

Quadrant Queries

There are N points in a plane. The i^{th} point has coordinates (x_i, y_i) . Perform the following queries, and always include the boundry points (i and j) in the operation:

1. Reflect all points between points i and j along the X axis. This query is represented as "X i j"
2. Reflect all points between points i and j along the Y axis. This query is represented as "Y i j"
3. Count how many points between points i and j lie in each of the 4 quadrants. This query is represented as "C i j"

Input Format

The first line contains N , the number of points. N lines follow.

The i^{th} line contains x_i and y_i separated by a space.

The next line contains Q , the number of queries. The next Q lines contain one query each, in one of the above forms.

All indices are 1 indexed.

Output Format

Display one line for each query of the type "C i j". The corresponding line contains 4 integers; the number of points having indices in the range [i..j] in the 1st,2nd,3rd and 4th quadrants respectively.

Constraints

$$1 \leq N \leq 100000$$

$$1 \leq Q \leq 1000000$$

You may assume that no point lies on the X or the Y axis. All (x_i, y_i) will fit in a 32-bit signed integer
In all queries, $1 \leq i \leq j \leq N$

Sample Input

```
4
1 1
-1 1
-1 -1
1 -1
5
C 1 4
X 2 4
C 3 4
Y 1 2
C 1 3
```

Sample Output

```
1 1 1 1
1 1 0 0
0 2 0 1
```

Explanation

When a query says "X i j", it means: take all the points between *indices i and j* (both i and j inclusive) and reflect those points along the X axis. The i and j here have nothing to do with the co-ordinates of the points. They are the indices. i refers to *point i* and j refers to *point j*

'C 1 4' asks you to 'Consider the set of points having index in $\{1,2,3,4\}$. Amongst those points, how many of them lie in the 1st,2nd,3rd and 4th quadrants respectively?'

The answer to this is clearly **1 1 1 1**.

Next, we reflect the points between indices '2 4' along the X axis. So the new coordinates are :

```
1 1
-1 -1
-1 1
1 1
```

Now 'C 3 4' is 'Consider the set of points having index in $\{3,4\}$. Amongst those points, how many of them lie in the 1st,2nd,3rd and 4th quadrants respectively?' Point 3 lies in quadrant 2 and point 4 lies in quadrant 1.

So the answer is **1 1 0 0**

