

Life Cycle Plan (LCP)

PROJECT NAME: XL 2

TEAM NO: 10

| Name | Primary Role | Secondary Role |
|-----------------------|-------------------------------------|---------------------------|
| Kevin Crimi | Prototyper, Builder | Feasibility Analyst |
| Sindhu Nachimuthu | Project Manager, Life Cycle Planner | Builder |
| Ritesh Nanda | Operations Concept Engineer | Reviewer, Tester, Trainer |
| Muthukumaran Dhanapal | Software Architect, Builder | Feasibility Analyst |
| Ted Lee | IIV & V, Tester, Quality Manager | Project Manager |

11/26/2012

Version History

| Date | Author | Version | Changes made | Rationale |
|----------|-------------------|---------|--|--|
| 10/01/12 | Sindhu Nachimuthu | 1.0 | Original template | Initial draft of member roles and skills. |
| 10/01/12 | Sindhu Nachimuthu | 1.1 | Current and required skills of team members. | Based on more detailed project understanding and review, the team member skills changed with respect to project context. |
| 10/14/12 | Sindhu Nachimuthu | 2.0 | Required skills of team members based on project technicalities, status of project and FCP delivery strategy. | After in-depth technical analysis of project domain, several required technical skills were identified. |
| 10/21/12 | Sindhu Nachimuthu | 2.1 | Overall strategy for Valuation, Foundation, Development, Construction and Transition phases and stakeholder's responsibilities for those phases. The tools/ methods used for project monitoring and control. | With the exploration and valuation of project, the development can be viewed more concretely and plans can be laid out. Stakeholder's responsibilities can be assigned with more clarity as team member's talents became more clear . |
| 10/22/12 | Sindhu Nachimuthu | 2.2 | Project resource estimation for single NDI process pattern using COTIPMO | Using the COTIPMO tool specific to NDI process pattern; screens, reports, 3GL components and application points were estimated. |
| 10/22/12 | Sindhu Nachimuthu | 2.3 | Updated status of LCP, reworded some responsibilities, COTIPMO added as the deliverable and additional tools identified | From IIV&Ver 's review: status was left unedited for draft FCP, COTIPMO estimations for valuation, Foundation and Development phases |
| 10/29/12 | Sindhu Nachimuthu | 2.4 | Revised roles, skills, Responsibilities. Updated strategy for foundations, development construction and transition phases. Renewal of project estimates. | Loss of one team member lead to reshuffling of team member roles, responsibilities and strategy for further project life cycle phases to balance work load and maintain work productivity for delivery within schedule and available resources. The project estimates reflect the new prototype. |

| Date | Author | Version | Changes made | Rationale |
|----------|-------------------|---------|---|--|
| 11/05/12 | Sindhu Nachimuthu | 3.0 | Section 6 iteration plan formulated. Updated overall development phases strategy based on feedback from faculty after FCR ARB and re-estimated resources using project estimate tools. Added more tools under section 4.2. Required skills modified for developers and testers. | Due to project change to Architected Agile ICSM process, resources needed re-estimation using COCOMOII tool, development strategy needed compressed schedule after DCR ARB feedback. As part of development kick off more tools were identified. |
| 11/22/12 | Sindhu Nachimuthu | 3.1 | Included personnel resources assumption in section 1.3. Software modules delivery included in development phase of section 2.2.4. Development team members mentioned, roles added for builder, tester trainer and grader's corrections incorporated under section 3.2, 3.3. Project cost and total effort was re estimated using COCOMO II for section 5. | From the grader's notes on correction of DCP many sections were modified. Development team was identified and hence roles and responsibilities were added. |
| 11/26/12 | Sindhu Nachimuthu | 4.0 | All the development iterations were identified, capabilities tested in each iteration documented under Section 6. Section 6.2 and 6.3 are new additions to this version of the document- include CCD activity, results and adherence to iteration plan. | After two development iterations, the development iterations plan, progress and CCD activity description have been included. |

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1. Introduction

1.1 Purpose of the LCP

LCP document is the project information backbone for the team, client, and stakeholders involved. The purpose of the life cycle plan is to ensure the project's approaches are feasible. Also, the plan will help identify the processes to deliver work products by determining and managing the entire life cycle of the system from conception, design, and development to testing and maintenance.

1.2 Status of the LCP

The status of the LCP document is at the Transition Readiness Package phase with a version number 4.0. This is the version that will be delivered for the Development Transition phase as part of the Transition Readiness Package. The major changes are:

- Iteration plan has been formulated (section 6.1)
- Due to change to Architected Agile ICSM methodology, COCOMOII has been used to determine project estimate and project effort to find feasibility (section 5)
- More tools identified and added as development has started (section 4.2)
- Updated the overall strategy of foundations, development construction and development transition phases (section 2.1)

1.3 Assumptions

- Stakeholders want to test variables for decision making
- Ends users are willing to use outside product
- Companies want to improve on their employee efficiency
- Client has zero budget leading to developers dependency on open source tools available
- Project team has 5 members (3 developers and 2 testers) committed to project for 12 man hours/week.
- Duration of project is 12 weeks in Fall 2012.
- Project maintenance will be transferred to new team by Client after product delivery.

2. Milestones and Products

2.1 Overall Strategy

Our project plan follows the Architected agile process of the Incremental Commitment Spiral Model. The course of ICSM changed after technical decisions for development were taken. The development of XL2 is from scratch using Java programming language. The current excel models provided by the client serve as the basis for the type of real estate underwriting operations the team is aiming to develop as part of the software tool.

Exploration phase

Duration: 09/12/2012 – 10/08/2012

Concept: In this phase, we explore the project concept, analyze its feasibility and develop a project plan to be followed during project life cycle. It also involves designing a prototype from initial requirements stated by client, establishing agreement with team members, and project scoping.

Deliverables: Valuation Commitment Package

Milestone: Valuation Commitment Review

Strategy: Weekly team meeting (with/without Client)

Valuation Phase

Duration: 10/09/2012 – 10/22/2012

Concept: During the Valuation Phase, win conditions are evaluated to establish new operational concept. More risks are identified and prototypes are implemented to mitigate risks. The System Structure and System analysis overview is provided as part of SSAD. The feasibility analysis and evidence supports are recorded in parallel.

Deliverable: Foundations Commitment Package

Milestone: Foundations Commitment Review

Strategy: Meetings and dependencies from prototype

Foundation Phase

Duration: 10/22/2012 – 10/31/2012

Concept: During the Foundations phase, the NDI component needs to be assessed for detailed system architecture, design and test cases. Some requirements changes also need to be managed and incorporated into the system. From the risks mitigation point of view, functional prototypes are laid out.

