Ethic coding exercise

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Disclaimer

This Exercise has been created by Ethic to assess candidates technical fit, this exercise is confidential, please do not share or distribute this exercise.

You may not use external libraries when solving this problem, you can use external libraries/frameworks/tools for testing or building purposes. You can use the internet while solving this problem. However, the work presented in your solution should be your own, without the help of any other person and without another person reviewing the code you're submitting.

Objective

The objective of this exercise are twofold:
● From Ethic's point of view, this will help us evaluate how you approach solving a problem in a similar fashion to what you'd have to do on a day-to-day basis at work
● From the Candidate's point of view, this will help you assess how Ethic's requirements methodology is articulated and the typical work you might be doing

Exercise

Description

The railroad service has come to you for help with providing its customers with information about the train routes. You need to help them compute the distance along a certain route, the number of different routes between two towns, and the shortest route between two towns.

Input:
A directed graph like *AB5* where *A* represents the start town, *B* represents the arrival town, and *5* represents the distance between A and B. The graph will be a comma separated list
Example input graph:

Graph: AB5, BC4, CD8, DC8, DE6, AD5, CE2, EB3, AE7

A list of questions that the customer can ask:

A) Distance along a certain route:
The question will have the following format:

The distance of the route ABC.

In the data above, the distance from A-B is 5, and B-C is 4, so the output should be 9.
If the route requested does not exist or cannot be calculated, then the output should be 'NO SUCH ROUTE'

B) The number of different routes between two towns:
B 1) By number of stops
The question will have the following format:

The number of trips starting at C and ending at C with a maximum of 3 stops

In the above data, there are 2 such trips: C-D-C (2 stops), and C-E-B-C (3 stops). The output should be 2.

B 2) By distance
The question will have the following format:

The number of different routes from C to C with a distance of less than 30

In the above data, the trips are: CDC, CEBC, CEBCDC, CDCEBC, CDEBC, CEBCEBC, CEBCEBCEBC. The output should be 7

C) The shortest route between two towns
The question will have the following format:

The length of the shortest route (in terms of distance to travel) from A to C

In the data above, the route A-B-C is the shortest with distance of 9. The output should be 9

You can decide how the input file(s) format will be, but we should be able to input a Graph, and ask the questions. The output will show the result for each question.

Technical

- Please use Java 8+ preferably for solving this problem. You can use Python 3 as a second alternative but Java is preferred.
- We expect to see unit tests for the program

Evaluation

Please send a zip file with the source code for the application. There needs to be a sample README.md file that describes the following:

- How to compile the source code on the command line
- How to run the application from the command line, along with a sample input file
- How to run the unit tests
- Any assumptions you made while writing the source code, including known limitations, and any other info you'd like us to know

The evaluation will take into account the following:

- Code quality
- Completeness of functionality