
Software Requirements Specification

for

Air Carpooler

Version 1.0 approved

Prepared by Erick & Vy

Flinders University

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1. Introduction

1.1. Purpose

The purpose of this SRS is to present the detailed description of how Air Carpooler works. It will explain the purposes and features of the system including its interfaces, what the system does and the constraints that must be satisfied.

1.2. Document Convention

Heading is set to be Calibri Light with size of 18 and colored blue. The first sub section is set to be Calibri Light with size of 16 and colored blue as well but with indentations. The second sub section is set to be the same as the rest of the content, Calibri with size of 11.

1.3. Intended Audience and Reading Suggestions

The intended audience of this document is intended for both the users and system's developer. The user should be able to grasp the clear idea of what the system will do, including the requirements to be used. The developers are aimed to understand the methodology used within this project and to personalize product whenever possible.

1.4. Project Scope

This project would be a web-based application that allows user to discover any carpooling opportunities around them. The system will allow user to participate in a car sharing system available within all users related to Flinders University. The app will facilitate user with weekly email for special offers and merit points for user to be given incentive. The system would implement several different databases which would be a relational database.

1.5. References

Project Broad Statement of Needs

2. Overall Description

2.1. Product Perspective

This project will allow users to offer and search for any available carpools from a given distance. The concept is similar as with Uber. The product will be an open source, licensed under the GNU general Public License. This would be web-based system implementing client-server model.

Project is not derived from any existing system. This project will use cloud system as it is going to be cloud based. In order to verify the users for security reasons, the access to the Flinders database is required. Only those affiliated with Flinders can use this software.

2.2. Product Features

The main features included in this system are:

Verified user registration and login: Users can only register for provider or seeker account using Flinders personal details based on Flinders database for security reason. Each Flinders student/staff can create both provider and seeker accounts but can only login to one type of role at a time.

Offer System performs car-pooling assignments. All carpool offers are stored in the database and can be filtered to display in seeker's search.

Means of communication: The system provides chat box and direct call option for both seeker and provider after the assignment based on provider's default selection.

Feedback: The system asks users to rate and give feedback to various aspects about carpool partner.

Email Client sends email to users subscribing to weekly emails on every Monday. The system continuously updates new and withdrawal email addresses on the database.

Application administration: The system can generate monthly reports for managerial personnel on the operation of car-pooling service.

2.3. User Classes and Characteristics

The users are required to possess the basic knowledge of how to use the internet and have an internet access to use this software. It is also expected for the users to have their GPS location activated on their system.

Seeker (main user) can do the following key functions:

- Find appropriate carpool offer from list of providers
- View all trips they have been assigned to
- Communicate with provider

When there are two or more seekers trying to register to the last place available by the provider, the seeker that hits the accept or submit button to book the carpool would be prioritized.

Provider (main user) can do the following key functions:

- Offer carpool
- View all trips and seekers in their own offers
- Involve in conversation with seeker

Application administrator is responsible for managing overall Flinders air-carpooling system and is the first point to receive initial warnings about technical problems or intrusion detections. Managerial role is also in charge of updating weekly email content.

2.4. Operating Environment

The operating environment for this software would be:

- Cloud based system where the server would reside in Cloud.
- Client/server model.
- Operating system used would be, but not limited to, Windows.

- Browsing system used would be, but not limited to, Google Chrome.
- The use of NoSQL as the database.
- Continuous service to allow any users to use the software at any time.

2.5. Design and Implementation Constraint

- User's privacy must be monitored carefully as all the data will be kept on cloud server, hence there should be an effort to protect user data whenever necessary.
- It is also important to limit the privileges of any users other than developers as to prevent any unwanted changes on the system server or other confidential data without permission.
- Languages that will be used are consisting of, but not limited to, SQL-query language, Java, Python, PHP, JavaScript and Angular.
- The application requires access to some external databases and shall be compatible with both smartphones and computers' displays. User interface must follow Flinders' standard design.

2.6. User Documentation

Quick tutorial videos corresponding account of seeker or provider shall be played when the users first login to the system. Users can then watch the tutorials again by pressing help button when needed.

