

2683. Neighboring Bitwise XOR

Solved ✓

Medium

Topics

Companies

Hint

A **0-indexed** array **derived** with length **n** is derived by computing the **bitwise XOR** (\oplus) of adjacent values in a **binary array** **original** of length **n**.

Specifically, for each index **i** in the range $[0, n - 1]$:

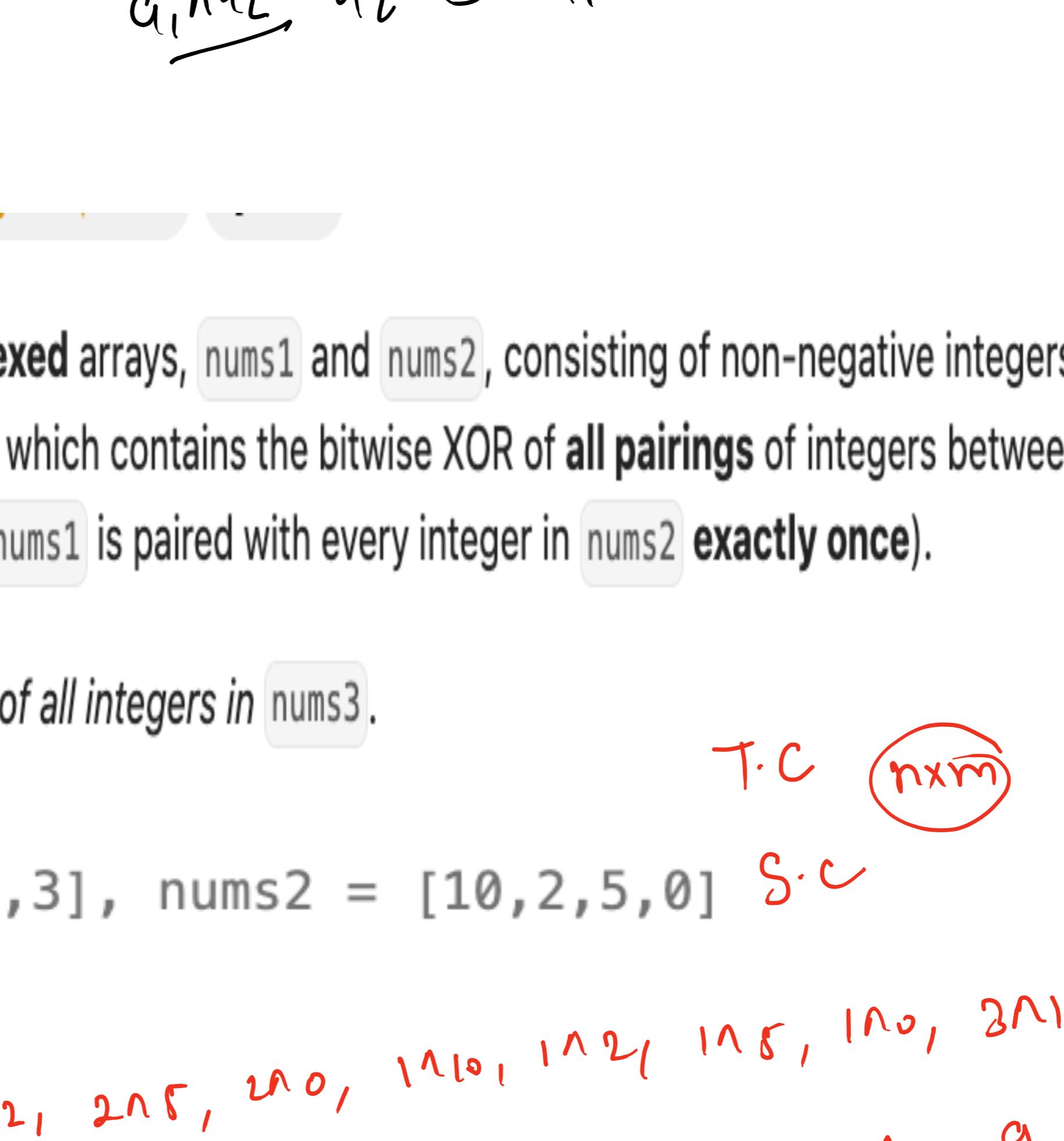
If $i = n - 1$, then $\text{derived}[i] = \text{original}[i] \oplus \text{original}[0]$.

