Florida Institute of Technology

Software Requirements Specification

Florida Tech Carpool and Park

A mobile application for students to use to find and create carpooling groups based on the students location and class schedule.

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1. Introduction

1.1 Purpose

The purpose of this document is to clearly describe the features that will be included in the development of the “Car Pool and Park” mobile application. The points that will be discussed are the overall description, system features, requirements, and attributes.

1.2 Scope

The scope of this project is to develop a mobile application that will create carpooling groups based on a user's profile/preferences, location, and scheduling.

2. Overall Description

2.1 Product Features

Car Pool and Park key features:

- Customize User Preferences in their Profile
- Receive Recommended Groups Based on User Profile
- Connect to Other FIT Students
- Stay Informed about your Trip

2.2 Primary Users

The primary users are Florida Tech’s registered students.

2.3 Operating Environment

The application will be available for Android and iOS mobile devices.

2.4 Assumptions and Dependencies

Users attempting to register on the application are currently-enrolled Florida Tech students and are using a Florida Tech email address

3. Functional Requirements

3.1 User Profile

1. **Register:** Users can register for an account by using a valid Florida Tech email address and a password.
    - **Sample Input (Valid):** New user enters a valid Florida Tech email address (ending in @my.fit.edu) and a password for their account
    - **Sample Output (Valid):** Account registration is successful and the user can move on to the next step of registration
    - **Sample Input (Invalid):** New user does not enter a Florida Tech email address that ends with “@my.fit.edu”
    - **Sample Output (Invalid):** Account creation fails until a valid Florida Tech email is used.

2. **Setup Profile:** Upon registration, users must fully complete their profile information by providing their basic information, location and vehicle information, and their carpooling schedule.
    a. **Basic Info:** General information about the user and their role in a carpooling group
        i. **Name:** First and last name
        ii. **Gender**
        iii. **Profile Picture:** Clear picture of the user
        iv. **Phone Number:** Users must answer a valid phone number.
        v. **Home Location:** Users can enter their home address.
        vi. **Rider or Driver:** Users must choose their role on the application.
            1. **Driver:** If the user has a vehicle and would be able to drive during a carpool ride, they choose Driver.
            2. **Rider:** If the user does not have a vehicle or is unable to drive, they choose Rider.
    b. **Location Info:** Information about where the user would be picked up/dropped off from and the distance a driver will travel
        i. **Address:** Users must provide their address which they may choose to remain private to other users if they provide a pick-up/drop-off location
        ii. **Pick-up Location:** Users may provide a public pick-up location (Ex: park, store parking-lot) if they prefer their address remains private to other members of a group
        iii. **Drop-off Location:** Users may provide a public drop-up location if they prefer their address remains private to other members of a group

iv. **Driving Distance (Driver Only):** Users who select the Driver role enter the maximum distance they are willing to drive to pick-up/drop-off other users in their group

c. **Vehicle Info (Driver Only):** Information about a Driver's vehicle used to determine the number of users in a group and used by Riders to identify their Driver's vehicle.
   i. **Number of Functional Seatbelts:** Determines the maximum number of users in a driver's group
   ii. **Manufacturer and Model**
   iii. **Vehicle Color**
   iv. **License plate Number**
   v. **Picture of the vehicle:** Clear picture of the drivers car
   vi. **Driver's Vehicle Preferences:** Driver selects if they…
      1. Allow eating/drinking in their car
      2. Allow smoking in their car

d. **Carpooling Schedule:** Users set their carpooling schedule and how often it reoccurs
   i. **Daily Schedule**: User sets their pick-up/drop-off time for each day of the school week (Monday through Friday)

      For Each day:
      1. **Desired Arrival Time:** User's preferred arrival time to campus
      2. **Earliest Arrival:** The earliest the user wants to arrive on campus (defaults to 1 hour)
      3. **Desired Departure Time:** User's preferred departure time from campus
      4. **Latest Departure:** The latest time the user wants to depart from campus (defaults to 1 hour)
   ii. **Recurring Schedule:** User sets how often their carpooling schedule reoccurs
      1. User Selects the timeframe that their schedule reoccurs for:
         a. Weekly (for how long)
            i. Ex: Reoccur for 10 weeks
         b. Until Specific Date
            i. Ex: Reoccur until April 15th
   iii. **Find Friends:** Upon registration and profile set-up, users may search for their friends that also have an account to add them to their friends list
      1. **Search Users:** Search for other users by name
      2. **Add Friend:** Adds user to friends list

3. **Remove Friend:** Removes user from friends list

- **Sample Input (Valid):** User selects their preferred role and fully enters their profile information
- **Sample Output (Valid):** Profile information is complete and user continues on to select carpooling preferences
- **Sample Input (Invalid):** User attempts to move on to next step of profile creation without entering vehicle information after selecting the “Driver” role
- **Sample Output (Invalid):** User must fill out profile information fully before moving on to the next step of profile creation