2.7. Assumptions and Dependencies

- Seekers will not be able to add an offer on the system, only provider able to do it.
- Merit points are calculated once seeker takes an offered job.
- Incentive management can be seen on the same screen as merit-point.
- Offer system is the database that is going to be implemented. Hence, it is not listed as an actor in the use cases.
- After the trip, users can rate car-pooling partner on the 5-star scale rating system as well as a max of 1000-characters feedback.
- Administrator can remove provider's offers assuming the providers are reported to misbehave.
- Offer will be removed by the system once all the available seats are filled up.
- Location recommender would automatically redirect the destination or starting point to the closest standard pickup point.

3. Specific Requirement System

3.1. Seeker

Seeker's interactions with the system are illustrated in Figure 1 (Appendix B).

3.1.1 View all offers

Actors: Seeker, Offer system

Type: Primary, essential

Description: This use case starts as the default when the website is opened. On completion, all the offers including the special offers will be listed on the screen.

3.1.2 View filtered offers

Actors: Seeker, Offer System

Type: Primary, essential

Description: This use case starts when seeker wishes to filter the list of offers. As a seeker, they will be able to select their destination and their chosen starting location as well as the selected radius from where the starting location is. On completion, users will be able to enter the locations of their starting point and destination to the system and view the list of offers tailored to seekers' needs.

3.1.3 Add number of travelers

Actors: Seeker, Offer system

Type: Primary, essential

Description: This use case starts after users have selected their starting, destination points and the type of journey. Users can choose how many travelers included in the request. The number of travelers cannot be more than the seats available. On completion, users can fill their desired number of passengers coming to the carpool.

3.1.4 Accept an offer or take a job on the board

Actors: Seeker, Job Board System

Type: Primary, essential

Description: This use case starts when seeker selects an offer provided on the offers list. The system shall assign the respective seeker and provider. On completion, seeker will be able to see the summary of the trip (such as when and where the starting point is) and provider they are assigned on.

3.1.5 Chat or call the assigned provider

Actors: Seeker, Provider

Type: Primary, essential

Description: This use case starts when seeker wants to communicate with assigned provider. The system shall allow seeker to chat or call the respective provider.

3.1.6 Report provider

Actor: Seeker, Administrator

Type: Primary, essential

Description: This use case starts when provider is reported by seeker for attempting to misbehave while driving such as driving under influence. On completion, administrator shall get the information of the provider that did not behave properly.

3.2. Provider

Provider's interactions with the system are illustrated in Figure 1 (Appendix B).

3.2.1 Add offers

Actors: Provider, Offer system

Type: Primary, essential

Description: This use case starts when provider decided to offer a carpool. On completion, provider can offer a ride which will be recorded in the Offer System.

3.2.2 Add seats available

Actors: Provider, Offer system

Type: Primary, essential

Description: This use case starts when provider want to add number of available seats the carpool can handle. On completion, user can fill car capacity to the offer.

3.2.3 Remove offer

Actors: Provider, Offer system

Type: Primary, essential

Description: This use case starts after provider decided to cancel an offer under their name. On completion, the offer would be removed from the list.

3.2.4 Add seats available

Actors: Provider, Offer system

Type: Primary, essential

Description: This use case starts after provider decided to cancel an offer under their name. On completion, the offer would be removed from the list.

3.3. Administrator

Administrator's interactions with the system are illustrated in Figure 2 (Appendix B).

3.3.1 Generate report

Actor: Administrator

Type: Primary, essential

Description: This use case automatically starts on the 28th day of each month. The system generates various reports to administrator:

- The number of seekers and providers registering to the system in a month

- The peak usage of the app (what time in a day, what day in a week) with its peak figure of commenced trips
- The distribution of starting points and destinations
- Merit points earned by providers and seekers during the month
- Top-point providers
- Number of parking permit reduction issued
- List of misbehaving providers reported

On completion, application manager received different reports on monthly basis.

3.3.2 Add/remove content in weekly email

Actors: Administrator, Email Client System

Type: Primary, essential

Description: This use case starts when contents are being updated (either added or removed) by an administrator. On completion, contents of the weekly email will be updated accordingly.

3.3.3 Cancel provider's offers

Actors: Administrator

Type: Primary, essential

Description: This use case starts when administrator desires to cancel provider's offers due to provider's misbehavior. On completion, all offers from that provider will be removed from offer system and seekers that were assigned with this provider will be notified via email.

