



Problem L: Quadrilateral Classification

Time limit: 1s; Memory limit: 256 MB

Tuan has just learned about different types of quadrilaterals and wants to test his ability to recognize them.

Given N points on the Oxy coordinate plane. The points are numbered from 1 to N . Two or more initial points may share the same coordinates.

Tuan chooses a set of 4 points with distinct indices (i, j, k, l) such that $1 \leq i < j < k < l \leq N$. A set of 4 points is considered a valid quadrilateral if it simultaneously satisfies two conditions:

- The four selected points have pairwise distinct coordinates.
- No three selected points are collinear.

Each set of 4 distinct indices is counted as a separate choice, even if some points share the same coordinates.

For each valid set of 4 points, determine which types of quadrilaterals they form:

- **Square (S)**: Has 4 equal sides and 1 right angle.
- **Rectangle (R)**: Has 4 right angles.
- **Rhombus (H)**: Has 4 equal sides.
- **Trapezoid (T)**: Has at least 1 pair of parallel opposite sides.
- **Parallelogram (P)**: Has 2 pairs of parallel opposite sides.

Input

The first line contains an integer N ($4 \leq N \leq 1000$).

The next N lines, the i -th line contains two integers x_i, y_i ($-10^9 \leq x_i, y_i \leq 10^9$).

Output

Print 5 integers on a single line separated by spaces, representing the counts of S, R, H, T, and P, respectively.

Sample

Sample Input	Sample Output
5 0 0 0 1 0 1 1 0 1 1	2 2 2 2 2
4 0 0 4 0 3 2 1 2	0 0 0 1 0



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