RoomQuest Mobile Navigation App

Software Project Management Plan

Version 3.1
February 2, 2017

Prepared by the following Team:

Jarred Fletes

Software Engineer/ Project Manager

E-mail: jwfletes@gmail.com

Phone Number: (909)708-9184

Pilar Morales

Software Engineer/ Assistant Manager

E-mail: morales.pilar18@yahoo.com

Phone Number: (323)747-6868

Table of Contents

6.1 Process model
6.2 Methods, tools, and techniques
6.3 Infrastructure plan
6.4 Product acceptance plan

7. Supporting process plans

7.1 Configuration management plan
7.2 Verification and validation plan
7.3 Documentation plan
7.4 Quality assurance plan
7.5 Reviews and audits
7.6 Problem resolution plan

1. Overview

1.1 Project summary

1.1.1 Purpose, scope, and objectives

This document outlines the management and development of the RoomQuest app. It also contains the development cycle plans, protocols for testing, and other details for the application. The intended audience for the this document is Dr. Concepcion.

Every once in awhile, students of the California State University, San Bernardino Main and Palm Desert campus become lost and directionally challenged and can sometimes even spend endless minutes trying to find a destination while roaming the on-growing campuses. Because of this, an idea arose, an idea that if implemented would give Apple iOS users a way to navigate to a destination while at the California State University of San Bernardino and Palm Desert Campus.

To clarify, the idea that was thought about involved creating a mobile app for Apple devices that would serve as a map and guide for students who are in need of direction while inside the buildings of the California State University of San Bernardino Main or Palm Desert campus.

After the idea was validated, it became a software project, which was commenced in the winter of 2015 (version 2.0) and continues to this very day. Dr. Gerard Au and Dr. Samuel Sudhakar requested the development of the software. Their ideas were the ones that were implemented in the the app during the first stages of development, and they continue to be the ideas that are being implemented into the app today. Further, the development of the application will be overseen by Dr. Concepcion, and will be done by CSE 455 Software Engineering students at the California State University of San Bernardino during the Winter of 2016. The following is a continuation of the project that adds the iOS version of the app, and will be carried out by CSE 455 students at the California State University of San Bernardino during the Winter 2017 quarter.

The software that is to be developed will be an Apple iOS application, which will aid students who are unfamiliar with the CSUSB campuses locate their destinations while at school.

The following documents what will be accomplished by the first prototype:

The app will include an internal map of all the buildings (and the room floors of those buildings) within the CSUSB Main campus. While in the app, users will be able to search and locate their

destinations; the user will be able to type a room number or the name of a faculty member (either by last name or first name) in the app's search bar, and the app will display the location of that user's destination on the Main campus map.

The following documents what will be accomplished by the second prototype:

Next, the app will include the location of Deans offices, department offices, and student service offices. All the above will only be developed for the Apple iOS platform.

In summary, the Room Quest app will contain all the maps of every floor of every building within the Main Campus.

1.1.2 Assumptions and constraints

- The development team is following the SRS
- There will be timely responses from the client
- All lab meetings are to be attended by each team member
- Time outside of class will be used if need be
- GitLab and GitHub will be used as an online backup

1.1.3 Project deliverables

1. Documentation
    - SRS
    - SPMP
    - SQAP
    - Software Architecture
    - Interface
    - Design
    - Repository commitments
2. The RoomQuest Apple iOS app
    - Browsable building layouts
    - Displaying of Classroom and Office locations
    - Office and Room search functionality

1.1.4 Schedule and budget summary

The delivery of Prototype #1 is set for the week of February 20, 2017 and the delivery of Prototype #2 is set by finals week in March, 2017. RoomQuest is also set for release on the GooglePlay store and the Apple store for the Winter 2017 quarter. There has been no budget specified for this project.

1.2 Evolution of the plan

There will be two stages of development. The first stage will involve the creation of an initial prototype. This prototype will then be presented to Thomas, the client, and the QA team for approval. The second stage will involve addressing any issues that the QA team discovers as well as adding any new features requested by the client and Dr. Concepcion. Each version of the SPMP will be submitted to Dr. Concepcion for approval. Upon return, the SPMP will be revised as necessary.