3.4. Users (common behaviors between provider and seeker)

User's interactions with the system are illustrated in Figure 1 (Appendix B).

3.4.1 Sign-up to the system

Actors: User, Flinders University Database

Type: Primary, essential

Description: This use case starts when a user wants to sign up to the system using first name, last name, Flinders FAN number, password and preferred contact point of phone call or online chat. When the affiliated account is not found, an error message shall be displayed. On completion, the user would be signed-up into the system successfully.

3.4.2 Login to the system

Actor: User

Type: Primary, essential

Description: This use case starts when a user wants to sign-in to the system using their created account. On completion, the user will be able to login to the system successfully.

3.4.3 Subscribe to weekly email

Actor: User, Email system

Type: Primary, essential

Description: This use case starts when the user wishes to subscribe to the weekly email. Email system shall add new user email address to the recipient list. On completion, user would successfully subscribe to the weekly email.

3.4.4 Unsubscribe from weekly email

Actors: User, Email system

Type: Primary, essential

Description: This use case starts when the user wishes to stop subscribing from the weekly email. Email system shall remove the user email address from the recipient list. On completion, weekly email would not be sent to the respected user who unsubscribed.

3.4.5 View merit points

Actor: User

Type: Primary, essential

Description: This use case starts when the user desires to view the merit points accumulated so far and the incentives available for them. On completion, merit points and incentive management will be displayed.

3.4.6 Rate and feedback

Actor: User

Type: Primary, essential

Description: This use case starts when the user wishes to provide rate and feedback for the recent trip. On completion, user would be able to rate (1 star for the lowest satisfaction and 5 stars for the maximum satisfaction) and provide comment of the trip as the feedback.

3.4.7 View user details

Actors: User

Type: Primary, essential

Description: This use case starts when user wishes to view details of other user such as information in regards of feedbacks received so far or preferred contact details. On completion, the information of another user would be displayed.

3.4.8 Log out from the system

Actor: User

Type: Primary, essential

Description: This use case starts when a sign out button is pressed by signed in user. On completion, the user will be able to log out from the system successfully.

3.4.9 View all chosen offers

Actor: Seeker

Type: Primary, essential

Description: This use case starts when user chooses to view the offers they have signed up on. On completion, list of all related offer together with the all carpoolers and their contacts would be displayed.

4. External Interface Required

4.1. User Interfaces

Every single error that occurred in this website will be displayed on the screen but will not be filling up the whole window eg appropriate size in the middle of the screen. There would be an icon of the company that would stay at the top of the screen, together with navigation bars including sign in and sign up buttons on the top right-hand side of the screen. Help button will also be provided and labelled as '?' at the most right of the navigation bar eg next to the sign in and sign up button. There would not be any keyboard shortcut available within the page, that is, only the default keyboard shortcut for the browser is available.

4.2. Hardware Interfaces

The interfaces between the page when viewed by desktop and mobile might be different. The screen size for different devices will determine the size of the interfaces shown, but the content would exactly be the same. There would not be any physical server as we are using cloud-based application.

4.3. Software Interfaces

This product would have access to existing external databases such as Flinders Databases, Places Recommenders and Email Client. Flinders Databases are used to verify the user signing up to the system since the assumption of only Flinders associated users can use this service. Places Recommenders are used to provide the popular places that commonly used as the rendezvous point for both destination and departure point. Email Client is responsible to save all the email addresses that subscribed to the system and send emails to the respective addresses.

4.4. Communication Interfaces

The type of communication used in this project includes the use of email, web browser, electronic forms. The standard that will be used throughout this service would be the use of HTTPS to ensure secure connection at all time.

5. Other Nonfunctional Requirements

5.1. Performance Requirements

The system shall be interactive with quick response time and the delays involved shall be minimized. The system shall be able to process 250 assigned trips in peak time and response up to 500 user queries at a time. Delays in the verification process of registering and logging-in shall be below 4 seconds. The filtering feature of Offer System shall be generated in less than 2 seconds.

5.2. Safety Requirements

The system shall be highly resilient. In case of considerable database damage, the backed-up copy of the database shall be restored to recovery the state of the system up to the time failure occurred.

In terms of verifying provider's driving license, the system shall validate that the name of provider printed in driving license exactly matches with the name in Flinders Database.

