Task 1: `Monsters`

Penguinland is an infinite number line with n monsters. The i-th monster is initially at position $a[i]$ on the number line, with health $h[i]$. It is guaranteed that no two monsters share the same initial position.

Today, Brian the penguin wishes to defeat all the monsters! To defeat them, Brian has planted k mines at certain positions. The j-th mine is located at position $x[j]$. Detonating a mine **instantly destroys all monsters** standing on that position, and each mine can be detonated any number of times. However, each detonation costs 1 dollar. It is guaranteed that no two mines are planted at the same position.

In addition to detonating mines, Brian can also perform two types of operations:

- Move a monster left or right by 1 unit along the number line.

- Increase or decrease a monster's health by 1.

Each operation costs 1 dollar to execute.

A monster is considered defeated if its health reaches 0 or if it is destroyed by a mine. Help Brian find the minimum cost (in dollars) needed to defeat all the monsters.

Input format

Your program must read from standard input.

The first line of input contains two space-separated integers n and k.

The following n lines each contain two space-separated integers. The i-th of these lines contains $a[i]$ and $h[i]$.

The last line of input contains k space-separated integers $x[1], x[2], \ldots, x[k]$.

Output format

Your program must print to standard output.

Output a single integer, the minimum cost (in dollars) needed to defeat all the monsters.

The output should contain only a single integer. Do not print any additional text such as `Enter a number` or `The answer is`.

Subtasks

For all test cases, the input will satisfy the following bounds:

- $1 \le n, k \le 200\,000$

- $1 \le a[i], x[i], h[i] \le 10^9$ for all $1 \le i \le n$

- $a[i] \ne a[j]$ for all $i \ne j$

- $x[i] \ne x[j]$ for all $i \ne j$

Your program will be tested on input instances that satisfy the following restrictions:

Subtask	Marks	Additional constraints
0	0	Sample test cases
1	14	$k = 1$
2	6	$k = 2$
3	10	$n, k \le 18$
4	30	$n, k \le 3000$
5	29	$h[i] = 10^9$
6	11	No additional constraints

Sample Test Case 1

This test case is valid for subtasks 1, 3, 4, and 6.

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

Sample Test Case 1 Explanation

There are $n = 3$ monsters and $k = 1$ mine. Brian can:

- Decrease the health of monster 1 to 0, costing 2 dollars.

- Move monster 2 to the right by 1 unit (changing its position from 4 to 5), costing 1 dollar.

- Detonate the mine at position 5, defeating both monsters 2 and 3, costing 1 dollar.

The total cost needed is $2 + 1 + 1 = 4$ dollars.

Sample Test Case 2

This test case is valid for subtasks 2, 3 and 4, and 6.

Input	Output
5 2 7 7 6 3 10 4 4 4 9 1 7 10	7

Sample Test Case 2 Explanation

There are $n = 5$ monsters and $k = 2$ mines. Brian can:

- Decrease the health of monster 5 to 0, costing 1 dollar.

- Detonate mine 2, defeating monster 3, costing 1 dollar.

- Move monster 2 to the right by 1 unit (changing its position from 6 to 7), costing 1 dollar.

- Move monster 4 to the right by 3 units (changing its position from 4 to 7), costing 3 dollars.

- Detonate mine 1, defeating monsters 1, 2, and 4, costing 1 dollar.

The total cost needed is $1 + 1 + 1 + 3 + 1 = 7$ dollars.

Sample Test Case 3

This test case is valid for subtasks 3, 4, and 6.

Input	Output
10 5 19 10 5 3 1 2 3 6 17 2 20 3 8 2 12 3 14 2 15 1 40 13 37 14 6	23