

The 31st Annual ACM International Collegiate Programming Contest ASIA Regional - Seoul



Problem G Tree

You have n points $P = \{p_1, p_2, \dots, p_n\}$ in the plane. The points should be connected to form a tree. But you know only the degree information of points of the tree (not the tree itself). Each point p_i has degree d_i , which means that p_i is connected to d_i other points of P . Figure 1(a) shows an example in which each point is associated with its degree. Figure 1(b) shows a tree for the point set in Figure 1(a) such that a node of the tree corresponds to a point p_i in one-to-one manner and its degree is d_i . Tree edges must be drawn as straight-line segments and they do not cross each other.

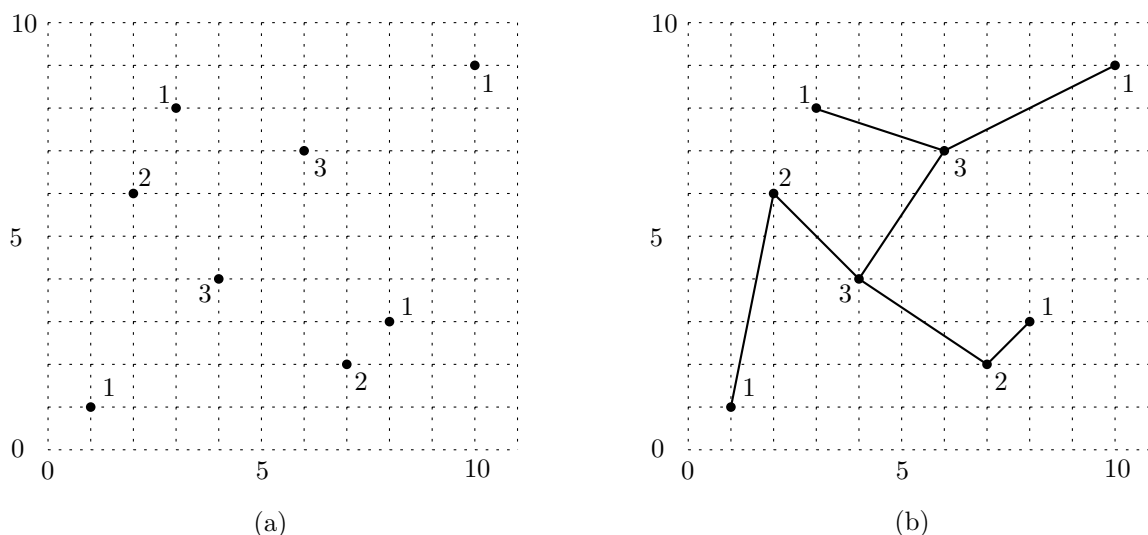


Figure 1

The formal definition of the problem is as follows. You are given a point set $P = \{p_1, p_2, \dots, p_n\}$ in the plane where each p_i has a positive integral value d_i as its degree; the degrees satisfy

$$\sum_{i=1}^n d_i = 2n - 2.$$

It is known that it is always possible to draw a tree such that each tree node of degree d_i corresponds to a point p_i and each edge is drawn as a straight-line segment without edge crossings. Your program should find the tree for a given input.

Input

Your program is to read the input from standard input. The input consists of T test cases. The number of test cases T is given in the first line of the input. Each test case starts with a line containing an integer n , the number of input points, $4 \leq n \leq 1,000$. The next n lines contain x -coordinates, y -coordinates, degrees of the n points; the i -th line represents the i -th point p_i and contains three positive integers x_i, y_i , and d_i . The values x_i, y_i, d_i are separated by a single space, and x_i, y_i are between 1 and 10,000, both inclusive.

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The input points are such that no three or more points lie on the same line, all x -coordinates are distinct, and all y -coordinates are distinct.

Output

Your program is to write to standard output. Print edges of the tree in $n-1$ lines for each test case. Note that the solution for each test case is not unique. Each line contains an edge of the tree – if the edge connects two points p_i and p_j , then just print i and j , separated by a single space.

The following shows sample input and output for three test cases.

Sample Input

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

Output for the Sample Input

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