

Problem C. Coins and Boxes

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 1024 mebibytes

There are N boxes and N coins on the coordinate line. The coordinate of the i -th box is B_i , and the coordinate of the j -th coin is C_j . You are starting at the point with coordinate 0, and can move freely along the coordinate line.

If you go to a point with a coin, you can pick up that coin. You can carry as many coins as you like. If you go to a point with the box, you can utilize one coin and open the box (but you are not forced to do that). You cannot pick up the coin that was already picked up, or open the box that is already opened.

You want to open all N boxes. Find the minimum distance you need to travel to achieve your goal.

Input

The first line of input contains one integer N ($1 \leq N \leq 10^5$).

The second line contains N integers B_1, B_2, \dots, B_N . The i -th of those integers is coordinate of the i -th box ($1 \leq B_i \leq 10^9$, $B_i < B_{i+1}$ for $1 \leq i < N$).

The third line contains N integers C_1, C_2, \dots, C_N . The i -th of those integers is coordinate of the i -th coin ($1 \leq C_i \leq 10^9$, $C_i < C_{i+1}$ for $1 \leq i < N$).

Output

Print one integer: the minimum distance you need to travel to open all boxes.

Examples

| <i>standard input</i> | <i>standard output</i> |
|----------------------------|------------------------|
| 4 1 6 7 12 3 5 10 11 | 21 |
| 2 1 2 1 1000000000 | 1999999998 |