

# American Computer Science League

2025-2026 • Contest 1: Short Problems • Junior Division

<b>1. Computer Number Systems</b>  Convert $52326_{16}$ to octal.	A. 336677 B. 1221446 C. 2443112 D. 1222045 E. 1622045
<b>2. Computer Number Systems</b>  What is the average of the following two numbers in base 10?  $36_8$ $74_8$	A. 36 B. 37 C. 45 D. 112 E. 132
<b>3. Recursive Functions</b>  Find $f(6)$ given:  $f(x) = \begin{cases} 2 & \text{if } x = 1 \\ 2 \cdot f(x-1) + 1 & \text{if } x > 1 \end{cases}$	A. 5 B. 11 C. 23 D. 95 E. 191
<b>4. Recursive Functions</b>  Find $f(16)$ given:  $f(x) = \begin{cases} f(x-3) + x & \text{if } x > 10 \\ 2 \cdot f(x-2) & \text{if } 8 \leq x \leq 10 \\ 2x + 3 & \text{if } x < 8 \end{cases}$	A. 73 B. 15 C. 60 D. 30 E. 89

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**5. What Does This Program Do? (Branching)**

Which of the following input values will print “wrong” when executed?

```
input a, b
a = a ^ 2
b = b ^ 2
c = a + b
d = sqrt(c)
if d == int(d) then
    output a, b, c
else
    output "wrong"
end if
```

- A. a=3, b=4
- B. a=5, b=12
- C. a=5, b=10
- D. a=9, b=12
- E. a=7, b=24

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**6. What Does This Program Do? (Branching)**

Run the following program with each number from 1 to 25, inclusive. How many of them are output?

```
input num
if num % 3 == 0 && num % 4 == 0 then
    output num
end if
if num % 5 == 0 || num % 7 == 0 then
    output num
end if
```

- A. 11
  - B. 10
  - C. 9
  - D. 8
  - E. 7
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