

## Easy-Level Questions

1. Write a function to check the grade of a student based on the score:

- 90-100: A
- 80-89: B
- 70-79: C
- 60-69: D
- Below 60: F

2. Write a function to determine whether a given number is positive, negative, or zero.

3. Write a function that takes three sides of a triangle and checks whether the triangle is equilateral, isosceles, or scalene.

4. Write a function to check whether a given character is a vowel or consonant.

5. Write a function that checks if a person is eligible to vote. The person is eligible if they are 18 years old or older.

6. Write a function that checks if a username and password match predefined values. If the username is "admin" and the password is "1234", print "Login successful"; otherwise, print "Login failed."

7. Write a function that simulates a traffic light system. The function should take the current light color (red, yellow, green) as input and print the corresponding action:

- "red" → "Stop"
- "yellow" → "Slow down"
- "green" → "Go"

8. Find the Average of an Array.

9. Sort an Array in Ascending Order **Example**: Input: `nums = [4, 2, 8, 5, 1]`; Output: `nums = [1, 2, 4, 5, 8]`.

10. Given an array of integers, count how many numbers are even and how many are odd.

**Example**

- **Input**: `[1, 2, 3, 4, 5]`
- **Output**: Even: 2, Odd: 3

11. Remove duplicate elements from the array `arr = [1, 2, 2, 3, 4, 4, 5]` and print the updated array.

12. Add the number 6 to the end of the array `arr = [1, 2, 3, 4, 5]` and print the updated array.

13. Check if the array `arr = [1, 2, 3, 4, 5]` contains the number `3` and print `true` or `false`.

14. Add Element to the Beginning of an Array **Example**:  
Input: `nums = [1, 2, 3, 4]`; Output: `nums = [0,1,2,3,4]`.

15. Remove the Last element Input: `nums = [1, 2, 3, 4,5]`; Output: `nums = [1,2,3,4]`.

16. Check if all the elements in `arr = [3, 5, 9, 1, 7]` are positive numbers, and print `true` or `false`.

17. Count how many positive and negative numbers are in `arr = [1, -2, 3, -4, 5, -6]` and print the result.

18. Print all elements that are at even indexes in the array `arr = [10, 20, 30, 40, 50]`.

19. Check if the array `arr = [1, 2, 3, 4, 5]` is sorted in ascending order, and print `true` or `false`.

20. Find and print the difference between the maximum and minimum elements in `arr = [80, 30, 70, 50, 20]`.

21. Write a program to convert a given string to uppercase.**Example**: Input: `"hello"`, Output: `"HELLO"`.

22. Write a program to find the length of a given string.

23. Write a program to concatenate two given strings. **Example:** Input: ("hello", "world"), Output: "hello world".

24. Write a program to remove whitespace from both ends of a string. **Example:** Input: " hello ", Output: "hello".

25. Write a program to split a string into an array of words.

26. Write a program to check if a string ends with a specific character. **Example:** Input: ("codinggita", "a"), Output: true.

27. Write a program to extract the file extension from a given filename. **Example:** Input: "document.pdf", Output: "pdf".

28. Write a function that takes two numbers and prints the largest one.

29. Write a program to find all pairs in an array whose sum is equal to a given number.

**Example 1:** Input: `nums = [2,7,11,15]`, `target = 9` , Output: `[0,1]`.

30. Write a program to input an integer '**n**' and print the sum of all its even digits and the sum of all its odd digits separately. **Example :** Input: '**n**' = `132456`, Output: `12, 9`

**Explanation:**

**The sum of even digits** =  $2 + 4 + 6 = 12$

**The sum of odd digits** =  $1 + 3 + 5 = 9$

31. Write a program to repeat a string a specified number of times.**Example:** Input: `("hello", 3)`, Output:

`"hellohellohello"`.

