E - Trapezium

Editorial (/contests/abc418/tasks/abc418_e/editorial)

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Time Limit: 4 sec / Memory Limit: 1024 MiB

Score : 475 points

Problem Statement

There are N points on a two-dimensional plane, with the i-th point at coordinates (X_i, Y_i). It is guaranteed that no two points are at the same position, and no three points are collinear.

Among the combinations of four points from these points, how many combinations can form a trapezoid as a polygon with those four points as vertices?

Constraints

- $4 \leq N \leq 2\,000$
- $0 \leq X_i, Y_i \leq 10^7$ $(1 \leq i \leq N)$
- No two points are at the same location.
- No three points are collinear.
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&N \\
&X_1 \quad Y_1 \\
&\vdots \\
&X_N \quad Y_N
\end{aligned}
$$

Output

Print the answer on one line.

Sample Input 1 Copy

Copy

```
5
0 2
0 5
1 0
2 1
2 4
```

Sample Output 1 Copy

Copy

```
3
```

The given points are arranged as shown in the figure below.

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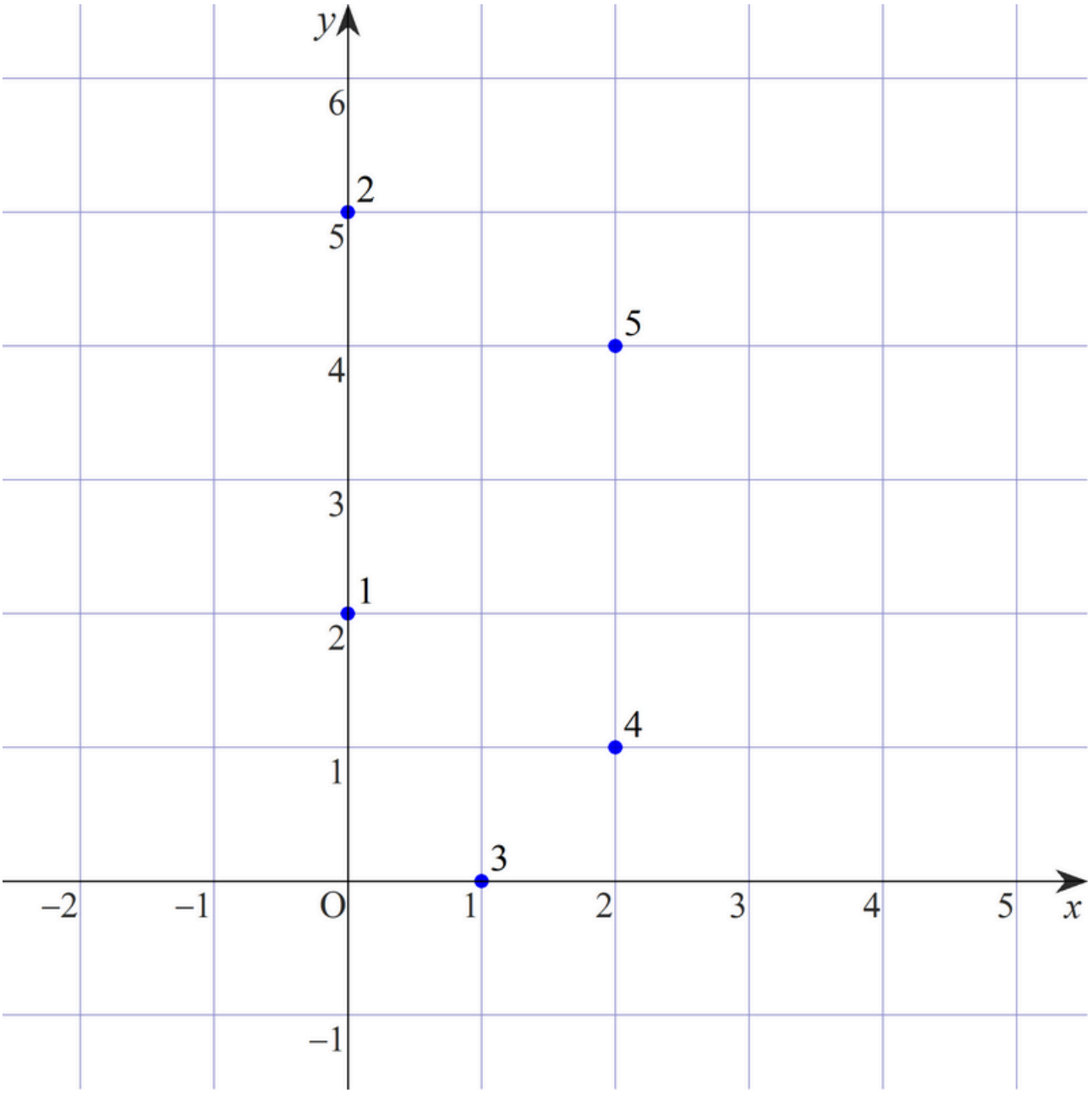

Among the combinations of four points, the following three combinations can form a trapezoid as a polygon with those points as vertices:

- The 1st, 5th, 4th, 3rd points.
- The 1st, 3rd, 4th, 2nd points.
- The 1st, 2nd, 5th, 4th points.

Note that parallelograms and rectangles are also treated as trapezoids.

Sample Input 2

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```
8
0 1
1 3
2 3
3 1
0 2
1 0
2 0
3 2
```

Sample Output 2 Copy

```
22
```
Copy

/#telegram)

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