

Life Cycle Plan (LCP)

Mission Science Information and Data Management System 3.0

Team 03

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Version History

Date	Author	Version	Changes made	Rationale
9/26/13	FY	1.0	<ul style="list-style-type: none">• Skills of different members added	<ul style="list-style-type: none">• Based on the exploration phase requirement
10/13/13	FY	2.0	<ul style="list-style-type: none">• Added detailed plan for LCP including milestone and other plans• Added iteration plan	<ul style="list-style-type: none">• After the valuation phase, we are more confident that we can finish the project with the resources that we have
10/23/13	SL	2.1	<ul style="list-style-type: none">• Update content for grammar, spelling, and term consistency	<ul style="list-style-type: none">• Final Draft for DC Package
11/29/13	FY	3.0	<ul style="list-style-type: none">• Added section 6• Wait for Amy to finish the test matrix	<ul style="list-style-type: none">• Draft of TRR package

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1. Introduction

The status of the LCP is currently at the Development Commitment Package version number 2.0. This is the second version of this documentation. In this modification, more details of the overall plan, individual plan and monitoring strategy will be added to this file.

A few things to note for this version:

- In valuation phase, we implemented a prototype for high-risk items and now we are facing less risk in the foundation phase.
- We know the technical skills of the individual team members are better than anticipated so we can distribute work in a more effective manner.

2. Milestones and Products

Exploration phase:

Duration: 09/16/13 – 10/1/13

Concept: Identify project operational concept and gain experience and understanding in the current system. Perform win-win negotiation and obtain the requirements and win-conditions from the client. In this phase, we also needed to identify critical tasks and try to plan for the software prototype.

Deliverables: Valuation Commitment Package

Milestone: Valuation Commitment Review

Strategy: One Incremental Commitment Cycle

Valuation phase:

Duration: 10/1/13 – 10/15/13

Concept: Complete operational concept understanding. Prioritize win-conditions and evaluate the difficulty and risk in implementation. Try to reduce project risks by implementing a prototype. Write more details in planning and milestones.

Deliverables: Foundation Commitment Package

Milestone: Foundation Commitment Review

Strategy: One Incremental Commitment Cycle

3. Responsibilities

3.1 Responsibilities by Phase

Table 1: Stakeholder's responsibilities

Name: Fei Yu	
Role: Project Manager, Life Cycle Planner	
Exploration	Team Formation; Team Management; Plan for Valuation Phase; Progress Report
Valuation	Meeting Management; Plan for Foundations Phase; Project Plan; Progress Report
Foundations	Meeting Management; Plan for Development construction; Project Plan; Progress Report; Monitoring project
Development-Construction Iteration	Meeting Management; Plan for Development Transition Iteration; Project Plan; Progress Report; Monitoring project
Development-Transition Iteration	Meeting Management; Plan for Deployment; Project Plan; Progress Report; Monitoring project

Name: Yunpeng Chen	
Role: Requirement Engineer, Feasibility Analysis	
Exploration	Interact with the client; List requirements from the client
Valuation	Interact with the client; Develop feasibility evidence and evaluate the project; perform win-win negotiation; Explore alternatives, access and plans to mitigate risks
Foundations	Update and interact with the client
Development-Construction Iteration	Update and interact with the client
Development-Transition Iteration	Update and interact with the client

Name: Yinlin Zhou	
Role: Prototyper, Operational Concept Engineer	
Exploration	Explore current system
Valuation	Identify objectives, constraints and priorities; Develop operational concept; Prototyping
Foundations	Prototyping
Development-	Develop system (as one of the members in the development team)

Construction Iteration	
Development-Transition Iteration	Develop system (as one of the members in the development team)

Name: Katherine Liu	
Role: Software Architect	
Exploration	Assist others
Valuation	Assist others
Foundations	Develop Software Architecture; Assess Project Status.
Development-Construction Iteration	Develop system (as one of the members in the development team)
Development-Transition Iteration	Develop system (as one of the members in the development team)

Name: Amy Peng	
Role: Builder, Tester	
Exploration	Assist others
Valuation	Assist others
Foundations	Assist others
Development-Construction Iteration	Develop system (as one of the members in the development team)
Development-Transition Iteration	Develop system (as one of the members in the development team); Testing

