

Problem 3128: Right Triangles

Problem Information

Difficulty: Medium

Acceptance Rate: 47.93%

Paid Only: No

Tags: Array, Hash Table, Math, Combinatorics, Counting

Problem Description

You are given a 2D boolean matrix `grid`.

A collection of 3 elements of `grid` is a **right triangle** if one of its elements is in the **same row** with another element and in the **same column** with the third element. The 3 elements may **not** be next to each other.

Return an integer that is the number of **right triangles** that can be made with 3 elements of `grid` such that **all** of them have a value of 1.

Example 1:

```
0 | 1 | 0 ---|---|--- 0 | 1 | 1 0 | 1 | 0 0 | 1 | 0 ---|---|--- 0 | 1 | 1 0 | 1 | 0 0 | 1 | 0 ---|---|--- 0 | 1 | 1 0 | 1  
| 0 **Input:** grid = [[0,1,0],[0,1,1],[0,1,0]]
```

Output: 2

Explanation:

There are two right triangles with elements of the value 1. Notice that the blue ones do **not** form a right triangle because the 3 elements are in the same column.

Example 2:

```
1 | 0 | 0 | 0 ---|---|--- 0 | 1 | 0 | 1 1 | 0 | 0 | 0 **Input:** grid = [[1,0,0,0],[0,1,0,1],[1,0,0,0]]
```

Output: 0

****Explanation:****

There are no right triangles with elements of the value 1. Notice that the blue ones do **not** form a right triangle.

****Example 3:****

1 | 0 | 1 ---|---|--- 1 | 0 | 0 1 | 0 | 0 1 | 0 | 1 ---|---|--- 1 | 0 | 0 1 | 0 | 0 **Input:** grid =
[[1,0,1],[1,0,0],[1,0,0]]

****Output:**** 2

****Explanation:****

There are two right triangles with elements of the value 1.

****Constraints:****

* `1 <= grid.length <= 1000` * `1 <= grid[i].length <= 1000` * `0 <= grid[i][j] <= 1`

Code Snippets

C++:

```
class Solution {
public:
    long long numberofRightTriangles(vector<vector<int>>& grid) {
        }
};
```

Java:

```
class Solution {
public long numberofRightTriangles(int[][] grid) {
        }
}
```

Python3:

```
class Solution:  
    def numberOfRightTriangles(self, grid: List[List[int]]) -> int:
```