**Color**

|  |  |  |
| --- | --- | --- |
| **Time Limit:** 2000MS |  | **Memory Limit:** 65536K |
|  |  |  |

**Description**

Beads of N colors are connected together into a circular necklace of N beads (N<=1000000000). Your job is to calculate how many different kinds of the necklace can be produced. You should know that the necklace might not use up all the N colors, and the repetitions that are produced by rotation around the center of the circular necklace are all neglected.   
  
You only need to output the answer module a given number P.

**Input**

The first line of the input is an integer X (X <= 3500) representing the number of test cases. The following X lines each contains two numbers N and P (1 <= N <= 1000000000, 1 <= P <= 30000), representing a test case.

**Output**

For each test case, output one line containing the answer.

**Sample Input**

5

1 30000

2 30000

3 30000

4 30000

5 30000

**Sample Output**

1

3

11

70

629

**Source**

[POJ Monthly](http://poj.org/searchproblem?field=source&key=POJ+Monthly),Lou Tiancheng