Problem 1. Watchmen

David's residential complex needs a watchman for each of the next m ($1 \leq m \leq 10^6$) days, days are numbered from 1 to m. The complex has n ($1 \leq n \leq 10^6$) watchmen, watchman i is only available to work from day a_i until day b_i, inclusive ($1 \leq a[i] \leq b[i] \leq m$). ¿How many of the next m days can have a watchman on duty?

Example

Input

$n = 3$ $m = 10$ $A = [1, 2, 8]$ $B = [4, 5, 9]$

Output

7

Explanation

Days 1, 2, 3, 4, 5, 8 y 9 can have a watchman. But no watchman is available on days 6, 7 y 10.

Problem 2. Count misordered pairs

Given an array a of n ($n <= 10^6$) distinct integer numbers. ¿How many pairs of indexes (i, j) are there such that $i < j$ and $a_i > a_j$?

Example

Input

$a = [1, 3, 2, 5, 4]$

Output

2

Explanation

The pairs are:

- $i = 1, j = 2, a_i = 3, a_j = 2$
- $i = 3, j = 4, a_i = 5, a_j = 4$

Problem 3. Knight

Given that we have an infinite chess board. You need to write a program to determine the minimum number of movements a Knight must do to get from coordinates (a, b) to coordinates (c, d). Note that coordinates can be negative and quite big: $-10^6 \leq a, b, c, d \leq 10^6$

Example

Input

$a = -5, b = -5, c = 5, d = 5$

Output

8

Explanation

Here is one of the possible 8 movement paths:

$(-5, -5) \rightarrow (-4, -3) \rightarrow (-2, -2) \rightarrow (0, -1) \rightarrow (1, 1) \rightarrow (3, 2) \rightarrow (4, 4) \rightarrow (3, 6) \rightarrow (5, 5)$