

# LIFE CYCLE PLAN (LCP)

## Construction Meeting Minutes Application for DPW

### Team 6

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## VERSION HISTORY

Date	Author	Version	Changes Made	Rationale
10/14/2015	Qichen Gu	1.0	Created document from ICSM template, updated team roles and skill sections	For the FCR ARB Submission

Date	Author	Version	Changes Made	Rationale
11/25/2015	Qichen Gu, Pavan Vasani	1.5	Updated the iteration plan and the milestones section	For the DCR ARB Submission

Date	Author	Version	Changes Made	Rationale
12/01/2015	Qichen Gu, Pavan Vasani	1.8	Update the COCOMO estimation	Draft for the DCR ARB

Date	Author	Version	Changes Made	Rationale
12/07/2015	Qichen Gu, Pavan Vasani	2.0	Add plans for the second semester	CSCI577a archive

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# **1.Introduction to the project**

## **1.1 Purpose of the LCP:**

Our client, Ms Crystal Munson is a manager who works for the Department of Power and Water. She currently collects information about construction meeting minutes and schedules and send out notifications manually to manage the construction projects currently undertaken by the company.

The Current System the client's company uses is a Database for entry of the construction meeting minutes, the data storage system present in a server with a single point of entry. Each of the contractors and the managers have to make a double entry of data, once manually at the place of work at that point and then enter the data into the database at the head office

The objective is to make a smartphone application (Android) to track all of these schedules, projects and meetings thus enabling all make parties involved either view or edit the said entities. This project will require two semesters to be completely built. It is very essential to plan all phases including the maintenance.

The LCP will serves as a basis for controlling and monitoring this project's progress. It identifies the available personnel, the skills each of them possess and their availability to bring out the best in them for the project's benefit. This also serves as a proof to key stakeholders that major life cycle issues are known and have been thought of in advance.

## **1.2 Status of the LCP:**

The LCP is currently at version 2.0. This version reflects changes in the plan as a result of the re-defined project phase.

## **1.3 Assumptions:**

The duration of this project is for 24 weeks, 12 of which are in Fall 15 and 12 of which will be in Spring 15. All of the members will work on the project during the fall semester and three of the original team will work on the project in the spring semester

## **2.Milestones and Products**

### **2.1 Overall Strategy:**

The team is following the Architected Agile plan. We are overhauling the existing software and equipment used by the client and are building a product completely from the start.

#### **Exploration Phase:-**

**Duration:** 08/24/15- 09/29/15

**Concept:** Explore the current system used by the client, which is a server with a single point of entry containing a database with manual inputting and parsing. The communication between different stakeholders are also in traditional ways (calls, text messages, emails etc). After the first win-win negotiation, they created a raw blueprint of the desired system and prepared to understand the basic background knowledge required to build the application.

**Deliverables:** Risk Defect Template, Client Interaction Report, Win Condition Report, Progress Reports, Meeting Reports.

**Milestone:** Valuation Commitment Review

**Strategy:** One Incremental Commitment Cycle

#### **Valuation Phase:-**

**Duration:** 09/30/15- 10/15/15

**Concept:** Identify project's operational concept, system and software requirements, system and software architecture, and life-cycle plan. In this phases, we prioritized the capabilities, conducted investment and feasibility analysis, and implemented the software prototype.

**Deliverables:** OCD, Feasibility analysis, initial life cycle planning, Use Case Diagram, OOAD artifacts, Architecture Initial designs.

**Milestone:** Foundation Commitment Review

**Strategy:** One Incremental Commitment Cycle

#### **Foundation Phase:-**

**Duration:** 10/15/15- 12/09/15

**Concept:**

Having developed the a rudimentary UI prototype using Balsamiq, we proceeded to test the google cloud platform feature needed to store the

backend through different trials like the Data persistence test, Data Storage and Retrieval test. All of these tests have proven to be successful. We also got to have the Android App with working functionality and integrated with the Google Cloud storage APIs.

**Deliverables:** Life Cycle Report, Feasibility Analysis enhanced, SSAD, Prototype, QFP, UI prototype using Balsamiq, Google App Engine Sample, Working prototypes for each risk item.

