

Car Pooling

Software Engineering Course Project

Project Plan Document



Group 5

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Session 2012-2013

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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

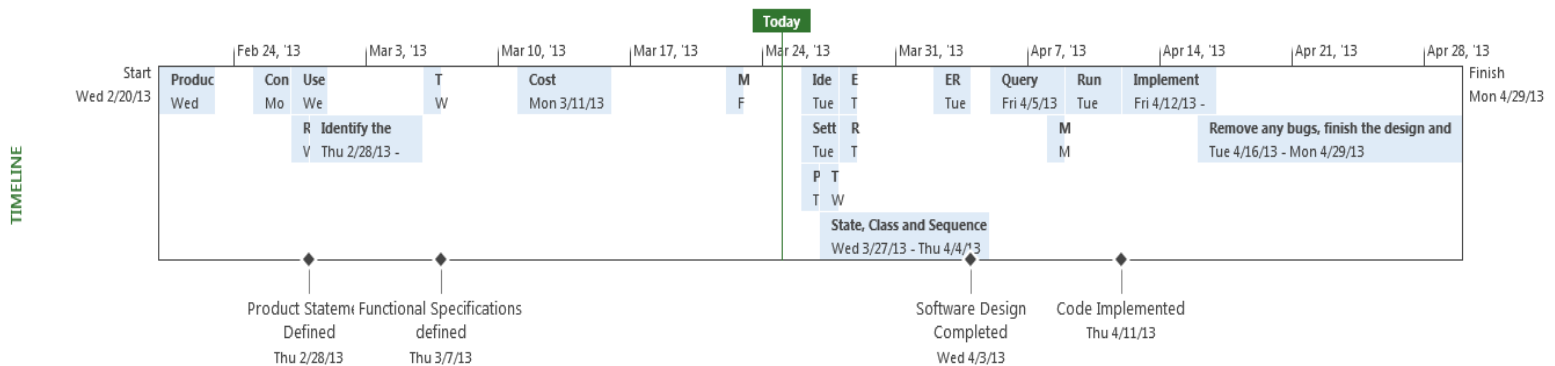
Tasks for testing

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

$$\text{VAF} = 0.65 + (48/100) = 0.65 + 0.48 = 1.13$$

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

$$TCF = 0.6 + (0.01 \times TFactor) = 0.6 + (0.01 \times 41) = \mathbf{1.01}$$

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

$EF = 1.4 + (-0.03 \times EFactor) = 1.4 + (-0.03 * 18) = \mathbf{0.86}$

$UUCP = UUCW + UAW = 90 + 7 = \mathbf{97}$

$UCP = TCF * EF * UUCP = 1.01 * 0.86 * 97 = \mathbf{84.2542}$

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.