7th Assignment – Graphs: Minimum spanning tree

Instructions

- Download the zipped file **TP7_unsolved.zip** from the course's Moodle area and unzip it. It contains a cpp 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 TP7, 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 TP7: 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

Consider the **Graph** class you used in previous classes, which is defined in the *Graph.h* file. You should edit the classes in *Graph.h* in order to complete the exercises below. Look at the *tests.cpp* file in order to identify auxiliary functions which are required but are not explicitly asked for.

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

```
unsigned int calculatePrim()
```

This function implements Prim's algorithm to find the minimum spanning tree from the first vertex ***v*** in the graph, to all other vertices. The function returns the cost of the minimum spanning tree.

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

```
unsigned int calculateKruskal()
```

This method implements Kruskal's algorithm to find the minimum spanning tree.