Politecnico di Milano
A.A. 2015-2016
Software Engineering 2: "myTaxiService"
Project **P**lan

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Contents

1 Introduction

This document describes the project plan for myTaxiService application. It presents an analysis of the expected size and effort required for the implementation phase calculated respectively with the Function Points and COCOMO. Then it presents the available resources and how they will be allocated to the project tasks and, in the end, it discusses the possible risks this project might encounter and the associated recovery actions.

2 Size and Effort Estimation

2.1 Size Estimation – Function Points

Following Albrecht's method, our application's function points will be divided in 5 types:

- Internal Logical File (ILF): homogeneous set of data used and managed by the application.
- External Interface File (EIF): homogeneous set of data used by the application but generated and maintained by other.
- External Input: elementary operation to elaborate data coming from the external environment.
- External Output: elementary operation that generates data for the external environment.
- External Inquiry: elementary operation that involves input and output.

The function points' types stated above will be weighted as specified in the following table.

Function Type	Complexity		
	Simple	Medium	Complex
Internal Logic File	7	10	15
External Interface File	5	7	10
External Input	3	4	6
External Output	4	5	7
External Inquiry	3	4	6

2.1.1 Internal Logical File

The application stores information about:

- Admins (user name, password hash, email)
- Users (user name, password hash, email)

- City zones (nearest zones)
- Requests (starting zone, destination zone, taxi code)
- Reservations (starting zone, destination zone, taxi code, meeting time)
- Taxi drivers (taxi code, user name, password hash, current zone, availability time)

The first five entities have a simple structure as they are composed of a small number of fields, while the taxi drivers have a more complex structure that also needs to be updated frequently. Thus we decide to adopt the simple weight for the first five and the medium weight for the last one. $5\times7+1\times10 = 45$ FPs concerning ILFs.

2.1.2 External Interface File

There are no such things in our project.

2.1.3 External Input

myTaxiService application interacts with users as follows:

- login/logout: as they're simple operations the simple weight can be adopted. $2\times3 = 6$ FPs.
- registration: this is considered of medium complexity as it requires a careful update of the ILFs. $1\times4 = 4$ FPs
- request/reserve a taxi: these operations are considered complex as they also involve the calculation of the queues and the CAT. $2\times6 = 12$ FPs
- cancel a request/reservation: these operation are complex as they involve two entities, users and taxi drivers, and a careful concurrency handling. $2\times6 = 12$ FPs
- modify personal data: this can be considered of medium complexity as it requires the handling of important information. 4 FPs
- toggle taxi driver state: this is considered an easy operation as it concerns only one entity. 3 FPs
- accept/refuse requests/reservations: these are considered operations of medium complexity as they require of two important entities. $4\times4 = 16$
- receiving gps information on the taxi driver's location: this is considered a medium complexity operation. 4 FPs

It also interacts with admins as follows:

- insert/modify/remove a taxi driver from the database: these can be considered easy operations. $3\times3 = 9$ FPs

Thus, 70 FPs concerning External Inputs.

2.1.4 External Output

The application allows the creation of:

- notifications about the taxi code to send to users: we can adopt the simple weight for this operation. 4 FPs
- notifications of requests/reservations to send to taxi drivers: we can adopt the simple weight for these operations too. 2×4 = 8 FPs
- notifications of the ETA: this is a complex operation as it involves the calculation of the queues and of the CAT. 7 FPs

19 FPs concerning External Outputs.

2.1.5 External Inquiry

The application allows users to:

- show all his/her active requests and reservations
- select a currently active request/reservation
- select the street between the available ones

and it allows admins to:

- show the list of all taxi drivers
- select a taxi driver

These 6 operations can all be considered easy, so we can adopt the simple weight for all of them. 6×3 = 18 FPs concerning External Inquiries.

2.2 Effort Estimation - COCOMO

To convert the function points in SLOC we use a conversion factor of 46, as specified here http://www.qsm.com/resources/function-point-languages-table for J2EE.

$$\text{SLOC} = \text{FP} \times 46 = 152 \times 46 = 6992$$

We consider our project with all nominal Cost Drivers and Scale Drivers so we have an EAF of 1.00 and an exponent E of 1.0997.

