

POLITECNICO DI MILANO

*Computer Science and Engineering*

**Project of Software Engineering 2: “*myTaxiService*”**

**Project Plan Document**

***Author***: Andrea Maioli (mat. 852429)

***Reference Professor***: Mirandola Raffaela

Sommario

[**1. Introduction** 2](#_Toc441334373)

[**2. Function Points** 2](#_Toc441334374)

[**3. COCOMO** 2](#_Toc441334375)

[**4. Tasks and Schedule** 2](#_Toc441334376)

[**5. Resources allocation** 2](#_Toc441334377)

[**6. Risks** 2](#_Toc441334378)

**1. Introduction**

This document has the scope of evaluate and identify the time and resources necessary to the development of the myTaxiService application.

**2. Function Points**

Ordinare per:  
Tabelle pesi

Analisi elementi

Tabella con pesi ed elementi

Risultato in SLOC

* 1. **Internal Logic Files**

|  |  |  |  |
| --- | --- | --- | --- |
| **Record Elements** | **Data Elements** | | |
|  | 1-19 | 20-50 | 51+ |
| 1 | Low (7) | Low (7) | Average (10) |
| 2-5 | Low (7) | Average (10) | High (15) |
| 6+ | Average (10) | High (15) | High (15) |

The Internal Logic Files are homogeneous set of data used and managed by the application, and in the **myTaxiService** application are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ILF** | **Record Elements** | **Data Elements** | **Weight** | **Function Points** |
| Passenger | 2 | 11 | Low | 7 |
| Driver | 2 | 20 | Average | 10 |
| Operator | 2 | 10 | Low | 7 |
| Administrator | 2 | 11 | Low | 7 |
| Area | 2 | 6 | Low | 7 |
| Request | 1 | 12 | Low | 7 |
|  |  |  |  |  |
| **Total:** | | | | 45 |

Explanation:

|  |  |  |
| --- | --- | --- |
| **ILF** | **Data Elements** | **Record Elements** |
| User  (Not considered) | first name, last name, email, telephone, password, birthdate, address, city, zipcode, gender | User |
| Passenger | User’s data elements, request\_id | User, Passenger |
| Driver | User’s data elements, status, queue position, queue\_id, latitude, longitude, maxPassengers, workStartedAt, acceptedRequests, declinedRequests, currentRequestID | User, Driver |
| Operator | User’s data elements | User, Operator |
| Administrator | User’s data elements, special\_code | User, Administrator |
| Queue  (Not considered) | containedTaxis | Queue |
| Area | Queue’s Data Elements, name, startingLatitude, startingLongitude, endingLatitude, endingLongitude | Area, Queue |
| Request | passenger\_id, address, city, zipCode, taxi\_id, status, eta, numberOfPassengers, isFromACall, endLatitude, endLongitude, operator\_id | Request |

* 1. **External Interface Files**

|  |  |  |  |
| --- | --- | --- | --- |
| **Record Elements** | **Data Elements** | | |
|  | 1-19 | 20-50 | 51+ |
| 1 | Low (5) | Low (5) | Average (7) |
| 2-5 | Low (5) | Average (7) | High (10) |
| 6+ | Average (7) | High (10) | High (10) |

The External Interface Files are homogeneous set of data used by the application but generated and maintained by other applications, and in myTaxiService application are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EIF** | **Record Elements** | **Data Elements** | **Weight** | **Function Points** |
| Map Data | 1 | 1 | Low | 5 |
| Coordinate | 1 | 3 | Low | 5 |
| ETA | 1 | 2 | Low | 5 |
| SMS | 1 | 1 | Low | 5 |
|  |  |  |  |  |
| **Total:** | | | | 20 |

|  |  |  |
| --- | --- | --- |
| **ILF** | **Data Elements** | **Record Elements** |
| Map Data | image | Map Data |
| Coordinates | Latitude, longitude, address | Coordinates |
| ETA | arrivalTime, remainingTime | ETA |
| SMS | sendStatus | SMS |

