(Adv.) Competitive Programming

Submit until 05.07.2019 13:30, via the judge interface

Problem: area51 (1 second timelimit)

Fresh out of university you landed your first job. The company is an aerospace company working on top secret government projects and you're really excited to write code for the world's most advanced flight hardware. The company even paid for your move to Area 51 already. On the first day, your boss had different plans for you, however: You are now in charge of air traffic monitoring, about as boring as it could be. Your task is to classify all objects flying in the vicinity of the base in several categories:

TOPSECRET Flights that start and end in Area 51. Those are the company's own prototypes. Report them to the intelligence officers so they can ensure their secrecy.

IRRELEVANT Flights that never even touch the Area 51 airspace. Of course, they can just be ignored.

WARNING Flights that start and end outside Area 51, but enter the base's airspace. Report them as a possible threat of espionage.

DANGER Flights that have only one endpoint in Area 51. They have to be immediately reported to the highest level for further investigation. Maybe someone is breaking in or stealing a prototype.

If you do this task well, you might get promoted to coffee delivery person for the actual engineers. Still more exciting than watching the sky, so make an effort please.

Input   First, there is a line with $3 \leq n \leq 10^5$, the number of buildings of Area 51 and $0 \leq p \leq 10^4$, the number of flight paths you have to check. Then follow n lines with the coordinates of the buildings (integers x, y). These buildings will define the airspace in the following way: Everything above the convex hull of the buildings (and also on its border) is in the airspace.

After that follow p lines with one flight path each. Each flight path consists of the coordinates of its starting point, then its end point. Objects always fly in a straight line between these points. All coordinates are within $[-10^8, 10^8]$. For the purpose of this task assume that earth is flat.

Output   For each flight path, print a line with the Category given above.

Sample input

```
7 4
6 4
0 0
1 1
1 3
2 1
3 1
3 0
0 4 5 4
0 2 5 2
3 0 0 3
1 2 3 2
```

Sample output

```
IRRELEVANT
WARNING
DANGER
TOPSECRET
```