

# Pool - carpooling app

SW Engineering CSC648-848-05 Fall 2023

## Milestone 1 | 09/21/2023

1. **Team Lead:** Zoe Rivka Panagopoulos | zpanagopoulos@sfsu.edu
2. **GitHub Guru:** Isiah Alfonso Paul-McGlothin | ipaulmcglothin@mail.sfsu.edu
3. **Release Manager:** Kristian Goranov | kgoranov@sfsu.edu
4. **Database Duke:** Kendrick Alexis Rivas | krivas2@sfsu.edu
5. **Backend Baron:** Phillip Diec | gdiec@sfsu.edu
6. **Frontend Lead:** Jonathan Sum | jsum@sfsu.edu

## History Table

Checkpoint #	Submission or revision	Date
1	submission	9/21/23
2	submission	9/21/23

---

## Executive Summary

Pool makes it convenient for people to commute to work – even during peak traffic, without relying on public transit or traditional ridesharing apps. By using Pool to carpool with fellow community members, passengers and drivers alike reduce commuter costs while limiting environmental impact and building community in the process. Plus, it's just nice to have someone else drive sometimes; Pool allows users to relax in the passenger's seat without the price tag of a Lyft or Uber.

Other ridesharing apps don't guarantee access to HOV and low-traffic lanes requiring FasTrak. Pool verifies all drivers for FasTrak subscriptions. Most carpooling apps don't break down the cost for you, but Pool will break down the costs of tolls and fuel per passenger. Pool is laser focused on the commuting experience and empowers users to ride to work with a trusted and familiar group of passengers, and a verified FasTrak driver able to cruise through traffic using HOV lanes. After work, expand your transit experience with your carpooling crew; go grocery shopping, get dropped off at the gym, or head home from sports practice together – all while paying less, having fun, and reducing your carbon footprint.

---

## Main Use Cases

### Actor Categories

#### Drivers

- Want to reduce their commuting costs.
- Want to reduce their commuting time.
- Want to offer their vehicle as a community resource.
- Want to connect with their community.
- Want to reduce their environmental footprint.
- Enjoy driving more than being a passenger.
- Can offer passengers a safer commute.
- Can offer a form of transit to people who may have no alternatives.
- Have Fastrak.
- Want to schedule based on their daily routine.

#### Passengers

- Want to reduce commuting times
- Want to reduce commuting costs
- Want a reliable mode of transportation
- Want to get to work on time
- Want to socialize
- Can offer drivers an extra body for HOV discounts
- Can offer company to the driver
- Want to be comfortable during their commute
- Pain points
  - Public transit doesn't always offer point to point transportation, cases where extra walking/waiting is required
  - If a carpool driver arrives late or does not show up
  - Has some anxiety about who they'll be commuting with
  - Lack of driver availability

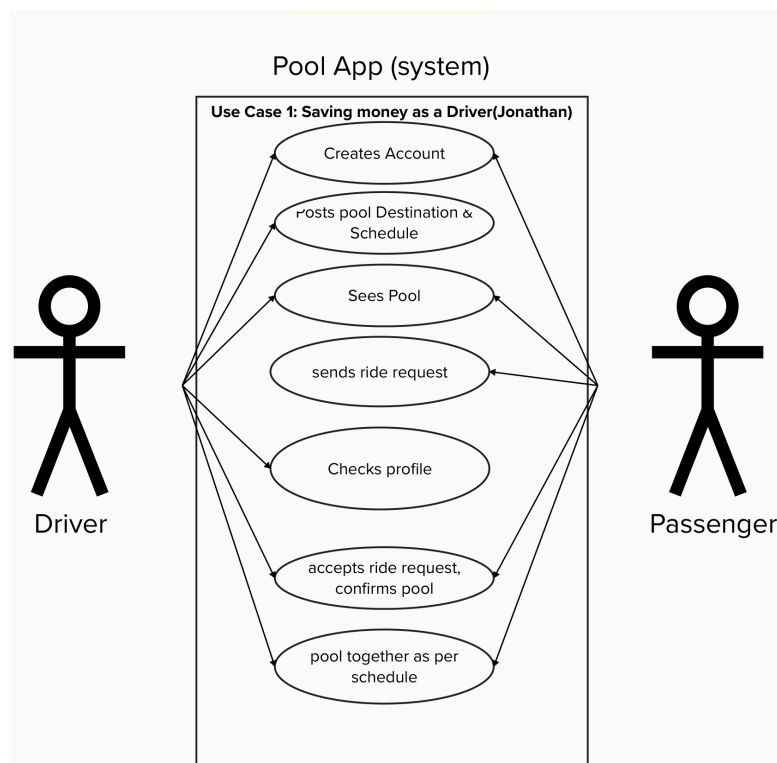
---

## Use Cases: Drivers

### Use Case 1: Saving money as a driver

*Actors: Amanda*

Amanda is a recent college graduate who has moved to Livermore, California for her new job. Amanda prefers not to have to rely on public transportation to move around the bay, so she drove her car to California. Her commute requires her to cross the Bay Bridge into San Francisco which costs money from the toll system. Additionally, there are toll lanes on the highway down from Livermore that require additional fees. By using Pool, Amanda is able to find passengers that also live in Livermore that commute daily to San Francisco in a “pool”. Amanda creates a password protected account using her name, email, and phone number, registers her car by make, model, year, color, license plate, and number of seats, and posts a recurring pool running five days a week from Livermore to San Francisco. Amanda makes some small adjustments to pickup time and end location, and soon receives rider requests from passengers who wish to join her pool. Since there are multiple passengers in Amanda’s vehicle, she qualifies for discounts not only on the highway, but for crossing the Bay Bridge as well. To make the Pool app better for other drivers, Amanda leaves feedback regularly for all of her passengers.

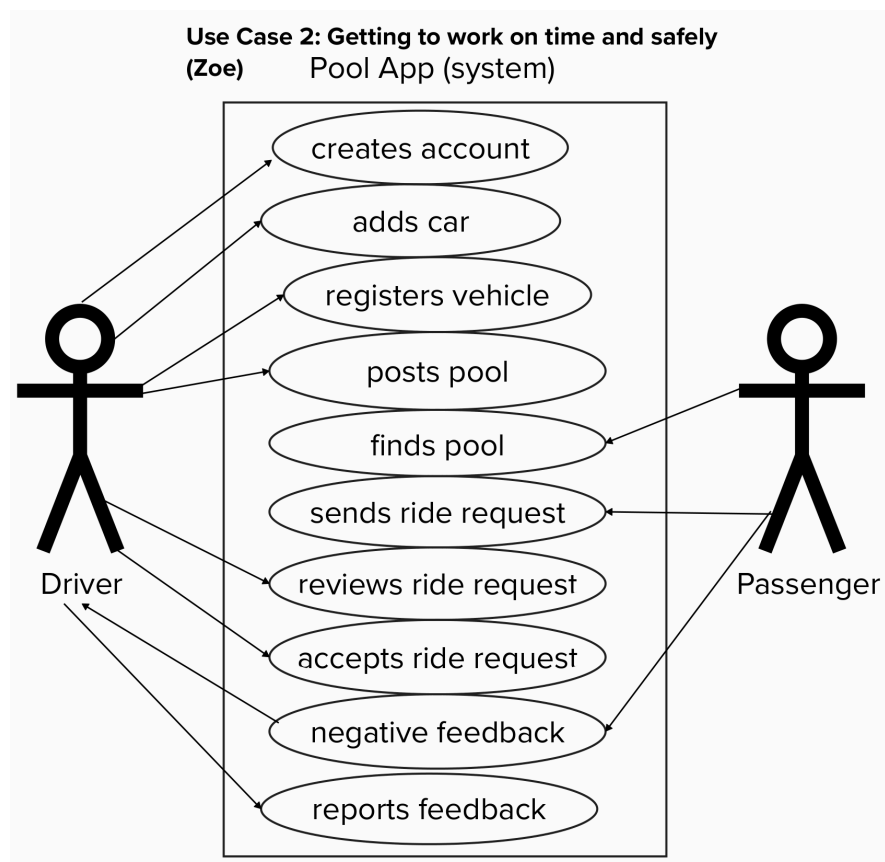


---

## Use Case 2: Getting to work on time and safely

*Actors: Alex*

Alex loves driving and has faced harassment on public transit, so choosing to drive to work is a no brainer – she'll even pay a premium for this choice (tolls, gas, parking, etc). But getting to work on time is a major problem as a commuter traveling from Marin County into San Francisco, over the Golden Gate. Alex has tried carpooling before but has faced similar harassment as a carpooling passenger as she did on public transit; a driver once even pulled over and demanded she exit the vehicle upon learning that she's trans. Despite the harassment, the speediness of carpooling is still very attractive to Alex, so she decides to try out Pool as a driver in her own car, where she can better control her environment and the passengers she commutes with by reviewing the profiles of prospective passengers in ride requests before accepting or declining them. And when she receives transphobic or otherwise inappropriate feedback from passengers, she can view it before it becomes public and easily report it. On days where Alex doesn't feel like dealing with people, it's easy to toggle off notifications so she can review ride requests when she's ready.