Otherwise, $\text{derived}[i] = \text{original}[i] \oplus \text{original}[i + 1]$.

Given an array **derived**, your task is to determine whether there exists a **valid binary array** **original** that could have formed **derived**.

Return **true** if such an array exists or **false** otherwise.

- A binary array is an array containing only **0's** and **1's**



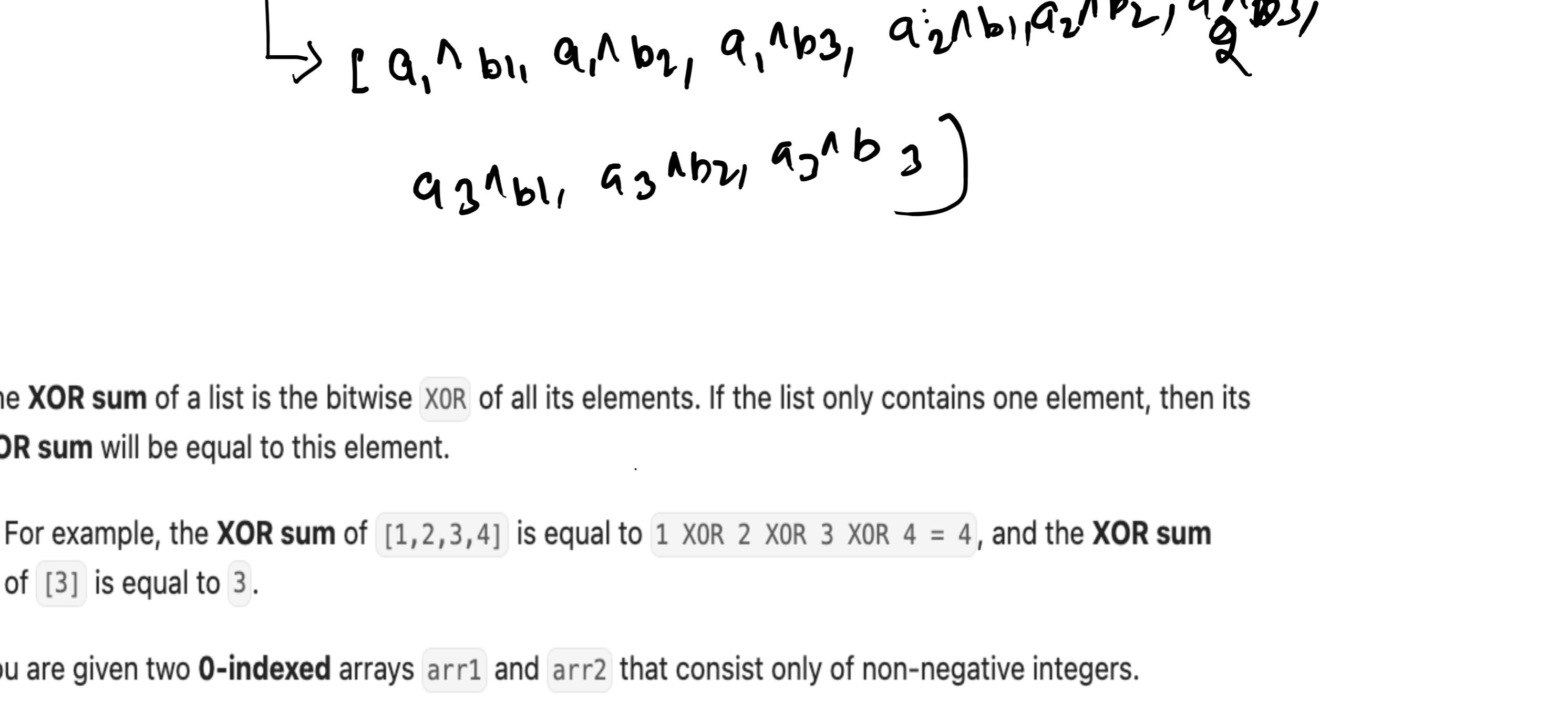
You are given two **0-indexed** arrays, **nums1** and **nums2**, consisting of non-negative integers. Let there be another array, **nums3**, which contains the bitwise XOR of all pairings of integers between **nums1** and **nums2** (every integer in **nums1** is paired with every integer in **nums2** exactly once).

