



# Factorial Zeros

Time limit: 1000 ms  
Memory limit: 256 MB

Dahsser studies business administration in Lima but he is also an amateur programmer. 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	6	In the first case, 6 is the minimum number whose factorial in base 3 ends with exactly 2 zeros.
3 2	-1	
10 5		$6! = 720$ (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.