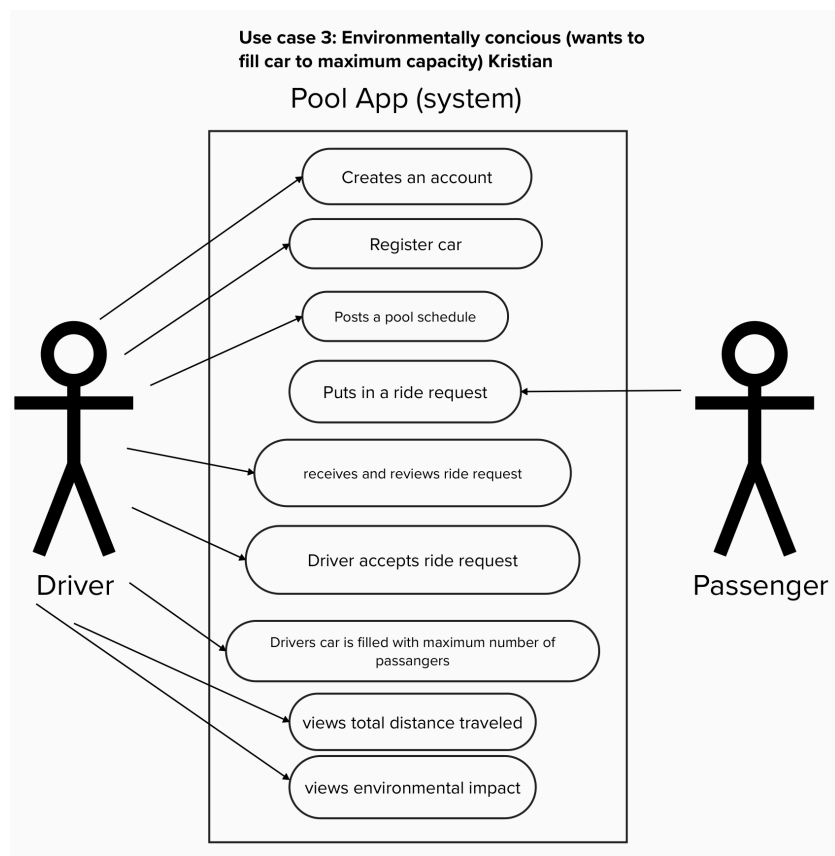


---

### Use Case 3: Environmentally Conscious

*Actors: Carol*

Carol has been seeing a lot of news articles about the acceleration of climate change and is wondering what she can do to limit her environmental footprint. But she likes her car and enjoys driving to work. So she creates a password protected account on Pool using her name, email, and phone number, and registers her car along with its make, model, year, color, license plate, and number of seats available. There, she can post pools that align with her commuting schedule and receive ride requests from prospective passengers who are going in the same general direction. Sometimes, Carol drives a little out of her way to pick up and drop passengers off as per their ride requests, but it's worth it because Carol prefers to have a full car to reduce her impact on the environment. Plus, she loves seeing her total distance traveled and environmental impact from all of her past rides; it reaffirms her choice to be a driver on the Pool app. When Carol thinks of other features that could create more in-app incentives for lessening environmental impact, she files a report ticket for the Pool customer support team with her suggestions.

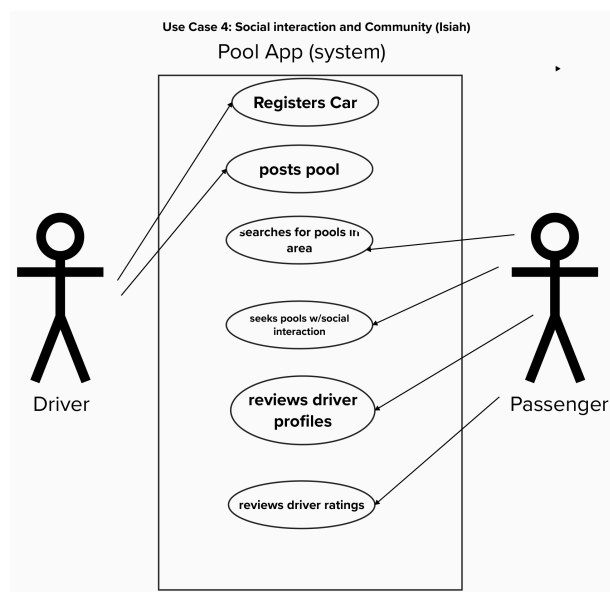


---

## Use Case 4: Social interaction and community

*Actors: Sarah*

Sarah is a retired teacher in her early 60's, living in a quiet suburban neighborhood in the Bay Area. She no longer commutes to work and enjoys her retirement, but she frequently needs to cross the Bay Bridge and navigate the city for her errands, social outings, and medical appointments. Sarah's primary concern is the hassle and stress of her regular commutes. Sarah is not looking to save money but to simplify her errands and improve her overall quality of life. Sarah is seeking a carpooling app that can help her find companions for her trips into the city. She hopes to connect with individuals who share her interests or have similar destinations. This way, she can have enjoyable conversations and company during her commutes, making her trips more pleasant and less stressful. Safety and reliability are vital to her, ensuring that she shares rides with trustworthy individuals. In her research, she learns that the Pool app has passenger and driver ratings, which entices her to try it out. Because Pool does not require her to create an account to search for available pools in her area, she starts by doing this. When Sarah tells her daughter that Pool has an emergency contact feature, her daughter feels much better about the prospect of her creating an account as a passenger, knowing that she'll be contacted by phone and email in the event of any unforeseen circumstances. And in the event Sarah deems the app too difficult to navigate, she can try chatting with support or can always just delete the account.

