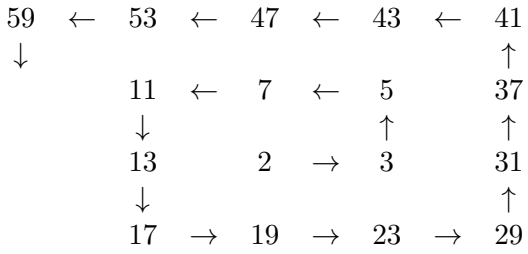
2120 The Spiral of Primes

Prime numbers (those that have only themselves and other primes as factors) starting with 2 can be arranged on a two-dimensional plane starting as show below:



Assume a Cartesian coordinate system is used to reference the primes, and that 2 is located at $(0, 0)$. We can then see that 3 is located at $(1, 0)$, 5 is located at $(1, 1)$, 7 is located at $(0, 1)$ and 11 is located at $(-1, 1)$. Given the coordinates of a prime number in this system, find and display the prime number at that location.

Input

The input data will contain multiple pairs of integers, each pair representing the coordinates of a prime number. The last pair will be followed by a single integer -999. No prime will be larger than 10000.

Output

For each coordinate pair, display the input case number (starting with 1), the coordinate pair, and the prime at that coordinate location. Display one blank line between the output for each case. Your output should resemble the format shown below.

Sample Input

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1 1
2 2
-2 2
-999
```

Sample Output

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Case 1: The prime at location (1,1) is 5.

Case 2: The prime at location (2,2) is 41.

Case 3: The prime at location (-2,2) is 59.
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