

APPROACH

INTUITION

To make **num1 equal to zero**, we perform a series of operations. We start by **subtracting num2 from num1**, and then subtract powers of two (2^k1 , 2^k2 , and so on) from the result.

When we rearrange the equation, we get:

$$\text{num1} - k * \text{num2} - (2^k1 + 2^k2 + \dots) == 0$$

This equation states that num1 can be expressed as the sum of k times num2 and the sum of powers of two.

The goal is to find the values of k and the powers of two that make num1 equal to zero. By subtracting num2 and powers of two from num1 in each step, we aim to reduce the remaining value to zero.

Therefore, the problem becomes finding the minimum combination of k and the powers of two needed to reach zero.

Why checking bits and steps

Here's why these conditions are important:

Checking the number of set bits (bits): The count of set bits in the diff value represents the **number of powers of two needed to construct the remaining value after subtracting num2 * steps from num1**. Recall that each power of two corresponds to an operation. If the count of set bits is less than or equal to the current step, it means that we have enough powers of two to perform the required operations within the given step count.

Checking if the step falls within the range of diff: The range of diff represents the remaining value after subtracting num2 * steps from num1. If the current step falls within this range, **it indicates that we can continuously subtract powers of two from the remaining value until it becomes zero**. By ensuring the step falls within the range, we confirm that the remaining value can be reduced to zero using the given number of steps.

By checking both conditions, we ensure that we have enough powers of two and a valid range to perform the necessary operations and make num1 equal to zero. If both conditions are met, the function returns the minimum number of steps required. Otherwise, it continues to the next iteration to check for other possible step counts.

In summary, the conditions of checking the number of set bits and the range of diff validate the feasibility of making num1 zero within the given step count and help in determining the minimum number of steps required.