Problem L
Largest Quadrilateral

Time limit: 6 seconds
Memory limit: 1024 megabytes

Problem Description

Given some points on a 2D Euclidean plane, please calculate the maximum area of quadrilaterals with vertices in given points. For example, points $A(0,0)$, $B(1,0)$, $C(3,1)$, $D(1,2)$, $E(0,1)$ are given. These points form 5 simple quadrilaterals $ABCD$, $ABCE$, $ABDE$, $ACDE$, $BCDE$ with areas 3, 2, 1.5, 3, 3 respectively and 10 complex quadrilaterals $ABDC$, $ABEC$, $ABED$, $ACED$, $BCED$, $ACBD$, $ACBE$, $ADBE$, $ADCE$, $BDCE$ with smaller areas. So the maximum area is 3.

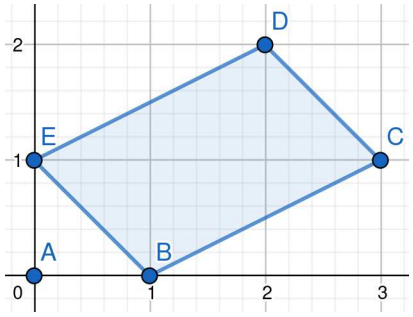


Figure 4: $BCDE$ has the maximum area 3 among all quadrilaterals.

Please notice that duplicated points may appear in the given points. All the degenerate cases are also taken as quadrilaterals such as quadrilateral $ABCD$ with $A(0,0)$, $B(0,0)$, $C(0,0)$, $D(0,0)$.

Input Format

The first line is an integer T indicating the number of test cases. The first line of each test case contains an integer N followed by N lines. Each line of the following N lines contains two integers X and Y representing a point (X, Y).

Output Format

For each test case, please output the maximum area among all quadrilaterals with vertices in given points.

Technical Specification

- $1 \leq T \leq 3$
- $4 \leq N \leq 4096$
- $0 \leq X \leq 10^9$
- $0 \leq Y \leq 10^9$
- You may not output numbers with scientific notaions. I.e., outputting `3E8` for `300000000` is not allowed.

- The area must be outputted without any redundant characters. I.e., outputting `3.0` for `3` is incorrect.

Sample Input 1

```
3
5
0 0
1 0
3 1
1 2
0 1
4
0 0
4 0
0 4
1 1
4
0 0
1 1
2 2
1 1
```

Sample Output 1

```
3
6
0
```

Sample Input 2

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

Sample Output 2

```
2.5
```