

The Destiny of a Great Kingdom

In the mystical realm of Camelot, where the fate of a one-dimensional kingdom hung in the balance, a fierce battle between the noble King Arthur Pendragon and the nefarious witch Morgana Pendragon was about to unfold. This was the legendary Battle of Camlann, a showdown of epic proportions, where swords clashed and destiny danced upon the single axis of existence.

Amidst this looming conflict, the great sorcerer Merlin, ever loyal to his dear friend and sovereign, secretly joined the ranks of King Arthur's valiant troops. But Merlin possessed a power beyond imagination, a spell that could move objects across the one-dimensional plane. However, this incantation came at a price, for it exacted a toll on Merlin himself, causing him to scream in agony as the distance to be traversed increased.

Morgana, the cunning and ruthless witch, hatched a devious plan to launch unidimensional fireballs from the heavens, aiming to rain destruction upon King Arthur's forces even before the battle commenced. But Merlin, gifted with foreknowledge of Morgana's wicked intentions, was prepared. He possessed the knowledge of where these fiery projectiles would descend upon the battlefield.

King Arthur's troops stood as continuous clusters, forming unbroken segments from one strategic point to the next, each denoted by $x_{start,i}$ and $x_{end,i}$. Merlin, the most powerful sorcerer in the annals of history, knew that he must move these troop clusters without detection, for revealing his magical prowess was not an option.

His mission was clear: to ensure that none of Morgana's fireballs would fall **strictly within** the boundaries of a troop cluster. In other words, Merlin's task was to orchestrate a clandestine ballet of movement, minimizing the total distance these troop clusters would need to traverse.

In this one-dimensional odyssey, where legends and magic converged, Merlin's silent scream echoed through the annals of history, for the fate of Camelot hung in the balance, and the timeless struggle between good and evil continued to unfurl along the single axis of destiny.

Input Format

The first line contains two integers: N and M , the number of troop clusters and the number of fireballs, respectively.

Each of the next N lines contain pairs of integers separated by a space, $x_{start,i}$ and $x_{end,i}$, the starting and ending x coordinates of the one-dimensional troop clusters such that $x_{end,i} > x_{start,i}$.

The last line of input contains M space separated integers denoting the coordinates y where the M fireballs will land on.

NOTE:

- All of the M fireballs will land at once.
- There may exist troop clusters that have some overlap (how is this [possible?](#)).

- Merlin has to move the troop clusters even before the fireballs start falling.

Constraints

$$1 \leq N \leq 10^6$$

$$1 \leq M \leq 10^6$$

$$-10^9 \leq x_{start}, x_{end}, y \leq 10^9$$

Output Format

A single number representing the minimum total distance of moving the troop clusters.

Sample Input 0

```
4 6
3 5
4 7
1 3
7 11
7 9 2 5 11 4
```

Sample Output 0

```
11
```

Explanation 0

Merlin moves the first troop **1** unit to the left, the second troop **5** units to the left, the third troop **1** unit to the right (moving **1** unit to the left is also possible), and the fourth troop **4** units to the right.