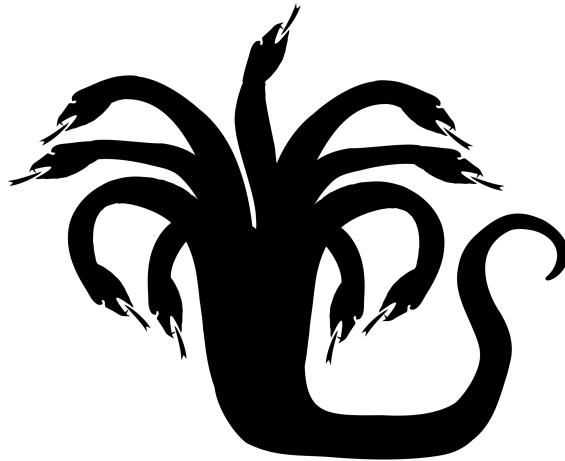


Slaying the Kayran

Problem ID: slaykayran

You managed to get through the the Mist Dragon's domain unharmed. You eventually stumble upon a small village called Flotsam. You notice that all the locals are on edge, so you head over to the pub to find out what's going on. You overhear that a monstrosity named the Kayran has been plaguing Flotsam's harbor, forcing away trade ships and cutting Flotsam off from the world. As a witcher, you begrudgingly accept the contract on the Kayran. You oil your weapons, clear your mind, and make your way towards the shoreline.



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The Kayran immediately leaps out and attacks you, a gargantuan hydra-like monstrosity the size of a large ship. Luckily, you manage to parry the attack just in time, avoiding fatal damage. Suddenly the Kayran loses a few heads..? But that can't be right, all the lore books and bestiaries have taught you that hydras only ever grow heads when they are attacked. Before you can finish your thought, the Kayran attacks again and you dodge roll away to safety. This time, however, the Kayran has grew some new heads. Absurd! This beast does not follow any conventional rules. You decide its time to change your tactics, deciding to take the brunt of the Kayran's next attack so you can study its patterns.

After studying the behavior of the beast, you conclude that the Kayran is unstable, it seems to grow or decrease its head count almost at random. But one thing you do notice is that there is a one-to-one correspondence to the number of heads the Kayran has before and after you decide to attack (i.e. the Kayran will never enter a state where it has x heads and suddenly go to either y heads or z heads where $y \neq z$). You chuckle, finally figuring out the creature.

Unfortunately you're still too injured to fight at full strength, you only have a limited amount of health points left and for each turn where you decide to defend yourself from the Kayran's attack you lose 1 health point. Or, you can choose to attack the Kayran on any given turn, taking a head but also the brunt of the Kayran's counter-attack. In this case, you take damage equivalent to the previous number of heads that the Kayran had. Remember that the Kayran always follows a set of rules when determining its head count after any action you perform (for example, if the Kayran has 4 heads and you defend, you take 1 damage and if a rule exists that $4 \rightarrow 2$, then two heads fall off after combat. If you attack and take a head, you take 4 damage, and if a rule exists that $3 \rightarrow 5$, then the Kayran will grow to five total heads after your attack). In the cases where a rule is not specified for a certain head count, you may assume the Kayran will only lose 1 head if you attack. Furthermore, the Kayran will keep on attacking you on each turn until it has reached 0 heads and has been defeated, or you have reached 0 or less health and have died.

You must choose quickly if it is possible to defeat the Kayran or to retreat to Flotsam and face the Kayran some other day.

Input

The first line of input consists of three integers, $1 \leq N, H, R \leq 500$, representing the current number of heads the Kayran has, the current amount of health you have, and the amount of rules that the Kayran follows with respect to its head count. Following this will be R lines of input consisting two integers $1 \leq n_i, n_j \leq 500$ representing one rule the Kayran must always follow when determining its head count. You may assume that the Kayran's head count will never exceed 5000.

Output

Should it be impossible to defeat the Kayran, you should print "retreat", otherwise, print the minimum sequence of moves required to defeat the Kayran.

Sample Input 1

```
5 10 4
5 6
6 1
4 3
2 1
```

Sample Output 1

```
3
```

Sample Input 2

```
1 1 1
1 2
```

Sample Output 2

```
retreat
```

Sample Input 3

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

Sample Output 3

```
3
```