Deliverable: Development Commitment Package

Milestone: Development Commitment Review

Strategy: Functions and development depending on evolution and feedback from prototype

Development phase - Construction Iteration**Duration:** 11/01/012 – 12/07/2012**Concept:** Using the architectural design of the system, modules are developed using the prototypes developed. These are the prototypes that have been developed, tested and accounted for the risks identified. All the system expected functionalities and features are developed and tested keeping the risks and defects at their minimal.**Deliverable:** Transition Readiness Review Package**Milestone:** Transition Readiness Review**Strategy:** Coding, writing test cases, integrating**Development phase - Transition Iteration****Duration:** 12/01/2012 – 12/12/2012**Concept:** The complete and developed system is now ready for replacing the current (manual) system. Documents for user manual, procedures, transition are prepared to assist the client and system maintainer. Training is also provided by the team to help the client, maintainer and end-user to adopt and use the new ready to use system.**Deliverable:** Operational Commitment Review Package**Milestone:** Operational Commitment Review**Strategy:** Transition and training

2.2 Project Deliverables

2.2.1 Exploration Phase

Table 1: Artifacts Deliverables in Exploration Phase

| Artifact | Due date | Format | Medium |
|---|-----------------|---------------|---------------|
| Client Interaction Report | 09/19/2012 | .doc, .pdf | Soft copy |
| Valuation Commitment Package <ul style="list-style-type: none"> • Operational Concept Description (OCD) Early Section • Life Cycle Plan (LCP) Early Section • Feasibility Evidence Description (FED) Early Section | 10/03/2012 | .doc, .pdf | Soft copy |
| Evaluation of Valuation Commitment Package | 10/08/2012 | .xls | Soft copy |
| Project Effort | Every Monday | Text | ER system |
| Project Plan | Every Wednesday | .mpp | Soft copy |
| Progress Report | Every Wednesday | .xls | Soft copy |

2.2.2 Valuation Phase

Table 2: Artifact deliverable in Valuation Phase

| Artifact | Due date | Format | Medium |
|---|-----------------|----------------------|-------------------------------|
| Core Foundations Commitment Package <ul style="list-style-type: none"> • Feasibility Evidence Description (FED) • Life Cycle Plan (LCP) • Operational Concept Description (OCD) • Supporting Information Document (SID) • System and Software Architecture Description (SSAD) • Prototype report (PRO) • Feasibility Evidence Description (FED) | 10/15/2012 | .doc, .pdf | Soft copy |
| Evaluation of Core Foundation Commitment Package | 10/17/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Response to Evaluation of Core Foundations Commitment Package | 10/17/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Draft Foundations Commitment Package <ul style="list-style-type: none"> • Operational Concept Description (OCD) • Prototype report (PRO) • System and Software Architecture Description (SSAD) • Life Cycle Plan (LCP) • Feasibility Evidence Description (FED) • Supporting Information Document (SID) | 10/19/2012 | .doc, .pdf | Soft copy |
| Evaluation of Draft Foundations Commitment Package | 10/22/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Response to Evaluation of Draft Foundations Commitment Package | 10/22/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Project Effort | Every Monday | Text | ER system |
| Project Plan | Every Wednesday | .mpp | Soft copy |
| Progress Report | Every Wednesday | .xls | Soft copy |
| COTIPMO | Every Wednesday | COTIPMO tool | Jazz team server-COTIPMO tool |

2.2.3 Foundations Phase

Table 3: Artifact deliverable in Foundations Phase

| Artifact | Due date | Format | Medium |
|---|-----------------|------------------------|--|
| Preparation for draft DCP <ul style="list-style-type: none"> • Operational Concept Description (OCD) • Prototype report (PRO) • System and Software Architecture Description (SSAD) • Life Cycle Plan (LCP) • Feasibility Evidence Description (FED) • Supporting Information Document (SID) • Quality Management Process (QMP) | 10/26/2012 | .doc, .pdf | Soft copy |
| DCR ARB | 10/31/2012 | .ppt, .doc, .pdf, .zip | Presentation slides, document submission |
| Project Effort | Every Monday | Text | ER system |
| Project Plan | Every Wednesday | .mpp | Soft copy |
| Progress Report | Every Wednesday | .xls | Soft copy |
| COTIPMO | Every Wednesday | COTIPMO tool | Jazz team server- COTIPMO tool |

2.2.4 Development Phase- (Construction and Transition Iteration)

Table 4: Artifact deliverable in Development Phase

| Artifact | Due date | Format | Medium |
|--|-----------------|---------------|---------------|
| Development Commitment Package <ul style="list-style-type: none"> • Feasibility Evidence Description (FED) • Life Cycle Plan (LCP) • Operational Concept Description (OCD) | 11/05/2012 | .doc, .pdf | Soft copy |

| | | | |
|---|------------|----------------------|---------------------------------------|
| <ul style="list-style-type: none"> • Supporting Information Document (SID) • System and Software Architecture Description (SSAD) • Prototype report (PRO) • Quality Management Plan (QMP) • Test Plan and Cases (TPC) | | | |
| Evaluation of Development Commitment Package | 11/12/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Response to Evaluation of Development Commitment Package | 11/14/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Development of GUI classes <ul style="list-style-type: none"> • XL2GUI • modelCreationGUI • Development Funding Panel • Phase selection panel • Pre-development Funding Panel • Revenue Panel • Stabilization Funding Panel Development of Controller classes <ul style="list-style-type: none"> • projectController (test template) • XLSheet (test template) | 11/16/2012 | .java | Eclipse Code Repository (Head branch) |
| Development of GUI classes <ul style="list-style-type: none"> • Costs Panel Development of Controller classes <ul style="list-style-type: none"> • projectController (complete) • XLSheet (complete) • phaseController • revenueController • costController | 11/23/2012 | .java | Eclipse Code Repository (Head branch) |

| | | | |
|---|------------|----------------------|---------------------------------------|
| <ul style="list-style-type: none"> • fundingController (This achieves generation of Cash flow report) | | | |
| Draft Transition Readiness Package <ul style="list-style-type: none"> • Feasibility Evidence Description (FED) • Life Cycle Plan (LCP) • Operational Concept Description (OCD) • Supporting Information Document (SID) • System and Software Architecture Description (SSAD) • Prototype report (PRO) • Quality Management Plan (QMP) • Transition Plan (TP) • User Manual (UM) • Training Material (TM) • Test Procedure and Result (TPR) • Test Plan and Cases (TPC) | 11/26/2012 | .doc, .pdf | Soft copy |
| Evaluation of Draft Transition Readiness Package | 11/28/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Response to Evaluation of Draft Transition Readiness Package | 11/29/2012 | .doc, .pdf, Bugzilla | Soft copy, Bugzilla |
| Development of functions <ul style="list-style-type: none"> • Budget Report Generator • PDF saving/opening • Excel saving/opening | 11/30/2012 | .java | Eclipse Code Repository (Head branch) |
| Complete functional XL2 desktop application | 12/05/12 | .exe | Software executable program |
| Transition Readiness Package <ul style="list-style-type: none"> • Feasibility Evidence Description (FED) • Life Cycle Plan (LCP) • Operational Concept Description (OCD) • Supporting Information Document (SID) | 12/10/2012 | .doc, .pdf | Soft copy |