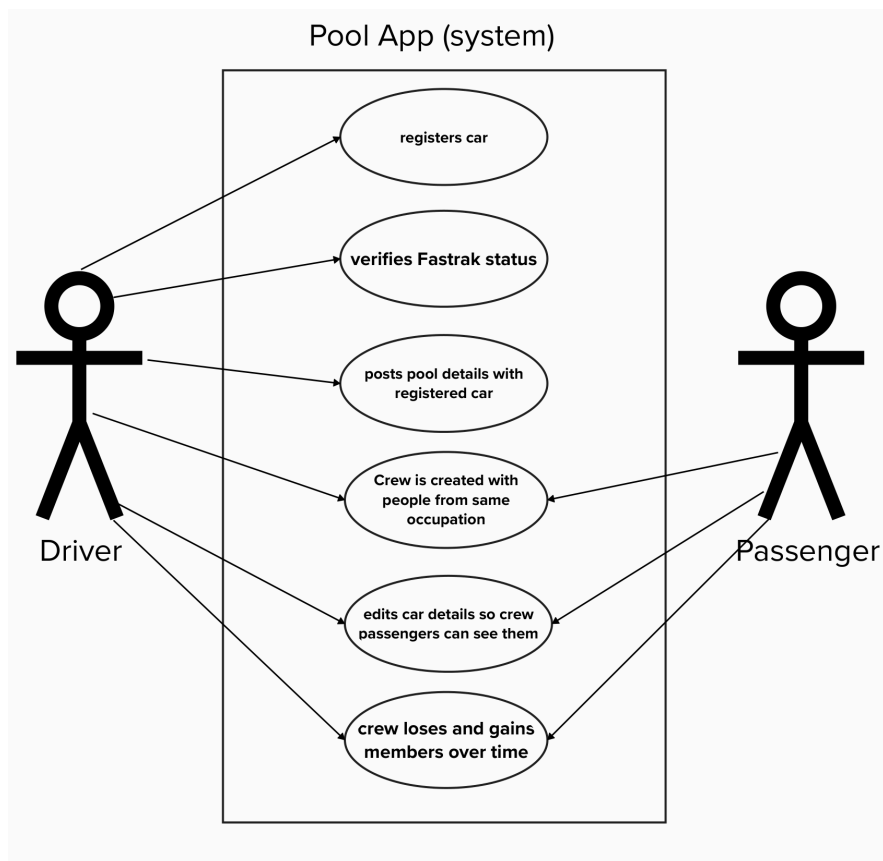


---

## Use Case 5: Reduce commuting time and having Fastrak

*Actors: John*

John, a software engineer in San Francisco, uses Fastrak to optimize his daily commute from San Jose. To save time and money, he ensures his Fastrak account is funded, allowing for smooth toll payments on the Bay Bridge and express lanes. John participates in carpooling through the Pool app as a Fastrak verified driver, sharing his registered vehicle with co-workers from the same area in a pool, which not only reduces his toll expenses but also makes his commute more enjoyable. Recently, John got his car detailed and re-painted, and edited his car details in the Pool app to reflect this. John and his co-workers recently created a crew from their regular pool commute to make traveling together using the Pool app even easier. John had been thinking about getting a new car anyway, so when another set of coworkers asked to join John's crew, he knew now was the right time to make the upgrade. When he did, he made sure to set his prior vehicle to inactive and registered his new vehicle so that he could add it to his recurring pool and grow his crew.





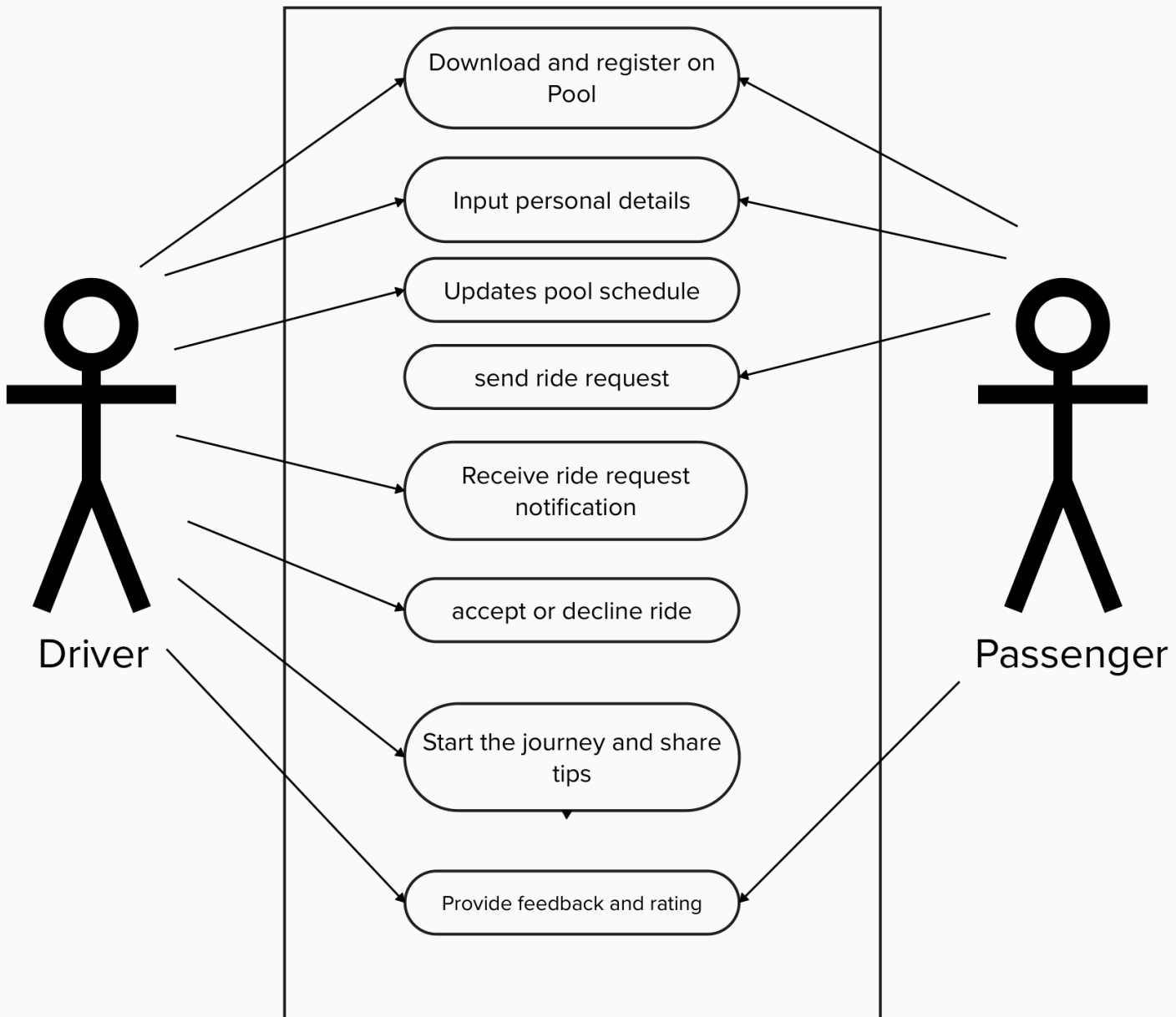
---

## Use Case 6: Building connections while lending a helping hand

*Actors: Ashley, Jeff*

Ashley is a senior at San Francisco State who has been living in the city for over three years. Originally from a suburban area, Ashley became acquainted with San Francisco's dynamics with its unique neighborhoods and city life. Her residence in the Outer Richmond area allows her to quietly live outside of the busier parts of the city and her commute time to the university isn't half bad. Ashley has been using Pool for over a year now as a driver, and the app has not only helps her offer rides to fellow students which makes their commutes easier, but it also helps offset some of her expenses with contributions from her passengers. Ashley is aware of the challenges new students face, especially those who are new to the city, so each semester, Ashley updates her pool schedule on the app, sharing pool routes with start and end locations she frequently takes, marking which pools are recurring, and indicating any available seats in her car. One evening, a notification from Pool pops up, a new passenger by the name of Jeff, is requesting a ride that aligns perfectly with her pool. Noting that he's a transfer student living in the Outer Sunset, Ashley realizes that his location is right along her daily pool route. Recalling how confused she was when she first came to the city, Ashley empathizes with Jeff, from one student to another, so she accepts the ride request for the next morning. Ashley pulls up outside Jeff's apartment the following day since he requested a pickup location different than Ashley's pool start location, they exchange greetings, and their pool begins. Ashley shares her experiences and gives Jeff tips about university life in San Francisco State and how to get around San Francisco, although the pool was short, the engagement made the once mundane drive to school an opportunity for connection and friendship. As the weeks went by, Ashley and Jeff's rides became more lively, with discussions, shared playlists and mutual appreciation of the city landmarks. Ashley gives Jeff positive feedback and a great rating for his passenger profile. Pool has turned Ashley's daily drive from a solitary task into a shared experience that fosters friendship and a sense of community now that she found this two person crew.

