AMBLE

Travel. Explore. Draw.

Introduction

LTA is in a large collaborative project with SIT to improve the commuting experience specifically during the First Mile and Last Mile (FMLM) portions of their journey. Our proposed mobile application (referred to as Amble hereafter) aims to improve the entire commute journey of users, specifically during the FMLM segments of walking to and fro from their current location to their intended destination. Amble will serve primarily as a navigational application for the user by providing routing functionality between points on the map. Additionally, through the use of gamification, Amble will allow users to better appreciate their walking experience by enticing them to explore their surroundings more by suggesting different nearby landmarks that they could check out and be able to view and create artworks at those locations, while on their FMLM journey.

Document Objective

This document outlines the entire process plan for the entirety of this project, and serves as a primer on understanding the concept, the applied methodologies and estimated cost, delivery and efforts of this project.

Glossary

Canvas
A canvas consists of a canvas drawing, with a title, description, location of the landmark at which the canvas was created.

Canvas Drawing
A canvas drawing consists of a picture taken at a Landmark, with drawings/scribbles done by the Users layered upon the picture.

First Mile/Last Mile (FMLM)
Imagine a commuter who usually gets to work by MRT every morning. After waking up and getting ready, the commuter typically has to either walk or cycle to the train station. This portion of the journey of getting from home to the MRT train station is an example of a First Mile (FM). Conversely, when the train arrives at the destination station, the

commuter then needs to walk from the station to the office location, and this is the Last Mile (LM).

First Mile (FM)
The journey from the User's current location to the location where the User boards a public transport vehicle.

Last Mile (LM)
The journey from the location where the User alights from a public transport vehicle to their final destination.

Journey
The process of following a defined route from one point to another point on the map.

Landmark
Designated areas dotted around Singapore where users who are within a certain distance from the area can view canvas created in that landmark or create their own canvas.

Landmark rating score
Users are able to give a rating from 0 - 5 for any particular landmark. The landmark rating would be the combined average rating from all the users that ever rated that particular landmark.

Canvas rating score
Users will be able to rate a Canvas by upvoting or downvoting on it. The number of upvotes and downvotes will contribute to a final rating score attributed to the Canvas, making it the Canvas rating score.

Personal rating score
A score determined by the combined value of all the upvotes on all the canvas created by the user divided by the combined value of all the downvotes on all the canvas created by the user.

Route
A defined path for the User to follow between any number of points on the map.

System
This refers to the Amble application.

Product Statement

Amble seeks to enhance the commuting experience of public transport users by providing a social artistic platform where users can explore and discover new FMLM routes and unleash their creativity at the same time.

Team Organisation

Name	**Responsibilities**
Lai Wei Fang Ted	Project Manager, Programmer, System Tester
Lim Wei Ming Shawn	Backup Project Manager, Lead Programmer, System Tester
Amirulamin Bin Mohd Osman	Backup Lead Programmer, System Tester
Chia Yi Hang	Programmer, System Tester
Pang Jun Rong	Programmer, System Tester
Tan Wei Han Darren	Programmer, System Tester

Process Description

Project Lifecycle

Amble will be developed using a modified Waterfall software development life cycle. However, maintenance phase will be omitted due to the nature of the project as an assignment for the module ICT2101 Introduction to Software Engineering, which does not include regular maintenance and support operations that would otherwise be usually included in a project. Similarly, actual deployment to the respective mobile platforms' application stores is also omitted, but would be considered as 'Deployed' once the application source files are handed over to the clients as part of the project submission.

Hence, the modified Waterfall approach will consist of the following high level overview of the sequential phases:

1. Requirement Specification
2. System Analysis and Design
3. Implementation
4. Verification and Validation
5. Deployment

Process Activities

Requirement Specification

Activity Name	Requirements Gathering
Activity Description	This process encompasses meeting up with the client to understand the user needs and requirements.
Entrance Criteria	This process starts once the contract is awarded to the team.
Exit Criteria	This process ends when the client signs off on the specified requirements.

Analysis and Design

Activity Name	Requirements Analysis
Activity Description	This process encompasses the in-depth review and understanding of the gathered requirements and converting them into documentable, measurable, actionable and testable use cases.
Entrance Criteria	This process starts once requirement gathering has started.
Exit Criteria	This process ends when there is sufficient analysis of requirements and the team has a clear understanding of the user requirements.

