

## Problem H. Master Zhu and Root

Input file: *standard input*  
Output file: *standard output*  
Time limit: 4 seconds  
Memory limit: 512 mebibytes

Master Zhu has a number  $n$ . He asks you  $q$  queries, the  $i$ -th query is a pair of integers  $(x_i, y_i)$ . For  $i$ -th query, Master Zhu would like you to find the smallest non-negative integer  $k_i$  such that, for some  $p$  which is a prime divisor of  $n$ , the equivalence  $x_i^{k_i} \equiv y_i$  modulo  $p$  holds, or to determine that no such  $k_i$  exists.

In this problem, we consider that  $0^0 = 1$ .

### Input

The first line of input contains two integers  $n$  and  $q$  ( $1 \leq n \leq 10^8$ ,  $1 \leq q \leq 10^5$ ). Each of the next  $q$  lines contains two integers  $x_i$  and  $y_i$  ( $0 \leq x_i, y_i \leq 10^9$ ).

### Output

For each query, print the answer on a separate line. If you found  $k_i$ , print it, otherwise print the number  $-1$ .

### Example

standard input	standard output
175 2	0
2 1	3
2 3	