Name: Steven Lee	
Role: Requirement Engineer, Quality Focal Point	
Exploration	Interact with the client. List requirements from the client.
Valuation	Interact with the client; Perform win-win negotiation
Foundations	Manage Project Quality; Interact with the client
Development-Construction Iteration	Manage Project Quality; Interact with the client; Maintain configuration management
Development-Transition Iteration	Manage Project Quality; Interact with client; Maintain configuration management

3.2 Skills

Team members	Role	Skills
Fei Yu	Project Manager Life Cycle Planner Implementer	Integration Development, Java C++, Javascript, HTML CSS, Python Required skills: Visual Basic for Microsoft Access
Yunpeng Chen	Requirement Engineer Feasibility	Java, C++, HTML CSS Required skills: Visual Basic for Microsoft Access
Yinlin Zhou	Prototyper Operational Concept Engineer	Java, C++ Required skills: Visual Basic for Microsoft Access
Katherine Liu	System Architect Tester	Java, C++, HTML CSS, C# Required skills: Visual Basic for Microsoft Access
Amy Peng	UML Modeler System Architect	Java, C++, C# Required skills: Visual Basic for Microsoft Access
Steven Lee	Requirement Engineer Quality focal point	Python Required skills: Visual Basic for Microsoft Access

4. Approach

4.1 Monitoring and Control

4.1.1 Closed Loop Feedback Control

Within the team, we use emails and Dropbox to share information. Since the development team members' primary language is Chinese, an instant message program called "WeChat" is used to achieve instant information sharing. However, during team meetings, English is used to include all team members. After each team meeting, meeting minutes will be uploaded to Dropbox so that they can be referenced in the future.

4.1.2 Reviews

Architecture Review Board (ARB): This is a review that is performed with all team members, instructors, and client at the end of the foundation phase and prior to the development phase.
Team Meetings: Every Friday, the on-campus, the development team will have a group meeting discussing about the development progress and to-do's. Every Sunday, the DEN student will come to campus to have a whole group discussion about the overall progress.
Bugzilla: We have maintained system bug and team status using Bugzilla to trace our progress.

4.2 Methods, Tools and Facilities

Tools	Usage	Provider
Microsoft Access	Microsoft Access is an effective tool as a good API for prototyping. Through the too, Visual Basic code can be debugged and ran with data from the Access database.	Microsoft

5. Resources

In this section, we present the project effort and schedule estimation of the project using COINCOMO II.

The following conditions were used to estimate the cost of our system:

1. This project has no budget for our development efforts, while the software is provided and tools are free.
2. The duration of the project is 12 weeks in CSCI577a.
3. There are six developers.
4. There are 5 modules in this system:
 - a. Search module
 - b. Lesson module
 - c. Inventory module
 - d. Survey module
 - e. Student module
5. The Estimated Effort is 6 team members at 15 hours/week for 12 weeks.
6. The development language is VBA.
7. The SLOC were estimated by the prototyper.

The following is modules listed in the system and its estimated size with Source Lines of Code (SLOC)

Table 2: Module lists and SLOC of each module

No.	Module Name	Brief Description	SLOC	REVL
1	Search Module	Search an item by another item and generate an Excel spreadsheet for further reporting.	250	5%
2	Lesson Module	Record the lesson for the ordinary courses as well as STEM courses.	300	20%
3	Inventory Module	Store the inventory related to different courses. NOTE: Only for debugging.	300	10%
4	Survey Module	Store the survey for STEM activities as well as individual students at the beginning of the year.	350	10%
5	Student module	Provide a place to store the student information. NOTE: Only for debugging.	50	50%

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

Table 3: COINCOMOII Scale Drivers

Scale Driver	Value	Rationale
PREC	LOW	The development team is not familiar with this type of database and has not write any code in VBA before.
FLEX	HIGH	Modification could be made upon discussion with client.
RESL	NOMINAL	All critical risk items, schedule, budget and internal milestones are identified. However, there is some uncertainty in hardware compatibility.
TEAM	HIGH	Each stakeholder has considerable consistency of objectives and cultures, and considerable ability and willingness to accommodate others' objectives. In addition, the stakeholders have basic experience in operating as a team. However, since 5 of the team members are Chinese and in their English is not proficient
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 COCOMOII Cost Drivers of each module and rationales of choosing the values.

