Problem H. Local Maxima

Input file:	*standard input*
Output file:	*standard output*
Time limit:	4 seconds
Memory limit:	512 mebibytes

Given an $n \times m$ integer matrix A, a *local maximum* of A is a location (i, j) ($1 \le i \le n$ and $1 \le j \le m$) such that $A_{i,j}$ is no smaller than any other integer on the i-th row or on the j-th column.

For example, in the 3×3 matrix

$$\begin{bmatrix} 2 & 5 & 4 \\ 2 & 1 & 6 \\ 2 & 2 & 2 \end{bmatrix},$$

there are three local maxima: locations $(1, 2)$, $(2, 3)$, and $(3, 1)$ with values 5, 6, and 2, repectively.

An $n \times m$ integer matrix A is *good* if and only if it satisfies the following two conditions:

- There is exactly one local maximum in A.
- Each integer from 1 to $n \times m$ occurs exactly once in A.

Given n, m, and a prime number P, your task is to count the number of good matrices of size $n \times m$ modulo P.

Input

The first line contains three integers, n, m, and P, where $1 \le n, m \le 3000$ and $10^8 \le P \le 10^9 + 7$. It is guaranteed that P is prime.

Output

Output a single line with a single integer: the number of good matrices modulo P.

Examples

standard input	standard output
2 2 1000000007	16
4 3 1000000007	95800320
100 100 998244353	848530760