Car Pooling

Software Engineering Course Project

Project Plan Document

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Group 5

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# Project Plan Document

## Project Type

This is a web application which will be developed with the help of PHP, Oracle and the WAMP server (to situate a host for this project). This project is aimed to assist the LUMS community to plan, organize and execute trips by communicating on this application via a simple yet a user friendly interface which would make it easy for any user to launch or seek a query of their interest.

This project will work in tandem with the Information Systems & Technology (IST) wing of LUMS who shall provide with the necessary logins as well as the server to run this application on. It would also uphold the security protocol and help maintain information privacy for each member of the LUMS community from any sort of security attack.

## Process Model

Each step in this project depends on the execution of the preceding step which is why a waterfall model with feedback loops is a design choice for this implementation. Moreover, there is a high preference being given to the customers preference for deliverability and as working code and progress documentation would be delivered on regular intervals, the Agile Manifesto gives this project a stable foundation to work on.

Furthermore, as this project is to attempted in groups, pair programming is the best course of action to ensure efficient code is delivered. Pair programming also yields time efficiency and would reduce errors in code while it would help raise the quality of code being written. Also, ideas of any one individual can be discussed in more detail in a group before being coded in order to overcome any algorithmic and practical shortfalls in the design plan.

### Project Deliverables

1. Requirements document
2. Project plan
3. System design document
4. Test reports
5. Final code
6. Software manuals e.g. user, installation

## Project Tasks

Tasks to determine product statement

1. Identify project needs, benefits and constraints
2. Meet with customer
3. Conduct questionnaire
4. Define project purpose and scope
5. Identify user characteristics
6. Milestone: Product statement defined

Tasks to determine functional specification

1. Define desired input/output
2. Identify use cases
3. Identify functional and nonfunctional requirements
4. Review with course staff
5. Review with team members
6. **Milestone:** Functional specification defined

Tasks for scheduling

1. Group meetings schedule
2. Gantt charts
3. **Milestone:** Scheduling accomplished

Tasks to determine estimation

1. Cost estimation
2. Software model specified
3. FP calculations
4. Project meeting
5. **Milestone**: Estimations done

Tasks for designing phase

1. Identify Classes
2. Class Diagram
3. Communication Diagram
4. State and Sequence Diagrams
5. ER Diagram
6. Normalization of Tables
7. Webpage Designing
8. **Milestone**: Design Completed

Tasks for coding/implementation

1. Designing the database in SQL
2. Designing login/registration/preference forms
3. Handling the queries
4. Coding of all modules including searching, ranking and matching
5. **Milestone:** Coding done

Tasks for testing

1. Devising test cases
2. Test cases run
3. Debug the system for errors/ anomalous behavior
4. **Milestone:** Testing Complete

## Project Scheduling

The plan for the scheduling covers the entire lifecycle of the project. It entails all the activities that must be performed before starting the development work. Scheduling estimation and staff requirement estimations are perhaps the most important activities after cost estimation. As there is a strong relationship between the project duration and the staff time (measured in staff -months) required for completing the project. Later this schedule can be used for monitoring the progress of the project.

### Timeline Chart

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Task Name | Duration | Start | Finish | Predecessors | Resource Names |
| Product Statement | 3 days | Wed 2/20/13 | Fri 2/22/13 |  |  |
| Conduct Questionare | 2 days | Mon 2/25/13 | Tue 2/26/13 | 1 | Google Docs |
| User Input/ System Output identification | 2 days | Wed 2/27/13 | Thu 2/28/13 |  |  |
| Review with Course Staff | 1 day | Wed 2/27/13 | Wed 2/27/13 |  |  |
| Product Statement Defined | 0 days | Thu 2/28/13 | Thu 2/28/13 | 4 |  |
| Identify the functional specifications | 4 days | Thu 2/28/13 | Tue 3/5/13 | 4 | MS WORD/ Brains |
| Team meeting with Course Staff | 1 day | Wed 3/6/13 | Wed 3/6/13 | 6 |  |
| Functional Specifications defined | 0 days | Thu 3/7/13 | Thu 3/7/13 |  |  |
| Cost Estimation | 5 days | Mon 3/11/13 | Fri 3/15/13 |  | FP analysis,UCP analysis |
| Model Specification | 1 day | Fri 3/22/13 | Fri 3/22/13 |  |  |
| Team meeting with Course Staff | 1 day | Wed 3/27/13 | Wed 3/27/13 |  |  |
| Estimation Done | 1 day | Thu 3/28/13 | Thu 3/28/13 | 11 |  |
| Identify Classes using Noun Extraction | 2 days | Tue 3/26/13 | Wed 3/27/13 |  |  |
| State, Class and Sequence Diagrams | 7 days | Wed 3/27/13 | Thu 4/4/13 |  | MS VISIO |
| ER Diagram and Normalization | 2 days | Tue 4/2/13 | Wed 4/3/13 |  | SQL Developer |
| Pick or design a webpage template | 1 day | Tue 4/2/13 | Tue 4/2/13 |  | Adobe Photoshop,CSS |
| Software Design Completed | 0 days | Wed 4/3/13 | Wed 4/3/13 | 15 |  |
| Setting up the DB | 2 days | Tue 3/26/13 | Wed 3/27/13 |  | Oracle SQL |
| Registration/ Login form | 1 day | Thu 3/28/13 | Thu 3/28/13 | 18 | PHP/HTML |
| Preference Form | 1 day | Tue 3/26/13 | Tue 3/26/13 |  | HTML/ PHP |
| Query handling and displaying results | 2 days | Fri 4/5/13 | Mon 4/8/13 |  | PHP/ SQL |
| Code Implemented | 0 days | Thu 4/11/13 | Thu 4/11/13 | 24 | Dreamweaver,WAMP |
| Make Test cases | 1 day | Mon 4/8/13 | Mon 4/8/13 |  | Brain |
| Run test cases and Debug | 3 days | Tue 4/9/13 | Thu 4/11/13 | 23 | Web Server |
| Implement any added functionality | 3 days | Fri 4/12/13 | Tue 4/16/13 | 22 | Google API |
| Remove any bugs, finish the design and code | 10 days | Tue 4/16/13 | Mon 4/29/13 |  | Brain,Dreamweaver |

