Memory Limit Exceeded

Given **n** points on X-Y plane. To each point, you are to find the other point who is closest to it with respect to the Euclidean distance.

Input

T (<= 15) test cases. Each starts with an integer n (2<= n <=100000). Then n lines follow. Each contains two space-seperated integers, the X and Y coordinate of the corresponding point, respectively. No two points in one test case will coincide.

Output

For each test case, output **n** lines. The i-th of them should contain the squared distance between the i-th point from the input and its nearest neighbour.

Example

Input:

2

10

17 41

0 34

24 19 8 28

14 12

45 5

27 31

41 11

42 45

36 27

15

0 0

12

23

3 2

4 0

8 4

6 1

8 0

11 0

14 2

15 0

Output:

200

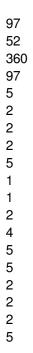
100

149

100

149

52



Warning: enormous input/output data, be careful with certain languages