4-Wheel Drive Used Car Dealership
Software Project Management Plan

Fall 2020

Version 2.0

Alyssa Wilcox (PM)
Wen Zhang (APM)
Jorge Valencia (Software Engineer)
Lingyun Yang (Software Engineer)
Taige Huang (Software Engineer)
Cong Ding (Software Engineer)
Chao Zhang (Software Engineer)

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Revision History

Name	Date	Reason For Changes	Version
4-wheel Drive Used Car Dealership	September 24,2020	Creation of SPMP document	1
4-wheel Drive Used Car Dealership	November 12,2020	Added revision history Updated 1.2 by changing the scope of prototype 2 Updated 1.2 evolution of the plan Updated 2. references by adding new references Updated 4.3 roles and responsibilities Updated 6.1 process model	2

1. Overview

1.1 Project summary

The software project management plan will lay out the details of the management plan, design and develop the website and vehicle data management system. It includes the development cycle, organization, specific roles, planned schedule, and testing protocol.

1.1.1 Purpose, scope, and objectives

The purpose of this Software Requirement Specification is to outline the requirements and goals of the Four-Wheel Drive Used Car Dealership web application. The requirements and goals included in this document reflect those discussed with our client Jennifer Jin. These requirements and goals are to be met and tested by the end of the Fall 2020 semester for the CSE-4550 Software Engineering Course.

The Four-Wheel Drive Used Car Dealership web application allows users to access and view the used cars being sold by this dealership. Employees will have special authorization on the web application to add, delete, or modify the dealership's inventory. Regular users will be able to create and login through custom accounts, search for vehicles, and save favorites.

Prototype 1: The first prototype will consist of a web application that will allow both users and employees to login or create their own custom user accounts, a functional user homepage, a visible vehicle search page, a visible user page for saved favorites, and a visible employee page to modify the inventory. The application will also be able to add vehicles to the database and read data from a database.

Prototype 2: The second prototype will consist of an application that will allow users to search for vehicles through keywords and filters, user accounts will be able to save vehicles to their favorites list, and employee accounts will be able to modify the inventory by removing vehicles, changing vehicle data, and setting/removing vehicles from the special deals list.

1.1.2 Assumptions and constraints

The list of all assumptions and constraints:

- Team members will attend all meetings
- Team members will meet all the deadlines
- Team members will acquire the necessary technical knowledge to complete their assigned tasks
- Team members will complete their assigned tasks
- Team members will follow the requirements specified in SRS
- Team members will work on the project outside the class to finish it on time
- The application will be hosted by a Firebase server
- The application's database will be hosted through CloudFirestore
- The application will only run on a computer's web browser
- A user's computer will have a web browser and internet access
- Users will be competent in navigating a web application and reading English

1.1.3 Project deliverables

This project will deliver the following items:
- Working executable web application
- SRS, SPMP, SQAP, and Documented Source Code

1.1.4 Schedule and budget summary

There is no budget given for this application. According to class guidelines, the first prototype will be delivered in Week 12 and the second prototype will be delivered in Week 15.

1.2 Evolution of the plan

The management team understood the customer's requirements and discussed the expectations for the application and its features. When determining the function of the final prototype, we kept in mind the customer's needs and the time it took to create the function. After that, we started the design of the web page and some beautification. We make sure to meet customer requirements, Employees will have special authorization on the web application to add, delete, or modify the dealership's inventory. Employees will

also be able to add/remove vehicles from the special deals list. Regular users will be able to create and login through custom accounts, search for vehicles, and save favorites.

2. References

Google, *Firebase*, ver. 7.21.0. [Online]. Available: https://firebase.google.com/, Accessed on: Sep. 28, 2020

IEEE Software Engineering Standard Committee, "IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specification", October 20, 1998.

Microsoft, *Visual Studio Code*, ver. 1.50.1. [Online]. Available: https://code.visualstudio.com/, Accessed on: Sep. 28, 2020.

3. Definitions

Algorithm: A finite sequence of well-defined, computer-implementable instructions, typically to solve a class of problems or to perform a computation.

Cloud Firestore: A flexible, scalable database for mobile, web, and server development from Firebase and Google Cloud Platform.

Computer: A machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming. These include desktops and laptops.

Firebase: A platform developed by Google for creating mobile and web applications.

Homepage: The primary page of the web application.

Internet Browser: A software application for accessing information on the World Wide Web.

Real-time Web Database: A database system that uses real-time processing to handle workloads whose state is constantly changing.

SRS: This document, the Software Requirements Specification (SRS), that illustrates the functional and non-functional requirements of the 4-Wheel Drive Used Car Dealership web application.

