Scalar Products

Integer sequence a having length $2n+2$ is defined as follows:

- $a_0 = 0$
- $a_1 = C$
- $a_{i+2} = (a_{i+1} + a_i) \ \% \ M$, where $0 \le i < 2n$

Write a function generator, gen, to generate the remaining values for a_2 through a_{2n+1}. The values returned by gen describe two-dimensional vectors $v_1 \ldots v_n$, where each sequential pair of values describes the respective x and y coordinates for some vector v in the form $x_1, y_1, x_2, y_2, \ldots, x_n, y_n$. In other words, $v_1 = (a_2, a_3), v_2 = (a_4, a_5), \ldots, v_n = (a_{2n}, a_{2n+1})$.

Let S be the set of scalar products of v_i and v_j for each $1 \le i, j \le n$, where $i \ne j$. Determine the number of different residues in S and print the resulting value modulo M.

Input Format

A single line of three space-separated positive integers: C (the value of a_1), M (the modulus), and n (the number of two-dimensional vectors), respectively.

Constraints

- $1 \le C \le 10^9$
- $1 \le M \le 10^9$
- $1 \le n \le 3 \times 10^5$

Output Format

Print a single integer denoting the number of different residues $\% \ M$ in S.

Sample Input

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4 5 3
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Sample Output

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2
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Explanation

Sequence $a = a_0, a_1, (a_1 + a_0)\%M, (a_2 + a_1)\%M, \ldots, (a_{2n} + a_{2n-1})\%M\}$
$= \{0,\ 4,\ (4+0)\%5,\ (4+4)\%5,\ (3+4)\%5,\ (2+3)\%5,\ (0+2)\%5,\ (2+0)\%5\}$
$= \{0, 4, 4, 3, 2, 0, 2, 2\}$.

This gives us our vectors: $v_1 = (4, 3)$, $v_2 = (2, 0)$, and $v_3 = (2, 2)$.

Scalar product $S_0(v_1, v_2) = 8$.
Scalar product $S_2(v_2, v_3) = 4$.
Scalar product $S_0(v_1, v_3) = 14$.

There are 2 residues $\%\ 5$ in S (i.e.: 3 and 4), so we print the result of $2\%5$ (which is 2).