| | | | |
|--|-----------------|--------------|-------------------------------|
| <ul style="list-style-type: none"> • System and Software Architecture Description (SSAD) • Prototype report (PRO) • Quality Management Plan (QMP) • Transition Plan (TP) • User Manual (UM) • Training Material (TM) • Test Procedure and Result (TPR) • Test Plan and Cases (TPC) | | | |
| Project Effort | Every Monday | Text | ER system |
| Project Plan | Every Wednesday | .mpp | Soft copy |
| Progress Report | Every Wednesday | .xls | Soft copy |
| COTIPMO | Every Wednesday | COTIPMO tool | Jazz team server-COTIPMO tool |

3. Responsibilities

3.1 Project-specific stakeholder's responsibilities

The XL2 project has the following stakeholders and their responsibilities are listed under section 3.2.

Client: Eric Lev

Development Team: Kevin Crimi, Muthukumaran Dhanapal, Sindhu Nachimuthu

Testing Team: Ted Lee, Ritesh Nanda

Training Team: Ritesh Nanda

User(s): Venture Capitalists, Real estate Developers, Brokers, Client

3.2 Responsibilities by Phase

Table 5: Stakeholder's Responsibilities in each phase

| Team Member / Role | Primary / Secondary Responsibility | | | | |
|---|--|--|--|---|---|
| | Exploration | Valuation | Foundations | Development-Construction Iteration | Development-Transition Iteration |
| Name: Eric Lev (Client) | Primary Responsibility - Explain requirements - Explain real estate calculations - Contribute to WinWin conditions - Provide industry knowledge for the types of assets tool is modeling. | Primary Responsibility - Assess work artifacts and provide feedback (prototype) - Identify shared vision, goal, and concepts - Provide domain knowledge pertaining to Project. | Primary Responsibility - Provide feedback for prototypes - Request changes and fixes to functionalities. - Review proposed system - Provide feedback | Primary Responsibility - Test system development modules - Provide Feedback of system features - Test system in operational environment | Primary Responsibility - Attend training sessions - Invite stakeholders for testing and use of new system - Prepare for system transition - Marketing product to success critical stakeholders |
| Name: Sindhu Nachimuthu (Project Manager/ Life Cycle Planner/ Builder) | Primary Responsibility - Plan the project - Track member efforts weekly - Manage client Interaction and satisfaction - Plan project life cycle phases - List deliverables and | Primary Responsibility - Plan the project - Track member efforts weekly - Manage client Interaction and satisfaction - Define milestones and artifacts - Provide | Primary Responsibility - Define detailed project plan - Track project development progress - Manage client interaction and satisfaction - Analyze the life cycle plan | Primary Responsibility - Track project development progress - Develop system - Manage client interaction and satisfaction - Detail iteration and support plan - Define detail life cycle plan | Primary Responsibility - Launch final system developed - Manage client interaction and satisfaction - Deliver final project artifacts - Define detail life cycle plan - Track project |

| | | | | | |
|--|--|--|---|---|---|
| | team members -Identify responsibilities and skills Secondary Responsibility - Provide quality control on documents | feasibility evidences at every phase - Track project plan with respect to overall strategy laid down Secondary Responsibility - Analyze business case - Provide quality control on documents | and lay down detail project plan - Track project plan with respect to overall strategy laid down Secondary Responsibility - Assess and evaluate NDI component - Provide quality control on documents | - Track project plan with respect to overall strategy laid down Secondary Responsibility -Test modules during development and record test case results - Ensure module code modifications are done based on test case results | plan with respect to overall strategy laid down Secondary Responsibility - Document Transition plan |
| Name: Kevin Crimi (Prototyper/ Feasibility Analyst/Builder) | Primary Responsibility -Identify system modules and functionality - Design prototype Secondary Responsibility -Analyze feasibility of processes -Perform business case analysis | Primary Responsibility - Prioritize and Analyze system functional capabilities - Develop and assess prototype Secondary Responsibility -Identify risks and mitigation plans -Perform NDI feasibility -Perform market trend and product line analysis | Primary Responsibility - Detail functional prototype - Analyze system prototype - Get feedback to ensure Client satisfaction Secondary Responsibility -Provide feasibility evidence at each phase before milestone - Cost, benefit and ROI analysis | Primary Responsibility - System development | Primary Responsibility - System deployment - Deliver final project artifacts |
| Name: Ritesh Nanda (Operations Concept Engineer/ Reviewer/Tester/Trainer) | Primary Responsibility - Identify the system concept - Develop vision and usage - Analyze current system Secondary Responsibility - Review the work products/ deliverables - Shaper of project plan - Provide | Primary Responsibility - Explore system alternatives - Establish new operational concept - Explore alternatives Secondary Responsibility -Verification and validation of work products | Primary Responsibility - Define detail operational concept - Analyze new operational concept Secondary Responsibility -Verification and validation of work products - Report defects - Provide | Primary Responsibility - Report defects - Manage and control issues and defects encountered - Provide evaluation of work products | Primary Responsibility - Manage and control issues and defects encountered - Provide evaluation of work products - Creation of user manual and testing materials prior to system transition and training. |

| | | | | | |
|--|--|--|---|---|--|
| | evaluation of work products | - Provide evaluation of work products | evaluation of work products | | |
| Name: Muthukumaran Dhanapal (Software Architect/ Feasibility Analyst/Builder) | Primary Responsibility -Explore system design - Modeling of product workflow Secondary Responsibility -Analyze feasibility of processes -Perform business case analysis | Primary Responsibility - Architect the proposed system - Design and assess design components Secondary Responsibility -Identify risks and mitigation plans -Perform NDI feasibility -Perform market trend and product line analysis | Primary Responsibility - Re-establish system architecture and design - Analyze NDI architecture Secondary Responsibility -Provide feasibility evidence at each phase before milestone - Cost, benefit and ROI analysis | Primary Responsibility - System development | Primary Responsibility - System deployment - Deliver final project artifacts |
| Name: Ted Lee (IIV & V / Tester/ Quality Manager/ Project Manager) | Primary Responsibility - Review the work products/ deliverables - Shaper of project plan - Provide evaluation of work products - Provide quality control on documents Secondary Responsibility - Plan the project - Track member efforts weekly - Manage client Interaction and satisfaction | Primary Responsibility -Verification and validation of work products - Provide evaluation of work products - Analyze business case - Provide quality control on documents Secondary Responsibility - Establish new operational concept - Explore system function alternatives | Primary Responsibility -Verification and validation of work products - Report defects - Provide evaluation of work products - Assess and evaluate NDI component - Provide quality control on documents Secondary Responsibility - Provide detail to and assess operational concept - Explore system design alternatives | Primary Responsibility - Report defects - Manage and control issues and defects encountered - Provide evaluation of work products -Test modules during development and record test case results - Ensure module code modifications are done based on test case results Secondary Responsibility - Track project development progress - Develop system - Manage client interaction and satisfaction | Primary Responsibility - Manage and control issues and defects encountered - Provide evaluation of work products - Testing at higher level i.e. acceptance testing etc. Secondary Responsibility - Launch final system developed - Manage client interaction and satisfaction - Deliver final project artifacts |

