

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS STANDINGS CUSTOM INVOCATION

F. Apollo versus Pan

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Only a few know that Pan and Apollo weren't only battling for the title of the GOAT musician. A few millennia later, they also challenged each other in math (or rather in fast calculations). The task they got to solve is the following:

Let x_1, x_2, \dots, x_n be the sequence of n non-negative integers. Find this value:

$$\sum_{i=1}^n \sum_{j=1}^n \sum_{k=1}^n (x_i \& x_j) \cdot (x_j | x_k)$$

Here $\&$ denotes the bitwise and, and $|$ denotes the bitwise or.

Pan and Apollo could solve this in a few seconds. Can you do it too? For convenience, find the answer modulo $10^9 + 7$.

Input

The first line of the input contains a single integer t ($1 \leq t \leq 1\,000$) denoting the number of test cases, then t test cases follow.

The first line of each test case consists of a single integer n ($1 \leq n \leq 5 \cdot 10^5$), the length of the sequence. The second one contains n non-negative integers x_1, x_2, \dots, x_n ($0 \leq x_i < 2^{60}$), elements of the sequence.

The sum of n over all test cases will not exceed $5 \cdot 10^5$.

Output

Print t lines. The i -th line should contain the answer to the i -th text case.

Example

inputCopy

8
2
1 7
3
1 2 4
4
5 5 5 5
5
6 2 2 1 0
1
0
1
1
6
1 12 123 1234 12345 123456
5
536870912 536870911 1152921504606846975 1152921504606846974 1152921504606846973

outputCopy

128
91
1600
505
0
1
502811676
264880351

Topic Stream Mashup: Bitwise Operations

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

Submit?

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

Choose file: Choose File No file chosen

Submit

Last submissions

Submission	Time	Verdict
268764867	Jul/04/2024 14:55	Accepted

Contest materials

Topic tutorial video (en)