

COCI '17 Contest 5 #5 Pictionary

Time limit: 1.5s **Memory limit:** 64M

There is a planet, in a yet undiscovered part of the universe, with a country inhabited solely by mathematicians. In this country, there are a total of N mathematicians, and the interesting fact is that each mathematician lives in their own city. It is also interesting that no two cities are connected with a road, because mathematicians can communicate online or by reviewing academic papers. Naturally, the cities are labeled with numbers from 1 to N .

Life was perfect until one mathematician decided to write an academic paper on their smartphone. The smartphone auto-corrected the word "self-evident" to "Pictionary" and the paper was published as such. Soon after, the entire country discovered pictionary and wanted to meet up and play, so construction work on roads between cities began shortly.

The road construction will last a total of M days, according to the following schedule: on the first day, construction is done on roads between all pairs of cities that have M as their greatest common divisor. On the second day, construction is done on roads between all pairs of cities that have $M - 1$ as their greatest common divisor, and so on until the M^{th} day when construction is done on roads between all pairs of cities that are co-prime. More formally, on the i^{th} day, construction is done on roads between cities a and b if $\text{gcd}(a, b) = M - i + 1$.

Since the mathematicians are busy with construction work, they've asked you to help them determine the minimal number of days before a given pair of mathematicians can play pictionary together.

Input Specification

The first line of input contains three positive integers N , M and Q ($1 \leq N, Q \leq 100\,000$, $1 \leq M \leq N$), the number of cities, the number of days it takes to build the roads, and the number of queries.

Each of the following Q lines contains two distinct positive integers A and B ($1 \leq A, B \leq N$) that denote the cities of the mathematicians who want to find out the minimal number of days before they can play pictionary together.

Output Specification

The i^{th} line must contain the minimal number of days before the mathematicians from the i^{th} query can play pictionary together.

Scoring

In test cases worth 40% of total points, it will hold $N \leq 1\,000$, $Q \leq 100\,000$.

Sample Input 1

```
8 3 3
2 5
3 6
4 8
```

Sample Output 1

```
3
1
2
```

Explanation for Sample Output 1

On the first day, road (3, 6) is built. Therefore, the answer to the second query is 1.

On the second day, roads (2, 4), (2, 6), (2, 8), (4, 6) and (6, 8) are built. Cities 4 and 8 are now connected (it is possible to get from the first to the second using city 6).

On the third day, roads between relatively prime cities are built, so cities 2 and 5 are connected.

Sample Input 2

```
25 6 1
20 9
```

Sample Output 2

```
4
```

Explanation for Sample Output 2

On the second day, road (20, 15) is built, whereas on the fourth day, road (15, 9) is built. After the fourth day, cities 20 and 9 are connected via city 15.

Sample Input 3

9999 2222 2

1025 2405

3154 8949

Sample Output 3

1980

2160