Freckles

Problem ID: freckles
CPU Time limit: 2 seconds
Memory limit: 1024 MB
Difficulty: 4.3

Source: Waterloo Programming Contest 2000-09-23
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In an episode of the Dick Van Dyke show, little Richie connects the freckles on his Dad's back to form a picture of the Liberty Bell. Alas, one of the freckles turns out to be a scar, so his Ripley's engagement falls through.

Consider Dick's back to be a plane with freckles at various (x, y) locations. Your job is to tell Richie how to connect the dots so as to minimize the amount of ink used. Richie connects the dots by drawing straight lines between pairs, possibly lifting the pen between lines. When Richie is done there must be a sequence of connected lines from any freckle to any other freckle.

Input

The input begins with a single positive integer on a line by itself indicating the number of the cases (at most 20) following, each of them as described below. This line is followed by a blank line, and there is also a blank line between two consecutive inputs.

The first line of test case contains $0 < n \leq 1000$, the number of freckles on Dick's back. For each freckle, a line follows; each following line contains two real numbers indicating the (x, y) coordinates of the freckle. The coordinates will be at most 100 000 in absolute value.

Output

For each test case, your program should print a single real number to two decimal places: the minimum total length of ink lines that can connect all the freckles. Put a blank line between outputs for consecutive test cases.

Sample Input 1

```
1

3
1.0 1.0
2.0 2.0
2.0 4.0
```

Sample Output 1

```
3.41
```