2. References

- Software Project Management Plan IEEE 1058-1998
- RoomQuest SPMP 3.1 Winter 2016
- RoomQuest SRS version 3.1

3. Definitions

ArcGIS

ArcGIS is a geographic information system used to develop maps; compiling geographic data; analyzing mapped information;sharing and discovering geographic information; using maps and geographic information in a range of applications; and managing geographic information in a database.

ArcMap

A map document that is a file containing one or more maps; one page layout; and the associated layers, tables, charts, and reports. These types of files have an .mxd extension.

API (Application Programing Interface)

Refers to a set of routines, protocols, and tools that is used in the building of software applications.

CSV

Stands for ‘Comma Separated Values.’ Microsoft Excel can export files in this format. A CSV file contains a single spreadsheet, which can hold information like professor name and room number.

Disk space

A very common form of long-term data storage for computing devices. It is where saved files such as documents, movies, and music, as well as system files are stored.

GPS

Stands for 'Global Positioning System'. It is a navigation system that uses satellites to locate a device in geophysical space.

HTTPS

Stands for 'Hyper Text Transfer Protocol Secure'. It is an encrypted data transfer protocol for use in Internet communications that prevents eavesdropping.

IEEE

Stands for 'Institute of Electrical and Electronics Engineers.' It is an organization that is responsible for setting technology standards, among many other things.

iOS

An operating system that is used on many mobile devices such as phones and tablets that is used on Apple's mobile devices.

MB/MiB

The megabyte (MB) and mebibyte (MiB) are two measures of data storage space that are multiples of a byte (or 8 bits) of data. These two measures are frequently used interchangeably. A megabyte is calculated in base-10 (or decimal) and is 1,000,000 bytes and a mebibyte is calculated in base-2 (or binary) and is 1,048,576 bytes.

Pixel Density

A measure of the screen resolution of a device measured in pixels-per-inch (ppi).

QA (Quality Assurance)

A group of individuals that verifies that the development team has delivered all of the software features as laid out in the SRS.

RAM (Random Access Memory)

RAM is the solid-state memory in a device that it stores its current state in. It is very fast compared to physical disk storage.

Server

A computer that stores data and programs that other computers connected to it can download. It is usually located remotely from the computers accessing its stored data.

UI

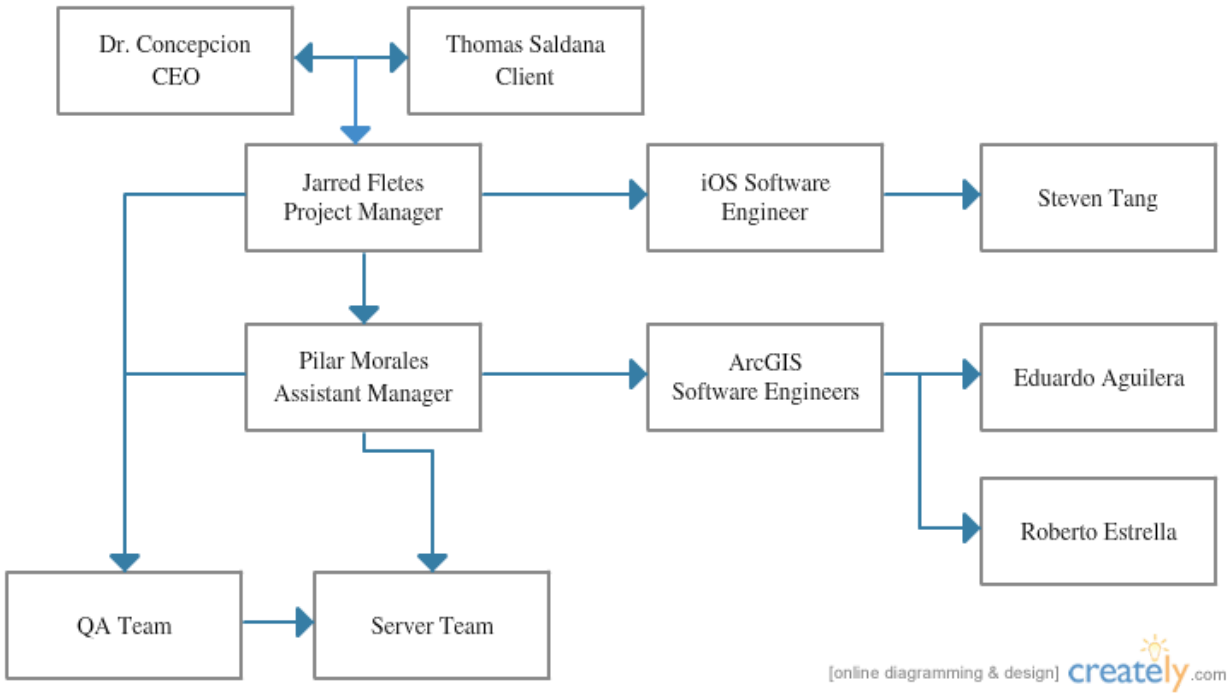
Stands for User Interface. This includes all the buttons, combo-boxes, sliders, menus, and windows etc. that the user uses to interact with the program.

