

GATE 2014 – C PROGRAMMING

Question 10 • Set 2 (CS02)

Problem: Find the value returned by func(435).

Given C Function

```
int func(int num) {  
    int count = 0;  
    while (num) {  
        count++;  
        num >>= 1;  
    }  
    return (count);  
}
```

1. Understand the key statement

num >>= 1 is equivalent to **num = num >> 1**

A right shift by 1 bit divides a positive integer by 2, with the remainder discarded.

2. Convert 435 to binary

Using repeated division by 2:

Number	Quotient	Remainder
435	217	1
217	108	1
108	54	0
54	27	0
27	13	1
13	6	1
6	3	0
3	1	1
1	0	1

Read the remainders from bottom to top: **110110011₂**

3. Trace the loop

Each iteration increments count and then right-shifts num by one bit.

Iteration	num
Start	435
1	217
2	108
3	54
4	27
5	13
6	6
7	3
8	1
9	0

4. Final Answer

$$\text{func}(435) = 9$$

Why? The binary representation of 435 is 110110011_2 , which contains 9 bits. The loop performs one count increment for each right shift, so count becomes 9.

 **Key takeaway:** For a positive integer, this function counts the number of bits in its binary representation.

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