

## K. The Gabriel Graph

### Description

Program:	gabriel.(cpp java)
Input:	gabriel.in
Balloon Color:	Purple

The Gabriel graph is the graph with vertex set  $V$  in which any points  $a$  and  $b$  are adjacent if they are distinct and the closed disc of diameter  $d(a, b)$  contains no other elements of  $V$ .  $d(a, b)$  is the distance, e.g., Euclidean distance, between the two points  $a$  and  $b$ . The result of applying a Gabriel graph on a set of points is illustrated in Figure 1.

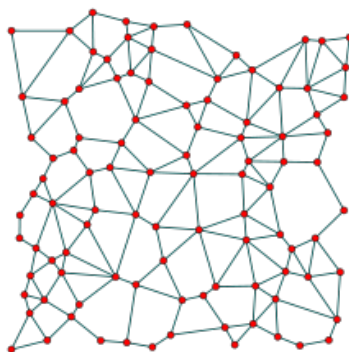


Figure 1. Example of a Gabriel graph on a set of points.

The following figures provide examples of the verification of the property of Gabriel graph and another with that property is not verified.

<p>Figure 2. Points <math>a</math> and <math>b</math> are neighbors because <math>c</math> is outside the disc of diameter <math>d(a, b)</math>.</p>	<p>Figure 3. Points <math>a</math> and <math>b</math> are not neighbors because <math>c</math> is inside the disc of diameter <math>d(a, b)</math>. If <math>c</math> is on the disc, then <math>a</math> and <math>b</math> are still not neighbors.</p>

Your task is given a set of 2D points, to find the corresponding Gabriel graph by calculating the neighbors of each point.

## Input format

The input starts with a number  $X$  ( $1 \leq X \leq 100$ ) that is the number of test cases in the file. Each test case starts with 2 numbers:  $Y$  (the test case number) and  $Z$  ( $2 \leq Z \leq 10$ ) that is the number of points to be examined.  $Z$  lines follow, each containing three numbers separated by whitespace: the point number and its x and y coordinates (e.g., 1 3 4: node 1 has 3 as x coordinate and 4 as y coordinate). The x and y coordinates are 32-bit integers.

## Output format

For each test case, you should output the test case number, followed by  $Z$  lines, one for each point in the test case. In each line, you should output the node number along with the numbers of the nodes that are its neighbors. Neighbor numbers should be sorted and they should be separated by a single space.

## Sample Input / Output

gabriel.in

```
1
1 10
1 2 3
2 4 5
3 6 7
4 8 9
5 1 3
6 6 5
7 2 1
8 4 1
9 3 4
10 1 2
```

OUTPUT

```
1
1 5 7 8 9 10
2 3 6 9
3 2 4 6
4 3
5 1 10
6 2 3 8
7 1 8 10
8 1 6 7 9
9 1 2 8
10 1 5 7
```