

Fibonacci Parity

In the quest to take over the world, the Pinky falls from the table, upside down. Miracle!!! Now he is intelligent. and the conversation goes like:

Brains : Pinky, are you pondering what I'm pondering?

Pinky : I think so, what would be the remainder when the n^{th} fibonacci number is divided by k ?

Help Brain, solving this mystery.

Statement : Given n and k , find the remainder when the n^{th} fibonacci number is divided by k .

Constraints :

$$1 \leq n \leq 10^4$$

$$1 < k \leq 10^5$$

n^{th} fibonacci numbers are defined by :

$$\text{fib}_n = 1 \quad \text{if } n = 1 \text{ or } n = 2$$

$$= \text{fib}_{n-1} + \text{fib}_{n-2} \quad \text{for } n > 2$$

Fibonacci series goes like : 1 1 2 3 5 8 13...

Input

The first line contains t , number of test cases. In following t lines, there are two space separated numbers, n k .

Output

For each test cases, print the solution to the Pinky's quest in new line.

Example

Input:

```
5
5 2
4 3
10 4
4 5
11 12
```

Output:

```
1
0
3
3
5
```