Strategic Tower

Time Limit : 3 Seconds
Memory Limit : 512 MB

There are N strategic (communication) towers built across a country. These strategic towers are used by the local government to relay confidential information (e.g., defense/intelligence related) between towers. They avoid satellites as the medium because they don't have one, and using a satellite from other countries to relay your confidential information is not a smart decision. Also, they are pretty confident in their communication technology.

The technology requires all towers to have the same effective range of R. Let $\texttt{dist}(p_i, p_j)$ denotes the distance of the i^{th} tower and the j^{th} tower. Two towers can communicate **directly** if and only if their distance is no more than R, i.e. $\texttt{dist}(p_A, p_B) \le R$. Two towers (A and B) can communicate either directly or indirectly if and only if there exists a set of towers M (possibly of empty size) such that there is a communication path from A to B via M, i.e. $\max\{\texttt{dist}(p_A, p_{m_1}), \texttt{dist}(p_{m_1}, p_{m_2}), \ldots, \texttt{dist}(p_{m_{|M-1|}}, p_{m_{|M|}}), \texttt{dist}(p_{m_{|M|}}, p_B)\} \le R$.

By the way, the distance between two locations is measured by a simple Euclidean distance on a 2-dimensional space, i.e. $((x_1-x_2)^2+(y_1-y_2)^2)^{0.5}$.

Building a tower with high R is costly, but due to a security reason, you have to ensure all towers can communicate with each other.

Given the location of N towers in a 2-dimensional space, your task is to find the minimum R such that all towers are connected (can communicate with each other, either directly or indirectly). As handling precision error might be troublesome, you only need to output the square of such R.

Input

Input begins with an integer: T ($1 \le T \le 10$) denoting the number of cases.

Each case contains the following input block: Each case begins with one integer: N ($2 \le N \le 1000$) in a single line denoting the number of towers. The next N lines, each contains two integers: y_i y_i ($-1{,}000{,}000 \le x_i, y_i \le 1{,}000{,}000$) denoting the location of the i^{th} tower. You may assume there are no two towers at the same location.

Output

For each case, output in a line "`Case #X: Y`" where `X` is the case number (starts from 1) and `Y` is the square of the minimum R such that all towers are connected for that particular case.

Examples

input **Example #1**

```
2
3
10 10
15 10
18 10
4
```

```
0 0
8 10
-10 -10
10 4
```

output

```
Case #1: 25
Case #2: 200
```

End of Problem