2026/2027 SOUTHERN CALIFORNIA REGIONAL INTERNATIONAL COLLEGIATE PROGRAMMING CONTEST

Problem 5
King's Folly

A king has decided to reward a loyal subject with a grant of land. The subject may draw any axis-aligned polygon on a map, and the king will grant them all of the land inside it. Not wanting to seem greedy to the king, the loyal subject has drawn a map with limited borders.

Unfortunately, the king accidentally made the same promise to another loyal subject! The second loyal subject, also not wanting to appear greedy, drew a map with limited borders as well. The king has received both of the maps and wants to know how much land was promised twice. The two recipients will share the overlapping land, and the royal treasury must pay the loyal subjects an amount proportional to the area that was double-granted.

Write a program to help the king determine how much money his mistake will cost the royal treasury by calculating the area of land that was promised to both subjects.

Each polygon is specified by listing its distinct vertices in order around its boundary. Consecutive vertices are connected by an edge, and the last vertex is connected back to the first vertex. Every edge is horizontal or vertical, and consecutive edges meet at a 90° angle. Nonconsecutive edges do not touch. The vertices have integer coordinates.

In Figure 1, the left drawing shows two overlapping rectangular land grants. The right drawing shows that the grants may not be convex.

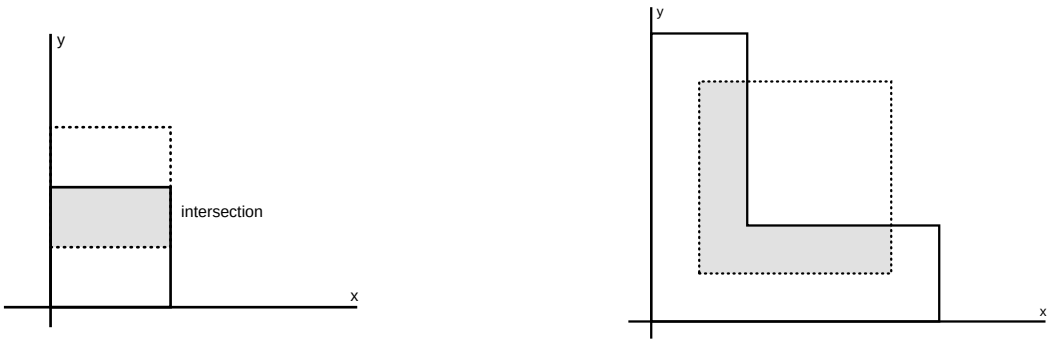


Figure 1. Drawings of the two examples in the Sample Input.

The first input line contains an integer N ($4 \le N \le 100{,}000$), the number of vertices in the first polygon. The next N lines contain the vertices of the first polygon in boundary order. Each line contains two integers x_i and y_i ($-5000 \le x_i, y_i \le 5000$). For every i from 1 through $N-1$, the edge from (x_i, y_i) to (x_{i+1}, y_{i+1}) is horizontal or vertical. The edge from the last vertex back to the first vertex is also horizontal or vertical. Consecutive edges meet at a 90° angle.

The next line contains an integer M ($4 \le M \le 100{,}000$), the number of vertices in the second polygon. The next M lines describe the second polygon in the same format.

Your program is to print one integer: the area of the intersection of the two polygons.

Problem 5
King's Folly (continued)

Sample Input 1

```
4
0 0
0 2
2 2
2 0
4
0 1
0 3
2 3
2 1
```

Output for Sample Input 1

```
2
```

Sample Input 2

```
6
0 0
0 6
2 6
2 2
6 2
6 0
4
1 1
1 5
5 5
5 1
```

Output for Sample Input 2

```
7
```