Problem A – Ants on a Ring

Author: Arthur Nascimento, Brasil

There are N ants on a circle. The circle has L spots numbered from 1 to L clockwise, with spot L adjacent to spot 1. Ants start at different spots, and want to reach different spots. To do so, in one second each ant may stay still or move around the circle to an adjacent spot (clockwise or counterclockwise).

No two ants can be at the same position on the circle at the same time, even between spots. For instance, suppose that during a second an ant moves clockwise from spot 1 to spot 2. During that second, other ants cannot do any of the following:

- Stay still at spot 2 (ants would meet at spot 2).
- Move counterclockwise from spot 3 to spot 2 (ants would meet at spot 2).
- Move counterclockwise from spot 2 to spot 1 (ants would meet between spots 1 and 2).

Determine whether it is possible for all ants to reach their targets, and if so, the minimum number of seconds required. That is, find the minimum t such that after t seconds, every ant can be at its target spot.

Input

The first line contains two integers N ($1 \leq N \leq 1000$) and L ($1 \leq L \leq 10^9$), indicating respectively the number of ants and the number of spots.

The second line contains N different integers $A_1, A_2, \ldots, A_N$ ($1 \leq A_i \leq L$ for $i = 1, 2, \ldots, N$), where A_i is the initial spot of the i-th ant.

The third line contains N different integers $B_1, B_2, \ldots, B_N$ ($1 \leq B_i \leq L$ for $i = 1, 2, \ldots, N$), such that B_i is the target spot of the i-th ant.

Output

Output a single line with an integer indicating the minimum time required for all ants to reach their targets, or the character "*" (asterisk) if it is impossible.

Sample Input 1	Sample Output 1
2 2 2 1 2 1	0

Explanation of Sample 1:

The two ants start at their target spots, so the answer is 0.

Sample Input 2	Sample Output 2
2 2 1 2 2 1	1

Explanation of Sample 2:

The two ants can move simultaneously either clockwise or counterclockwise, reaching their targets after just 1 second.

Sample Input 3	Sample Output 3
1 10 1 7	4

Sample Input 4	Sample Output 4
3 5 1 3 2 5 2 4	*

Sample Input 5	Sample Output 5
3 5 1 3 2 4 2 5	2

Explanation of Sample 5:

All three ants can move counterclockwise, with the second ant staying still for a second.