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3/7/2017

Project Plan

EXIT6 – Trip Planning Application
for Singapore

**Delivered by,
EXIT6 Team**

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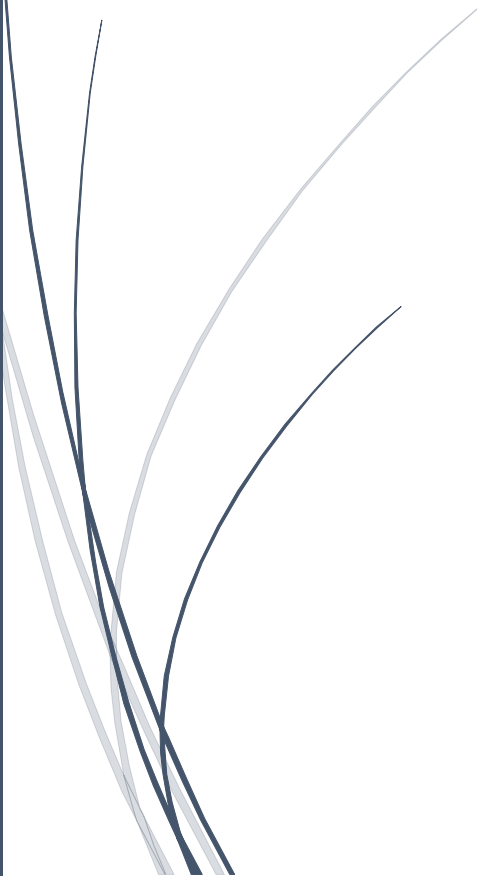
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Document Change Record

Revision	Description of Change	Approved by	Date
0.1.0	Initial Template	EXIT 6 Team	01/03/2017
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Project Description

Overview

The Exit6 Project Plan provides a complete detailed documentation of the whole project's execution requirements and timeline for both the developers and the client. Information regarding the overall project's budget, timeline and resource allocation will be defined in this report to ensure the smooth delivery of EXIT6 application. Supporting vendors and client can refer to this report to make necessary adjustments or inputs to the project.

In addition, this report serves as a communication platform between the development team and the company with regards to the resources required for the scale of the project.

Goals and Objectives

EXIT6 Trip recommendation application project aims to meet the follow goals/objectives:

1. Ensure the completed project is delivered on time and within the given budget.
2. Provides user with the most favorable choices of places to visit while using the application.
3. Minimize the learning time of the application for the user.
4. Provides user with accurate information on selected places of interest.
5. Collaborate with involved clients and vendors.
6. Increase the visits of popular tourist hotspots of a country.

Project Scope

"EXIT6", an android based application, is a trip recommendation application that aims to generate a recommended itinerary of Singapore based on the user's interests and preference, employing the use of algorithms to recommend a personalized itinerary of Singapore to tourists without the need for them to plan one manually. It will feature both a Recommendation mode

where an itinerary is generated by our application algorithm and a Do-it- Yourself (DIY) mode which provides flexibility to users who desire control over their itinerary.

Team Organization

Team Structure

EXIT6 Team structure is divided into 3 teams: Development, Release and Quality Assurance(QA). The development team is further categorized into front end and back end team. All teams are headed with an overall project manager.

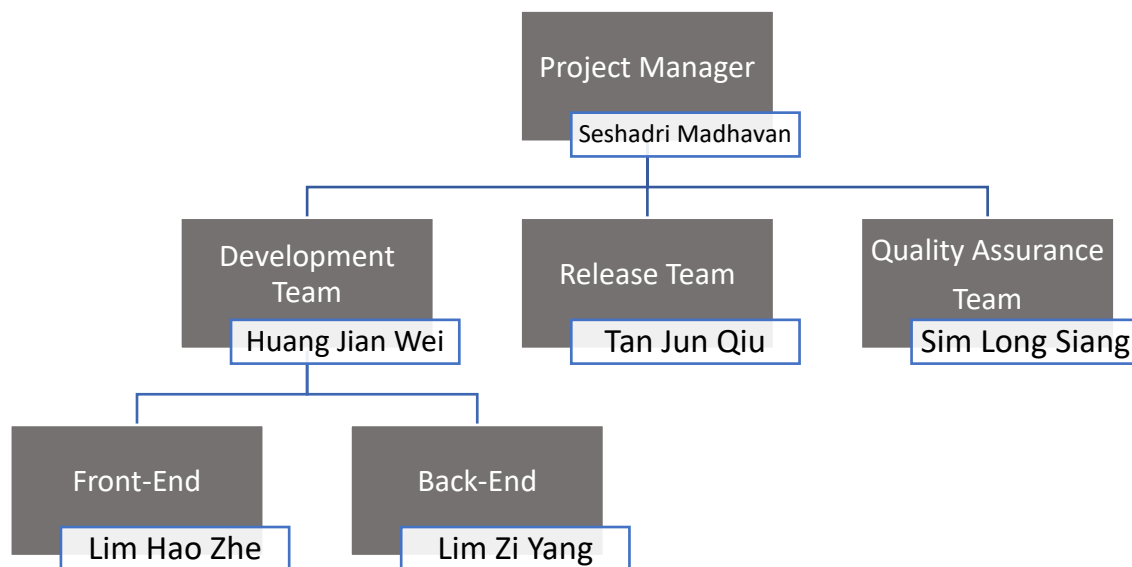


Figure 1 EXIT6 Team structure

Roles and Responsibility

1. Project Manager (Seshadri Madhavan)

Responsible for approving the following during the developmental projects.

- a. The System Requirement Specification(SRS) document.
- b. Project Plan Document.
- c. The overall time scale for the project.

- d. The choice of system development life cycle.
- e. The choice of software development tools and techniques utilized.

Other Responsibilities

- a. Monitor and track the progress of development.
- b. Resolve general project issues and problems.
- c. Constant update with involved parties (Vendors, Clients, etc.).
- d. Request budget and resources from sponsor.
- e. Manage other administrative matters not covered.

