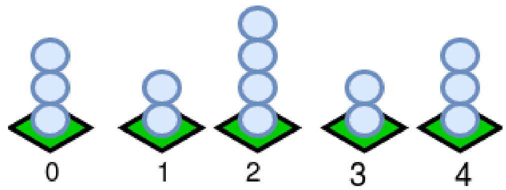
What Are the Odds?

HackerRank

Nim is a famous two-player algorithm game with the following basic rules:

- The game starts with n piles of stones indexed from 0 to $n-1$. Each pile i (where $0 \leq i < n$) has s_i stones. The diagram below shows an example:

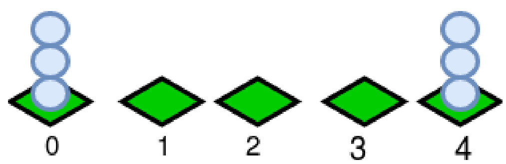


- The players move in alternating turns. During each move, the current player must remove one or more stones from a single pile.
- The first player who is unable to remove a stone (e.g., a stone can't be removed if all piles are already empty) loses the game.

Alice and Bob decided to add the following *special move* before starting a game of Nim:

- Alice selects two indices, b and e, such that $0 \leq b \leq e \leq n-1$.
- Remove all the piles in the between index b and index e. Note that the number of removed piles can be anywhere from 1 to n.

For example, If Alice selects $b = 1$ and $e = 3$, the set of piles of the diagram above would look like this:



After Alice makes the special move, Bob starts a game of Nim as its first player. They both play optimally, meaning they will not make a move that causes them to lose the game if some better, winning move exists.

Given the number of stones in each pile, find the number of ways Alice can select b and e to ensure she wins the game.

Input Format

There are two lines of input:

1. An integer, n, denoting the number of piles.
2. n space-separated integers describing the respective values of $s_0, s_1, \ldots, s_{n-1}$.

Constraints

- $1 \leq n \leq 5 \cdot 10^5$
- $1 \leq s_i \leq 10^5$

Subtasks

- $1 \le n \le 5000$ for 20% of the maximum score.

Output Format

Print the number of ways Alice can select b and e to ensure she wins the game.

Sample Input 0

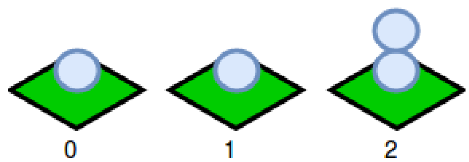
```
3
1 1 2
```

Sample Output 0

```
2
```

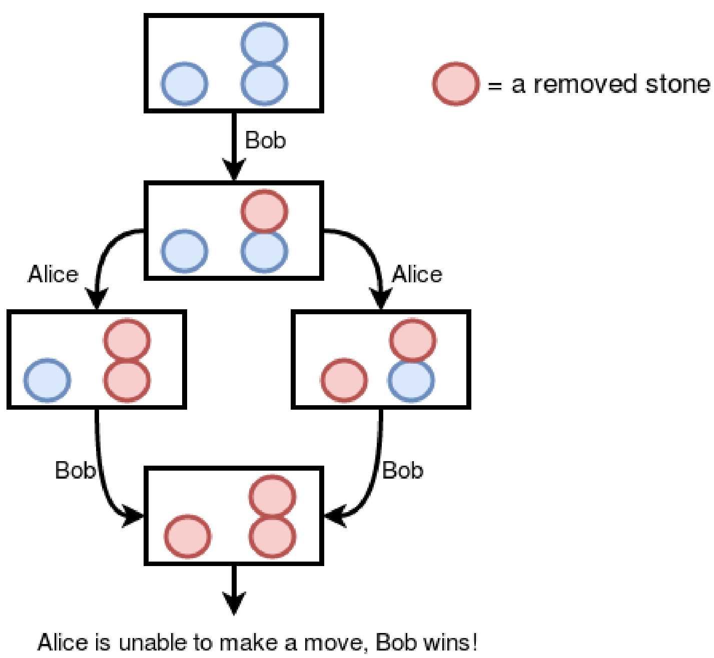
Explanation 0

There are $n = 3$ piles that look like this:



Alice can remove piles in the following six ways:

1. $[b, e] = [0, 0]$ and they are left with one pile of size 1 and one pile of size 2. The following figure shows that Bob will win the game.



1. $[b, e] = [1, 1]$ and again they are left with one pile of size 1 and one pile of size 2. They play the same as in scenario 1 (so Bob wins).

2. $[b, e] = [2, 2]$ and they're left with two piles, each of size 1. Bob starts the game by removing 1 stone from either pile, leaving one pile of size 1. Alice then removes the stone from the last pile and wins.
3. $[b, e] = [0, 1]$ and they're left with just one pile of size 2. Bob starts the game by removing both stones and wins.
4. $[b, e] = [1, 2]$ and they're left with just one pile of size 1. Bob starts the game by removing the last stone and wins.
5. $[b, e] = [0, 2]$ and they don't have any piles remaining. Bob is unable to make a move and so Alice wins the game.

Because there are two ways for Alice to win the game, we print 2 as our answer.

Sample Input 1

```
4
1 2 3 4
```

Sample Output 1

```
2
```