Question - 1
River Records

Given an array of integers, without reordering, determine the maximum difference between any element and any prior smaller element. If there is never a lower prior element, return -1.

Example
arr = [5, 3, 6, 7, 4]

There are no earlier elements than *arr[0]*.
There is no earlier reading with a value lower than *arr[1]*.
There are two lower earlier readings with a value lower than *arr[2] = 6:*
- *arr[2] - arr[1] = 6 - 3 = 3*
- *arr[2] - arr[0] = 6 - 5 = 1*

There are three lower earlier readings with a lower value than *arr[3] = 7:*
- *arr[3] - arr[2] = 7 - 6 = 1*
- *arr[3] - arr[1] = 7 - 3 = 4*
- *arr[3] - arr[0] = 7 - 5 = 2*

There is one lower earlier reading with a lower value than *arr[4] = 4:*
- *arr[4] - arr[1] = 4 - 3 = 1*

The maximum trailing record is *arr[3] - arr[1] = 4.*

Example
arr = [4, 3, 2, 1]

No item in *arr* has a lower earlier reading, therefore return *-1*

Function Description
Complete the function *maximumTrailing* in the editor below.

maximumTrailing has the following parameter(s):
int arr[n]: an array of integers

Returns:
int: the maximum trailing difference, or *-1* if no element in *arr* has a lower earlier value

Constraints
- $1 \le n \le 2 \times 10^5$
- $-10^6 \le arr[i] \le 10^6$ and $0 \le i < n$

▼ Input Format For Custom Testing

Input from stdin will be processed as follows and passed to the function:

The first line contains a single integer, *n*, the number of elements in the array *arr*.

Each of the *n* subsequent lines contains a single integer, each an element *arr[i]* where *0 ≤ i < n*.

▼ Sample Case 0

Sample Input 0

```
STDIN         Function
-----         --------
7       →     arr[] size n = 7
2       →     arr = [2, 3, 10, 2, 4, 8, 1]
3
10
2
4
8
1
```

Sample Output

```
8
```

Explanation

Differences are calculated as:

- *3 - [2] = [1]*
- *10 - [3, 2] = [7, 8]*
- *4 - [2, 3, 2] = [2, 1, 2]*
- *8 - [4, 2, 3, 2] = [4, 6, 5, 6]*

The maximum trailing difference is *10 - 2 = 8*.

▼ Sample Case 1

Sample Input 1

```
STDIN         Function
-----         --------
6       →     arr[] size n = 6
7       →     arr = [7, 9, 5, 6, 3, 2]
9
5
6
3
2
```

Sample Output

```
2
```

Explanation

Differences are calculated as:

- *9 - [7] = 2*
- *6 - [5] = 1*

The maximum trailing difference is *2*.

Question - 2
Project Estimates

A number of bids are being taken for a project. Determine the number of distinct pairs of project costs where their absolute difference

is some target value. Two pairs are distinct if they differ in at least one value.

Example

n = 3

projectCosts = [1, 3, 5]

target= 2

There are *2* pairs *[1,3], [3,5] that* have the target difference *target = 2,* therefore a value of *2* is returned.

Function Description

Complete the function *countPairs* in the editor below.

countPairs has the following parameter(s):

int projectCosts[n]: array of integers

int target: the target difference

Returns

int: the number of distinct pairs in *projectCosts* with an absolute difference of *target*

Constraints

- $5 \leq n \leq 10^5$
- $0 <$ *projectCosts[i]* $\leq 2 \times 10^9$
- Each *projectCosts[i]* is distinct, i.e. unique within *projectCosts*
- $1 \leq target \leq 10^9$

▼ Input Format for Custom Testing

Input from stdin will be processed as follows and passed to the function.

The first line contains an integer *n*, the size of the array *projectCosts*.
The next *n* lines each contain an element *projectCosts[i]* where 0 ≤ i < n.
The next line contains the integer *target*, the target difference.

▼ Sample Case 0

Sample Input 0

```
STDIN       Function
-----       --------
5       →   projectCosts[] size n = 5
1       →   projectCosts = [1, 5, 3, 4, 2]
5
3
4
2
2       →   target = 2
```

Sample Output 0

```
3
```

Explanation 0

Count the number of pairs in *projectCosts* whose difference is *target = 2*. The following three pairs meet the criterion: *(1, 3)*, *(5, 3)*, and *(4, 2)*.

▼ Sample Case 1

Sample Input 1

```
STDIN            Function
-----            --------
10          →    projectCosts[] size n = 10
363374326   →    projectCosts = [363374326,
364147530, 61825163, 107306571, 128124602,
139946991, 428047635, 491595254, 879792181,
106926279]
364147530
61825163
107306571
128124602
139946991
428047635
491595254
879792181
106926279
1           →    target = 1
```

Sample Output 1

```
0
```

Explanation 1

Count the number of pairs in p*rojectCosts* whose difference is target *= 1*. Because no such pair of integers exists, return *0*.

▼ Sample Case 2

Sample Input 2

```
STDIN      Function
-----      --------
6      →   projectCosts[] size n = 6
2      →   projectCosts = [2, 4, 6, 8, 10, 12]
4
6
8
10
12
2      →   target = 2
```

Sample Output 2

```
5
```

Explanation 2

Count the number of pairs in *projectCosts* whose difference is *target = 2*. The following five pairs meet the criterion: *(2, 4)*, *(4, 6)*, *(6, 8)*, *(8, 10)*, and *(10, 12)*.