Use Case 6 Building connections  
while lending a helping hand (Phillip)  
Pool App (system)

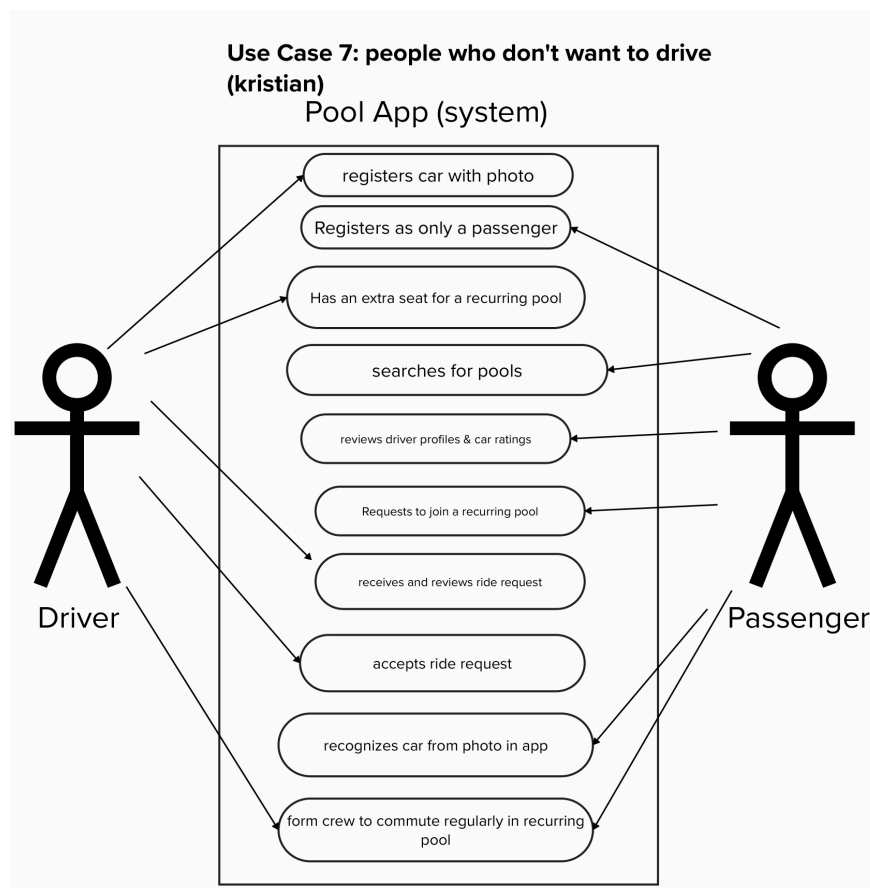


## Use Cases: Passengers

### Use Case 7: People who do not want to drive

*Actors: Tom (carpool passenger), Driver*

Tom is a business professional who works in the San Francisco financial district. Tom and his wife recently moved away from their downtown apartment to a home in San Mateo, California. When Tom Lived downtown he was conveniently located next to an underground Muni train station and only needed to go a few stops to get to work. After moving to San Mateo he tried driving, but quickly realized he did not like driving during peak traffic hours, it caused him a great deal of distress. Because Tom does not like driving during peak hours, he creates an account with the intention to only be a pool passenger. Tom searches the Pool website for recurring Pools he can regularly join to share a car to work. Tom finds an available pool that has space in the car; both the driver and car have great ratings, so he sends a ride request to the driver. Plus, the driver's profile shows that he accepts Venmo, making it easy for Tom to pay the very reasonable toll contribution of \$1 using his posted account details. The driver reviews Tom's profile and approves his ride request. Tom easily recognizes the car at the pickup location of his first pool based on the make, model, year and color, which matches its picture in the app. Tom now commutes to work regularly with a crew and he no longer dreads his daily commute to work – and because the car has air conditioning and wifi, he can even get a head start on work during his commute, in comfort.



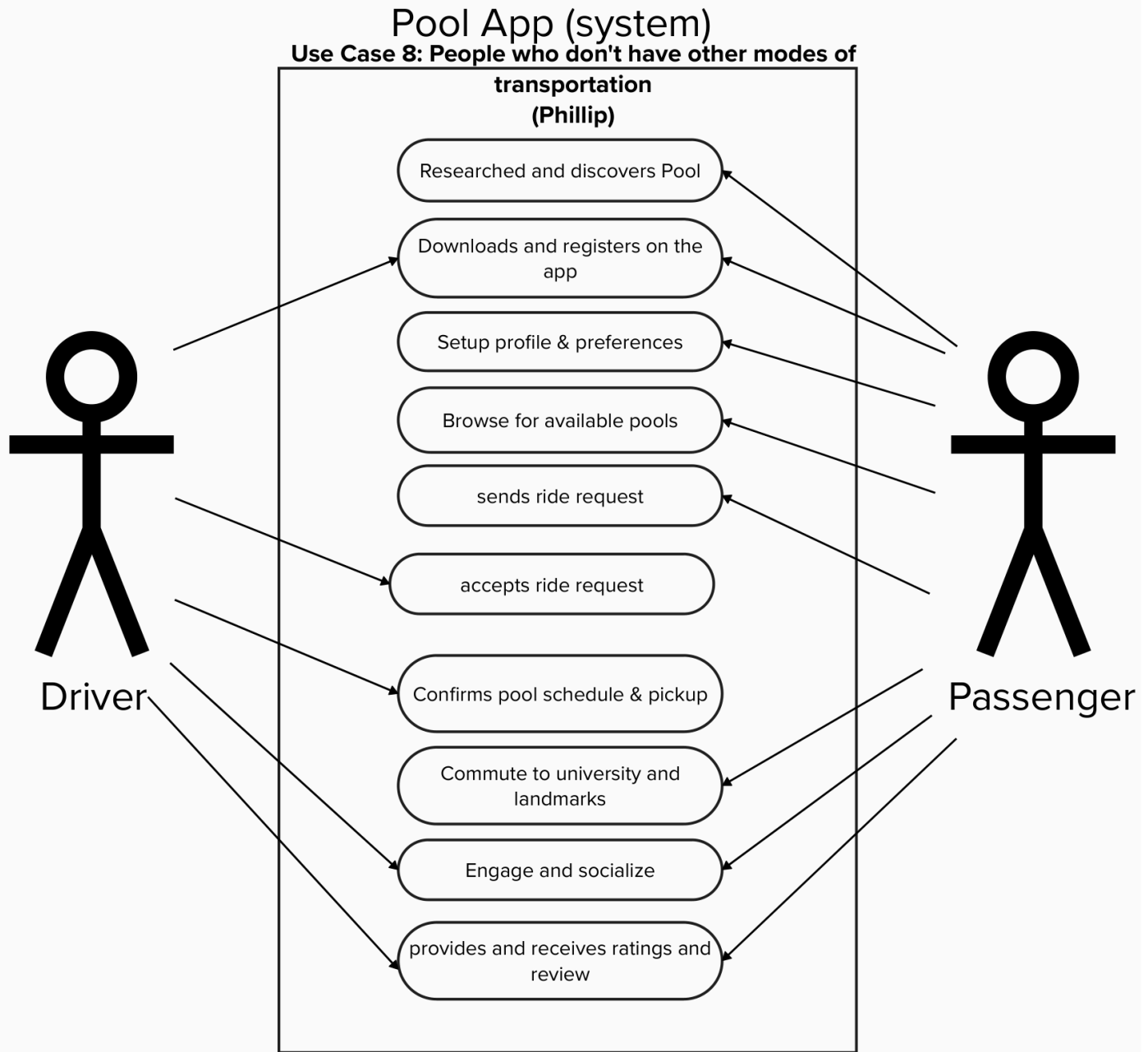
---

## Use Case 8: People who don't have other modes of transportation

*Actors: Jeff*

Jeff is a university student who recently transferred to San Francisco from his community college in a relatively smaller town where he only had to walk to where he needed to be, so a car was unnecessary. Excited to start attending San Francisco State and a new life in a different city, Jeff forgot how much bigger San Francisco was compared to where he was from. Initially intimidated by the city's overwhelming and bustling transportation system, Jeff began to stress out, although there were public transport options available, things such as unfamiliar routes and packed schedules made his commute to the university stressful. While attending a university orientation event, Jeff hears about Pool, an app specifically designed for students and residents of San Francisco looking to share rides, intrigued by the idea, he downloads the app right away. After getting the app, Jeff quickly set up his profile, detailing his commute from his apartment in the Outer Sunset to SF State, he inputs his class times to allow the app to suggest optimal pick-up times and check preferences such as fellow student passengers or quiet rides to study during the journey. The app identifies several drivers with overlapping routes, but a particular driver was also a senior student from his university and has been carpooling for the past year, they have been driving by his apartment every morning and have space in their car. The next morning, Jeff waits outside his apartment and, right on time, the senior student from his university arrives, the ride to campus is smooth and quick, with the driver sharing tips about the city and university life, Jeff feels more connected, having made a new friend along with an efficient way to commute to school. As days turn into weeks, Jeff regularly uses Pool as a mode of transportation, not just for school but also for exploring the city and visiting iconic places such as the Golden Gate Bridge and Fisherman's Wharf. The app allows him to travel with locals, making his adaptation to San Francisco life cost-effective and socially enriching. Jeff provides positive feedback for his driver and gives her a great rating.

