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154. Find Minimum in Rotated Sorted Array II

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Notes

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Suppose an array of length n sorted in ascending order is **rotated** between 1 and n times. For example, the array `nums = [0,1,4,4,5,6,7]` might become:

- `[4,5,6,7,0,1,4]` if it was rotated 4 times.
- `[0,1,4,4,5,6,7]` if it was rotated 7 times.

Notice that **rotating** an array `[a[0], a[1], a[2], ..., a[n-1]]` 1 time results in the array `[a[n-1], a[0], a[1], a[2], ..., a[n-2]]`.

Given the sorted rotated array `nums` that may contain **duplicates**, return *the minimum element of this array*.

You must decrease the overall operation steps as much as possible.

Example 1:

Input: `nums = [1,3,5]`
Output: `1`

Example 2:

Input: `nums = [2,2,2,0,1]`
Output: `0`

Constraints:

- $n == \text{nums.length}$
- $1 \leq n \leq 5000$
- $-5000 \leq \text{nums}[i] \leq 5000$
- `nums` is sorted and rotated between 1 and n times.

Follow up: This problem is similar to Find Minimum in Rotated Sorted Array (<https://leetcode.com/problems/find-minimum-in-rotated-sorted-array/description/>), but `nums` may contain **duplicates**. Would this affect the runtime complexity? How and why?

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```
1 class Solution {
2     public int findMin(int[] arr) {
3         int pivot = findPivot(arr);
4         return arr[pivot+1];
5     }
6     static int findPivot(int[] nums){
7         int start = 0;
8         int end = nums.length-1;
9         while(start<=end){
10             int mid = start + (end - start)/2;
```

11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38

```
        if(mid<end && nums[mid]>nums[mid+1]){
            return mid;
        }
        if(mid>start && nums[mid]<nums[mid-1]){
            return mid-1;
        }
        if(nums[start]==nums[mid] && nums[mid]==nums[end]){
            if(start<end && nums[start]>nums[start+1]){
                return start;
            }
            start++;
            if(end>start && nums[end]<nums[end-1]){
                return end-1;
            }
            end--;
        }
        else if(nums[start] < nums[mid] || (nums[start] == nums[mid] && nums[mid] > nums[end])) {
            start = mid + 1;
        }
        else {
            end = mid - 1;
        }
    }
    return -1;
}
```

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Notes

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Check out our solution!

Reveal Solution (/articles/find-minimum-in-rotated-sorted-array-ii/)

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