

PROBLEMS SUBMIT STATUS STANDINGS CUSTOM TEST

D. Vlad and Division

time limit per test: 2 seconds
memory limit per test: 256 megabytes

Vladislav has n non-negative integers, and he wants to divide **all** of them into several groups so that in any group, any pair of numbers does not have matching bit values among bits from 1-st to 31-st bit (i.e., considering the 31 least significant bits of the binary representation).

For an integer k , let $k_2(i)$ denote the i -th bit in its binary representation (from right to left, indexing from 1). For example, if $k = 43$, since $43 = 101011_2$, then $43_2(1) = 1$, $43_2(2) = 1$, $43_2(3) = 0$, $43_2(4) = 1$, $43_2(5) = 0$, $43_2(6) = 1$, $43_2(7) = 0$, $43_2(8) = 0, \dots, 43_2(31) = 0$.

Formally, for any two numbers x and y in the same group, the condition $x_2(i) \neq y_2(i)$ must hold for all $1 \leq i < 32$.

What is the minimum number of groups Vlad needs to achieve his goal? Each number must fall into exactly one group.

Input

The first line contains a single integer t ($1 \leq t \leq 10^4$) — the number of test cases.

The first line of each test case contains a single integer n ($1 \leq n \leq 2 \cdot 10^5$) — the total number of integers.

The second line of each test case contains n given integers a_1, \dots, a_n ($0 \leq a_j < 2^{31}$).

The sum of n over all test cases in a test does not exceed $2 \cdot 10^5$.

Output

For each test case, output a single integer — the minimum number of groups required to satisfy the condition.

Example

input

Copy

9
4
1 4 3 4
2
0 2147483647
5
476319172 261956880 2136179468 1671164475 1885526767
3
1335890506 811593141 1128223362
4
688873446 627404104 1520079543 1458610201
4
61545621 2085938026 1269342732 1430258575
4
0 0 2147483647 2147483647
3
0 0 2147483647
8
1858058912 289424735 1858058912 2024818580 1858058912 289424735 122665067 289424735

output

Copy

4
1
3
2
2
3
2
2
4

Note

In the first test case, any two numbers have the same last 31 bits, so we need to place each number in its own group.

In the second test case, $a_1 = 000000000000000000000000000000_2$,
 $a_2 = 111111111111111111111111111111_2$ so they can be placed in the same group because $a_1(i) \neq a_2(i)$ for each i between 1 and 31, inclusive.

Codeforces Round 928 (Div. 4)

Finished

Practice

Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

Last submissions		
Submission	Time	Verdict
274445695	Aug/04/2024 23:44	Accepted
271678699	Jul/21/2024 03:16	Wrong answer on test 3
271678622	Jul/21/2024 03:14	Wrong answer on test 3
271678497	Jul/21/2024 03:11	Wrong answer on test 3

Problem tags

bitmasks greedy *1300

No tag edit access

Contest materials

Announcement (en)

Tutorial (en)