Uncle Bob and XOR Sum

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Uncle Bob, the Mayor of Bytelands, is not only a great leader but also an enthusiastic problem solver. He is so obsessed with problem solving that he hired a team to create new problems for him every day. But no matter how hard the problem is, Uncle Bob solves it within a few minutes. As the days pass by, he feels bored with solving such easy problems. So, he threatens the team to come up with an exciting problem or they have to look for a new job. After hours of brainstorming, the team came up with the following problem:

Given two arrays of integers A and B, determine the number of **non-empty subsets of positions** in A such that the **XOR Sum** of the values corresponding to those positions in A does not contain a submask that is present in B. More formally, if the XOR Sum of the values corresponding to a chosen subset of positions in A is S, and the set of submasks of S is $\{m_1, m_2, \ldots, m_k\}$, then: $m_i \notin B$ for all $1 \leq i \leq k$.

Since the number of valid non-empty subsets can be very large, you are required to provide the answer modulo $1,000,000,007$ $(10^9 + 7)$.

The **XOR Sum** of a subset of positions $\{p_1, p_2, \ldots, p_k\}$ is defined as: $S = A[p_1] \oplus A[p_2] \oplus \cdots \oplus A[p_k]$, where $\oplus$ denotes the bitwise XOR operator.

A **submask** of a number n is any number m such that all bits set in m are also set in n.

Looking at the problem, Uncle Bob was stunned. He never thought in a million years that he would be given a problem that requires any bitwise operations, let alone XOR sum. Now he regrets threatening the team. He is aware that not being able to solve this problem will harm his reputation as a Mayor. So, he hired you to solve it for him. Would you be able to help Uncle Bob and save him from his misery? Also, make sure not to tell anybody that Uncle Bob has hired you!

Input

The input will contain multiple test cases. The first line of the input contains an integer T $(1 \leq T \leq 100)$, representing the number of test cases. For each test case:

- The first line contains two positive integers N $(1 \leq N \leq 10^5)$ and K $(1 \leq K \leq 10)$ representing the length of the arrays A and B, respectively.
- The second line contains N space-separated integers $a_1, a_2, \ldots, a_n$ $(0 \leq a_i \leq 2^{31} - 1)$.
- The third line contains K space-separated integers $b_1, b_2, \ldots, b_k$ $(0 \leq b_i \leq 2^{31} - 1)$.

You can safely assume that the sum of N over all test cases will not exceed 10^5.

Output

For each test case, print the answer modulo $1,000,000,007$ $(10^9 + 7)$ on a new line.

Example

standard input	standard output
3 1 1 1 1 2 1 1 2 4 2 1 1 3 1	0 3 1