Different Xor Values

Time limit: *1000 ms*
Memory limit: *256 MB*

You are given an integer sequence a of length n and want to play a game with your friend. The game consists of selecting a contiguous subsequence $a_l, \ldots, a_r$, define an empty set S and then make the maximum number of possible moves.

A move over a subsequence $a_l, \ldots, a_r$ consists of choosing some positions (possibly none) $l \leq i_1 < \ldots < i_k \leq r$ such that the Bitwise XOR of the elements $a_{i_1} \oplus \ldots \oplus a_{i_k}$ is not present in S and then insert this value in it. (The Bitwise XOR of an empty sequence is 0).

Since you can choose any contiguous subsequence of a, you want to know how many moves will be made in total after every different possible game. In other words, let $Q(l, r)$ be the maximum number of moves over the subsequence $a_l, \ldots, a_r$ in one game, then you want to compute

$$\sum_{l=1}^{n} \sum_{r=l}^{n} Q(l, r)$$

Since the answer could be large, print it modulo $10^9 + 7$.

Standard Input

The first line of input contains an integer t, the number of testcases.

The first line of each testcase contains an integer n, the length of the sequence.

The second line of each testcase contains n integers a_i, where the i-th integer is the i-th element of the sequence.

Standard Output

For each testcase, print a single line with the answer to the problem.

Constraints and notes

- $(1 \leq t \leq 5)$
- $(1 \leq n \leq 10^5)$
- $(0 \leq a_i \leq 10^6)$

Input	Output	Explanation
3 2 1 0 2 1 1 3 3 3 2	5 6 16	For the first testcase, we have the following subsequences: • $\{1\}$, in which 2 moves can be made: one with value 1 (choosing the only element of the subsequence) and another one with value 0 (empty). • $\{0\}$, in which 1 move can be made: one with value 0 (either choosing the only element or none). • $\{1, 0\}$, in which ***2*** moves can be made: one with value 1 (either choosing the first or the two values) and another one with 0 (either choosing the second value or none of them). For the second testcase, we have the following subsequences: • $\{1\}$, in which 2 moves can be made: one with value 1 (choosing the only element of the subsequence) and another one with value 0 (empty). • $\{1\}$, in which 2 moves can be made: one with value 1 (choosing the only element of the subsequence) and another one with value 0 (empty). • $\{1, 1\}$, in which 2 moves can be made: one with value 1 (either choosing only one element) and another one with 0 (either choosing both elements or none of them). For the third testcase, we have the following subsequences:

Input	Output	Explanation
		• $\{3\}$, in which 2 moves can be made: one with value 3 (choosing the only element of the subsequence) and another one with value 0 (empty). • $\{3\}$, in which 2 moves can be made: one with value 3 (choosing the only element of the subsequence) and another one with value 0 (empty). • $\{2\}$, in which 2 moves can be made: one with value 2 (choosing the only element of the subsequence) and another one with value 0 (empty). • $\{3, 3\}$, in which 2 moves can be made: one with value 3 (either choosing only one element) and another one with 0 (either choosing both elements or none of them). • $\{3, 2\}$, in which 4 moves can be made: one with value 1 (choosing both elements), one with value 2 (choosing only the second element), one with value 3 (choosing only the first element) and another one with 0 (choosing none of the elements). • $\{3, 3, 2\}$, in which 4 moves can be made: one with value 1 (choosing one 2 and one 3), one with value 2 (choosing only the element with value 2), one with value 3 (choosing any of the elements with value 3) and another one with 0 (choosing none of the

Input	Output	Explanation
		elements or two elements with value 3).