Sightseeing in Kyoto

Kyoto City is a worldwide sightseeing place. It is also known as a city with grid of streets. You are now visiting Kyoto City for sightseeing. You are planning to visit a famous spot on foot. You want to arrive there as early as possible. In this task, we consider the following simplified situation.

In this city, there are H streets in the east-west direction, and W streets in the south-north direction. The shape of the city is a grid of $(H-1) \times (W-1)$ cells. The crossing of the i-th street ($1 \leq i \leq H$) from the north and the j-th street ($1 \leq j \leq W$) from the west is denoted by (i, j).

Different streets may have different width, material, and crowdedness. Your walking speed may be different for different streets. For each street, your walking speed is determined as follows.

- If you walk on the i-th street ($1 \leq i \leq H$) from the north for the unit length, it takes A_i seconds. In other words, for each c ($1 \leq c \leq W-1$), it takes A_i seconds to walk from the crossing (i, c) to the crossing $(i, c+1)$.
- If you walk on the j-th street ($1 \leq j \leq W$) from the west for the unit length, it takes B_j seconds. In other words, for each r ($1 \leq r \leq H-1$), it takes B_j seconds to walk from the crossing (r, j) to the crossing $(r+1, j)$.

In order not to destroy the beautiful landscape of Kyoto City, you are not allowed to walk outside the streets.

Now you are in the crossing $(1, 1)$. You want to walk to the crossing (H, W). Since you will be tired if you walk for long distance, you do not want to make a detour. You will not walk to the north or west direction. Under this condition, you want to arrive at the destination as early as possible.

Write a program which, given information of the streets, calculates the minimum time to walk from the crossing $(1, 1)$ to the crossing (H, W) without making a detour.

Input

Read the following data from the standard input. Given values are all integers.

H W
A_1 A_2 $\cdots$ A_H
B_1 B_2 $\cdots$ B_W

Output

Write one line to the standard output. The output should contain the minimum time (seconds) to walk from the crossing $(1, 1)$ to the crossing (H, W) without making a detour.

Constraints

- $2 \leq H \leq 100\,000$.
- $2 \leq W \leq 100\,000$.
- $1 \leq A_i \leq 1\,000\,000\,000$ $(= 10^9)$ $(1 \leq i \leq H)$.
- $1 \leq B_j \leq 1\,000\,000\,000$ $(= 10^9)$ $(1 \leq j \leq W)$.

Subtasks

1. (10 points) $H \leq 1\,000$, $W \leq 1\,000$.
2. (30 points) $A_i \leq 1\,000$ $(1 \leq i \leq H)$, $B_j \leq 1\,000$ $(1 \leq j \leq W)$.
3. (60 points) No additional constraints.

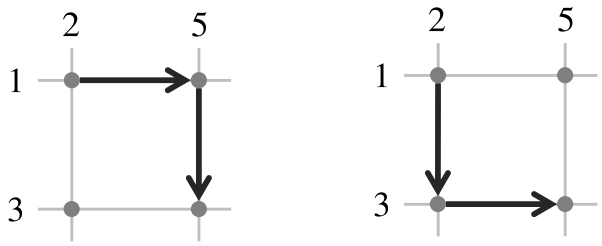
Sample Input and Output

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

There are two ways to walk from the crossing $(1, 1)$ to the crossing $(2, 2)$ without making a detour.

- Walk in the following way: crossing $(1, 1) \to (1, 2) \to (2, 2)$. It takes $A_1 + B_2 = 1 + 5 = 6$ seconds.
- Walk in the following way: crossing $(1, 1) \to (2, 1) \to (2, 2)$. It takes $B_1 + A_2 = 2 + 3 = 5$ seconds.

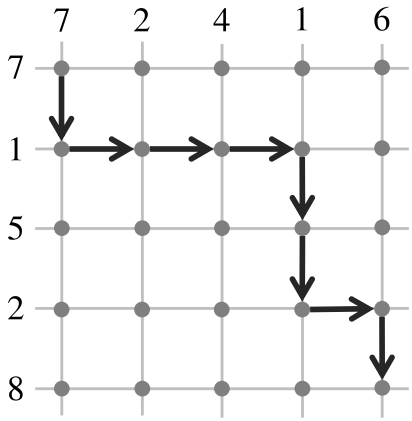
Since the minimum time is 5 seconds, output 5. These two ways are described in the following figure. An integer in the figure is the time needed to walk for the unit length on the corresponding street.



This sample input satisfies the constraints of all the subtasks.

Sample Input 2	Sample Output 2
5 5 7 1 5 2 8 7 2 4 1 6	20

For example, if you walk from the crossing $(1, 1)$ to the crossing $(5, 5)$ in the following way, it takes 20 seconds. Since it is impossible to walk in 19 seconds or less, output 20. An integer in the figure is the time needed to walk for the unit length on the corresponding street.



This sample input satisfies the constraints of all the subtasks.

Sample Input 3	Sample Output 3
4 6 454863204 543362989 866044086 813602010 71574269 17945210 688720933 392135202 38174709 168241720	2737473954

This sample input satisfies the constraints of Subtasks 1, 3.