

Problem L

Prepare to be Moon-Struck!

(Time Limit: 5 second)

Problem Description

Elune, the goddess of moon, has a row of N moonstones set in front of her palace all the way to the entrance. These stones, like moon, can turn dark or light under the goddess's influence. Upon full moon, Elune will set all the moonstones to light. But as Elune is the goddess of moon, her mood and preference change quickly from time to time. She likes to modify some of the moonstones every time she returns to her temple and passes through them. For whatever strange moon goddess reason, she must start modifying them by turning one of the light moonstone into dark. After that, she can modify the rest of the stones however she wants. And as an important goddess as she is, she is busy all the time so she cannot go backwards to modify the ones she has already passed through. Note that she only modifies the moonstones when she returns to the temple, never when she is leaving it. Suppose there are 15 moonstones and their pattern is:

Entrance ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ Elune's palace

where white circles represent light moonstones and black circles represent dark ones. Elune may change the pattern above into:

Entrance ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ Elune's palace

But she will NOT change the first mentioned pattern into

Entrance ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ Elune's palace

Of course, those mortal beings cannot see her as she comes and goes. But they can, however, see the changing of the moonstones. The high priestess loves to observe and record the changes as she thinks it might be some omen that the goddess is giving to her. How silly of her, the moon goddess is just doing that for fun!

Recently, there has been a series of criminal activities near the Temple of Elune. The Ancients that witnessed the crimes are so old that they cannot remember the time it happened. They are so old that time doesn't make sense to them anymore, you see. Luckily, they do remember the pattern of the moonstones when the crime happened! That combined with the high priestess's record, there may be hope for us to piece out the time the crime was witnessed.

Input Format

The first line in the input is the number of test cases T , which will not exceed 10. The first line of each test case contains three integers N , M and Q . There are N moonstones, the high priestess recorded M patterns in the order that Elune may modify them, and there are Q criminal activities that happened. It is guaranteed that N will not exceed 100000, M will not exceed 1000, and Q will not exceed 500.

The next M lines are the patterns the high priestess recorded and the Q lines after that are the patterns that the Ancients saw during the crime. These patterns are described by a run-length code " $a\ r_1\ r_2\ \dots\ r_a$ " which represents there are a runs, the first run is r_1 of light moonstones, the second run is r_2 of dark moonstones, and so on. For instance, "4 4 3 2 1" represents ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩, and "5 0 1 2 3 4" represents ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩. It is guaranteed that only r_1 can be zero, $r_1+r_2+\dots+r_a = N$ and a will not exceed 1000.

Output Format

For each criminal activity, output one line:

1. If it is before the first recorded pattern, output “<1”.
2. If it is after the M -th recorded pattern, output “> M ”.
3. If it is exactly the i -th recorded pattern, output “ i ”.
4. If it is between the i -th and the $(i+1)$ -th recorded pattern, output “ $i\ i+1$ ”.

Example

Sample Input:	Sample Output:
2 3 2 1 1 3 2 1 2 3 1 1 1 10 3 5 3 4 2 4 4 2 3 3 2 5 0 1 2 3 4 2 2 8 2 1 9 3 4 2 4 2 0 10 1 10	1 2 2 3 2 3 1 >3 <1