**Milestone:** Development Commitment Review

**Strategy:** One Incremental Commitment Cycle

## **2.2 Project Deliverables**

### **Exploration Phase:**

Table 1: Exploration Phase

Artifact	Due Date	Format	Medium
Win Condition Report	9/28/2015	.pdf file	Soft Copy
Client Interaction Report	9/28/2015	.pdf file	Soft Copy
Progress Report	every alternate wednesday	.xls file	Soft Copy
Project Plan	every alternate wednesday	.mpp file	Soft Copy
Risk & Defect	every alternate wednesday	.xls file	Soft Copy

### **Valuation Phase:**

Table 2: Valuation Phase

Artifact	Due Date	Format	Medium
Prototype	10/02/2015	.ppt file	Soft Copy
Progress Report	every alternate	.xls file	Soft Copy



	wednesday		
Project Plan	every alternate wednesday	.mpp file	Soft Copy
Risk & Defect	every alternate wednesday	.xls file	Soft Copy

## Foundation Phase:

Table 3: Foundation Phase

Artifact	Due Date	Format	Medium
Project Modules	12/09/2015	.zip file	Soft Copy
LCP, OCD, FED, SSAD, Prototype Details	10/19/2015	.pdf files	Soft Copy
Prototype Presentation	11/06/2015	.ppt file	Soft Copy
Progress Report	every alternate wednesday	.xls file	Soft Copy
Project Plan	every alternate wednesday	.mpp file	Soft Copy
Risk & Defect	every alternate wednesday	.xls file	Soft Copy

## **3.Responsibilities**

### **3.1 Responsibilities by phase:-**

Table 4: Team member responsibilities - Developers

Team Member	Exploration	Valuation	Foundation
<b>Dennis Evans</b>  Role: System Architect, Project Manager	Primary Responsibility: Point of contact for the client. Developing client interaction report and assisting in win-win negotiations.	Primary Responsibility: Developing first datastore prototype. Analysis of NDI/NCS. Analyzed the proposed system to create system design.	Primary Responsibility: Organizing and leading client interaction meetings for system improvement. Identifying technology-dependent architecture and completing SSAD. Android screen implementation.
<b>Pradeep Muruganandam</b>  Role: Prototyper and Quality Focal Point	Primary Responsibility: Part of Negotiating project requirements in win-win negotiation sessions with client and discussions involving	Primary Responsibility: Involved in devising prototype choices for high risk items, showing initial prototypes and starting off with ideas related to Quality Focal Point duties.	Primary Responsibility: Worked on the improvement of the prototypes, elaborating more on the risky factors, thereby reducing chances of product failure. Fully involved in development of modules integrating the API's and the Android application. Also elaborated on QFP testing measures
<b>Pavan Vasan</b>  Role: Requirements Engineer, Life Cycle Planner	Primary Responsibility: Determining the desired features during negotiation sessions with client through win win conditions	Primary Responsibility: Determine the most significant requirements and prioritize them. Determine if there are more features to be added through client meetings	Primary Responsibility: Document the details of the requirements. Determine if modifications to the requirements need to be made through interactions with the client. Responsibility: Involved in the development of functionalities of the product which implement the required features discussed with the clients

Chris Nguyen Tran  Role: IIV & V	Primary Responsibility: Involved in Winwin negotiation clients and team initial development of system design	Primary Responsibility: Verify and validate initial prototypes	Primary Responsibility: Develop test plan and cases for each functionality of our app. Verify and validate all tests to ensure that they meet requirements
Quichen Jack Gu  Role: Life Cycle Planner	Primary Responsibility: Create the raw draft of the life cycle plan and negotiate the win conditions.	Primary Responsibility: Document the life cycle plan, especially the COCOMO estimation and prototyping.	Primary Responsibility: Document for the life cycle plan. Count the actual code using Unified Code Count and calibrate the COCOMO estimation. Advise on the workload of the second semester.
Eason Shengyi Chen  Role: Operational Concept Engineer	Primary Responsibility: Summarize from the client's requirement and win-win condition to list the capability goals, organizational goals and according functionalities we need to implement	Primary Responsibility: Design and draw benefit chain, system boundary diagram and business workflow from capability goals and according functionalities.	Primary Responsibility: Based on client's feedback and additional functionalities, change and update each diagram to make it fit the requirement and prototype more. Drawing ER diagram for database storage.
Caleb Sideok You  Role: Feasibility Analyst	Primary Responsibility: Doing feasible analysis in win win session. Categorizing win conditions. Documenting win condition report.	Primary Responsibility: Doing feasibility evidence that analyzed business case, hardware analysis, software analysis, cost analysis, ROI, process analysis, risk assessment, and COTS feasibility analysis. Finding alternative solutions which are risk mitigation plans for all possible risks.	Primary Responsibility: Documenting for Feasibility Evidence, and researched all COTS cost and usage availability with free cost. because lacking of budget, this job was mandatorily required. Also, analyzing interoperability between application and all COTS such as Google App Engine and parse.

