

# Life Cycle Plan (LCP)

## Tour Conductor

### TEAM - 05

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12/01/2015

# Version History

Date	Author	Version	Changes made	Rationale
10/06/15	Ajay Kumar	0.1	Updated roles and skills of the development team.	To begin with the planning of project life cycle by finding the strength of each member and the skills.
10/12/15	Ajay Kumar	1.0	Updated section 1,2,3, 4 & 5	Identifying the project deliverables, all stakeholder's responsibilities, quality management process, tracking the project progress for ARB.  Calculate the estimate effort, time and cost of the project using COINCOMO.  This is the initial draft for FCP-ARB.
10/18/15	Ajay Kumar	1.1	Update for ARB feedback	Reworking of estimate effort, time using updated scale factors based on ARB feedback.
11/23/15	Ajay Kumar	2.0	Update for Development Plan	Development plan and outline for feature implementation
12/01/15	Ajay Kumar	3.0	Draft for TRR and DCR	Update iteration plan, CCD and capability tested

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# **1. Introduction**

## **1.1 Purpose of the LCP**

The LCP acts as a guide for controlling and monitoring the team in each phase and iteration of the project's life cycle. It elucidates for the available people, skills, and resources to advantage over the project's life cycle. It also tracks deliverables, milestones, team strategies, estimation of effort, cost and time. It aids in evaluating risks and issues so that the team can adjust the plan suitably to mitigate it.

## **1.2 Status of the LCP**

The status of this LCP is currently at the draft version of Development Commitment Review and is version 2.0. Sections 6 is updated along with section 2. The previous draft version had feedback of ARB.

## **1.3 Assumptions**

- The duration of the project is 12 weeks in fall 2015.
- The development team consist of 7 members listed before will work on the project during the fall semester.
- The project is expected to be worked later on by another team to continue.

## 2. Milestones and Products

This segment briefs the overall strategy that will be employed in each phase of the project life cycle with project deliverables and their due dates.

### 2.1 Overall Strategy

Tour Conductor is a new android mobile application along with web interface that needs to be developed from scratch. The team is following Architected Agile Process because a major portion of the application cannot be implemented using existing Non-Development Items. The team follows the Incremental Commitment Spiral Model.

#### Exploration phase

**Duration:** 9/10/15-9/22/15

**Concept:** Identify operational concept, system and software requirements and architecture, and life-cycle plan.

**Deliverables:** Client Interaction Report and Gathered Requirements.

**Milestone:** Valuation Commitment Review

**Strategy:** One Incremental Commitment Cycle, Win-Win Negotiation Sessions.

#### Valuation phase

**Duration:** 9/22/15-10/19/15

**Concept:** Identify Objectives, Constraints and Priorities, develop operation concept, explore alternatives, work on project feasibility evidence, Prototyping, Assess and plans to mitigate risks, Plan and manage project, perform win-win negotiation, Define quality and configuration policy.

**Deliverables:** Foundations Commitment Package

**Milestone:** Foundations Commitment Review

**Strategy:** One Incremental Commitment Cycle, Risk assessment analysis, Win-Win Negotiation Sessions, Planning Poker.

#### Foundations phase

**Duration:** 10/11/15-10/20/15

**Concept:** Assess Project Status, Plan and Manage Project, Manage Project Quality, Prototyping, Develop Software Architecture.

**Deliverables:** Draft Foundation Commitment Package, Bi-weekly Project Report and Plan, Weekly Effort Report

**Milestone:** Development Commitment Review

**Strategy:** One Incremental Commitment Cycle, Risk assessment analysis.

#### Development phase

**Duration:** 10/20/15- 12/07/15

**Concept:** Project plan, recording project progress and emphasize on implementing the system and performing tests. Core Capability Drive, Transition Readiness Review.

**Deliverables:** Final Package, Source code.

**Milestone:** Core Capability Drive, Draft Transition Readiness Review, Development Commitment Review.

**Strategy:** Development, Testing, Training, Deployment

## 2.2 Project Deliverables

The following are a list of deliverable artifacts grouped by phase.

