



Task Sličnost

In her hands, she was carrying some of those repulsive yellow flowers. Still, he found her attractive.

According to a well-known theorem, a person's personality is determined by a permutation of length N . Consequently, the personality of our protagonist, the master, is determined by such a permutation, denoted by p . Similarly, the personality of Margarita, the lady who caught his attention, is denoted by q .

The measure of similarity of the two permutations p and q is defined as the largest possible size of the intersection of a length K subsegment of p and a length K subsegment of q . Note that the intersection is taken in terms of sets, i.e. the order of the elements in the subsegments does not matter. For example, if $N = 4, K = 3$, the similarity of the permutations $(2\ 4\ 1\ 3)$ and $(1\ 2\ 3\ 4)$ is 2 and it is obtained by choosing any pair of subsegments.

Ever since he saw Margarita, the master had become obsessed with the similarity of his and her permutation, and his personality became very volatile. Because of this, every day two adjacent elements in his permutation swap their places. Note that this change is permanent, i.e. those elements remain swapped over the following days. The master now wants to know the similarity between his and her permutation initially and after the changes for the following Q days.

Input

The first line contains integers N, K and Q .

The second line contains N numbers, the i -th of which denotes p_i .

The third line contains N numbers, the j -th of which denotes q_j .

The following Q lines describe the changes. The i -th line contains an integer t_i ($1 \leq t_i < N$) denoting the fact that the numbers on positions t_i and $t_i + 1$ swapped their places in the master's permutation.

Output

In the first line output the initial similarity between the permutations and the number of pairs of subsegments for which it is achieved.

In the following Q lines output both values again but after the change that day.

Scoring

In all subtasks, it holds that $2 \leq N \leq 100\,000$, $1 \leq K \leq N$ and $0 \leq Q \leq 100\,000$.

Subtask	Points	Constraints
1	7	$Q = 0, N \leq 100$
2	10	$Q = 0, N \leq 5000$
3	33	$Q = 0$
4	7	$N, Q \leq 100$
5	10	$N, Q \leq 5000$
6	33	No additional constraints.



Example

input

```
2 1 1
1 2
1 2
1
```

output

```
1 2
1 2
```

input

```
4 3 0
2 4 1 3
1 2 3 4
```

output

```
2 4
```

input

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

1

4

output

```
2 5
2 6
3 1
3 1
```

Clarification of the second example

Subsegments of length 3 in the first permutation are (2 4 1) and (4 1 3), while in the second permutation they are (1 2 3) and (2 3 4). For the intersections we have

$$\{2, 4, 1\} \cap \{1, 2, 3\} = \{1, 2\}, \quad \{2, 4, 1\} \cap \{2, 3, 4\} = \{2, 4\},$$

$$\{4, 1, 3\} \cap \{1, 2, 3\} = \{1, 3\}, \quad \{4, 1, 3\} \cap \{2, 3, 4\} = \{3, 4\},$$

and so we see that the similarity is 2 and it is achieved for 4 pairs of subsegments.