5.3. Security Requirements

The system shall guarantee information transmitted from and to the server is secure with no change. The system shall ensure the privacy of users including user's trip detail history and mobile phone number which is only displayed after a trip is assigned. The accounts shall automatically logout after 3-minute idle period.

5.4. Software Quality Attributes

Maintainability: Due to possible future development of the application, 80% of the program module shall be highly maintainable. In case of installing an upgraded version, information in database and personal settings remain unchanged.

Correctness: The system shall assign the exact respective car-pool partners. Rating points and feedback need to be correctly recorded to the associated user profile in user database. Administration monthly reports generated shall be statistically accurate and shall follow Flinders report templates.

Availability: The system shall exceed 99.9% uptime, which means it is only allowed a maximum downtime of 9 hours/year.

6. Other Requirements

- Error report for administration such as application crash on user's device
- Since the app is cloud-based, it is possible for the server to be down unexpectedly, hence a solution to allow full availability is required.

7. Reflection

This document is a proposal document based on the requirement mentioned in the Broad Project Statement of Needs. All the requirements have been successfully mentioned and described with

the use of Use Case diagram and DFD to explain all the requirements in a detailed manner. This document also includes the use of elicitation report to investigate further or gauge the experiences of user in using any of similar apps.

Appendix A: Glossary

Term	Definition
User	Anyone who comes to website to use the service. For example, providers or seekers
Administrator	Person who has all the access to the app
Database	Or data store, would be the collection of information used by this system
Software Requirements Specification	Abbreviated as SRS, defined as a document that describes all the functions of the proposed system and the constraints under which it must operate within.
Data Flow Diagram	Abbreviated as DFD, defined as a document that describes how the data flows in regard of input and output. It focuses on the flow of information such as where the data comes from or goes to and how are they stored.
Use Case Diagram	List all the tasks done by various group of users that would use the software.

