# Get Connected

The Problem

The company Pacific Island Net (PIN) has identified several small island groups in the Pacific that do not have a fast internet connection. PIN plans to tap this potential market by offering internet service to the island inhabitants. Each group of islands already has a deep-sea cable that connects the main island to the closest internet hub on the mainland (be it America, Australia or Asia). All that remains to be done is to connect the islands in a group to each other. You must write a program to help them determine how long this will take.
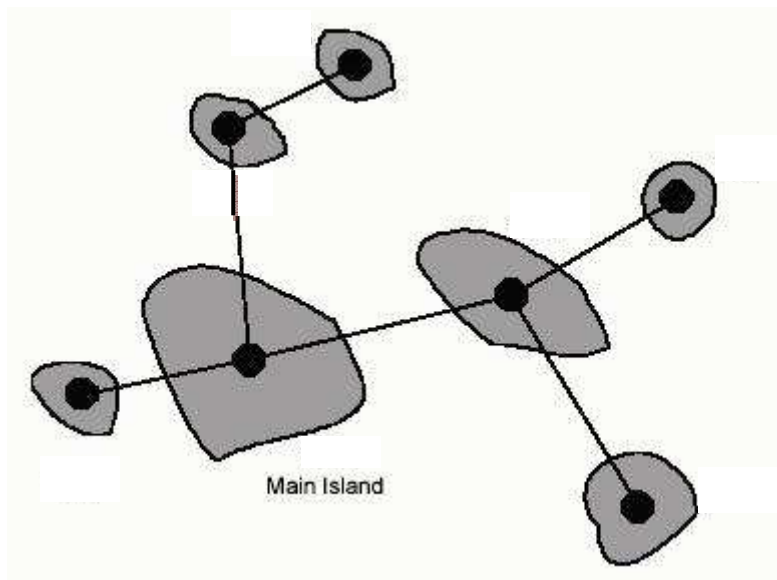
Main Island

For each island, you are given the position of its router. In the figure, the dark dots are the routers. PIN will build connections between pairs of routers such that every router has a path to the main island. PIN has decided to build the network such that the total amount of cable used is minimal. Under this restriction, there may be several optimal networks. However, it does not matter to PIN which of the optimal networks is built.

PIN is interested in the time required for new customers to access the internet, based on the assumption that construction on all cable links in the network begins at the same time. The time required for all customers to get connected is the time taken to construct the final link that joins the network together. Cable links can be constructed at a rate of one kilometre of cable per day. As a result, shorter cable links are completed before the longer links. The island group will have internet access as soon as there is a completed path between all islands.

The distance, d, between two routers, a and b is defined as the Euclidean distance between the coordinates (x_a, y_a) and (x_b, y_b).

$$d = \sqrt{(x_a - x_b)^2 + (y_a - y_b)^2}$$

The Input

The first line of input will be a number on a line by itself which is the number of test cases to run. For each test case, the first line will have a single number N, where N $(1 \le N \le 100)$ is the number of islands in the island group. Each of the next N lines has two integers, x_i and y_i $(0 \le x_i, y_i \le 5000)$, giving the coordinates of the router on the island.

The Output

For each group of islands in the input, output the sequence number of the group and the number of days until the inhabitants are connected to the internet. The number of days should have two digits to the right of the decimal point. Use the output format in the sample given below.

Sample Input

```
2
7
11 12
14 17
9 9
7 15
19 16
8 18
15 21
5
3 0
0 0
0 4
6 0
6 4
```

Sample Output

```
Island Group 1 is connected in 5.83 days
Island Group 2 is connected in 4.00 days
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