

Quiz 3: Agricultural Hydro Network Configuration

Topics: Graphs - **A MUST use starter code**

Problem Statement

The Ministry of Agriculture needs to establish an efficient water supply system for several agricultural stations spread across a vast desert region. The system will utilize two types of technologies:

1. Every station will have a ground pump.
2. Some stations will also have access to an advanced aerial water drone system.

Any two stations equipped with the water drone system can share resources via drones, regardless of their distance. Otherwise, stations can only share water through ground pumps if the distance between them does not exceed a certain threshold T , which depends on the pump's capacity. Higher capacity pumps can reach farther but are more expensive. The pumps at all stations must be of the same type; thus, T is consistent across all station pairs. **The objective is to determine the minimum T necessary such that there is at least one water-sharing path (direct or indirect) connecting every pair of stations.** This also involves critical decision-making about which stations will be equipped with the advanced water supply system.



Input Format

The input file will be given as the *first command-line argument*. The first line of input contains N , the number of test cases. For each test case:

- The first line contains two integers S and P , ($1 \leq S < P \leq 500$), where S is the number of stations equipped with the water drone system, and P is the total number of stations.
- The next P lines list the x, y coordinates (integers between 0 and 10,000) of each station in kilometers.

Sample Input:

```
1
2 4
0 100
0 300
0 600
150 750
```

Output Format

For each test case, output a single line giving the minimum T required to ensure complete connectivity across the hydro network, rounded to two decimal points.

Sample Output:

```
212.13
```

Check the `sample_io` directory in the starter code for the full sample output format.

Constraints

$1 \leq S \leq 100$; $S < P \leq 500$; $0 \leq x, y \leq 10,000$

Important Rules

- **You MUST use this starter code.** Do not change any part of the given starter codes, those are given to ensure that you pass the unit tests in autograding. Only complete the TODOs.
- Test your codes using the [Tur⁶Bo Grader](#) and finally submit them via submit.cs.hacettepe.edu.tr using the same format given below:

```
– <studentID>.zip
  * Quiz3.java
```

Academic Integrity Policy

All work **must be done individually**. You are encouraged to discuss the given problems with your classmates, but these discussions should be carried out in an abstract way. That is, discussions related to a particular solution to a specific problem (either in actual code or in pseudocode) **will not be tolerated**. In short, turning in someone else's work (including work available on the internet, or generated by the AI tools), in whole or in part, as your own will be considered as **a violation of academic integrity**. Please note that the former condition also holds for the material found on the web as everything on the web has been written by someone else.



The submissions will be subjected to a similarity check. Any submissions that fail the similarity check will not be graded and will be reported to the ethics committee as a case of academic integrity violation, which may result in the suspension of the involved students.