WiFi

A wireless data transfer protocol that allows varied devices such as laptops, desktops, phones, tablets, and routers to communicate with each-other over a local area network.

4. Project organization

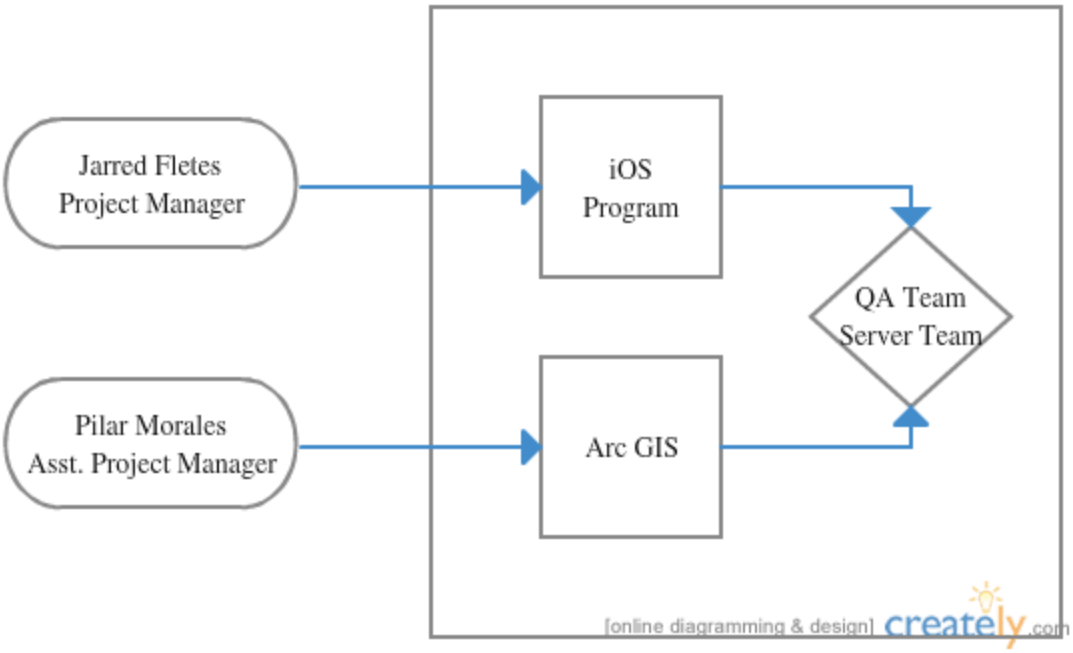
4.1 External interfaces



The organization of this project is as follows:
Thomas Saldana and Jose Banuelos the clients, will communicate their needs and ideas, regarding the project, with Jarred Fletes and Pilar Morales, the project managers. Dr. Concepcion, the CEO of CSE 455, Inc., will oversee the work of the project manager and his team. Jarred Fletes will be required to give weekly reports, where he will address the state of the

program, to Dr. Concepcion, Thomas Saldana, or Jose Banuelos. Further, Jarred will communicate with Pilar Morales, the assistant project manager, who will oversee Eduardo Aguilera and Robert Estrella in mapping out the school using ArcGIS software. Jarred will collaborate with Steven Tang on the development of the mobile application. Jarred will communicate with the entire team on the design and direction of the app. Both Jarred and Pilar will communicate with the server team whenever server services are needed to develop the app. Jarred and Pilar will also communicate with the QA team in order to perfect the quality of the app and its software.