Activity Name	Requirement Specification Document
Activity Description	This process encompasses the creation of a document that consists of reviewing and documenting the gathered requirements through use cases and use case diagrams.
Entrance Criteria	This process starts once requirement gathering has started.
Exit Criteria	This process ends when the requirements have been fulfilled by the use cases and the use cases are complete and appropriately defines the system flow, and use case diagrams are added into the document and signed off by the client.

Activity Name	Process Plan Document
Activity Description	This process encompasses the creation of a document that provides the project background, adopted methodologies, team information and project information.
Entrance Criteria	This process starts once requirement gathering has started.
Exit Criteria	This process ends when the document contains the required information in a clear, understandable format by all stakeholders, and is signed off by the client.

Activity Name	System Analysis and Design
Activity Description	This process encompasses the analysis and design of the system, defining the elements of the system functions to satisfy the requirements.
Entrance Criteria	This process begins when the requirements specification document is signed off.
Exit Criteria	This process ends when the client signs off on the system design.

Activity Name	System and User Flow Design
Activity Description	This process encompasses a team discussion on the system flow and user flow to outline the entire system functionality.
Entrance Criteria	This process starts once the requirement gathering is completed.
Exit Criteria	This process ends when the system and user flow is completed.

Activity Name	Technology Stack Meeting
Activity Description	This process encompasses a team discussion on the technological stack to use.
Entrance Criteria	This process starts once requirement gathering is completed.
Exit Criteria	This process ends when the technological stack has been decided.

Activity Name	User Interface/Experience Design
Activity Description	This process encompasses the design and agreed upon standardisation of the User Interface and its elements and User Experience of the System.
Entrance Criteria	This process starts once the system and user flow is completed.
Exit Criteria	This process ends when the design of the user interface and experience is satisfactory, up to a maximum of 3 weeks.

Implementation

Activity Name	Technological Stack Familiarisation
Activity Description	This process encompasses individual familiarisation of the technological stack, researching, exploring and testing out the different mobile application frameworks and languages to be used.
Entrance Criteria	This process starts once the technological stack is decided.
Exit Criteria	This process ends two weeks after the process starts.

Activity Name	Test Plan Development
Activity Description	This process encompasses the test plan development for blackbox and whitebox testing.
Entrance Criteria	This process starts once system and user flow has been completed.
Exit Criteria	This process ends once the test plan is comprehensive and satisfactory, and is signed off by the client.

Activity Name	Development
Activity Description	This process encompasses technical development of the system and its functions.
Entrance Criteria	This process starts when the system design is signed off by the client and the technological stack familiarisation activity has started.
Exit Criteria	This process ends once the system and its functionalities are completed.

Activity Name	Technical Integration
Activity Description	This process encompasses integration of all components of the system into the final product.
Entrance Criteria	This process starts when more than two components of the system are fully built and are ready to be integrated.
Exit Criteria	This process ends once all components have been integrated into one complete system.

Verification and Validation

Activity Name	Test Plan Verification
Activity Description	This process encompasses verification of the system against the test plan.
Entrance Criteria	This process starts once the system development has been completed.
Exit Criteria	This process ends when all test cases from the test plan pass.

Activity Name	System Validation
Activity Description	This process encompasses validation of the system through a complete showcase of the system to the clients.
Entrance Criteria	This process starts when the test plan verification has been completed and the product is ready to be presented to the client.
Exit Criteria	This process ends when the client signs off on the system for deployment.

Deployment

Activity Name	Deployment
Activity Description	This process encompasses deployment of the system to the respective mobile app stores.
Entrance Criteria	This process starts after the client signs off on the system for deployment.
Exit Criteria	This process ends once the application source files are handed over to the client as part of the submission.

Effort Estimation

1) Calculate Unadjusted Function Points

Use Case Complexity and Weight	Number of Use Cases	Product of Weight with Number
Simple (5) (<=3)	25	5*25=125
Average (10) (4-7)	2	10*2=20
Complex (15) (7>)	0	15*0=0

Actor Type	Number of Actors	Product
Simple (1)	1	1
Average (2)	0	0
Complex (3)	1	3

Total Unadjusted Points = 145 + 4 = 149

2) Compute Technical Complexity Factor (0 to 5)

* Weight is obtained from example given in Week 03 Lecture Slides Page 55.

