9th Assignment – Graphs: Minimum cost flow in transport networks

Instructions

- Download the zipped file **TP9_unsolved.zip** from the course's Moodle area and unzip it. It contains a .cpp file for each exercise, each with the respective unit tests, and the file **Graph.h** (based on the previous classes).
- In the CLion IDE, open the project used in the previous lessons and add the folder TP9, selecting the folder that contains the files mentioned in the previous bullet point.
- Update the *CMakeLists.txt* file by copying, pasting, and adapting the three lines of code of TP9: file, add_executable and target_link_libraries.
- Do "*Load CMake Project*" over the file *CMakeLists.txt*
- Run the project (**Run**)
- Please note that the unit tests of this project may be commented. If this is the case, uncomment the tests as you make progress in the implementation of the respective exercises.
- You should implement the exercises following the order suggested.
- Implement your solutions in the respective .cpp file of each exercise.
- Important note: in case you need to read text files in I/O mode, you should tell CLion where such files are, by redefining the IDE environment variable "Working Directory", through menu Run > Edit Configurations… > Working Directory.

Exercises

You should edit the classes in *Graph.h* in order to complete the exercises below.

a) Implement the following method in the **Graph** class:

```
double minCostFlow(T source, T target, double targetFlow)
```

This method implements the algorithm to calculate the minimum cost for delivering a certain quantity of flow, *targetFlow*, from the source vertex *source* to the sink vertex *target* in the graph. If the network represented by the graph does not support the *targetFlow*, then the method should return the minimum cost to deliver the maximum allowed flow through the network.