

Problem E. Fibonacci

Time limit: 2s

Color of balloons: yellow

We consider the Fibonacci sequence f where $f(0) = 0, f(1) = 1$ and $f(n) = f(n-1) + f(n-2)$ for $n \geq 2$. For given $x(0)$, one can define another sequence x that $x(n) = f(x(n-1))$. Now you need to find the minimum n such that $x(n) \equiv x(0) \pmod{p}$.

Input

The first line contains an integer T indicating the number of test cases. Then for each test case, a line consists of two integers $x(0)$ and p where $0 \leq x(0) \leq 10^9$ and $1 \leq p \leq 200000$.

Output

For each test, output the minimum n in a line, or -1 if it is impossible.

Sample

standard input	standard output
5	3
6 4	3
8 11	-1
9 11	1
12 11	1
13 11	

In the first case, $x(0) = 6 \equiv 2 \pmod{4}$, $x(1) = f(6) = 8 \equiv 0 \pmod{4}$ and $x(2) = f(8) = 21 \equiv 1 \pmod{4}$, and therefore $x(3) = f(21) = 10946 \equiv 2 \pmod{4}$.