

Software Engineering 2 Project, AA 2015-2016

Assignments 1 and 2

1 Your tasks

Assignments 1 and 2 consist in the creation of the Requirement Analysis and Specification Document (RASD) and of the Design Document (DD) for the problem defined below.

Groups composed of one student will focus exclusively on Part I, groups composed of two students will focus on Part I and Part II, finally, groups composed of three students will focus on all the three parts described below.

All students should refer to the general project rules document for more details on deadlines and general rules for the project.

2 The problem: myTaxiService

Part I

The government of a large city aims at optimizing its taxi service. In particular, it wants to: i) simplify the access of passengers to the service, and ii) guarantee a fair management of taxi queues.

Passengers can request a taxi either through a web application or a mobile app. The system answers to the request by informing the passenger about the code of the incoming taxi and the waiting time.

Taxi drivers use a mobile application to inform the system about their availability and to confirm that they are going to take care of a certain call.

The system guarantees a fair management of taxi queues. In particular, the city is divided in taxi zones (approximately 2 km² each). Each zone is associated to a queue of taxis. The system automatically computes the distribution of taxis in the various zones based on the GPS information it receives from each taxi. When a taxi is available, its identifier is stored in the queue of taxis in the corresponding zone.

When a request arrives from a certain zone, the system forwards it to the first taxi queuing in that zone. If the taxi confirms, then the system will send a confirmation to the passenger. If not, then the system will forward the request to the second in the queue and will, at the same time, move the first taxi in the last position in the queue.

Besides the specific user interfaces for passengers and taxi drivers, the system offers also programmatic interfaces to enable the development of additional services (e.g., taxi sharing) on top of the basic one.

Part II

A user can reserve a taxi by specifying the origin and the destination of the ride. The reservation has to occur at least two hours before the ride. In this case, the system confirms the reservation to the user and allocates a taxi to the request 10 minutes before the meeting time with the user.

Part III

A user can enable the taxi sharing option. This means that he/she is ready to share a taxi with others if possible, thus sharing the cost of the ride. In this case the user is required to specify the destination of all rides which he/she wants to

share with others. If others are willing to start a shared ride from the same zone going in the same direction, then the system arranges the route for the taxi driver, defines the fee for all persons sharing the taxi and informs the passengers and the taxi driver.

3 The documents to be created

The *Requirements analysis and specification document (RASD)* contains the description of the scenarios, the use cases that describe them, and the models describing requirements and specification for the problem under consideration. You are to use a suitable mix of natural language, UML and Alloy. UML and Alloy **MUST** be part of the documentation. You must also show that you used the Alloy tool for analysis, by reporting the models you obtained by using it. Of course, the initial written problem statement we provide suffers from the typical drawbacks of natural language descriptions: it is informal, incomplete, uses different terms for the same concepts, etc. You may choose to solve the incompleteness and ambiguity as you wish, but be careful to clearly document the choices you make and the corresponding rationale. You will also include in the document information on the number of hours each group member has worked towards the fulfillment of this deadline.

The *Design document (DD)* must contain a functional description of the system, and any other view you find useful to provide. You should use all the UML diagrams you need to provide a full description of the system. Alloy may also be useful. You will also include in the document information on the number of hours each group member has worked towards the fulfillment of this deadline.