## Team Structure

|  |  |  |
| --- | --- | --- |
| **Role** | **Responsibility** | **Person** |
| Project Planner , Documentation Manager, Code reviewer | To review all possible resources to plan each project stage and write its documentation. Also, to assist in planning, writing and reviewing each stage of code writing and web-page design (CSS) | Hasan Abbas |
| Project Manager,     Programmer, Architect,          Designer | Project Management using MS Project, programming different parts of the system, drawing of different charts and diagrams, webpage designing (CSS) | Muhammad Wajahat |
| Extreme Coder | Principle executioner to design and aid the webpage, database and security protocols implemented by Object Oriented PHP with Oracle, Javascript and WAMP server. | Luqman Ghani |
| Synchronizer and Stabilizer | To merge different segments of code to minimize workload on the server and make the code easier to understand. Also, to review each step of the documentation process to assist in any changes deemed necessary. | Usman Zaheer |

## Task and Member Assignment Table

### Allocation of People to Activities

|  |  |  |
| --- | --- | --- |
| ***No.*** | ***Activities*** | ***Members*** |
| ***1.*** | ***Database Design*** | ***Muhammad Wajahat / Luqman Ghani*** |
| ***2.*** | ***Web Page design*** | ***Muhammad Wajahat / Luqman Ghani*** |
| ***3.*** | ***Testing and verification*** | ***Hasan Abbas*** |
| ***4.*** | ***Estimation / Analysis*** | ***Usman Zaheer*** |
| ***5.*** | ***Designing Phase*** | ***Muhammad Wajahat / Luqman Ghani***  ***/ Usman Zaheer / Hasan Abbas*** |
| ***6.*** | ***Functional Specification*** | ***Hasan Abbas / Usman Zaheer*** |

## Project/Product Estimates

### Project Estimation by Function Point Analysis

**The Credentials Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Description** | **Count as a DET?** | **Notes** |
| **Username** | **LUMS username (will serve as primary key for the table)** | **Yes** |  |
| **Password** | **LUMS password** | **Yes** |  |
| **Total DETs:** | **2** |  |  |

**Personal Information Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Description** | **Count as a DET?** | **Notes** |
| **Username** | **Foreign key from credentials table. Will also serve as primary key for this table.** | **Yes** |  |
| **Fname** | **First name** | **Yes** |  |
| **Last name** | **Last name of the user** | **Yes** |  |
| **Gender** | **Male/Female** | **Yes** |  |
| **Contact** | **Contact number of the user** | **Yes** |  |
| **Status** | **Student/Faculty/Staff** | **Yes** |  |
| **Interest** | **General interests of the user** | **Yes** |  |
| **Other** | **Other info about the user** | **Yes** |  |
| **Total DETs:** | **9** |  |  |

**Ratings Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Description** | **Count as a DET?** | **Notes** |
| **Username** | **Foreign key from credentials table. Will also serve as the primary key for this table.** | **Yes** |  |
| **Rating** | **A value between 0 and 10** | **Yes** |  |
| **Total DETs:** | **2** |  |  |

