

Problem K. Determinant

Input file: *standard input*
Output file: *standard output*
Time limit: 8 seconds
Memory limit: 512 mebibytes

The determinant is one of the important objects covered in linear algebra.

For a natural number n , S_n is the set of all permutations: functions from $\{1, 2, \dots, n\}$ to $\{1, 2, \dots, n\}$ such that all n values $f(1), f(2), \dots, f(n)$ are different.

For $f \in S_n$, $inv(f)$ is the number of inversions in permutation f : the number of pairs (i, j) such that $i < j$ but $f(i) > f(j)$.

Consider matrix A of size $N \times N$. Let $a_{i,j}$ be the element at row i and column j . The *determinant* of A is:

$$\det(A) = \sum_{f \in S_n} (-1)^{inv(f)} \prod_{i=1}^n a_{i,f(i)}.$$

We have an $N \times N$ matrix A where each element is an integer. Let's run Q of the following queries.

When the integer x is given, print the value of the determinant of $A - xI$, where I is an $N \times N$ unit matrix.

Since the value can be too large, print the answer modulo prime number 998 244 353.

Input

The first line contains two integers N and Q ($1 \leq N \leq 500$, $1 \leq Q \leq 250\,000$).

The next N lines describe matrix A . The i -th of these lines contains N integers, and the j -th of these integers represents $a_{i,j}$ ($0 \leq a_{i,j} < 998\,244\,353$).

Then Q lines follow, each containing one query: an integer x ($0 \leq x < 998\,244\,353$).

Output

For each query, print the answer on a separate line.

Example

standard input	standard output
3 6 2 4 5 6 3 8 1 6 3 10 9 5 8 3 1	407 470 402 495 260 110