题目来源 https://leetcode.com/problemset/algorithms/

1.Two Sum

Given an array of integers, return **indices** of the two numbers such that they add up to a specific target.

You may assume that each input would have ***exactly*** one solution.

Example:

```
Given nums = [2, 7, 11, 15], target = 9,

Because nums[0] + nums[1] = 2 + 7 = 9,
return [0, 1].
```

2.Median of Two Sorted Arrays

There are two sorted arrays **nums1** and **nums2** of size m and n respectively.

Find the median of the two sorted arrays. The overall run time complexity should be O(log (m+n)).

Example 1:

```
nums1 = [1, 3]
nums2 = [2]
The median is 2.0
```

Example 2:

```
nums1 = [1, 2]
nums2 = [3, 4]
The median is (2 + 3)/2 = 2.5
```

3.Remove Element

Given an array and a value, remove all instances of that value in place and return the new length.

Do not allocate extra space for another array, you must do this in place with constant memory.

The order of elements can be changed. It doesn't matter what you leave beyond the new length.

Example:

Given input array *nums* = `[3,2,2,3]`, *val* = `3`

Your function should return length = 2, with the first two elements of *nums* being 2.

4. Remove Duplicates from Sorted Array

Given a sorted array, remove the duplicates in place such that each element appear only *once* and return the new length.

Do not allocate extra space for another array, you must do this in place with constant memory.

For example,
Given input array *nums* = `[1,1,2]`,

Your function should return length = `2`, with the first two elements
of *nums* being `1` and `2` respectively. It doesn't matter what you leave beyond the new length

5. Remove Duplicates from Sorted Array II

Follow up for "Remove Duplicates":
What if duplicates are allowed at most *twice*?

For example,
Given sorted array *nums* = `[1,1,1,2,2,3]`,

Your function should return length = `5`, with the first five elements
of *nums* being `1`, `1`, `2`, `2` and `3`. It doesn't matter what you leave beyond the new length.

6. Find All Numbers Disappeared in an Array

Given an array of integers where 1 ≤ a[i] ≤ *n* (*n* = size of array), some elements appear twice and others appear once.

Find all the elements of [1, *n*] inclusive that do not appear in this array.

Could you do it without extra space and in O(*n*) runtime? You may assume the returned list does not count as extra space.

Example:

```
Input:
[4,3,2,7,8,2,3,1]

Output:
[5,6]
```

7. Max Consecutive Ones

Given a binary array, find the maximum number of consecutive 1s in this array.

```
Input: [1,1,0,1,1,1]
Output: 3
Explanation: The first two digits or the last three digits are consecutive 1s.
    The maximum number of consecutive 1s is 3.
```

Note:

- The input array will only contain `0` and `1`.
- The length of input array is a positive integer and will not exceed 10,000

8. Find All Duplicates in an Array

Given an array of integers, 1 ≤ a[i] ≤ *n* (*n* = size of array), some elements appear **twice** and others appear **once**.

Find all the elements that appear **twice** in this array.

Could you do it without extra space and in O(*n*) runtime?

Example:

```
Input:
[4,3,2,7,8,2,3,1]

Output:
[2,3]
```

9. Third Maximum Number

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).

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.
```

10. Teemo Attacking

In LLP world, there is a hero called Teemo and his attacking can make his enemy Ashe be in poisoned condition. Now, given the Teemo's attacking **ascending** time series towards Ashe and the poisoning time duration per Teemo's attacking, you need to output the total time that Ashe is in poisoned condition.

You may assume that Teemo attacks at the very beginning of a specific time point, and makes Ashe be in poisoned condition immediately.

Example 1:

```
Input: [1,4], 2
Output: 4
Explanation: At time point 1, Teemo starts attacking Ashe and makes Ashe be poisoned imme
This poisoned status will last 2 seconds until the end of time point 2.
And at time point 4, Teemo attacks Ashe again, and causes Ashe to be in poisoned status
So you finally need to output 4.
```

Example 2:

```
Input: [1,2], 2
Output: 3
Explanation: At time point 1, Teemo starts attacking Ashe and makes Ashe be poisoned.
This poisoned status will last 2 seconds until the end of time point 2.
However, at the beginning of time point 2, Teemo attacks Ashe again who is already in poi
Since the poisoned status won't add up together, though the second poisoning attack will
So you finally need to output 3.
```

Note:

1. You may assume the length of given time series array won't exceed 10000.
2. You may assume the numbers in the Teemo's attacking time series and his poisoning time duration per attacking are non-negative integers, which won't exceed 10,000,000.

11. Move Zeroes

Given an array `nums`, write a function to move all `0`'s to the end of it while maintaining the relative order of the non-zero elements.

For example, given `nums = [0, 1, 0, 3, 12]`, after calling your function, `nums` should be `[1, 3, 12, 0, 0]`.

Note:

1. You must do this **in-place** without making a copy of the array.
2. Minimize the total number of operations.

12. Missing Number

Given an array containing *n* distinct numbers taken from `0, 1, 2, ..., n`, find the one that is missing from the array.

For example,
Given *nums* = `[0, 1, 3]` return `2`.

Note:
Your algorithm should run in linear runtime complexity. Could you implement it using only constant extra space complexity?