### 2.2.1 Exploration Phase

**Table 1: Artifacts Deliverables in Exploration Phase**

<b>Artifact</b>	<b>Due date</b>	<b>Format</b>	<b>Medium</b>
Client Interaction Report	09/28/2015	.doc, .pdf	Soft copy
Program Model and Business Process Model	09/28/2015	.pdf	Soft copy
Valuation Commitment Package <ul style="list-style-type: none"><li>• Life Cycle Plan (LCP)</li><li>• Feasibility Evidence Description (FED)</li></ul>	09/28/2015	.doc, .pdf	Soft copy
Jira Report / git issue tracker	Every Monday	Text	On Jira Website
Project Plan	Biweekly on Wednesday	.mpp, .pdf	Soft copy
Progress Report	Biweekly on Wednesday	.xls	Soft copy

### 2.2.2 Valuation Phase

**Table 2: Artifact deliverable in Valuation Phase**

<b>Artifact</b>	<b>Due date</b>	<b>Format</b>	<b>Medium</b>
Team Prototype Presentation	10/02/2015	.ppt	Soft copy
Draft Foundation Commitment Package <ul style="list-style-type: none"><li>• Life Cycle Plan (LCP)</li><li>• Feasibility Evidence Description (FED)</li><li>• Prototype Report (PRO)</li><li>• Operation Concept Design (OCD)</li><li>• System and Software Architecture Description (SSAD)</li></ul>	10/13/2015	.ppt, .doc	Soft copy
Jira Report / git issue tracker	Every Monday	Text	Jira Website
Project Plan	Biweekly on Wednesday	.mpp, .pdf	Soft copy
Progress Report	Biweekly on Wednesday	.xls	Soft copy
Foundation Commitment Package <ul style="list-style-type: none"><li>• Life Cycle Plan (LCP)</li><li>• Feasibility Evidence Description</li></ul>	10/19/2015	.pdf, .doc	Soft copy



(FED) <ul style="list-style-type: none"> <li>• Prototype Report (PRO)</li> <li>• Operation Concept Design (OCD)</li> <li>• System and Software Architecture Description (SSAD)</li> </ul>			
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## 2.2.3 Foundations Phase

**Table 3: Artifact deliverable in Foundation Phase**

Artifact	Due date	Format	Medium
Foundation Commitment Package <ul style="list-style-type: none"> <li>• Operational Concept Description (OCD)</li> <li>• Prototype</li> <li>• Structured System analysis and Design</li> <li>• Life Cycle Plan (LCP)</li> <li>• Feasibility Evidence Description (FED)</li> <li>• Description (SSAD)</li> <li>• Test Plan and Cases (TPC)</li> </ul>	10/20/2015	.pdf, .doc	Soft copy
Jira Report and Git issue tracker	Every Monday	Text	Jira and GitHub Website
Project Plan	Biweekly Wednesday	.mpp, .pdf	Soft copy
Progress Report	Every Wednesday	.xls	Soft copy

## 2.2.4 Development Phase

Artifact	Due date	Format	Medium
Draft Transition Readiness Package <ul style="list-style-type: none"> <li>• Feasibility Evidence Description (FED)</li> <li>• Life Cycle Plan (LCP)</li> <li>• Operational Concept Description (OCD)</li> <li>• System and Software Architecture Description (SSAD)</li> <li>• Test Plan and Cases (TPC)</li> <li>• Test Plan (TP)</li> <li>• User Manual (UM)</li> <li>• Technical Material(TM)</li> </ul>	12/01/2015	.doc, .pdf	Soft copy
Core Capabilities Drive through Reporting	11/25/2015	Online Using TeamViewer	Online Using TeamViewer
Progress Report	Bi-weekly	.xls	Soft copy

	Wednesday		
Microsoft Project Plan	Bi-weekly Wednesday	.mpp, .pdf	Soft copy
Risk Analysis	Bi-weekly Wednesday	Text	Part of Progress Report
Development Commitment Package <ul style="list-style-type: none"> <li>• Feasibility Evidence Description (FED)</li> <li>• Life Cycle Plan (LCP)</li> <li>• Operational Concept Description (OCD)</li> <li>• System and Software Architecture Description (SSAD)</li> <li>• Test Plan and Cases (TPC)</li> <li>• Test Plan (TP)</li> <li>• User Manual (UM)</li> <li>• Technical Material(TM)</li> </ul>	12/07/2015	.doc, .pdf	Soft copy

**Table 2: Artifact deliverable in Development Phase**

### 3. Responsibilities

This segment briefs the obligation of all different stakeholders of the project and outlines the current & required skills of each teammate of the team.