32. Write a program that categorizes a person's age group based on the given age:

- Less than 13: "Child"
- Between 13 and 19: "Teenager"
- Between 20 and 59: "Adult"
- 60 and above: "Senior"

33. Write a program that takes a year as input and checks whether it is a century year (a year divisible by 100).
34. Access and print the first and last element of the array `arr = [10, 20, 30, 40, 50]`.
35. Print an inverted right-angled triangle pattern with `n` rows.
36. Print a pyramid pattern with `n` rows.
37. Given a sorted array and a target value, return the starting and ending position of that target in the array.**Example:Input:** `[5, 7, 7, 8, 8, 10]`, **target=8** ,**Output:** `[3, 4]`
38. Given a temperature in Celsius, convert it to Fahrenheit. **Example:Input:** `0` **Output:** `32`.
39. Given a string, check if all brackets are closed properly. **Example:Input:** `"{[()]}"`  
**Output:** `true`

40. Given two numbers, generate an array containing all numbers between them (inclusive). **Example: Input: 1,5 Output: [1, 2, 3, 4, 5]**

41. Given a valid IP address, you are asked to return a defanged version of that IP address. A defanged IP address replaces every period "." with "[.]".

**Example1:Input: address = "1.1.1.1" Output: "1[.]1[.]1[.]1"**

**Example2:Input: address = "255.100.50.0" output: "255[.]100[.]50[.]0"**

42. Given two lists of events. Each event is represented by a start time and an end time. You need to **determine if the two events conflict**, which means if the events overlap in time.

### **Input Format:**

- Each event is represented by a list **[start, end]**, where **start** is the start time (inclusive) and **end** is the end time (exclusive).
- The events are represented as two arrays: **event1** and **event2**.

### **Output:**

- Return **true** if there is a conflict between the two events; otherwise, return **false**.

**Example 1:** Input: **event1** = [1, 5], **event2** = [5, 10]  
Output: **false**, **Example 2:** Input: **event1** = [1, 5], **event2** = [2, 3] Output: **true**.

43. The "Max Consecutive Ones" problem is a common algorithmic challenge that involves finding the maximum number of consecutive 1s in a binary array.

**Problem Statement** Given a binary array, find the maximum number of consecutive 1s in the array.

### Example

- **Input:** [1, 1, 0, 1, 1, 1]
- **Output:** 3 (the longest sequence of 1s is 111)

44. Given a string, return all possible substrings of that string. This includes all substrings of every length, from length 1 to the length of the string itself.

### Example:

- **Input:** "abc"
- **Output:** ["a", "ab", "abc", "b", "bc", "c"]

45. Given a sentence, return the longest word in it.



- **Input:** "I love programming in JavaScript"
- **Output:** "programming"

46. Given a string, return the index of the first repeating character. If no character repeats, return -1.

- **Input:** "hello"
- **Output:** 2 (because 'l' repeats first)
- **Input:** "abcdef"
- **Output:** -1

47. Given an array of integers, find the first element that repeats. If no element repeats, return -1.

- **Input:** [10, 5, 3, 4, 3, 5, 6]
- **Output:** 5

48. Given a string, return a new string with all vowels removed.

- **Input:** "hello"
- **Output:** "hll"

49. Given an array and two indices, swap the elements at those indices.

- **Input:** `arr = [1, 2, 3, 4], i = 1, j = 3`
- **Output:** `[1, 4, 3, 2]`

50. Given a string and a character, count how many times the character appears in the string.

- **Input:** `str = "hello world", char = "o"`
- **Output:** `2`

51. Given two arrays, one containing keys and the other containing values, create an object that combines them.

- **Input:**
  - `keys = ['name', 'age', 'city']`
  - `values = ['Alice', 30, 'New York']`

**Output:** `{name: 'Alice', age: 30, city: 'New York'}`

52. Given an array `nums`, the running sum of an array is defined as `runningSum[i] = sum(nums[0]...nums[i])`.

**Example:**

- **Input:** `nums = [1, 2, 3, 4]`

- **Output:** [1, 3, 6, 10]

- **Explanation:**

- $\text{runningSum}[0] = 1$

- $\text{runningSum}[1] = 1 + 2 = 3$

- $\text{runningSum}[2] = 1 + 2 + 3 = 6$

- $\text{runningSum}[3] = 1 + 2 + 3 + 4 = 10$

53 . Given an integer columnNumber, return *its corresponding column title as it appears in an Excel sheet*.

