Problem 2527: Find Xor-Beauty of Array

Problem Information

Difficulty: Medium
Acceptance Rate: 70.13%
Paid Only: No
Tags: Array, Math, Bit Manipulation

Problem Description

You are given a **0-indexed** integer array `nums`.

The **effective value** of three indices `i`, `j`, and `k` is defined as `((nums[i] | nums[j]) & nums[k])`.

The **xor-beauty** of the array is the XORing of **the effective values of all the possible triplets** of indices `(i, j, k)` where `0 <= i, j, k < n`.

Return _the xor-beauty of_ `nums`.

Note that:

* `val1 | val2` is bitwise OR of `val1` and `val2`. * `val1 & val2` is bitwise AND of `val1` and `val2`.

Example 1:

Input: nums = [1,4] **Output:** 5 **Explanation:** The triplets and their corresponding effective values are listed below: - (0,0,0) with effective value ((1 | 1) & 1) = 1 - (0,0,1) with effective value ((1 | 1) & 4) = 0 - (0,1,0) with effective value ((1 | 4) & 1) = 1 - (0,1,1) with effective value ((1 | 4) & 4) = 4 - (1,0,0) with effective value ((4 | 1) & 1) = 1 - (1,0,1) with effective value ((4 | 1) & 4) = 4 - (1,1,0) with effective value ((4 | 4) & 1) = 0 - (1,1,1) with effective value ((4 | 4) & 4) = 4 Xor-beauty of array will be bitwise XOR of all beauties = 1 ^ 0 ^ 1 ^ 4 ^ 1 ^ 4 ^ 0 ^ 4 = 5.

Example 2:

Input: nums = [15,45,20,2,34,35,5,44,32,30] **Output:** 34 **Explanation:** The xor-beauty of the given array is 34.

Constraints:

* `1 <= nums.length <= 105` * `1 <= nums[i] <= 109`

Code Snippets

C++:

```
class Solution {
public:
int xorBeauty(vector<int>& nums) {

}
};
```

Java:

```
class Solution {
public int xorBeauty(int[] nums) {

}
}
```

Python3:

```
class Solution:
def xorBeauty(self, nums: List[int]) -> int:
```