#### 3.1 Project-specific stakeholder's responsibilities

Our client is Prof. David Klappholz from New Jersey. The idea behind the software is to enable the administrative user to put together tours of a university campus, a neighborhood within a city, or a city. A tour will consist of a number of sites to visit, information about each site, a logical sequence in which to visit the tour's sites, etc. tour taker users will be able to choose a tour and to take it using their mobile devices. Administrative users will put together tours using a browser, and tour taker users will take tours using android mobile device. Client maintains the application with the help of maintainers.

Responsibilities by Phase

The responsibilities of each member of the development team in the different phases of the project is given below in the table.

**Table 4: Stakeholder's Responsibilities in each phase**

Team Member / Role	Primary / Secondary Responsibility				
	Exploration	Valuation	Foundations	Development- Construction Iteration	Development - Transition Iteration
<b>Name:</b> Ajay Kumar <b>Role:</b> Project Manager, Life Cycle Planner, Prototype Builder	<b>Primary Responsibility:</b> Define the project plan, Schedule weekly Meetings, analyze risks and analyze current & required skills for the project. <b>Secondary Responsibility:</b> Update Jira and track the tasks.	<b>Primary Responsibility:</b> Facilitate client interaction, create & follow up the action items <b>Secondary Responsibility:</b> Update Jira, track issues on Git, Develop Prototype	<b>Primary Responsibility:</b> Detail Project Plan, Record Project Progress, Create and follow up action items <b>Secondary Responsibility:</b> Follow up on Jira & Git issues, analyze feasibility evidence, Work on prototype		
<b>Name:</b> Joseph <b>Role:</b> Operations Concept Engineer,	<b>Primary Responsibility:</b> Explore current system & alternatives	<b>Primary Responsibility:</b> Establish new operational concept, Identify	<b>Primary Responsibility:</b> Assess operational concept.		

Prototyper/Builder .	<b>Secondary Responsibility:</b> Define the vision with is agreed by all stakeholders.	organizational and operational transformation <b>Secondary Responsibility:</b> Work on Prototype	<b>Secondary Responsibility:</b> Analyze prototype and components, Work on Prototype.		
<b>Name:</b> Manas Yadav <b>Role:</b> Feasibility Analyst, Prototyper/Builder .	<b>Primary Responsibility:</b> Assess the Business case, Analyze & plan to mitigate the risks <b>Secondary Responsibility:</b> Define shared vision and Interact with client.	<b>Primary Responsibility:</b> Analyze NDI/NCS components, Explore alternatives <b>Secondary Responsibility:</b> Analyze and prioritize capabilities of prototype	<b>Primary Responsibility:</b> Assess feasibility evidence <b>Secondary Responsibility:</b> Assess the components and prototype, prototyping and identify the test cases.		
<b>Name:</b> Andrew Han <b>Role:</b> IIV & V, Quality Focal Point, Prototyper/Builder .	<b>Primary Responsibility:</b> Interact with client, Analyze current system, <b>Secondary Responsibility:</b> Assess the captured requirements.	<b>Primary Responsibility:</b> Capture and score MMFs and win-win conditions. <b>Secondary Responsibility:</b> Construct traceability matrix, Define and manage the quality management strategy.	<b>Primary Responsibility:</b> Assess project quality, Verify and validate work products using Git issue tacker. <b>Secondary Responsibility:</b> Analyze prototype and components, Develop Prototype.		
<b>Name:</b> Ankush H Prasad <b>Role:</b> System Architect, Prototyper/Builder , Project Manager	<b>Primary Responsibility:</b> Interact with client, Analyze current system, <b>Secondary Responsibility:</b> Setup and update website	<b>Primary Responsibility:</b> Assess and evaluate NDI/NCS candidates <b>Secondary Responsibility:</b> Analyze and prioritize capabilities of prototype	<b>Primary Responsibility:</b> Assess system architecture, define technology and architecture, Specify architecture styles, patterns and frameworks. <b>Secondary Responsibility:</b> Analyze priorities and		