**For Example:**

A -> 1

B -> 2

C -> 3

...

Z -> 26

AA -> 27

AB -> 28...

**Example 1:** Input: n=28; Output: "AB"

**Example 2:** Input: n=701; Output: "ZY"

54. An ugly number is a positive integer whose prime factors only include 2, 3, and 5. Given an integer  $n$ , write a program to determine if  $n$  is an ugly number.

**Example:**

- Input:  $n = 6$ 
  - Output: true
- Input:  $n = 8$ 
  - Output: true
- Input:  $n = 14$ 
  - Output: false
- Input:  $n = 1$ 
  - Output: true

55. You are given an integer  $n$ . Your task is to write a program that determines whether  $n$  is a power of three. If  $n$  is a power of three, return true; otherwise, return false. **A number is a power of three if:**
$$n = 3^k$$

where  $k$  is a non-negative integer.

**Example:**

- **Input:**  $n = 27$ 
  - **Output:** `true` (since  $3^3=27$  and  $27^3=27$ )
- **Input:**  $n = 0$ 
  - **Output:** `false` (since no power of 3 can be 0)

56. The "**Roman to Integer**" problem requires converting a string representing a Roman numeral into its equivalent integer value. Here's a structured approach to solve it.

### Problem Summary:

- **Input:** A string  $s$  representing a Roman numeral.
- **Output:** The integer value of the Roman numeral.

### Roman Numerals:

The Roman numeral system uses the following characters:

- $I = 1$
- $V = 5$

- $X = 10$
- $L = 50$
- $C = 100$
- $D = 500$
- $M = 1000$

### Rules:

1. If a smaller numeral appears before a larger numeral, it should be subtracted (e.g.,  $IV = 4$ ,  $IX = 9$ ).
2. Otherwise, the values should be added (e.g.,  $VI = 6$ ,  $XIII = 13$ ).

57. You are given an integer array `score` of size `n` representing the scores of players. You need to return a string array `answer` of size `n` where:

- `answer[i]` is "Gold Medal" if the score of the  $i$ -th player is the highest.
- `answer[i]` is "Silver Medal" if the score of the  $i$ -th player is the second highest.

- `answer[i]` is "Bronze Medal" if the score of the *i*-th player is the third highest.
- Otherwise, `answer[i]` is the rank of the player (1-indexed).

58. Given an integer *n*, return *true* if it is a power of four. Otherwise, return *false*. An integer *n* is a power of four, if there exists an integer *x* such that  $n == 4^x$ .

**Example 1:** Input: `n = 16`, Output: `true`; **Example 2:** Input: `n = 5`, Output: `false`

## Moderate-Level Questions

1. Write a function that takes a digit (0-9) as input and returns the corresponding word. For example, input `1` should return `"one"`.
2. Write a function that takes an hour (0-23) and prints an appropriate greeting based on the time:
  - 5:00-11:59 → "Good morning"
  - 12:00-17:59 → "Good afternoon"
  - 18:00-21:59 → "Good evening"
  - 22:00-4:59 → "Good night"

