

Departamento de Matemática da Universidade de Coimbra		
2013/2014	Programação Orientadas para os Objectos	Projecto 2

Routing Program The problem is to build a routing program allowing to choose the best route between to cities, accordingly to a certain criteria (time, length, cost). The user should be able to state the *origin*, and the *destination*, a departure time and a cost criteria. After that the program should be able to find the shortest path between the two cities and (to extra credits) draw the solution graph ⁴ [2].

The graph should be read from a text file with the following format (see file `rede.txt`).

```
c Network description
N number of nodes
A number of arcs
a start_node end_node cost1 cost2 cost3
a ...
a ...
```

The *Forward Star Form* [1] should be use to keep the graph.

The *Dijkstra Algorithm* [1] should be use to find the shortest Path.

- Document your program. Internal and external documentation. The report (external documentation, max 5pp) should include the UML diagram of the class structure and a small user's manual. You should identify the group.
- The code should be organised in a hierarchy of classes.
- The graph representation must use the vector class of the *STL*.
- The code for all the graph manipulations should be made available in the form of a dynamic library.
- You have to deliver (by electronic mail) one `zip` or `tar.gz` archive containing all the files related to the program (`Makefile`, `.cpp`, `.hpp`, `.so`), and also the report (PDF format), up to the 24:00 hours of the project deadline.

References

- [1] Ravindra Ahuja, Thomas Magnanti, and James Orlin. Network flows : theory, algoritms, and applications. Prentice-Hall, 1993. 90C/AHU/ex1; 90C/AHU/ex2.
- [2] Emden Gansner, Eleftherios Koutsofios, and Stephen North. Drawing graphs with dot. Documentation of the package graphviz, 2006.

⁴<http://www.graphviz.org/>