€ffort = 2.94×EAF×$(KSLOC)^E$ = 2.94×$(6.992)^{1.0997}$ = 24.95 Person-Month

The duration of the project could therefore be calculated with the following equation

$$\text{Duration} = 3.67 \times (€\text{ffort})^{SE} = 3.67 \times 24.95^{0.3179} = 10.2 \text{ months}$$

where SE = 0.3179 as derived from nominal Scale Drivers. Thus, the estimate of people needed to complete the project is

$$\text{N}_{people} = \frac{Effort}{Duration} = 2.45 \text{ people} \rightarrow 3 \text{ people}$$

3 Resource Allocation

3.1 Tasks

We're going to refer to the tasks with a [Tx] notation, where x stands for a number used to uniquely identify the task.
RASD (15.10.2015-6.11.2015):

- T1 - Domain assumptions
- T2 - Functional requirements
- T3 - Non functional requirements
- T4 - Use cases and scenarios
- T5 - Models (the world and the machine, class diagram, sequence diagrams)
- T6 - User interface
- T7 - Alloy

Design Document (12.11.2015-4.12.2015):

- T8 - Component view
- T9 - Deployment view
- T10 - Runtime view
- T11 - Component interfaces

Code Inspection (9.12.2015-5.1.2016):

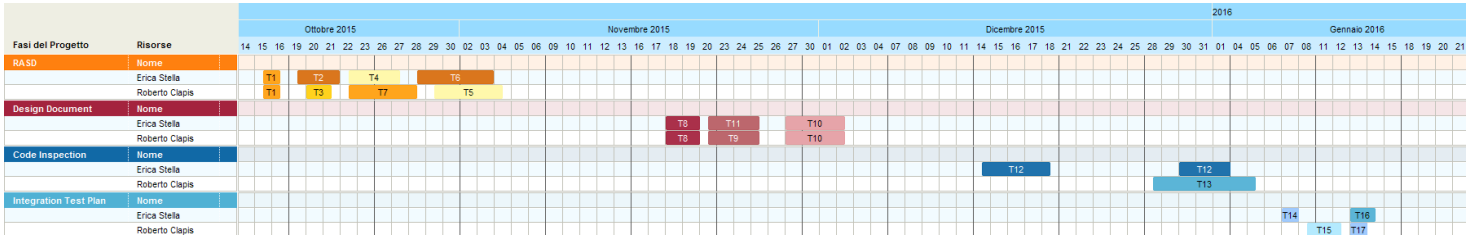
- T12 - Checklist points 1-30
- T13 - Checklist points 31-60

Integration Test Plan Document (7.1.2016-21.1.2016):

- T14 - Integration sequence
- T15 - Test case specifications
- T16 - Test procedures
- T17 - Tools, drivers and stubs

Tasks	Dependencies	Tasks	Dependencies	Tasks	Dependencies
T1	None	T7	T2, T3	T13	None
T2	T1	T8	None	T14	None
T3	T1	T9	T8	T15	T14
T4	T2, T3	T10	T8	T16	T15
T5	T4	T11	T8	T17	T15
T6	T4	T12	None		

The following Gantt's graph describes by who the tasks stated above have been completed and when.


2016
Ottobre 2015
Novembre 2015
Dicembre 2015
Gennaio 2016
Fasi del Progetto
Risorse
14 15 16 19 20 21 22 23 26 27 28 29 30 02 03 04 05 06 09 10 11 12 13 16 17 18 19 20 23 24 25 26 27 30 01 02 03 04 07 08 09 10 11 14 15 16 17 18 21 22 23 24 25 28 29 30 31 01 04 05 06 07 08 11 12 13 14 15 18 19 20 21
RASD
Nome
Erica Stella
Roberto Clapis
T1
T2
T4
T6
T1
T3
T7
T5
Design Document
Nome
Erica Stella
Roberto Clapis
T8
T11
T10
T8
T9
T10
Code Inspection
Nome
Erica Stella
Roberto Clapis
T12
T12
T13
Integration Test Plan
Nome
Erica Stella
Roberto Clapis
T14
T16
T15
T17

4 Risks

Risk	Probability	Effects	Strategy
Personnel shortfall due to any cause (e.g. illness)	Moderate	Serious	
Capacity shortfalls of the entire system	High	Catastrophic	Use a real-time scalable cloud-based infrastructure
Problems with the mobile application development framework	Low	Serious	investigate several frameworks to better choice of the one to use
Taxi drivers don't cooperate in the use of the application	Low	Catastrophic	Propose discounts and other advantages to those adhering to the application