3. Write a simple calculator function that takes two numbers and an operator (+, -, \*, /) as input, then returns the result of the operation.
4. Write a function that simulates a simple login system. The user has 3 attempts to input the correct password. After 3 failed attempts, the function should print "Account locked."
5. Write a function that takes three numbers as input and returns the second largest number.
6. Write a program that prints numbers from 1 to 100. But for multiples of 3, print "Fizz" instead of the number, and for multiples of 5, print "Buzz". For numbers that are multiples of both 3 and 5, print "FizzBuzz".
7. Rotate the array `arr = [1, 2, 3, 4, 5]` to the left by one position and print the updated array **Output:** `[2, 3, 4, 5, 1]`.
8. Given an array `arr = [1, 2, 3, 4, 5, 6, 7, 8, 9]` and a target sum `sum = 10`, find all pairs of numbers that add up to the sum.
9. Rotate the array `arr = [1, 2, 3, 4, 5]` by `k = 2` positions to the right .**Output:** `[4, 5, 1, 2, 3]`



10. Merge two sorted arrays `arr1 = [1, 3, 5]` and `arr2 = [2, 4, 6]` into one sorted array and print the result.

11. Given an array `arr = [1, -2, 3, -4, 5, -6]`, rearrange it so that positive and negative numbers alternate.

12. Write a program to find the maximum element in an array. **Example:** Input: `[1, 3, 5, 2, 4]`, Output: `5`.

13. Write a program to count the number of vowels in a string. **Example:** Input: `"hello"`, Output: `2`.

14. Find and print the index of the number `4` in the array `arr = [10, 20, 30, 40, 50]`.

15. Remove duplicate elements from the array `arr = [1, 2, 2, 3, 4, 4, 5]` and print the updated array.

16. Find and print the second largest element in the array `arr = [10, 20, 5, 30, 15]`.

17. Rotate the array `arr = [1, 2, 3, 4, 5]` to the right by one position and print the updated array **Output:** `[5, 1, 2, 3, 4]`.

18. Move all the zeroes in the array `arr = [1, 0, 2, 0, 3, 0, 4]` to the end.

19. Check if two strings are anagrams of each other. **Example:** Input:`let str1 = "listen"; let str2 = "silent";` output:`true`.

20. You are given a non-negative integer `n`. Your task is to calculate the difference between the product of its digits and the sum of its digits.

Specifically, you need to:

- Find the product of the digits of `n`.
- Find the sum of the digits of `n`.
- Return the difference: **(Product of digits) - (Sum of digits)**.

21. Write a program to create a new array where each element is the square of the corresponding element in the original array

**Example:** Input: `nums = [1, 2, 3, 4];`  
Output: `nums = [1,4,9,16]`.

23. You are given two strings, `word1` and `word2`. Merge the strings by adding letters in alternating order, starting with `word1`. If one string is longer than the other, append the remaining letters from the longer string to the end of the merged string. Return the merged string.

**Example:** Input: `word1="abc", word2="pqr",`  
Output: `"apbqcr"`.

24. Given two strings `s` and `t`, return `true` if `s` is a **subsequence** of `t`, or `false` otherwise. **Example 1:** Input: `s="abc", t="ahbgdc"` output: `true`, **Example 2:** input: `s="axc", t="ahbgdc"` Output: `false`.

25. Replace all negative numbers in `arr = [-1, 2, -3, 4, -5]` with zero and print the updated array. **Output:** `[0, 2, 0, 4, 0]`.

26. Given an array where each element represents the stock price on a given day, find the maximum profit that can be made by buying and then selling the stock.

**Example:** `arr = [7, 1, 5, 3, 6, 4]`, output should be 5 (buy on day 2 and sell on day 5).

27. Write a program that takes three numbers as input and prints the largest of the three using `if-else` statements.

28. Write a program to calculate the electricity bill based on the following rates:

- For the first 100 units: \$1.5 per unit
- For the next 100 units (101-200): \$2.5 per unit
- For units above 200: \$3.5 per unit

29. You are given two string arrays `word1` and `word2`. A string array is considered **equivalent** if the strings in the array concatenated form the same string. Return `true` if `word1` and `word2` are equivalent, otherwise return `false`. **Example 1: Input:** `word1 = ["ab", "c"], word2 = ["a", "bc"]` **Output:** `true`. **Example 2 :Input:** `word1 = ["a", "cb"], word2 = ["ab", "c"]` **Output:** `false`.