User: Someone who uses the web application.

User Credentials: A user's username and password used to sign into their account.

Web Application: An application software that runs on a web server. Web applications are accessed by the user through a web browser with an active internet connection.

4. Project organization

4.1 External interfaces
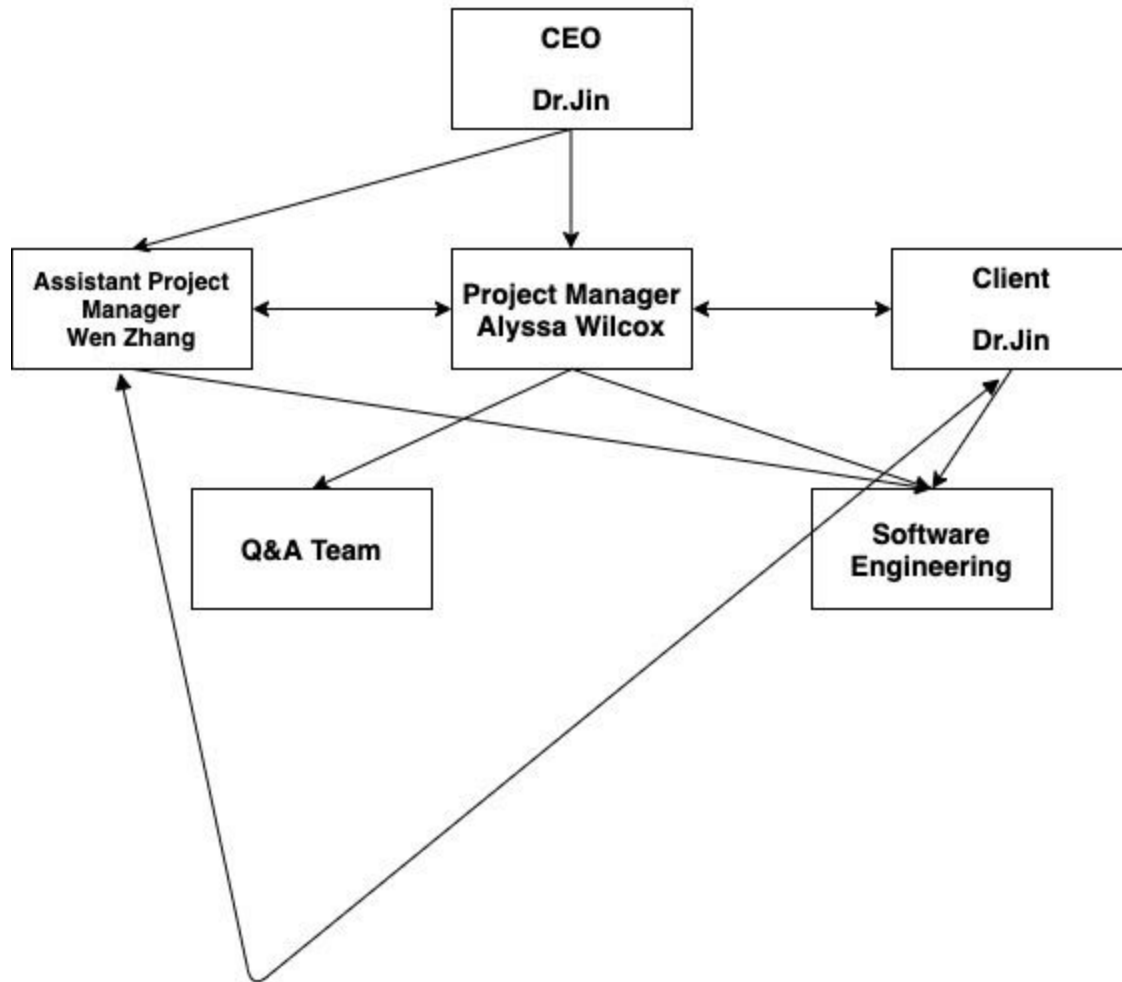
Dr. Jin (CEO) - Monitors performance of the development team and provides guidance to the project managers.