4.2 Internal structure



This diagram explains the internal structure between the project and assistant project managers, the room quest team, and the QA and Server teams. Jarred will overlook the part of the team that is working on the iOS portion of the app. Pilar will overlook the part of the team that is working on the map design portion of the app. The entire team will make sure we properly communicate with both QA and Server team.

4.3 Roles and responsibilities

Name:	Role:	Responsibility:
Jarred Fletes	Project Manager	Guides the team's efforts Conduct meetings with team, Dr. Concepcion, and Thomas Saldana. Oversees all team activities Ensure adherence of the app to the SRS. Design the app based on the client's needs
Pilar Morales	Assistant Project Manager	Oversees team. Manages Time Line. Helps team with mapping and routing using ArcGIS Ensure team's needs are met Helps in the design of the app Keeps Jarred on track
Steven Tang	Software Engineer	Will design and code the software of the RoomQuest app
Eduardo Aguilera	Software Engineer	Will use ArcGIS to map out the buildings and routes of the school campus
Robert Estrella	Software Engineer	Will use ArcGIS to map out the buildings and routes of the school campus
Thomas Saldana	Project Advisor	Will oversee the continuation of the project

Nathan Rouksek	Graphics Designer	Design logo, buttons, etc.

5. Managerial process plans

5.1 Start-up plan

The start up plan consists of eight tasks:

- Researching tools that will aid in the development of the software
- Creating the specifications
- Estimating time to accomplish requirement specification
- Estimating project scope
- Learning Swift for the continuation of the apps development
- Setting up the development environment
- Designing reliable software
- Setting up a version control system

5.1.1 Staffing plan

The software engineers that are going to work on the RoomQuest app were chosen based on their skill. The project manager and the assistant project manager were also given their positions according to their skills. All team members will be part of the CSE 455 Software Engineering class at Cal State, San Bernardino.

The staff will consist of one Project Manager, one Assistant Project Manager, and three Software Engineers.

5.1.2 Resource acquisition plan

Multiple tools and resources will be needed to complete this project.

Two computers, installed with Xcode and photoshop will be needed.

Three computers installed with ArcGIS will be needed.

1 iPhone will be needed to test the application.

1 iPad will be needed to test the application.

1 Server and Server Personnel will be needed to secure and host the apps information

1 Quality Assurance Team will be needed to ensure the quality of the app

All workstations and servers are already provided by the CSE department. Any Apple devices needed for testing will be provided by other team members and Dr. Concepcion if needed.

5.1.3 Project staff training plan

The staff will be trained in several different ways.

The first week of training, Thomas Saldana, Jose Banuelos, and Chris Koenig, the project advisors, will train the entire team, how to use the ArcGIS software to map out the school. Further, they will show Jarred Fletes everything that has to do with the apps improvement and development. Thomas will also give the software engineering team a tutorial on the ESRI website for using Xcode to build a mapping app.

The second week, Christopher Koenig will continue to train Pilar Morales, Eduardo Aguilera, and Robert Estrella how to map the campus buildings on ArcGIS. Thomas Saldana will direct Jarred and Steven Tang on where to find information from ESRI on building the iOS application, and the order in which to complete the steps.

The third week, Christopher Koenig will train Pilar, Eduardo, and Robert in how to create routes using ArcGIS. Thomas and Jose will direct Jarred and Steven in the design of the app and where to find the information on routing.

Also, the team will spend some time collaborating on the SRS and other paperwork and forms that must be completed. The team also has access to consultants, Thomas Saldana, Jose Banuelos, and Chris Koenig for any questions or concerns the team might have.

