

## Problem F

### Fix the Sequence

Time limit: 2 seconds

Memory limit: 512 megabytes

#### Problem Description

Frank loves numbers and music! The best way to show his love is to compose music using numbers. One day, he received a “music sequence” from the fourth dimension. The music sequence is a sequence  $[a_1, a_2, \dots, a_n]$  of  $n$  integers where each value is between 0 and  $m$  (inclusive). He also received  $n$  positive integers  $b_1, b_2, \dots, b_n$ .

Frank can apply a series of operations to the sequence. There are three types of them:

- $inc(i)$ : He changes the value of  $a_i$  to  $a_i + b_i$ . This operation is applicable only if  $a_i + b_i \leq m$ .
- $dec(i)$ : He changes the value of  $a_i$  to  $a_i - b_i$ . This operation is applicable only if  $a_i - b_i \geq 0$ .
- $nop(i)$ : He does nothing to  $a_i$ .

We define a sequence  $[a_1, a_2, \dots, a_n]$  to be *beautiful* if and only if there is an index  $j$  such that:

- $1 < j < n$ ,
- $a_1 < a_2 < \dots < a_j$ , and
- $a_j > a_{j+1} > \dots > a_n$ .

For example, the sequences  $[1, 2, 3, 0]$  and  $[2, 222, 22]$  are beautiful, while  $[1, 3, 3, 1]$  and  $[2, 22, 222]$  are not. Frank’s goal is to change the sequence he received into a beautiful one. For every minute, he chooses and performs one of the operations  $inc(i)$ ,  $dec(i)$ , or  $nop(i)$  for each  $i \in [1, n]$ , and stops as soon as the goal is reached.

Help Frank find out the minimum time required to make the sequence beautiful, or tell if it’s impossible.

#### Input Format

The first line contains two integers  $n$  and  $m$  separated by a space.

The second line contains  $n$  space-separated integers  $a_1, a_2, \dots, a_n$ .

The third line contains  $n$  space-separated integers  $b_1, b_2, \dots, b_n$ .

#### Output Format

Print one integer indicating the minimum number of minutes required to make the sequence beautiful. If it is impossible to do so, print  $-1$  instead.



## Technical Specification

- $3 \leq n \leq 3 \times 10^5$
- $2 \leq m \leq 10^9$
- $0 \leq a_i \leq m$  for  $i \in [1, n]$ .
- $1 \leq b_i \leq m$  for  $i \in [1, n]$ .

### Sample Input 1

```
5 10
1 2 1 2 4
1 2 3 2 1
```

### Sample Output 1

```
2
```

### Sample Input 2

```
3 222
2 22 222
200 201 200
```

### Sample Output 2

```
-1
```

## Hint

In the first sample test case, the original sequence is  $[1, 2, 1, 2, 4]$ . Frank can make it beautiful in 2 minutes:

- In the first minute, he applies  $nop(1)$ ,  $nop(2)$ ,  $inc(3)$ ,  $inc(4)$ , and  $dec(5)$ . The sequence becomes  $[1, 2, 4, 4, 3]$ .
- In the second minute, he applies  $nop(1)$ ,  $nop(2)$ ,  $inc(3)$ ,  $nop(4)$ , and  $nop(5)$ . The sequence becomes  $[1, 2, 7, 4, 3]$  which is beautiful.

In the second sample test case, it is not possible to make the sequence beautiful using the operations.