2 & \text{if } x>10 \\ x * F(x\text{-}1) - 2 & \text{if } 6 \leq x \leq 10 \\ 3 & \text{otherwise} \end{cases}$$

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2. Recursion

Find f(32) where f(x) is defined as follows:

$$f(x) = \begin{cases} f(x\text{-}2) + 1 & \text{whenever } x>0 \\ 0 & \text{otherwise} \end{cases}$$

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3. Recursion

NOTE: This is much harder than what ACSL would give (unless you get to the finals).

$$\begin{aligned} \mathbf{F(x)} &= & x/2 & \quad \text{if x is even} \\ &= & F(F(3x + 1)) & \quad \text{otherwise} \end{aligned}$$

If $x = 2^k + 1$, then $\mathbf{F(x)} =$

a) $3*2^k + 1$
b) $3*2^k + 4$
c) $3*2^{k-1} + 1$
d) $3*2^{k-2} + 1$
e) $3*2^{k-3} + 1$