3.3 Skills

| Team members | Role | Skills |
|-------------------|--|--|
| Sindhu Nachimuthu | Project Manager/ Life Cycle Planner/ Builder | Current Skills <ul style="list-style-type: none"> • Business analysis skills • People skills • Problem solving skills • Organization and consistent planning skills • Leadership and team builder skills • Communication skills • Documentation skills Tools <ul style="list-style-type: none"> • COCOMO II Required Skills <ul style="list-style-type: none"> • Project tracking, monitoring and progress checking skills • Budget management and cost control skills • Risk management and decision making skills • Managing team organization skills • Goal setting and target definition skills • Schedule establishment and budget estimation skills • Allocation of resources and balancing workload |

| | | |
|-------------|--|---|
| | | <p>amongst team member skills</p> <ul style="list-style-type: none"> • Negotiation and influencing skills • Programming skills in Java using Java Excel Package <p>Tools</p> <ul style="list-style-type: none"> • Microsoft Project • WINBOOK • Bugzilla • COTIPMO |
| Kevin Crimi | Prototyper/ Feasibility Analyst/ Builder | <p>Current Skills</p> <ul style="list-style-type: none"> • Software modeling skills • Prototyping skills • Skills to asses NDI components • Client requirements understanding skills • Risk identification and mitigation skills • Software capability analysis skills • Business case analysis skills • Analyze NDI feasibility skills • Communication skills <p>Required Skills</p> <ul style="list-style-type: none"> • Prototype reports documentation skills • Project breakdown for development skills • Feature identification and Prioritization skills • Programming skills in Java using Java Excel Package • Skills to perform cost, benefit and ROI analysis • Negotiation skills • Product line analysis |

| | | |
|-----------------------|---|--|
| | | skills <ul style="list-style-type: none"> • UML modeling skills Tools <ul style="list-style-type: none"> • WINBOOK • Bugzilla • Balsamiq prototype tool |
| Ritesh Nanda | Operations Concept Engineer/ Reviewer / Tester/ Trainer | Current Skills <ul style="list-style-type: none"> • Formulation of operational concept description skills • Analytical skills • Objectives and constraints identification skills • Prioritization skills • Communication skills • Business and technical documentation skills • People skills Required Skills <ul style="list-style-type: none"> • Operational and organization values identification skills • Skills to exploring alternatives • Training skills • Issue reporting, tracking and management skills • Work products Verification and validation skills • Negotiation skills • Test case development using Java programming skills Tools <ul style="list-style-type: none"> • WINBOOK • Bugzilla |
| Muthukumaran Dhanapal | System Software Architect/ Feasibility Analyst/ Builder | Current Skills <ul style="list-style-type: none"> • Analytical skills • Risk identification |

| | | |
|---------|--|---|
| | | <ul style="list-style-type: none"> and mitigation skills • Architecture designing skills • Communication skills • Negotiation skills • Analyze NDI Interoperability skills • Analyze NDI feasibility skills <p>Required Skills</p> <ul style="list-style-type: none"> • Software architecture documentation skills • Product line analysis skills • Skills to perform cost, benefit and ROI analysis • Business case analysis skills • Feature identification and Prioritization skills • Programming skills in Java using Java Excel Package <p>Tools</p> <ul style="list-style-type: none"> • WINBOOK • Visual Paradigm • Bugzilla |
| Ted Lee | IIV & V / Tester/ Quality Manager/ Project Manager | <p>Current Skills</p> <ul style="list-style-type: none"> • Artifacts analysis skills • Software Unit Testing skills • Communication skills • Business analysis skills • Project progress tracking and monitoring skills • People skills <p>Tools</p> <ul style="list-style-type: none"> • COCOMO II • Microsoft Project |

| | | |
|--|--|--|
| | | Required Skills <ul style="list-style-type: none">• Issue reporting, tracking and management skills• Work products Verification and validation skills• Test case development using Java programming skills• Problem solving skills Tools <ul style="list-style-type: none">• WINBOOK• Bugzilla• COTIPMO |
|--|--|--|

4. Approach

4.1 Monitoring and Control

Every team member is responsible to report their effort on a weekly basis. The combined effort is reported using a progress report. This includes reporting of issues, risks, mitigation plans, activities planned for next week and activities accomplished during the prior week, SLOCs. This is one way artifacts produced by the team are monitored, tracked, and controlled. The project timeline and progress is tracked and controlled using the project plan document. When activities have been completed, the progress and actual dates are updated in the project plan document. Activities that are delayed or upcoming are brought up as agenda topics during the weekly team meetings.

While the primary responsibility of oversight to the life cycle plan falls on the Life Cycle Planner, team members are individually accountable for their contributions to the LCP. Issues and divergence from the LCP are initially communicated and attempts to resolve through discussion in email forums or verbally. If no resolution can be met, items in contention are brought up as agenda items during the weekly team meetings.

4.1.1 Closed Loop Feedback Control

Electronic mail threads are created and replied on for artifacts for every phase. Document defects are recorded and tracked through the use of the Bugzilla repository (see 4.12 Reviews below). This allows the entire team to view, track, and close the loop on any issues that the team is facing.

For closed loop feedback control of meetings, weekly team check-in meetings are conducted. Minutes of the meeting are recorded for reference later, topics from agenda for meeting are discussed, and resolutions are recorded. A similar format is followed for client meetings with the team also. Any issues that continue to remain unresolved from team meetings are entered in Bugzilla and tracked to resolution.

4.1.2 Reviews

The author of a particular document creates and uploads draft of document into a 'In Progress' folder' in team's Google drive shared folder named 'csci577-xl2'. The reviewer after evaluation, uploads the new version of the document under 'reviewed' sub-folder of 'In Progress' folder. Occasionally peer review is incorporated prior to submission to the reviewer if time permits. The final draft after mutual agreement with all team members is then uploaded on the 'Ready for Upload' folder and one team member is responsible for uploading the document on the project website.