30. Given an integer array `nums`, find the contiguous subarray (containing at least one number) which has the largest sum and return its sum. **Example1. Input:** `nums = [-2, 1, -3, 4, -1, 2, 1, -5, 4]`, **Output:** 6 //The subarray [4, -1, 2, 1] has the largest sum = 6.

31. Given an array of characters, compress it in-place. The length after compression must be the same or smaller than the original array. Compression should be done using the following rules:

- Count consecutive repeating characters and store the character followed by the count. **Example: Input:** ["a","a","b","b","c","c","c"], **Output:** ["a","2","b","2","c","3"].

32. Given an array `nums` of  $n$  integers where  $n > 1$ , return an array `output` such that `output[i]` is equal to the product of all the elements of `nums` except `nums[i]`. **Example: Input:** [1, 2, 3, 4] **Output:** [24, 12, 8, 6].

33. Sum of Square Numbers:

**Problem Statement:** Given a non-negative integer  $c$ , determine whether there are two integers  $a$  and  $b$  such that:  $a^2 + b^2 = c$

**Example 1: Input:**  $c = 5$ ; **Output:** `true`; Explanation:  $1 * 1 + 2 * 2 = 5$ .

34. Given an array containing  $n$  distinct numbers taken from  $0$  to  $n$ , find the missing number. **Example: Input:** [3, 0, 1], **Output:** 2.

35. Given a string `word` and a character `ch`, reverse the segment of `word` that starts at the beginning and ends at the first occurrence of `ch` (inclusive). If `ch` does not exist in `word`, return `word` unchanged. **Example: Input:** `word = "abcdefd"`, `ch = "d"`, **Output:** `"dcbaef"`

36. Given a string `s`, reverse the order of characters in each word within a sentence while still preserving whitespace and initial word order. **Example: Input:** `s = "Let's take LeetCode contest"` **Output:** `"s'teL ekat edoCteeL tsetnoc"`.

### 37. Check If Array is Monotonic

**Description:** An array is considered monotonic if it is either entirely non-increasing or entirely non-decreasing. Given an array, return `true` if the array is monotonic, otherwise return `false`. **Example1: Input:** `nums = [1, 2, 2, 3]` **Output:** `true`, **example2: Input:** `nums = [1, 3, 2]` **Output:** `false`

### 38. Plus One

**Description:** You are given a large integer represented as an array of digits where each digit is in the range `[0, 9]`. The most significant digit is at the start of the array. Increment the large integer by one and return the resulting

array of digits. **Example: Input:** `digits = [1, 2, 3]` **Output:** `[1, 2, 4]`

39. Number of Students Doing Homework at a Given Time.

**Description:** You are given two integer arrays `startTime` and `endTime`, and an integer `queryTime`. The  $i$ -th student started their homework at the time `startTime[i]` and finished it at the time `endTime[i]`.

Return the number of students doing their homework at `queryTime`. More formally, return the number of students where `queryTime` lies in the interval `[startTime[i], endTime[i]]` inclusive.

**Example 1: Input:** `startTime = [1, 2, 3]`, `endTime = [3, 2, 7]`, `queryTime = 4` **Output:** 1 **Explanation:** Only the third student was doing homework at time 4.

40. You are given a list of strings `sentences`, where each sentence is a string containing words separated by spaces. Your task is to return the maximum number of words found in any single sentence.

**Example 1: Input:** `sentences = ["alice and bob love leetcode", "i think so too", "this is great thanks very much"]`  
**Output:** 6

**Explanation:** The first sentence has 5 words.

- The second sentence has 4 words.

- The third sentence has 6 words.

Thus, the maximum number of words is 6.

41. You are given an  $n \times n$  2D matrix representing an image, rotate the image by 90 degrees (clockwise). You must rotate the matrix **in-place**, which means you cannot use another 2D matrix to accomplish the rotation.

