Problem E. Colorful Floor

You are going to build a tile mosaic floor on an alien planet. You will choose a certain rectangular pattern (with R rows and C columns) of unit square tiles, and then you will choose a color for each tile from the K colors that exist on that planet; they are numbered 0 through $K-1$. You will tessellate the pattern infinitely in the horizontal and vertical directions. (That is, in the finished floor, if you choose a tile of a certain color, and you move any multiple of R cells up or down or any multiple of C cells left or right, you will end up on another tile of the same color.)

When an alien is happy, it perceives colors exactly as they are. When an alien is angry, though, it sees the i^{th} color as the P_i^{th} color, where P is a permutation of 0, 1, $\cdots$, $K-1$. (It is possible for P_i to equal i.) To avoid confusion, you must choose a pattern that is unambiguous, meaning that happy and angry aliens will see the same overall design when looking at the floor. That is, no matter where on the floor an alien in one emotional state stands, there must be another cell where an alien of the other emotional state can stand, facing in the same direction, such that they both see exactly the same floor.

For example, suppose that the floor will consist of tiles of two colors, black and red, and that an angry alien sees black as red, and red as black. Then an all black floor would be ambiguous, since happy aliens would think it was all black, while angry aliens would think it was all red. However, a checkerboard pattern would be unambiguous, because both types of aliens would see the same overall design.

Find the number of different unambiguous patterns, modulo $1,000,000,007$ (10^9+7). Two patterns are considered the same if the floors paved by them can be matched after horizontal and/or vertical translations only (i.e., reflections and rotations are not allowed).

Input

The first line of the input gives the number of test cases, T. T test cases follow; each consists of two lines.

he first line has three integers K, R, and C, as described above. The second line has K integers; the i^{th} of these is P_i, representing the color perception permutation.

Output

For each test case, output one line containing "`Case #x: y`", where `x` is the test case number (starting from 1) and `y` is the number of different unambiguous patterns, modulo $1,000,000,007$ (10^9+7).

Limits

- $1 \le T \le 100$.
- $2 \le K \le 10^4$.
- $1 \le R, C \le 10^6$.

Sample input and output

Sample Input	Sample Output
6 2 1 2 1 0 2 2 2 1 0 3 2 2 1 2 0 3 1 3 1 2 0 3 3 3 0 1 2 3 3 3 0 2 1	Case #1: 1 Case #2: 3 Case #3: 0 Case #4: 2 Case #5: 2211 Case #6: 1

Note

In Case #1, the only unambiguous pattern has one cell each of the two different colors.

In Case #2, the three different unambiguous patterns are:

```
00   01   01
11   01   10
```

Any other pattern would either be ambiguous, or identical (under our definition above) to one of these three patterns.

In Case #4, the two different unambiguous patterns are `012` and `021`.