

Politecnico di Milano A.A. 2015-2016 Software Engineering 2 "myTaxiService"

Project Plan Document (PPD)

version 1.0

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## Contents

1	Inti	roduction	3				
	1.1	Revision History	3				
	1.2	List of Definitions and Abbreviations	3				
		1.2.1 Definitions	3				
		1.2.2 Acronyms	3				
2	Fun	action points and COCOMO	4				
	2.1	Function Points	4				
		2.1.1 ILFs	4				
		2.1.2 EIFs	4				
		2.1.3 EIs	4				
		2.1.4 EIQs	5				
		2.1.5 EOs	5				
		2.1.6 LoC estimation	5				
	2.2	COCOMO II	6				
		2.2.1 Effort estimation	6				
		2.2.2 Duration estimation	6				
		2.2.3 Number of people required	6				
3	Tas	ks ad schedule	7				
	3.1	Main tasks of the Requirement And Specification Document (RASD)					
	3.2	Main tasks of the Design Document (DD)	10				
	3.3	Main tasks of the Integration Test Plan Document (ITPD)	11				
	3.4	Main tasks of the Project Plan Document (PPD)	13				
4	Alle	ocation resources to tasks	16				
5	Ris	ks for the project	19				
6	Sup	pporting information	21				
	6.1	Tools used	21				
	6.2	References	21				
	63	Workland	22				

#### 1 Introduction

A project plan is a formal, approved document used to guide both project execution and project control. The primary uses of the project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved cost and schedule baselines.

Project planning is an iterative process that starts when you create an initial project plan during the project startup phase.

In this document we will analyze the size of "myTaxiService" system, the effort and the cost of the implementation, estimating project size. To achieve this in chapter 2 we will use two main techniques:

- Function-Points (FP);
- COCOMO;

In chapters 3 and 4 we will divide the project in tasks to identify dependencies and to show resources allocation.

Finally, in chapter 5 we report a list of possible risks for the project, specifying their importance and the associated recovery actions.

#### 1.1 Revision History

Version 1.0

#### 1.2 List of Definitions and Abbreviations

#### 1.2.1 Definitions

- Call: A taxical requested immediately (if no distinction is made between reservations and call this refers simply to pickups);
- Reservation: A reservation of a taxi for a later pickup;
- **Notification:** A notification sent to drivers or users to communicate certain informations;
- User: Registered People;
- Driver: Registered taxi drivers.

#### 1.2.2 Acronyms

- RASD: Requirements Analysis and Specification Document;
- **DD**: Design Document;
- ITPD: Integration Test Plan Document;
- PPD: Project Plan Document;

• COCOMO: COnstructive COst MOdel;

• **FP**: Function-Points;

• ILFs: Internal Logic Files;

• EIFs: External Interface Files;

• EIs: External Inputs;

• EIQs: External Inquiries;

• EOs: External Outputs;

• LoC: Lines of Code;

• EAF: Effort Adjustment Factor;

• E: Exponent (derived from Scale Drivers);

## 2 Function points and COCOMO

#### 2.1 Function Points

#### 2.1.1 ILFs

The application stores data about Users and Drivers both of which are simple structures and about the taxi queue which is a bit more complex.

Functionality	Estimated difficulty	FP
Users	simple	7
Drivers	simple	7
Queue	average	10

Total ILFs FPs: 24

#### 2.1.2 EIFs

No External Interface File has been identified.

Total EIFs FPs: 0

#### 2.1.3 EIs

Users insert inputs about Calls and Reservations both of which are simple and straight forward. Users also insert data to call and reserve taxis and, because, these involve multiple entities and need to get the Users' position are considered complex. Drivers' operations involves few entities and as such are considered of average difficulty.

Functionality	Estimated difficulty	FP
Call	complex	6
Reservation	complex	6
Login	$_{ m simple}$	3
Registration	$_{ m simple}$	3
Toggle availability	average	4
Answer Calls	average	4
Answer Reservation	average	4

Total EIs FPs: 30

#### 2.1.4 EIQs

The only enquiries that Users could do are: look at their active calls and look at their active reservations both of which involves multiple entities and needs an elaboration to determine the estimated time of arrival of the taxi and, as such, are considered complex operations.

