Problem C
Cutting Cakes
Input: Standard Input
Output: Standard Output

Alice and Bob are twins. In their birthday, they have a really large cake of dimensions **10^4x10^4**. The cake has a number of flowers on it. As usual, Alice and Bob starts playing with it. First, Alice cuts the cake in two pieces, and then Bob takes the part with the maximum flowers on it. Since, Alice likes the flowers too, she will try to get maximum number of flowers. The flowers, which are incident by the cut are ruined, and thus non of them get those. The badness of a cut is the difference of the number of flowers between the two sets.

The task presented to you is not to maximize the number of flowers, Alice gets. Instead, you are given the co-ordinates of the flowers, and a cut, made by Alice. You need to find out the number of flowers, that are partitioned into two parts, and the number of flowers, being ruined by the cut. Alice always cuts in a straight line.

Input

First line contains **T**, the number of test cases. Each test case starts with an integer **N**, the number of flowers. Following **N** lines each contains two integers, **x_i** and **y_i**, the co-ordinate of the i-th flower. **No three flowers will be collinear.** After that, a line with values, **M, X_1, Y_1, X_2, Y_2, dX_1, dY_1, dX_2, dY_2** follows. Here, **M** is the number of queries. Each of these queries will be a line between two given points. The end points are generated by the function given below. Each call to the function generate will produce the end points of the query line. **X_1, Y_1, X_2, Y_2, dX_1, dY_1, dX_2, dY_2** are used to generate the lines.

X1, Y1, X2, Y2, dX1, dY1, dX2, dY2

function generate
$$X_1 = (X_1 + dX1) \bmod 10^4$$
$$Y_1 = (Y_1 + dY1) \bmod 10^4$$
$$X_2 = (X_2 + dX2) \bmod 10^4$$
$$Y_2 = (Y_2 + dY2) \bmod 10^4$$

if $X_1 == X_2$ and $Y_1 == Y_2$ then
$$Y_2 = (Y_1 + 1) \bmod 10^4$$

P.S.: It is highly unlikely that, an O(NM) solution would pass the time limits. You have to think of some more clever solution

Output

Each case starts with the line "Case #n:" where **n** is the number of the test case. For each line, output three integers, **p**, **q** and **r**; where **r** is the number of flowers on the line and **p** and **q** are the number of flowers on the sides of the line.

Constraints

- $T \leq 3$
- $N \leq 1500$
- $M \leq 700000$
- For all location of flower (x$_i$,y$_i$), $0 \leq x_i, y_i \leq 10000$. No three points will be collinear.
- $p \leq q$
- All input values will fit into a 32bit signed integer

Sample Input	Output for Sample Input
1 4 5 5 5 10 10 5 10 10 2 -7 -7 7 7 1 1 1 1	Case #1: 1 1 2 1 1 2

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