**Example:**

**Input:**  $matrix = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

**Output:**  $\begin{bmatrix} 7 & 4 & 1 \\ 8 & 5 & 2 \\ 9 & 6 & 3 \end{bmatrix}$

42. Given an integer num, repeatedly add all its digits until the result has only one digit, and return it. **Example:** Input :num = 38, Output: 2.

**Explanation:**



- **The process is like:**
  - **38  $\rightarrow$  3 + 8 = 11**
  - **11  $\rightarrow$  1 + 1 = 2**
  - **Since 2 has only one digit, return 2.**

43. To count the number of pairs in an array where the two elements are equal and their indices are divisible, we can follow this approach:

### Problem Breakdown:

- You have an array of integers, and you need to find how many pairs  $(i, j)$  satisfy:
  1. `arr[i] == arr[j]`
  2. `i < j`
  3. `i % j == 0` (index  $i$  is divisible by index  $j$ )

**Example: Input:** `nums = [3,1,2,2,2,1,3]`, `k = 2`, **Output:** 4

44. To solve the problem of counting the **Number of Employees Who Met the Target**, where you are given an array of employee performances (as integers) and a target, the goal is to count how many employees have performance equal to or greater than the target.

**Example:Input:**`hourse=[0,1,2,3,4]`,`target=2`,**Output:**3

45. Given a string  $s$ , the task is to check whether the string can be constructed by taking a substring of it and

appending multiple copies of the substring together.

**Example:**

- **Input:** `s = "abab"`
- **Output:** `true` (The string is made by repeating the substring "ab" twice)
- **Input:** `s = "aba"`
- **Output:** `false` (The string cannot be constructed from a repeated substring)

46. You are given a list of words, and you need to return the words that can be typed using letters from only one row of a **QWERTY** keyboard.

**QWERTY Keyboard Layout:**

- **Row 1:** QWERTYUIOP
- **Row 2:** ASDFGHJKL
- **Row 3:** ZXCVBNM

**Example:** **Input:** `words = ["Hello", "Alaska", "Dad", "Peace"]`,  
**Output:** `["Alaska", "Dad"]`

47. Given an integer `numRows`, return the first `numRows` of **Pascal's triangle**.

In Pascal's triangle, each number is the sum of the two numbers directly above it.

**Example:**

- Input: numRows = 5
- Output

```
[  
  [1],  
  [1,1],  
  [1,2,1],  
  [1,3,3,1],  
  [1,4,6,4,1]]
```

### Explanation:

- The first row is [1].
- The second row is formed by taking the previous row, starting and ending with 1, and the middle value is formed by summing up 1 + 1 to get [1, 1].
- Similarly, each row is formed by summing up the two numbers directly above.

48. You are given two **axis-aligned** rectangles. The first rectangle is defined by its bottom-left corner (`rec1[0]`, `rec1[1]`) and top-right corner (`rec1[2]`, `rec1[3]`). The second rectangle is defined in the same way.

Two rectangles overlap if the area of their intersection is **positive**. To be clear, two rectangles that only touch at the corner or edges do not overlap.

Return **true** if the two rectangles overlap, otherwise return **false**.

### Example 1:

- **Input:** rec1 = [0, 0, 2, 2]; rec2 = [1, 1, 3, 3], **Output:** **true**;

### Example:

- **Input:** rec1 = [0,0,1,1]; rec2 = [1, 0, 2,1]; **Output:** **false**;

49. You are given an  $m \times n$  integer grid `accounts` where `accounts[i][j]` is the amount of money the  $i$ -th customer has in the  $j$ -th bank account. Return the **wealth** that the richest customer has.

A customer's **wealth** is the sum of money they have in all their bank accounts. The richest customer is the customer that has the maximum wealth.

**Example: Input:** `accounts = [[1,5], [7,3], [3,5]]`; **Output** **=10**.

**Explanation:**

- The first customer has a wealth of  $1 + 5 = 6$ .
- The second customer has a wealth of  $7 + 3 = 10$ .
- The third customer has a wealth of  $3 + 5 = 8$ .
- The richest customer has a wealth of  $10$ .