Functionality	Estimated difficulty	FP
See active calls	complex	6
See active reservations	complex	6

Total EIQs FPs: 12

#### 2.1.5 EOs

The external outputs of the application are the notifications and, because these involves multiple entities and are sent in concurrency with other applications, are considered complex.

Functionality	Estimated difficulty	FP
Users' notifications	complex	7
Drivers' notifications	complex	7

Total EOs FPs: 14

#### 2.1.6 LoC estimation

The total FPs estimated for the application is 80. Given that the application should be developed using the JEE platform (LoC multiplier=46) the total estimation of the LoC is:

$$LoC = 46 * 80 = 3680$$

#### 2.2 COCOMO II

#### 2.2.1 Effort estimation

Given that we don't know who is going to implement the application we kept nominal the estimation of all Scale Factors and Cost Drivers (see tables below).

$$E = 0.91 + 0.01 * (3.72 + 3.04 + 4.24 + 3.29 + 4.68) = 1.0997$$

$$EAF = 1$$

The resulting effort (in person-month) is:

$$Effort = 2.94 * 1 * (3.68)^{1.0997} = 12.32$$

#### 2.2.2 Duration estimation

The time to dvelop the application (in months) is given by the following formula:

$$Duration = 3.67 * (12.32)^{0.31794} = 8.15$$

#### 2.2.3 Number of people required

$$N = \frac{12.32}{8.15} = 1.51 = 2$$

#### 3 Tasks ad schedule

In each following subsection we described the main tasks for each document redacted. We reported for each one a table (containing duration and dependencies) and an activity bar chart.

## 3.1 Main tasks of the Requirement And Specification Document (RASD)

- T1 Layout setup and study of the given problem.
  - T2 Introduction and description of the given problem.
  - T3 Goals and benefits.
  - T4 Constraints and assumptions.
  - T5 Functional requirements.
  - T6 Scenarios.
  - T7 Alloy.
  - T8 Product perspective.
  - T9 User interfaces.
  - T10 Class diagram.
  - T11 Other interfaces.
  - T12 Supporting information and final touches.
  - T13 English translation and revision.

Task	Effort (person-days)	Duration (days)	Dependencies
T1	1	1/2	
T2	1	1/2	T1 (M1)
T3	1	1/2	T1 (M1)
T4	1	1/2	T1 (M1)
T5	1	1 1/2	T3 (M2)
T6	1	1	T5 (M3)
Т7	1	1 1/2	T3.T4 (M4)
Т8	1	1/2	T1 (M1)
Т9	1	1 1/2	T3,T5 (M5)
T10	1	1/2	T5 (M3)
T11	1	1/2	T1 (M1)
T12	1	1/2	From T1 to T11 (M6)
T13	1	1/2	T12 (M7)

Table 1: Tasks, durations, and dependencies of the RASD. Abbiamo supposto che per la duration un giorno vale 8 ore.