The links to the resources used in staff training are:

- ESRI ArcGIS iOS website https://developers.arcgis.com/ios/latest/swift/guide/

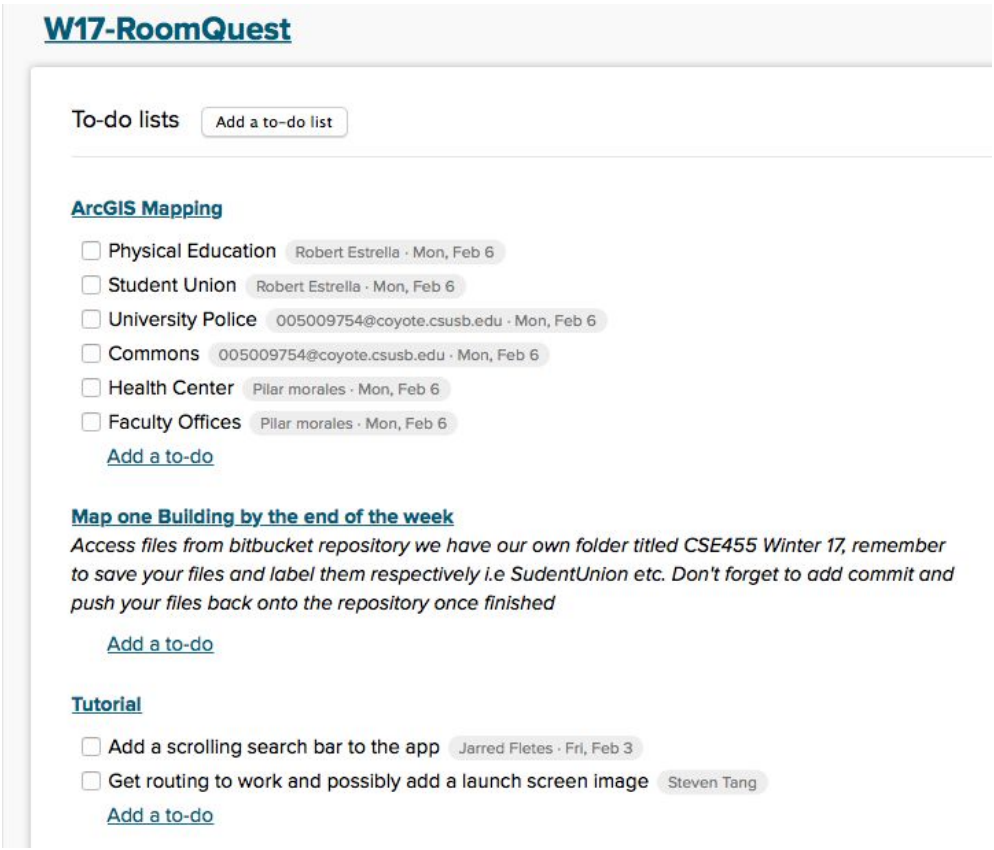
5.2 Work plan

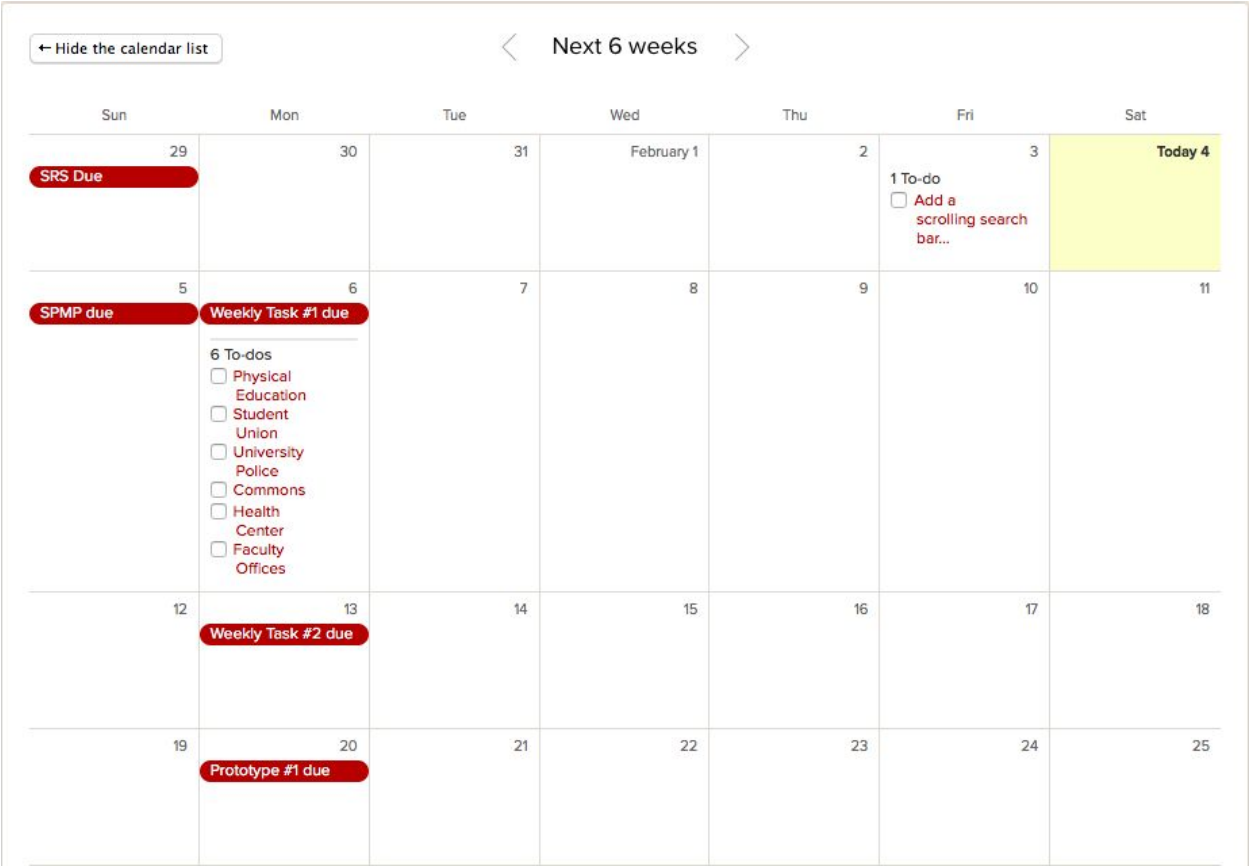
5.2.1 Work activities

- **Prototype:** Develop an early working build of the application that will demonstrate the core functions outlined in the SRS.
- **Graphic Design:** Develop the layout, styles, Icons, and graphics for the map and the android app UI.
- **Programming:** Develop code for the UI, parsing, and searching.
- **Testing:** Verify application reliability and functionality. Verify that all information within the app is up-to-date and easily accessible.
- **Documentation:** Document all aspects of the development of the app so that future developer of the app could also develop and improve the application with ease.

5.2.2 Schedule allocation

The entire schedule of the development process will be made by the project manager and the assistant project manager. The schedule will outline weekly to do's, tasks and deadlines. The development team will use Basecamp to keep up to date with the development schedule. The RoomQuest BaseCamp calendar will also help guide the software engineers in their work.





The following figures are our to-do list and calendar from Basecamp.

5.2.3 Resource allocation

The most important resource of this project is time. Because time is limited, the team will need take advantage lab time in order to finish this project. Also, the team will work on the app from home and collaborate via text message, BaseCamp, and Discord. This will ensure that the first and second prototype get delivered on a time.

5.2.4 Budget allocation

No budget will be needed for this project.The staff will not receive monetary compensation for their labor. However, they will be given course grade and course credit depending on their accomplishments during the winter 2017 quarter.

5.3 Control plan

5.3.1 Requirements control plan

The team will hold weekly meetings with the client. The goal of these meetings is to update the client about the prototype and any changes or modifications to the application. Any change in requirements will be addressed as thoroughly as possible by the team to meet the client's needs.

5.3.2 Schedule control plan

Dr. Concepcion will conduct meetings with Project Managers and Assistant Managers. Jarred Fletes and Pilar Morales will keep Dr. Concepcion apprised of the team's progress.. The team's progress will be evaluated continuously. Any change in the team's schedule will be addressed by the Project Managers, should the need arise.

