Problem 2: A generalized jug problem

This assignment should be done by your lab group

– Using you group login Submit your code to mooshak
  http://deei-mooshak.ualg.pt/~jvo/ Problem C up to:

  November 16, 2021 – 17h30

– A submission will remain *pending* until validated by the Instructor during the lab class. Only *final* submissions will be considered for evaluation. Deadline for validation:

  November 30, 2021 – 17h30

Problem

In the current version of the problem you are given a number of jugs, say n, their respective capacities; an initial configuration, i.e., a certain amount of water in each jug, that can be zero, and a final one. All the other conditions of Problem 1 still apply.

Task
Your task is to write a program that, based on the approach followed in Tutorial 1, returns the minimum number of movements to transform the initial configuration into the final one.

Please note that any other approach, however meritorious it may be, will be quoted with 0 (zero).

Input
The input has now three lines. The first line has a space separated sequence of natural numbers, in descending order, representing the capacities of each jug. The second line represents the initial configuration while the last line denotes the goal configuration. In the last two lines, there is a space separated sequence of naturals representing the current quantity of the water in each one of the jugs, respectively.

All inputs are well-formed. All given instances of the problem have a (unique) solution.

Output
A natural number with the length of the shortest path found.

Sample Input 1
8 5 3
8 0 0
0 5 3

Sample output 1
2

Sample input 2
21 13 8 5 3
21 0 0 0 0
6 4 4 4 3

Sample output 2
13

Sample input 3
8 7 6 5 4 3 2 1
0 0 0 0 4 3 2 1
1 1 1 1 1 3 1 1

Sample output 3
8