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**36th Annual High School Programming Contest**

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##### April 12, 2024

###### Gold Problem #1: Least Significant Binary Zeros

Background Information:

What are the next three numbers in the sequence:

0, 1, 0, 2, 0, 1, 0, 3, 0, 1, 0, 2, 0, 1, 0, 4, 0, 1, 0, 2, 0, 1, 0, 3, 0, 1, 0, 2, 0, 1, 0, 5, 0, \_\_\_, \_\_\_, \_\_\_, \_\_\_

Maybe you like factoring and noticed that the highest power of 2 that divides 1 is 0

the highest power of 2 that divides 2 is 1

the highest power of 2 that divides 3 is 0

the highest power of 2 that divides 4 is 2

the highest power of 2 that divides 5 is 0

the highest power of 2 that divides 6 is 1

the highest power of 2 that divides 7 is 0

the highest power of 2 that divides 8 is 3

the highest power of 2 that divides 9 is 0

the highest power of 2 that divides 10 is 1

the highest power of 2 that divides 11 is 0

the highest power of 2 that divides 12 is 2

the highest power of 2 that divides 13 is 0

the highest power of 2 that divides 14 is 1

the highest power of 2 that divides 15 is 0

the highest power of 2 that divides 16 is 4

and so on.

So our sequence is formed by calculating how many times you can start with a number N and divide it by 2 with no remainder.

Write a program that will calculate the number of times a positive integer N can be repeatedly divided by 2 with no remainder. In other words, given N, compute K where K is the largest non-negative integer such that 2K is a factor of N.

Programming Problem:

Input:  A positive integer N ≤ 2.000,000,000.

Output: K, where K is the largest non-negative integer such that 2K is a factor of N.

Example 1: Example 2: Example 3: Example 4: Example 5:

Input: 48 Input: 64 Input: 15 Input: 38 Input: 7340032

Output: 4 Output: 6 Output: 0 Output: 1 Output: 20