

## Extremely Sharp

*Time limit: 0.5 second. Memory limit: 128MB*

You have an extremely sharp sword and a nice modern painting that shows a convex polygon. You want to practice your swording skill by cutting this painting but you do not want to destroy the polygon.

The convex polygon has  $N$  vertices at positions  $(X_1, Y_1)$ ,  $(X_2, Y_2)$ , ...,  $(X_N, Y_N)$  in a counter-clockwise order. It is guaranteed that there will be no three vertices on the same line.

Each cut is a straight line and is specified by two distinct points on that line. For each cut you want to know if it intersects the polygon.

### Input

Each test case starts with a line containing two integers  $N$  and  $M$  ( $3 \leq N \leq 100\,000$ ;  $1 \leq M \leq 100\,000$ ).

The next  $N$  lines specify the convex polygon. For  $1 \leq i \leq N$ , the  $1 + i$  line contains two integers  $X_i$  and  $Y_i$ , the co-ordinate of the  $i$ -th vertex of the polygon.

The next  $M$  lines describe the cuts. For  $1 \leq j \leq M$ , the  $1 + N + j$  line contains four integers  $A\ B\ C\ D$  stating that the  $j$ -th cut passes through points  $(A, B)$  and  $(C, D)$ . Each co-ordinate is within the range  $-1\,000\,000\,000$  to  $1\,000\,000\,000$ .

### Output

For each test case, your program must output the number of cuts that pass through the polygon.

### Example

Input 1	Output 1
4 5 0 0 10 0 10 10 0 10 -10 0 50 0 -1 1 1 -1 100 10 101 11 20 0 20 30 19 24 -1 4	3
Input 2	Output 2
3 6 0 0 10 0 5 5 -10 5 -5 5 -10 3 -5 3 -5 3 -7 3 -10 0 -5 0 -10 -1 -5 -1 -10 -5 -5 -5	4

**Explanation:** For the first test case, the 1<sup>st</sup> cut, the 2<sup>nd</sup> cut, and the 5<sup>th</sup> cut pass through the polygon, so the correct output for this test case is 3 (3 cuts). For the second test case, the first 4 cuts pass through the polygon, so the correct answer is 4.