A* Project

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EPITA Bachelor - Algorithmics and data structures

Context

The project aims at computing the shortest path between two cities, using the A* algorithm described in class. The map data (cities, direct connections, coordinates and distances) can be found in a text file whose name is given on the command line (default name FRANCE.MAP).

The program is given the names of the departure and arrival cities (on the command line or asked by the code), then computes and displays the (complete) shortest path between the chosen two cities, together with the partial distances for each intermediate city and, of course, the total distance for the trip.

For instance:

```
$ ./aStar Rennes Lyon
Rennes : (0 km)
Nantes : (107 km)
Limoges : (436 km)
Lyon : (825 km)
```

Error handling

- If the city names are not provided on the command line, the program must ask for them.
- in case of incorrect input (unknown city name), the program should return 1
- in case the data file (FRANCE.MAP by default, or other) is not found, the program should return 2
- on failure due to lack of connectivity in the graph, the program should return 3
- on success, the program must return 0 as usual

Deliverables

The project code must use the *HashTable* structures seen during the course, it is not allowed to use python dictionaries. Final grade will take performance of the code into account.

Students must send an archive (named after the names of the 2 members of the team) by email to *laroque@u-cergy.fr*. The contents of the archive is

1. the complete commented source code and data file (map if file different from FRANCE.MAP)
2. a README file to help the user understand how to (build and) run the program
3. an evaluation of the complexity of your solution, in terms of E and V (E : number of edges of the map, V : number of vertices)
4. **nothing else!**

Pay attention to the following potential issues:

- the source code must be portable: no reference to OS-specific libraries must be made. Students are urged to test their program against windows *and* linux *and* macOS if possible!
- Teams are composed of 2 students. If you choose to do the project alone or with 2 mates you will get a penalty (unless the last student happens to be alone of course)

The excel sheet provided with this document should help you understand precisely what is expected from you in this project.