Problem H. TDL

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	512 mebibytes

For a positive integer n, let us denote function $f(n, m)$ as the m-th smallest integer x such that $x > n$ and $\gcd(x, n) = 1$. For example, $f(5, 1) = 6$ and $f(5, 5) = 11$.

You are given the values of m and $(f(n, m) - n) \oplus n$, where "$\oplus$" denotes the bitwise XOR operation. Please write a program to find the smallest positive integer n such that $(f(n, m) - n) \oplus n = k$, or determine it is impossible.

Input

The first line of the input contains an integer T ($1 \le T \le 10$), denoting the number of test cases.

Each test case is denoted by a single line containing two integers k and m ($1 \le k \le 10^{18}$, $1 \le m \le 100$).

Output

For each test case, print a single line containing a single integer: the smallest value of n. If there is no solution, output "-1" instead.

Example

standard input	standard output
2	5
3 5	-1
6 100	