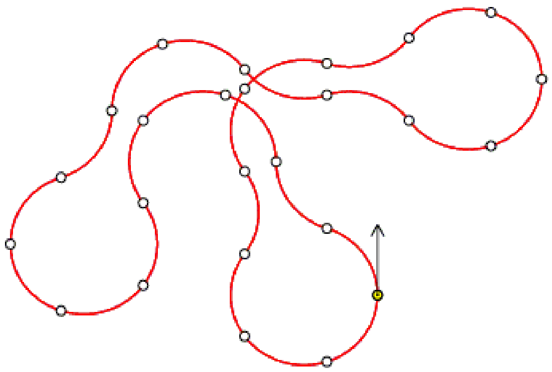
Project Euler #208: Robot Walks

This problem is a programming version of Problem 208 from projecteuler.net

A robot moves in a series of one-n^{th} circular arcs ($\frac{360^o}{n}$), with a free choice of a clockwise or an anticlockwise arc for each step, but no turning on the spot.

For example, one of 70932 possible closed paths of 25 arcs with $n = 5$ and starting northward is



Given that the robot starts facing North, how many journeys of m arcs in length can it take that return it, after the final arc, to its starting position?

Any arc may be traversed multiple times.

Since the answer can be huge, output it modulo K.

Input Format

The only line of each test case contains exactly three space-separated integers: n, m, and K.

Constraints

- $1 < n \leq 10$
- $n < m$
- $n^2 \times m \leq 2 \times 10^4$
- $10^9 < K < 2 \times 10^9$
- K is a prime number

Output Format

On a single line print the answer modulo K.

Sample Input 0

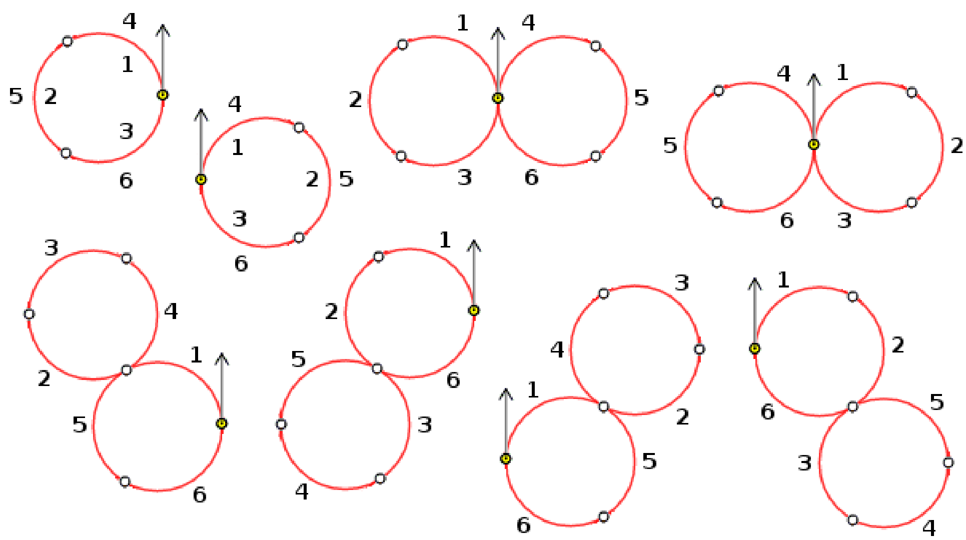
```
3 6 1000000007
```

Sample Output 0

```
8
```

Explanation 0

If a robot moves in a series of six 120^o circular arcs, then there are only 8 journeys that return to the starting position:



Sample Input 1

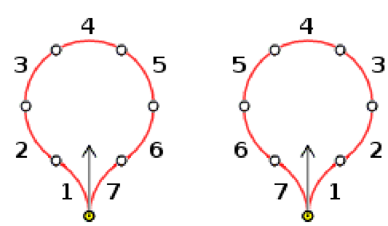
```
6 7 1000000009
```

Sample Output 1

```
2
```

Explanation 1

If a robot moves in a series of seven 60^o circular arcs, then there are only 2 journeys that return to the starting position:



Sample Input 2

```
4 8 1000000033
```

Sample Output 2

```
18
```

Explanation 2

If a robot moves in a series of eight 90^o circular arcs, then there are 18 journeys that return to the starting position: