Essences of Grasse

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	2048 MB

In the South of France, a young perfumer is preparing a new perfume for the start of the school year.

The perfume is built in N layers. For each layer, there are exactly M available essences. The perfumer must choose one essence from the first layer, then one essence from the second layer, and so on until the N-th layer.

The first essence is chosen uniformly at random among the M essences of the first layer. This choice is always recorded and it counts towards the total number of attempted choices.

After an essence was recorded on layer i, the perfumer tries to choose an essence on layer $i+1$. However, not every pair blends well: for every essence on layer i, the perfumer has a list of compatible essences on layer $i+1$ that is known.

Every attempt chooses one of the M essences of the next layer uniformly at random. If it is compatible with the previous recorded essence, it is recorded as well and the perfumer moves to the next layer. Otherwise, the perfumer tries again on the same layer. Failed attempts do not remove essences from future attempts, so the same essence may be chosen multiple times.

It is guaranteed that every essence on layers $1, 2, \ldots, N-1$ has at least one compatible essence on the next layer.

Compute the expected number of attempts needed to finish the perfume.

It can be shown that the expected value can be written as an irreducible fraction $\frac{p}{q}$, where q is not divisible by 998244353. Print the value of $p \cdot q^{-1} \bmod 998244353$.

Input

The first line contains two integers N and M.

For each layer i from 1 to $N-1$, the input contains M lines. The a-th of these lines describes the essences on layer $i+1$ that are compatible with essence a from layer i.

Each such line has the following form:

$$c\ b_1\ b_2\ \ldots\ b_c$$

where c is the number of compatible essences, and $b_1, b_2, \ldots, b_c$ are distinct integers between 1 and M.

Constraints

- $1 \le N, M \le 100$
- $1 \le c \le M$
- For each line, the values $b_1, b_2, \ldots, b_c$ are distinct
- The modulo is 998244353

Output

Print a single integer: the expected number of attempts modulo 998244353.

Examples

standard input	standard output
2 2 1 1 2 1 2	499122179

standard input	standard output
3 3 2 1 2 1 2 3 1 2 3 1 3 2 1 3 1 1	415935152

standard input	standard output
4 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2	4

Note

In the first example, the first essence costs one attempt. If essence 1 is chosen first, the expected number of attempts on the second layer is 2. If essence 2 is chosen first, the expected number of attempts on the second layer is 1.

Therefore the total expected number of attempts is:

$$1 + \frac{2+1}{2} = \frac{5}{2}.$$

Modulo 998244353, this is 499122179.