Table 5: Team member responsibilities - Client

Name	Ms. Crystal Munson
Role	Client
Exploration	Demonstration the current system
Valuation	Propose Win Conditions
Foundations	Review Team Presentation and give instant feedback
Development->Construction->Iteration	Join the Test
Development->Transition->Iteration	Participate in the Training

Table 6: Team member responsibilities - Maintainer

Name	Anonymous
Role	Maintainer
Exploration	N/A
Valuation	N/A
Foundations	N/A
Development->Construction->Iteration	N/A
Development->Transition->Iteration	Participate in the training maintain the database.

## 3.2 Team Skillsets:

Table 7: Develop skillsets

Team members	Role	Skills
Sideok You	Feasibility Analyst	Java, Android development, web development, and DBMS, Git  <b>Required Skills:</b> Git, Android, DBMS, Testing
Pavan Vasan	Requirements Engineer	Java, Android Development, MySQL, DBMS, Python, Web Development languages like jQuery, HTML, Javascript, PHP, Ajax, Git  <b>Required Skills:</b> Git, Android, DBMS, Testing
Pradeep Muruganandam	Prototyper/Focal Point	Java, Android Development, Web Development, DB, Prototyping skills and Web Automated Testing Frameworks, Git.  <b>Required Skills:</b> Git, Android, DBMS, Testing
Dennis Evans	System Architect/ Manager	Java, Android Development, MySQL, Google App Engine, Embedded System Design and Development  <b>Required Skills:</b> Git, Android, DBMS, Testing
Nguyen Tran (Chris)	IIV & V	2.5 years of industry experience in automation, testing, validation, and data analysis, Git  <b>Required Skills:</b> Git, Android, DBMS, Testing
Shengyi Chen (Eason)	Operational Concept Engineer	Java, Android, MySQL, jQuery, PHP, HTML, Git  <b>Required Skills:</b> Git, Android, DBMS, Testing
Qichen Gu (Jack)	Life Cycle Planner	C/++, Python, Java, Android Studio, MySQL, HTML/CSS, JavaScript, jQuery, PHP, Bootstrap, Responsive Design.

		<b>Required Skills:</b> Git, Android, DBMS, Testing
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## **4.Approach**

### **4.1 Monitoring and Control**

The team is using Progress Report, Risk and Defect Report and Project plan in monitoring and controlling your project. We used Git for version control of our programs and each of the team members would update the Github repository created for this project

#### **4.1.1 Closed Loop Feedback Control**

The team would discuss in a “Whatsapp” group for short messages and send emails for long messages.

We would meet frequently on Mondays, Wednesdays and Fridays for a brief amount of time to work on the project deliverables.

Documents, Diagrams and Charts done by each team member would be shared and reviewed by other team members and feedback on what can be improved is given.

#### **4.1.2 Reviews**

The win-win conditions negotiations helped understand what the client wants in the new product we are designing for her and have a level of realization so as to visualise the client's requirements

All the reviews for this product are directly performed by the developers, along with feedback from the client at regular intervals

## **4.2 Methods, Tools and Facilities**

Table 8: Software tools used

<b>Tools</b>	<b>Usage</b>	<b>Provider</b>
Android Studio and SDK	The IDE for making Android App and the software for building the Android Apps	Google Inc.
Google App Engine/Google Cloud Platform	Provides data storage service	Google Inc.
iText libraries	Provides Application Programming Interfaces to generate reports in the PDF format and mail it to the concerned personnel	iText Software Corporation Inc.

