Factorial Zeros

Time limit: *1000 ms*
Memory limit: *256 MB*

Dahsser studies business administration in Lima but he is also an amateur programer. During a particularly boring class he realized that the factorial of a number in a base B would end with a certain number of zeros, but that not all exact number of zeros was possible for a given base. He then tried to find an algorithm to print the minimum number whose factorial in base B ends with exactly N zeros.

Standard input

The first line contains an integer T, denoting the number of cases. The next T lines contain two separated integers B and N.

Standard output

For each case T, print the minimum number whose factorial in base B ends with exactly N zeros. In case there is no solution, print -1.

Constraints and notes

- $1 \leq T \leq 20$
- $2 \leq B \leq 100$
- $1 \leq N \leq 10^{12}$

Input	Output	Explanation
2 3 2 10 5	6 -1	In the first case, 6 is the minimum number whose factorial in base 3 ends with exactly 2 zeros. $6! = 720$ (base 10), 222200 (base 3) In the second case there is no solution. There is no factorial in base 10 that ends with exactly 5 zeros.