

# PROBLEM SOLVING

LeetCode



# Two Sum

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## Problem Description:

<https://leetcode.com/problems/two-sum/>

## Solution:

```
class Solution {
    List<int> twoSum(List<int> nums, int target) {
        // create a Map to store the complement of each number
        var numsMap = <int, int>{};

        // iterate through the list
        for (var i = 0; i < nums.length; i++) {
            // calculate the complement of the current element
            var complement = target - nums[i];

            // if the complement is already in the map, return the
indices
            if (numsMap.containsKey(complement)) {
                return [numsMap[complement]!, i];
            }

            // otherwise, add the current number and its index to the
map
            numsMap[nums[i]] = i;
        }

        // if no solution is found, return an empty list
        return [];
    }
}
```

# Palindrome Number

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## Problem Description:

<https://leetcode.com/problems/palindrome-number/>

## Solution:

```
class Solution {
    bool isPalindrome(int x) {
        return x.toString().split('').reversed.join() == x.toString();
    }
}
```

## Roman to Integer

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### Problem Description:

<https://leetcode.com/problems/roman-to-integer/description/>

### Solution:

```
class Solution {
    int romanToInt(String s) {
        Map<String, int> romanSymbols = {
            'I': 1,
            'V': 5,
            'X': 10,
            'L': 50,
            'C': 100,
            'D': 500,
            'M': 1000
        };

        int result = 0;

        for (int i = 0; i < s.length; i++) {
            if (i > 0 && romanSymbols[s[i]]! > romanSymbols[s[i - 1]]!)
            {
                result += romanSymbols[s[i]]! - 2 * romanSymbols[s[i -
1]]!;
            } else {
                result += romanSymbols[s[i]]!;
            }
        }

        return result;
    }
}
```

# Longest Common Prefix

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## Problem Description:

<https://leetcode.com/problems/longest-common-prefix/description/>

## Solution:

```
class Solution {
    String longestCommonPrefix(List<String> strs) {
        if (strs.isEmpty())
            return '';
        else {
            String longestCommonPrefix = strs[0];

            for (int i = 1; i < strs.length; i++) {
                while (strs[i].indexOf(longestCommonPrefix) != 0) {
                    // remove the last letter until indexOf == 1 (There's a
match)
                    longestCommonPrefix =
                        longestCommonPrefix.substring(0,
longestCommonPrefix.length - 1);

                    // if no match & longestCommonPrefix become
                    if (longestCommonPrefix.isEmpty()) return '';
                }
            }
            return longestCommonPrefix;
        }
    }
}
```

# Valid Parentheses

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## Problem Description:

<https://leetcode.com/problems/valid-parentheses/>

## Solution:

```
class Solution {
    bool isValid(String string) {
```

```

List<String> stack = <String>[];

for (int i = 0; i < string.length; i++) {
    String bracket = string[i];

    if (bracket == '(' || bracket == '{' || bracket == '[') {
        stack.add(bracket);
    } else if (bracket == ')' && (stack.isEmpty() || stack.last != '(')) {
        return false;
    } else if (bracket == '}' && (stack.isEmpty() || stack.last != '{')) {
        return false;
    } else if (bracket == ']' && (stack.isEmpty() || stack.last != '[')) {
        return false;
    } else {
        stack.removeLast();
    }
}

return stack.isEmpty;
}

```

## Merge two sorted lists

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### Problem Description:

<https://leetcode.com/problems/merge-two-sorted-lists/description/>

### Solution:

Firstly, we choose our head, let's assume it's the first element in the first list. The first case is when the lists aren't empty (null), we take the next node of the current node is the lower node between the two nodes.

The second case is when one list of them become empty or it's already empty from the beginning, so we add all the nodes of the other list directly to the current as the nodes in the lists are already sorted.

The third case is when the two lists are empty (null) from the beginning, therefore the result is null.

```
class Solution {
    ListNode? mergeTwoLists(ListNode? list1, ListNode? list2) {
        ListNode? head = ListNode(0);
        ListNode? current = head;

        while (list1?.val != null && list2?.val != null) {
            if (list1!.val <= list2!.val) {
                current?.next = list1;
                list1 = list1.next;
            } else {
                current?.next = list2;
                list2 = list2.next;
            }

            current = current?.next;
        }

        if (list1 != null) {
            current?.next = list1;
        } else if (list2 != null) {
            current?.next = list2;
        }
        // Two lists are empty, then return null
        else {
            return null;
        }

        return head.next;
    }
}
```

## Remove duplicates from sorted array

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**Problem Description:**

<https://leetcode.com/problems/remove-duplicates-from-sorted-array/description/>

**Solution:**

We use two pointers **leftPointer** (L) and **rightPointer** (R) and make them starts from the index **1**, because the index 0 is always unique as it's the first element.

Assume we have this array [2, 3, 3, 4], we check if the current integer isn't equal to the previous integer, so at the first cycle we found that the condition isn't true so the value of the L becomes the value of the R which is the first **3** because both of them starts from index 1.

So the index of R and L increase to become 2.

In the second cycle, we found that the condition isn't true because the value of R is equal to the one previous it, so the index of R increases to become 3 and the index of L still the same (2).

In the third cycle, we found that the condition is true, therefore the value of L which equal 3 at index 2 becomes the value of R which is 4, then the value of L increases.

Now if we sum the times of increasing (moving) L, we'll find it's 3.

```
class Solution {
    int removeDuplicates(List<int> nums) {
        int leftPointer = 1;

        for (int rightPointer = 1; rightPointer < nums.length;
rightPointer++) {
            if (nums[rightPointer] != nums[rightPointer - 1]) {
                nums[leftPointer] = nums[rightPointer];
                leftPointer += 1;
            }
        }

        return leftPointer;
    }
}
```





