Problem C. Ciulama

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	1024 mebibytes

Ciulama is a kind of Romanian stew. It is very tasty and should be served hot. It can be made from mushrooms, chicken, and, less often, pork.

Your mother made you ciulama. You HATE ciulama, so now you want to find a good excuse to delay the inevitable. You remembered your homework for Advanced Latticeal Geometric Operators (ALGO). That was enough to excuse yourself from the meal, but now you face an even harder problem.

The problem involves integer points in k-dimensional space. Let $n_1, n_2, n_3, \ldots, n_k$ be positive integers. Consider all points with integer coordinates $(x_1, x_2, x_3, \ldots, x_k)$ such that $0 \le x_i \le n_i$ in every dimension. Each point has an associated binary value that is initially 0.

In one operation, you choose $y_1, y_2, y_3, \ldots, y_k$ such that $0 \le y_i \le n_i$ in every dimension, and then flip (turn 0 into 1 or 1 into 0) the values of all points $(x_1, x_2, x_3, \ldots, x_k)$ where $0 \le x_i \le y_i$ in every dimension.

Let m be the maximum of all $\{n_i\}$. You are given $m + 1$ desired binary values $f(0), f(1), \ldots, f(m)$. Your goal is to make each point $(x_1, x_2, x_3, \ldots, x_k)$ have the value $f(x_1) \oplus f(x_2) \oplus \ldots \oplus f(x_k)$. Find the minimum number of operations required to achieve this. Because this number can be very large, output it modulo $10^9 + 7$.

The operation $\oplus$ is the binary exclusive OR.

Input

The first line of input contains two integers: k and m ($1 \le k \le 10^5$, $1 \le m \le 10^6$).

The second line contains k positive integers $n_1, n_2, n_3, \ldots, n_k$ separated by spaces ($1 \le n_i \le m$). The value m is the maximum of all n_i.

The third line contains a string of $m + 1$ binary values $f(0), f(1), \ldots, f(m)$. These are **not** separated by spaces.

Output

Print a single integer: the minimum number of operations to achieve the desired configuration modulo $10^9 + 7$.

Examples

standard input	*standard output*
1 5 5 011010	4
3 6 4 6 1 0101010	12

Note

In the first example, you can apply the operation four times: do it with $y = 0$, $y = 2$, $y = 3$, and $y = 4$.