			capabilities to prototype, assess prototype and components, Develop Prototype. Prepare list of test cases.		
<b>Name:</b> Aadithya B K <b>Role:</b> Requirements Engineer, Prototyper/Builder 	<b>Primary Responsibility:</b> Analyze current system, Capture requirements <b>Secondary Responsibility:</b> Setup winbook	<b>Primary Responsibility:</b> Capture and score MMFs and win-win conditions, Capture progress of win-win negotiation. <b>Secondary Responsibility:</b> Identify objectives, constraints and priorities.	<b>Primary Responsibility:</b> Define the system and software requirements. <b>Secondary Responsibility:</b> Analyze priorities and capabilities to prototype, assess prototype and components, Develop Prototype. Prepare list of test cases.		
<b>Name:</b> Rohith Ravindra <b>Role:</b> Life Cycle Planner, Prototyper/Builder 	<b>Primary Responsibility:</b> Plan and manage project, Identify current and required skills <b>Secondary Responsibility:</b> Interact with client, Analyze current system,	<b>Primary Responsibility:</b> Develop a detailed project plan, Identify responsibilities, Estimate effort and schedule. <b>Secondary Responsibility:</b> Develop Prototype	<b>Primary Responsibility:</b> Assess life cycle content, Detail Project Plan <b>Secondary Responsibility:</b> Assess prototype and components, Develop Prototype. Prepare list of test cases.		

## 3.2 Skills

Given below are the current and required skills relevant to this project, for each member of the development team.

**Table 5: Development team's skills**

Team members	Role	Skills
Ajay Kumar	Project Manager, Life Cycle Planner, Prototype Builder	Current skills: Java, C, C++, MySQL, python, Software Architecture, HTML5, CSS3, JavaScript, DOM, XML, A.I., Algorithms, Project Management, Git, Unit Testing.  Required skills: Android, UML, Google API, ICSM.
Joseph	Operations Concept Engineer, Prototyper/Builder.	Current skills: C, C++, C#, Java, HTML5, CSS3, JavaScript, XML.  Required skills: Android Development, wamp, PHP, HTML,CSS3.
Manas Yadav	Feasibility Analyst, Prototyper/Builder.	Current skills: Java, C, C++, Android Development, HTML5, CSS3, Javascript, PHP, DOM, XML, JSON.  Required skills: Android Development, PHP,HTML,CSS3
Andrew Han	IIV & V, Quality Focal Point, Prototyper/Builder.	Current skills:  Required skills:
Ankush H Prasad	System Architect, Prototyper/Builder.	Current skills: C, C++, Java, SQL, Python, VCS (Git, Bit Bucket), Software Design, Kernel dev, Scripting.  Required skills: Android advanced programming, multi-threading, Analysis of design patterns.
Aadithya	Requirements Engineer, Prototyper/Builder.	Current skills: C++, Python, Unity 3D, Unreal Engine 4, Algorithms, C#.  Required skills: Android,

		PHP, databases
Rohith	Life Cycle Planner, Prototyper/Builder.	Current skills set: Have experience in C++ and java programming, knowledge on algorithms, operating systems and kernel programming. Required skills set: Need to acquire knowledge on server side programming, android and UI technologies such as Bootstrap

## 4. Approach

This section describes the approach/tools the team uses to better track and control the progress of the project.

### 4.1 Monitoring and Control

The following are documentation and tools used for tracking and controlling the progress of the project:

- Bi-weekly progress report: To track the progress, current risks and activities planned for the next 2 weeks.
- Bi-weekly project plan: To plan future events and assign task to project members.
- Frequent Meetings: Meet four times a week to discuss the progress, solve any road blocks within the team and to plan for further progress.
- Client Meeting: Once a week, to show our work to the client and document feedback / requirement changes.
- Jira: To track tasks and documentation among team members.
- Git issue tracker: To track development issues, and progress.
- Winbook: Use the USC's tool to capture the requirements, to define priorities and during the requirements capture and prioritization, the client and the team used winbook to post issues, comments on different win conditions.

#### 4.1.1 Closed Loop Feedback Control

Internally within the team, we use the following as means of communication and feedback/ review of each other's work:

- WhatsApp Group: The team has created a group chat and this is our primary means of scheduling team meetings, team events.
- Slack: The team has created a slack group, and we use the group to post/discuss issues, share hyperlinks, media and documentation amongst ourselves. We review posts/documents uploaded by other team members.
- GitHub issue tracker: Team uses this to track development issues & defects in development.
- Jira: To assign and track tasks assigned to specific team members, along with logging the work.

#### 4.1.2 Reviews

The team uses the following review strategies as and when it is possible:

- IIV&V review: Every document uploaded is reviewed by Andrew and all the team member and bugs/tickets are issued incase defects are detected.



- Peer review: During team meeting we review each other's progress and work. Also, since we share documents on the slack. Any team member is allowed to post issues/comment on any documentation.
- Review by TA: Team can also get its work reviewed by the teaching staff of the course.
- Review Boards from Instructors & TA.

