

# Wiring

Maryam is an electrical engineer. She is designing wiring on a communication tower. On the tower there are some connection points, placed at distinct heights. A wire can be used to connect any two connection points. Each connection point can be connected to an arbitrary number of wires. The are two types of connection points: red and blue.

For the purpose of this problem the tower should be viewed as a line and the connection points as blue and red points that are at non-negative integer coordinates on this line. The length of a wire is the distance between the two connection points it connects.

Your goal is to help Maryam find a wiring scheme such that:

- 1. Each connection point has at least one wire to a connection point of a different color.
- 2. The total length of the wires is minimized.

# Implementation details

You should implement the following procedure:

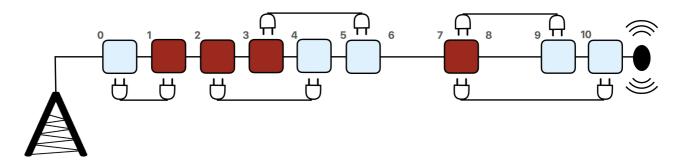
```
int64 min_total_length(int[] r, int[] b)
```

- r: array of length n containing the positions of the red connection points in increasing order.
- *b*: array of length *m* containing the positions of the blue connection points in increasing order.
- This procedure should return the minimum total length of wires, among all valid wiring schemes.
- Note that the return type of this procedure is int64.

## Example

min\_total\_length([1, 2, 3, 7], [0, 4, 5, 9, 10])

The figure below illustrates this example.



- The tower is shown horizontally.
- In the black-and-white printed version of the problem statement the red connection points are dark and the blue ones are light.
- There are 4 red connection points, located at positions 1, 2, 3, and 7.
- There are 5 blue connection points, located at positions 0, 4, 5, 9, and 10.
- One optimal solution is shown in the figure above.
- In this solution, the total length of the wires is 1 + 2 + 2 + 2 + 3 = 10, which is optimal. So, the procedure should return 10.
- Note that two wires are connected to the connection point at position 7.

### Constraints

- $1\leq n,m\leq 100\,000$ ,
- ullet  $0\leq r[i]\leq 10^{9}$  (for all  $0\leq i\leq n-1$ ),
- ullet  $0\leq b[i]\leq 10^{9}$  (for all  $0\leq i\leq m-1$ ),
- Each of the arrays *r* and *b* is sorted in ascending order.
- All n + m values in the arrays r and b are distinct.

#### Subtasks

- 1. (7 points)  $n,m\leq 200$ ,
- 2. (13 points) All red connection points have positions smaller than any blue connection points.
- 3. (10 points) There is at least one red connection point and one blue connection point among every 7 consecutive connection points.
- 4. (25 points) All connection points have different positions in the range [1, n + m].
- 5. (45 points) No additional constraints.

#### Sample grader

The sample grader reads the input in the following format:

- line 1: n m
- line 2:  $r[0] \ r[1] \ \dots \ r[n-1]$
- line 3:  $b[0] \ b[1] \ \dots \ b[m-1]$

The sample grader prints a single line containing the return value of min\_total\_length.