Problem 3623: Count Number of Trapezoids I

Problem Information

Difficulty: Medium
Acceptance Rate: 32.95%
Paid Only: No
Tags: Array, Hash Table, Math, Geometry

Problem Description

You are given a 2D integer array `points`, where `points[i] = [xi, yi]` represents the coordinates of the `ith` point on the Cartesian plane.

A **horizontal** **trapezoid** is a convex quadrilateral with **at least one pair** of horizontal sides (i.e. parallel to the x-axis). Two lines are parallel if and only if they have the same slope.

Return the _number of unique_** _horizontal_ _trapezoids_** that can be formed by choosing any four distinct points from `points`.

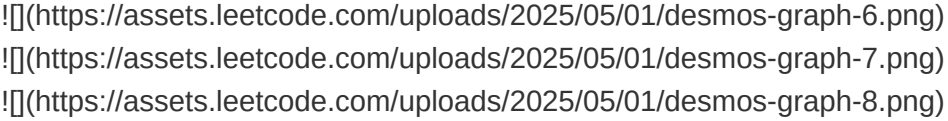
Since the answer may be very large, return it **modulo** `109 + 7`.

Example 1:

Input: points = [[1,0],[2,0],[3,0],[2,2],[3,2]]

Output: 3

Explanation:



There are three distinct ways to pick four points that form a horizontal trapezoid:

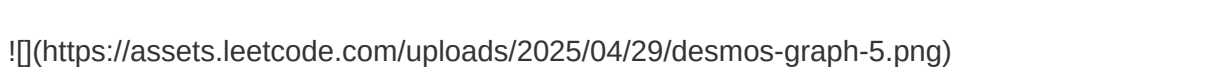
* Using points `[1,0]`, `[2,0]`, `[3,2]`, and `[2,2]`. * Using points `[2,0]`, `[3,0]`, `[3,2]`, and `[2,2]`. * Using points `[1,0]`, `[3,0]`, `[3,2]`, and `[2,2]`.

Example 2:

Input: points = [[0,0],[1,0],[0,1],[2,1]]

Output: 1

Explanation:



There is only one horizontal trapezoid that can be formed.

Constraints:

* `4 <= points.length <= 105` * `-108 <= xi, yi <= 108` * All points are pairwise distinct.

Code Snippets

C++:

```
class Solution {
public:
int countTrapezoids(vector<vector<int>>& points) {

}
};
```

Java:

```
class Solution {
public int countTrapezoids(int[][] points) {

}
}
```

Python3:

```
class Solution:
def countTrapezoids(self, points: List[List[int]]) -> int:
```