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
1 2
2 3
3 2
4 0
8 4
7 4
6 3
6 1
8 0
11 0
12 2
13 1
14 2
15 0
```

Output:

```
200
100
149
100
149
52
```

97
52
360
97
5
2
2
2
5
1
1
2
4
5
5
2
2
2
5

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