

11964 Equation

Your friend John was told to find an integer solution to the equation:

$$x_1 + 2x_2 + 4x_3 + 8x_4 = 15 \quad \text{where } x_i \geq 0$$

John spent all week thinking and could find only one solution, it is $x_1 = 1; x_2 = 1; x_3 = 1; x_4 = 1$. However, he thinks that is not the only possible integer solution to this equation, but he isn't sure about it. You have decided to help your friend to prove or deny his assumption. In order to do this you should write a program that finds the number of integer solutions for a given equation (let us leave the fun of searching solutions to John). On the other hand it is rather boring to write program for this particular equation, so you generalize it into the form:

$$x_1 + 2x_2 + 4x_3 + 8x_4 + 16x_5 + \dots + 2^t x_t = K \quad \text{where } x_i \geq 0.$$

Can you manage this?

Input

The number of tests T ($T \leq 10^5$) is given on the first line. Each of next T lines contains two numbers K M ($0 \leq K \leq 10^5; 1 \leq M \leq 10^{15}$). Where K is the number from equation and M is modulo. M can be always factorized into primes numbers not larger than 150.

Output

For each test case output a single line 'Case T : N '. Where T is the test case number (starting from 1) and N is the number of different integer vectors that are solutions to a given equation. As number N can be very large, output it modulo M .

Sample Input

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3
15 99
101 123
1234 536870912
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Sample Output

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Case 1: 26
Case 2: 111
Case 3: 176223474
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