Factor	Description	Weight*	Degree of Influence (0-5)	Product
T1	Distributed System	2	0	0
T2	Response time/performance objectives	1	4	4
T3	End-user efficiency	1	4	4
T4	Internal processing complexity	1	3	3
T5	Code reusability	1	0	0
T6	Easy to install	0.5	1	0.5
T7	Easy to use	0.5	3	1.5
T8	Portability to other platforms	2	5	10

T9	System maintenance	1	0	0
T10	Concurrent/parallel processing	1	3	3
T11	Security feature	1	5	5
T12	Access for third parties	1	0	0
T13	End user training	1	0	0

Technical Complexity Factors (TCF) = 0.65 + 0.01 * 31

= 0.96

3) Adjusting for Environmental Complexity

Factor	Description	Weight	Assessment
E1	Familiar with the development process	1.5	5
E2	Part time workers	-1	0
E3	Analyst capability	0.5	4
E4	Application experience	0.5	5
E5	Object oriented experience	1	4
E6	Motivation	1	4
E7	Difficult programming language	-1	2
E8	Stable requirement	2	4

Environmental Factors (EF) = 1.4 + (-0.03 * 26)

= 0.62

Use Case Points = 149 * 0.96 * 0.62

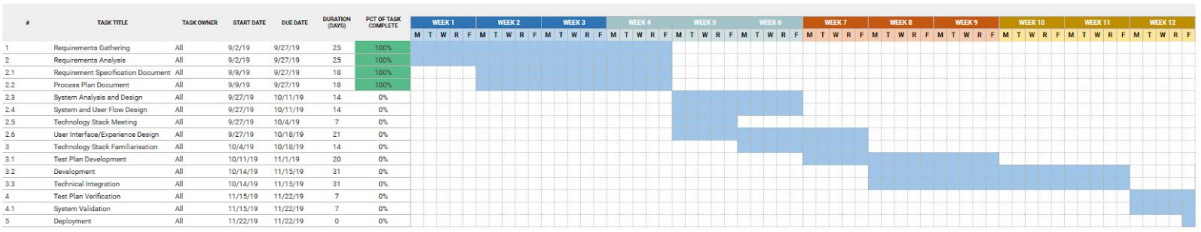
= 88.6848

The estimated effort in developer hours of Amble based on a UCP size of 89 is between 89 x 15 hours to 89 x 30 hours; between 1335 to 2670 hours.

Divided between 6 programmers, the estimated effort per developer is between 222.5 hours and 445 hours.

Project Schedule

Our project shall follow the estimated time schedule listed in the gantt chart.



#	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION (DAYS)	PCT OF TASK COMPLETE
1	Requirements Gathering	All	9/2/19	9/27/19	25	100%
2	Requirements Analysis	All	9/2/19	9/27/19	25	100%
2.1	Requirement Specification Document	All	9/9/19	9/27/19	18	100%
2.2	Process Plan Document	All	9/9/19	9/27/19	18	100%
2.3	System Analysis and Design	All	9/27/19	10/11/19	14	0%
2.4	System and User Flow Design	All	9/27/19	10/11/19	14	0%
2.5	Technology Stack Meeting	All	9/27/19	10/4/19	7	0%
2.6	User Interface/Experience Design	All	9/27/19	10/18/19	21	0%
3	Technology Stack Familiarisation	All	10/4/19	10/18/19	14	0%
3.1	Test Plan Development	All	10/11/19	11/1/19	20	0%
3.2	Development	All	10/14/19	11/15/19	31	0%
3.3	Technical Integration	All	10/14/19	11/15/19	31	0%
4	Test Plan Verification	All	11/15/19	11/22/19	7	0%
4.1	System Validation	All	11/15/19	11/22/19	7	0%
5	Deployment	All	11/22/19	11/22/19	0	0%

Team Reflection

Through the process of working on M1, it was indeed an eye-opener for our group. We realised the complexity of gathering and understanding the requirements of the project. After gathering the initial project requirements and brainstorming on ideas, the challenge we faced was understanding the entire user flow and breaking down and translating it to specific use cases. Through this process, we realised that communication is key in crafting out clear and concise use cases. During the process, there were times whereby standardising certain keywords are exceptionally important to ensure a clear use case. Often, there were times when individuals refer to a certain task differently or had different interpretations of how certain tasks are done. Thus, putting together the glossary with effective communication is important to ensure each member in the group is on the same page and there will not be conflicts when referring to the same task. We came to realise a good use case is not just beneficial within the team but especially so when the client reads it. This helps the client to understand our train of thoughts and also reduce miscommunication and misalignment when we move on to the other phases of the project.

Translating the tasks into a projected timeline through the use of the Gantt chart is extremely important. Through the creation of the Gantt chart, we understand the difficulties and constraints when it comes to predicting the time frame whereby specific features are to be completed. Overall, we recognised and understood the importance of the M1 phase even before starting on the technical development. Without proper planning and management, there is a huge risk of snow balling into the later stages of the project.