

775. Global and Local Inversions

Difficulty:Medium

- Total Accepted:3.1K
- Total Submissions:10.6K
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We have some permutation A of $[0, 1, \dots, N - 1]$, where N is the length of A.

The number of (global) inversions is the number of $i < j$ with $0 \leq i < j < N$ and $A[i] > A[j]$.

The number of local inversions is the number of i with $0 \leq i < N$ and $A[i] > A[i+1]$.

Return `true` if and only if the number of global inversions is equal to the number of local inversions.

Example 1:

Input: A = [1,0,2]

Output: true

Explanation: There is 1 global inversion, and 1 local inversion.

Example 2:

Input: A = [1,2,0]

Output: false

Explanation: There are 2 global inversions, and 1 local inversion.

Note:

- A will be a permutation of $[0, 1, \dots, A.length - 1]$.
 - A will have length in range $[1, 5000]$.
 - The time limit for this problem has been reduced.
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Seen this question in a real interview before?

All local inversions are global inversions.

If the number of global inversions is equal to the number of local inversions, it means that all global inversions in permutations are local inversions.

It also means that we can not find $A[i] > A[j]$ with $i+2 \leq j$.

In other words, $\max(A[i]) < A[i+2]$

In this first solution, I traverse A and keep the current biggest number `cmax`. Then I check the condition `cmax < A[i+2]`

Here come this solutions:

```
bool isIdealPermutation(vector<int>& A) {  
    int cmax = 0, n = A.size();  
    for (int i = 0; i < n - 2; ++i) {  
        cmax = max(cmax, A[i]);  
        if (cmax > A[i + 2]) return false;  
    }  
    return true;  
}
```