Triangle

2024/2025 SEASON – ROUND 4

As a part of their preparation for the upcoming ICPC season, the team "They Cheated ^^^" organized an event for team bonding – football match. Vlad, Misho and Den are the heart of the attack and it is crucial to not miss passes between each other. Therefore, they generated statistics on the N most visited points on the pitch by any of the three players. The football pitch can be described as an Euclidean 2D plane – the lower left corner has coordinates (0;0).

It is important for them to derive the following: What is the area of the smallest and largest triangle or line between them, if they are positioned on points among the given ones. This way, they will enhance passing and counterattacks. Since the collection of points is not unique, they prepared T tests for you. For each test you have to find the described areas.

Input

The first line of the file **triangle.in** consists of a number T. T tests follow, each consisting of N+1 lines. First line of every test contains N – the number of points. N points with 2 integer coordinates follow: x_i y_i.

Output

Print T lines in the file **triangle.out** each containing 2 integers – the minimum and maximum area. If the absolute difference between your answer and the actual value is less than **0.01**, your answer will be considered correct.

Constraints

$1 \leq T \leq 10$

$10 \leq \sum_{i=1}^{T} n_i \leq 1500$, where n_i denotes the number of points in the i-th test.

$0 \leq |x_i|, |y_i| \leq 10^4$

Time limit: 0.3 sec.

Memory limit: 256 MB

Sample test

Input (triangle.in)	Output (triangle.out)
2 4 -5 -4 9 -1 7 0 -5 7 5 0 -7 9 8 0 -7 6 4 7 2	1 77 0 12

Sample test explanation

The minimum area in test 2 is 0 since the points with indices 1, 3 and 4 lie on the same line.