

Problem J. Apollo versus Pan

Time limit 2000 ms

Mem limit 262144 kB

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 test case.

Sample 1

Input	Output
8	128
2	91
1 7	1600
3	505
1 2 4	0
4	1
5 5 5 5	502811676
5	264880351
6 2 2 1 0	
1	
0	
1	
1	
6	
1 12 123 1234 12345 123456	
5	
536870912 536870911 1152921504606846975 1152921504606846974	