

Dangerous Tiles

Problem ID: dangtiles

Being the true (pretend) **Fire Emblem** fan that you are, you have played the game long enough to understand the most appealing aspect of the game is its **permadeath** feature. This feature entailing that when a unit dies in the game, they will become unplayable for all future battles (quite a grim fate).

In the illustration to the right, we can see a sample configuration for a 5 by 5 grid with 2 enemies and units. In this case the green and red units have a **move** range of 1; meaning they can move through any adjacent tile (vertical or horizontal). The **danger zone** indicated by the shaded region, show tiles that are not safe for your units to occupy.

Fire Emblem is a turn based RPG, meaning that at the start of each turn, you can select to move all or some of your units. As soon as your turn ends, the enemy's turn begins, and they will move their units to approach and attack the closest alive unit in their **proximity**. A vulnerable unit is considered to be in another unit's proximity if the other unit can move themselves to be directly adjacent to the vulnerable unit. After this exchange, the next turn begins and the fun ensues!

After several visits to the AMAACS office, you hear the noticeable groans from one of the executives as they loudly, exclaim: "I CAN'T BELIEVE HE KILLED ME, AGAIN!". As you speak with him he explains to you how he can't get passed this level since an enemy unit always manages to kill one of his characters. Being the true Emblemier that you are, you realize that this is the enfuriating RNG chapter, where at the start of the match:

- 1 : All of your unit's are positioned randomly across the grid, with no two units being adjacent.
- 2 : All of your units move are reduced to 1 and our stripped of their weapons for the duration of this turn.
- 3 : All of your enemy units' are positions and move are chosen randomly, units may be adjacent with your own
- 4 : Enemy units are granted INSTA-KILL hits on any of your units in their proximity

The mission objective of this map isn't to fight off the enemies, instead it is to sucessfully survive the first turn.

You have decided to team up with the executive to tackle this chapter, as he provides you with the grid information, you must tell him if an optimal movement exists for each unit to end this turn safely , or tell him to soft-reset and try the next configuration.

Input

The first line of input will consist four integers, $1 \leq N, M \leq 20$, the dimensions for the grid. $0 \leq E, U \leq 10$, the number of enemy units and your units respectively. E lines , r_i, c_i, m_i , indicating the enemy's coordinates and the movement for the character, followed by U lines consting of r_i, c_i , indicating you unit's coordinates. You may assume the following: $1 \leq r_i \leq N, 1 \leq c_i \leq M, 1 \leq m_i \leq M * N$

Output

If the current configuration is impossible output the phrase "soft-reset!". Otherwise, output the phrase "safe"



Photo by William

Sample Input 1

5 5 2 2	safe
2 4 1	
4 2 1	
1 3	
4 4	

Sample Output 1**Sample Input 2**

5 5 4 1	soft-reset!
1 2 2	
1 4 2	
5 2 2	
5 5 2	
3 3	

Sample Output 2**Sample Input 3**

5 5 4 1	safe
1 2 1	
1 4 1	
5 2 1	
5 5 1	
3 3	

Sample Output 3**Sample Input 4**

4 4 2 2	soft-reset!
2 3 1	
3 2 1	
3 4	
4 3	

Sample Output 4