

Problem N. Xor Sum 4

Time limit 2000 ms

Mem limit 1048576 kB

Problem Statement

We have N integers. The i -th integer is A_i .

Find $\sum_{i=1}^{N-1} \sum_{j=i+1}^N (A_i \text{ XOR } A_j)$, modulo $(10^9 + 7)$.

► What is XOR ?

Constraints

- $2 \leq N \leq 3 \times 10^5$
- $0 \leq A_i < 2^{60}$
- All values in input are integers.

Input

Input is given from Standard Input in the following format:

```
N
A1 A2 ... AN
```

Output

Print the value $\sum_{i=1}^{N-1} \sum_{j=i+1}^N (A_i \text{ XOR } A_j)$, modulo $(10^9 + 7)$.

Sample 1

Input	Output
3 1 2 3	6

We have $(1 \text{ XOR } 2) + (1 \text{ XOR } 3) + (2 \text{ XOR } 3) = 3 + 2 + 1 = 6$.

Sample 2

Input	Output
10 3 1 4 1 5 9 2 6 5 3	237

Sample 3

Input	Output
10 3 14 159 2653 58979 323846 2643383 27950288	103715602

Print the sum modulo $(10^9 + 7)$.