Responses to documents are reported on Bugzilla and the author responds to each bug by editing the document, changing the version number, uploading under 'In Progress' folder, changing the status of bug on Bugzilla repository and on mutual consensus resolving the bug and cleaning the Bugzilla repository on a weekly basis. In addition, feedback to the document artifacts will be provided via graded documents with comments and during the review boards.

4.2 Methods, Tools and Facilities

| Tools | Usage | Provider |
|-------------------|--|-----------|
| Apache | Server to launch our project website with information regarding team, project undertaken, project progress etc. updated on a timely basis. | Apache |
| Bugzilla | Bug tracking system to keep repository of bugs found and track its status. | Mozilla |
| COTIPMO | Calculate estimation efforts and conduct team surveys | USC |
| CVS | Concurrent Versioning System to keep track of code work and allow developers to collaborate. | CVS Team |
| Eclipse Juno | The IDE for project development using Java programming language. | Eclipse |
| Google Calendar | Schedule team and client meetings | Google |
| Google Drive | Work products created can be shared, mutually edited for transparent communication between team members | Google |
| Gmail | Sending and receiving electronic mails for fast communication with team members (usage of Google-groups mail) | Google |
| iCard | Weekly Effort report of team members can be recorded | USC |
| Join.me | Fast and efficient sharing of screen amongst team members during review of common documents/ artifacts | LogMeIn |
| Microsoft Excel | Real estate investment models/ templates are built on excel sheets in current manual system. Automation requires building on excel sheets. | Microsoft |
| Microsoft Project | Weekly project plan can be recorded | Microsoft |
| Microsoft Visio | Creation of technical diagrams for use in conveying information and concepts in the work products. | Microsoft |
| Skype | Conference calls can be established for virtual team/ client meets | Skype |
| TeamViewer | Software for desktop sharing, remote control, online meetings and web conferencing. | |
| Visual Paradigm | Create UML modeling diagrams | USC |
| Winbook | WinWin session inputs, results, discussions from Client, team members can be recorded, sorted, analyzed, edited, raise issues, equilibrate | USC |

5. Resources

The following information is used in order to estimate the software cost:

- **Estimated CSCI577a Effort :** 5 team members at 10.13 hrs/week for 12 weeks per person.
- **Total estimated effort:**
From the analysis of project feasibility using COCOMO II, we get pessimistic total effort as 4.0. Hence, # of staff = (Person Months / 1.67) * 2.
The weekly hours effort from each member is $(4 \times 152) / (5 \times 12)$ i.e. pessimistic value obtained times 152 hours (since 1PM= 152 hours) divided between 5 team members for 12 weeks is 10.13 hours/week per person. As each team member has committed to 12 man hours per person per week, the project is doable.
- **Budget information:** Client has zero budget. The system will be deployed on the Client's system as desktop application (alternatively the application .exe file will be burnt and given on a disk drive)
- **Project duration:** 12 weeks
- **Component modules in your development project:** Input model, budget report generator, cash flow report generator, excel sheet populate and display
- **Programming language used:** Java

Table 6: COCOMOII Scale Driver

| Scale Driver | Value | Rationale |
|--|---------|---|
| PREC (Precedentedness) | Nominal | The team has no experience developing similar system but somewhat familiar as such a process follows format of taking input and calculating values to populate the database. |
| FLEX (Development Flexibility) | High | The Client gives general conformity by negotiating some additional features but expects core capabilities to be implemented. |
| RESL (Architecture/ Risk resolution) | High | The architectural definition and freedom from risk being generally 75% clear and thorough for the product gives it a high value with use of ICSM risk based process. |
| TEAM (Team Cohesion) | High | The team is largely cooperative and the Client is also highly cooperative reducing the extra effort required due to difficulties in synchronizing the project's stakeholders. |
| PMAT (Process Maturity) | High | Our team strictly follows project life cycle as that of ICSM guidelines. |

Table 8: COCOMOII Cost Driver for 'input model' module

| Cost Driver | Value | Rationale |
|--------------------|--------------|---|
| RELY | High | The main inputs are taken from this functionality for calculations to be populated on models so there is a high required reliability on this software. |
| DATA | Nominal | The database size is moderate with 10 to 100bytes per for this program. ($10 \leq B/P < 100$) |
| DOCU | Nominal | The documentation requires a right-sized plan for lifecycle needs. |
| CPLX | Very Low | This module involves simple user interface management operations, simple input forms and report generators hence a very low value for complexity. |
| RUSE | Nominal | The code snippet can be used again across the program to take input of other variables as most of the values are numbers, percentages etc. |
| TIME | Nominal | For taking inputs with user interface takes about less than or equal to 50% use of available execution time. |
| STOR | Nominal | The inputs are stored and use about less than 50% of available storage space. |
| PVOL | Low | When there exists market changes over a year, then more variables may come into picture and need incorporation, hence a low score for platform volatility. |
| ACAP | High | The team has highly technical capable and analytical personnel. |
| PCAP | High | The high team cohesion and technical capability of each individual gives the programmers an edge in communication ability, work efficiency to deliver work products. |
| PCON | Very High | As this is a 12 week project, team will not be continuing with 577b course and Client will have to find maintainers for this application. |
| APEX | Nominal | The team has no experience with the domain knowledge but has about 1 year experience developing applications similar to the current application. |
| LTEX | High | The development team has language and tools experience with technical platform chosen for development. |
| PLEX | Nominal | The development platform chosen is convenient for the development team but new packages and libraries need to be explored as part of building models over excel plugins |
| TOOL | Low | The implementation involves a simple GUI and backend that is written on excel sheet and little integration of |

| | | |
|------|---------|---|
| | | modules to build modules. |
| SITE | Nominal | The team is fully collocated except for one team member who is in another city making it easy for the team interaction. However the development team is fully collocated single city. |

