Project Euler #182: RSA encryption

This problem is a programming version of Problem 182 from projecteuler.net

The RSA encryption is based on the following procedure:

Generate two distinct primes p and q.
Compute $n = pq$ and $\phi = (p-1)(q-1)$.
Find an integer e, $1 < e < \phi$, such that $\gcd(e, \phi) = 1$.

A message in this system is a number in the interval $[0, n-1]$.
A text to be encrypted is then somehow converted to messages (numbers in the interval $[0, n-1]$).
To encrypt the text, for each message, m, $c \equiv m^e \pmod{n}$ is calculated.

To decrypt the text, the following procedure is needed: calculate d such that $ed \equiv 1 \pmod{\phi}$, then for each encrypted message, c, calculate $m \equiv c^d \pmod{n}$.

There exist values of e and m such that $m^e \equiv m \pmod{n}$.
We call messages m for which $m^e \equiv m \pmod{n}$ unconcealed messages.

An issue when choosing e is that there should not be too many unconcealed messages.
For instance, let $p = 19$ and $q = 37$.
Then $n = 19 \times 37 = 703$ and $\phi = 18 \times 36 = 648$.
If we choose $e = 181$, then, although $\gcd(181, 648) = 1$ it turns out that all possible messages m ($0 \le m \le n-1$) are unconcealed when calculating $m^e \pmod{n}$.
For any valid choice of e there exist some unconcealed messages.
It's important that the number of unconcealed messages is at a minimum.

For given p and q find the sum of all values of e, $1 < e < \phi(p, q)$ and $\gcd(e, \phi) = 1$, so that the number of unconcealed messages for this value of e is at a minimum.

Input Format

Every test case contains a single line with two integers separated by a single space: p and q.

Constraints

p and q are distinct primes.

$11 \le p, q \le 10^9$.

But for more than half of tests $11 \le p, q \le 10^6$.

Output Format

Output the sum of all values of e for which the number of unconcealed messages is at a minimum. As this number may be huge, output it modulo $10^9 + 7$.

Sample Input

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11 13
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Sample Output

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438
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