2. **Quality Assurance Manager (Sim Long Siang)**

The responsibilities of the Quality Assurance Manager are the following:

- a. Provides visibility into the processes being used by the software development teams and the quality of the products being built.
- b. Ensures that reviews and audits are carried out.
- c. Conduct SQ activities and record results and issues.
- d. Write and review Risk Assessment plan.

3. **Lead Developer Manager (Huang Jian Wei)**

The responsibilities of the Lead Developer Manager are the following:

- a. Defines architecture for the system.
- b. Approve choice of framework used for the system.
- c. Delegates task to respective Front-End and Back-End personnel.
- d. Collate resources required for the project.

4. **Front-End Manager (Lim Hao Zhe)**

The responsibilities of the Front-End Manager are the following:

- a. Design the user interface design of the system.

- b. Create Lo-fi/Hi-fi prototype.
- c. Review prototype design through design notebook.
- d. Co-ordination with Back-End Developer for integration.
- e. Organize usability test through test groups.
- f. Record usability errors and suggest improvements.

5. **Back-End Manager (Lim Zi Yang)**

The responsibilities of the Back-End Manager are the following:

- a. Handles the system's database and server creation.
- b. Integrate external data APIs into the system.
- c. Ensure smooth retrieval of data by API interfaces.
- d. Minimize the retrieval time of data.
- e. Co-ordination with Front-End Developer for integration.
- f. Write Software Test Plan (TP).

6. **Release Manager (Tan Jun Qiu)**

The responsibilities of the Release Manager are the following:

- a. Handles test processes by delegating it to team members.
- b. Documents all test that are carried out.
- c. Maintains a structure in the CVS repository by creating new directories and imposing establishing naming conventions.
- d. Manages the proof reading of all documents before release of system.

Communication Plan

Communication Plan is crucial for the smooth execution of the overall project. Having information consistently disseminated to various parties, it encourages active participation and feedbacks on the development of the software. The plan also effectively ensure that the development timeline is followed and are on track by having all members in the team updated with the progress of individual portfolio.

Audience

This communication plan is for the following audience:

- Project Manager
- Development Team
- External Vendor
- Clients
- Company's Executive Committee

Outreach

This communication plan is carried out in several platforms:

Routine Meeting

Meetings are conducted on a weekly basis for individual portfolio to update the whole team on the progress. Problems and issues are raised in this session to avoid deadlocks in progress. In addition, changes made from the client and vendors will be made known to respective team members.

Mobile Chat Application

Applications such as WhatsApp and Telegram are used to convey information and message after office hours. These information and messages are usually important and urgent which requires quick attention from the involved parties.

Video Conferencing

An alternative to the traditional board meeting, where the project manager updates the executive committee of the development of the software. This is used only when both parties could not arrange a face-to-face meeting or when emergencies arise.

Online Cloud Storage

Usage of online storage such as GitHub and Google Drive allows developers to work on the same files at the same time. The real-time changes features increase the efficiency of the

workload as the time of re-editing and re-saving files can be reduced significantly. Similarly, Multiple parties can view relating files at the same time.

Resource Allocation

Human Resource

Seshadri Madhavan is the project manager for the team. He is currently studying Computer Science at Nanyang Technological University in his final Semester. Madhavan is known for ensuring the demand of the project are met and has impeccable people management skills.

Sim Long Siang is the QA manager for the project. He is currently studying Computer Science at Nanyang Technological University. He has an eye for ensuring that the software has been tested as per the requirements. He possesses deep knowledge in Testing Methodology. He also possesses a great sense of meticulousness and pays high attention to detail which will facilitate the testing process.

Huang Jian Wei is the lead developer manager of the team. He is currently studying Computer Science at Nanyang Technological University. He has prior experience in developing Android Applications. He can get up to speed with new technologies quickly and is focused in completing any task given.

Lim Hao Zhe is the Front-End manager of the team. He is currently studying Computer Science at Nanyang Technological University. He has extensive knowledge in building UIs for Android applications and is quickly able to design and verify the validity of different UI designs.

Lim Zi Yang is the Back-End manager for this project, who is currently studying Computer Science at Nanyang Technological University. He has handled back-end application development during his prior internships and for other academic projects making him perfect for the task at hand.

Tan Jun Qiu is the Release manager of the team. He studies Computer Science at Nanyang Technological University. His analytical skills make him an ideal candidate for handling the release activities for the team.

Hardware & Software Resource

The technologies used for the implementation of EXIT6 Trip Planning Application are PostgreSQL running on android OS v5.0.2 (Lollipop).

Most of the work will be done on personal workstation such as Laptop with a minimum required of Intel Core i7 CPU. The software packages used for this project includes Microsoft Word for documentations, Visual Paradigm CE for analysis diagrams (e.g. Use case diagram), Android Studio for implementation of the front end and Microsoft PowerPoint for Lo-fi design.

Basic services such as internet connection and web browser are required for documents and code access. Java Development Kit and Xamarin android emulator are adds on from Android Studio required to run the prototype version on a virtual server.