# Passenger Use Cases

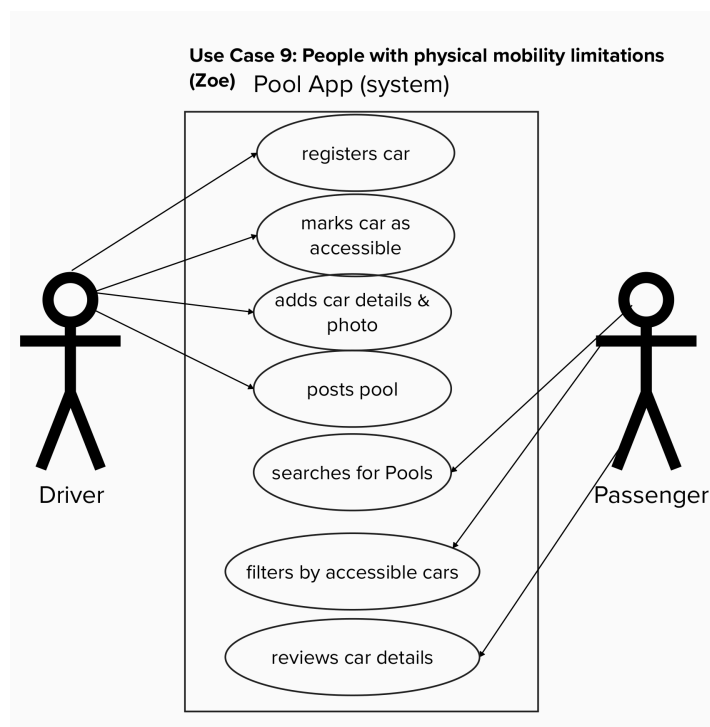


---

## Use Case 9: People with physical mobility limitations

*Actors: Ty*

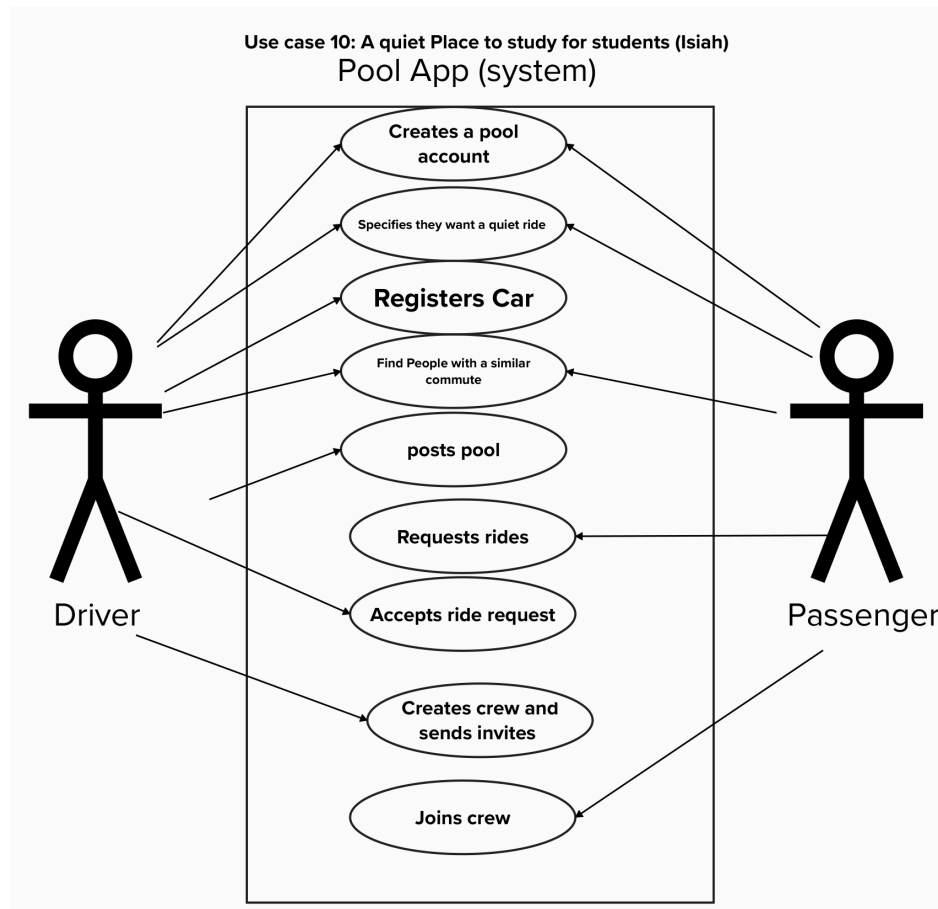
Ty has navigated their life in a wheelchair since they were a toddler, and has always been incredibly independent. This has left Ty with remarkable upper body strength and the ability to self transport around home as well as within their community. But even as an advanced wheelchair user, Ty struggles with public transit – at no fault of their own; many times, elevators are out of service at Bart stations, and Ty has no way of finding this out prior to their arrival, at which point they must completely renavigate and often end up arriving late for work. A friend recently told Ty about Pool, a community carpooling app. But Ty is skeptical of Pool, because their experiences with Lyft and Uber haven't been consistent; sometimes drivers who say their vehicle can accommodate wheelchairs actually can't, and the process of even communicating about this with drivers has been arduous. With no better options, Ty decides to try Pool since it allows you to filter by pools with accessible vehicles, but plans to set aside a whole extra hour for the experience in case it doesn't work out and they need to make alternative plans to get to work. Before creating an account, Ty simply browses to see if any pools in their area actually have wheelchair accommodations.



