



4530 - Location for a Power Generator

Asia - Hsinchu - 2009/2010

Happyland is a small island in Pacific Ocean. There are n families dwelling in the island. Each family owns a house and the address is specified by the coordinate (x, y) , x and y are not necessary to be integers. One day, Happyland is struck by a typhoon and the electrical power system is destroyed.

The mayor of Happyland has a mobile nuclear power generator that can provide electricity to all of the house in the island. The power generator can be placed at any place in the Happyland. Each family has a power cord of length l . By connecting the power cord to the generator, the family can have electricity. Thus, even the power generator can supply electricity to all of the n families but the limitation is the length of the power cord. For example, if the distance between two houses is greater than $2l$, the two houses can not have electricity simultaneously.

The Mayor wants to find a good place for the power generator. He thinks the best spot should be a place where if the power generator is placed, the number of houses received electricity is maximized. Please help the mayor to find out the places for the generator.

There are different regions for the power generator to support the maximum number of houses. A region, R , in the Happyland is a k -region, if a power generator locating in R can serve exactly k houses. The power generator locating in the k -region can serve the maximum number of houses when k is maximized. Let k_{\max} be the largest k . There are cases the number of k_{\max} -regions is not unique. Please design the code to compute k_{\max} and the number of k_{\max} -regions.

Technical Specification

1. There are at most 1100 houses in Happyland.
2. The coordinates for each house and the length of the cord are real number. In the input file, there are 3 digits below decimal point.
3. Please use double precision to hold real number in your code.

Input

The first line of the input file contains an integer indicating the number of test cases to follow. There is a blank line between two consecutive cases. Each set of data starts with a real number, l , which is the length of the power cord. Following the real number is an integer, n , that stands for the number of houses. Then there are n pairs of real numbers to specify the addresses of the houses.

Output

For each test case, output two integers. The first integer is k_{\max} . The second integer is the number of k_{\max} -regions.

Sample Input

```
3
2.1
3
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0.0 0.0
4.0 0.0
2.0 3.5

2.5
3
0.0 0.0
4.0 0.0
2.0 3.5

2.0
3
0.0 0.0
4.0 0.0
2.0 3.5

Sample Output

2 3
3 1
2 1

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