In 1960, Donald Wall of IBM, in White Plains, NY, proved that the series obtained by taking each element of the *Fibonacci* series modulo m was periodic.

For example, the first ten elements of the *Fibonacci* sequence, as well as their remainders modulo 11, are:

n	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
F(n)	**1**	**1**	**2**	**3**	**5**	**8**	**13**	**21**	**34**	**55**
F(n) mod 11	**1**	**1**	**2**	**3**	**5**	**8**	**2**	**10**	**1**	**0**

The sequence made up of the remainders then repeats. Let k(m) be the length of the repeating subsequence; in this example, we see k(11) = 10.

Wall proved several other properties, some of which you may find interesting:

- If $m > 2$, k(m) is even.
- For any even integer $n > 2$, there exists m such that $k(m) = n$.
- $k(m) \leq m^2 - 1$
- $k(2^n) = 3 * 2^{(n-1)}$
- $k(5^n) = 4 * 5^n$
- $k(2 * 5^n) = 6n$
- If $n > 2$, $k(10^n) = 15 * 10^{(n-1)}$

For this problem, you must write a program that calculates the length of the repeating subsequence, k(m), for different modulo values m.

Input

The first line of input contains a single integer ***P***, (1 ≤ ***P*** ≤ 1000), which is the number of data sets that follow. Each data set is a single line that consists of two space separated integer values ***N*** and ***M***. ***N*** is the data set number. ***M*** is the modulo value ($2 <= m <= 1,000,000$).

Output

For each data set there is one line of output. It contains the data set number (***N***) followed by a single space, followed by the length of the repeating subsequence for ***M, k(M)***.

Sample Input	Sample Output
5 1 4 2 5 3 11 4 123456 5 987654	1 6 2 20 3 10 4 15456 5 332808