

Problem A. XOR

Input file: *standard input*
Output file: *standard output*
Time limit: 6 seconds
Memory limit: 512 mebibytes

Every good problemset needs a problem that can be summarized in a single doge meme. Today's problemset is no different.



Given a multiset S of non-negative integers, divide it into two multisets A and B in a way that minimizes $|\text{xor}(A) - \text{xor}(B)|$. Here $\text{xor}(X)$ denotes the bitwise XOR of all elements of X .

Note that one of the multisets A and B can be empty, and XOR of an empty multiset is 0.

It is enough to output the minimum possible value of $|\text{xor}(A) - \text{xor}(B)|$.

Input

The first line of input contains the number of test cases z ($1 \leq z \leq 50$). The descriptions of the test cases follow, two lines per test case.

The first line of every test case contains an integer n ($1 \leq n \leq 10^5$) – the size of the multiset.

The second line contains n integers x_i ($0 \leq x_i \leq 10^{18}$) – elements of the multiset.

Output

For each test case output one integer: the smallest possible difference of XORs.

Example

standard input	standard output
2	4
4	5
1 2 3 4	
5	
3 7 3 9 5	