## Use Case 10: A quiet place to study for students

*Actors: Emily*

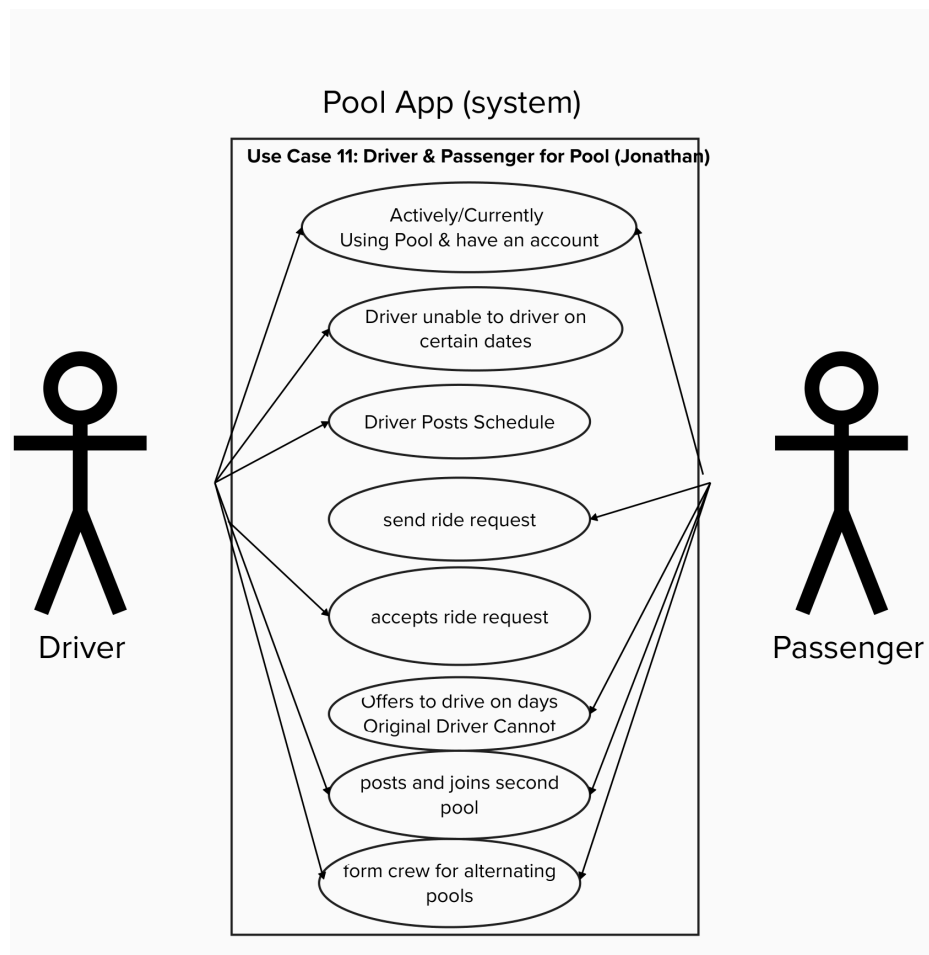
Emily is a University Student attending San Francisco State University but lives in Milpitas. She has a long commute to campus, and she's determined to make the most of her time. Emily uses the Pool app to find pools to school with wifi where she can study during the journey, so she searches for pool names and descriptions containing keywords like "study" and "students". For Emily, the pool isn't just a mode of transportation; it's her mobile study space. She is actively looking for a crew of fellow passengers who also value a quiet and focused environment during their pool. By carpooling with others who share her goal, Emily can make the most of her daily commute, optimize her study time, and arrive at school prepared for her classes. After her fourth pool with a consistent group of passengers who also see their commute as an opportunity to enhance their productivity and learning experience, Emily invites the members of her pool to create a crew. The members all accept and they proceed to regularly pool together.



## Use Case 11: Driver & Passenger for Pool

*Actors: Jason, Marissa*

Jason recently moved to the East Bay for work and has been living there for the past 3 years. During his time there, he has met coworkers that also live in East Bay and have agreed to form a crew and commute together regularly through the Pool app. Jason doesn't mind driving, but he sleeps later than usual every other Tuesday night to help his kids study for their school's biweekly math competitions. Because of the lack of sleep Jason gets, Jason doesn't feel comfortable driving on less sleep than usual – especially when transporting his youngest to daycare en route. Jason has informed his coworkers of his situation beforehand so they are aware that he can't drive their crew on this day of the week. One of his coworkers, Marissa, agrees to sign up as a driver and register her vehicle – which has child seats – and create a recurring pool to drive their crew to work every other Wednesday. When Jason's schedule later changes, it's easy for him to leave his Wednesday crew and add this day back to his own recurring pool's schedule.

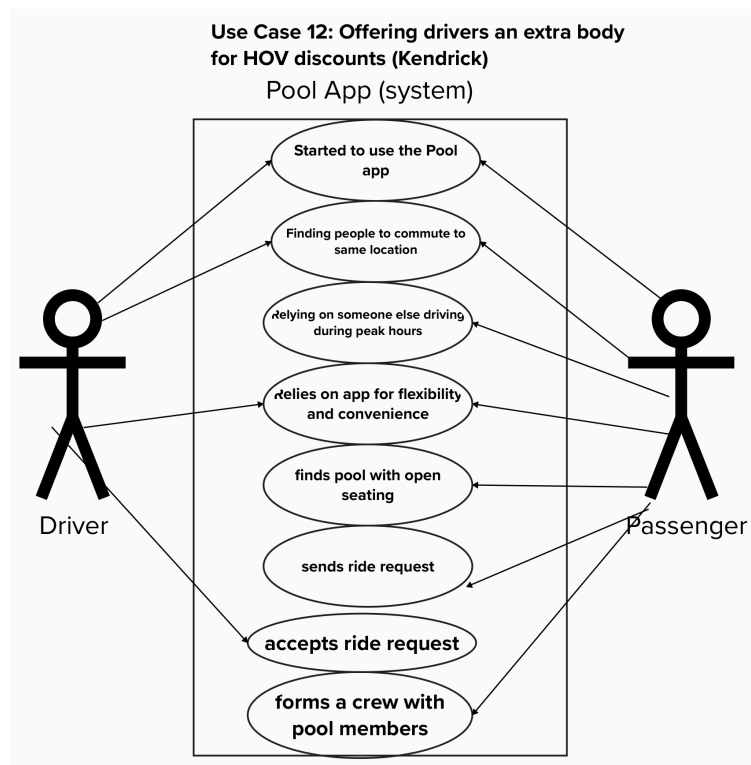




## Use Case 12: Offering drivers an extra body for HOV discounts

*Actors: Tom*

Tom, a business professional working in San Francisco SoMa, recently relocated to East Bay and faced the challenge of commuting during peak traffic hours, which caused him distress. To alleviate this, Tom turned to the Pool app. He wanted to use the app to start commuting with a regular pool who he could form a crew with to regularly share a car with to work, so he started by seeking out pools with drivers who are already members of crews, thinking this would be the easiest point of entry. After Tom sent his first crew invites to members of a recurring pool he'd ridden with twice, one member declined, but the group was still big enough to form a new crew without him. Tom preferred being a passenger rather than a driver during peak hours, and the app made it easy to find free pools posted by drivers seeking HOV discounts. Now, Tom no longer dreads his daily commute, where he had to find his luck for parking, as he enjoys a reliable and stress-free mode of transportation, thanks to his Pool crew. And when a member of his crew eventually left the Bay Area, it was easy to remove this member to make room for a new one. As a passenger, Tom benefits from the app's flexibility and convenience, transforming his daily commute into a more pleasant experience.



---

## Main Data Items and Entities

User: browsing capabilities only, doesn't require an account

Account: can be created by user, required for drivers and passengers

Driver: user with an account, registers vehicles and submits trips

Passenger: user with an account, must be ID verified, requests rides in many trips

Profile: associated with a user who has an account, visible to drivers and passengers within a common pool, and after a trip for a limited time

Crew: a common group of people who pool together

Car: registered to one driver, associated with many pools

Pool: created by a driver, can have passengers, can be converted into a crew

Ratings: for drivers and passengers to rate each other

Ride request: how passengers request to be admitted into a pool

---

## Functional Requirements

### 1. Unauthenticated User

- 1.1 An unauthenticated user may search for pools.
- 1.2 An unauthenticated user may view the total number of pools near them.
- 1.3 An unauthenticated user may view limited pool details.

### 2. User

- 2.1 A user shall register with their name
- 2.2 A user shall register with an email
- 2.3 A user shall register with a password
- 2.4 A user shall register with their phone number
- 2.5 A user shall be able to view their passenger profile
- 2.6 A user shall be able to view their driver profile
- 2.7 A user shall be able to view their passenger ratings received
- 2.8 A user shall be able to view their driver ratings received
- 2.9 A user shall be able to view their passenger feedbacks received
- 2.10 A user shall be able to view their driver feedbacks received
- 2.11 A user shall be able to report any feedbacks they received
- 2.12 A user shall have zero or one emergency contact name
- 2.13 A user shall have zero or one emergency contact phone number
- 2.14 A user shall have zero or one emergency contact email
- 2.15 A user shall be able to delete their account
- 2.16 A user shall be able to file a report ticket
- 2.17 A user shall be able to chat with support

### 3. Profile

- 3.1 A profile shall belong to one and only one passenger
- 3.2 A profile shall belong to one and only one driver
- 3.3 A profile shall have zero or one profile picture

- 
- 3.4 A profile picture shall be updated
  - 3.5 A profile picture shall be deleted
  - 3.6 A profile shall contain account name
  - 3.7 A profile shall display account email
  - 3.8 A profile shall display account phone number
  - 3.9 A profile shall display the average rating
  - 3.10 A profile shall contain a payment method
  - 3.11 A profile shall contain a payment account
  - 3.12 A profile shall display total distance traveled
  - 3.13 A profile shall display total environmental impact
  - 3.14 A profile shall display total number of crews with membership

