1045 – Digits of Factorial

Factorial of an integer is defined by the following function

f(0) = 1
f(n) = f(n - 1) * n, if(n > 0)

So, factorial of 5 is 120. But in different bases, the factorial may be different. For example, factorial of 5 in base 8 is 170.

In this problem, you have to find the number of digit(s) of the factorial of an integer in a certain base.

Input

Input starts with an integer **T (≤ 50000)**, denoting the number of test cases.

Each case begins with two integers **n (0 ≤ n ≤ 10^6)** and **base (2 ≤ base ≤ 1000)**. Both of these integers will be given in decimal.

Output

For each case of input you have to print the case number and the digit(s) of factorial n in the given base.

Sample Input	Output for Sample Input
5 5 10 8 10 22 3 1000000 2 0 100	Case 1: 3 Case 2: 5 Case 3: 45 Case 4: 18488885 Case 5: 1