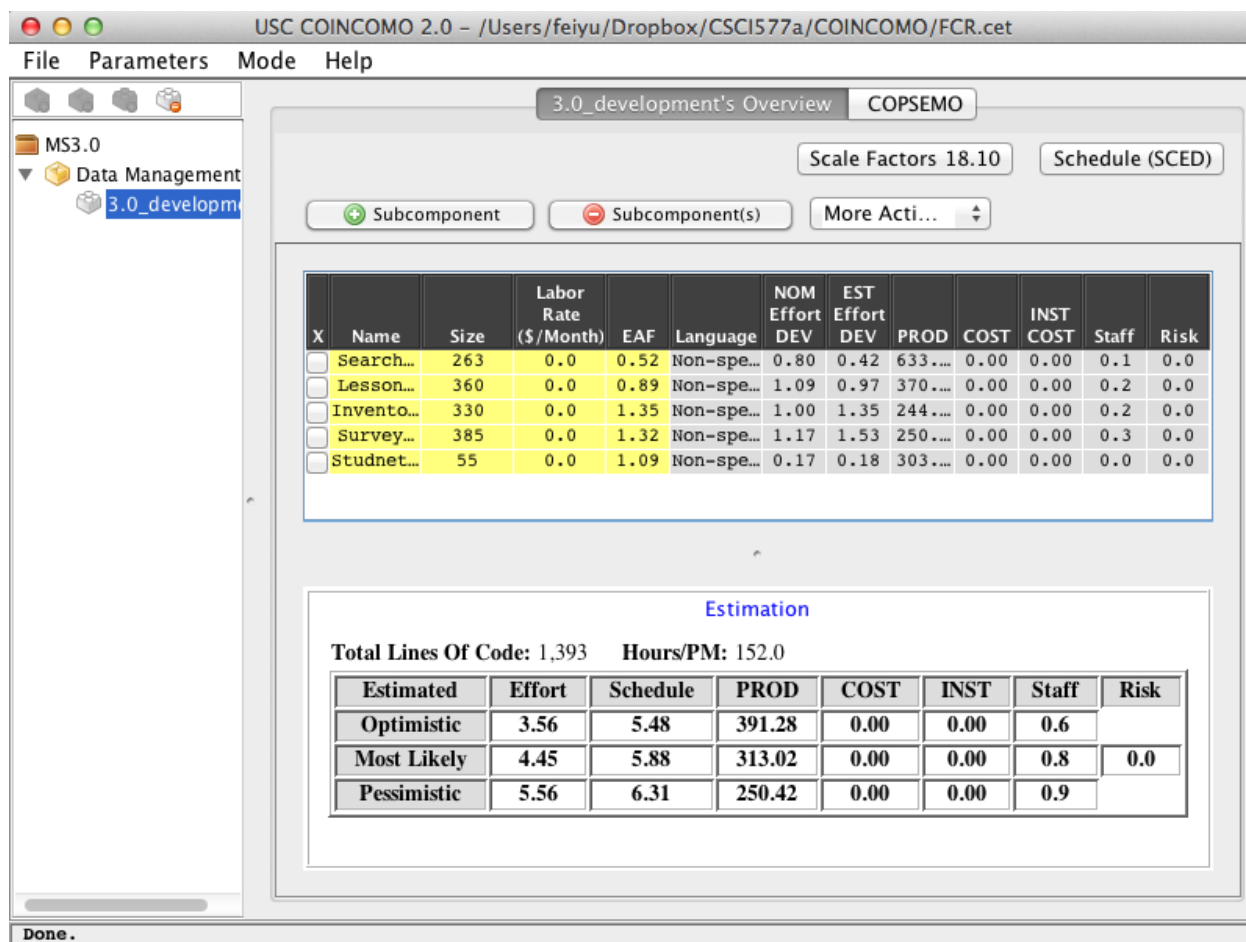
Table 4: COINCOMOII Cost Drivers

Cost Driver	Value	Rationale
RELY	NOMINAL	Crashing will not lost much as long as backup is stored.
DATA	LOW	Currently there are only about 100 lessons with students from 20 schools. Database is relative small
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	This system is not very complex by our understanding but we don't have much experience in it. As a result, we will give a nominal for it.
RUSE	HIGH	This project built intends to be reused in the future.
TIME	NOMINAL	The percentage of available execution time expected to be used by the system and subsystem consuming the execution time resource is less than 50% because this system is used when a worker does plant services which are preformed once a week, and this system is used by a manager to review plant service reports which at most couple times a week.
STOR	VERY HIGH	We almost used up all available storage available provided by Microsoft Access
PVOL	LOW	Platform is not complex
ACAP	HIGH	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 team members in CSCI477a and 3 team members in CSCI477b that suitable for our project sizing.
APEX	LOW	Little database Experience
LTEX	LOW	Little VBA experience
PLEX	LOW	Little Access experience before
TOOL	LOW	The software tools development team plan to use is just simple, frontend, backend CASE, and supporting little integration. There is no support for life-cycle.
SITE	HIGH	In CSCI577a, among six team members, 5 are campus students and one is DEN student
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester

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

Figure 1: COINCOMO Estimation Result



One team member effort = 0.8 (2 months with around 60 hours per month) COINCOMO II person months. The pessimistic effort from the COCOMO estimation above is 5.56, so the total number of team members needed for this project = $5.56/0.8 = 6.95$. We only have 6 team members. As a result, we might not be able to commit to all requirements while we can probably finish the highest prioritized requirements.

6. Iteration Plan

6.1 Plan

In this iteration plan, life cycle phases such as the Foundation Phase, Development Phase and Operational Phase will be further explained. Milestones include the transmission of deliverables between different phases.

6.1.1 Capabilities to be implemented

Table 5: Construction iteration capabilities to be implemented

