Problem 2001: Number of Pairs of Interchangeable Rectangles

Problem Information

Difficulty: Medium
Acceptance Rate: 51.97%
Paid Only: No
Tags: Array, Hash Table, Math, Counting, Number Theory

Problem Description

You are given `n` rectangles represented by a **0-indexed** 2D integer array `rectangles`, where `rectangles[i] = [widthi, heighti]` denotes the width and height of the `ith` rectangle.

Two rectangles `i` and `j` (`i < j`) are considered **interchangeable** if they have the **same** width-to-height ratio. More formally, two rectangles are **interchangeable** if `widthi/heighti == widthj/heightj` (using decimal division, not integer division).

Return _the**number** of pairs of **interchangeable** rectangles in _`rectangles`.

Example 1:

Input: rectangles = [[4,8],[3,6],[10,20],[15,30]] **Output:** 6 **Explanation:** The following are the interchangeable pairs of rectangles by index (0-indexed): - Rectangle 0 with rectangle 1: 4/8 == 3/6. - Rectangle 0 with rectangle 2: 4/8 == 10/20. - Rectangle 0 with rectangle 3: 4/8 == 15/30. - Rectangle 1 with rectangle 2: 3/6 == 10/20. - Rectangle 1 with rectangle 3: 3/6 == 15/30. - Rectangle 2 with rectangle 3: 10/20 == 15/30.

Example 2:

Input: rectangles = [[4,5],[7,8]] **Output:** 0 **Explanation:** There are no interchangeable pairs of rectangles.

Constraints:

* `n == rectangles.length` * `1 <= n <= 105` * `rectangles[i].length == 2` * `1 <= widthi, heighti <= 105`

Code Snippets

C++:

```
class Solution {
public:
long long interchangeableRectangles(vector<vector<int>>& rectangles) {

}
};
```

Java:

```
class Solution {
public long interchangeableRectangles(int[][] rectangles) {

}
}
```

Python3:

```
class Solution:
def interchangeableRectangles(self, rectangles: List[List[int]]) -> int:
```