Problem D
Intersecting Lines

Time limit: **3 seconds**
Memory limit: **1024 megabytes**

Problem Description

We all know that a pair of distinct points on a plane defines a line and that a pair of lines on a plane will intersect in one of three ways:

1. no intersection because they are parallel;
2. intersect in a line because they are on top of one another (i.e. they are the same line);
3. intersect in a point.

In this problem, you will use your algebraic knowledge to create a program that determines how and where is the intersect point of these two lines.

Your program will repeatedly read in four points that define two lines in the x-y plane and determine how and where the lines intersect ($-1000 \leq x, y \leq 1000$).

Input Format

The first line contains an integer N between 1 and 100 describing how many pairs of lines are represented.

The next N lines will each contain eight integers. These integers represent the coordinates of four points on the plane in the order $x_1, y_1, x_2, y_2, x_3, y_3, x_4, y_4$. Thus each of these input lines represents two lines on the plane: one line through (x_1, y_1) and (x_2, y_2) and the other one line through (x_3, y_3) and (x_4, y_4). The point (x_1, y_1) is always distinct from (x_2, y_2). Likewise with (x_3, y_3) and (x_4, y_4).

Hint:

- Use double for all calculations and storage of coordinates and results (**Do not use float**).
- When printing the x and y coordinates of the point in two decimal places, please use: "`System.out.printf("POINT %.2f %.2f\n", x, y);`"
- If the calculation result is "`-0.00`", replace it with "`0.00`" before printing to pass the judge.

Output Format

There should be N lines of output. There will then be one line of output for each pair of planar lines represented by a line of input, describing how the lines intersect: "`NONE`", "`LINE`", or "`POINT`". If the intersection is a point then your program should output the x and y coordinates of the point, correct to **two decimal places**.

Technical Specification

- $1 \leq N \leq 100$.
- $-1,000 \leq x_i, y_i \leq 1,000$, where $1 \leq i \leq 4$

Sample Input 1

```
5
0 0 4 4 0 4 4 0
5 0 7 6 1 0 2 3
5 0 7 6 3 -6 4 -3
2 0 2 27 1 5 18 5
0 3 4 0 1 2 2 5
```

Sample Output 1

```
POINT 2.00 2.00
NONE
LINE
POINT 2.00 5.00
POINT 1.07 2.20
```