Return the **bitwise XOR** of all integers in **nums3**.

T.C (nxm)

Input: $\text{nums1} = [2, 1, 3]$, $\text{nums2} = [10, 2, 5, 0]$ S.C

Output: 13



The **XOR sum** of a list is the bitwise **XOR** of all its elements. If the list only contains one element, then its **XOR sum** will be equal to this element.

- For example, the **XOR sum** of $[1, 2, 3, 4]$ is equal to $1 \oplus 2 \oplus 3 \oplus 4 = 4$, and the **XOR sum** of $[3]$ is equal to 3 .

You are given two **0-indexed** arrays **arr1** and **arr2** that consist only of non-negative integers.

Consider the list containing the result of $\text{arr1}[i] \text{ AND } \text{arr2}[j]$ (bitwise **AND**) for every (i, j) pair where $0 \leq i < \text{arr1.length}$ and $0 \leq j < \text{arr2.length}$.

Return the **XOR sum** of the aforementioned list.

$(1, 2, 3) \quad (6, 5)$

$(1 \wedge 6), (1 \wedge 5), (2 \wedge 6), (2 \wedge 5), (6 \wedge 5), 385$

$(0 \quad 1 \quad 2 \quad 0 \quad 2 \quad 1)$

$\overline{\overline{8}}(P\wedge P)$

$[a_1, b_1, c_1] \quad [x_1, y_1]$

$\frac{[a \wedge b] \wedge [a \wedge c]}{a \wedge (b \wedge c)}$

$(a_1 \wedge b_1), (a_1 \wedge c_1), (b_1 \wedge c_1), (b_1 \wedge y_1), (c_1 \wedge y_1), (c_1 \wedge b_1)$

$\left[(a_1 \wedge b_1) \wedge (a_1 \wedge c_1) \wedge (b_1 \wedge c_1) \wedge (b_1 \wedge y_1) \wedge (c_1 \wedge y_1) \wedge (c_1 \wedge b_1) \right]$

$(x_1 \wedge y_1) \wedge (a_1 \wedge b_1) \wedge (a_1 \wedge c_1) \wedge (b_1 \wedge c_1) \wedge (b_1 \wedge y_1) \wedge (c_1 \wedge y_1)$

$(x_1 \wedge y_1) \wedge (a_1 \wedge b_1) \wedge (a_1 \wedge c_1) \wedge (b_1 \wedge c_1) \wedge (b_1 \wedge y_1) \wedge (c_1 \wedge y_1)$

$(P \wedge P) \wedge (r \wedge r)$

$(x_1 \wedge y_1) \wedge (a_1 \wedge b_1) \wedge (a_1 \wedge c_1) \wedge (b_1 \wedge c_1) \wedge (b_1 \wedge y_1) \wedge (c_1 \wedge y_1)$

$(x_1 \wedge y_1) \wedge (a_1 \wedge b_1) \wedge (a_1 \wedge c_1) \wedge (b_1 \wedge c_1) \wedge (b_1 \wedge y_1) \wedge (c_1 \wedge y_1)$

Given two positive integers **num1** and **num2**, find the positive integer **x** such that:

- x** has the same number of set bits as **num2**, and

- The value **x XOR num1** is **minimal**.

Note that **XOR** is the bitwise **XOR** operation.

Return the integer **x**. The test cases are generated such that **x** is **uniquely determined**.

The number of **set bits** of an integer is the number of **1's** in its binary representation.

$\overline{\overline{1 \ll 6}}$

$n \text{num2} = 7 \rightarrow 3$

$n \text{num1} = 2^4$

$\frac{x^6}{10000} \oplus \frac{x^5}{0100} \oplus \frac{x^4}{0010} \oplus \frac{x^3}{0001} \rightarrow 3$

$\frac{x^6}{10000} \oplus \frac{x^5}{0100} \oplus \frac{x^4}{0010} \oplus \frac{x^3}{0001} \rightarrow 3$

$\frac{x^6}{10000} \oplus \frac{x^5}{0100} \oplus \frac{x^4}{0010} \oplus \frac{x^3}{0001} \rightarrow 3$

$\frac{x^6}{10000} \oplus \frac{x^5}{0100} \oplus \frac{x^4}{0010} \oplus \frac{x^3}{0001} \rightarrow 3$