Process Modelling

Lifecycle Modelling

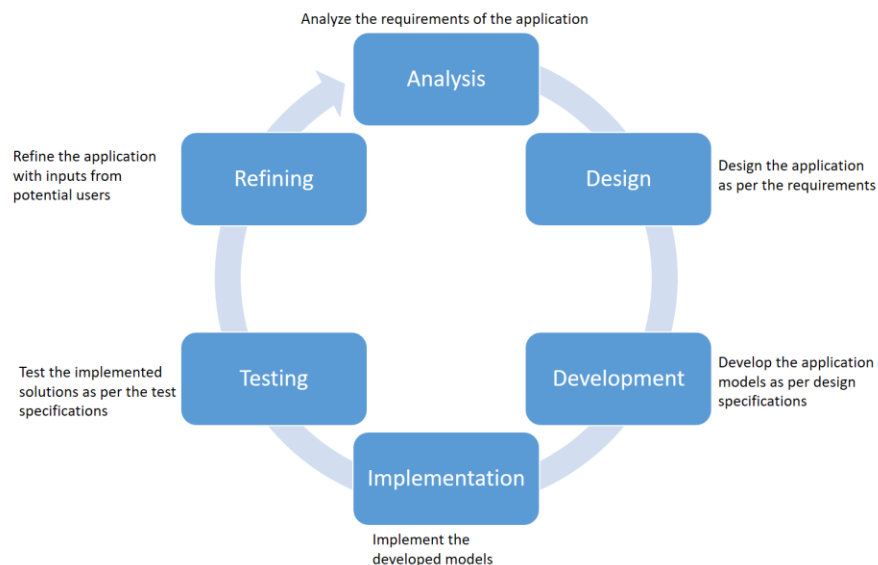


Figure 2 Lifecycle Model

EXIT 6 has adopted the Agile methodology (as seen in Figure 2) as our lifecycle model. Agile method was chosen as it's benefits help ensure we can overcome possible issues we might encounter during the project.

The main issue we face is the tight project schedule that we had to adhere to. Due to the time constraint, the project team must work as quickly as possible to complete both the documentation and the application to meet the project deadline. Due to its working, Agile method can reduce the time constraint faced. The testing of application is done throughout the whole project lifecycle ensuring that any errors are identified early and can be rectified immediately. This prevent the accumulation of errors which might have a snowball effect. Hence less time is spent on debugging the application.

Agile methodology ensures there is effective communication, vital for project to be completed successfully, within the team. Agile encourages constant communication among team members. This ensure feedback is regularly provided and all doubts can be clarified promptly.

Capability Maturity Model

EXIT6 establish itself as a new startup software company created in 2017. Given the experience and knowledge, this project will be implemented following the Capability Maturity Model – Level 2(Repeatable). The key process area are as follows:

1. Requirement Management
2. Software Project Planning
3. Software project tracking and oversight
4. Software Quality Assurance
5. Software configuration management

Software subcontract management is not included in the above key area as all processes and execution are in-house.

Key Process Area Definition

Table 1 Process Area Definition 1

Process 01	Requirement Management
Entry Criteria	None
Process Description	This process defines the procedures in acquiring requirements from the client. This ensure the correctness and quality of the documentation
Exit Criteria	Well defined System Requirement Specification
Begin	Obtain requirements from client Analyze requirements Define requirement feasibility and testability Prevent ambiguities in specification Interpret and clarify requirements Specify acceptance criteria Allocate requirements for processes Review the requirement with customer Ask customer to sign the requirement
End	

Table 2 Process Area Definition 2

Process 02	Software Project Planning
Entry Criteria	Project Manager has been selected A set of Project Proposal Document
Process Description	This process defines the overall working structure of the project, which includes quality management and risk management.
Exit Criteria	Well Defined Project Plan Document and Quality Plan
Begin	Plan project, create vision and goals Establish project schedule Establish project commitments Work breakdown structure Assign team member roles Estimate project Plan risk avoidance and mitigation Plan project quality management Plan for change control
End	

Table 3 Process Area Definition 3

Process 03	Software project tracking and oversight
Entry Criteria	Any stage of the development process
Process Description	This process happens over the period of the whole software development. It constantly keeps track of the progress of the project according to the schedule. It also tracks the resources used for the development.
Exit Criteria	Completion of the overall project Backlog documentation

	Resource tracking documentation
Begin	On Every Routine Meeting, Get updates on individual team members on their development progress and used resources. Cross-check and update backlog document Cross-check and update resource tracking document
End	Generate summary of progress report for project manager reference
Process 04	Software Quality Assurance
Entry Criteria	A set of Quality Plan Deliverables received by QA team
Process Description	This process happens when a deliverable is completed and received by the QA team for vetting. Referencing with the quality plan, this process ensures that the deliverables are of a minimal quality stated in the plan.
Exit Criteria	Revised Deliverables Approval of deliverables from QA team
Begin	When QA team receives a deliverable, QA team understand the inputs of the deliverable QA team understand the pre-defined quality standards of the deliverable using the quality plan QA team set up testing or comparison methodologies to compare the pre-defined quality standards and deliverable quality If quality approved, Sign approval document from QA team. Else, send change requests or bugs reports to developers of the deliverable and loop back to waiting for the revised deliverable.
End	

Table 4 Process Area Definition 4

Process 05	Software configuration management
Entry Criteria	A set of Project Proposal
Process Description	This process sets up the configuration management standard for the project to follow
Exit Criteria	Configuration management standard guideline Configuration management tools
Begin	Identity configuration management goals in project Choose appropriate tool for configuration tools Define conventions for release control Define the methodologies to report bugs Define the methodologies to suggest change requests Define methodologies to maintain historical data Document the configuration management standard guideline
End	

Project Schedule

Work Packages

The entire project work is broken down by the important phases of the software development life cycle. They include the following:

1. Project Proposal
2. Requirement Specification
3. Project Planning
4. Software Design
5. Implementation and Testing
6. Documentation
7. Pilot

Work Packages Dependencies and Details

The table shows the dependencies between the deliverable work packages, supported by the activity network diagram:

Table 5 EXIT6 Work Packages Table

Work Package #	Work Package Description	Duration	Dependencies
WP1	Project Proposal	11 days	-
WP2	Requirements Specification	14.5 days	WP1
WP3	Project Planning	10.5 days	WP2
WP4	Software Design	18 days	WP3
WP5	Implementation and Testing	18 days	WP3
WP6	Documentation	43.5 days	WP2
WP7	Pilot	34.5 days	WP3