3. **Provide Carpooling Preferences:** Upon registration and entering profile information, users must then select their preferences regarding safety, cleanliness, and comfort during the ride..
    a. **Safety:** Preferences regarding safety during the ride, where the user can choose if they want a carpooling group of only the same gender
    b. **Cleanliness:** Preferences regarding cleanliness during the ride, such as whether the user prefers a non-eating and drinking vehicle or a non-smoking vehicle
    c. **Comfort:** Preferences regarding comfort during the ride, such as the user’s preferred music
    d. **No Preference:** All user preferences default to “No Preference” if the user chooses to enter no preference information during profile set-up
    - **Sample Input (Valid):** User fully completes preference information, selecting “No preference” for options they have no opinion for
    - **Sample Output (Valid):** User preferences are entered and profile creation is complete
    - **Sample Input (Invalid):** N/A
    - **Sample Output (Invalid):** N/A

4. **Friends List:** On the application, users can manage a list of users they have added as “friends”, which can be used to quickly find users they would like to carpool with
    a. **View:** Users can view their current list of friends on the application
    b. **Add Friend:** Users can either search for other users by name to add them as friends or add users from their carpooling trip to their friends list, sending them a friend request
    c. **Remove Friend:** Users can remove other users from their friends list at any point
    d. **Accept/Deny Friend Request:** When adding a friend, a friend request is sent to the user which they can either accept or deny
    - **Sample Input (Valid):**
    - **Sample Output (Valid):**
    - **Sample Input (Invalid):**
    - **Sample Output (Invalid):**

5. **Login**: Users can login in to the application using their student email and password used during registration.
    - **Sample Input (Valid):** User attempts to login using their correct Florida Tech email and account password
    - **Sample Output (Valid):** User login is successful and they are entered into the application
    - **Sample Input (Invalid):** User attempts to login using a non-Florida Tech email address and their account password
    - **Sample Output (Invalid):** User login is unsuccessful and the user is prompted to enter a correct email and password

6. **Update Profile:** At any point after registration, users can update/modify their profile information and preferences.
    - **Sample Input (Valid):** User needs to arrive on campus earlier so they update their arrive time information
    - **Sample Output (Valid):** User's arrival time preference is updated and reflected in group recommendations
    - **Sample Input (Invalid):** User selects option to update profile and removes their vehicle information
    - **Sample Output (Invalid):** User must have completed all profile information fields (add vehicle information back) before saving their profile

7. **Delete Account:** Users can delete their account at any point, removing them from any current and future carpooling recommendations and groups.
    - **Sample Input (Valid):** User attempts to delete profile/account and selects "Yes" when prompted to "Confirm Account Deletion"
    - **Sample Output (Valid):** User profile and account is deleted
    - **Sample Input (Invalid):** User attempts to delete profile/account and selects "No" when prompted to "Confirm Account Deletion"
    - **Sample Output (Invalid):** User profile and account is not deleted

8. **View Profile:** View a user's full profile
    a. **User Bio**
        i. **Name**
        ii. **Gender**
        iii. **Profile Picture**
        iv. **Role** (Rider or Driver)
    b. **User Rating:** View a user's carpooling rating out of 5 stars
        i. **Reviews:** Users can write reviews for other users in addition to rating them out of 5 stars
    c. **User Statistics:** View a user's driving and riding related statistics from their time using the application
        i. **Driving miles**
        ii. **Riding miles**

iii. **Net driving miles**
iv. **Net driving miles per week**

9. **Privacy:**
    a. **Accessibility to Sensitive Information:** The user can choose
        i. **Friends:** The default preference is set to yes.
        ii. **Driver of Trip:** The default preference is set to yes.
        iii. **Other Passengers:** The default is set to no.

3.2 Creating Group Recommendations

1. **Considerations:** The group recommendation algorithm attempts to match users based on their similarity in the following considerations…
    a. **Time:** The users schedule
    b. **Proximity of users:** The users general locations for safety purposes
    c. **Number of available seats:** The drivers amount of functional seatbelts
    d. **Preferences**
2. **Determining the Driver of a Trip:** When a group is recommended, the Driver role of the ride will be recommended based on the following…
    a. **Consider the Driver's…**
        i. Number of carpooling driving miles
        ii. Number of carpooling riding miles
    b. **Driver with the lowest Net Driving Miles will be recommended for the ride**
        i. Net Driving Miles = Driving Miles - Riding Miles
    c. **Manually Change Driver:** Users in the group can override the recommendation and change the Driver as they see fit
        i. Ex: If the route is a better fit for another driver