Parse libraries	Provides the Application Programming Interfaces to create and broadcast notifications	Parse Inc.
Git	Version Control tool to update code repositories constituting the product to be built for the client	Github Inc.
Microsoft Project	To create the Project Plans	Microsoft Inc.
Balsamiq	To create the product prototype	Balsamiq
Skype	To communicate with the client during meetings and to communicate with the DEN student	Microsoft Inc
Whatsapp	To communicate with all the team members on a daily basis in order to discuss plans of action	Facebook Inc
Bootstrap	Used in order to create the project website	Open Source
Winbook	Used in order to discuss the minimum marketable features which the product is to have by using the win conditions established during the client meetings	USC Center for Software Engineering
Unified Code Count	Used in order to count the actual SLOC (Source lines of code) to verify and calibrate the COCOMO estimation	USC Center for Software Engineering

## **5.Resources**

- Estimated CSCI577a Effort: 6 team members at 10 hrs/week for 12 weeks
- Estimated CSCI577b Effort: 3 team members at 10 hrs/week for 12 weeks
- Total estimated effort:  $6 * 1.6 + 3 * 1.6 = 14.4$  person months  
(See the end of this section for explanation)
- Budget information: The client will get the product free of cost, however charges to the development team can be applied for usage of Google Cloud Platform Services if the usage is beyond the free usage threshold
- Project duration: 2 semesters
- Component modules in the development project: See Table 9
- Programming language used: Java and XML in Android mobile application development

The following is module listed in the system and its estimated size with Source Lines of Code (SLOC). 15% is a general guess of REVL which may be changed during development.

Table 9: Module lists and SLOC of each module

No.	Module Name	Brief Description	SLOC	REVL
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1	Frontend UI	Define several screen using standard Java UI schema	1257	15%
2	Login page	User authentication and authorization mechanism	150	15%
3	Sign Up Page	User information validation and storage	215	15%
4	Dashboard	A list of available tasks and features	155	15%
5	Project Functions	Allow user to add/view/edit projects	212	15%
6	Meeting Functions	Allow user to add/view/edit meetings	122	15%
7	Database Functions	Hold all user information, tasks information and meeting information.	915	15%
8	Notification - Standalone	Automatically alert user about upcoming meetings. Developed as a separate package.	500	15%
9	Report Generation - Standalone	Generate a formatted Report file in the pdf form and with preview and Email Features. Developed as a separate package.	300	15%
10	Task Functions	Allow user to add/view/edit pending task items		
11	Notification - Integration	Additional work to integrate the notification into the product.	200	15%
12	Report Generation - Integration	Additional work to integrate the report generation into the product.	200	15%
13	Local Storage	All users can view the latest updated tasks and meetings without internet connection.	300	15%

No.1 - No.9 are completed in the first semester. No.10 - No.13 are scheduled in the second semester.

The following is COCOMO II Scale Drivers and rationales of choosing the values.

Table 10: COCOMO II Scale Driver

Scale Driver	Value	Rationale
PREC	NOMINAL	The development team is familiar with Android App development but only one team member is familiar with Google App Engine.
FLEX	NOMINAL	The system needs to considerably conform to pre-established requirement from the client and external interface specifications. For example, network may not be continuous on some devices and the product should storage the most recent information retrieved. The choice of backend service is also limited due to no budget.

RESL	HIGH	All critical risk items, schedule, budget and internal milestones are identified. All team members can program in Java. Most of the team members have experience in Android App development. Dennis has experience in Google App Engine.
TEAM	NOMINAL	Our client proposed more demanding requirements at the second win-win negotiation than the first one. The TA managed to reduce the workload to a reasonable scale.
PMAT	NOMINAL	The development team follows ICSM guidelines, which the processes are defined and repeatable but the result may not be consistent, CMM Level 2.

The following is COCOMO II Cost Drivers of each module and rationales of choosing the values.

Table 11: COCOMO II Cost Drivers of Module 1 - Frontend UI

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	LOW	The UI does not store data. LOW is minimum option.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface contains 8 widgets on each screen on average.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the login page will usually not take too long.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a which is suitable for our project sizing.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at XML, the basis for Android App development.

PLEX	NOMINAL	The development team have one year experience of Android App development on average.
TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 12: COCOMO II Cost Drivers of Module 2 - Login Page

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	LOW	There are less than 100 users in the system and only the username, password, email address and role (manager or contractor) are stored.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface of the login page only contains two input fields and several buttons. However, SSL connection is required.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the login page will usually not take too long.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a which is suitable for our project sizing.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.

