Problem A - Arcade Magic

Daniel's officially retired from apple farming as well as ACM, so to celebrate, Daniel and David go to an arcade by the beach.

Daniel is playing an arcade game where where two medieval armies are fighting. Daniel can cast a giant triangular fireball, but Daniel doesn't want to hit too many of his own knights. Help Daniel determine who's safe from his triangular fireball.

Input

The first line contains a single integer T denoting the number of test cases.

Each test case begins with a single integer n ($1 \leq n \leq 100,000$) denoting the number of people in Daniel's army.

The next line contains 6 integers $x_1, y_1, x_2, y_2, x_3, y_3$ denoting the vertices of the triangular fireball.

Each of the following n lines contain two integers x_i, y_i denoting the locating of the ith knight in Daniel's army.

Output

For each knight output in a single line `DANGER` if the knight is inside or on the boundary of the triangle, and `SAFE` otherwise.

Sample Input

```
1
3
0 0 3 0 3 3
-1 -1
1 1
2 1
```

Sample Output

```
SAFE
DANGER
DANGER
```