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111001 Freckles

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 test cases, followed by a blank line.

The first line of each test case contains $0 < n \leq 100$, giving 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.

There is a blank line between each two consecutive test cases.

Output

For each test case, your program must print a single real number to two decimal places: the minimum total length of ink lines that can connect all the freckles. The output of each two consecutive cases must be separated by a blank line.

Sample Input

```
1

3
1.0 1.0
2.0 2.0
2.0 4.0
```

Sample Output

```
3.41
```

