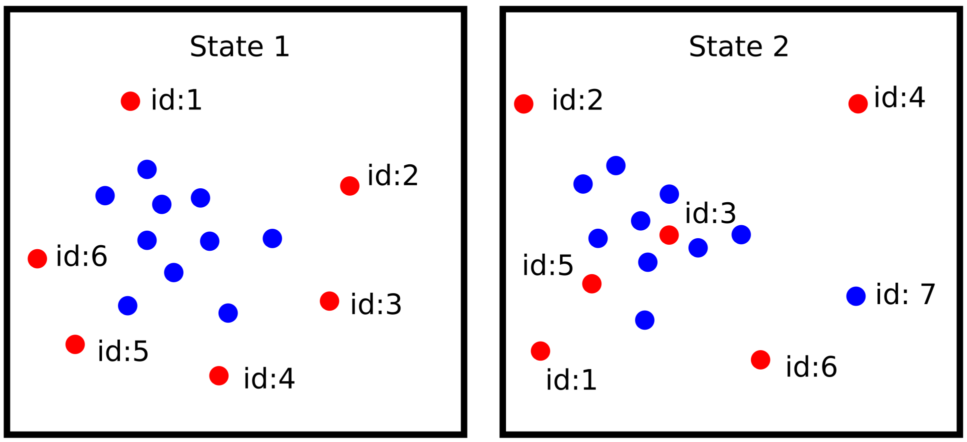
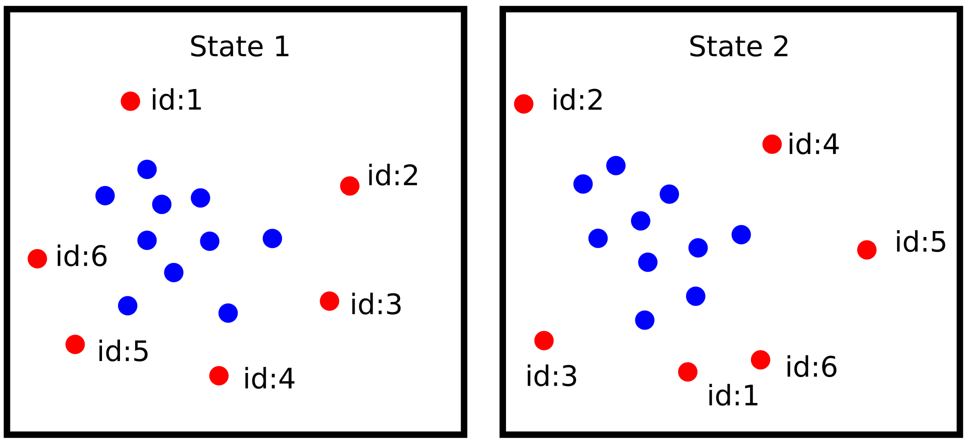
G: Swarms as a Service

It's the year 2050, and SaaS (Swarms as a Service) has become the norm. SaaS involves large groups of robots (called swarms) that deliver consumer goods throughout the skies. As a stationary observer, you want to ensure that all of the robots flying above you have stable dynamics. You do this by sampling the swarms state at two different times (t1, t2). When we look at the swarm between any two states, we first want to determine if the swarm has maintained formation, or if it entering unstable dynamics.

A swarm exhibits stable dynamics if the robots forming the outer boundary of the swarm of state 1, are the same robots in the outer boundary of state 2 (i.e, if you took an elastic band and wrapped it around the robots, the outer boundary is formed by all robots touching the elastic band.)



example 1: Unstable swarm dynamics. Robot 3 has left the outer boundary of the swarm. Furthermore robot 7 becomes part of the outer boundary.



example 2: Stable swarm dynamics. The robots [1,2,3,4,5,6] are surrounding the swarm in both states, despite changing their positions.

Input

Each case will begin with an input containing an integer N being the number of robots in the swarm. $0 \leq N \leq 100$

The following 2N lines contain space separated integers $p_i x_i y_i$, where p_i is the id of the ith robot and x_i and y_i represent the x and y coordinates of the ith robot. The first N of these values represent the state of the N robots at time t_1. The second batch of N lines represents the state of swarm at time t_2

Input is complete once you read in a single "0" indicating a swarm with no robots.

Output

Output TRUE If the swarm is stable between states 1 and 2. Output: FALSE If the swarm is not stable between states 1 and 2.

Sample Input

```
4
1 5 2
2 1 3
3 1 5
4 4 4
1 2 4
2 1 3
3 1 5
4 4 4
3
1 2 4
2 1 3
3 1 5
1 333 666
2 420 69
3 391 5
0
```

Sample Output

```
FALSE
TRUE
```