# Mock CCC '23 2 S5 - The Obligatory Data Structures Problem

**Time limit:** 2.0s **Memory limit:** 1G

Mock CCC would not be a real mock CCC without a data structures problem, would it?

You are given a function f that maps  $\mathbb{Z}^2$  to  $\mathbb{Z}$ . f is zero everywhere except at N points.

You must answer Q queries, as follows

• Query(x\_a, y\_a, x\_b, y\_b) - let S be the multiset of all integers f(x,y) where  $x_a \le x \le x_b$ ,  $y_a \le y \le y_b$ , and f(x,y) is positive. Return 1 if there is a submultiset of S of size 3 where the three elements of the submultiset, when interpreted as side lengths, form a non-degenerate triangle.

#### **Scoring**

To get full marks, your solution must solve all test cases in under 0.5 seconds.

If your solution solves all test cases in under 1 second, you get 7 marks.

If your solution solves all test cases in under 1.5 seconds, you get 3 marks.

If your solution solves all test cases in under 2 seconds, you get 1 mark.

#### **Constraints**

$$1 \leq N, Q \leq 10^5$$

$$1 \leq x,y,z \leq 10^9$$

$$1 \leq x_a \leq x_b \leq 10^9$$

$$1 \leq y_a \leq y_b \leq 10^9$$

#### **Input Specification**

The first line contains two integers, N and Q.

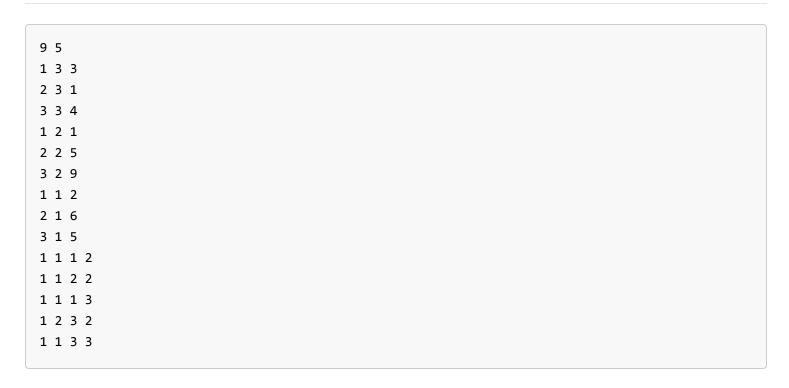
The next N lines contain three integers, x, y, and z, indicating that f(x,y)=z.

The next Q line contain four integers,  $x_{a}$ ,  $y_{a}$ ,  $x_{b}$ , and  $y_{b}$ .

#### **Output Specification**

Output Q lines. On the ith line, output Query(x\_a, y\_a, x\_b, y\_b).

## **Sample Input**



### **Sample Output**

```
0
1
0
0
1
```