

Problem B - Breaking Ice

Daniel is playing an arcade game where he controls a character that's skating on ice. The ice is thin, so if his character ever steps on a place where he was previously, he will fall into the ice.

Daniel controls his character by giving angles of turns (positive angles are right hand turns and negative angles are left hand turns), and specifying distances to travel after turning.

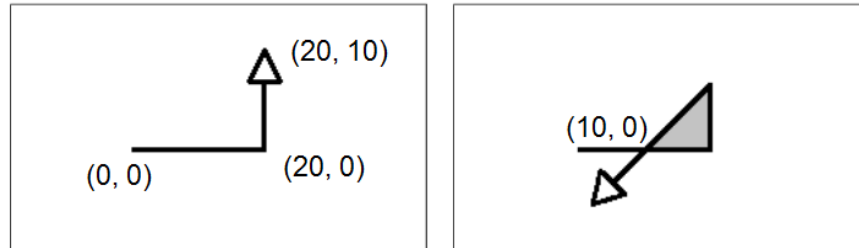


Figure 1: Illustration of first sample test case after step 2 (left) and step 3 (right). Notice that as third move intersects a previous move.

Input

The first line of input contains an integer T , the number of test cases.

Each test case begins with a single line containing an integer N ($1 \leq N \leq 100$), denoting the number of turn+move combo commands to his character. Assume for simplicity that Daniel's character's starting location is $(0, 0)$.

The next N lines contain the actions. Each action consists of two integers: an integer a_i ($-179 \leq a_i \leq 179$) denoting the number of degrees to turn, and an integer d_i ($1 \leq d_i \leq 100$) denoting the distance to move forward in a straight line after the turn.

Output

For each test case output, in a single line, the number of the first move (counted from 1) that will intersect a previous point in the path, so his character falls into the water. If no such move exists, then output "SAFE".

Sample Input

```
3
4
-90 20
90 10
135 20
-90 10
4
-90 20
90 10
135 10
-90 20
6
60 20
60 20
60 20
60 20
60 20
80 40
```

Sample Output

```
3
SAFE
6
```