## 4.2 Methods, Tools and Facilities

The following table summarizes the tools the team uses in the project:

**Table 6: Tools used for the project**

<b>Tools</b>	<b>Usage</b>	<b>Provider</b>
Winbook	Capture and negotiate win conditions, define priorities to them.	USC
GitHub Issues Tracker	Track and report defects / bugs	GitHub
Slack	Share and review documents	Slack
WhatsApp Messenger	Organize/schedule team meetings,	Facebook
Project Website	Info regarding the project, central place to store all the documents, progress reports, plans and all the documents required.	USC
Microsoft Project	Project management and planning	Microsoft
MySQL Work Bench	To design DB schema and convert it into tables	Oracle
Microsoft Office	Documentation such as Client Interaction report, LCP, FED, OCD, SSAD, SID.	Microsoft'
Wix	Developing UI prototypes and demonstrating the work flow.	Wix
Visual Paradigm	UML case tool for modelling UML diagrams	USC
COINCOMO	Estimation of effort, schedule and cost of the project	USC
Java SDK	Development of project prototype	Oracle
Android SDK	Development of mobile application	Android
Android Studio	Integrated Development Environment	Eclipse Foundation
Google Map API	App retrieves the user location, show the tour on the map and different navigation maps	Google

## 5. Resources

In this section, we calculate the effort and schedule for our project using COINCOMO. The following conditions were used to calculate the cost of our system:

- Budget: \$0
- Project Duration – 12 weeks
- Programming language used – Android, php, sql, JS, HTML.
- Number of modules – 6
- Number of developers - 7

The following are the key modules of development for the Tour Conductor application along with their estimated source lines of code (SLOC).

**Table 7: List of modules for Tour Conductor**

No	Module Name	Brief Description	SLOC	REVL
1	Login and profile management of tour creator	Tour Creator can sign up on the website and once authorized be able to login to their profile. This requires an authentication check.	800	15%
2	Tour Creation Module.	The tour creator can create tour of places and even modify and update the already existing tour.	1400	10%
3	Query Module	The tour taker searches the tour nearby or searches using pin code. It's a query to the DB to get the corresponding results.	300	5%
4	Tour & stop View Activity	When the tour taker gets a list of tours available, he/she should be able to view the tours and within a tour all the stops available.	2000	15%
5	Map & navigation module	Once the tour taker chooses a particular tour, he should be able to view the map and all navigations option available.	500	10%

**Table 8: COCOMOII Scale Driver**

Scale Driver	Value	Rationale
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PREC	High	The team has a thorough understanding of the app objectives. There is scope for concurrent development.
FLEX	High	There is a basic need for software conformance with pre-established requirements and a considerable need for conformance with external interfaces.
RESL	Low	The team needs to identify and to resolve the module with high risk and stakes. There is some uncertainty regarding the architecture.
TEAM	High	Each member has experience in working with a team and also there is consistency in stakeholder's objectives.
PMAT	Low	Since this is the first time, most of the team members are working in such an environment the process maturity level is low.

**Table 9: COCOMOII Cost Driver, Module 1: Login and profile management of tour creator**

Cost Driver	Value	Rationale
RELY	Nominal	A failed login of tour creator is a moderately recoverable error and loss
DATA	Nominal	Login and sign up does require a lot of test data, mostly to handle invalid inputs.
DOCU	Low	Just about enough documentation to fit the life cycle needs is sufficient.
CPLX	Nominal	This will be reused code and has low complexity.
RUSE	Very High	The profile management's and login code can be used across multiple projects.
TIME	Nominal	Login does not require too much execution time.
STOR	Nominal	Profile data does not consume lots of memory.
PVOL	Low	Database platform updates less than once a month and google api's change with new version of android.
ACAP	High	Team of graduates with good analytical skills.
PCAP	High	Team of graduates with good programming skills
PCON	Very High	The entire team stays till the end of the semester.
APEX	Low	Team has very less experience in developing the web application authentication.
LTEX	Low	Team has the experience with programming language which is similar but less on web framework authentication.
PLEX	Nominal	Most team members have not worked on MEAN stack before
TOOL	Very High	Main tool is brackets with web framework plugins plugged in. Mature, Well Integrated tool.
SITE	Extra High	Team collaborates and works on campus which helps to have frequent meetings and work collaboratively

