Problem 3096: Minimum Levels to Gain More Points

Problem Information

Difficulty: Medium
Acceptance Rate: 39.77%
Paid Only: No
Tags: Array, Prefix Sum

Problem Description

You are given a binary array `possible` of length `n`.

Alice and Bob are playing a game that consists of `n` levels. Some of the levels in the game are **impossible** to clear while others can **always** be cleared. In particular, if `possible[i] == 0`, then the `ith` level is **impossible** to clear for **both** the players. A player gains `1` point on clearing a level and loses `1` point if the player fails to clear it.

At the start of the game, Alice will play some levels in the **given order** starting from the `0th` level, after which Bob will play for the rest of the levels.

Alice wants to know the **minimum** number of levels she should play to gain more points than Bob, if both players play optimally to **maximize** their points.

Return _the**minimum** number of levels Alice should play to gain more points_. _If this is**not** possible, return_ `-1`.

Note that each player must play at least `1` level.

Example 1:

Input: possible = [1,0,1,0]

Output: 1

Explanation:

Let's look at all the levels that Alice can play up to:

* If Alice plays only level 0 and Bob plays the rest of the levels, Alice has 1 point, while Bob has -1 + 1 - 1 = -1 point. * If Alice plays till level 1 and Bob plays the rest of the levels, Alice has 1 - 1 = 0 points, while Bob has 1 - 1 = 0 points. * If Alice plays till level 2 and Bob plays the rest of the levels, Alice has 1 - 1 + 1 = 1 point, while Bob has -1 point.

Alice must play a minimum of 1 level to gain more points.

Example 2:

Input: possible = [1,1,1,1,1]

Output: 3

Explanation:

Let's look at all the levels that Alice can play up to:

* If Alice plays only level 0 and Bob plays the rest of the levels, Alice has 1 point, while Bob has 4 points. * If Alice plays till level 1 and Bob plays the rest of the levels, Alice has 2 points, while Bob has 3 points. * If Alice plays till level 2 and Bob plays the rest of the levels, Alice has 3 points, while Bob has 2 points. * If Alice plays till level 3 and Bob plays the rest of the levels, Alice has 4 points, while Bob has 1 point.

Alice must play a minimum of 3 levels to gain more points.

Example 3:

Input: possible = [0,0]

Output: -1

Explanation:

The only possible way is for both players to play 1 level each. Alice plays level 0 and loses 1 point. Bob plays level 1 and loses 1 point. As both players have equal points, Alice can't gain more points than Bob.

Constraints:

* `2 <= n == possible.length <= 105` * `possible[i]` is either `0` or `1`.

Code Snippets

C++:

```
class Solution {
public:
int minimumLevels(vector<int>& possible) {

}
};
```

Java:

```
class Solution {
public int minimumLevels(int[] possible) {

}
}
```

Python3:

```
class Solution:
def minimumLevels(self, possible: List[int]) -> int:
```