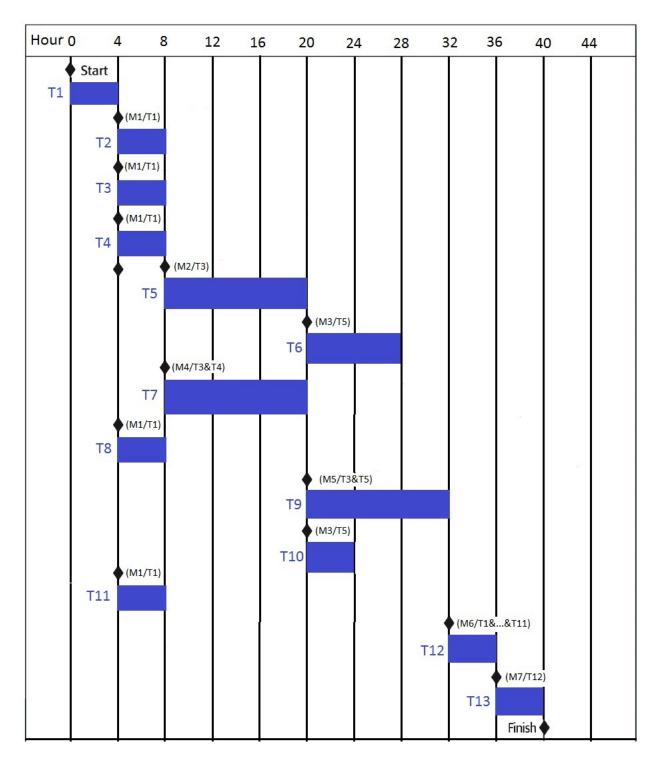


Figure 1: Activity bar chart of the RASD  $\phantom{\Big|}9$ 

### 3.2 Main tasks of the Design Document (DD)

- T1 Layout setup and study of the given problem.
  - T2 Introduction
  - T3 Architectural design
  - T4 Component / deployment / runtime decision
  - T5 Other design decision
  - T6 Algorithm design
  - T7 Requirement traceability
  - T8 Supporting information and final touches.
  - T9 English translation and revision.

Task Effort (person-days)		Duration (days)	Dependencies
T1	1	1/2	
T2	1	1/2	T1 (M1)
Т3	1	1 1/2	T1 (M1)
T4	1	, 2	T3 (M2)
Т5	1	1/2	T3 (M2)
T6	1	1	T1 (M1)
T7	1	1	T4 (M3)
Т8	1	1	From T1 to T7 (M4)
Т9	1	1/2	T8 (M5)

Table 2: Tasks, durations, and dependencies of the DD

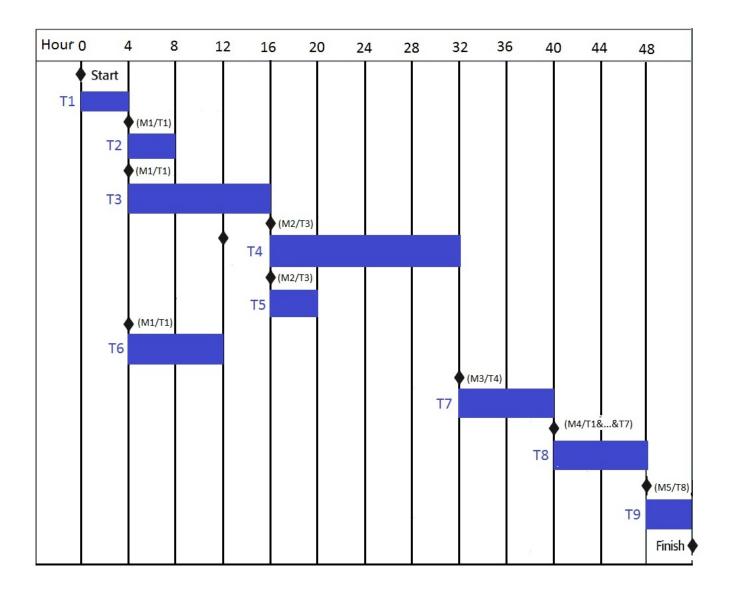


Figure 2: Activity bar chart of the DD

# 3.3 Main tasks of the Integration Test Plan Document (ITPD)

- T1 Layout setup and study of the given problem.
  - T2 Introduction.
  - T3 Integration strategy to be used.
  - T4 Test description.
  - T5 Supporting information and final touches.

T6 English translation and revision.

Task	Effort (person-days)	Duration (days)	Dependencies
T1	1	1/4	
T2	1	1/4	T1 (M1)
T3	1	( 1 <b>1</b> %	T1 (M1)
T4	1	1/2	T3 (M2)
T5	1	1/4	T4 (M3)
T6	1	1/4	T5 (M4)

Table 3: Tasks, durations, and dependencies of the ITPD

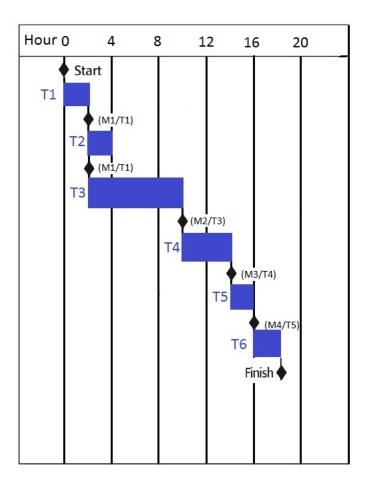


Figure 3: Activity bar chart pf the ITPD

### 3.4 Main tasks of the Project Plan Document (PPD)

- T1 Layout setup and study of the given problem.
  - T2 Introduction
  - T3 Function points and cocomo
  - T4 Tasks and schedule
  - T5 Allocate resources to task
  - T6 Risk for the project
  - T8 Supporting information and final touches.
  - T9 English translation and revision.

