Points

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	64 megabytes

Consider n points in a 2D plane. You are required to compute the square of the minimum distance between any two of the first two points, then the first three points, and so on until the nth point.

Input

The first line will contain the integer n $(1 \leq n \leq 10^5)$.

The following n lines will each contain two integers, the two coordinates of each point.

$-10^9 <= x, y <= 10^9$ where x and y are the coordinates.

For tests worth 20 points it is guaranteed that $(1 \leq n \leq 1000)$.

Output

You will print $n - 1$ lines, each representing the square of the minimum distance between the first two, then three then four points and so on.

Example

standard input	standard output

4
1 2
3 6
9 10
1 1
	20
	20
	1

Note

The square of the distance between the first two points is $((1-3)^2 + (2-6)^2) = 20$.

The square of the distance between the third and first point is 128, and between the third and second point is 52, so the minimum distance remains 20.

The distance between the fourth and first point is 1.