- **Sample Input (Valid):** A user fully completes their profile information during account registration
- **Sample Output (Valid):** The user is able to view their recommended carpooling groups based on their profile information and preferences
- **Sample Input (Invalid):** A user did not fully complete their profile information in account registration
- **Sample Output (Invalid):** The user is unable to view the automatic group recommendations until all necessary profile information has been given

3.3 Group Formation

1. **Form a Group via System Recommendations**
    a. **View Group Recommendations:** Users can view automatically-generated group recommendations that are suggested based on their profile information.
        i. **View brief profile of members in the group:** When viewing group suggestions, a brief version of other users' profiles is displayed.
            1. Name (link to full profile)
            2. Profile Picture

3. Role in group (Driver or Rider)
4. User rating (if available)

ii. **View Expanded Profile:** The brief profile displayed when viewing group recommendations can be expanded to view users' full profile

b. **Accept/Deny Recommendations:** Users can either accept or deny suggested groups from the system

i. **Accept Group Recommendation:** User accepts the suggestion and joins the group

ii. **Deny Group Recommendation:** User denies the suggestion and is either recommended another group or prompted to form one manually

1. **Recommend another group to join:** Cycles back to "View Group Recommendations" with a different suggested group
2. **Manually form user's own group (See 3.3.2)**
    a. **View friends list:** Users are linked to their friends list where they request their friends form a group
    b. **View list of similar users:** Users are linked to a list of users with similar profile information where they can request to form a group

- **Sample Input (Valid):** User has fully completed their profile information and preferences, allowing their account to receive carpooling group recommendations
- **Sample Output (Valid):** User can view their list of group recommendations that are determined to be the best fit for them
- **Sample Input (Invalid):** User does not fully complete their profile information and preferences
- **Sample Output (Invalid):** User is unable to view their generated group recommendations without their profile information and preferences completed

2. **Form a Group manually**
    a. **View Friends List:** Users can view a list of their friends they have added on the application, where they request their friends form a group
    b. **View List of Similar Users:** User can view a list of all other users with similar profile information and preferences.
        - **Sample Input (Valid):** User has fully completed their profile information and preferences, allowing their account to view a list of similar users
        - **Sample Output (Valid):** User can view a list of all users with similar profile information and preferences, ordered from most similar to least similar
        - **Sample Input (Invalid):** User does not fully complete their profile information and preferences
        - **Sample Output (Invalid):** User is unable to view their list of other similar users without their profile information and preferences completed

c. **Send Request to Join a Group:** User can send a request to join a pre-existing group
    i. **Group Accepts Request:** The group can accept a user's request and the user joins their group
    ii. **Group Denies Request:** The group can deny a user's request to join
        - **Sample Input (Valid):** A user without a group sends a request to join a pre-existing group with available seats
        - **Sample Output (Valid):** The pre-existing group accepts the join request and the user joins their carpooling group
        - **Sample Input (Invalid):** A user without a group attempts to send a request to join a pre-existing group that is already full
        - **Sample Output (Invalid):** The user's join request fails as the group has no available seats left
d. **Request User Join your Group:** Users already in a group can request other users to join their carpooling group.
    i. **User Accepts Request:** The user can accept the group's request and join the group
    ii. **User Denies Request:** The user can deny the group's request
        - **Sample Input (Valid):** User in a group with available seats sends a request to another user with similar preferences to join their group
        - **Sample Output (Valid):** The request is successfully sent and the user with similar preferences joins the carpooling group
        - **Sample Input (Invalid):** User who is already in a full group attempts to request another user join their group
        - **Sample Output (Invalid):** The request to the user without a group fails, as the user sending the request is already in a full group

3. **Manage group**
    i. **Switch which user is the driver:** Groups can switch who is the group's driver at any point
    ii. **Organize pick up/drop off spots:** If users do not want to provide their personal address to be picked up at, a public pick up/drop off spot can be set.
    - **Sample Input (Valid):** Another group member would prefer to be the group's Driver for the ride,
    - **Sample Output (Valid):** The users manage the group and replace the automatically assigned Driver
    - **Sample Input (Invalid):** Users attempt to manage the group and switch the automatically assigned Driver, but there are no other users with the Driver role in the group
    - **Sample Output (Invalid):** The automatically assigned group Driver is not changed