Table 9: COCOMOII Cost Driver for 'budget report generator' module

| Cost Driver | Value | Rationale |
|-------------|-----------|--|
| RELY | Nominal | The budget report is a derived part of cash flow report, hence losses can be easily recovered and reliability is moderate. |
| DATA | High | The database size is high to derive and store cash flow model values ranging between 100 to 1000 bytes for the program. |
| DOCU | Nominal | The documentation requires a right-sized plan for lifecycle needs. |
| CPLX | Very Low | This module involves simple user interface management operations, simple input forms and report generators hence a very low value for complexity. |
| RUSE | High | The budget reports derive values from cash flow reports and such budget calculations are done for several models and asset types and hence can be used across product line |
| TIME | Nominal | As cash flow reports are pre-generated, the time taken to generate budget reports takes $\leq 50\%$ use of available execution time. |
| STOR | High | The budget reports derive and generate values on embedded budget template on excel sheets which require about 70% of storage space. |
| PVOL | Low | When there exists market changes over a year, then more variables may come into picture and need incorporation, hence a low score for platform volatility. |
| ACAP | Nominal | With technically capable and analytical personnel, a nominal value indicates diving into real estate knowledge which is a new domain for all team members. |
| PCAP | High | The high team cohesion and technical capability of each individual gives the programmers an edge in communication ability, work efficiency to deliver work products. |
| PCON | Very High | As this is a 12 week project, team will not be continuing with 577b course and Client will have to find maintainers for this application. |
| APEX | Nominal | The team has no experience with the domain knowledge |

| | | |
|------|---------|---|
| | | but has about 1 year experience developing applications similar to the current application. |
| LTEX | High | The development team has language and tools experience with technical platform chosen for development. |
| PLEX | Nominal | The development platform chosen is convenient for the development team but new packages and libraries need to be explored as part of building models over excel plugins |
| TOOL | Low | The implementation involves a simple GUI and backend that is written on excel sheet and little integration of modules to build modules. |
| SITE | Nominal | The team is fully collocated except for one team member who is in another city making it easy for the team interaction. However the development team is fully collocated single city. |

Table 10: COCOMOII Cost Driver for 'cash flow report generator' module

| Cost Driver | Value | Rationale |
|-------------|-----------|---|
| RELY | High | The ultimate core functionality requirement of the project is generation of the cash flow model for real estate investment analysis and hence there is a high required reliability on this software. |
| DATA | High | The database size is high to derive and calculate from input variable values ranging between 100 to 1000 bytes for the program. |
| DOCU | Nominal | The documentation requires a right-sized plan for lifecycle needs. |
| CPLX | Very Low | This module involves simple user interface management operations, simple input forms and report generators hence a very low value for complexity. |
| RUSE | Very High | There are full build reports, summary reports etc. which are a slight modification of cash flow report and also for several asset types and hence this software is highly reusable across multiple product line |
| TIME | Very High | The complete input variable values calculation, population on excel sheet and display on the embedded model built on excel format takes up to $\leq 85\%$ of total execution time. |
| STOR | Very High | All of the input variables are used in performing calculations that contribute to populating the cash flow report model and hence require about $\leq 85\%$ of |

| | | |
|------|-----------|---|
| | | available storage space |
| PVOL | Low | When there exists market changes over a year, then more variables may come into picture and need incorporation, hence a low score for platform volatility. |
| ACAP | Nominal | With technically capable and analytical personnel, a nominal value indicates diving into real estate knowledge which is a new domain for all team members. |
| PCAP | High | The high team cohesion and technical capability of each individual gives the programmers an edge in communication ability, work efficiency to deliver work products. |
| PCON | Very High | As this is a 12 week project, team will not be continuing with 577b course and Client will have to find maintainers for this application. |
| APEX | Nominal | The team has no experience with the domain knowledge but has about 1 year experience developing applications similar to the current application. |
| LTEX | High | The development team has language and tools experience with technical platform chosen for development. |
| PLEX | Nominal | The development platform chosen is convenient for the development team but new packages and libraries need to be explored as part of building models over excel plugins |
| TOOL | Low | The implementation involves a simple GUI and backend that is written on excel sheet and little integration of modules to build modules. |
| SITE | Nominal | The team is fully collocated except for one team member who is in another city making it easy for the team interaction. However the development team is fully collocated single city. |

Table 11: COCOMOII Cost Driver for 'excel sheet populate and display' module

| Cost Driver | Value | Rationale |
|-------------|------------|---|
| RELY | High | The final templates are delivered in the excel sheet formats as desired by the Client and hence there is a high required reliability on this software. |
| DATA | High | All the model value calculated are populated in single excel sheet which has the templates embedded within it hence it requires about $100 \leq B/P < 1000$. |
| DOCU | Nominal | The documentation requires a right-sized plan for lifecycle needs. |
| CPLX | Very Low | This module involves simple user interface management operations, simple input forms and report generators hence a very low value for complexity. |
| RUSE | High | The excel sheet model population is a core functionality and can be used across product line for generating models on excel formats. |
| TIME | Very High | The ultimate excel model generation requires several values to be populated which are pre-calculated and hence requires $\leq 75\%$ of execution time. |
| STOR | Extra High | The storage space used for such high execution time is thus high too in order to retrieve values that are calculated. Hence a extra storage space of about $\leq 95\%$ is required. |
| PVOL | Low | When there exists market changes over a year, then more variables may come into picture and need incorporation, hence a low score for platform volatility. |
| ACAP | Nominal | With technically capable and analytical personnel, a nominal value indicates diving into real estate knowledge which is a new domain for all team members. |
| PCAP | High | The high team cohesion and technical capability of each individual gives the programmers an edge in communication ability, work efficiency to deliver work products. |
| PCON | Very High | As this is a 12 week project, team will not be continuing with 577b course and Client will have to find maintainers for this application. |
| APEX | Nominal | The team has no experience with the domain knowledge but has about 1 year experience developing applications similar to the current application. |
| LTEX | High | The development team has language and tools experience with technical platform chosen for |

| | | |
|------|---------|---|
| | | development. |
| PLEX | Nominal | The development platform chosen is convenient for the development team but new packages and libraries need to be explored as part of building models over excel plugins |
| TOOL | Low | The implementation involves a simple GUI and backend that is written on excel sheet and little integration of modules to build modules. |
| SITE | Nominal | The team is fully collocated except for one team member who is in another city making it easy for the team interaction. However the development team is fully collocated single city. |

Using the COTIPMO tool for architected agile process pattern the initial project estimates were performed and results are shown:

Figure 1: COCOMO II analysis result

Project Name: KL2

Scale Factor: 13.89

Schedule

Project Notes

Development Model: Post Architecture

| X | Module Name | Module Size | LABOR Rate (\$/month) | EAF | Language | NCM Effort DEV | EST Effort DEV | PROD | COST | INST COST | Staff | RISK |
|---|----------------|-------------|-----------------------|------|----------|----------------|----------------|-------|------|-----------|-------|------|
| | Input model | S:1632 | 0.00 | 0.42 | JAVA | 4.9 | 2.1 | 788.6 | 0.00 | 0.0 | 0.3 | 0.0 |
| | Budget report | S:100 | 0.00 | 0.58 | JAVA | 0.3 | 0.2 | 575.7 | 0.00 | 0.0 | 0.0 | 0.0 |
| | Cash flow rep | S:204 | 0.00 | 0.98 | JAVA | 0.6 | 0.6 | 338.7 | 0.00 | 0.0 | 0.1 | 0.0 |
| | Excel populate | S:100 | 0.00 | 1.13 | JAVA | 0.3 | 0.3 | 291.8 | 0.00 | 0.0 | 0.1 | 0.8 |

