

Card game

Problem ID: kortlek

Nicole and Simon are playing a card game consisting of N rounds. In round i , Nicole plays a card with a number a_i written on it. Simon must respond by playing a card from his hand. If Simon's card has a value b_i , Nicole scores $|a_i - b_i|$ points. Nicole thus scores more points the farther Simon's card value is from the one Nicole played.

Given exactly which cards Nicole will play and which cards Simon has in his hand from the start, what is the minimum score Nicole can get if Simon plays optimally? If Simon has M cards, they will always play exactly M or $M - 1$ rounds, i.e., $M = N$ or $M = N + 1$.

Input

The first line contains two integers N ($1 \leq N \leq 2 \cdot 10^5$) and M ($N \leq M \leq N + 1$), the number of rounds in the game and the number of cards Simon has.

The second line contains N integers a_1, \dots, a_N ($0 \leq a_i \leq 10^9$), where a_i is the value of the card Nicole plays in round i .

The third line contains M integers b_1, \dots, b_M ($0 \leq b_i \leq 10^9$), the values of Simon's cards.

Output

Print the minimum total score Nicole gets if Simon plays optimally.

Points

Your solution will be tested on several test case groups. To get the points for a group, it must pass all the test cases in the group.

Group	Point value	Constraints
1	15	$N \leq 8$
2	25	$N \leq 2000$
3	20	$M = N$
4	40	No additional constraints.

Explanation of Samples

In example case 1, it is optimal for Simon to play the card with value 1 in the first round, and the card with value 2 in the second round. Then Nicole gets $|1 - 1| + |10 - 2| = 8$ points.

In example case 2, Simon plays the cards with values 2, 5, 1, in that order.

In example case 3, Simon plays the cards with values 4, 6, 3, 1, in that order.

Sample Input 1

2 3	8
1 10	
2 0 1	

Sample Output 1

Sample Input 2

3 3	5
4 8 1	
5 1 2	

Sample Output 2

Sample Input 3

4 5	10
6 10 6 2	
1 4 0 6 3	

Sample Output 3

Sample Input 4

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5 5
0 0 0 0 0
1000000000 1000000000 1000000000 1000000000 1000000000
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Sample Output 4

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5000000000
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