Appendix B: Analysis Model

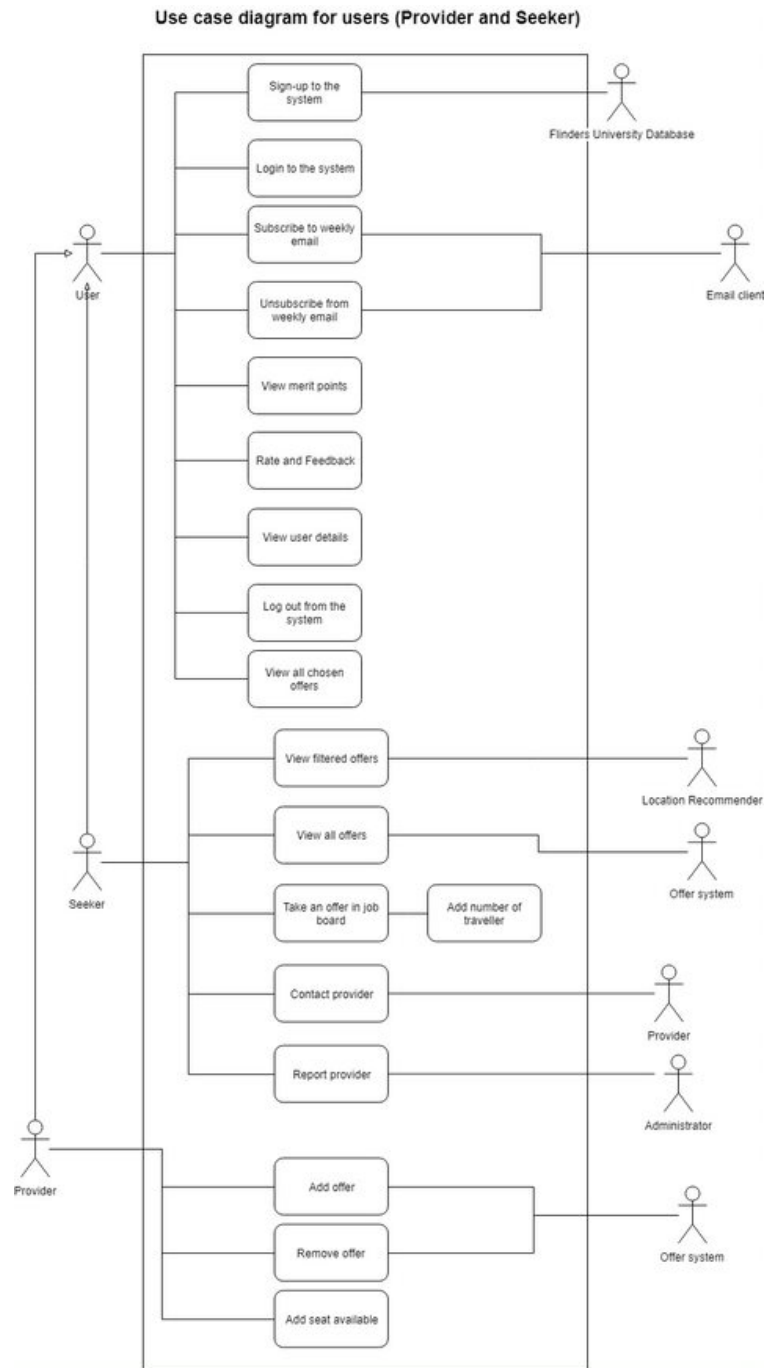


Figure 1. Use Case Diagram for Users (Provider and Seeker)

