Tri

Task

You are given **K** points with positive integer coordinates. You are also given **M** triangles, each of them having one vertex in the origin and the other 2 vertices with non-negative integer coordinates.

You are asked to determine for each triangle whether it has at least one of the **K** given points inside. (None of the K points are on any edge of any triangle.)

Input

The first line of the input file will contain **K** and **M**. The following **K** lines will contain 2 positive integers **x y** separated by one space that represent the coordinates of each point. The next **M** lines have 4 non-negative integers separated by one space, (**x1**, **y1**) and (**x2**, **y2**), that represent the other 2 vertices of each triangle, except the origin.

Output

The output file should contain exactly **M** lines. The *k*-th line should contain the character **Y** if the *k*-th triangle (in the order of the input file) contains at least one point inside it, or **N** otherwise.

Constraints

- $1 \le$ **K,M** $\le 100\ 000$
- $1 \le$ each coordinate of the **K** points $\le 10^9$
- $0 \le$ each coordinate of the triangle vertices $\le 10^9$
- Triangles are not degenerate (they all have nonzero area).
- In 50% of the test cases, all triangles have vertices with coordinates **x1=0** and **y2=0**. That is, one edge of the triangle is on the *x*-axis, and another is on the *y*-axis.
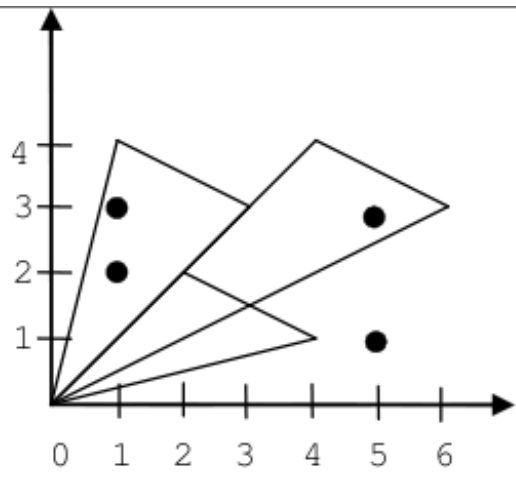
Sample input 1

```
4 3
1 2
1 3
5 1
5 3
1 4 3 3
2 2 4 1
4 4 6 3
```

Sample output 1

```
Y
N
Y
```

Explanation for sample 1

Sample input 2

```
4 2
1 2
1 3
5 1
4 3
0 2 1 0
0 3 5 0
```

Sample output 2

```
N
Y
```

Explanation for sample 2