Alyssa Wilcox (Project Manager) - Complete work distribution, complete UI, saving and other modules, and coordinate the work of the entire team to promote mutual cooperation among team members

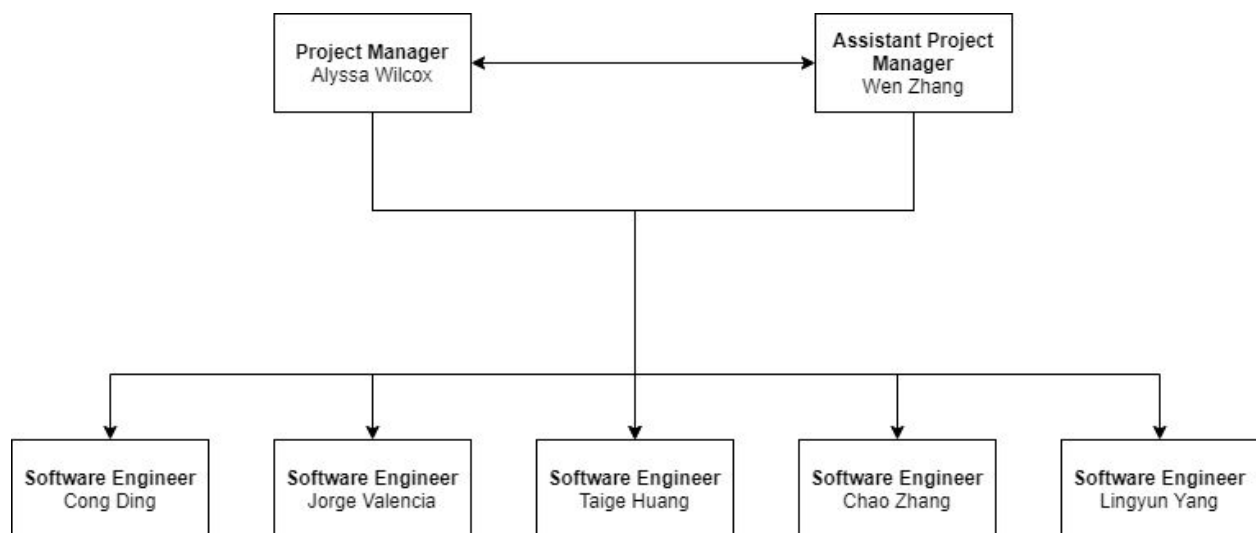Sagar Patel (Assistant Project Manager) - Complete the login and saving modules. In the case of Project Manager absence, can take over duties and responsibilities associated with the Project Manager.

Dr.Jin (Client) - Communicates to Project manager the requirements of the website and gives feedback on presented prototypes.

Software Engineering - Codes the required objects. Design and develop a website and the vehicle data management system

Q&A Team - Evaluates prototypes as they are made available and tests for worst case scenarios.

4.2 Internal structure

The project manager and assistant project manager work together to facilitate progress in completing the prototypes.

4.3 Roles and responsibilities

Alyssa Wilcox (Project Manager) - Communicates to the team what the client desires in the website. Builds UI components and special deals module.

Wen Zhang (Assistant Project Manager) - Works with PM to complete prototype development, login, and saving models.

Cong Ding (Software Engineer) - Complete the Reading and Displaying part of the database design.

Taige Huang (Software Engineer) - Complete the Adding/Deleting/Modifying part of the database design.

Chao Zhang (Software Engineer) - Complete the Adding/Deleting/Modifying part of the database design.

Lingyun Yang (Software Engineer) - Complete the part of login to create different accounts and saving models.

Jorge Valencia (Software Engineer) - Complete the design of the Search Feature part.

5. Managerial process plans

5.1 Start-up plan

5.1.1 Estimation plan

- Discuss with the client all the specifications for the application.
- Research all the technologies required to meet these expectations.
- Ascertain how much can be accomplished in the given time.
- Create guidelines for prototypes #1 and #2.
- Created estimated deadlines and task completion deadlines to create both prototypes.

5.1.2 Staffing plan

The project staff were selected based on a shared interest in the project description. The selection of team members was approved by the professor and TA.

5.1.3 Resource acquisition plan

All software resources required for this project are provided for free. Each team member is responsible for the hardware required for this project, either through using their own devices or renting devices from the Technology Support Center at CSUSB.

5.1.4 Project staff training plan

All group members will watch and complete the tutorials provided by the project manager in the first few weeks of class. After this period, each group member is responsible for learning additional technologies required for this project.

5.2 Work plan

5.2.1 Work activities

Work units:
- **Prototype 1:** The first prototype will consist of a working UI, a working login function for regular and employee users, and a working page to add vehicles to the database. All team members will work on this work unit.
- **Prototype 2:** The second prototype will consist of a working search feature, a working save feature, and a working modify/delete feature. All team members will work on this work unit.
- **Documentation:** All members will ensure that all source code is properly documented.