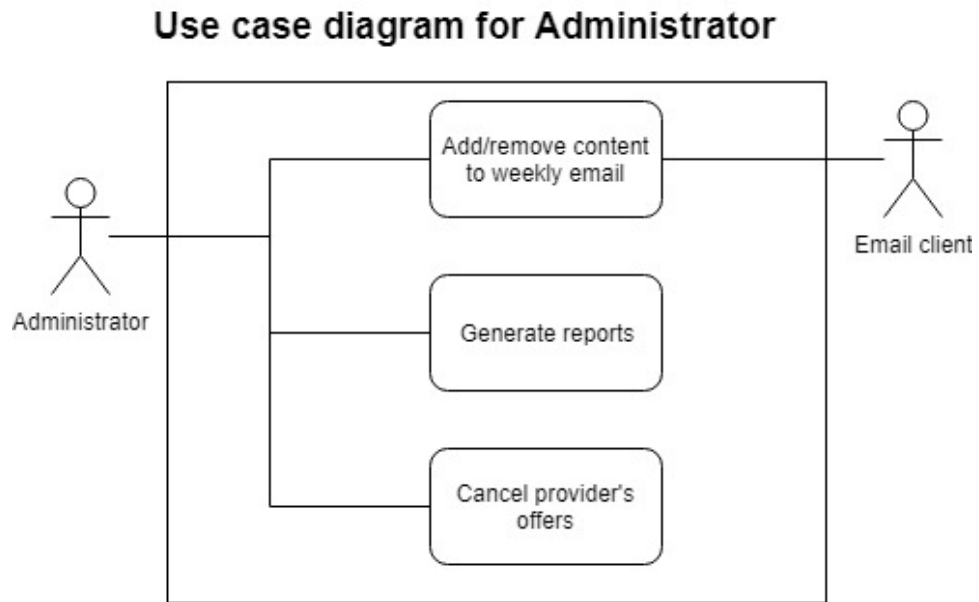


Figure 2. Use Case Diagram for Administrator

User DFD

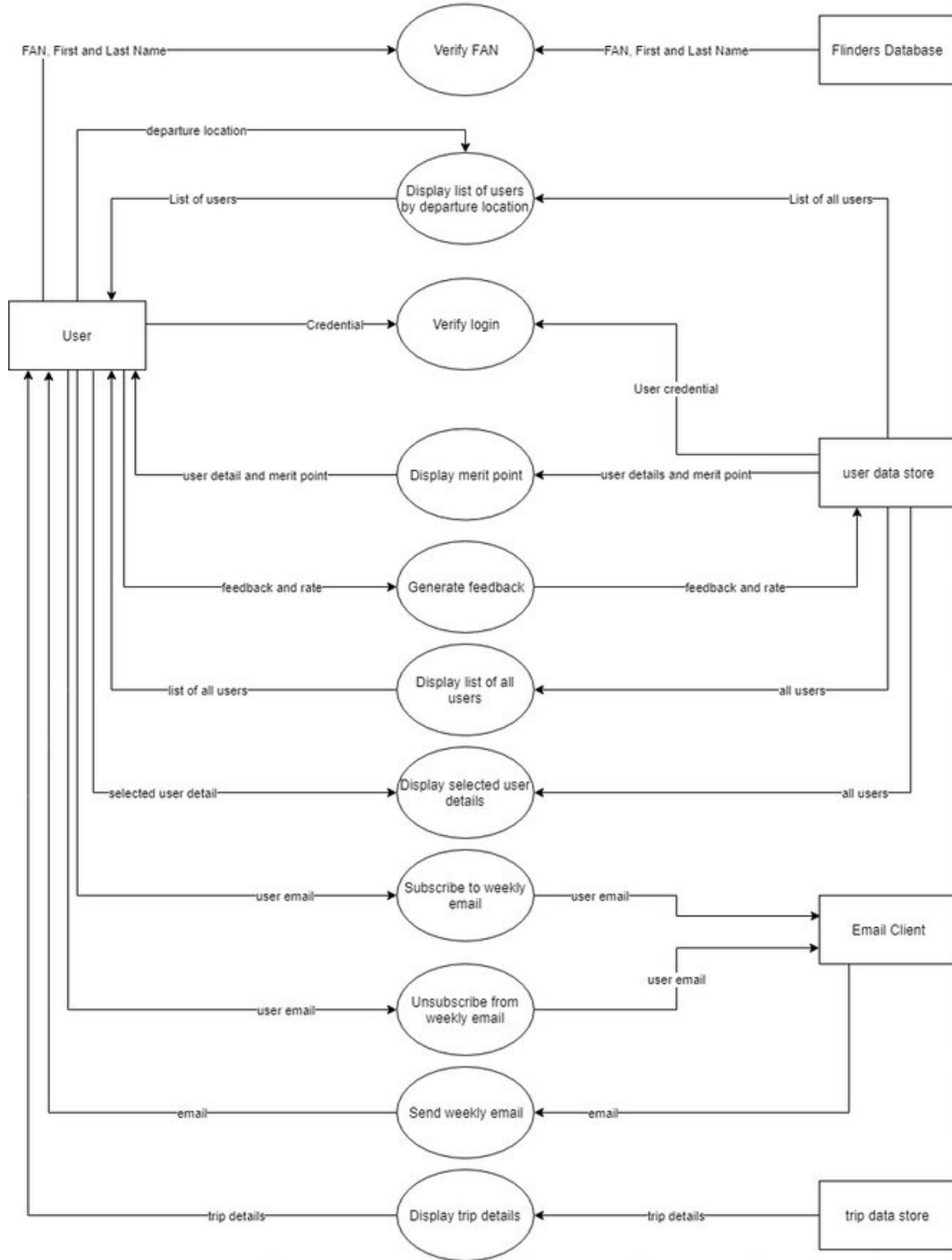


Figure 3. Data Flow Diagram (Level 1) for User (both provider and seeker)