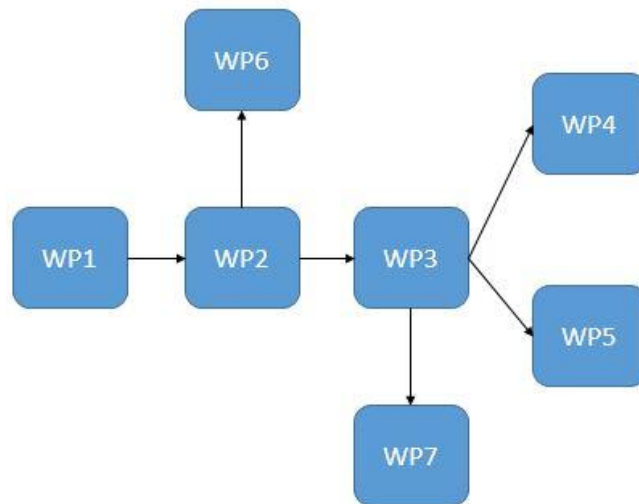


Figure 3 EXIT6 Activity Network Diagram for Work Packages

Details of the various work packages are listed below:

Project	EXIT6 Trip Planning Application
Work Package	WP1 – Project Proposal (1 of 7)
Assigned To	Seshadri Madhavan , Hwang Jian Wei, Lim Zi Yang, Lim Hao Zhe, Tan Jun Qlu, Sim Long Siang
Effort	11 PD (Person-Day)
Start Date	Tuesday, 17/01/17
Purpose	To start off the project with initial brainstorming of idea, to defining objective and goals.
Inputs	None
Activities	Idea generation, outlining project scope, generating design concepts, scheduling and budgeting, proposal documentation
Outputs	A written documentation of project proposal

Project	EXIT6 Trip Planning Application
Work Package	WP2 – Requirement Specification (2 of 7)
Assigned To	Seshadri Madhavan, Hwang Jian Wei, Lim Zi Yang, Lim Hao Zhe, Tan Jun Qiu, Sim Long Siang
Effort	14.5 PD
Start Date	Tuesday, 31/01/17
Purpose	To gather sufficient knowledge and information relating to the project, specify the resources required and define all relating system specifications.
Inputs	None
Activities	Investigation and analysis, customer profiling, outlining software and hardware requirement, defining quality metrics
Outputs	A written documentation of System Requirement Specification, Use case diagram

Project	EXIT6 Trip Planning Application
Work Package	WP3 – Project Planning (3 of 7)
Assigned to	Seshadri Madhavan , Tan Jun Qiu, Sim Long Siang
Effort	10.5 PD
Start Date	Tuesday 21/02/17
Purpose	To create a concrete project development process flow and management system, includes defining the methodologies for project management.
Inputs	Project Proposal
Activities	Resource allocation, project scheduling, risk management, finalisation and release of plan
Outputs	A written document of Project Plan, Quality Plan

Project	EXIT6 Trip Planning Application
Work Package	WP4 – Software Design (4 of 7)
Assigned To	Tan Jun Qiu , Sim Long Siang, Lim Zi Yang, Lim Hao Zhe, Hwang Jian Wei
Effort	18 PD
Start Date	Tuesday 07/03/17
Purpose	to start the software development from creating visual prototypes and sourcing available APIs to be used. To clarify with client about features of the application through Lo-fi design.
Inputs	System Requirement Specification (SRS) document
Activities	Designing Lo-fi and high-fi prototype, defining API for communication, UI Designing
Outputs	Prototype visualization

Project	EXIT6 Trip Planning Application
Work Package	WP5 – Implementation and Testing (5 of 7)
Assigned To	Lim Zi Yang, Lim Hao Zhe , Hwang Jian Wei , Seshadri Madhavan
Effort	18 PD
Start Date	Friday 10/03/17
Purpose	Translate initial software design into codes. Integrate between the server and the client and carry out constant testing for debugging
Inputs	System Requirement Specification (SRS) document
Activities	Server side implementation, Client side implementation, Developer testing (Primary Debugging), QA Testing
Outputs	Source code and header files

Project	EXIT6 Trip Planning Application
Work Package	WP6 – Documentation (6 of 7)
Assigned To	Lim Zi Yang , Tan Jun Qiu, Sim Long Siang
Effort	43.5 PD
Start Date	Monday 30/01/17
Purpose	Review and update previous documentations. Create release documentations (e.g. help specification and user manuals)
Inputs	None
Activities	Develop/review help specification and system, Develop user manuals, Review user

Outputs	documentation, incorporate feedback from client A written document of user manual, Release Plan, Change management Plan
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Project	EXIT6 Trip Planning Application
Work Package	WP7 – Pilot (7 of 7)
Assigned To	Seshadri Madhavan, Hwang Jian Wei, Lim Zi Yang, Lim Hao Zhe, Tan Jun Qlu, Sim Long Siang
Effort	34.5 PD
Start Date	Tuesday 21/02/17
Purpose	
Inputs	Source codes and header files
Activities	identify test group, develop software delivery mechanism, install/deploy software, obtain user feedback, evaluate testing information
Outputs	Test cases and requirement test coverage report, Test Plan