#### 4. Driver

- 4.1 A driver shall have a binary FasTrak verification status
- 4.2 A driver shall have many ratings
- 4.3 A driver shall have many cars
- 4.4 A driver shall have many crews
- 4.5 A driver shall be associated with one and only one account

#### 5. Passenger

- 5.1 A passenger shall be associated with many pools
- 5.2 A passenger shall be associated with many crews.
- 5.3 A passenger shall be associated with one and only one profile
- 5.4 A passenger shall be associated with one and only one account
- 5.5 A passenger shall have many ratings

#### 6. Crew

- 6.1 A crew shall be created by one user
- 6.2 A crew creator shall be able to give their crew a name
- 6.3 A crew creator shall be able to add a description to their crew
- 6.4 A crew creator shall be able to invite users to their crew
- 6.5 A crew invite shall be accepted
- 6.6 A crew invite shall be declined

- 
- 6.7 A crew creator shall be able to remove users from their crew
  - 6.8 A user shall be able to leave a crew

## 7. Car

- 7.1 A car shall be associated with one and only one driver
- 7.2 A car shall be registered by its make
- 7.3 A car shall be registered by its model
- 7.4 A car shall be registered by its year
- 7.5 A car shall be registered by its color
- 7.6 A car shall be registered by its license plate number
- 7.7 A car shall have one or many seats
- 7.8 A car's make shall be edited by the user that registered it
- 7.9 A car's model shall be edited by the user that registered it
- 7.10 A car's year shall be edited by the user that registered it
- 7.11 A car's color shall be edited by the user that registered it
- 7.12 A car's license plate number shall be edited by the user that registered it
- 7.13 A car shall have a binary status of active or inactive
- 7.14 A car shall have zero or one photo
- 7.15 A car's photo shall be updated by the user that added it
- 7.16 A car's photo shall be removed by the user that added it
- 7.17 A car shall have wifi
- 7.18 A car shall have air conditioning
- 7.19 A car shall have child seats
- 7.20 A car shall have wheelchair accommodations
- 7.21 A car shall have many ratings

## 8. Pool:

- 8.1 A pool shall have one schedule.
- 8.2 A pool shall have one start time.
- 8.3 A pool shall have one end time.
- 8.4 A pool shall have a binary value of one-time or repeat.
- 8.5 A pool shall have an occurrence rate.

- 
- 8.6 A pool shall be transformed into many crews.
  - 8.7 A pool shall be created by one and only one driver.
  - 8.8 A pool shall have one and only one driver.
  - 8.9 A pool shall have many passengers.
  - 8.10 A pool shall have many ride requests.
  - 8.11 A pool shall be viewable by its passengers
  - 8.12 A pool shall be viewable by its driver
  - 8.13 A pool shall have a total distance in miles
  - 8.14 A pool shall have one and only one car
  - 8.15 A pool shall have one start location
  - 8.16 A pool shall have one end location

## 9. Ratings

- 9.1 A rating shall have a numerical value of 1-5
- 9.2 A rating for a driver shall be provided by a passenger belonging to a common pool
- 9.3 A rating for a passenger shall be provided by a driver belonging to a common pool
- 9.4 A rating for a car shall be provided by a passenger belonging to a common pool

## 10. Ride request

- 10.1 A ride request shall be made by one and only one Passenger
- 10.2 A ride request shall be made for one or many Passengers
- 10.3 A ride request shall be made for one Crew
- 10.4 A ride request shall be made for one and only one Pool
- 10.5 A ride request shall have one or more seats
- 10.6 A ride request shall contain the Profile associated with the requesting Passenger(s)
- 10.7 A ride request shall contain the name associated with the requesting Crew
- 10.8 A ride request shall contain the description associated with the requesting Crew

- 
- 10.9 A ride request shall have zero or one pickup location(s)
  - 10.10 A ride request shall have zero or one dropoff location(s)
  - 10.11 A ride request shall be accepted
  - 10.12 A ride request shall be declined

## 11. Payment Method

- 11.1 A payment method may be associated with many profiles.

## 12. Notifications

- 12.1 Notifications may be triggered by many actions.
- 12.2 Notifications may be toggled on or off per account.

---

## Non Functional Requirements

### Performance

Application will have an average response time of 2 seconds or less.  
Application utilizes efficient data storage techniques to reduce load time.  
Application leverages caching to reduce load time and increase performance.  
Application backend is capable of switching between different data sources when it is required to call a backup data source.  
Application has an intentional splash page for unexpected downtime.  
Code deployments and maintenance will not require downtime.  
Pool shall use cloud based scaling solutions.  
Pool shall use database optimization techniques to increase performance.  
Pool shall minimize device CPU usage.  
Pool shall minimize device memory usage.

### Navigation & Wayfinding

All open fields shall have sufficient validations.  
All open validations shall have helpful error handling that help the user course correct.  
Open fields shall auto suggest and when possible, pre-fill data to reduce the cognitive burden required to complete an action.

### Security

Data shall be encrypted.  
Data shall be sent over https protocol.  
Passwords shall be stored as hashes, ie. SHA256 hashing function.  
Encryption and decryption shall be tested for accuracy.  
Pool shall have a response plan in the event of a data breach.  
User accounts shall require authentication for access.  
PII shall be handled with an added layer of care and protection.  
Requesting systems must have the required credentials in order to access application data.

### Portability

Application shall have cross platform compatibility across different devices.  
Application shall function on most common web browsers, i.e. Safari, Chrome, Firefox, DuckDuckGo



---

## Cost & Budgeting

Application operating entity shall maintain sufficient financial resources capable of maintaining and scaling core services including the database, servers, third party applications and software, etc.

Google Cloud should not have to incur any charges based on memory usage

## Storage

User actions and associated data shall be preserved at the database level.

Data shall be backed up regularly.

Tables should not exceed 400 bytes

Values in tables should not exceed 50 bytes

## Accessibility

Application frontend can accommodate users who may require a larger font size.

Application frontend can be easily translated to any language.

Application frontend can be easily navigated by users without sight.

Application frontend is optimized for readability.

Application signup should take no more than 10 clicks

## Environmental Impact

The application shall incentivize making full use of car's capacity to optimize environmental impacts

The application shall have a feature that will remind drivers to turn off their engines if they're waiting for long periods of time, like waiting for carpool participants

The application shall give priority or recognition to drivers with hybrid or electric vehicles to promote environmental sustainability

The application shall provide periodic emission saving reports to users to keep them motivated and informed

The application will conduct efficient routing that will minimize fuel consumption and travel time, indirectly reducing emissions

---

## Competitive Analysis

Table 1

Features	Uber	Lyft	Merge	SF Casual Carpool	Public Transit	Taxis/Flywheel
UI/UX	Intuitive, each category has concisely what one needs.	User friendly , intuitive UI/Ux	Simple, Compact, not overly flashy, easy to navigate	UI design is simplistic and easy to navigate	Varies by service and transit agency, not consistent	User friendly, easy to navigate and accessible to many tabs
Accessibility	Covers all of the major cities spanning multiple countries as well areas with smaller populations.	Robust coverage in metropolitan areas. Sparser coverage farther from large cities. Mobile version.	Nationwide, dependent on user population for rider options	There are no accessibility features, things like dark mode is absent on the site, and there are no instructions for non abled people, and the drop off point(s) are very limited.	Accessibility varies for web experiences. In person accessibility varies greatly by vehicle in use (light rail vs bus when it comes to Muni), and whether or not elevators are in service for BART.	Covers four different cities
Community	Based on one's location, uber drivers and riders are paired together.	Riders are paired with drivers based on their vicinity to one another.	Small community, but enough carpooling options. Community based on how the	The stops across the bay are condensed , so drivers and passengers are most likely going to be going	BART has had some recent efforts to build community on board, none for other public	Not many carpooling options and the rider asks for a pickup. If one needs to learn more about the company they have to reach

			demand for carpooling in a given area	the same way, so familiar drivers/passengers is a possibility. However, ride etiquette is random and based on the people you carpool with.	transit agencies	out.
Privacy	An in depth policy that labels what the drivers can and cannot see from the rider and vice versa, including but not limited to ratings, phone numbers, profile picture, last name etc.	Robust data privacy. Issues with drivers posting dash cams without rider permission have occurred.	User profile shows only what user wants to publicly show, no profile picture, cookies used to share with third parties, location data tracking the moment app is downloaded	SF Casual Carpool doesn't really ask for your phone number or details, so what you decide to share is up to you when meeting drivers or other passengers.	Standard cookie policies on most sites, none in IRL experiences.	Do not gather info of visitors under 13 of age. Collects personal that is listed and it is all accessed once the user gives consent. Only name, phone # and email can be inputted. No profile pic or pronouns.
Pricing	Pricing is mainly based on the base rate, the operating	Pricing varies because of the surge pricing model,	Pricing varies dependent on location A to B	Pricing is dependent on the driver, the driver is responsible for	Due to a lack of connectivity between services, expensive	Pricing is based on the base fare, distance, time, additional charges, tips.

