



Problem H

Fair Problemset

Time Limit: 8 Seconds

This problem adopts exactly the same definition of *Fair Problemset* as Problem M, “Triple Fairness”.

ICPC is a team competition. Each team has three members. At the beginning of a contest, most teams divide the $3n$ problem evenly. They use one of two common methods to distribute problems:

1. **Sequential Distribution:** Each member takes a contiguous block of n problems from the set of $3n$ problems. Specifically, the first member takes problems $1, \dots, n$, the second member takes problems $n + 1, \dots, 2n$, and the third member takes problems $2n + 1, \dots, 3n$.
2. **Jump Distribution:** Each member takes problems with indices that have the same remainder when divided by 3 from the set of $3n$ problems. Specifically, the first member takes problems $1, 4, 7, \dots, 3n - 2$, the second member takes problems $2, 5, 8, \dots, 3n - 1$, and the third member takes problems $3, 6, 9, \dots, 3n$.

The ICPC Seoul Regional Contest Scientific Committee must prepare a problemset consisting of $3n$ problems. The difficulty of each problem is represented by an integer from 1 to n , inclusive. For each difficulty, there are exactly three problems with that difficulty. Thus, the arrangement of difficulties in the problemset can be viewed as a *difficulty sequence* of length $3n$ containing three problems of each of the n difficulty levels.

To prevent any advantage or disadvantage for a team based on their chosen problem distribution method, the ICPC Seoul Regional Contest Scientific Committee has defined a standard called a *Fair Problemset*. A difficulty sequence of length $3n$ is called a Fair Problemset if it satisfies both of the following conditions:

1. **Sequential Distribution Fairness:** When using Sequential Distribution, for every difficulty level i ($1 \leq i \leq n$), each of the three members receives exactly one problem with difficulty i .
2. **Jump Distribution Fairness:** When using Jump Distribution, for every difficulty level i ($1 \leq i \leq n$), each of the three members receives exactly one problem with difficulty i .

In other words, regardless of which of the two methods is chosen, each team member must be assigned exactly one problem for each difficulty level from 1 to n , inclusive.

Given a positive integer k , write a program to find the number of Fair Problemset sequences of length $3n$ for each $n = 1, 2, \dots, k$.

Input

Your program is to read from standard input. The input consists of exactly one line. The line contains two integers, k and m ($1 \leq k \leq 10^6$; $10^8 < m < 10^9$; m is a prime number).

Output

Your program is to write to standard output. You should print exactly k lines. On the n -th line ($1 \leq n \leq k$), print the number of Fair Problemset sequences of length $3n$, modulo m .

The following shows sample input and output for two test cases.

Sample Input 1	Output for the Sample Input 1
2 993244853	1 2
Sample Input 2	Output for the Sample Input 2
3 998244353	1 2 12

Explanation of Sample Input 2:

Here are 12 Fair Problemset sequences of length 9 (= 3×3).

- i. 1 2 3 2 3 1 3 1 2
- ii. 1 2 3 3 1 2 2 3 1
- iii. 1 3 2 2 1 3 3 2 1
- iv. 1 3 2 3 2 1 2 1 3
- v. 2 1 3 1 3 2 3 2 1
- vi. 2 1 3 3 2 1 1 3 2
- vii. 2 3 1 1 2 3 3 1 2
- viii. 2 3 1 3 1 2 1 2 3
- ix. 3 1 2 1 2 3 2 3 1
- x. 3 1 2 2 3 1 1 2 3
- xi. 3 2 1 1 3 2 2 1 3
- xii. 3 2 1 2 1 3 1 3 2