Work Breakdown Structure and Schedule

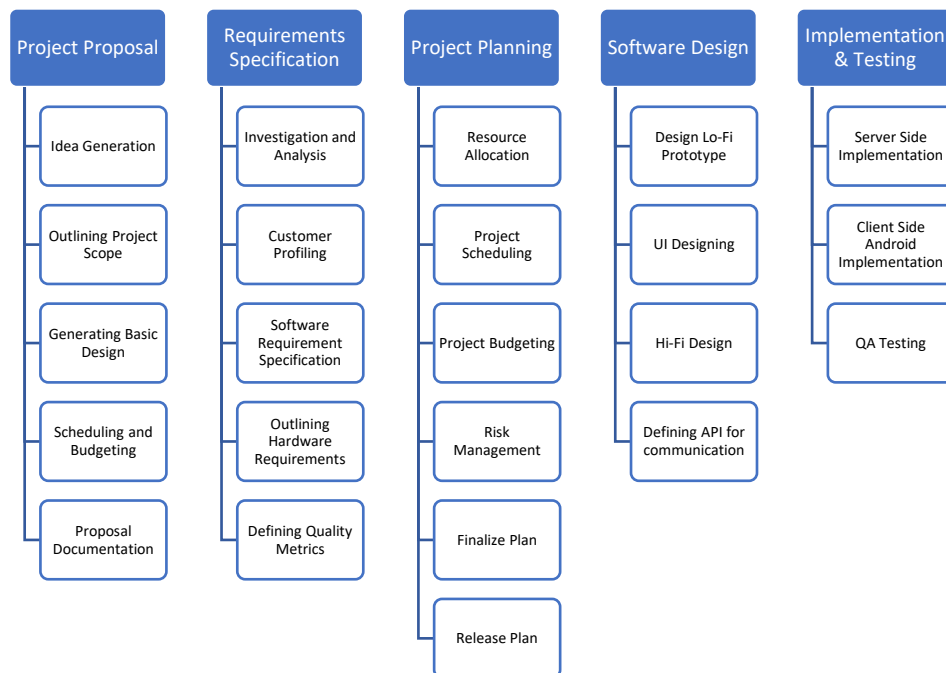


Figure 4 EXIT6 Work Breakdown Structure

Table 6 Project Plan

No.	Task Name	Duration	Start Date	End Date
	Software Development	59.5 days	Tue 1/17/17	Mon 4/10/17
	Project Proposal	11 days	Tue 1/17/17	Tue 1/31/17
1	Idea Generation	4 hours	Tue 1/17/17	Tue 1/17/17
2	Outlining Project Scope	3 days	Tue 1/17/17	Fri 1/20/17
3	Generating Design Concepts	4 days	Fri 1/20/17	Thu 1/26/17

4	<i>Scheduling and Budgeting</i>	1 day	Thu 1/26/17	Fri 1/27/17
5	<i>Proposal Documentation</i>	2 days	Fri 1/27/17	Tue 1/31/17
	<u>Requirements Specification</u>	14.5 days	Tue 1/31/17	Mon 2/20/17
6	<i>Investigation and Analysis</i>	5 days	Tue 1/31/17	Tue 2/7/17
7	<i>Customer Profiling</i>	6 days	Tue 2/7/17	Wed 2/15/17
8	<i>Software Requirement Specifications</i>	1 day	Wed 2/15/17	Thu 2/16/17
9	<i>Outlining Hardware Requirements</i>	4 hours	Thu 2/16/17	Thu 2/16/17
10	<i>Defining Quality Metrics</i>	2 days	Fri 2/17/17	Mon 2/20/17
	<u>Project Planning</u>	10.5 days	Tue 2/21/17	Tue 3/7/17
11	<i>Resource Allocation</i>	1 day	Tue 2/21/17	Tue 2/21/17
12	<i>Project Scheduling</i>	2.5 days	Wed 2/22/17	Fri 2/24/17
13	<i>Risk Management</i>	4 days	Fri 2/24/17	Thu 3/2/17
14	<i>Finalize Plan</i>	2 days	Thu 3/2/17	Mon 3/6/17
15	<i>Release Plan</i>	1 day	Mon 3/6/17	Tue 3/7/17
	<u>Software Design</u>	18 days	Tue 3/7/17	Fri 3/31/17
16	<i>Design Lo-Fi Prototype</i>	1 day	Tue 3/7/17	Wed 3/8/17
17	<i>UI Designing</i>	1 day	Wed 3/8/17	Thu 3/9/17
18	<i>Design Hi-Fi Prototype</i>	1 day	Thu 3/9/17	Fri 3/10/17
19	<i>Defining API for Communication</i>	15 days	Fri 3/10/17	Fri 3/31/17
	<u>Implementation and Testing</u>	18 days	Fri 3/10/17	Wed 4/5/17
20	<i>Server Side Implementation</i>	10 days	Fri 3/10/17	Fri 3/24/17
21	<i>Client Side Implementation</i>	10 days	Fri 3/10/17	Fri 3/24/17
22	<i>Developer Testing (primary debugging)</i>	2 days	Fri 3/24/17	Tue 3/28/17
23	<i>QA Testing</i>	6 days	Tue 3/28/17	Wed 4/5/17
	<u>Documentation</u>	43.5 days	Mon 1/30/17	Thu 3/30/17
24	<i>Develop Help specification</i>	3 days	Fri 3/24/17	Wed 3/29/17
25	<i>Develop Help system</i>	3 hours	Wed 3/29/17	Wed 3/29/17
26	<i>Review Help documentation</i>	2 hours	Wed 3/29/17	Thu 3/30/17
27	<i>Incorporate Help documentation feedback</i>	3 hours	Thu 3/30/17	Thu 3/30/17
28	<i>Develop user manuals specifications</i>	1 day	Mon 1/30/17	Mon 1/30/17
29	<i>Develop user manuals</i>	1 day	Wed 3/22/17	Wed 3/22/17
30	<i>Review all user documentation</i>	1 day	Thu 3/23/17	Thu 3/23/17
31	<i>Incorporate user documentation feedback</i>	1 day	Fri 3/24/17	Fri 3/24/17
	<u>Pilot</u>	34.5 days	Tue 2/21/17	Mon 4/10/17
32	<i>Identify test group</i>	1 day	Tue 2/21/17	Tue 2/21/17
33	<i>Develop software delivery mechanism</i>	1 day	Wed 2/22/17	Wed 2/22/17
34	<i>Install/deploy software</i>	1 day	Thu 3/30/17	Fri 3/31/17
35	<i>Obtain user feedback</i>	1 week	Fri 3/31/17	Fri 4/7/17
36	<i>Evaluate testing information</i>	1 day	Fri 4/7/17	Mon 4/10/17
	<u>Release</u>	0 days	Mon 4/10/17	Mon 4/10/17