* 1. **External Inputs**

|  |  |  |  |
| --- | --- | --- | --- |
| **File Types** | **Data Elements** | | |
|  | 1-4 | 5-15 | 16+ |
| 0-1 | Low (3) | Low (3) | Average (5) |
| 2-3 | Low (3) | Average (5) | High (6) |
| 4+ | Average (5) | High (6) | High (6) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EI** | **File Types** | **Data Elements** | **Weight** | **Function Points** |
| Passenger Registration | 1 | 14 | Low | 3 |
| Call Center Forced User Registration | 2 | 11 | Average | 5 |
| Login | 4 | 5 | High | 6 |
| Logout | 4 | 2 | Average | 5 |
| Call Center Request | 6 | 8 | High | 6 |
| Passenger Request | 4 | 6 | High | 6 |
| Manage User Profile | 4 | 13 | High | 6 |
| Delete User Profile | 5 | 4 | Average | 5 |
| Create Area | 2 | 7 | Average | 5 |
| Manage Area | 2 | 8 | Average | 5 |
| Delete Area | 2 | 3 | Low | 3 |
| Update Driver Status | 2 | 5 | Average | 5 |
| End Request | 3 | 6 | Average | 5 |
| Report exceptional event | 4 | 8 | High | 6 |
| Accept Request | 3 | 6 | Average | 5 |
| Decline Request | 3 | 8 | Average | 5 |
| Report Passenger Status | 3 | 4 | Low | 3 |
| Update Driver Location | 2 | 4 | Low | 3 |
| Set Request End Point | 2 | 4 | Low | 3 |
|  |  |  |  |  |
| **Total:** | | | | 90 |

|  |  |  |
| --- | --- | --- |
| **EI** | **Data Elements** | **File Types** |
| Passenger Registration | User data elements, repeat password, activity button, message | Passenger |
| Call Center Forced User Registration | User data elements (without password), activity button, message | Passenger, Operator |
| Login | email, password, code + activity button, message | Operator, Administrator, Passenger, Driver |
| Logout | activity button, message | Operator, Administrator, Passenger, Driver |
| Call Center Request | address, city, zipCode, numberOfPassengers, driver\_id (derived and stored in the request), eta (calculated and stored), activity button, message | Request, Operator, Passenger, Area, Driver, ETA |
| Passenger Request | numberOfPassengers, driver\_id, latitude, longitude, activity button, message | Request, Passenger, Area, Driver |
| Manage User Profile | User data elements, level, activity button, message | Administrator, Operator, Passenger, Driver |
| Delete User Profile | user\_id, request\_id, activity button, message | Administrator, Operator, Passenger, Driver, Request |
| Create Area | name, startlatitude, startlongitude, endlatitude, endlongitude, activity button, message | Administrator, Area |
| Manage Area | name, startlatitude, startlongitude, endlatitude, endlongitude, area\_id, activity button, message | Administrator, Area |
| Delete Area | area\_id, activity button, message | Administrator, Area |
| Update Driver Status | tatus, driver\_id, queue\_id, activity button, message | Driver, Area |
| End Request | request\_id, area\_id, queue\_id, driver\_id, activity button, message | Driver, Request, Area |
| Report exceptional event | driver\_id, request\_id, area\_id, queue\_id, newdriver\_id, passenger\_id, activity button, message | Driver, Request, Area, Passenger |
| Accept Request | driver\_id, passenger\_id, request\_id, queue\_id, activity button, message | Driver, Request, Passenger |
| Decline Request | driver\_id, request\_id, queue\_id, queueposition, newdriver\_id, status, activity button, message | Driver, Request, Queue |
| Report Passenger Status | status, passenger\_id, activity button, message | Driver, Passenger, Request |
| Update Driver Location | latitude, longitude, newarea\_id, newqueue\_id | Driver, Area |
| Set Request End Point | address, request\_id, activity button, message | Driver, Request |

The External Inputs are elementary operation to elaborate data coming from the external environment, and in the myTaxiService application are:

* 1. **External Outputs**

|  |  |  |  |
| --- | --- | --- | --- |
| **File Types** | **Data Elements** | | |
|  | 1-5 | 6-19 | 20+ |
| 0-1 | Low (4) | Low (4) | Average (5) |
| 2-3 | Low (4) | Average (5) | High (7) |
| 4+ | Average (5) | High (7) | High (7) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EO** | **File Types** | **Data Elements** | **Weight** | **Function Points** |
| Request Notification | 3 | 3 | Low | 4 |
| Request Update Notification | 4 | 3 | Average | 5 |
| SMS Notification with Admin Code | 2 | 2 | Low | 4 |
| SMS Notification for passenger not found | 3 | 3 | Low | 4 |
|  |  |  |  |  |
| **Total:** | | | | 17 |

|  |  |  |
| --- | --- | --- |
| **EO** | **Data Elements** | **File Types** |
| Request Notification | address, numberOfPassengers, activity button | Request, Driver, Coordinate |
| Request Update Notification | status, eta, driver\_id | Request, Driver, Passenger, ETA |
| SMS Notification with Admin Code | Code, telephone number | Administrator, SMS |
| SMS Notification for passenger not found | Message, telephone number, request\_id | Passenger, Request, SMS |

The External Outputs are elementary operation that generates data for the external environment (usually includes the elaboration of data from logic files), and in the myTaxiService application are:

* 1. **External Inquiries**

|  |  |  |  |
| --- | --- | --- | --- |
| **File Types** | **Data Elements** | | |
|  | 1-5 | 6-19 | 20+ |
| 0-1 | Low (3) | Low (3) | Average (4) |
| 2-3 | Low (3) | Average (4) | High (6) |
| 4+ | Average (4) | High (6) | High (6) |

The External Inquiries are elementary operation that involves input and output (usually does not include significant elaboration of data from logic files), and in the myTaxiService application are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EQ** | **File Types** | **Data Elements** | **Weight** | **Function Points** |
| View User Information | 4 | 11 | High | 6 |
| View Area Information | 1 | 6 | Low | 3 |
| View Active Request Information | 3 | 12 | Average | 4 |
| View Queue Information | 2 | 1 | Low | 3 |
|  |  |  |  |  |
| **Total:** | | | | 16 |

|  |  |  |
| --- | --- | --- |
| **EQ** | **File Types** | **Data Elements** |
| View User Information | User’s Data Elements, code | Passenger, Administrator, Operator, Driver |
| View Area Information | Area’s Data Elements | Area |
| View Active Request Information | Request’s Data Elements | Request, Passenger, Driver |
| View Queue Information | position | Area, Driver |

|  |  |
| --- | --- |
| **FP Type** | **FP Count** |
| ILF | 46 |
| EIF | 20 |
| EI | 90 |
| EO | 17 |
| EQ | 16 |
|  |  |
| **Total:** | 189 |

UFP to SLOC : the multiplier for java code is 53.

10017 SLOC

**3. COCOMO II**

Organizzare la spiegazione dei software scale drivers

Introdurre spiegazione software costs driver

Until now, only one person has developed the project. In order to have a more realistic situation that corresponds to the reality, two developers with the same level of knowledge of the currently employed developer will be hired to help the development phase.

**3.1. Software Scale Drivers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Name** | **Factor** | **Value** |
| PREC | Precedentedness | Low | 4.96 |
| FLEX | Development Flexibility | High | 2.03 |
| RESL | Architecture / Risk Resolution | High | 2.83 |
| TEAM | Team Cohesion | Very High | 1.10 |
| PMAT | Process Maturity | High | 3.12 |
|  |  |  |  |
|  | | | 1.0504 |

PREC: Reflects the previous experience of the organization with this type of project. Very low means no previous experience, extra high means that the organization is completely familiar with this application domain.

It is set to “Low” because there is no enough experience with the used technology and the design skills achieved until now are not enough. The most of the notions and technology used for this project are new.

FLEX: Reflects the degree of flexibility in the development process. Very low means a prescribed process is set; Extra high means that the client only sets general goals.

It is set to “High” because there are some goals and some general key-point defined, but there is also a good level of flexibility.