	<p>fee, and where one is in a busy time or area. There is a pricing estimate on their website. For major cities and long commutes, expect higher pricings.</p>	<p>but is generally expensive for daily commuting.</p>	<p>and driver. From first glance, no money required except for tip at the end</p>	<p>communicating with the passengers if they would like a small contribution to cover expenses (usually \$1).</p>	<p>e.</p>	<p>No pricing estimate is located in their data</p>
<p>Sustainability</p>	<p>In 2020, Uber had announced a global commitment to becoming a zero-emission mobility platform. Their goal by 2025 is that a large percentage of drivers transition to EVs. (Electric Vehicles.)</p>	<p>Lyft pool service has been suspended. Uses a one driver one request ride request model contributing to added traffic congestion and greater environmental impact.</p>	<p>As of 2022, Merge has been announced as an official carpool collaborator for the Bay Area, extremely community driven as passengers are only expected to tip at the end</p>	<p>The casual carpool system comprises and relies on common sense, as passengers and drivers are expected to act responsibly. And the entire system is community driven, so it's cost effective and adaptive, but a challenge would definitely be monetization and</p>	<p>BART is electric, so low environmental impact. BART also utilizes sheep and goat herds for natural land maintenance. Muni is a mixed gas/electric fleet (50% electric).</p>	<p>Rideshare hasn't announced much for the sustainability. Although, in 2022 Flywheel had partnered up with Uber.</p>

				funding.		
Personalization	Very Barebones personalization, one can add their name, pronouns, profile picture, and their home and work addresses.	Account links to social media and remembers most frequently traveled destinations.	Only can post short description and commute preferences	No personalization since there's no need to nor ability to put any personal information on the website.	None	Can favor their favorite location, set preferred vehicle type, only schedule rides to airport
Trust & Safety	Uber has highlighted a lot of safety measures. They have a multi-step background process for uber drivers. As well as policies such as no front seat use for riders, 911 assistance built into the app, auto insurance, and ways to report any issues on their app.	Have only an initial background check. Many incidents have made the news questioning safety standards.	Trust solely based on driver and passenger relationship. No authorization required. Driver may ask for authorization after messaging about commute	Random carpool forming, no system to really allow riders or drivers to know who they're meeting.	BART launched a "citizen oversight board" to increase accountability of BART police	Taxi drivers require a higher level of licensing and permits than rideshare drivers.

Table 2

Features	Uber	Lyft	Merge	SF Casual Carpool	Public Transit	Taxis	Pool
Finding a ride	++	++	++	+	+	-	+
Ride w/your "Crew"	-	-	-	-	-	-	++
Ride ratings	++	++	+	-	-	-	++
profiles	+	-	+	-	-	-	++
carpooling	-	-	+	++	+	+	++
Reducing carbon emissions	+	-	+	++	++	+	++

**Legend:** + = has this feature, ++ = does this really well, - = doesn't have this feature

---

## High-level System Architecture & Technologies Used

Server Host: Google Cloud

Operating System: Windows and Mac

Database: MySQL v 8.0.34

Web Server: Tomcat v 8.5 (via Spring Boot)

Server-Side Language: Java

Additional Technologies:

Web Framework: Spring Boot v 3.1.3 and React.js v 18.2

IDE: Visual Studio Code 1.81 and IntelliJ v 2023.2.1

SSL Cert: Google-managed SSL

---

## Checklist

1. **Done** ☒ Team found a time slot to meet outside of the class.
2. **Done** ☒ Github Master chosen.
3. **Done** ☒ Team decided and agreed together on using the listed SW tools and deployment server.
4. **Done** ☒ Team ready and able to use the chosen back and front end frameworks and those who need to learn are working on learning and practicing.
5. **Done** ☒ Team lead ensured that all team members read the final M1 and agree/understand it before submission.
6. **Done** ☒ GitHub is organized as discussed in class (e.g. master branch, development branch, folder for milestone documents etc.)



---

## List of Team Contributions

### Contribution Scores

- Isiah: 10
- Jonathan: 10
- Kendrick: 8
- Kristian: 10
- Phillip: 10

### Team Contributions: Checkpoint 1

#### *Executive Summary*

Required roles: full team, collaborative work on a Zoom

- ☒ Isiah
- ☒ Jonathan
- ☒ Kendrick
- ☒ Kristian
- ☒ Phillip
- ☒ Zoe

#### *Main Use Cases*

Required roles: full team, each member writes one passenger use case and one driver use case (asynchronously)

- ☒ Isiah
- ☒ Jonathan
- ☒ Kendrick
- ☒ Kristian
- ☒ Phillip
- ☒ Zoe

#### *Main Data Items & Entities*

Required roles: full team, collaborative work on two Zooms (two sessions split between team members)

- 
- ☒ Isiah
  - ☒ Jonathan
  - ☒ Kendrick
  - ☒ Kristian
  - ☒ Phillip
  - ☒ Zoe

### *Functional Requirements*

Required roles: full team, collaborative work on two Zooms (two sessions split between team members)

- ☒ Isiah
- ☒ Jonathan
- ☒ Kendrick
- ☒ Kristian
- ☒ Phillip
- ☒ Zoe

### *Nonfunctional Requirements*

Required roles: full team, collaborative work on Zoom plus asynchronous contributions (five additional nonfunctional requirements each)

- ☒ Isiah
- ☒ Jonathan
- ☒ Kendrick
- ☒ Kristian
- ☒ Phillip
- ☒ Zoe

### *Competitive Analysis*

Required roles: full team, collaborative work on Zoom plus asynchronous contributions (team worked together on column 1 in both tables and ranked our product together, each team member assigned a competitor to rank against column 1 in each table asynchronously)

- ☒ Isiah

- 
- ☒ Jonathan
  - ☒ Kendrick
  - ☒ Kristian
  - ☒ Phillip
  - ☒ Zoe

### *High-level System Architecture & Tech Used*

Required roles: full team, collaborative work on Zoom

- ☒ Isiah
- ☒ Jonathan
- ☒ Kendrick
- ☒ Kristian
- ☒ Phillip
- ☒ Zoe

### Team Contributions: Checkpoint 2

#### *Creating the application*

Required roles: GitHub Guru, Backend Baron, Team Lead (collaborative work on two Zoom sessions with Backend Baron driving)

- ☒ Isiah
- ☒ Phillip
- ☒ Zoe

#### *Configuring Cloud Instance and Setting Up VM & CloudSQL DB*

Required roles: Release Manager and Team Lead (collaborative work on three Zoom sessions with Release Manager driving, and later, Team Lead driving due to device incompatibility issue (ARM Mac)).

- ☒ Kristian
- ☒ Zoe

#### *Create About Page*

Required roles: Frontend Lead (driving), DB Lead, Release Manager, Team Lead

- ☒ Jonathan

- 
- ☒ Kendrick
  - ☒ Kristian
  - ☒ Zoe

### *Create Team Member Pages*

Required roles: Full team, everyone creates and contributes to their own page,  
Frontend Lead troubleshoots as needed and ensures consistency between pages.

- ☒ Isiah
- ☒ Jonathan
- ☒ Kendrick
- ☒ Kristian
- ☒ Phillip
- ☒ Zoe