Baltic OI '04 P5 - Rectangles

Baltic Olympiad in Informatics: 2004 Day 2, Problem 2

There are given N rectangles on the plane. Rectangle sides are parallel to coordinate axis. These rectangles may overlap, coincide or be drawn inside one another. Their vertices have non-negative integer coordinates and x coordinates do not exceed $x_{\max}$ and y coordinates do not exceed $y_{\max}$.

A segment is started in the point $A(0,0)$ and ended in point B. The coordinates of the point B (the other end of the segment) satisfy the following conditions:

Example with 8 rectangles. The segment AB crosses 5 of them.

- The coordinates of B are integer numbers;
- The point B belongs either to the segment $[(0, y_{\max}), (x_{\max}, y_{\max})]$ or to the segment $[(x_{\max}, 0), (x_{\max}, y_{\max})]$.

The segment AB might cross rectangles (we assume that crossing takes place even if only one rectangle vertex is crossed).

Write a program to find a point B for which the segment AB crosses as many rectangles as possible.
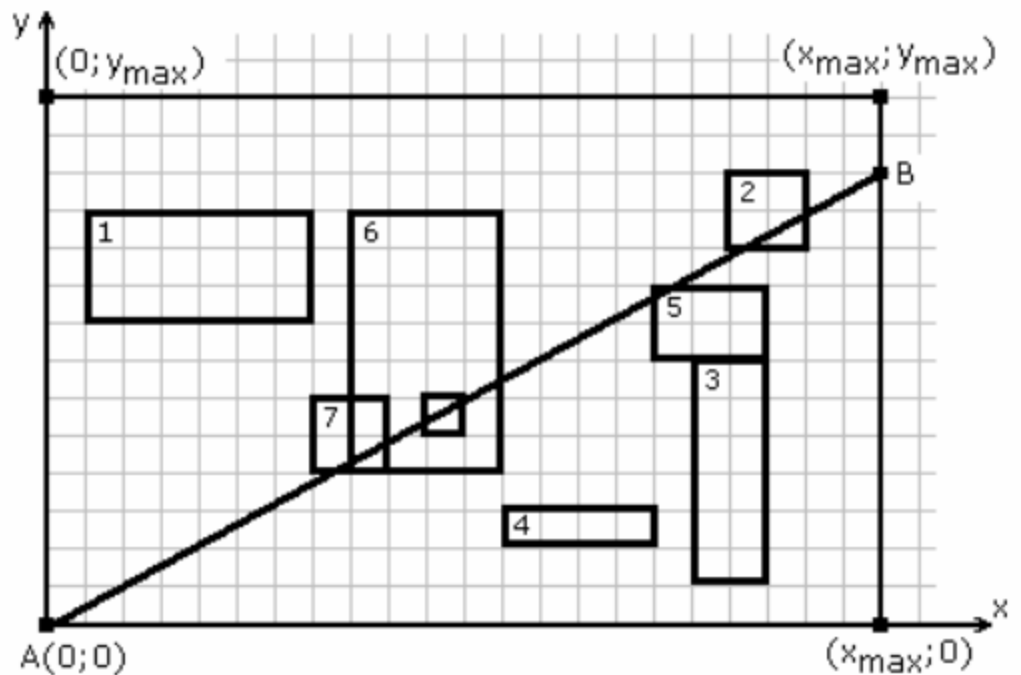
Constraints

$1 \leq N \leq 10^4$

$0 \leq x_{bl} < x_{tr} \leq x_{\max} \leq 10^9$

$0 \leq y_{bl} < y_{tr} \leq y_{\max} \leq 10^9$

Input Specification

The first line of the input contains three space-separated integers: $x_{\max}$, $y_{\max}$ and N.

Each of the following N lines contains four space-separated integers: the coordinates of the bottom left corner x_{bl} and y_{bl}, and coordinates of the top right corner x_{tr} and y_{tr}.

Output Specification

Output three space-separated integers on the first and only line of output.

First output the maximum number of crossed rectangles, followed by the x and y coordinates of point B.

If there are several solutions, output any one of them.

Sample Input

```
22 14 8
1 8 7 11
18 10 20 12
17 1 19 7
12 2 16 3
16 7 19 9
8 4 12 11
7 4 9 6
10 5 11 6
```

Sample Output

```
5 22 12
```

Sample Explanation

The sample corresponds to the diagram in the problem statement. Another possible solution is `5 22 11`.