Problem Description

We define $f(X, Y)$ as the number of different corresponding bits in the binary representation of **X** and **Y**.
For example, $f(2, 7) = 2$, since the binary representation of 2 and 7 are 010 and 111, respectively. The first and the third bit differ, so f(2, 7) = 2.

You are given an array of N positive integers, A_1, A_2,..., A_N. Find sum of $f(A_i, A_j)$ for all pairs (i, j) such that 1 â‰¤ i, j â‰¤ N. Return the answer modulo 10^9+7.

Problem Constraints

$1 <= N <= 10^5$

$1 <= A[i] <= 2^{31} - 1$

Input Format

The first and only argument of input contains a single integer array A.

Output Format

Return a single integer denoting the sum.

Example Input

Input 1:

A = [1, 3, 5]

Input 2:

A = [2, 3]

Example Output

Ouptut 1:

8

Output 2:

2

Example Explanation

Explanation 1:

f(1, 1) + f(1, 3) + f(1, 5) + f(3, 1) + f(3, 3) + f(3, 5) + f(5, 1) + f(5, 3) + f(5, 5) = 0 + 1 + 1 + 1 + 0 + 2 + 1 + 2 + 0 = 8

Explanation 2:

f(2, 2) + f(2, 3) + f(3, 2) + f(3, 3) = 0 + 1 + 1 + 0 = 2