



Switch to Non-IDE mode

Contest Code: FEB222C Problem Code: PLYARSM



You are given a **convex** polygon P with N vertices. The vertices (in clockwise order) are v_1, v_2, \dots, v_N . The coordinates of v_i are (x_i, y_i) . All vertices have integer coordinates.

A *diagonal* of P is a line segment l joining two distinct vertices v_i and v_j of P , such that l is not already an edge of P . Every diagonal of P splits it into two smaller convex polygons, both having *positive* areas.

The *evenness* of a diagonal of P is the minimum of the areas of the two parts obtained when the polygon P is cut along this diagonal.

Let S be the sum of the *evenness* of all diagonals of P .

Find the value of $2S \pmod{998244353}$.

It can be shown that for all polygons P with integer coordinates, the value $2S$ is an integer.

Input Format

- The first line of input contains an integer T , denoting the number of test cases. The description of T test cases follows.
- The first line of each test case contains an integer N , the number of vertices of the convex polygon P . This is followed by N lines describing the points of the convex polygon, in **clockwise** order.
- The i^{th} subsequent line contains two space-separated **integers**, x_i, y_i — the coordinates of v_i .

Output Format

For each test case, print a new line with a single integer, the answer as per the problem statement.

Constraints

- $1 \leq T \leq 10^5$
- $3 \leq N \leq 10^5$
- The sum of N over all test cases does not exceed 10^6
- The given polygon P is convex
- Every coordinate is an integer whose absolute value does not exceed 10^8

Subtasks

Subtask #1 (5 points): Sum of N over all test cases does not exceed 500

Subtask #2 (15 points): Sum of N over all test cases does not exceed 2000

Subtask #3 (80 points): Original constraints

Sample Input 1

```
4
4
-1 0
0 1
1 0
0 -1
4
-100000 0
0 100000
```

```
100000 0
0 -100000
3
0 0
0 1
1 0
5
-87260 82619
-59348 68595
86583 -16668
85637 -45559
-49307 -31316
```

Sample Output 1

```
4
70225880
0
667956140
```

Explanation

Test case 1: The given polygon is a square with side length $\sqrt{2}$. There are only two diagonals, both are identical and split the polygon equally into two halves each with area $\frac{(\sqrt{2})^2}{2} = 1$. Thus $S = \min(1, 1) + \min(1, 1) = 2$. The value of $2S \pmod{998244353}$ is thus 4.

Test case 2: The given polygon is identical to the previous case, except that all coordinates are multiplied by 10^5 . Therefore the given sum gets multiplied by $(10^5)^2$. Make sure you output the sum modulo 998244353. Here $2S = 4 \cdot 10^{10}$ and $4 \cdot 10^{10} \pmod{998244353} = 70225880$.

Test case 3: There are no diagonals in this polygon, and so the answer is 0.

PYTH 3.6

Code gets autosaved every second

```
1 # cook your dish here
2
```

0:0

Open File

Run

Submit

Custom Input

Note: Your program will be run with no input.

Important Links of our resources & information -

Programming Tools

Online IDE

Upcoming Coding Contests

CodeChef Certifications

Hosting Contests

Problem Setting

Learning Resources

Getting Started

Practice Problems

Prepare for DSA Certification

CodeChef Discuss

CodeChef Tutorials

Initiatives

Go For Gold

CodeChef for Schools

Campus Chapters

CodeChef Goodies

More

CodeChef For Business

Contact Us

Code Of Conduct

User Ranklist

Release Notes

Privacy policy

Terms

www.codechef.com

Follow Us