Gantt Chart and Activity Dependency Chart

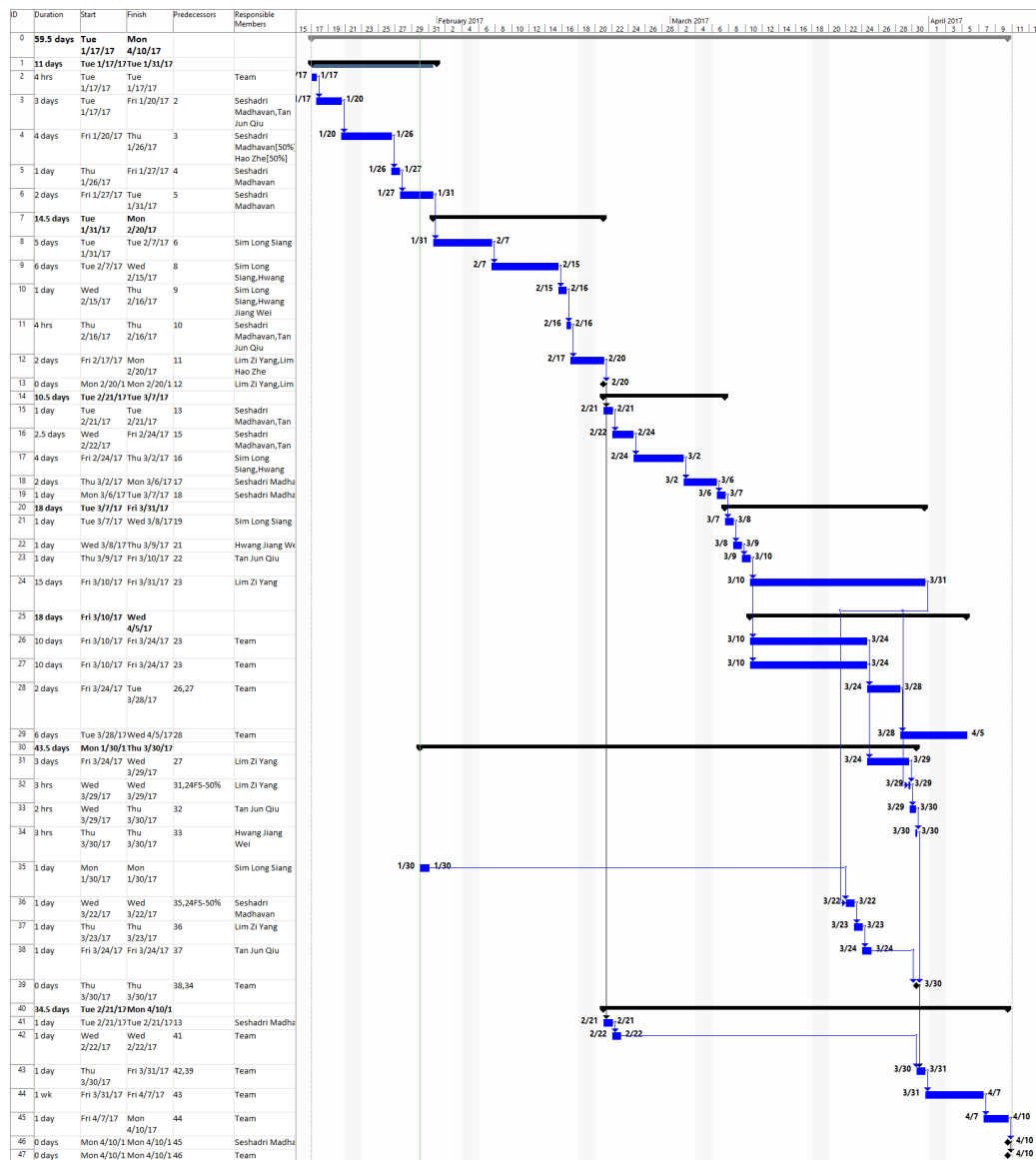


Figure 5 Gantt Chart

Product Checklist

This purpose of this checklist is to highlight the deadlines of each deliverables. It also serves as a milestone tracking list for the project.

Table 7 Product Checklist

Deliverables	Date of Delivery
Project proposal	31 st January 2017

System requirement specification	14 th February 2017
Quality plan	14 th February 2017
Use case Diagram	14 th February 2017
Project plan	7 th March 2017
Risk management	7 th March 2017
Prototype visualization	7 th March 2017
Code, video and documentation	7 th March 2017
Design report on software Maintainability	21 st March 2017
Configuration Management plan	21 st March 2017
Release plan	21 st March 2017
Enhanced prototype	4 th April 2017
Test plan	4 th April 2017
Test cases and requirement test coverage report	4 th April 2017
CMM level 2 Definition	4 th April 2017
Documentation	4 th April 2017

Project Estimates

Estimation Model – Function Point (FP) Model

Unadjusted function point are calculated based on the complexity of functions provided by this system. After which, Code size is then estimated by adjusted function point.

Unadjusted Function Point

The measure of unadjusted function points is based on five primary component elements of these functions: Inputs, Outputs, Inquiries, Logical Files, and Interfaces. Each element ranges from Low Complexity, Medium Complexity to High Complexity. The table below shows the detailed analysis of the complexity of the system and its rating:

Table 8 Function Point Estimate Model

Element	Complexity	Detail
Inputs	Low	Account management: Registration, login, change of preference
	Low	Create Trip menu inputs: Destination, Date, Budget
	Low	Interest filter selection
	Low	Select Create Trip mode: Recommendation Mode, DIY Mode
	Medium	DIY mode: Search for place of interest with Google Place Picker

	Medium	DIY mode: Search for place of interest by filters
Outputs	Low	Display of list of Recommended Itinerates generated by the application
	Low	Display of saved trips under user's profile
	Medium	Display of Recommended Itinerary summary
	Medium	Display of details of Recommended Itinerary
Inquiries	Low	Display of top rated trips
	Medium	Display of other recommendations when the user modifies a Recommended Itinerary
Internal Files	Medium	Trip database
	Medium	Account database
	Medium	Location database
	Medium	Events database
External Interface	Medium	Google Place API
	Medium	Eventful API
	Medium	Google Distance Matrix