SCED	Nominal	Currently there is no expected acceleration or expansion
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**Table 10: COCOMOII Cost Driver, Module 2: Tour Creation Module**

Cost Driver	Value	Rationale
RELY	Nominal	Failure to create a tour is a moderately recoverable error and loss
DATA	Nominal	Need large number of test cases to test tour creation and updating since involves backend storage and network failures.
DOCU	Low	Just about enough documentation to fit the life cycle needs is sufficient.
CPLX	Nominal	This is straightforward code and has medium complexity.
RUSE	Low	The code is specific to this project hence cannot be reused as such.
TIME	High	Tour creation and updating requires a major part of execution time since it involves db query and to get the result back
STOR	Nominal	Consumes lots of memory since each tour is stored in DB and any update also has to query the db these require lot of memory.
PVOL	Low	The related platform being used like HTML, js, php and MySQL seldom changes.
ACAP	High	Team of graduates with good analytical skills.
PCAP	High	Team of graduates with good programming skills
PCON	Very High	The entire team stays till the end of the semester.
APEX	Nominal	Team has very less experience in developing the web application
LTEX	Nominal	Team has the experience with programming language which is similar but less on web framework.
PLEX	Very Low	Most team members have not worked on MEAN stack before
TOOL	Very High	Main tool is brackets with web framework plugins plugged in. Mature, Well Integrated tool.
SITE	Extra High	Team collaborates and works on campus which helps to have frequent meetings and work collaboratively
SCED	Nominal	Currently there is no expected acceleration or expansion

**Table 11: COCOMOII Cost Driver, Module 4: Query Module**

<b>Cost Driver</b>	<b>Value</b>	<b>Rationale</b>
RELY	Nominal	Failure to execute a query is a moderately recoverable error and loss
DATA	Nominal	Less test code to check the query execution.
DOCU	Low	Most of queries are self-explanatory and also less documentation needed.
CPLX	Nominal	This is straightforward code and has low complexity.
RUSE	Low	The code is specific to this project hence cannot be reused as such.
TIME	Nominal	It does not require too much execution time.
STOR	Nominal	Does not consume lots of memory.
PVOL	Low	The query language seldom changes as well the db.
ACAP	High	Team of graduates with good analytical skills.
PCAP	High	Team of graduates with good programming skills
PCON	Very High	The entire team stays till the end of the semester.
APEX	High	Team has good experience in SQL and querying
LTEX	High	Team has good experience in SQL and querying
PLEX	High	Team has good experience in SQL and querying
TOOL	Very High	Team has good experience in SQL and querying in php. It's a matured and has extensive support.
SITE	Extra High	Team collaborates and works on campus which helps to have frequent meetings and work collaboratively
SCED	Nominal	Currently there is no expected acceleration or expansion

**Table 12: COCOMOII Cost Driver, Module 5: Tour & Stop View Module**

<b>Cost Driver</b>	<b>Value</b>	<b>Rationale</b>
RELY	Nominal	Failure to view a tour or a stop within a tour queue is a moderately recoverable error and loss
DATA	Nominal	Since it contains gui components and async calls to backend needs more test data to validate.
DOCU	Nominal	Just enough documentation as its GUI components is self-explanatory.
CPLX	Nominal	This is straightforward code and has medium complexity.
RUSE	Low	The code is specific to this project hence cannot be reused as such.

TIME	High	The tour or the stop remains continuously displayed/ updated for the app for extended periods of time.
STOR	Nominal	Does not consume lots of memory but makes frequent backend calls
PVOL	Low	This is Android app. Android seldom changes version. (in a span of one year)
ACAP	High	Team of graduates with good analytical skills.
PCAP	High	Team of graduates with good programming skills
PCON	Very High	The entire team stays till the end of the semester.
APEX	Nominal	Team has very less experience in developing the android application
LTEX	Nominal	Team has the experience with programming language which is similar but less exposure to android.
PLEX	Low	Most team members have not worked on android platform before.
TOOL	Very High	Main tool is Android Studio with Android SDK plugged in. Mature, Well Integrated tool.
SITE	Extra High	Team collaborates and works on campus which helps to have frequent meetings and work collaboratively
SCED	Nominal	Currently there is no expected acceleration or expansion

**Table 13: COCOMOII Cost Driver, Module 6: Map & Navigation Module**

Cost Driver	Value	Rationale
RELY	High	If the navigation module fails it can lead to disaster at times. So it as to be accurate enough
DATA	Low	Since google maps is already tested and we are using that less data to test.
DOCU	Nominal	Just about enough documentation to fit the life cycle needs is sufficient.
CPLX	Nominal	This will be an implementation of google api's customized to each tour and has high complexity.
RUSE	Very High	This code can be reused for any application which uses map and custom info across projects
TIME	Nominal	Doesn't require much of execution time
STOR	Nominal	Consumes very less data since map gets rendered from google.
PVOL	Low	Maps api seldom get updated.
ACAP	High	Team of graduates with good analytical skills.
PCAP	High	Team of graduates with good programming skills
PCON	Very High	The entire team stays till the end of the semester.

