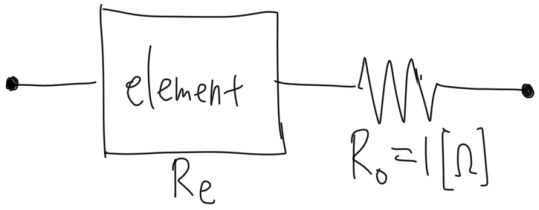
Problem B. Building Resistors

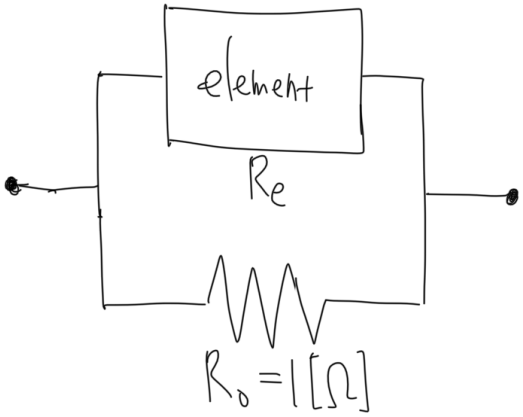
You are conducting a physics experiment. During the experiment, you need a resistor with resistant value $\frac{p}{q}[\Omega]$, where p and q are both positive integers. However, you have only 10^{100000} unit resistors, which means resistors that have unit resistance value $R_0 = 1[\Omega]$. By plugging these unit resistors, we will make a new circuit element with resistance $\frac{p}{q}[\Omega]$. In this problem, only these are considered as elements:

1. ***One*** unit resistor
2. ***An*** element and ***one*** unit resistor plugged in series (consecutive connection)



$$R = R_e + R_0$$

3. ***An*** element and ***one*** unit resistor plugged in a row (parallel connection)



$$\frac{1}{R} = \frac{1}{R_e} + \frac{1}{R_0}$$

Although you have lots of unit resistors, you are too lazy to plug those, so you want to use the *minimum number of unit resistors*. Given p and q, write a program that calculates the minimum number of unit resistors that you need to make a new circuit element with resistance $\frac{p}{q}[\Omega]$. We can prove that it is always possible.

Input

Your input consists of an arbitrary number of records, but no more than 10,000.

Each input record is a line that contains two integers p and q $(1 \leq p, q \leq 10^{18})$, separated by a space.

The end of input is indicated by a line containing only the value -1.

Output

For each input record, print a line that contains the minimum number of unit resistors that you need to make a new circuit element with resistance $\frac{p}{q}[\Omega]$.

Example

Standard input	Standard output
3 1 3 2 3 3 -1	3 3 1

Explanation of the example

For the second example:

- Connect two unit resistors (we can view as one element + one unit resistor) in parallel and make a circuit element with resistance $\frac{1}{\frac{1}{1}+\frac{1}{1}} = \frac{1}{2}[\Omega]$.
- Connect this element and a unit resistor consecutively and make a new circuit element with resistance $\frac{1}{2} + 1 = \frac{3}{2}[\Omega]$.

Time Limit

1 second.