# Snap Tokens

Type	Input file	Output file	Time limit	Memory limit
Batch	$\operatorname{stdin}$	$\operatorname{stdout}$	1 second	128 MB

#### Statement

We play an game of generalised N-Snap-Tag<sup>1</sup> using tokens on an **undirected connected** graph of N vertices (numbered 1 to N) and N edges. No edge goes from a vertex to itself and there is at most 1 edge between any two vertices. Initially, there are K identical tokens, each on a different vertex. At each moment, you may choose a token and move it to an adjacent vertex. If two tokens are on the same vertex, they annihilate each other and are **both instantly removed** from the graph. It takes 1 second to move any token.

Given the initial state of a game, determine the minimum amount of time required to remove all tokens from the graph. It is guaranteed that it is always possible to do so.

#### Input

The first line contains 2 integers N K. The next line contains N integers  $v_1 \dots v_N$ , indicating for each i that there is an edge between vertices i and  $v_i$ . The next line contains K distinct integers  $p_1 \dots p_K$ , the starting vertices of each token.

## Output

Output 1 integer, the minimum amount of time in seconds to remove all tokens.

## Sample Input

```
8 4
3 3 4 5 3 5 6 6
1 4 8 7
```

## Sample Output

4

## **Explaination**

It is optimal to move the tokens on vertices 7,8 to vertex 8 and the tokens on 1,4 to vertex 4.

<sup>&</sup>lt;sup>1</sup>See AIO 2015, Snap Dragons II

# Constraints

- $\bullet \ 2 \leq K \leq N \leq 10^5$
- $1 \le v_i, p_i \le N$
- $\bullet$  K is even

# Subtasks

Number	Points	$\operatorname{Max} N$	$\operatorname{Max} K$	Additional constraints	
1	16	20	20	None	
2	20	1000	1000	$v_i = (i \mod N) + 1$ for all i. That is, the graph is a cycle.	
3	16	1000	1000	K = N. That is, there is a token on every vertex.	
4	29	1000	1000	None	
5	19	$10^{5}$	$10^{5}$	None	