NonZero PrefSuf Sums

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

Prince Charming wanted to give you a long, tedious legend full of pomp and flair. But Shrek won't allow this! He gives you a completely formal and short statement instead.

Count the number of arrays $[a_1, a_2, \ldots, a_n]$ of integers that satisfy the following conditions:

1. $|a_i| \leq m$ for all $1 \leq i \leq n$.
2. There exists a permutation $[b_1, b_2, \ldots, b_n]$ of elements of a, such that the following holds:
   - $b_1 + b_2 + \cdots + b_k \neq 0$ for all $1 \leq k \leq n$.
   - $b_k + b_{k+1} + \cdots + b_n \neq 0$ for all $1 \leq k \leq n$.

Output the answer modulo p, where p is a big prime number.

Input

The only line of the input contains three integers n, m, p.

Constraints

$2 \leq n \leq 100$,

$1 \leq m \leq 100$,

$10^8 < p < 10^9$, p is prime.

Output

Output a single integer — the answer modulo p.

Examples

standard input	standard output
2 1 998244353	2
69 42 696969697	378553557

Note

In the **first** test case, there are 9 possible arrays: $[-1, -1]$, $[-1, 0]$, $[-1, 1]$, $[0, -1]$, $[0, 0]$, $[0, 1]$, $[1, -1]$, $[1, 0]$, $[1, 1]$. Only arrays $[-1, -1]$ and $[1, 1]$ satisfy the condition from the problem.