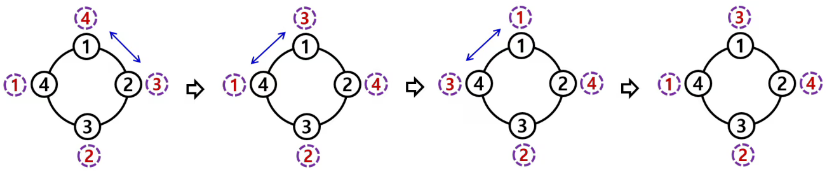
Problem G. Game with Coins

Input file:	*standard input*
Output file:	*standard output*
Time limit:	5 seconds
Memory limit:	1024 mebibytes

A cycle C of length n is a graph with vertices numbered 1 to n where, for each $i = 1, \ldots, n$, the vertices i and $(i \bmod n + 1)$ are connected by an edge.

Consider n coins placed on the cycle, so that each vertex contains one coin. Each coin also has a number from 1 to n on it, but some numbers may be equal. We start in some vertex and walk along the edges, swapping coins in the process. A *swapping walk* $w = (v_1, v_2, \ldots, v_k)$ of length $k \geq 1$ makes $k - 1$ swaps: for $i = 1, 2, \ldots, k - 1$, in this order, we swap the two coins in vertices v_i and v_{i+1}. Each two consecutive vertices of the swapping walk must be adjacent in C.

The figure below shows the progress of the swapping walk $(2, 1, 4, 1)$ in a cycle with 4 vertices:



You are given two configurations of coins, the initial one and the final one: for each vertex in C, which coin is initially in that vertex, and which coin should be there in the end. Find a swapping walk of minimum length which transforms the initial configuration into the final one, or determine that there is no such swapping walk.

For example, in the above figure, the length of the swapping walk $(2, 1, 4, 1)$ is 3. However, the final configuration can also be achieved by the swapping walk $(1, 2)$ with length 1.

Input

The input starts with a line containing one integer n $(1 \leq n \leq 3000)$, the length of the cycle C.

The second line contains n integers between 1 and n (not necessarily distinct): the numbers on the coins initially placed in vertices $1, 2, \ldots, n$.

The third line contains n integers between 1 and n (not necessarily distinct): the numbers on the coins that have to be in vertices $1, 2, \ldots, n$ in the end.

Output

Print exactly one line. The line should contain the minimum length of a swapping walk that transforms the initial configuration of coins into the final one. If there is no such swapping walk, print -1 instead.

Examples

standard input	standard output
4 4 3 2 1 3 4 2 1	1
6 2 1 1 2 2 1 1 2 2 2 1 1	7
6 4 1 3 6 2 5 6 2 1 3 4 5	-1