PROBLEM 6

Spaceship Shuffle

Input File: `spacein.txt`
Output File: `spaceout.txt`

Time and Memory Limits: 1 second, 1 GB

Welcome aboard, Captain! Today you are in charge of the first ever doughnut-shaped spaceship, *The Circular*. There are N cabins arranged in a circle on the spaceship. They are numbered from 1 to N in a clockwise direction around the ship. The ith and the $(i+1)$th cabins are connected. So too are cabin 1 and cabin N.

Currently the ith cabin has A_i crewmates, however the spaceship cannot depart unless there are exactly B_i crewmates in this cabin.

To achieve this, you have the power to pay crewmates to change cabins. You can pay a crewmate $1 to move to an adjacent cabin. A crewmate can be asked to move multiple times, provided that you pay them $1 each time.

What is the fewest dollars you must pay before you can depart? It is always be possible to depart.

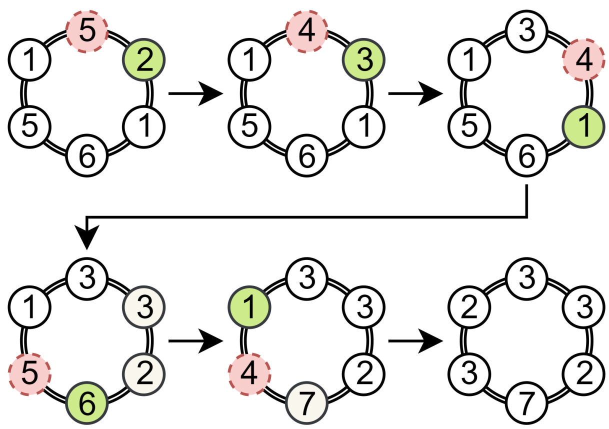

Figure 1: One possible solution to Sample Input 1, illustrated one move at a time. In each move, a crewmate moves from the red cabin (dashed) to the green cabin. Cabin 1 is the topmost one.

Input

- The first line of input contains the integer N.
- The second line of input contains N integers describing the initial number of crewmates in each cabin. They are $A_1, A_2, \ldots, A_N$.
- The third line of input contains N integers describing the desired number of crewmates in each cabin. They are $B_1, B_2, \ldots, B_N$.

Output

You program must output one integer: the fewest dollars you must pay before you can depart.

Sample Input 1

```
6
5 2 1 6 5 1
3 3 2 7 3 2
```

Sample Output 1

```
5
```

Sample Input 2

```
5
5 0 0 0 0
1 1 1 1 1
```

Sample Output 2

```
6
```

Sample Input 3

```
6
2 2 0 1 1 1
1 1 2 1 1 1
```

Sample Output 3

```
3
```

Explanation

In the first sample case, one optimal solution is to move a crewmate:

- from cabin 1 to 2
- from cabin 1 to 2
- from cabin 2 to 3
- from cabin 5 to 4
- from cabin 5 to 6.

In the second sample case, one optimal solution is to move a crewmate:

- from cabin 1 to 2
- from cabin 1 to 2
- from cabin 1 to 5
- from cabin 1 to 5
- from cabin 2 to 3
- from cabin 5 to 4.

In the third sample case, one optimal solution is to move a crewmate:

- from cabin 1 to 2
- from cabin 2 to 3
- from cabin 2 to 3.

Subtasks & Constraints

For all subtasks:

- $2 \leq N \leq 100\,000$.
- $0 \leq A_i, B_i \leq 100\,000$ for all i.
- $A_1 + A_2 + \cdots + A_N = B_1 + B_2 + \cdots + B_N$.

Additionally:

- For Subtask 1 (20 marks), $A_i = 0$ for all $i \geq 2$. That is, all crewmates start in cabin 1.
- For Subtask 2 (35 marks), there is an optimal solution where no crewmates move between cabin 1 and cabin N.
- For Subtask 3 (35 marks), $N \leq 1000$.
- For Subtask 4 (10 marks), no special constraints apply.