50. A **lucky number** is defined as an element of the matrix that is the **minimum** element in its row and the **maximum** in its column.

You are given an  $m \times n$  matrix of distinct numbers. Return all lucky numbers in the matrix in **any order**

**Example: Input:** matrix =  $[[3,7,8], [9,11,13], [15,16,17]]$ ;  
**Output:** 15

**Explanation:**

- In the first row, the minimum is 3.
- In the second row, the minimum is 9.
- In the third row, the minimum is 15.
- For the numbers 3, 9, and 15, the maximum in their columns are:
  - For 3: maximum in the first column is 15.
  - For 9: maximum in the first column is 15.
  - For 15: maximum in the first column is 15.
- Hence, 15 is the only lucky number.

51. Given an integer  $n$ , break it into the sum of  $k$  positive integers, where  $k \geq 2$ , and maximize the product of those integers. Return the maximum product you can get.

**Example:**

- **Input:**  $n = 10$
- **Output:**  $36$ 
  - **Explanation:** The best way to split 10 is  $3 + 3 + 4$ , and the product of  $3 * 3 * 4 = 36$ .

52. The "**3Sum**" problem is a classic algorithmic problem where the goal is to find all unique triplets in an array that sum up to zero. Here's a step-by-step explanation of how to solve it efficiently using a two-pointer approach, along with the code.

**Problem:**

Given an integer array **nums**, return all the triplets  $[\text{nums}[i], \text{nums}[j], \text{nums}[k]]$  such that:

- $i \neq j \neq k$
- $\text{nums}[i] + \text{nums}[j] + \text{nums}[k] == 0$

The solution set must not contain duplicate triplets.

**Example:** **Input:**  $\text{nums} = [-1, 0, 1, 2, -1, -4]$ ; **Output:**  $[-1, -1, 2], [-1, 0, 1]$

53.The "**Integer to Roman**" problem requires converting an integer to its equivalent Roman numeral representation. Here's a structured approach to solving this problem.

### **Problem Summary:**

- **Input:** An integer `num` ranging from 1 to 3999.
- **Output:** A string representing the Roman numeral corresponding to the integer.

### **Roman Numerals:**

The Roman numeral system includes the following characters and their values:

- `I` = 1
- `V` = 5
- `X` = 10
- `L` = 50
- `C` = 100
- `D` = 500
- `M` = 1000

### **Special Cases:**

In Roman numerals, certain numbers are represented by subtractive notation:

- 4 = **IV** (5 - 1)
- 9 = **IX** (10 - 1)
- 40 = **XL** (50 - 10)
- 90 = **XC** (100 - 10)
- 400 = **CD** (500 - 100)
- 900 = **CM** (1000 - 100)

**Example1:** Input: **nums=9**, Output: **"IX"**, **Example2:**  
**Input: nums=1994**, Output: **"MCMXCIV"**

54. Given a string *s*, return *the number of homogenous substrings of s*. Since the answer may be too large, return it **modulo**  $10^9 + 7$ .

A string is **homogenous** if all the characters of the string are the same. A **substring** is a contiguous sequence of characters within a string.

**Example 1:** Input: **s = "abbcccaa"** Output: **13**

**Explanation:** The homogenous substrings are: "a", "b", "b", "c", "c", "c", "a", "aa", "bb", "cc", "ccc", "a", "aa" (13 in total).

**Example 1:** Input: **s = "xy"** Output: **3**

**Explanation:** The homogenous substrings are: "x", "y", "xy" (3 in total).

55. Given an integer array *nums* of **unique** elements, return *all possible Subsets (the power set)*



The solution set **must not** contain duplicate subsets.  
Return the solution in **any order**.

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

`[[],[1],[2],[1,2],[3],[1,3],[2,3],[1,2,3]]`

