414. Third Maximum Number

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Given a **non-empty** array of integers, return the **third** maximum number in this array. If it does not exist, return the maximum number. The time complexity must be in O(n).

Notes

Example 1:

```
Input: [3, 2, 1]

Output: 1

Explanation: The third maximum is 1.
```

Example 2:

```
Input: [1, 2]

Output: 2

Explanation: The third maximum does not exist, so the maximum (2) is returned instead.
```

Example 3:

```
Input: [2, 2, 3, 1]

Output: 1

Explanation: Note that the third maximum here means the third maximum distinct number.
Both numbers with value 2 are both considered as second maximum.
```

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C++

```
class Solution {
public:
    int thirdMax(vector<int>& nums) {
        if(nums.empty()) return 0;
        int q[4];
        int size = 0;
        for(int n:nums){
            bool find = false;
            for(int i=0;i<size;i++)
                if(q[i]==n){
                    find=true;
                    break;
                }
            if(!find){
                q[size++] = n;
                for(int i=size-1;i>0;i--){
                    if(q[i]>q[i-1]) swap(q[i],q[i-1]);
                    else break;
                }
                if(size==4) size--;
            }
        }
        if(size==3) return q[2];
        else return q[0];
    }
};
```

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