

[A1] The Encrusted Lock (50 pts)

Time Limit: 1s
Memory Limit: 512MB

Problem Description

“So, which one of these troublemakers should I send to the dungeons?”, the Yellow King asks you as one of the knights bring in an open and empty chest. As a member of “The Sun’s Inquisition”, Seeker Blanc Enyelu has been called in to identify the culprit in the theft of the Yellow King’s jewels. “I’m sure its one of the castle groundskeepers, since the thief dropped a pendant given only to the castle’s residents”, the king says.



Figure 1: Lock used to seal the king’s treasure room

“This would’ve been so much easier if someone cleaned up around here!” You mutter to yourself as you inspect the keyhole on the lock. With some effort you break it open and take notice that dirt is causing the lock to open with multiple keys following some conditions. You take a piece of parchment out of your bag and note down the length of the keyhole D . You also note down the depth of each groove in the keyhole as A_i . Lastly, you measure the depth of the dirt buildup in each of the groove as B_i . From your experience as a blacksmith’s apprentice, you determine that any key wherein all of its teeth t_i falls between A_i and $A_i - B_i$ (inclusive) can open the lock. This happens because the dirt adds to the teeth of the key and pushes on the lock mechanism.

You then stare at the N men standing before you. “I don’t think I can figure this one out, but I can narrow down your suspects”, you say to the king. He nods then asks the groundskeepers to take out the singular key entrusted to them. “Work your magic then”, the king orders you.

Given N groundskeepers with one key each, identify which groundskeeper should remain a suspect. Each key is defined by D integers denoting the height of its teeth t_i . You are also given the properties of the lock with D integers representing the depth of each groove A_i . Lastly, you are given the D integers to represent the dirt depth in each tooth B_i .

Input Specification

The input will only contain one test case. The first line contains two space separated integers, D — denoting the depth of the keyholes and length of the keys, and N the number of groundskeepers

The second line contains D space separated integers which denotes the depth of a groove in the keyhole A_i

The third line contains D space separated integers denoting the depth of the dirt in each groove B_i .

N lines then follow each containing D space separated integers. Each integer in a line denotes the height of the tooth t_i on the key of the j th groundskeeper.

Output Specification

Output N lines containing “SUS” if the N th groundskeeper should remain a suspect for the theft. Otherwise, print out the word “INNOCENT”

Constraints

$$\begin{aligned} 1 &\leq N \leq 10 \\ 1 &\leq D \leq 10^4 \\ 0 &\leq B_i \leq A_i \leq 10^6 \\ 0 &\leq t_i \leq 10^6 \end{aligned}$$

Sample Input

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

Sample Output

```
SUS
SUS
INNOCENT
SUS
INNOCENT
```