**Lifts Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Description** | **Count as a DET?** | **Notes** |
| **Lift\_id** | **Sequential id. Assigned by the system and it will serve as the primary key for the this table.** | **No** | **This field is not visible to the user and hence not user-recognizable. Hence it will not count as a DET.** |
| **Lift\_name** | **Name given to the lift by the lift-provider** | **Yes** |  |
| **Source** | **Start place of the ride** | **Yes** |  |
| **Destination** | **End place of the ride** | **Yes** |  |
| **Vehicle\_type** | **Description of the vehicle** | **Yes** |  |
| **Lift\_time** | **Time of the lift** | **Yes** |  |
| **Lift\_date** | **Date of the lift** |  |  |
| **Num\_seats** | **No. of seats available** | **Yes** |  |
| **Username** | **Foreign key from the credentials table.** | **Yes** |  |
| **User\_type** | **Indicates whether the user is lift\_provider/lift\_subscriber/on\_waiting\_list for this lift.** | **Yes** |  |
| **Total DETs:** | **9** |  |  |

**Total Function Points due to ILFs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ILF** | **No. of RETs** | **No. of DETs** | **Complexity** | **Function points** |
| **Credentials** | **1** | **2** | **Low** | **7** |
| **Personal Information** | **1** | **9** | **Low** | **7** |
| **Ratings** | **1** | **2** | **Low** | **7** |
| **Lifts** | **1** | **9** | **Low** | **7** |
|  |  |  | **Total Function Points:** | **28** |

**Function Points due to EIFs:**

Because our system does not access any external file, therefore EIFs don’t contribute to the Function Point cost in our case.

Function Points due to EIFs = 0

**Function Points due to EIs:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **No. of DETs** | **FTR names** | **No. of FTRs** | **Resulting Complexity** | **Function Points** |
| **Login** | **2** | **Credentials** | **1** | **Low** | **3** |
| **Advertise Lift** | **9** | **Lifts** | **1** | **Low** | **3** |
| **Apply for lift** | **9** | **Lifts** | **1** | **Low** | **3** |
| **Update Personal Information** | **9** | **Personal Information** | **1** | **Low** | **3** |
| **Rate Partner** | **2** | **Ratings** | **1** | **Low** | **3** |
| **Modify trip specs** | **9** | **Lifts** | **1** | **Low** | **3** |
| **Confirm Lift** | **9** | **Lifts** | **1** | **Low** | **3** |
|  |  |  |  | **Total Function Points :** | **21** |

**Function Points due to EOs:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **No. of DETs** | **FTR names** | **No. of FTRs** | **Resulting Complexity** | **Function Points** |
| **Search Lifts** | **9** | **Lifts** | **1** | **Low** | **4** |
| **Cancel Lift** | **9** | **Lifts** | **1** | **Low** | **4** |
|  |  |  |  | **Total Function Points :** | **8** |

**Function Points due to EQs:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **No. of DETs** | **FTR names** | **No. of FTRs** | **Resulting Complexity** | **Function Points** |
| **Check Ratings** | **2** | **Ratings** | **1** | **Low** | **3** |
| **Check my lifts** | **9** | **Lifts** | **1** | **Low** | **3** |
|  |  |  |  | **Total Function Points :** | **6** |

**Final Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of Components** | **Complexity** | **Of** | **Components** |  |
|  | **Low** | **Average** | **High** | **Total** |
| **External Inputs** | **7x3=21** | **0x4=0** | **0x6=0** | **21** |
| **External Outputs** | **2x4=8** | **0x5=0** | **0x7=0** | **8** |
| **External Inquiries** | **2x3=6** | **0x4=0** | **0x6=0** | **6** |
| **Internal Logical Files** | **4x7=28** | **0x10=0** | **0x15=0** | **28** |
| **External Interface files** | **0x5=0** | **0x7=0** | **0x10=0** | **0** |
|  |  |  | **Total Number of Unadjusted Function Points** | **63** |
|  |  |  | **Multiplied Value Adjustment Factor** | **1.13** |
|  |  |  | **Total Adjusted Function Points** | **71.19** |

**Calculation of Value Adjustment Factor:**

|  |  |
| --- | --- |
| **General System Characteristic** | **Rating/Impact (On a scale of 0-5)** |
| **Data Communications** | **3** |
| **Distributed Data Processing** | **0** |
| **Performance** | **5** |
| **Heavily Used Configuration** | **2** |
| **Transaction Rate** | **4** |
| **On-line data Entry** | **5** |
| **End-user efficiency** | **5** |
| **Online update** | **5** |
| **Complex Processing** | **5** |
| **Reusability** | **5** |
| **Installation ease** | **5** |
| **Operational Ease** | **2** |
| **Multiple Sites** | **0** |
| **Facilitate Change** | **2** |
| **Total :** | **48** |