PLEX	NOMINAL	The development team have one year experience of Android App development on average.
TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 13: COCOMO II Cost Drivers of Module 3 - Signup Page

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	There are less than 100 users in the system. We have to store the basic personal information (username, password, email address and role) and projects participated are stored.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface of the login page only contains about 10 fields and several buttons. Meanwhile, SSL connection is required.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the signup page will usually not take too long to load and submit.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a which is suitable for our project sizing.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.

PLEX	NOMINAL	The development team have one year experience of Android App development on average.
TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 14: COCOMO II Cost Drivers of Module 4 - Dashboard

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface will contain less than 10 buttons and less than three lists.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the dashboard is simple and the loading speed should be acceptable.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a which is suitable for our project sizing.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 15: COCOMO II Cost Drivers of Module 5 - Project Functions

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface will contain less than 5 buttons and a list of currently active projects.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the project function page is simple and the loading speed should be acceptable.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a which is suitable for our project sizing.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 16: COCOMO II Cost Drivers of Module 6 - Meeting Functions

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects, tasks and meetings.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface will contain less than 5 buttons and a list of meetings under a specific task.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the meeting function page is simple and the loading speed should be acceptable.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a which is suitable for our project sizing.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 17: COCOMO II Cost Drivers of Module 7 – Database Functions

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects, tasks and meetings.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The business logic is simple and the local storage is just a local copy of fetch data.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the total size of database is several megabytes and the response time is usually satisfactory.
STOR	NOMINAL	All data are stored on cloud.
PVOL	HIGH	Net-centric service is under frequent updates, including API and pricing policy.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI 577a which is suitable for our project sizing.
APEX	LOW	Only one team member is familiar with Google App Engine and the database on it.
LTEX	HIGH	The development team are skilled at Java, which is applicable on Google App Engine.
PLEX	LOW	Only NoSQL database is free to use and the team have limited experience on it.
TOOL	LOW	Only one team member has used Google App Engine.



SITE	HIGH	We have 6 on-campus team members and 1 DEN team member in CSCI577a. We can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 18: COCOMO II Cost Drivers of Module 8/11 – Notifications - Standalone/Integration

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects, tasks and meetings.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	There is no input user interface but a pop-up reminder for upcoming meetings.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the alarm-clock function is simple and should not be delayed on a regular Android phone.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH(standalone)/VERY LOW(integration)	We have 6 on-campus team members and 1 DEN team member in CSCI577a but only 3 on-campus members will continue in CSCI577b.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	Teammates can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 19: COCOMO II Cost Drivers of Module 9/12 – Report Generation - Standalone/Integration

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects, tasks and meetings.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The business logic is simple and the report format is not
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	The PDF report generation usually takes 0.5 seconds which is acceptable to our client.
STOR	NOMINAL	The pdf report is stored temporarily on local storage and takes less than 500KB of space per file.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	HIGH(standalone)/VERY LOW(integration)	We have 6 on-campus team members and 1 DEN team member in CSCI577a but only 3 on-campus members will continue in CSCI577b.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	Teammates can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 20: COCOMO II Cost Drivers of Module 10 - Task Functions

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects and tasks.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The user interface will contain less than 5 buttons and a list of tasks under a specific project.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module but the task function page is simple and the loading speed should be acceptable.
STOR	NOMINAL	All data are stored on cloud.
PVOL	LOW	Major changes of the platform, Android Studio, Android SDK are approximately every year.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	VERY LOW	We have 6 on-campus team members and 1 DEN team member in CSCI577a but only 3 on-campus members will continue in CSCI577b.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	Teammates can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

Table 21: COCOMO II Cost Drivers of Module 13 – Local Storage

Cost Driver	Value	Rationale
RELY	NOMINAL	The whole project is designed to assist several employees in the company and there is no risk of financial loss. They can switch back to the old working style in the worst case scenario.
DATA	NOMINAL	Calculated based on the annual amount of active projects, tasks and meetings.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	The business logic is simple and so is the schema. The expected number of tables in the database should be no more than five.
RUSE	NOMINAL	It is not intended to be reused for the future project.
TIME	NOMINAL	There is no obvious time constraint for this module. Instead a successful data fetch, a network exception or timeout occurs, which takes seconds longer than a successful data may fetch.
STOR	NOMINAL	All data are stored on device storage.
PVOL	LOW	Local storage is a mature and popular feature of the Android system and should not be under frequent change.
ACAP	NOMINAL	The analysts have the ability to analyze, design, communicate, and cooperate very well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate very well.
PCON	VERY LOW	We have 6 on-campus team members and 1 DEN team member in CSCI577a but only 3 on-campus members will continue in CSCI577b.
APEX	NOMINAL	The average experience of the team members for Android App development is about one year.
LTEX	HIGH	The development team are skilled at Java and XML, the basis for Android App development.
PLEX	NOMINAL	The development team have one year experience of Android App development on average.

