

## 11529 Strange Tax Calculation

The people living in large cities have to pay more tax than people living in rural areas. That is because in cities people have many facilities, which rural people don't have. Also people in large and famous cities tend to pay more tax than people living in smaller cities or towns. Government of Euphoria now has a strange rule to decide tax rate — Tax rate of a house is proportional to the total number of houses within 1 kilometer radius of it. The rule apparently seems ok, but as a result people have started building houses 500 meters away from the main city and in this way they are enjoying all the facilities but paying much less taxes. Also in this way the town has begun to expand very quickly, which is not desirable.

So the government of Euphoria now decides to make a new tax rule which will be less (or not) understood by common people and hence it will have less chance of being manipulated. In the new rule, tax depends on the number of high rise buildings in the city and their orientation. Any three high rise building makes Bermuda block in the city and the tax depends on average number of high rise buildings per Bermuda block.



Figure 1: High-rise buildings of Euphoria

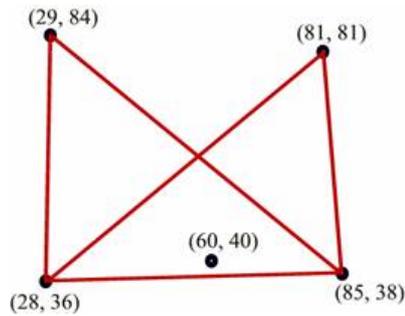


Figure 2: The black circles denote the locations of high-rise buildings. Of the 10 Bermuda blocks only 2 contains one high-rise building each. So the average number of high-rise building per Bermuda block is  $2/10 = 0.2$ . This figure corresponds to the first sample input.

As total number of buildings can be high so you have to help the Mayor of Euphoria to write an efficient program that will help calculate tax.

### Input

The input file contains several sets of inputs.

Each set starts with an integer  $N$  ( $0 \leq N \leq 1200$ ), which denotes the total number of high rise building in the city. Each of the next  $N$  lines contains two integers  $x_i, y_i$  ( $0 \leq x_i, y_i \leq 10000$ ) which actually denotes that the Cartesian coordinate of the  $i$ -th high-rise building is  $(x_i, y_i)$ . You can assume that the city is located on a flat land and it is so large that a point can actually be used to denote the position of a high-rise building. You can also assume that no three buildings are on the same straight line and no two buildings are at the same place either.

Input is terminated by a case where  $N = 0$ .

## Output

For each set of input produce one line of output. This line contains the serial of output followed by a floating-point number. This floating-point number denotes the average number of high rise buildings per Bermuda block. This floating-point number should be rounded to two digits after the floating-point. Look at the output for sample input for details.

## Sample Input

```
5
29 84
81 81
28 36
60 40
85 38
5
0 0
10 0
0 10
10 10
6 7
0
```

## Sample Output

```
City 1: 0.20
City 2: 0.20
```