Binomial Coefficients

In mathematics, **binomial coefficients** are a family of positive integers that occur as coefficients in the binomial theorem.

$$\binom{n}{k}$$

denotes the number of ways of choosing k objects from n different objects.

However when n and k are too large, we often save them after modulo operation by a prime number P. Please calculate how many binomial coefficients of n become to 0 after modulo by P.

Input Format

The first of input is an integer T, the number of test cases.
Each of the following T lines contains 2 integers, n and prime P.

Constraints

$T < 100$
$n < 10^{500}$
$P < 10^{9}$

Output Format

For each test case, output a line contains the number of $\binom{n}{k}$s (0<=k<=n) each of which after modulo operation by P is 0.

Sample Input

```
3
2 2
3 2
4 3
```

Sample Output

```
1
0
1
```