7738 Fibonacci

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 $x(n) \equiv x(0) (\mathrm{mod} p)$.

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.

Hint

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

Sample Input

```
5
6 4
8 11
9 11
12 11
13 11
```

Sample Output

```
3
3
-1
1
1
```