**VAF = 0.65 + (48/100) = 0.65 + 0.48 = 1.13**

### Project Estimation by Use Case Point Analysis

|  |  |
| --- | --- |
| **Use Case Name** | **No. of Transactions** |
| **Login** | **4** |
| **Advertise Lifts** | **6** |
| **Search lifts** | **4** |
| **Apply for lift** | **3** |
| **Cancel lift** | **3** |
| **Check Rating** | **5** |
| **Check my lifts** | **2** |
| **Update Personal Information** | **4** |
| **Rate Partner** | **3** |
| **Modify trip specs** | **4** |
| **Confirm lift** | **4** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Use case Complexity** | **Weight** | **Number of Use cases** | **Product** |
| Simple | 5 | 4 | 20 |
| Average | 10 | 7 | 70 |
| Complex | 15 | 0 | 0 |
| **Total** |  | **11** | **90** |

UUCW= **90**

|  |  |  |  |
| --- | --- | --- | --- |
| **Actor Type** | **Weight** | **Number of Actors** | **Product** |
| Simple | 1 | 1 | 1 |
| Average | 2 | 0 | 0 |
| Complex | 3 | 2 | 6 |
| **Total** |  |  | **7** |

UAW= **7**

|  |  |  |  |
| --- | --- | --- | --- |
| **Factor** | **Weight** | **Assessment** | **Impact** |
| Distributed System | 2 | 0 | 0 |
| Performance Objectives | 2 | 4 | 8 |
| End-User efficiency | 1 | 5 | 5 |
| Complex Processing | 1 | 2 | 2 |
| Reusable Code | 1 | 1 | 1 |
| Easy to install | 0.5 | 3 | 1.5 |
| Easy to use | 0.5 | 5 | 2.5 |
| Portable | 2 | 4 | 8 |
| Easy to change | 1 | 4 | 4 |
| Concurrent use | 1 | 5 | 5 |
| Security | 1 | 4 | 3 |
| Access for Third Parties | 1 | 1 | 1 |
| Training need | 1 | 0 | 0 |
| **Total (TFactor)** |  |  | **41** |

TCF =0.6 + (0.01×TFactor) = 0.6 + (0.01\*41) = **1.01**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factor** | **Weight** |  | **Assessment** | **Impact** |
| Familiar with the development Process | 1.5 |  | 3 | 4.5 |
| Application experience | 0.5 |  | 3 | 1.5 |
| Object Oriented Experience | 1 |  | 2 | 2 |
| Lead analyst capability | 0.5 |  | 2 | 1 |
| Motivation | 1 |  | 3 | 3 |
| Stable requirements | 2 |  | 4 | 8 |
| Part-time staff | -1 |  | 0 | 0 |
| Difficult Programming language | -1 |  | 2 | -2 |
| **Total (EFactor)** |  |  |  | **18** |

EF =1.4 + (−0.03× EFactor) = 1.4+ (-0.03 \* 18) = **0.86**

UUCP= UUCW + UAW= 90 +7 = **97**

UCP= TCF \* EF \* UUCP = 1.01 \* 0.86 \* 97 = **84.2542**

### Putting it all Together:

|  |  |  |
| --- | --- | --- |
| **Factor** | **Description** | **Weight** |
| UUCW | Unadjusted Usecase Weight | 90 |
| UAW | Unadjusted Actor Weight | 7 |
| TCF | Technical Complexity Factor | 1.01 |
| EF | Environmental Factor | 0.86 |

## Tools and Technology with reasoning

### Front End Tools

Adobe Photoshop, Adobe Dreamweaver, SQL Developer

#### Reasons

Adobe Photoshop will be used to make icons and graphics to be used in the GUI construction. Possible menu items for the web pages and customized icons and designs by utilizing its various functions.

Dreamweaver is a pertinent tool in designing web pages and efficient code implementation.

SQL Developer will be used to develop the database schema and checking queries that would result in time efficient results.

### Documentation Tools

Microsoft Word, Microsoft Visio

#### Reasons

Microsoft Word and Microsoft Visio will be used for documentation and technical writing and compilation purposes. Some project diagrams will be created in Visio and then imported in Word.

### Project Management Tools:

Microsoft Project

#### Reasons

Microsoft Project will be used basically to track the progress of our project to see how it is going according to schedule. It helps to visually track and manage the ongoing project. It also provides Gantt chart feature.

### Back End Tools

Oracle, PHP, JavaScript, WAMP server

#### Reasons

The project deals with a huge amount of data which is predicted to be in thousands or greater. We have to use Oracle as it is preferred by the IST department of LUMS. We will be using WAMP server to facilitate the development on our local machines as the availability of a server is not guaranteed.

JS will be used for client side input validation and other different good looking features.

### Version Control Tools

GIT, github

### Reasons

As it is a team project there can be a lot of difficulty managing updates in the code during the course of project, therefore, we would like a version control software like GIT to handle this for us. It will also help us merge the code written by different members of the team.