問題 7 – 尖峰 (Peak)

(20 分)

問題敘述

給定長度為 n 的相異元素陣列 $a_1, a_2, \ldots, a_n$。若數對 (i, j, k) 滿足$i < j < k$ 且 $a_j > a_i$, $a_j > a_k$，則我們稱此數對是一個尖峰。請計算滿足 $a_i + a_j + a_k$ 是偶數的尖峰 (i, j, k) 數量。

輸入格式

輸入有兩行。第一行有一個正整數 n，第二行有 n 個用空白分隔的正整數 $a_1, a_2, \ldots, a_n$。

輸出格式

輸出一個整數代表滿足條件的尖峰數量。

資料範圍

- $1 \leq n \leq 200000$
- $1 \leq a_i \leq 10^9$
- 若 $i \neq j$ 則 $a_i \neq a_j$

Input Example 1

```
4
1 3 4 2
```

Output Example 1

```
1
```

Input Example 2

```
5
10 20 30 40 50
```

Output Example 2

```
0
```

Input Example 3

```
5
1 2 100 3 4
```

Output Example 3

```
2
```

範例說明

範例一，總共有三個尖峰：$(1, 2, 4)$, $(1, 3, 4)$, $(2, 3, 4)$（這些數字是陣列元素位置，並不是陣列中的元素值），唯一滿足條件的尖峰位置是 $(1, 2, 4)$，對應到元素值是 $1, 3, 2$，因為 $1 + 3 + 2$是偶數，所以輸出 1。

範例二，沒有任何的尖峰。

範例三，總共有四個尖峰：$(1, 3, 4)$, $(1, 3, 5)$, $(2, 3, 4)$,$(2, 3, 5)$，元素值的和是偶數的尖峰位置有 $(1, 3, 4)$，$(2, 3, 5)$ ，所以輸出 2。

Q7: Peak

(20 points)

Description

Given an array $a_1, a_2, \ldots, a_n$ of length n. (i, j, k) is called a peak if $i < j < k$, $a_j > a_i$, and $a_j > a_k$. Please count the number of peak (i, j, k)such that $a_i + a_j + a_k$ is an even number.

Input Format

The input consists of two lines. The first line contains a single integer n, and the second line contains the array $a_1, a_2, \ldots, a_n$, with the numbers separated with a single space.

Output Format

Output an integer, which is the number of peaks that satisfy the requirement.

Data Range

- $1 \leq n \leq 200000$
- $1 \leq a_i \leq 10^9$
- if $i \neq j$, then $a_i \neq a_j$

Input Example 1

```
4
1 3 4 2
```

Output Example 1

```
1
```

Input Example 2

```
5
10 20 30 40 50
```

Output Example 2

```
0
```

Input Example 3

```
5
1 2 100 3 4
```

Output Example 3

```
2
```

Example Explanation:

For example 1, there are 3 peaks – $(1, 2, 4)$, $(1, 3, 4)$, $(2, 3, 4)$ (the numbers here are the indices, not the element of the array), and the only peak that has an even sum is $(1, 2, 4)$, which corresponds to the numbers $1, 3, 2$, as $1 + 3 + 2$ is an even number.
For example 2, there are no peaks in the array.
For example 3, all peaks involves the middle element, 100, and we have to choose an element on the left and an element on the right that sums to an even number. There are two possible ways.