

Coding Questions by Topic

Two Pointer

Write a function that takes a sorted array of integers and a target sum, and returns a pair of numbers that add up to the target. If no such pair exists, return an empty array.

Example Input: [1, 2, 3, 4, 6], target = 6

Example Output: [2, 4]

Prefix Sum

Given an array of integers, write a function to find the sum of all elements between two given indices (inclusive). Your function should preprocess the array to allow $O(1)$ time queries.

Example Input: nums = [1, 2, 3, 4, 5], queries = [(1, 3), (0, 4)]

Example Output: [9, 15]

Top K Elements

Given an unsorted array of integers, write a function to find the top k largest elements.

Example Input: nums = [3, 2, 1, 5, 6, 4], k = 2

Example Output: [5, 6]

Sliding Window

Write a function to find the length of the longest substring without repeating characters in a given string.

Example Input: "abcabcbb"

Example Output: 3

Depth First Search

Given a 2D grid representing a map of 1s (land) and 0s (water), count the number of islands. An island is surrounded by water and is formed by connecting adjacent lands horizontally or vertically.

Use DFS to solve this.

Example Input:

```
grid = [  
    [1, 1, 0, 0],  
    [1, 0, 0, 1],  
    [0, 0, 1, 1],  
    [0, 1, 0, 0]  
]
```

Example Output: 3

Breadth First Search

You are given a grid where each cell is either a wall (-1), a gate (0), or an empty room (INF, represented by a large number). Fill each empty room with the distance to its nearest gate. If it is impossible to reach a gate, leave it as INF.

Example Input:

```
grid = [  
    [INF, -1, 0, INF],  
    [INF, INF, INF, -1],  
    [INF, -1, INF, -1],  
    [0, -1, INF, INF]  
]
```

Example Output:

```
[
```

[3, -1, 0, 1],

[2, 2, 1, -1],

[1, -1, 2, -1],

[0, -1, 3, 4]

]