5.2.2 Schedule allocation

Week 1		
8/28/20	8/30/20	Project Topic Discussion
Week 2		
9/01/20	9/03/20	Team Selection Project Selection Assign PM and APM
Week 3		
9/08/20	9/10/20	Begin SRS Documentation Begin SPMP Documentation Prototype #1 Development
Week 4		
9/15/20	9/17/20	UML Diagrams SRS Documentation SPMP Documentation

		Prototype #1 Development
Week 5		
9/22/20	9/24/20	Submission of SRS and SPMP Prototype #1 Development and Testing
Week 6		
9/29/20	10/01/20	Prototype #1 Development and Testing
Week 7		
10/06/20	10/08/20	Prototype #1 Development and Testing
Week 8		
10/13/20	10/15/20	Prototype #1 Development and Testing
Week 9		
10/20/20	10/22/20	Prototype #1 Development and Testing
Week 10		
10/27/20	10/29/20	Submission of QA plan Prototype #1 Development and Testing
Week 11		
11/02/20	11/05/20	Final testing of Prototype #1
Week 12		
11/10/20	11/12/20	Delivery of Prototype #1
Week 13		
11/17/20	11/19/20	Prototype #2 Development
Week 14		
11/24/20	11/26/20	Prototype #2 Testing
Week 15		
12/01/20	12/03/20	Delivery of Prototype #2

5.2.3 Resource allocation

Each member will have access to the same resources as all the other members. The resources include a text editor such as Visual Studio Code, a web browser such as Google Chrome, and a Google Account to access the Firebase web server and Cloud Firestore database.

5.2.4 Budget allocation

No budget has been allocated for this project.

5.3 Control plan

5.3.1 Requirements control plan

Every group member is expected to attend the bi-weekly class meetings. Additionally, each member is expected to document their code, follow the guidelines established in the SRS, and meet all deadlines. Unexpected issues, technical difficulties, or any other progress-hindering event will be assessed by the project manager and assistant project manager.

5.3.2 Schedule control plan

In addition to bi-weekly class meetings, group members may be required to meet outside of regular class time in order to finish and deliver the final product on time. The project manager and assistant project manager will keep track of each group member's progress.

5.3.3 Budget control plan

There is no budget allocated to the 4-Wheel Drive Used Car Dealership group.

5.3.4 Quality control plan

All group members will consistently perform quality checks on the software in order to assure that the project meets all expectations.

5.3.5 Reporting plan

The project manager and assistant project manager will notify professor, Dr. Jin, or the TA, Benjamin Alexander, should questions and issues arise within the group that the group is unable to solve on their own.

5.3.6 Metrics collection plan

The project manager and assistant project manager will assure that each software engineer completes their tasks on time and that the project is on track and progressing as scheduled.

5.4 Risk management plan

Development:
- Team members will meet biweekly to allow for continuous improvements and developments of the web application.
- There will be deadlines that team members are expected to meet.
- Each team member will be kept up to date with the most recent additions and improvements.
- Each team member is expected to inform the project manager or assistant project manager should any difficulties in development arise.

Project Failure:
- If the technologies or features expected to be implemented in this web application prove to be nonviable, the project manager and assistant project manager will discuss with the client to see if a satisfactory compromise can be found.

Server Failure:
- Upon major server failure with Firebase, team members will have to wait until Firebase engineers are able to diagnose and fix the server failure.
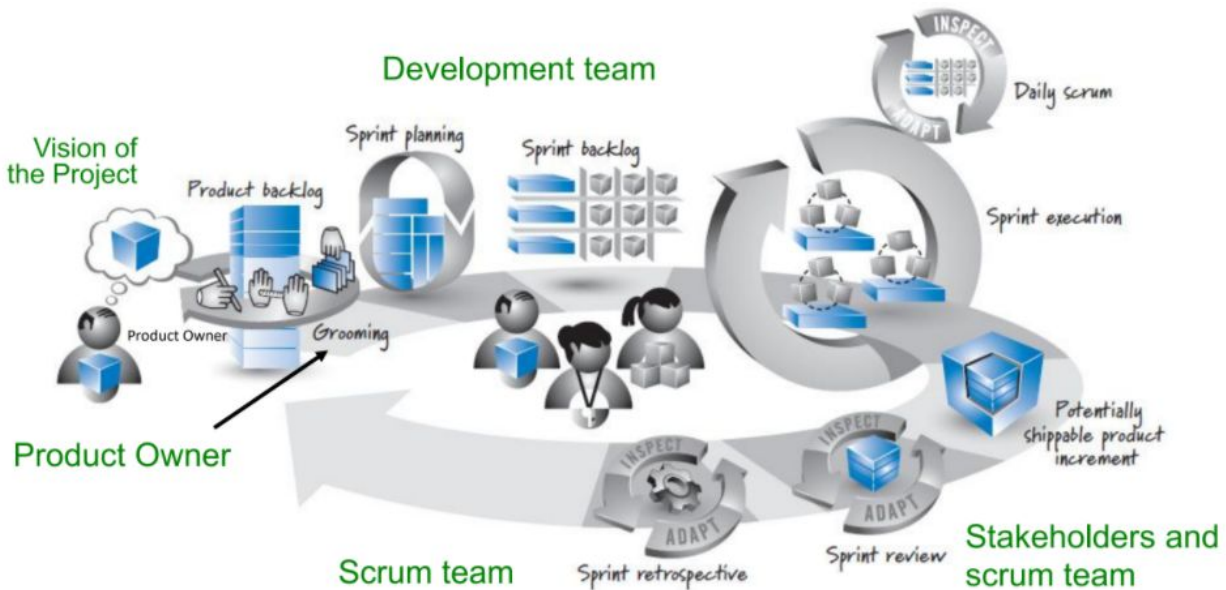
5.5. Closeout plan