Provider DFD

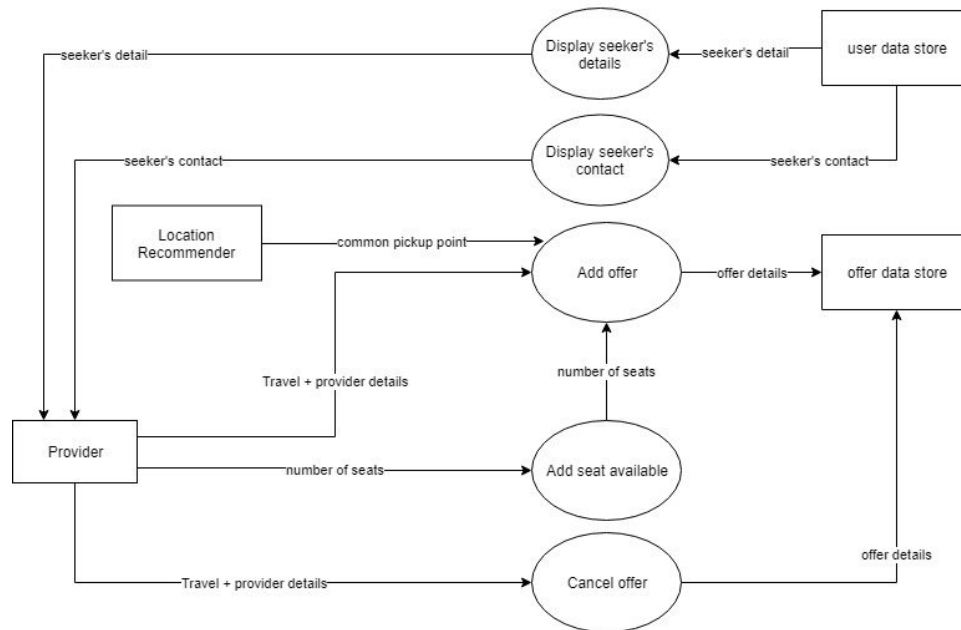


Figure 4. Data Flow Diagram (Level 1) for Provider

Seeker DFD

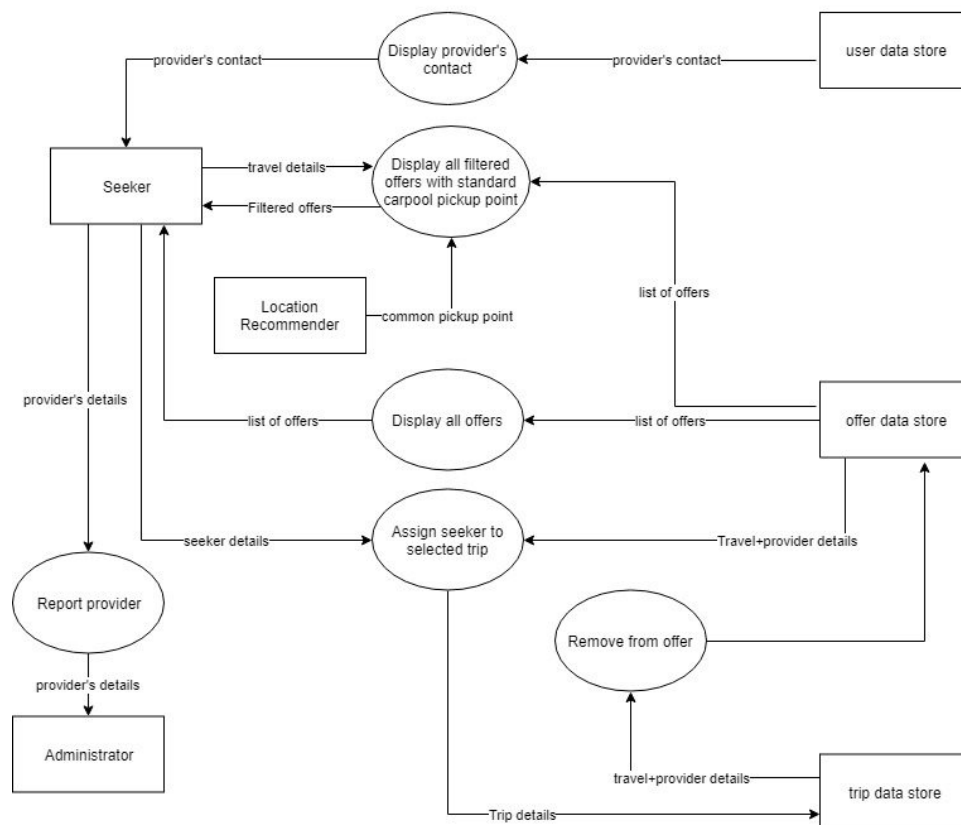


Figure 5. Data Flow Diagram (Level 1) for Seeker

Administrator DFD

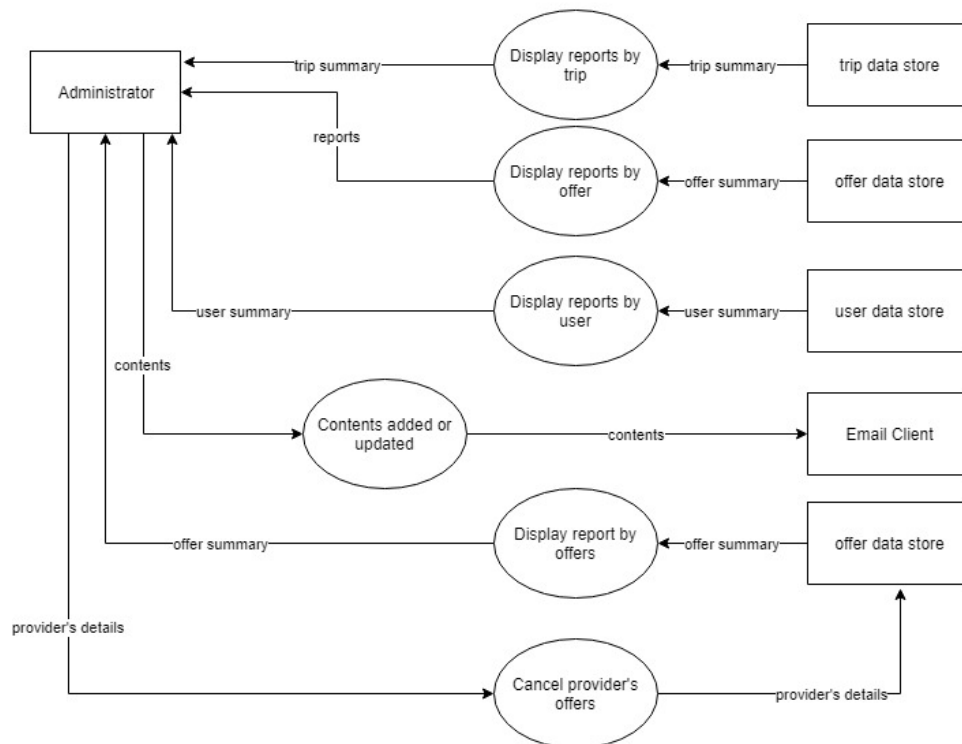


Figure 6. Data Flow Diagram (Level 1) for Administrator

Appendix C: Issues List

- The server would always need to be up all the time. If the server in Cloud is down, the system is going down as well.
- Offer tables must be updated periodically as to see the live update of available offers. This might cause problem such as too many data being passed over and shown, slowing the system's performance.
- There isn't any implementation to prevent any time clashes. For example, it is possible for the provider to offer a ride and be a seeker user at the other provider's offer at the same time.

Appendix D: Elicitation Report

The requirements were identified by undertaking two elicitation techniques, survey and interviews.

List of survey questions:

1. What is your main means of transportation?
 - a. Public transportation
 - b. I drive my own car
 - c. My friend/ family member gives me a lift

- d. Taxi
- e. Carpooling service
- f. Walking

2. Are you aware what carpooling is?

- a. Yes
- b. No

3. Have you used any carpooling sharing system in the past?

- a. Yes
- b. No

4. From 1-10, how do you rate your experience of using carpooling system?

1 Very terrible ----- 10 Very good

5. Would you use the Flinders carpooling system software if available?

- a. Yes
- b. No

6. Would you consider Flinders car sharing assignment for your daily transportation if available?

