Avoid XOR Zero

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

Busy Beaver calls an array of N nonnegative integers $A_1, A_2, \ldots, A_N$ **unavoidable** if the following condition holds:

- For every pair of arrays $(B_1, B_2, \ldots, B_N)$, $(C_1, C_2, \ldots, C_N)$, where B_i, C_i are nonnegative integers such that $B_i + C_i = A_i$ for all i from 1 to N, the following condition holds:
  - There exists an array $(X_1, X_2, \ldots, X_N)$ such that for every i, $X_i = B_i$ or $X_i = C_i$, and $X_1 \oplus X_2 \oplus \ldots \oplus X_N = 0$.

Here $\oplus$ denotes the bitwise XOR operation.

You are given numbers N, K. Find the number of unavoidable arrays of length N, in which $0 \le A_i \le 2^K - 1$ for all i. Since this number can be very large, output it modulo some prime P.

Input

The only line of each test case contains three integers N, K, P ($1 \le N, K \le 100$, $10^8 < P < 10^9$, P is prime).

Output

Output a single integer: the number of unavoidable arrays of length N, in which $0 \le A_i \le 2^K - 1$ for all i.

Examples

standard input	standard output
10 1 111111113	1024
14 2 263652251	237
100 100 998244353	914574519

Note

For the first sample, all arrays with elements in $\{0, 1\}$ are unavoidable (try to see why yourself), so there are 2^{10} of them of length 10.