Problem J. Again Permutation Problem

Time limit: 5 seconds
Memory limit: 1024 megabytes

You are given M permutations of $(1, 2, \ldots, N)$. The i-th permutation is $P_i = (P_{i,1}, P_{i,2}, \ldots, P_{i,N})$.

You have a sequence $Q = (1, 2, \ldots, N)$. You can perform the following operation zero or more times:

- Choose an integer i satisfying $1 \leq i \leq M$, and update Q to $(Q_{P_{i,1}}, Q_{P_{i,2}}, \ldots, Q_{P_{i,N}})$.

Find the sum of the inversion number for all possible sequences Q that can be obtained after performing any number of operations. Output the result modulo 998244353.

Constraints

- $1 \leq N \leq 30$
- $1 \leq M \leq 30$
- $P_i = (P_{i,1}, P_{i,2}, \ldots, P_{i,N})$ is a permutation of $(1, 2, \ldots, N)$.

Input

The input is given from standard input in the following format:

$N\ M$
$P_{1,1}\ P_{1,2}\ \ldots\ P_{1,N}$
$P_{2,1}\ P_{2,2}\ \ldots\ P_{2,N}$
$\vdots$
$P_{M,1}\ P_{M,2}\ \ldots\ P_{M,N}$

Output

Output the answer.

Examples

standard input	standard output
3 2 1 2 3 2 3 1	4
5 2 3 4 5 1 2 1 5 4 3 2	50
30 12 1 2 9 4 5 6 <...> 26 3 28 29 30 (download in the attchments)	701414999

Note

For the first sample case:

There are three possible sequences Q: $(1, 2, 3)$, $(2, 3, 1)$, and $(3, 1, 2)$. Their inversion numbers are 0, 2, and 2, respectively, so the answer is $0 + 2 + 2 = 4$.