Problem 4: why did nobody invite me to prom
13 Points

Problem ID: `flights`
Rank: 3

Introduction

You and your neighborhood friend Itani Mulli have finally finished building a drone to spy on the people going to prom without you! After testing it in the comfort of your own backyard, you decide to put it to the test by flying it to his house. However, your cranky neighbor Dory Toh absolutely hates the new century and has no patience for your newfangled technology flying over her precious hydrangeas. Will you be able to fly your drone to Itani's house without facing even more lawsuits?

Problem Statement

Given the corner coordinates of Dory's triangular backyard $(\mathbf{X_1}, \mathbf{Y_1})$, $(\mathbf{X_2}, \mathbf{Y_2})$, $(\mathbf{X_3}, \mathbf{Y_3})$ and the start and end coordinates of your drone's planned flight $(\mathbf{X_S}, \mathbf{Y_S})$, $(\mathbf{X_E}, \mathbf{Y_E})$, determine if the direct flight path travels through your neighbor's backyard.

All coordinates are given as a pair of integers in the 2D plane.

Although Dory is cranky, you can get away with the following:

- Flight paths that travel along the boundary of their backyard without entering inside are acceptable
- Flight paths that travel through a single corner of their backyard are also acceptable

Finally, the start and end coordinates of the drone's flight path are guaranteed to be strictly outside of Dory's backyard.

Input Format

The first line of the input contains a positive integer $\mathbf{T}$ denoting the number of test cases that follow. For each test case:

- The first line contains 4 space-separated integers $\mathbf{X_S}$ $\mathbf{Y_S}$ $\mathbf{X_E}$ $\mathbf{Y_E}$ where:
  - $\mathbf{X_S}$ $\mathbf{Y_S}$ denotes the start coordinate of your flight path in 2D space
  - $\mathbf{X_E}$ $\mathbf{Y_E}$ denotes the end coordinate of your flight path in 2D space
- The second line contains 6 space-separated integers $\mathbf{X_1}$ $\mathbf{Y_1}$ $\mathbf{X_2}$ $\mathbf{Y_2}$ $\mathbf{X_3}$ $\mathbf{Y_3}$ where:
  - $\mathbf{X_1}$ $\mathbf{Y_1}$ denotes the first corner coordinate of Dory's backyard in 2D space
  - $\mathbf{X_2}$ $\mathbf{Y_2}$ denotes the second corner coordinate of Dory's backyard in 2D space
  - $\mathbf{X_3}$ $\mathbf{Y_3}$ denotes the third corner coordinate of Dory's backyard in 2D space
- The third line is blank to separate individual test cases

Output Format

For each test case:

- If the flight path does not travel through Dory's backyard, output a single line containing: `SAFE`
- If the flight path travels through Dory's backyard, output a single line containing: `I'LL SEE YOU IN COURT`

Constraints

$1 \leq \mathbf{T} \leq 100$
$-10^4 \leq \mathbf{X}, \mathbf{Y} \leq 10^4$
The triangle corner coordinates are not collinear.
All given coordinates are unique.
The start and end coordinates of the flight path are strictly outside the triangle.

Sample Test Case

Sample Input:

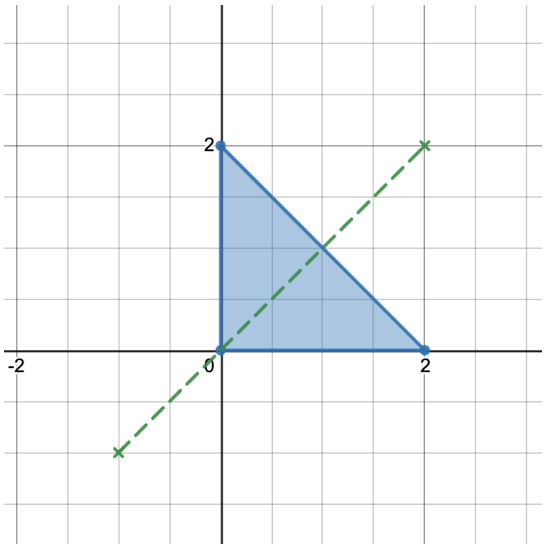
```
4
4 4 -2 6
-2 -2 -4 0 2 3

-1 -1 2 2
0 0 2 0 0 2

2 6 2 -2
2 2 4 6 6 0

3 11 6 -4
-5 3 4 6 5 1
```

Sample Output:

```
SAFE
I'LL SEE YOU IN COURT
SAFE
SAFE
```

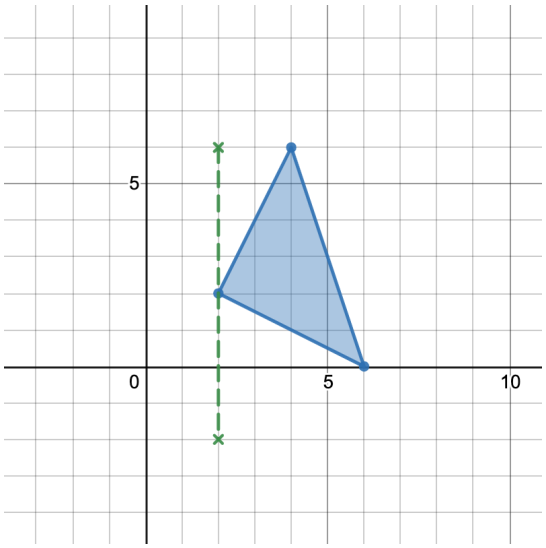
Sample Explanations:

For Test Case #2:
The given flight path crosses through the boundaries laid out by the three points, so the flight path passes through Dory's backyard.



For Test Case #3:

The given flight path only crosses over a corner of Dory's backyard, so the flight path is safe.



For Test Case #4:

The given flight path travels along a boundary, but doesn't cross over it. Therefore, the flight path is safe.