- a. Yes
- b. No

7. From 1 –10, how likely are you to share your ride with strangers?

1 Very unlikely ----- 10 Very likely

8. From scale 1 – 10, how do you rate the importance of drivers' reputation (reflected by past behavior)?

1 Not important at all ----- 10 Very important

9. From scale 1 – 10 how likely are you to register to a long-term car-pooling with someone?

1 Very unlikely ----- 10 Very likely

10. If you travel by your own car, are you willing to share your car with other Flinders students and staffs (to join Flinders' provider)?

1 Very unlikely ----- 10 Very likely

List of interview questions:

1. What would be the disadvantages of using public transport compared to carpooling?
2. List at most 5 carpools system that you have used in the past.
3. Did you experience any difficulties on using the car sharing system in the past?
4. If you do not drive to university, why would or would not you sign up to the carpool system as a seeker?
5. If you drive to university, why would or would not you sign up to the carpool system as a provider?
6. In your opinion, what would be the major benefits of using carpool system?
7. In your opinion, what would be the possible drawbacks of using carpool system?
8. Based on your experience with previous car sharing system, which feature do you want to add in?
9. Based on your experience with previous car sharing system, is there any feature or function you want to change or eliminate? Why?
10. Do you have any concern about feedback and reporting functionalities in air-carpooling system?

Appendix E: Team Meeting Minutes