ID	Capability	Description	Priority	Iteration
1	STEM Module	We need to create a new database to manage open-ended STEM projects. This includes functions related to Lessons, Modules and survey	9	First iteration
2	Search Module	For easy search and reporting data. We need a search module	8	First iteration
3	Inventory Module	Reserve and fix current problems in the database	5	Second Iteration
4	Student Module	Detect people duplicates	3	Second Iteration

6.1.2 Capabilities to be tested

Table 6: Construction iteration capabilities to be tested

ID	Capability	Description	Priority	Iteration
1	STEM Module (add, delete, modification)	To manage newly created STEM project, this functions are necessary	9	1
2	Create STEM relative activity	Insert an open-ended activity to current STEM project	9	1
3	Create Survey	Create and link a survey to an activity related to STEM	9	1
4	View Report	Search wanted result and output them as an useful format(excel)	8	1

6.1.3 Capabilities not to be tested

- Inventory module (fix the bugs and reserve module)
- Student duplicate detection function

6.1.4 CCD Preparation Plans

The following people will be involved in the Core Capability Drive-through:

- Darin (Client/Administrator/Instructor)
- Representative USC Student worker
- Development Team

During the CCD, we will demonstrate 4 functions:

- Create STEM project and related modules.
- Create STEM project related activities (both Administrator and student worker interface)
- Create Survey linked to STEM activities.
- Search for results (given different keyword in different tables)

Preparation:

Note: The CCD will take place in the middle of November.

Table 7: CCD Preparation Timeline

Date	Item	Notes
21 st Oct. – 2 nd Nov.	Develop features	
2 nd Nov.	Tester test features	Includes STEM project
2 nd – 7 th Nov.	Develop other features and debug	
7 th Nov.	First test among development team	Gain feedback from development team members
7 th – 11 th Nov	Improve the features and relative functions given by team members	
11 th Nov	Show features to client for feedback	Gain feedback from client and system user
11 th - 15 th Nov	Improve the product based on client's requirements	Final preparation for CCD

CCD risk management:

Currently, the risk for search function, STEM project and activity module is relatively low. However, the associated risk for the inventory and student modules is still relatively high.

