# IOI Training Camp 2018 Final Test 2

## Changing Numbers

You are given two arrays $A = A_1, A_2, \ldots, A_N$ and $B = B_1, B_2, \ldots, B_N$. We want to make these two arrays identical. That is, for each $1 \leq i \leq N$, we want to make $A_i = B_i$. To do this, we are allowed to make many operations of the following type:

In a single operation, we choose two integers $x$ and $y$, and replace all the occurrences of $x$ in both the arrays with $y$. This operation is denoted by $(x, y)$. Notice that regardless of the number of characters replaced, it will still be counted as a single operation.

A sequence of operations $((x_1, y_1), (x_2, y_2), \ldots, (x_m, y_m))$ is said to be optimal, if after performing these operations in the given order, both arrays $A$ and $B$ are identical, and there is no sequence with fewer operations which can achieve the same.

You will also be given an integer $K$ which will either be 1 or 2. If $K = 1$, you need to output the minimum number of operations needed to make the two arrays identical. If $K = 2$, in addition to the minimum number of operations, you should also output the number of different optimal sequences. As this number could be huge, output it modulo $10^9 + 7$.

### Input

The first line of the input contains a single integer, $T$, which is the number of testcases. The description of each testcase follows.
The first line of each testcase contains two integers: $N$, and $K$.
The next line contains $N$ integers: $A_1, A_2, \ldots, A_N$.
The next line contains $N$ integers: $B_1, B_2, \ldots, B_N$.

### Output

You need to output a single line for each testcase.
If $K = 1$, then that corresponding line should contain a single integer, which is the minimum number of operations needed.
If $K = 2$, then that corresponding line should contain two integers, the minimum number of operations needed and the number of optimal sequences modulo $10^9 + 7$.

### General Constraints

Unless otherwise mentioned, the following constraints are met throughout all subtasks:

- $1 \leq T \leq 5$
- $1 \leq N \leq 10^5$
- $1 \leq K \leq 2$
- $1 \leq A_i, B_i \leq N$

## Subtasks

**Subtask 1 (16 Points)**:

- $K = 1$

**Subtask 2 (84 Points)**:

- No further constraints.

**Sample Input 1**

```
2
5 1
2 1 1 3 5
1 2 2 4 5
5 2
2 1 1 3 5
1 2 2 4 5
```

**Sample Output 1**

```
2
2 8
```

**Explanation**

Testcase 1: The arrays are initially $(2, 1, 1, 3, 5)$ and $(1, 2, 2, 4, 5)$. Consider the sequence of operations $((1, 2), (3, 4))$. In the first operation all the 1s are converted into 2s. So, the arrays will now be $(2, 2, 2, 3, 5)$ and $(2, 2, 2, 4, 5)$. In the second operation all the 3s are converted into 4s. So, the arrays will now be $(2, 2, 2, 4, 5)$ and $(2, 2, 2, 4, 5)$. We have made the two arrays identical in two operations, and you can check that you cannot do better. Hence the output is 2.

Testcase 2: The arrays are the same, and hence the first integer is the same. Now we need to also find the number of optimal sequences. They are listed below:

- $((1, 2), (3, 4))$
- $((1, 2), (4, 3))$
- $((2, 1), (3, 4))$
- $((2, 1), (4, 3))$
- $((3, 4), (1, 2))$
- $((3, 4), (2, 1))$
- $((4, 3), (1, 2))$
- $((4, 3), (2, 1))$

Since there are eight optimal sequences, the second integer is 8.

## Limits

Time: 3 seconds

Memory: 128 MB