Problem 305: Number of Islands II

Problem Information

Difficulty: Hard
Acceptance Rate: 40.27%
Paid Only: Yes
Tags: Array, Hash Table, Union Find

Problem Description

You are given an empty 2D binary grid `grid` of size `m x n`. The grid represents a map where `0`'s represent water and `1`'s represent land. Initially, all the cells of `grid` are water cells (i.e., all the cells are `0`'s).

We may perform an add land operation which turns the water at position into a land. You are given an array `positions` where `positions[i] = [ri, ci]` is the position `(ri, ci)` at which we should operate the `ith` operation.

Return _an array of integers_ `answer` _where_ `answer[i]` _is the number of islands after turning the cell_ `(ri, ci)` _into a land_.

An **island** is surrounded by water and is formed by connecting adjacent lands horizontally or vertically. You may assume all four edges of the grid are all surrounded by water.

Example 1:

Input: m = 3, n = 3, positions = [[0,0],[0,1],[1,2],[2,1]] **Output:** [1,1,2,3] **Explanation:** Initially, the 2d grid is filled with water. - Operation #1: addLand(0, 0) turns the water at grid[0][0] into a land. We have 1 island. - Operation #2: addLand(0, 1) turns the water at grid[0][1] into a land. We still have 1 island. - Operation #3: addLand(1, 2) turns the water at grid[1][2] into a land. We have 2 islands. - Operation #4: addLand(2, 1) turns the water at grid[2][1] into a land. We have 3 islands.

Example 2:

Input: m = 1, n = 1, positions = [[0,0]] **Output:** [1]

Constraints:

* `1 <= m, n, positions.length <= 104` * `1 <= m * n <= 104` * `positions[i].length == 2` * `0 <= ri < m` * `0 <= ci < n`

Follow up: Could you solve it in time complexity `O(k log(mn))`, where `k == positions.length`?

Code Snippets

C++:

```
class Solution {
public:
vector<int> numIslands2(int m, int n, vector<vector<int>>& positions) {

}
};
```

Java:

```
class Solution {
public List<Integer> numIslands2(int m, int n, int[][] positions) {

}
}
```

Python3:

```
class Solution:
def numIslands2(self, m: int, n: int, positions: List[List[int]]) ->
List[int]:
```