Topo Counting

Input file: `standard input`
Output file: `standard output`
Time limit: 4 seconds
Memory limit: 512 megabytes

Now we start to describe a kind of directed graph called the Drying Rack Graph (DRG) with a parameter N.

A DRG contains N groups of vertexes. The i-th group V^i contains $2N$ vertices: $V_1^i, V_2^i, \cdots, V_{2N}^i$.

There are two types of edges in DRG: intra-group edges (edges inside each group) and inter-group edges (edges between groups).

Intra-Group Edge For the i-th group, the following intra-group edges exist:

- (V_j^i, V_{j+N}^i), for all integer j such that $1 \le j \le N$;
- (V_j^i, V_{j+1}^i), for all integer j such that $1 \le j \le N-1$ or $N+1 \le j \le 2N-1$.

Inter-Group Edge The following inter-group edges exist:

- (V_{i+N}^1, V_1^{i+1}), for all integer i such that $1 \le i \le N-1$;
- (V_i^1, V_{1+N}^i), for all integer i such that $2 \le i \le N$.

Now we want to know the number of topo-order of a DRG parameterized with N.

A topo-order of a directed graph $G = (V, E)$ is a permutation $v_{p_1}, v_{p_2}, \cdots, v_{p_{|V(G)|}}$ of all vertices from $V(G)$ such that for all $i < j$, $(v_{p_j}, v_{p_i}) \notin E(G)$

In order to avoid calculations of huge integers, report answer modulo a prime M instead.

Input

The input contains only two integers N, M $(1 \le N \le 5000, 2 * N * N < M \le 2^{30})$, and M is a prime.

Output

Output one integer indicating the answer.

Examples

standard input	standard output
2 1073741789	31
3 1073741789	7954100