The team will submit all required deliverables onto Blackboard, as well as give a presentation of the application and subsequent documentation during class time.

6. Technical process plans

6.1 Process model

The process model used throughout the development of this web application is the Agile Software development model, specifically Scrum.

The diagram above represents Scrum activities and artifacts. Particularly, this diagram represents one sprint. During a sprint, items from the product backlog are taken and placed into the sprint backlog. The spring is then in execution where the software engineers work on the features in the sprint backlog. Daily scrum meetings (bi-weekly in this project's case) are held to inspect the progress made in the sprint execution. After this execution period, a potentially shippable product increment is produced. The sprint cycle is then reviewed.

6.2 Methods, tools, and techniques

Method: Scrum development model
Tools: Visual Studio Code, Google Drive, Chrome
Techniques: Bi-weekly scrum

6.3 Infrastructure plan

All team members will establish and maintain their own development environment through the usage of their own hardware and software, such as a desktop computer or laptop with a text editor, internet access, and an internet browser. Updates to these softwares are provided by the providing company. Firebase and Cloud Firestore automatically provide updates to their server and database environments.

6.4 Product acceptance plan

The client will be kept up to date on the latest improvements and developments of the application. After each prototype has been produced, the QA team will test the application to ensure that the prototypes are satisfactory and acceptable.

7. Supporting process plans

7.1 Configuration management plan

The team is using Google Drive for the configuration. Each team member has access to folders that will contain all of the changes made to the code as well as access to the project's documentation.

7.2 Verification and validation plan

Verification and validation of the application will be done through periodic testing of the web application. This will be done in three phases: unit, integration, and system. Throughout this testing, bugs and errors will be documented and reported to the project manager and assistant project manager. For unit testing, throughout the development of the web application, each team member involved in the programming of the application is expected to test his or her own code pertaining to their assigned task. This type of testing will be the most frequent type of testing used as it allows for a smoother development of the overall application and prevents the accumulation of bugs and errors. Once a team member's assigned task has been completed and unit tested, the next phase of integration will begin. The completed task will be integrated into the already completed task and tested for errors. Each member of the team is expected to test this integration. The last type of testing occurs at the system level. This will occur when a completed prototype produced by the team is evaluated between the project manager, assistant project manager, the client, and the quality assurance (QA) team. This final stage of testing is essential to perform before the final delivery of the web application.

7.3 Documentation plan

The project manager and assistant project manager will prepare the SRS and SPMP documents. The development will document their progress, as well as errors and bugs.

7.4 Quality assurance plan

The QA team will perform periodic tests to ensure that the application is running according to the functionalities specified in the SRS documentation.

7.5 Reviews and audits

During development and testing phases, team members will test and report any bugs, errors, and deficiencies in the web application. These issues should be documented for immediate fix or future review.

7.6 Problem resolution plan

Each team member of the development team is expected to inform the project manager and assistant project manager of any issues they may have encountered. Once the management team has been informed, they will make a decision on how to handle the reported issue.

7.7 Subcontractor management plan

This project has no subcontractors.

7.8 Process improvement plan

Properly documented source code is essential to the improvement and development of this web application. If there are features that cannot be implemented in the given time for the project, they will be pushed to the next stage of development. By writing properly documented source code, future development will be made much easier. To help the facilitation of properly documented source code, team members are expected to report to the project manager and assistant project manager on his or her progress. Members who show severe lack of improvement will be helped by the project manager or assistant project manager in order to propose solutions and assist in the application's development.