Table 8: Project Risk Matrix

Item	Risk (9 for high)	Possible risk
STEM project	3	<ul style="list-style-type: none"> - Immigration of development system to current system - User experience improvement
STEM project Activity	4	<ul style="list-style-type: none"> - Connection between inventory module and student module - User experience improvement
Survey create and search reporting	5	<ul style="list-style-type: none"> - Survey details and relationship between other tables is still not crystal clear. - User experience improvement

6.2 Iteration Assessment

6.2.1 Capabilities Implemented, Tested, and Results

Table 9: Capabilities implemented, tested, and results

ID	Capability	Test Case	Test Results	If fail, why?
OC-1	STEM Project Management	TC-01	Pass	
OC-1	STEM Project Management	TC-02	Partial Pass	Some illegal inputs are not handled
OC-1	STEM Project Management	TC-03	Pass	
OC-1	STEM Project Management	TC-04	Pass	
OC-1	STEM Project Management	TC-05	Pass	
OC-1	STEM Project Management	TC-06	Pass	
OC-1	STEM Project Management	TC-07	Pass	
OC-1	STEM Project Management	TC-08	Pass	
OC-2	Survey Report System	TC-08	Partial Pass	Student duplicate problem

				is not handled
OC-2	Survey Report System	TC-09	Pass	
OC-2	Survey Report System	TC-10	Pass	
OC-2	Survey Report System	TC-11	Pass	
OC-3	Inventory Management	TC-12	Partial Pass	Inventory location is not recorded in the reserve system
OC-3	Inventory Management	TC-13	Pass	
OC-4	Assign Next Generation Science Standards	TC-01	Pass	
OC-4	Assign Next Generation Science Standards	TC-02	Pass	
OC-5	Check Completeness of Student Data	TC-14	Psss	

6.2.2 Core Capabilities Drive-Through Results

Positive Feedbacks:

Item	Note
Full Functionality	We have implemented the new system request by the client with all related functions.
Separation of old and new system	We have provided a gateway to use our new system and it
Fixed the problem of size limitation	According to the win-conditions, we have fixed the problem caused by MS Access file size limitation.
Overall is Good	We have finished all the “high-value”* conditions.

* “High-value” win-conditions refer to either business value or relative penalty is larger or equal to 8. According to win-book

Improvement:

Item	Note	To-be Considered
Search Result List	In the search interface, we need to click search to search out the result. However, it could be changed into an interface that automatically display the wanted information	After CCD, we fixed the problem and now the result could be displayed automatically.
Selection Interface	In many interface, we use text input instead of Combo box, which introduce some inconvenience.	After CCD, all textboxes were replaced as combo boxes.
State Standard and National Standard	The descriptions are too long such that some combo boxes cannot contain them	They were changed to longer ones

Selection		
Main Gateway Interface Change	Further separation of old and new system. Grouping utilities together.	Redesigned and Implemented
Requirement for Reserve Inventory restated and rephrased	Reserve inventory requirement needs the cooperation between development team and client. We further confirm the requirement and proposed a systematic solution to the problem.	We have been working on the inventory problem together.

Risks:

Risk Added	Risk Mitigated
Reserve inventory functionality needs cooperation between client and development team. The risk of having non-tech people involved in development process	Risk of GUI interface user-friendliness
Data Immigration between current system and developed system. Compatibility problem.	In many interface, we use text input instead of Combo box, which introduce some inconvenience.

6.3 Adherence to Plan

Generally speaking, the iteration plan goes very well. All iterations were carried out as planned. However, there were still some problems that we encountered.

1. CCD Date:
 - a) At the date of plan, the date for core capability was not confirmed. We assume the first date of possible CCD
 - b) This caused time shortage for the second transition iteration.
2. Thanks giving holiday:
 - a) At the date of plan, Thanks Giving Holiday was considered as workdays with less workload. However, one of our teammates flied to other places so we meet some coordination problem for the TRR and Final deliverables.

One way to avoid those questions is to list them as risks and try to reduce them along the process of planning. If some plans are dependent on some risky estimation, they should carry the risks along.