

3760 Johnny Hates Number Theory

Johnny hates Number Theory! Actually, back in 2002, we came to know that Johnny couldn't count and in 2005 we knew that Johnny couldn't yet add. (But we did know in 2003 that Johnny was street smart enough to solve difficult graph problems!) Why Johnny decided to study Number Theory is incomprehensible to us.

Anyhow, back to Johnny. Johnny just failed his comprehensive exam and that was all because of Euler's Totient function (φ). Johnny is so angry that he decides to create his own Totient function. Here's how he described it to his advisor:

In number theory, the prime factors of a positive integer are the prime numbers that divide into that integer exactly, without leaving a remainder. Johnny defines function $F(n)$, for $n \geq 2$, to be the non-decreasing list of prime numbers whose product is n . For example, $F(8) = \ll 2, 2, 2 \gg$, $F(60) = \ll 2, 2, 3, 5 \gg$, and $F(71) = \ll 71 \gg$ (71 is a prime.) Let $O(n)$ be the length of the list $F(n)$ (i.e. its ordinal.) For example, $O(8) = 3$, $O(60) = 4$, and $O(71) = 1$. Johnny also defines function $p(n)$ over positive integers as follows:

$$p(n) = \begin{cases} 0 & \text{if } n = 1 \\ -1 & \text{if } n \text{ is a prime number} \\ O(n) & \text{otherwise} \end{cases}$$

The following table illustrates $p(n)$ for the first twenty positive integers:

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
$p(n)$	0	-1	-1	2	-1	2	-1	3	2	2	-1	3	-1	2	2	4	-1	3	-1	3

Given two positive integers a and b where $a \leq b$, Johnny defines his very own Totient function $\varphi(a, b)$ as follows:

$$\varphi(a, b) = \left(\sum_{k=a}^b p(k) \right) - (b - a + 1)$$

For example, $\varphi(1, 4) = -4$, $\varphi(16, 16) = 3$, and $\varphi(8, 12) = 4$.

For his dissertation, Johnny needs a program that determines the maximal φ within a given range $[L, U]$. In other words, given two positive integers L, U such that $L \leq U$, the program must find the maximum $\varphi(a, b)$ where $L \leq a \leq b \leq U$. For example, the maximal φ within the range $[1, 20]$ is 7 (which is $\varphi(8, 16)$.)

Write the program Johnny needs!

Input

Your program will be tested on one or more test cases. Each test case is specified on a single line. Each test case is specified using two positive integers L and U separated by one or more spaces, and satisfying the following property: $1 \leq L \leq U < 1,000,000$

The end of the test cases is indicated by a line made of two '-1's. That last line is not part of the test cases.

Output

For each test case, output the result on a single line using the following format:

$k.\sqcup result$

Where k is the test case number (starting at 1,) and result is the maximal φ that can be found within the range $[L, U]$.

Sample Input

```
1 5
1 20
10 20
900000 901000
-1 -1
```

Sample Output

```
1. 1
2. 7
3. 5
4. 2551
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