TOOL	NOMINAL	The IDE Android Studio is highly-integrated but new to the industry. Potential bugs inside this IDE may lower its performance.
SITE	HIGH	Teammates can meet after class whenever necessary and hold video conference with our client weekly.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 12 weeks in Spring semester.

The following is the result from COCOMO II estimation based on Scale Drivers and Cost Drivers discussed above.

USC-COCOMO II.2000.3 - C:\CS577a\_DEN\_video\LCP\_final\_submission\first.est

File Edit View Parameters Calibrate Phase Maintenance Help

Project Name: Team 6 - Sem 1 Scale Factor: 17.87 Schedule

Project Notes Development Model: Post Architecture

X	Module Name	Module Size	LABOR Rate (\$/month)	EAF	Language	NOM Effort DEV	EST Effort DEV	PROD	COST	INST COST	Staff	RISK
	Frontend UI	S:1445	0.00	0.52	JAVA	4.8	2.5	568.3	0.00	0.0	0.3	0.0
	Login Page	S:172	0.00	0.52	JAVA	0.6	0.3	568.3	0.00	0.0	0.0	0.0
	Signup Page	S:247	0.00	0.58	JAVA	0.8	0.5	511.5	0.00	0.0	0.1	0.0
	Dashboard	S:178	0.00	0.58	JAVA	0.6	0.3	511.5	0.00	0.0	0.0	0.0
	Project Fns	S:243	0.00	0.58	JAVA	0.8	0.5	511.5	0.00	0.0	0.1	0.0
	Meeting Fns	S:140	0.00	0.58	JAVA	0.5	0.3	511.5	0.00	0.0	0.0	0.0
	Database Fns	S:1052	0.00	0.92	JAVA	3.5	3.3	322.7	0.00	0.0	0.4	0.0
	Notification-S	S:575	0.00	0.58	JAVA	1.9	1.1	511.5	0.00	0.0	0.2	0.0
	Report Gen-S	S:345	0.00	0.58	JAVA	1.2	0.7	511.5	0.00	0.0	0.1	0.0

Total Lines of Code: 4397 Hours/PM: 152.00

	Estimated	Effort Sched	PROD	COST	INST	Staff	RISK
Optimistic	7.6	7.0	579.6	0.00	0.0	1.1	
Most Likely	9.5	7.5	463.7	0.00	0.0	1.3	0.0
Pessimistic	11.9	8.0	370.9	0.00	0.0	1.5	

Project Is Saved To File : C:\CS577a\_DEN\_video\LCP\_final\_submission\first.est

