

Project Euler #227: The Chase

This problem is a programming version of [Problem 227](#) from [projecteuler.net](#)

"The Chase" is a game played with two m -sided equiprobable dice and an even number of players.

The players sit around a table; the game begins with two opposite players having one die each. On each turn, the two players with a die roll it.

If a player rolls a **1**, he passes the die to his neighbour on the left; if he rolls an m , he passes the die to his neighbour on the right; otherwise, he keeps the die for the next turn.

The game ends when one player has both dice after they have been rolled and passed; that player has then lost.

In a game with n players, what is the expected number of turns the game lasts? It can be proved that the answer is always rational, thus it can be represented as $\frac{p}{q}$ with natural coprime p and q . Give your answer as $p \times q^{-1} \pmod{10^9 + 9}$.

Input Format

Each test file contains one line with **2** integers separated by single spaces: n and m .

Constraints

- $2 \leq n \leq 10^6$
- n is even
- $4 \leq m \leq 100$

Output Format

Print exactly one integer number that is the answer to the problem.

Sample Input 0

```
6 6
```

Sample Output 0

```
113636380
```

Explanation 0

The real answer is $\frac{675}{44}$. One could easily check that $675 \times 44^{-1} = 113636380 \pmod{10^9 + 9}$.