Problem M
XOR Sequences

Suppose you are given two integers, m and n. You are also given a list of n distinct integers $x_1, x_2, \ldots, x_n$, with $0 \leq x_i \leq 2^m - 1$. For each number y from 0 to $2^m - 1$, you've found the number p_y such that x_{p_y} has a maximum bitwise-XOR with y. That is, $y \oplus x_{p_y} > y \oplus x_i$ for all $i = 1..n, i \neq p_y$ ($\oplus$ means bitwise-XOR).

Now, consider the reverse problem. Given m, n, and the sequence $p_0, p_1, \ldots, p_{2^m-1}$, count the number of sequences of distinct integers $x_1, x_2, \ldots, x_n$ that could have generated that p sequence from the above algorithm. Two x sequences are different if there is some i such that x_i in one sequence is different from x_i in the other sequence. Output this count modulo 10^9+7.

Input

Each test case will begin with a line with two space-separated integers m ($0 \leq m \leq 16$) and n ($1 \leq n \leq 2^m$), where 2^m is the length of the p sequence, and n is the length of the x sequences.

Each of the next 2^m lines will contain a single integer p ($1 \leq p \leq n$). These are the values of the sequence $p_0, p_1, \ldots, p_{2^m-1}$, in order. Every value from 1 to n inclusive will appear at least once.

Output

Output a single integer, which is the number of sequences $x_1, x_2, \ldots, x_n$ which could have generated the sequence $p_0, p_1, \ldots, p_{2^m-1}$ from the above algorithm, modulo 10^9+7.

Sample Input 1	Sample Output 1
3 6 1 1 2 2 3 4 5 6	4

Sample Input 2	Sample Output 2
2 3 1 2 1 3	0

Sample Input 3	Sample Output 3
3 8 1 2 3 4 5 6 7 8	1