Total Lines of Code: 2036

Hours/PM: 152.00

| | Estimated | Effort | Sched | PROD | COST | INST | Staff | RISK |
|-------------|-----------|--------|-------|-------|------|------|-------|------|
| Optimistic | | 2.6 | 6.4 | 798.2 | 0.00 | 0.0 | 0.4 | |
| Most Likely | | 3.2 | 6.8 | 638.6 | 0.00 | 0.0 | 0.5 | 0.8 |
| Pessimistic | | 4.0 | 7.3 | 510.9 | 0.00 | 0.0 | 0.5 | |

6. Iteration Plan

6.1 Plan

The sequence of milestones based on priority in the development iteration is:

1. Population of cash flow/budget model (11/09/2012 to 11/16/2012)
2. Generation of the report files (11/16/2012 to 11/23/2012)
3. Opening Excel sheet with model (11/23/2012 to 11/30/2012)

6.1.1 Capabilities to be implemented

The capabilities that will be implemented in each of the three iterations are tabulated as shown below. The prioritization follows the MoSCoW requirements rule, where the Must Have, Should Have and Could Have requirements will be the first to be implemented but the Should Have and Could Have requirements will go first if the timeline is threatened.

Table 7: Construction iteration capabilities to be implemented

| ID | Capability | Description | Priority | Iteration |
|----|--|---|-----------|-----------|
| 1 | Accept model type input | In this first menu, the analyst decides which type of asset model he would like to work off of (current implementation will only include one model but future development teams can expand on this) | Must Have | 1 |
| 2 | Accept input for phase selection | In this menu the user will be able to customize the names of the development phases in the model (future development teams will use this menu to also adjust the number and length of phases) | Must Have | 1 |
| 3 | Accept input for revenue values | Allows adjustment of revenue in terms of Hotel NOI and CAP rates as absolute dollars or percentage. | Must Have | 1 |
| 4 | Accept input for cost factors and values | The costs are divided between categories of land acquisition, pre-development cost, direct development costs and indirect development costs. The cost distribution should be specified monthly, yearly or in total. | Must Have | 1 |
| 5 | Accept input for sources of funding and values | The source of funding- public financing, net sale proceeds etc. should be inputted for type and value. The funding from NOI, equity or debt should be specified across the three phases. For | Must Have | 1 |

| | | | | |
|----|---|--|-------------|---|
| | | predevelopment phase, funding strictly comes from equity. For stabilization phase, funding comes primarily from NOI with equity making up any shortcomings. The development funding puts up equity required for an assumed 7% LTC (Loan to cost) and then disperse the loan. | | |
| 6 | Calculate values | The accepted input values should be formulated to give calculated values for each cell of excel sheet model. | Must Have | 1 |
| 7 | Embed the model on excel sheet | The model should be built within an excel sheet to be populated. | Must Have | 1 |
| 8 | Dynamic generation of cash flow report files. | The report file needs to be populated with calculated values from the database and generated with the embedded model. | Must Have | 2 |
| 9 | Dynamic generation of budget report files | The report file needs to be populated with calculated values from the database and generated with the embedded model. | Must Have | 2 |
| 10 | Deploy as desktop application | To maintain security over the data stored, the application runs on a desktop (Windows only) platform. | Must Have | 2 |
| 11 | Edit input fields | Allows editing phases, revenues, costs and sources of funding in any order. | Should Have | 2 |
| 12 | Excel sheet pop up with model generated | The report files generated should open in excel sheet format. Allows manual customization of generated model. | Should Have | 3 |
| 13 | Create new customized model. | Allows creation of a new model from a selection of prebuilt models. | Could Have | 3 |
| 14 | Generate PDFs from populated model | The report files generated should open in PDF format. | Could Have | 3 |

6.1.2 Capabilities to be tested

Table 8: Construction iteration capabilities to be tested

| ID | Capability | Description | Priority | Iteration |
|-----------|--|--|-----------------|------------------|
| 1 | Accept model type input | In this first menu, the analyst decides which type of asset model he would like to work off of (current implementation will only include one model but future development teams can expand on this) | Must Have | 1 |
| 2 | Accept input for phase selection | In this menu the user will be able to customize the names of the development phases in the model (future development teams will use this menu to also adjust the number and length of phases) | Must Have | 1 |
| 3 | Accept input for revenue values | Allows adjustment of revenue in terms of Hotel NOI and CAP rates as absolute dollars or percentage. | Must Have | 1 |
| 4 | Accept input for cost factors and values | The costs are divided between categories of land acquisition, pre-development cost, direct development costs and indirect development costs. The cost distribution should be specified monthly, yearly or in total. | Must Have | 1 |
| 5 | Accept input for sources of funding and values | The source of funding- public financing, net sale proceeds etc. should be inputted for type and value. The funding from NOI, equity or debt should be specified across the three phases. For predevelopment phase, funding strictly comes from equity. For stabilization phase, funding comes primarily from NOI with equity making up any shortcomings. The development funding puts up equity required for an assumed 7% LTC(Loan to cost) and then disperse the loan. | Must Have | 1 |
| 6 | Calculate values | The accepted input values should be formulated to give calculated values for each cell of excel sheet model. | Must Have | 1 |
| 7 | Embed the model on excel sheet | The model should be built within an excel sheet to be populated. | Must Have | 1 |
| 8 | Dynamic generation of cash flow | The report file needs to be populated with calculated values from the database and generated with the embedded model. | Must Have | 2 |

| | | | | |
|----|---|---|-------------|---|
| | report files. | | | |
| 9 | Dynamic generation of budget report files | The report file needs to be populated with calculated values from the database and generated with the embedded model. | Must Have | 2 |
| 10 | Deploy as desktop application (portability) | To maintain security over the data stored, the application runs on a desktop (Windows only) platform. | Must Have | 2 |
| 11 | Edit input fields | Allows editing phases, revenues, costs and sources of funding in any order. | Should Have | 2 |
| 12 | Excel sheet pop up with model generated | The report files generated should open in excel sheet format. Allows manual customization of generated model. | Should Have | 3 |
| 13 | Create new customized model. | Allows creation of a new model from a selection of prebuilt models. | Could Have | 3 |
| 14 | Generate PDFs from populated model | The report files generated should open in PDF format. | Could Have | 3 |

6.1.3 Capabilities not to be tested

The project team commits to delivering all the core functionalities for the XL 2 project in 12 weeks. Thus all the functions developed and minimal additional features will be tested.

