Burakku bokkusu de

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

You are a YoRHa unit assigned to a trivial task.

The Bunker, can be defined as a polyhedron (not necessarily convex), and you need to determine the probability of the ship receiving an impact. In other words, given a point outside the ship (which represents an enemy), all faces (or part of them) visible from this point can receive damage. Given that the probability of an enemy appearing follows a uniform distribution (as long as they are outside the ship), you need to determine the expected value of receiving an impact.

However, it has already been three days, and you haven't made any progress on your task. 2B has decided to help you if you do her math homework, especially on FFT.

Yep, another three days have passed, and you still haven't managed to complete the task (which wasn't worth describing). 2B has felt bad seeing your situation, so she decided to write the first problem that came to her mind (assuming it would be easy) and told you that she has been trying to solve it for over a month, hoping that you could resolve it and feel better.

Given a number N and k, and two lists of numbers A and B (the latter consisting of 0s and 1s) of size M, compute the following sum:

The function $\phi(i, a)$ is defined as:

$$\phi(i, a) = \begin{cases} 1 & \text{if } i \text{ is coprime with } a \\ 0 & \text{otherwise} \end{cases}$$

The summation is expressed as:

$$\sum_{i=1}^{N} i^k \quad \text{such that} \quad [\phi(i, a_j) = b_j \quad \forall j \in \{1, 2, \ldots, M\}]$$

It is guaranteed that all a_j are pair-wise coprime.

Input

The first line of the input will contain three integers, N, k and M ($1 \leq N \leq 10^{18}$, $1 \leq k \leq 500$, $1 \leq M \leq 10$).

The following M lines will each contain two integers a_i and b_i ($2 \leq a_i \leq 100$, $b_i \in \{0, 1\}$).

Output

Print one integer — the value of sum, modulo 998244353.

Examples

standard input	standard output
10 1 1 2 1	25
10 1 1 11 1	55
10 1 1 11 0	0