3.4 Communication

1. **Messaging**

   a. **Message Group:** When a group is formed, members can message one another as a group to discuss their next ride
   b. **Message Individual Group Members:** Members of a group may also reach out and message other group members individually
2. **Notifications:** Users may receive multiple types of push-notifications on their device related to their carpooling trip. These notifications include…
   a. **Received Group Request:** A notification will be sent to members of a group when another user requests to join their group
   b. **Received Message:** A notification will be sent when a group member messages the user individually or in their group chat
   c. **Upcoming Carpool:** Members of a carpooling group will be notified the day before to remind them of their upcoming ride
   d. **Confirm Carpool:** Members of a carpooling group will be notified shortly before their ride to confirm they will be carpooling
   e. **Time to Leave (Driver):** The Driver of a group will be notified day-of to remind them when it is time to leave
   f. **Driver is Arriving (Rider):** Riders will receive a notification when their Driver is within 10 minutes of their location
   g. **Provide Trip Feedback:** Members of a group will be asked to provide feedback on their trip shortly after the drive. The feedback includes rating their Driver or other carpool Riders
   - **Sample Input (Valid):** A Rider in a carpooling group has push-notifications turned on for the application
   - **Sample Output (Valid):** The Rider receives important reminders about their trip and is notified to confirm their upcoming ride
   - **Sample Input (Invalid):** The Rider has push-notifications for the application turned off in their system's settings
   - **Sample Output (Invalid):** The Rider does not receive important reminders about their carpooling trip and fails to confirm their ride

3.5 Before the Trip

1. **Ride Confirmation**
   a. **Confirm Ride:** Driver and Riders confirm they will be carpooling shortly before their ride that day
   b. **Cancel Ride:**
      i. **Rider Cancels:**
         1. Other users in need of a ride that day are searched for and recommended to join the group
         2. Driver's route is updated
      ii. **Driver Cancels:**
         1. If the Driver cancels the ride, another valid Driver in the group is suggested
         2. If no other group members are valid Drivers or are able to drive that day, the group is disbanded
2. **Know the Driver**

a. **View Driver information:** Before the ride, Riders should view their Driver's information, such as their name, distance from their pick-up location, and profile picture
b. **View Driver Vehicle Information:** Rider's should also familiarize themselves with their Driver's vehicle information in order to confirm they are entering the correct vehicle during pick-up

- **Sample Input (Valid):** A Rider is no longer able to make the carpooling trip they are scheduled for and cancels their ride
- **Sample Output (Valid):** Group members are notified, other Riders in need of a group are searched for, and the Driver's route is updated
- **Sample Input (Invalid):** Rider fails to confirm their upcoming ride
- **Sample Output (Invalid):** Group is notified that a Rider did not confirm their ride and is no longer a part of the Driver's carpool route

3.6 During the Trip

1. **Driver Communication**
    a. **Route Navigation:** Driver receives and follows an external link to gps navigation for their route, including each Rider's pick-up location
2. **Rider Communication**
    a. **View Driver Location:** After the Driver has started the route, Riders can view the Driver's location and estimated time of arrival to their pick-up location
    b. **Pick-Up Confirmation:** Rider confirms they were picked up by the Driver
3. **Florida Tech Safe:** Drivers and Riders are given a link to the Florida Tech Safe app which provides access to all Florida Tech safety resources.
    - **Sample Input (Valid):** A Driver receives their link to external navigation and follows it throughout their carpooling route
    - **Sample Output (Valid):** The Driver reaches their group members' pick-up locations and Riders confirm they were picked up
    - **Sample Input (Invalid):** A Driver attempts to make the trip without navigation fails to follow their given route
    - **Sample Output (Invalid):** The Driver is unable find a carpooling member's pick-up location

3.7 After the Trip

1. **Provide feedback**
    a. **Rating system:** Users will be requested to rate their carpooling Driver and other group members on a rating system of 1 to 5 stars.
    b. **Report inappropriate behavior:** Users can report any inappropriate behavior of other group members that occurred during the ride. Users will also be prompted to block the user they reported.
    - **Sample Input (Valid):** Carpooling group arrives to campus and the user rates each member of their group 5 stars

- **Sample Output (Valid):** The positive review from the user is reflected in their group members' ratings
- **Sample Input (Invalid):**
- **Sample Output (Invalid):**

4. Interface Requirements

1. **Application is fully functional on a mobile device**
2. **Application Appearance:** Users may select between a light and dark background appearance when using the application
3. **Rider and Driver Interfaces:** The application offers distinct user interfaces for riders and drivers during the carpool ride
    a. **Rider:** Riders are able to view Driver's location and confirm/deny pickup
    b. **Driver:** Drivers are be able to view Rider's pickup locations
4. **System Admin View:** System Admins are able to view database information through the application to manage…
    a. **Groups**
    b. **Users**
    c. **Available preferences**

5. Security Requirements

5.1 Security Requirements

1. **Sign in / Sign up using Florida Tech email:** This helps ensure that all users of the application are currently enrolled Florida Tech students.
2. **System Administrator:** Only system admins are able to…
    a. View full database information
    b. View user reports of inappropriate behavior
    c. Terminate user accounts based on user reports
3. **Block Users:** Users are able to block other users if they do not feel comfortable being in their carpooling group or receiving communications from them on the application.
4. **Confirming Ride:** Riders must confirm their Driver arrived at their location and picked them up
5. **Link to Florida Tech Safe:** The Florida Tech Safe application will be easily accessible if a user needs Florida Tech safety resources immediately