

Problem B. Be Friends

Input file: *standard input*
Output file: *standard output*
Time limit: 2.5 seconds
Memory limit: 512 mebibytes

There are n lovely lolis in teacher Jiang's class. Each loli has her own personality. For simplicity, we assume that the personality of i -th loli can be represent as an integer p_i .

It is easy to understand that if two lolis have very different personality, they are hard to be direct friends. To formalize this, when the i -th and the j -th loli is a pair of direct friends, there will be a run-in cost of $p_i \oplus p_j$. Here we use \oplus to denote bitwise xor operation.

We say two lolis are indirect friends if there is an "loli path" between them. For example, if $(1, 2), (2, 3), (3, 4)$ are pairs of direct friends, then $(1, 4)$ is a pair of indirect friends.

As a good teacher, Mr. Jiang wants to make all of the lovely lolis to be friends. That is, any two lolis must be either a pair of direct friends of indirect friends. What is the minimum total run-in cost to make this happen?

Input

The first line contains an integer n . The second line contains n integers p_1, p_2, \dots, p_n .

- $1 \leq n \leq 10^5$
- $0 \leq p_i \leq 10^9$

Output

Please output the minimum total run-in cost in one line.

Examples

standard input	standard output
3 5 1 4	5
6 1 2 3 5 8 13	20