1. 135. A peak element is an element that is strictly greater than its neighbors. Given a 0-indexed integer array nums, find a peak element, and return its index. If the array contains multiple peaks, return the index to any of the peaks. You may imagine that nums[-1] = nums[n] = -∞. In other words, an element is always considered to be strictly greater than a neighbor that is outside the array. You must write an algorithm that runs in O(log n) time.

   Example 1:
   Input: nums = [1,2,3,1]
   Output: 2

Code:

```
def find_peak_element(nums):
    left, right = 0, len(nums) - 1

    while left < right:
        mid = (left + right) // 2
        if nums[mid] < nums[mid + 1]:
            left = mid + 1
        else:
            right = mid

    return left

nums = [1, 2, 3, 1]
print("Peak element index:", find_peak_element(nums))  # Output: 2
```

output:

```
PS C:\Users\karth>
PS C:\Users\karth> & C:/Users/karth/AppData/Local/Programs/Python/Python312/python.exe c:/Users/karth/OneDrive/Documents/OriginLab/problems.py
Peak element index: 2
PS C:\Users\karth>
```

Time complexity:f(n)=o(n)