

Classroom Division

1. Recursive Function

Find $f(20)$ given:

$$f(x) = \begin{cases} f(x-1) + 2 & \text{if } x > 1 \\ 4 & \text{if } x = 1 \end{cases}$$

2. Recursive Functions

Find $f(3)$ given:

$$f(x) = \begin{cases} f(2x-1) + 1 & \text{if } x \leq 10 \\ x + 2 & \text{if } x > 10 \end{cases}$$

3. Computer Number Systems

Convert 2016_{16} to octal.

4. Computer Number Systems

Which of the following has the largest value?

- a) $327_8 + 11011011_2$ b) $11011010_2 + 334_8$
 c) $330_8 + 11011101_2$ d) $11011001_2 + 332_8$

5. What Does This Program Do?

What is printed when this program is run?

```
a = 42: b = 20: c = 2: d = 1
if a / c > b + d then a = a / c else a = a - b
if a - b * c < 0 then c = c + 2 else b = b / 2
if (a > b) and (c < d) then d = 2 * d else d = d + c
if b/d = int(b/d) then b = b / d else b = d
if c ^ 2 >= b ^ 2 then a = a / 2
print 2 * (a - 3) / b - b ^ d / c ^ 3
end
```

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6. Recursive Functions

Find $f(6)$ given:

$$f(x) = \begin{cases} 2 * f(x-1) + 3 & \text{if } x > 1 \\ 2 & \text{if } x = 1 \end{cases}$$

7. Recursive Functions

Find $f(16)$ given:

$$f(x) = \begin{cases} 2 * f(x-3) + 4 & \text{if } x \geq 8 \\ f(\lfloor x/2 \rfloor) - 1 & \text{if } 0 < x < 8 \\ x * x - x & \text{if } x \leq 0 \end{cases}$$

where $\lfloor x \rfloor =$ greatest integer $\leq x$

8. Computer Number Systems

Evaluate the expression and express the final answer in hex.

$$10_2 * 61_{16} + 1001_2 * (1011_2 - A_{16})$$

9. Computer Number Systems

What is the next term in the following sequence in base 10? Express the answer in octal.

$$1_8, A_{16}, 144_8, 3E8_{16}$$

10. What Does This Program Do?

What is printed when this program is run?

a = 24: b = 5: c = 2: d = 4: e = 1

if a + c > c * e then a = a / (b - 1) else a = a - 2 * b

if a - b * d < e + c * d then c = c + b else b = b - 2

if (a < b + c) and (c < d + e) then d = 2 * e else d = d + e

if b/d = int(b/d) then b = b / d else b = d

if (c ^ 2 > a / d) or (d > b - a) then a = 2 * a else c = a * c

if (a < b) or (c > d) and (e < a - b) then a = 10 else e = 0

print a + c / b - d * (a / 5 + d / b) / c - c / (b + d + e)

end