Problem E. Expected Cost

Input file:	*standard input*
Output file:	*standard output*
Time limit:	6 seconds
Memory limit:	512 mebibytes

A tree is an undirected graph in which any two vertices are connected by exactly one path. One tree is chosen uniformly at random among all labeled trees with n vertices. Define the *cost of the tree* as

$$\min_{i=1}^{n} \sum_{j=1}^{n} dist(i, j),$$

where $dist(i, j)$ is the number of edges in the simple path from vertex i to vertex j. Find the expected value of cost of a chosen tree.

Input

The only line contains two integers n and m ($3 \le n \le 5000$, $900\,000\,011 \le m \le 1\,000\,000\,007$, m is prime) separated by a single space.

Output

It can be shown that the answer can be represented as an irreducible fraction $\frac{P}{Q}$, where P and Q are positive coprime integers and $Q \not\equiv 0 \pmod{m}$. Print a single integer $X = P \cdot Q^{-1} \pmod{m}$ ($0 \le X < m$), where Q^{-1} is the inverse of Q modulo m.

Examples

standard input	standard output
4 900000011	675000012
7 1000000007	363182020
4999 950000017	506366868

Note

The exact answers for the first and the second sample tests are $\frac{15}{4}$ and $\frac{23\,916}{2401}$, respectively.