APEX	Low	Team has very less experience in developing the android application with map apis
LTEX	Low	Team has the experience with programming language which is similar but less exposure to map apis
PLEX	Low	Most team members have not worked on android platform with map apis.
TOOL	Very High	Main tool is Android Studio with Android SDK plugged in. Mature, Well Integrated tool.
SITE	Extra High	Team collaborates and works on campus which helps to have frequent meetings and work collaboratively
SCED	Nominal	Currently there is no expected acceleration or expansion

The following is the COINCOMOII estimate of effort based on the scale drivers and cost drivers mentioned above.

**Figure 1: COINCOMO II Estimate**

USC COINCOMO 2.0 - C:\Users\Manyata\Documents\TourCond.cet

File Parameters Mode Help

TC - SubComponents's Overview COPSEMO

Scale Factor 18.59 Schedule (SCED)

Subcomponent Subcomponent(s) More Actions ...

X	Name	Size	Labor Rate (\$/Month)	EAF	Language	NOM Effort DEV	EST Effort DEV	PROD	COST	INST COST	Staff	Risk
<input type="checkbox"/>	Login and Profile	920	0.0	0.41	Non-specified	3.19	1.32	698.34	0.00	0.00	0.2	2.0
<input type="checkbox"/>	Tour Creation	1,540	0.0	0.38	Non-specified	5.34	2.01	767.34	0.00	0.00	0.3	0.9
<input type="checkbox"/>	QueryModule	315	0.0	0.21	Non-specified	1.09	0.23	1390.90	0.00	0.00	0.0	0.0
<input type="checkbox"/>	Tour and Stop view Module	2,300	0.0	0.41	Non-specified	7.98	3.29	698.28	0.00	0.00	0.5	0.9
<input type="checkbox"/>	Map and Navigation module	550	0.0	0.49	Non-specified	1.91	0.93	588.91	0.00	0.00	0.1	2.3

Estimation

Total Lines Of Code: 5,625 Hours/PM: 152.0

Estimated	Effort	Schedule	PROD	COST	INST	Staff	Risk
Optimistic	6.22	6.55	903.93	0.00	0.00	0.9	
Most Likely	7.78	7.03	723.14	0.00	0.00	1.1	6.2
Pessimistic	9.72	7.55	578.52	0.00	0.00	1.3	

From the above estimate: In the worst case, it requires about 152 hours per month for 7.55 months' worth of effort. Since the development team has 7 members, each working for at least 12 hours a week during the development phase. That's about  $7 \times 12 \times 4 = 336$  hours/per month. At this rate the project can be completed in  $152 \times 7.55 / 336 = 3.415$  months.

As stated above the team has 12 weeks and the estimate comes up to about 14 weeks. The project lacks around 2weeks of time. To solve this, we plan to discuss with the client to prioritize the requirements and identify requirements which don't need through testing. Also discuss if the authentication module be dropped so as to accommodate other features. So that we can accommodate the project to 12weeks. Update: As discussed with client we have dropped the tour creator authorization by client module.

## 6. Iteration Plan

### 6.1 Plan

This section outlines the overall plan for each development iteration. It describes the capabilities to be implemented, tested and those that will not be tested. We used sprints to follow track progress and plan both android and web development.

After the Core Capability Drive, team and client would check and record the accomplishments and take use of it as the input to refine the development. At the same time, they would also test the core capability and make use of it as the input for testing. After the Core Capability Drive, there would be a milestone, TRR.

#### 6.1.1 Capabilities to be implemented

The following capabilities have been noted in order of similarity / implementation dependence with one another. Also, the dependency of each capability is documented with either its use case and/or the operational capability as documented in the 2 artifacts "System and Software architecture Description" and the "Operational Concept Description".

