Practice Problem PD

Red Panda

You and your pet red panda live in a one-dimensional world. Your red panda really loves eating apples. There are N boxes (numbered from 1 to N), each containing an apple. Box i is located at point A_i. Unfortunately, all the boxes are locked. Luckily, you know the location of all keys; key i that can unlock box i is located at point B_i.

Currently, both you and your red panda are at point S. You want to gather all the apples **and bring them back** to point S for your red panda. At any time, you can carry any number of keys and apples.

The distance between two points p and q is $|p - q|$. Determine the minimum total distance you need to cover to bring all the N apples to point S.

Input

The first line consists of two integers N S ($1 \leq N \leq 100\,000; -10^9 \leq S \leq 10^9$).

Each of the next N lines consists of two integers A_i B_i ($-10^9 \leq A_i, B_i \leq 10^9$).

Output

Output a single integer representing the minimum total distance you need to cover to bring back all the N apples to point S.

Sample Input #1

```
4 2
7 9
-1 4
7 -7
1 3
```

Sample Output #1

```
36
```

Explanation for the sample input/output #1

You can bring back all the apples in 36 seconds by doing the following:

- Start at point 2.

- Go to point 3 and pick up key 4.

- Go to point 4 and pick up key 2.

- Go to point 1 and open box 4.

- Go to point -1 and open box 2.

- Go to point -7 and pick up key 3.

- Go to point 9 and pick up key 1.

- Go to point 7, open boxes 1 and 3.

- Go back to point 2.

Sample Input #2

```
1  1
1  1
```

Sample Output #2

```
0
```