Unadjusted Function Point (FP) Size Estimate Table

Table 9 Unadjusted Function Point Model

Characteristic	Low Complexity	Medium Complexity	High Complexity
# Inputs	$4 \times 3 = 12$	$2 \times 4 = 8$	$0 \times 6 = 0$
# Outputs	$2 \times 4 = 8$	$2 \times 5 = 10$	$0 \times 7 = 0$
# Inquiries	$1 \times 3 = 3$	$1 \times 4 = 4$	$0 \times 6 = 0$
# Internal Files	$0 \times 7 = 0$	$4 \times 10 = 40$	$0 \times 15 = 0$
# External Interfaces	$0 \times 5 = 0$	$3 \times 7 = 21$	$0 \times 10 = 0$
Total Unadjusted FP:	23	83	0
	106		

Influence Factor Estimate Table

Table 10 Influence Factor Estimate Table

Influence Factors	Score (0-5)	Details
Data Communications	5	Application frequently accesses database remotely

Distributed Functions	0	Single processor. Data processing on server-side
Performance	2	Response time must meet usability requirements (3 secs)
Heavily Used	4	Android Application is localised to NTU at launch. No more than 20 concurrent users at a time
Transaction Rate	2	Probability of handling more than a dozen simultaneous transactions is low
Online Data Entry	5	Most transactions are interactive
End-user Efficiency	3	Minimalistic user interface designed for user efficiency
Online Update	3	Updates are of low complexity but require prompt response (reflected within 15 secs)
Complex Processing	3	Relatively complex processing of inputs when a request is sent to the server
Reusability	1	No intention to reuse elements in other projects
Installation Ease	2	Installation involves downloading the application from the google play store
Operational Ease	4	Increased ease of use is a feature of the application
Multiple Sites	2	Project planned for Singapore for now but could extend to other countries in the future
Facilitate Change	4	Frequent entry, storage and alteration of tables in database
Total Score	40	

Influence Multiplier = Total Score * 0.01 + 0.65

$$= 40 * 0.01 + 0.65 = 1.05$$

Adjusted Function Point = Unadjusted FP * Influence Multiplier

$$= 160 * 1.05$$

$$= 111.3$$

Effort and Duration Estimation

Lines of Code(LOC)

Since our android application would be using **Java** as the main programming language, the **average LOC per function point** would be **53**

$$\begin{aligned}\text{Total LOC} &= 111.3 * 53 \\ &= 5898.9\end{aligned}$$

Given the assumption there to be 7 working days in a week and the **production rate** to be historically determined at **2 FP per week**:

$$\begin{aligned}\text{Effort} &= \text{Size} / \text{Production Rate} \\ &= 111.3 / 2 \\ &= 55.65 \text{ PW}\end{aligned}$$

$$\begin{aligned}\text{Duration} &= 3 \times (\text{Effort})^{1/3} \\ &= 3 \times (55.65)^{1/3} \\ &= 11.4 \text{ weeks}\end{aligned}$$

Budget Estimation

The budget for this project has been divided into two parts, namely the fixed expenses and variable monthly expenses. Fixed expenses are incurred during the start of the project and it is for procuring the resources required for the successful completion of the project. The variable expenses are for the Manpower costs, mainly the salary incurred for the development team. The detailed breakdown for both these categories have been provided in the following tables:

Table 11 Budget Estimation

Item	Supplier	Quantity	Unit Price (SGD)	Total (SGD)
Hardware Budget				
Development Phone	Alphabet Inc.	1	400	400
Development Laptop	Hewlett Packard Inc.	6	1200	7200

Software Budget				
App store Developer Fee	Google Inc.	6	100	100
Eclipse IDE	Eclipse Foundation	6	0	0
Visual Paradigm	Visual Paradigm International	6	0	0
Microsoft Office 365	Microsoft Corporation	6	0	0
Android Studio	Google Inc.	6	0	0
Total				7700

Table 12 Manpower cost

Role	Manpower Allocation	Monthly Expenses (SGD)	Total (SGD)
Project Manager	1	4000	10000
QA Manager and Engineer	1	3800	9500
Lead Developer	1	4000	10000
Front-End Developer	1	3000	7500
Back-end Developer	1	3000	7500
Release Engineer	1	3600	9000
Total			53500

Risk Management

Risk Identification

The following are risks identified for this project. All risks are given the probability of it occurring, severity of risk, impact of risk as well as the risk reduction. A detailed description of each factor is described below:

Probability

Probability is the chance the risk might occur within the project. The probability value is set between 1% to 100%.

Impact Severity

This determine how much harm the risk will cause should it occur. It will have a value of either: low, moderate, high and very high.

Impacts

This section describes the consequences of the risk.

Risk Reduction

This section focuses on possible methods in preventing or overcoming the risk.

Following are some of the risks associated with the project plan:

Risk 1: Front-end and Back-end Integration Delays

Impact Severity: High

Probability: 35%

Impacts: Delayed integration between the 2 ends result in date of project completion to be delayed.

Risk Reduction: The development team must meet up to perform the integration process together.

Any issues encountered must be addressed immediately.

Risk 2: Inaccurate Project Estimation

Impact Severity: Moderate

Probability: 20%

Impacts: An incorrect project estimation will provide wrong values in both effort (person-week) and duration (weeks) required to build the application.

Risk Reduction: Values in estimate table must be as realistic as possible to provide an accurate estimation.

Risk 3: Inaccurate Dependencies

Impact Severity: High

Probability: 20%

Impacts: The project schedule and cost will be severely impacted if dependencies forecasted are incorrect.

Risk Reduction: Values in the work package detail table must be pragmatic and not of wishful thinking.

Risk 4: Scope Creep

Impact Severity: High

Probability: 15%

Impacts: The constant changes made to the project scope raises project complexity. This delays the project schedule which in turn increase project cost.

Risk Reduction: Good communication between all parties ensure changes to project scope are made only when necessary.

Risk 5: Under Communication among Team

Impact Severity: Moderate

Probability: 25%

Impacts: Team will be unaware of application development progress when there is under communication.