RESL: Reflects the extent of risk analysis carried out. Very low means little analysis, extra high means a complete a thorough risk analysis.

TEAM: Reflects how well the development team know each other and work together. Very low means very difficult interactions, extra high means an integrated and effective team with no communication problems.

The hired developers will have a good level of experience in working in team, so it can be considered very high.

PMAT: Reflects the process maturity of the organization. The computation of this value depends on the CMM Maturity Questionnaire but an estimate can be achieved by subtracting the CMM process maturity level from 5. By analyzing the description of each CMM level, it can be a CMM level 3.

CMM level 3: defined. It is characteristic of processes at this level that there are sets of defined and documented standard processes established and subject to some degree of improvement over time. These standard processes are in place (i.e., they are the AS-IS processes) and used to establish consistency of process performance across the organization.

So, High

**3.2. Software Cost Drivers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Name** | **Factor** | **Value** |
| **Product** | | | |
| RELY | Required Software Reliability | Nominal | 1.00 |
| DATA | Data Base Size | Nominal | 1.00 |
| CPLX | Product Complexity | Nominal | 1.00 |
| RUSE | Developed for Reusability | Nominal | 1.00 |
| DOCU | Documentation Match to Lifecycle Needs | Nominal | 1.00 |
| **Platform** | | | |
| TIME | Time Constraint | Nominal | 1.00 |
| STOR | Storage Constraint | Nominal | 1.00 |
| PVOL | Platform Volatility | Low | 0.87 |
| **Personnel** | | | |
| ACAP | Analyst Capability | High | 0.85 |
| PCAP | Programmer Capability | Nominal | 1.00 |
| PCON | Personnel Continuity | Very High | 0.81 |
| APEX | Application Experience | Very Low | 1.22 |
| PLEX | Platform Experience | Very Low | 1.19 |
| LTEX | Language and Toolset Experience | Low | 1.09 |
| **Project** | | | |
| TOOL | Use of Software Tools | Low | 1.09 |
| SITE | Multisite Development | Extra High | 0.80 |
| SCED | Required Development Schedule | Nominal | 1.00 |
|  |  |  |  |
| **:** | | | 0.8266 |

**3.3. Results**

KSLOC = estimated lines of code using the FP analysis

E = exponent derived from Scale Drivers

EAF = product of all the cost drivers

SE = Schedule Equation Exponent derived from the Scale Drivers

Considering that the team is composed by three members, the actual duration of the development phase is 10 months. (AGGIUNGERE CHE è un arrotondamneto per eccesso per evitare problem con la deadline)

**4. Tasks and Schedule**

**4.1. Project Tasks**

1. Creation of the Requirement Analysis and Specification Document
2. Creation of the Design Document
3. Creation of the Integration Testing Plan Document
4. Creation of the Project Plan Document
5. Creation of the Project Presentation
6. Implementation
7. Integration Testing

**4.2. Project Schedule**

|  |  |  |
| --- | --- | --- |
| **Task** | **Starting Date** | **Deadline** |
| RASD | 15/10/2015 | 06/11/2015 |
| DD | 07/11/2015 | 04/12/2015 |
| ITPD | 07/01/2016 | 21/01/2016 |
| PPD | 21/01/2016 | 02/02/2016 |
| Project Presentation | 02/02/2016 | 24/02/2016 |
| Implementation | 25/02/2016 | 25/12/2016 |
| Integration Testing | 26/12/2016 | 07/01/2017 |

**5. Resources allocation**

Creare I diagrammi con I vari component da integrare:

* Per i documenti: capitolo X, Y, Z
* Per Implementation: componente x, y, z
* Per Integration: integrazione di x, y, z

Diagramma con me in tutto, tranne in implementation and integration (mettere membro 1,2,3)

**6. Risks**

**6.1. Project Risks**

Delays

One team member

Requirements Change

Lack of experience

**6.2. Technical Risks**

Downtime

Scalability issues? Only if cloud provider crashes

Data loss

Data leaks

Security problems

Junk code

Integration testing failures

**6.3. Business Risk**

Bankruptcy

Competitors