Task	Effort (person-days)	Duration (days)	Dependencies
T1	1	1/4	
T2	1	1/4	T1 (M1)
T3	1	1/2	T1 (M1)
T4	1	1/2	T1 (M1)
T5	1	1/2	T4 (M2)
T6	1	1/2	T1 (M1)
Т7	1	1/4	From T1 to T6 (M3)
Т8	1	1/4	T7 (M4)

Table 4: Tasks, durations, and dependencies of the PPD

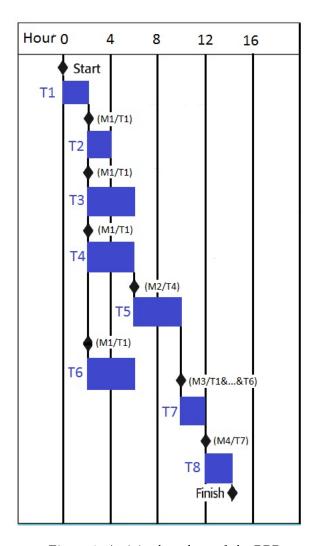


Figure 4: Activity bar chart of the PPD

## 4 Allocation resources to tasks

Here are showed the staff allocation charts for each document. In each chart is shown the time schedule for each task.

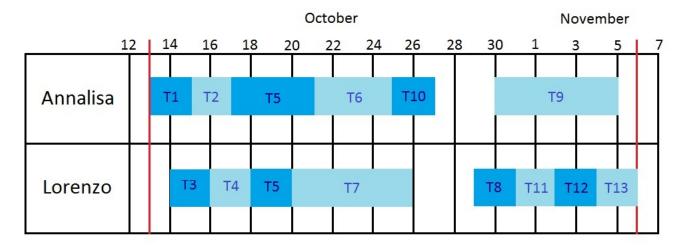


Figure 5: Staff allocation chart of the RASD

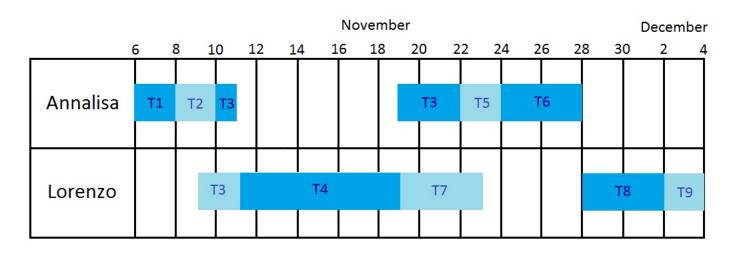


Figure 6: Staff allocation chart of the DD

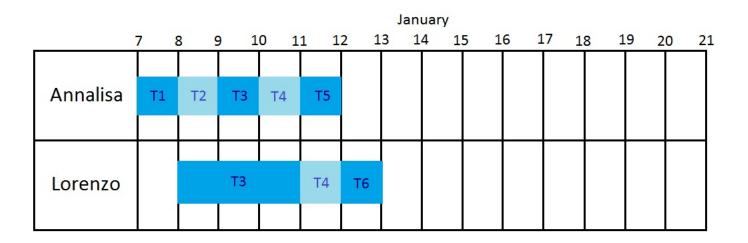


Figure 7: Staff allocation chart of the ITPD

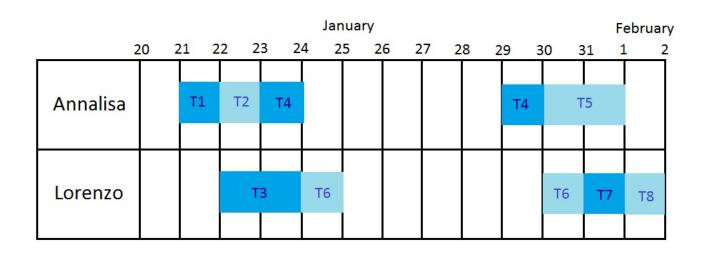


Figure 8: Staff allocation chart of the PPD

The following chart shows the schedule for the whole project (including the code inspection that is not related with myTaxiService).

