

2107 Double, Double, Toil and Trouble

The **ToxicCo** chemical company has developed a new, somewhat unstable process for electroplating metals in a hot acid bath. This process requires constant monitoring of the temperatures and voltages present in the bath. Too low a temperature or too high a voltage will cause the dissolved metals to congeal in a mass at the bottom of the vat, damaging the equipment. On the other hand, if the temperature gets too high, acid fumes may be released into the atmosphere. If the voltage goes too low, the chemical reaction is altered, and an explosion becomes possible.

A state-of-the-art, artificially-intelligent process controller is supposed not only to keep the vat temperature and voltage at safe levels, but also to continually adjust them so as to maximize the speed of the electroplating process. Unfortunately, the software developers have reported that “there’s still a few bugs in the system” and won’t promise delivery of the controller for at least another 9 months. (A few malcontents within the company are beginning to question whether the development team, headed by the nephew of the ToxicCo company president, will ever deliver a working system.)

This plant needs to start operation as soon as possible, so you have been commissioned to write a simpler control program to serve in the interim while the deluxe version is being debugged.

Write a program to read descriptions of “safe regions” within which temperature and voltage levels can range and to read current temperatures and voltage values and then to determine if the current values are safe. A safe region is described by 4 linear constraints:

- Two lower bounds of the form $aT + bV \geq c$, where T and V denote the vat temperature and voltage, respectively. a , b , and c are constants to be supplied in the program input.
- Two upper bounds of the form $aT + bV \leq c$, where the symbols are defined in the same manner.

The safe region forms a quadrilateral in the (T, V) coordinate space, and is guaranteed to be closed (i.e., the safe region does not include plus or minus infinity for either T or V).

Input

All input to this program is supplied from the standard input stream. The input begins with a line containing an integer value indicating the number of data sets to follow. There will be at least one data set, but no more than 500.

Each data set consists of 5 lines of text, as follows

- Line 1 will contain the a , b , and c values for the first lower bound.
- Line 2 will contain the a , b , and c values for the second lower bound.
- Line 3 will contain the a , b , and c values for the first upper bound.
- Line 4 will contain the a , b , and c values for the second upper bound.
- Line 5 will contain the current temperature and voltage.

On each line, the indicated values will be given as floating point numbers, separated from one another by one or more blanks. No line will exceed 80 characters.



Output

The output of this program will consist of a single line of text per data set, written to the standard output. Each line will contain the data set number, left-justified, a blank, and then either the word 'SAFE' or the word 'UNSAFE', followed by the appropriate end-of-line termination. No other output should appear.

Sample Input

```
2
35.0 -5.0 375.0
0.0 1.0 65.0
-10.0 32.5 3000.0
55.0 -30.0 1350.0
 15.0 75.2
35.0 -5.0 375.0
0.0 1.0 65.0
-10.0 32.5 3000.0
55.0 -30.0 1350.0
 25.0 70.6
```

Sample Output

```
1 UNSAFE
2 SAFE
```