6.1.4 CCD Preparation Plans

The stakeholders involved in the Core Capability Drive will be

- **Client:** Eric Lev
- **Development Team:** Kevin Crimi, Muthukumaran Dhanapal, Sindhu Nachimuthu
- **Testing Team:** Ted Lee, Ritesh Nanda
- **Training Team:** Ritesh Nanda

The CCD preparation plan:

1. User will be explained about the development sprint results and what was the goal of every milestone. He will be asked to check for compatibility with the excel format of models given by Client and to check for change in model values when inputs are changed. He could give values to reflect all kinds of hotel types given Client's 5 year experience in underwriting real estate investment models.

2. Several code runs using the values already present in Client's excel models will be shown initially. After he gets an idea of workflow, he could be given control of modifying values to check for model perfection and user satisfaction.
3. The team will have 3 Computer Systems in total during every development iteration capability drive through. Before the iteration, the development will be run tested on two systems for- memory leaks, GUI misalignments, and screen resolution match to User Interface.
4. User will be given a feedback form to explain his experience using our application. His satisfaction criteria will be tracked. The snapshot of the feedback form is as shown below (Figure 2) The Client will also be provided with and asked to sign the on-closure report.
5. After the CCD, the team reflects on features and functionalities shown to Client. The team shall investigate the risks that have arisen and plan on mitigating the risks in future development sprints.

Figure 2: Client Feedback Form

CLIENT FEEDBACK FORM


PROJECT NAME: XL 2

Date: __/__/20__

Client Name: _____

Email Address: _____@_____

Please take a few moments to provide us with some important feedback about working with our project team on XL2.



| | Totally agree | Agree | Disagree |
|---|--------------------------|--------------------------|--------------------------|
| My questions/concerns/requests were dealt with promptly | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Product developments were delivered in a timely manner | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Team was capable of understanding my requirements | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Team was approachable and friendly | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| The product quality was as expected | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| The win conditions committed to by the team were delivered. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I was satisfied with the development/ end product | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Do you have any comments/suggestions for us (Good or Bad):

I would give an overall rating as

| Excellent | Average | Average |
|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6.2 Iteration Assessment

6.2.1 Capabilities Implemented, Tested, and Results

The development team is currently in development sprint #3, hence the capabilities mentioned in this section are for iterations #1 and #2 only.

Table 9: Capabilities implemented, tested, and results

| ID | Capability | Test Case | Results | If fail, why? |
|----|--|--|--|--|
| 1 | Menu bar 'file' menu has option to save file | Entered number values for input panels and chose option 'save'. | Save feature missing. No system response on clicking 'save' from file menu. | FAIL Save feature not implemented. |
| 2 | Menu bar 'file' menu has option to 'save as' file. | Entered number values for input panels and chose option 'save as'. | 'Save as' feature missing. No system response on clicking 'save' from file menu. | FAIL 'Save as' feature not implemented. |
| 3 | Save file automatically as excel worksheet | Clicked on file menu and chose option 'save' file. | File while being saved needs the user to manually enter the file extension. | FAIL .xls file extension is not considered the default prototype. |
| 4 | Accept input for revenue values | Enter a percentage value in Hotel NOI text box | The G9 cell location in 'cash flow' worksheet is empty. | FAIL The cell populates on first entry of values but when inputs are edited, the formula coded for that cell is not calculating new values. |
| 5 | Accept input for cost values | Entered numbered cost values in terms of number for pre-development phase costs panel to populate model. | Cell E27 for entitlement cost, legal, title, Ins., and Misc. Expenses, preconstruction services did not write to properly. | FAIL The cell populates on first entry of values but when inputs are edited, the formula coded for that cell is not calculating new values. |

| | | | | |
|---|---|---|---|--|
| 6 | Accept inputs for indirect development | 1. Entered number values to populate model through 'construction management' filed. 2. Entered a number value for construction loan field. | 1. Field did not write to cell D45 in saved excel file. 2. Unable to test where this field's value is being shown on excel file. | FAIL The cell populates on first entry of values but when inputs are edited, the formula coded for that cell is not calculating new values. |
| 7 | Accept inputs for predevelopment phase. | Entered a number value in insurance filed of predevelopment phase. | Value is being represented as a percentage in excel file | FAIL Incorrect cell formula that is populated by this field. |
| 8 | Accepting percentages as input | Entered 50, 50.1 etc. for the percentage fields. | The program does not take percentage values for input. | FAIL The number has to contain both a decimal place and a percentage sign. Either have to code validation for percentage input field or mention to user the format of entering such inputs. |
| 9 | Automatic warnings for invalid inputs | Typed text and alphanumeric characters for all input fields. | Input accepted and incorrect values populated on excel worksheet. | FAIL Input validation not coded. |

6.2.2 Core Capabilities Drive-Through Results

The Client was first shown the screens shots of GUI and manual flow of work from one screen to another using the PRO document to get him familiar with the protocol. After he was accustomed to the automated work, the working system was presented by one team member using input values from Client's Hotel Model Excel sheet. He was shown how to input values to populate the model using checkboxes, radio buttons, spinner etc.

The Client checked the cash flow model generation for all the three phases and after a hands-on experience with the GUI commented positively on the panel selections for each set of input. He requested the following changes to be considered:

1. The public financing and net sale proceeds funding sources were asked to be removed and following changes to be incorporated for the 3 phases:
 - i. The development funding should put up equity required for an assumed 7% LTC (Loan to cost) and then disperse the loan.
 - ii. For stabilization phase, funding comes primarily from NOI with equity making up any shortcomings.
 - iii. For predevelopment phase, funding strictly comes from equity.
2. For the revenue selection panel, only Hotel NOI and CAP rates were asked to be taken as input.

The Client gave some of his previous model input values such as- Equity, NOI and debt for revenue and played with the spinner for different cost percentages. After several runs, he was comfortable using the system and found it easy to understand.

6.3 Adherence to Plan

The first development iteration ran well within the scheduled time and the work modules were divided amongst development team members fairly based on member schedule and expertise; however there was more focus on the GUI look and feel and since the Client always requested meetings when more functionalities were developed, the CCD with the Client could not be conducted for sprint #1. Before the second development sprint, we conducted a feature prioritization to focus on core functionality implementation, work was integrated on time, release freeze was sent out to testers and Client's date for CCD was booked.

We are in the third and final development sprint where one functionality (budget report generation) needs to be implemented and falls within schedule since it has several functions code reuse from cash flow report generation (already developed in sprint #2). But there are several test cases that failed and need to be addressed before implementing new functionality. The Software development is in a stable state now and lies within the strategy and plan laid out before Development Phase started.

All the development was done on team member's laptop and team/client meetings conducted using the resources provided by USC, as the Client stated that he had zero budget for this project.