5.3.3 Budget control plan

There will be no budget to manage for this project.

5.3.4 Quality control plan

Jarred Fletes and Pilar Morales will continuously check that the team's efforts are in adherence with the SRS. He will also consult the client for any details

To assure the quality of the RoomQuest app, the Quality Assurance (QA) team will thoroughly test the software for defects and to make sure that the software meets the requirements laid out in the Software Quality Assurance Plan (SQAP). All deliverables must be delivered in the Git repositories of the development team and these will be tested on iOS devices. The QA team will use Bugzilla to help keep track of any bugs found in a the RoomQuest app. If the QA team finds an error during testing they are to report it to Jarred Fletes. The tests for the app are derived from the SRS from the development teams.

5.3.5 Reporting plan

The team will follow a schedule set up in Basecamp. This schedule will be reviewed by Dr. Concepcion to assure that the development of RoomQuest is progressing in a timely manner. Each team member will report to Jarred Fletes and Pilar Morales during class meetings on Mondays and Wednesdays, or through BaseCamp, Discord, or text message.

5.4 Risk management plan

The development of this app involves risk. The following outlines some of the most greatest risks this project will undertake.

In the case of loss or unavailability of team members:
If for whatever reason one or more of the team members cannot fulfill their project duties, they will be removed from the team and other team members will be recruited. If no new team members are able to be recruited, each individual in the management team will continue the work of the absent team member or members.

In the case of Equipment Loss:
If team members are responsible for the loss of equipment, they will be held accountable. If equipment gets stolen, or no longer works, it will be replaced, in order to assure the continuation of the project.

Server Unavailability:
In case of server unavailability, the application will be designed to cache data retrieved from the server previously, and the server team will be contacted via email to inform the team about the unavailability.

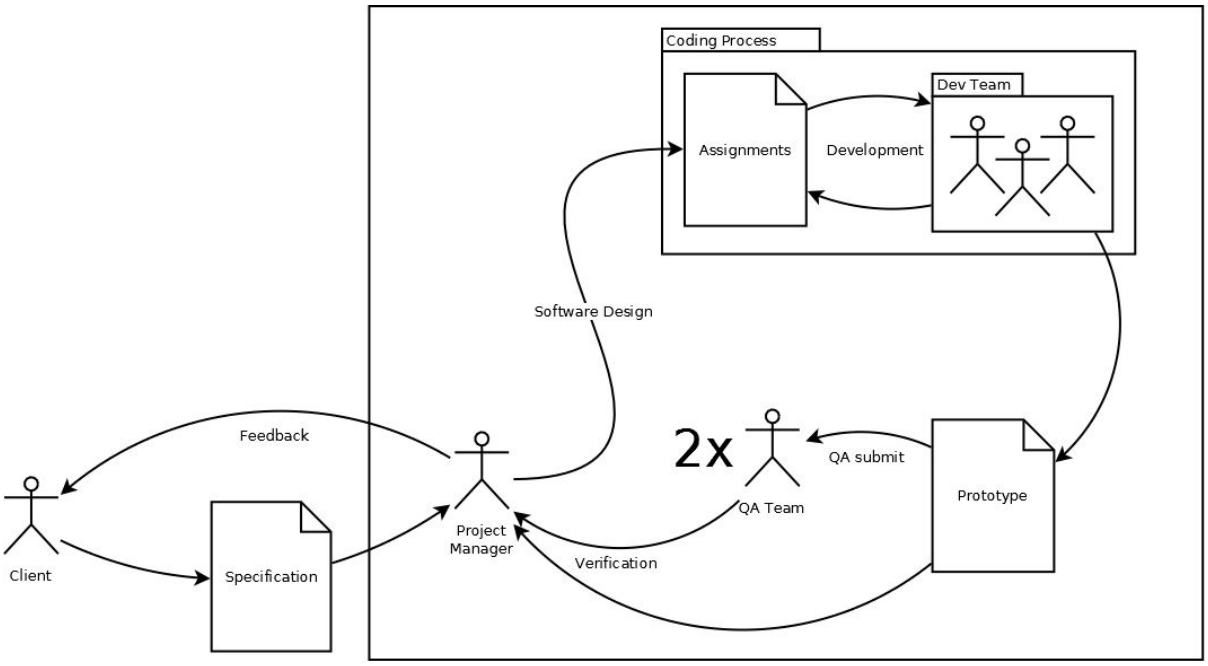
5.5. Closeout plan

The closeout of the RoomQuest project for the Winter 2017 quarter will involve:

