

Cycle Constrained Graph

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 512 megabytes

Busy Beaver is taking a graph theory class, and his teacher asks him to count the number of graphs which satisfy a special condition. Help him solve the following problem about counting graphs!

Let P be an odd prime and N be a positive integer. Count the number of undirected, labeled simple graphs on NP vertices that contain no simple cycle of length P . Compute the answer modulo P . Note the repetition of P in this statement!

A simple cycle in an undirected graph is a cycle that does not use any vertex more than once.

Input

The input is one line with two integers: P ($3 \leq P < 5000$) and N ($1 \leq N \leq 10^9$). P is an odd prime.

Output

Output a single integer modulo P .

Scoring

- (25 points) $N \leq P$ and $P \leq 500$.
- (25 points) $N \leq P$.
- (25 points) $P \leq 500$.
- (25 points) No additional constraints.

Examples

| standard input | standard output |
|----------------|-----------------|
| 3 1 | 1 |
| 5 4 | 1 |
| 479 166 | 344 |

Note

In the first sample, we are counting the number of labeled graphs on $1 \cdot 3 = 3$ vertices that do not have a simple cycle of length 3. Out of the $2^3 = 8$ total graphs, exactly one of them contains a simple cycle of length 3, so there is a total of 7 ways. Then, 7 modulo 3 is 1.