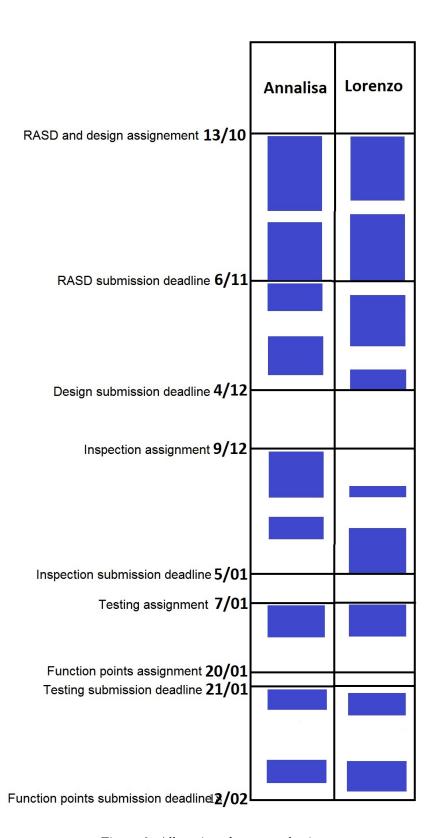


Figure 9: Allocation chart complessivo

## 5 Risks for the project

In the following section are shown some potential risks that the development of the application may encounter during the implementation phase or that the final product may experience after it's launch.

The probability criteria are the following:

- Low: probably won't occur during the implementation phase;
- Moderate: there is a fair chanche that this risk will occur;
- High: almost certainthat the problem will occur.

The effects criteria apply only if the problem occur and are the following:

- Marginal: the impact on the development and the final result is minimal;
- Critical: main consequences are loss of money directed to the development and major delay in delivery the final product or reduced functionalities when the product is delivered;
- Catastrophic: makes impossibile to finish the implementation or causes the final product tostop all of it's functions.

Risk	Probability	Effects
Lack of communication between members of the project	Low	Marginal
Unrealistic schedule of the project	Moderate	Critical
Lost data of the database	Low	Catastrophic
Key staff are ill at critical times in the project	Moderate	Critical
Requirements inflation in the implementation phase	Moderate	Critical
Specification breakdown (in the implementation phase some requirements may show conflicts)	Moderate	Critical

Table 5: Risks of the project con relative probabilities and effects

In the following table are shown some strategies to face the risks explained above.  $\,$ 

Risk	Strategy		
Lack of communication	Group e- mail accounts, trade instant messaging IDs, meet regulary		
Unrealistic schedule	Detailed schedule estimation, requirements scrubbing		
Lost data	Backup of the data and presence of another database		
Staff illiness	Reorganize team so that there is more overlap of work and people therefore understand each other's jobs.		
Requirements inflation	Constant involvement of the customers and developers		
Specification breakdown	Choose a product manager to handlecritical decisions		

Table 6: Risks of the project with relative strategies

## 6 Supporting information

#### 6.1 Tools used

- LyX: used to write this document.
- **DropBox**: used to share materials between members of the group.
- **GitHub**: used to share materials between members of the group and to deliver this document.
- Paint: used to build the pictures.

#### 6.2 References

- RASD: where we took the informations about task and time.
- ullet **DD**: where we took the informations about task and time.

- ITPD: where we took the informations about task and time.
- "Assignments 5 Project plan": template for the redaction of the project plan document.
- LATEX documentation: to support the redaction of this document.
- LyX documentation: to redact this document.
- Slides "Lesson PM 1" by Raffaela Mirandola: to study about schedule and risks in general.
- Slides "Cost Estimation" by Damian A. Tamburri: to study about Functional points and COCOMO in general.
- COCOMO II Manual

#### 6.3 Workload

The time spent to redact this document is approx:

Lorenzo Federico Porro : 12 hours Annalisa Rotondaro : 12 hours