Figure 1: COCOMO II estimation in the first semester

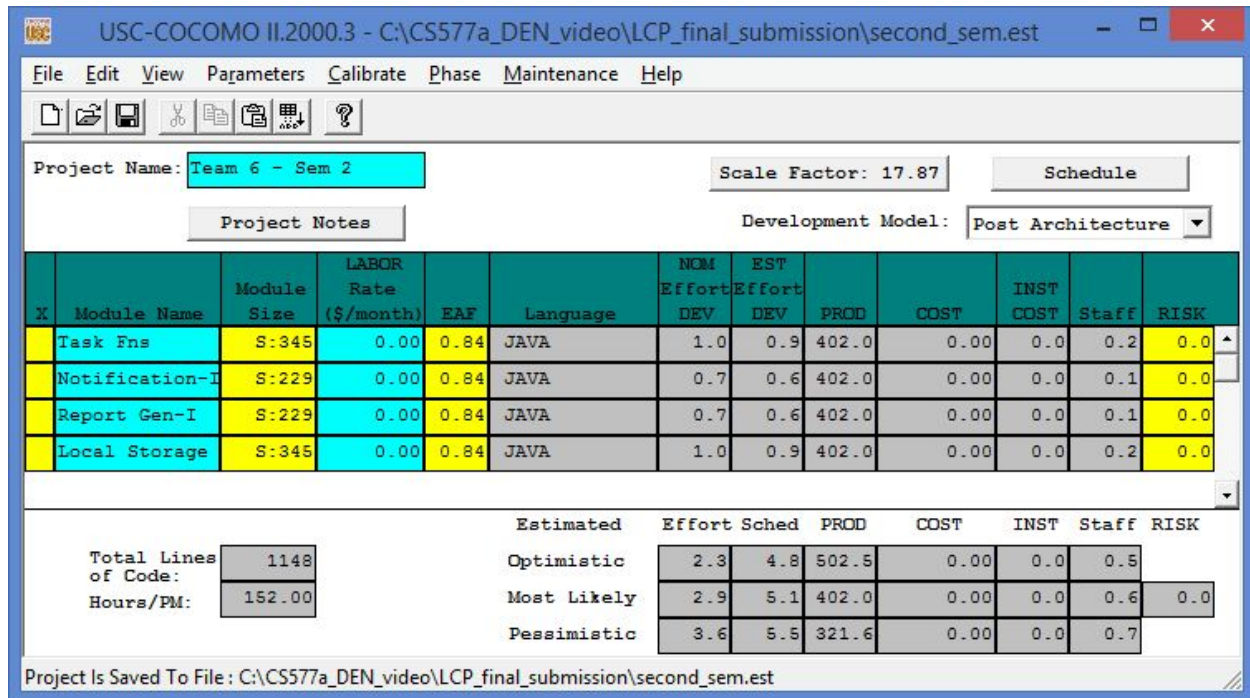


Figure 2: COCOMO II estimation in the second semester(including only JAVA code)

10 out of the 12 weeks are used for implementation in each semester. Since team members are working part-time on this project, the total contribution per semester per person is only estimated as 1.6 person months in the American industry.

In CSCI577a, the pessimistic effort from the COCOMO estimation above is 11.9 person months but the team managed to commit the development with 6 on-campus team members, close to the most-likely estimation of 9.5 person months.

In CSCI577b, the pessimistic estimation is 3.6 person months, equivalent to 2.25 team members while the most-likely estimation is 2.9 person months, equivalent to 1.8 team members. The latter matches closer to the team capability according to the performance in CSCI577a. We have 3 on-campus team members and probably one DEN team member. Therefore, the construction can be complete with or without the DEN team members but the appearance of the DEN team member will enhance the testing quality.

The estimation shows that it is of high possibility that the team can finish this project in two semesters.

## **6.Iteration Plan**

### **6.1 Plan**

The construction iteration of the development phase will be divided into two cycles with each cycle containing two subcycles. one where the core capabilities of the product will be developed and tested in parallel by developers in the team and integrated into the product along with tests. The next phase, which is in the next semester, will be used to develop and complete the full functionality of the system.

This is to make sure that the core functionality of the product which make up some of the minimum marketable features is working first before adding the extra features. The core capabilities developed in the first cycle are:- Login and User Management, Manage Tasks, Manage Meetings, Report Generation.

#### **6.1.1 Capabilities to be implemented**

Table 22: Construction iteration capabilities to be implemented

ID	Capability	Description	Priority	Iteration
1	Login and User Management	Implement two kinds of users	High	1
2	Manage tasks	Add/view/edit tasks	High	1
3	Manage meetings	Add/view/edit meetings based on tasks	High	1
4	Report Generation	Generate the reports about the meetings	High	1
5	Notifications	Automatically alert about upcoming meetings	Medium	2
6	Local storage	All users can view the last updated tasks and meetings.	Medium	2

### **6.1.2 Construction iteration capabilities to be tested**

Table 23: To be tested capability List

ID	Capability	Description	Priority	Iteration
1	(OC-1) Login and User Management	Implement two kinds of users	Highest	1
2	(OC-2) Manage tasks	Add/view/edit tasks	High	1
3	(OC-3) Manage meetings	Add/view/edit meetings based on tasks	High	2
4	(OC-4) Generate Reports	Generate a formatted Report file in the pdf form and with preview and Email Features	Medium	2

### **6.1.3 Capabilities not to be tested**

Table 24: Not to be tested capability List

ID	Capability	Description	Priority	Iteration
1	(OC-5) Notifications, Report Generation Prototype, Google App Engine Module integration	Automatically alert about upcoming meetings	Medium	3
2	(OC-6) Local Storage	All users can view the last updated tasks and meetings.	Medium	4