- Presentation of RoomQuest app to Dr. Concepcion and Client
- Storage of all deliverables on Bitbucket
- Exhibition of RoomQuest app
- Submittal of maintenance manual

6. Technical process plans

6.1 Process model



Initially, the requirements of the app will be designed and placed into an SRS document. This step will involve heavy participation of the client and project manager as well as software engineers. According to requirements outlined in the SRS, a system will then be designed. The project manager and assistant project manager will then take the role as the software designers. Tasks will be assigned to each member of the team by the project manager. After all the tasks have been completed successfully, the project manager will integrate all code into the app for submittal of the first prototype to the QA team. This process will be performed a second time for the final prototype. Finally, all documentation will be compiled for continued development and maintenance. This process incorporates some ideas from the XP software methodology. However, it does not fully intend to follow the method verbatim. The ideas from XP that will feature prominently in the team's efforts are those of frequent testing as well as an understanding that the software requirements can and will likely change during the development phase.

6.2 Methods, tools, and techniques

Methods

- XP

Tools

- Xcode
- Dia
- Gliffy
- Qt Creator
- BaseCamp
- Google docs, calendar

Techniques

- Unit testing for all buildings
- Design and code reviews

6.3 Infrastructure plan

Any further plans for development will be considered after the app has been released.
The server team will provide and manage an HTTPS server with SFTP for RoomQuest.

6.4 Product acceptance plan

The clients, Thomas Saldana and Jose Banuelos, will test the final product.
The main areas of focus are:

- Does it have an intuitive UI?
- Does it have a responsive UI?
- Is the design functional?
- Is the enough of the CSUSB campus mapped to launch?
- Is the enough of the CSUSB campus routed to launch?
- Proof of concept

7. Supporting process plans

7.1 Configuration management plan

The configuration management plan will be outlined in the SRS, SPMP, and SQAP documents.
The SRS, SPMP and SQAP documents will contain a version number and will be revised by

every new team that works on the app. Each code revision will be submitted to a respective development branch on Git to be inspected then merged with the project by Steven Tang. The SRS, SPMP and the SQAP documents will ensure that the project is complete on time and without errors. Any proposed changes to the management plan will first need to be reviewed by Thomas Saldana and Jose Banuelos, the client, and Dr. Concepcion, the project advisor.

7.3 Documentation plan

The entire project will be documented from start to finish. This will ensure that future development teams are able to pick up from where previous teams have left of. Every team member will document, after every work session what he has done. Any code that is added to the project will also be documented.

7.4 Quality assurance plan

The app is required to hold accurate and reliable information. Making the apps content as accurate and reliable as possible is one of the development team's main priority. In order to assure the quality of the apps content and data, the development team will test the application and its software once every two weeks. Further, the Quality Assurance Team will make an acceptance plan.

7.5 Reviews and audits

Jarred Fletes will review and audit all code, documentation and other files created by the development team before they are merged into the master development branch on git.

7.6 Problem resolution plan

Problems will be resolved among the entire development team internally. If there is an issue resolving an issue internally, Dr. Concepcion will be consulted.

7.7 Subcontractor Management Plan

Not applicable.

7.8 Process Improvement Plan

The improvement of the project will always be a main priority. The management team as well as the software developing team will work towards creating an efficient work environment. One goal of the team will be to create the apps quality and information as well as its user interface. The team will use several tools like the Personal Software Process, and Team Software Process to maximize the development and improvement of the app.

8. Additional Plans

After the app is developed in the iOS platform, plans are to release both the iOS and Android version together. Once the app is developed for both the Android and iOS platform, new services will be developed for the app. This includes adding parking information, floor maps of dorm buildings, the history of buildings,and real time GPS routing.