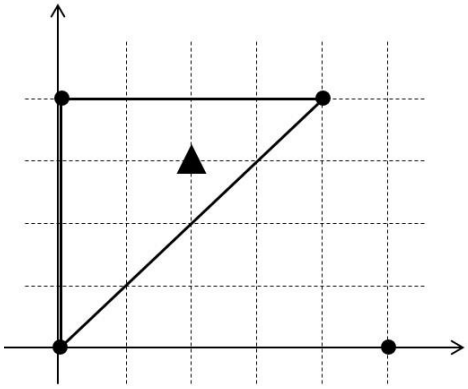
Problem L
Treasure Protection

Time Limit: 2 seconds

Memory Limit: 1024 megabytes

Recently, the very famous VNU Museum has been attracting many students and visitors from around the world. Thus, the treasures in the museum could be in danger and we have to protect them. In order for the managers of the museum to guard the treasure against stealing, they decided to install fences around all the treasures.



We can consider the museum is a convex polygon whose vertices are the corners, and the treasures are points inside the polygon. The fences that will be installed form 1 or 2 triangles (noted that the common area of these triangles is 0), and the vertices of these triangles must be the vertices of the polygon.

The managers of the museum hope that the fences cause the least inconvenience for the visitors, so the total areas of the two triangles should be as small as possible.

In other words, given n vertices on Oxy plane, which are the corners of the museum, and the position of the m treasures in the museum, find the minimum total areas of the guard regions.

Input

- The first line contains an integer t – the number of test cases. Each test case has the following structure:
  - The first line contains two integers n, m ($3 \le n \le 2000; 1 \le m \le 2000$) – the number of the corners, and the number of treasures, corresponding.
  - In the next n lines, the i^{th} line contains two integers x_i, y_i ($-10^9 \le x_i, y_i \le 10^9$), the coordinate of the i^{th} corner. They are listed in counter-clockwise direction.
  - In the next m lines, the j^{th} line contains two integers x_j, y_j $\left(-10^9 \le x_j, y_j \le 10^9\right)$, the coordinate of the j^{th} treasure.

- It is guaranteed that all the treasures are inside the museum, and there are no three collinear points among the given $n + m$ points.
- The total number of vertices in all test cases are not greater than 2000.

Output

- Print -1 if there is no possible solution.
- Otherwise, print the minimum total areas of the two guard regions. The output must contain exact 3 digits after the floating point.

Sample Input	Sample Output
3 4 1 0 0 5 0 4 4 0 4 2 3 5 3 0 0 6 -6 11 0 8 4 3 4 3 2 7 3 8 -2 8 4 -4 -4 0 -7 4 -4 6 0 4 4 0 7 -4 4 -6 0 -2 -5 2 -5 3 2 -3 2	8.000 -1 54.000