F - Chord Crossing

Editorial (/contests/abc405/tasks/abc405_f/editorial)

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Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 525 points

Problem Statement

On a circle, $2N$ points are placed at equal intervals and numbered $1, 2, \ldots, 2N$ in clockwise order starting from an arbitrary point.

There are M line segments numbered $1, 2, \ldots, M$ connecting these points. Segment i connects points A_i and B_i. Here, A_i and B_i are distinct **even numbers**. It is guaranteed that no two of these segments share a point.

Process Q queries. The j-th query is as follows:

- You are given two distinct **odd numbers** C_j and D_j. Among the M segments $1, 2, \ldots, M$, find how many share a point with the segment connecting points C_j and D_j.

Constraints

- $2 \leq N \leq 10^6$
- $1 \leq M \leq \min\left(\lfloor \frac{N}{2} \rfloor, 2 \times 10^5\right)$
- $1 \leq Q \leq 2 \times 10^5$
- $1 \leq A_i < B_i \leq 2N$
- $1 \leq C_j < D_j \leq 2N$
- A_i and B_i are even.
- C_j and D_j are odd.

- For any i_1 and i_2 $(i_1 \neq i_2)$, segments i_1 and i_2 do not share a point.
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&N \quad M \\
&A_1 \quad B_1 \\
&A_2 \quad B_2 \\
&\vdots \\
&A_M \quad B_M \\
&Q \\
&C_1 \quad D_1 \\
&C_2 \quad D_2 \\
&\vdots \\
&C_Q \quad D_Q
\end{aligned}
$$

Output

Output Q lines. The j-th line $(1 \leq j \leq Q)$ should contain the answer to the j-th query.

Sample Input 1 Copy

Copy

```
4 2
2 4
6 8
3
1 3
3 7
1 5
```

Sample Output 1 Copy

Copy

```
1
2
0
```

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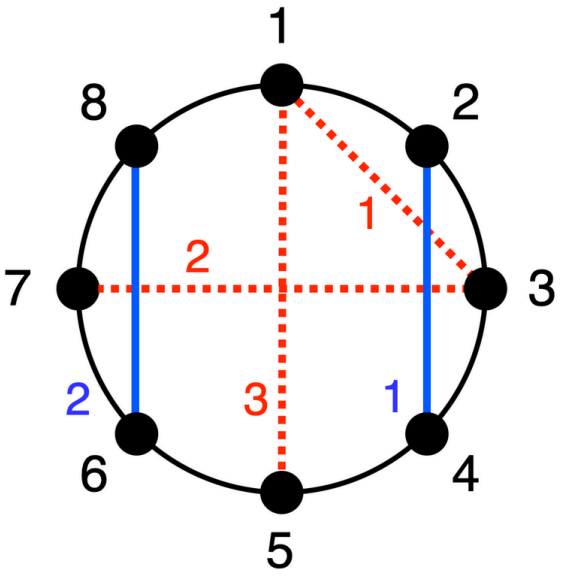

The figure above illustrates Sample Input 1. Black dots are the $2N\ (=8)$ points, blue solid lines are the initial $M\ (=2)$ segments, and red dashed lines are the $Q\ (=3)$ query segments.

- For the first query, the segment connecting points 1 and 3 intersects one initial segment: segment 1.
- For the second query, the segment connecting points 3 and 7 intersects two initial segments: segments 1 and 2.
- For the third query, the segment connecting points 1 and 5 intersects zero initial segments.

Sample Input 2

Copy

Copy

```
20 7
24 34
26 28
18 38
2 14
8 12
30 32
20 22
10
7 29
31 39
9 21
19 29
15 21
11 39
17 21
15 31
5 25
25 31
```

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Sample Output 2 Copy

```
3
3
4
1
2
2
2
3
3
1
```

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