Problem List

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# 1459. Rectangles Area

Premium

Solved

Medium | Topics | Companies

SQL Schema > Pandas Schema >

Table: `Points`

| Column Name | Type |
| --- | --- |
| id | int |
| x_value | int |
| y_value | int |

id is the column with unique values for this table.
Each point is represented as a 2D coordinate (x_value, y_value).

Write a solution to report all possible **axis-aligned** rectangles with a **non-zero area** that can be formed by any two points from the `Points` table.

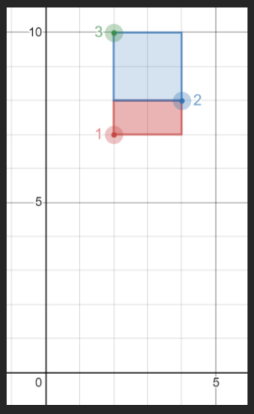
Each row in the result should contain three columns `(p1, p2, area)` where:

- `p1` and `p2` are the `id`'s of the two points that determine the opposite corners of a rectangle.
- `area` is the area of the rectangle and must be **non-zero**.

Return the result table **ordered** by `area` **in descending order**. If there is a tie, order them by `p1` **in ascending order**. If there is still a tie, order them by `p2` **in ascending order**.

The result format is in the following table.

**Example 1:**




**Input:**
Points table:

| id | x_value | y_value |
| --- | --- | --- |
| 1 | 2 | 7 |
| 2 | 4 | 8 |
| 3 | 2 | 10 |

**Output:**

| p1 | p2 | area |
| --- | --- | --- |
| 2 | 3 | 4 |
| 1 | 2 | 2 |

**Explanation:**
The rectangle formed by p1 = 2 and p2 = 3 has an area equal to |4-2| * |8-10| = 4.
The rectangle formed by p1 = 1 and p2 = 2 has an area equal to |2-4| * |7-8| = 2.
Note that the rectangle formed by p1 = 1 and p2 = 3 is invalid because the area is 0.

Seen this question in a real interview before? 1/5

Yes No

Accepted 19,769/28.8K | Acceptance Rate 68.6%

Topics

Companies

Discussion (8)



98 8 0 Online

Submit

Code

Pandas • Auto

```python
import pandas as pd

def rectangles_area(points: pd.DataFrame) -> pd.DataFrame:

    # Self join to generate all point pairs
    df = points.merge(points, how='cross', suffixes=('_1', '_2'))

    # Keep only pairs where id1 < id2 (avoid duplicates & self-pairs)
    df = df[df['id_1'] < df['id_2']]

    # Compute area
    df['area'] = (
        (df['x_value_1'] - df['x_value_2']).abs() *
        (df['y_value_1'] - df['y_value_2']).abs()
    )

    # Remove zero-area rectangles
    df = df[df['area'] > 0]

    # Select and rename columns
    result = df[['id_1', 'id_2', 'area']].rename(
        columns={'id_1': 'p1', 'id_2': 'p2'}
    )
```

Saved

Ln 6, Col 66

Testcase | Test Result

Accepted Runtime: 344 ms

Case 1

Input

Points =

| id | x_value | y_value |
| --- | --- | --- |
| 1 | 2 | 7 |
| 2 | 4 | 8 |
| 3 | 2 | 10 |

Output