Product of factorials (again)

For ***n*** positive integer, let ***F(n) = 1! × 2! × 3! × 4! × ... × n!***, product of factorial(i) for i in [1..n],

For ***p*** a prime number, and ***n*** an integer, and let ***V(p, n) = max({i>=0 integer, such that p^i divides F(n)})***.

Input

The first line of input contains an integer ***T***, the number of test cases.
On each of the next ***T*** lines, your are given two integers ***p*** a prime number, and ***n***.

Output

For each test case, you have to print ***V(p, n)***.

Example

Input:
2
2 3
3 4

Output:
2
2

Constraints

0 < T < 10^5
1 < p < 10^18, a prime number
0 < n < 10^18

p and ***n*** are log-uniform independent randomly distributed.

Four lines of Python code can get AC in half the time limit. (Edit 2017-02-11, after compiler changes)
;-) Have fun.