**Table 14: Construction iteration capabilities to be implemented**

ID	Capability	Description	Priority	Iteration
OC-1	Tour Creator Sign-up	Tour Creators are capable of creating accounts on Tour Conductor's Website.	Must Have	1
OC-2	Tour Creation	Tour Creators are capable of creating tours of specific areas that they wish to promote.	Must Have	1
OC-3	Location-Based Touring	Tour Takers are capable of accessing and taking all tours of areas near their location.	Must Have	1
OC-4	Tag-based Location Search	Tour Takers are capable of searching tours areas according to specific tags describing the desired areas.	Must Have	1
OC-5	View, Edit, and Delete Existing Tours	Tour Creators are capable of viewing, editing, and deleting	Must Have	1



		tours they have already created.		
LOS-1	Ease of use	The system shall be user-friendly and intuitive.	Should Have	1
LOS-2	Correctness	The system shall render the searched tours correctly on mobile platforms.	Must Have	1
OG-1	Finding tour easily	Make it convenient for users to tour around any area	Must Have	1
OG-2:	Search specific tour	Help users find specific location in a certain area	Must Have	1
OG-3	Create tours	Help the Cities(or other areas) to promote any touring route	Must Have	1

## 6.1.2 Capabilities to be tested

The following is a list of capabilities that will be tested along with their corresponding iteration. Also documented is the corresponding test case from the artifact “Test Plan & Cases”. The test case number mentioned below have already been mapped/ traced to their corresponding win conditions (requirements) in the above mentioned artifact

**Table 15: Construction iteration capabilities to be tested**

ID	Capability	Description	Priority	Iteration
OC-1	Tour Creator Sign-up	Tour Creators are capable of creating accounts on Tour Conductor’s Website.	Must Have	1
OC-2	Tour Creation	Tour Creators are capable of creating tours of specific areas that they wish to promote.	Must Have	1
OC-3	Location-Based Touring	Tour Takers are capable of accessing and taking all tours of areas near their location.	Must Have	1
OC-4	Tag-based Location Search	Tour Takers are capable of searching tours areas according to specific tags describing the desired areas.	Must Have	1
OC-5	View, Edit, and Delete Existing Tours	Tour Creators are capable of viewing, editing, and deleting tours they have already created.	Must Have	1
LOS-1	Ease of use	The system shall be user-friendly and intuitive.	Should Have	1
LOS-2	Correctness	The system shall render the searched tours correctly on mobile platforms.	Must Have	1
OG-1	Finding tour easily	Make it convenient for users to tour around any area	Must Have	1

OG-2:	Search specific tour	Help users find specific location in a certain area	Must Have	1
OG-3	Create tours	Help the Cities(or other areas) to promote any touring route	Must Have	1

### 6.1.3 Capabilities not to be tested

All the agreed features with client is being tested.

### 6.1.4 CCD Preparation Plans

The Core Capability Drive through (CCD) is scheduled to be on November 25th, 2015. Client and the team involved in the Core Capability Drive-through which is done over online using TeamViewer. The usage scenarios it will support are implemented feature set along with feedback.

#### *Sample Usage Scenario at CCD:*

Our client would assume the role of Tour creator and Tour Taker.

The following should be the sequence of events for both roles:

- Tour creator – register, log in, create tour, view tour and log out.
- Tour Taker – Search for the tour and take one tour out of the retrieved result.

This will be the core set of capabilities to be used and demonstrated in the CCD.

#### *Risk Management:*

The following are some measures the development team needs to carry out to ensure a smooth CCD.

- Continue prototyping through to identify and mitigate technical risk.
- Develop and test the mobile application along with website well in advance to the day of the CCD.
- Ensure the server is up and running by local server.
- Mobile device and local server is in same network and have access to internet.
- Double-check whether every requirement has been implemented.

## 6.2 Iteration Assessment

### 6.2.1 Core Capabilities Drive-Through Results

Positive feedback:

- Program exceeds expectation of the client
- Program will make it easier for tour creator to create tours and also makes it easier for tour takers to take tour.

Improvements suggested:

- Label names to be updated.
- Finish the edit/delete feature.

- User manual and testing.

Risks:

- Navigation between all stops.

## **6.3 Adherence to Plan**

The team really adhere to the sprint plans. Some features were still missing from CCD, like edit/delete tours. But it got completed on time. At the same time, the team should increase the time to test all features set. In the last few days of the development phase, the system's testing is accelerated and almost all the requirements is finished and tested.