Risk Reduction: Schedule a weekly meeting to allow team members to provide updates on respective task.

Risk Information Sheet

The following is the filled Risk Information Sheet:

Table 13 Risk Information Sheet 1

Risk information sheet			
Risk ID: 01	Date: March 7, 2017	Probability: 35%	Impact: High
Description: Front-end and Back-end Integration Delays			
Consequence: Delayed integration between the 2 ends result in date of project completion to be delayed.			
Refinement/context: Sub condition 1: Application is unable to pass data to server. Sub condition 2: Server is unable to pass data to application			
Mitigation/monitoring: Front end will attempt to connect to server through the application to pass and receive data from the server.			
Management/contingency plan/trigger: Development team to meet up to perform integration between both ends. Any issues encountered must be addressed immediately.			
History and Status: March 7, 2017: Monitoring			
Originator: Zi Yang		Assigned: Zi Yang	

Table 14 Risk Information Sheet 2

Risk information sheet			
Risk ID: 02	Date: March 7, 2017	Probability: 20%	Impact: Moderate
Description: Inaccurate Project Estimation			
Consequence: An incorrect project estimation will provide wrong values in both effort (person-week) and duration (weeks) required to build the application.			
Refinement/context: N/A			
Mitigation/monitoring: Values in estimate table must be as realistic as possible to provide an accurate estimation.			
Management/contingency plan/trigger: Refine the estimation once there is a clearer understanding of the project estimate.			
History and Current status: March 7, 2017: Monitoring			
Originator: Zi Yang		Assigned: Zi Yang	
Risk information sheet			
Risk ID: 03	Date: March 7, 2017	Probability: 20%	Impact: High
Description: Inaccurate Dependencies			

Consequence: The project schedule and cost will be severely impacted if dependencies forecasted are incorrect.	
Refinement/context: N/A	
Mitigation/monitoring: Values used in the work package detail table must be pragmatic and not of wishful thinking.	
Management/contingency plan/trigger: The work package in the table must be updated accordingly when dependencies of any package is delayed. This will provide an accurate estimation of project schedule.	
History and Status: March 7, 2017: Monitoring	
Originator: Zi Yang	Assigned: Zi Yang

Table 15 Risk Information Sheet 3

Risk information sheet			
Risk ID: 04	Date: March 7, 2017	Probability: 15%	Impact: High
Description: Scope Creep			
Consequence: The constant changes made to the project scope raises project complexity. This delays the project schedule which in turn increase project cost.			
Refinement/context: Sub condition 1: Changes are made to project scope after scope is already defined.			
Mitigation/monitoring: Good communication between all parties ensure changes to project scope are made only when necessary.			
Management/contingency plan/trigger: Project manager must ensure any changes made to project scope will not affect the project schedule and cost.			
History and Status: March 7, 2017: Monitoring			
Originator: Zi Yang		Assigned: Zi Yang	

Table 16 Risk Information Sheet 4

Risk information sheet			
Risk ID: 05	Date: March 7, 2017	Probability: 25%	Impact: Moderate
Description: Under Communication among Team			
Consequence: Team will be unaware of application development progress when there is under communication.			
Refinement/context: Sub condition 1: Lack of team meetings. Sub condition 2: Failure to provide updates of task at hand.			

Mitigation/monitoring: Conduct a mandatory weekly meeting to provide updates and clarify any doubt	
Management/contingency plan/trigger: If any team mate is unable to attend, he must provide updates through a mobile chat application (WhatsApp).	
History and Status: March 7, 2017: Monitoring	
Originator: Zi Yang	Assigned: Zi Yang

Quality Assurance

Quality Assurance has the following responsibilities:

- Identify weaknesses in the processes
- Correct those weaknesses to continually improve the process

The quality management system under which the EXIT6 Trip Planning Application is created is normally based on the three quality characteristics of a software which are:

- Functionality
 - Can it fulfil its purpose as a trip planning application?
 - Can it operate similarly to traditional method of trip planning – searching for location and slotting it into a time in a day?
 - Can it speed up the planning time as compared to traditional method?
 - Can one find a popular hotspot of a country using the application?
- Usability
 - How easy it is to use the application?
 - How long does it take for user to learn the application?
- Efficiency
 - How fast does it take to generate an itinerary based on user inputs?
 - How responsive are the external APIs in retrieving location ID and information?

EXIT6 Trip Planning Application will thus be using two testing methodologies:

- Unit Testing – for testing of individual components in the system (E.g. recommender engine)

Black and White Box Testing – for testing the whole system through the output/results

Software Quality Assurance for EXIT6 Trip Planning Application encompasses the entire software development life cycle and the goal is to ensure that the development and/or maintenance processes are continuously improved to produce products that meet specifications/requirements.

Monitoring and Control

Project monitoring and control are required to record and scrutinise the performance of the team in a project with relation to its progress. It is essential that we can pinpoint required changes to the project plan and implement these changes in a timely and efficient manner.

To achieve this, some important procedures are followed by the EXIT6 team:

Consistent reviews of project progress: For the whole period of EXIT6 Trip Planning Application project, routine weekly meetings are crucial to track the development. During the meeting, all project task will be reviewed, from management, planning, development to testing. In addition, documentations are regularly updated for team members to get the latest, most accurate information/changes.

Identification of major project risk: Early detection of possible risk can aid in the performance of the project as preventative measure can be applied and avoid causing delay to the development. Possible risk for this project are stated in the risk management section, accompanied by the respective measures to avoid them.

Communication between involved parties: Participation from clients and developers plays a part in delivering a smooth process for software development. Several communication platforms are formed under the communication plan for both the clients and developers. These platforms allow non-verbal communication to be passed to relevant personal in a shortest time possible.

Active Quality Management: Quality management activities should start right at the beginning of the whole project period. Every deliverable should be vetted by the QA team before it is fully approved. The importance of quality management activities from the start will lead to a consistent standard for the software at the later part.