

PROJECT PROPOSAL

CSCI5308 | GROUP 15



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Group Project Agenda

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 - 1.1 Background and Study
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1. Introduction and Overview:

1.1 Background Study

“Cabby” is yet another cab application with some added functionalities that differentiates it from existing applications like Uber, Lyft, etc. Our main focus is providing a smooth experience for booking inter-city (outstations) cabs just like other applications provide for intra-city cabs. However, we would be providing both inter-city as well as intra-city cabs.

1.2 Objectives

Cabby has been built with keeping security as the paramount feature. Along with driver’s background verification checks, we also focus on the user’s background verification. Both the driver and user would have to provide a government ID as part of the registration process.

We aim to provide maximum flexibility to users while booking a cab with the help of filters, like a female user can choose to get a female driver if she wants. A user can not only select the class of vehicle like SUV/Sedan/Hatchback like in traditional apps, but they can also select the exact brand and vehicle from our list of available vehicles.

Users can enter pickup, destination, date, and other options like driver choice, car choice, etc. After that, the user will be shown the expected price range and he can choose cab from list of available options.

At last, both users and drivers will have to provide each other with a “star” rating while ending the trip. This would contribute towards getting an overall score for the driver as well as the user so that drivers and users can be matched accordingly. Later, they would be allowed to provide feedback and complaints about the trip.

Our application also has a separate dashboard for drivers to check their total rides and earnings. The driver's earning will be calculated based on the total number of rides and incentives. The driver will complete the target and the company will reduce the commission deducted from the driver. This commission deduction will be treated as an incentive and increase the driver's earnings.

Additionally, customers and drivers can earn points based on rides distance, duration, tasks completion, etc. and later these points can be used with the business partners, booking movie tickets, booking cabs, forwarding points to the friends etc.

2. Requirements and Features:

2.1 Functional Requirements

2.1.1 Admin

- Registration Verification
- Monitor Database Activities

2.1.2 System application (For Back-end logic in some features)

- Offer best possible cab to end user based on multiple parameters like distance, Traffic in that route, Driver's Gender.
- Evaluate price for the ride considering several parameters.

2.1.3 Cab Driver

- Registers on the portal
- Accept payments from users in the form of cash, points, card, and wallets
- Customer can earn points based on rides distance, duration, tasks completion, etc.
- Customer can use points with business partners, booking movie tickets, booking cabs, forwarding points to friends, etc.
- Points can be bought using real money whose price will be decided on the factors: area of service, demand of points in that area, etc.
- The driver and customer will be able to see the history of rides. This feature will display the rides in three option - Daily, Monthly, or Between a specific period

2.1.4 Customer

- Registers on the application
- Book Cab based on different parameters.
- Give ratings to driver at the end of each ride.
- Customer can earn points based on rides distance, duration, tasks completion, etc.
- Customer can use points with business partners, booking movie tickets, booking cabs, forwarding points to friends, etc.
- Points can be bought using real money whose price will be decided on the factors: area of service, demand of points in that area, etc.

2.2 Non-Functional Requirements

- 2.2.1 User's personal credentials are secured with encryptions.
- 2.2.2 Overall responsiveness of our application will meet industry standards.
- 2.2.3 Our application would be user friendly.

2.3 Discussion of the Logics

2.3.1 Registration and Sign in Functionality

Registration

The registration workflow will be kept simple. Customers/driver can simply register themselves by providing simple details like Name, date of birth, contact details, address, and ID proof. ID proofs will be a mandatory requirement and all details would be verified by the admin. After that, user will be eligible to use the product.

The registration workflow for driver will be slightly different wherein he has to give some extra details like driving licence, number of years of experience, his complete car details, area where he will operate etc. Once a driver submits his details, there will be verification checks performed by the admin. After complete verification, a driver will be marked as successfully registered for a given area.

Use Case name		Registration
Actors		Cab driver, Customer, Admin
Preconditions		Customer and driver must provide all required documents for verification, especially an ID proof.
Normal Flow	Description	Admin will register the driver/customer by verifying truthfulness of the information provided based on some background checks.
	Post Conditions	After verification, our application will confirm the registration of a passenger or a driver and create their account and display all account information.
Alternative Flows and Exceptions		If there is any serious criminal record associated with a customer or a driver based on their ID proof, account will have to be manually created based on investigations by a core committee.
Non-functional requirements		Password chosen by the user/driver should not be their first name or email id username.

Sign-in

There will be three sign-in options, one each for customer, driver, and admin. The respective person can login using username and password provided in the registration process. In case someone forgets the password, they can choose to reset the password with the help of their email address for getting a password reset link.

Use Case name		Sign in
Actors		Cab driver, Customer, Admin
Preconditions		Admin, Passenger and Customer must be fully registered.
Normal Flow	Description	Fully registered users would be able to log in using their email address and password.
	Post Conditions	After verification of entered credentials, users would be directed to the home screen of the application.
Alternative Flows and Exceptions		If the entered credentials do not match the ones saved in the database, an “invalid credentials” error message would be displayed, and the user would have to reset the password.
Non-functional requirements		Password encryption and decryption techniques would be used.

2.3.2 Selection of Cab

Cab selection by User/Passenger is an essential component of our project. While booking for a cab there would be multiple points of screening starting from different cab types (sedan, SUV, XUV, premium sedan, etc). Upon selection of specific category, our application will perform some operations to fetch the best possible cab from the lists of cabs available in that location. Some parameters which our application will consider in selection of cabs are:

- Distance of Cab from customer’s location.
- Traffic on that particular route (from user’s current location to cab’s current location). Based on distance and traffic we will find the estimate time of arrival (ETA) of cab.
- Gender preference from customer’s end. For example, a female candidate might prefer a female driver.
- Ratings of Cab Driver and Customer.

Example of showing best available cab:

Scenario 1: Cab 1 is 2 km away from user’s location, however, there is a lot of traffic in that route.

Scenario 2: Cab 2 is 3 km away from user’s location, however, there is no traffic in that route.

So, from above scenario’s our system will suggest the customer to book Cab 2 as it will reach faster at user’s current location. Upon fetching most nearby

cabs, customer will further have an option of screening on parameters like gender, age, ratings etc.

Use Case name		Selection of Cab
Actors		Cab driver, Customer
Preconditions		Customer and cab driver must be registered on application
Normal Flow	Description	Customer will choose his/her preferred cab and based on which we will get list of cabs which can arrive at the pickup location.
	Post Conditions	After performing set of operations our application will show the best possible cab near our location.
Alternative Flows and Exceptions		If two cabs show similar outcomes, then customer should book the cab based on driver's rating and gender preference.
Non-functional requirements		Performance, security, responsiveness. Our application will fetch best possible cabs in shortest time period.

2.3.3 Price Calculator

We all know price is an important aspect from every customer's perspective. Everyone looks around for cheaper things so, following the same mindset after fetching the cab, our application will calculate the best possible price for the ride. There are several factors on which our application will calculate fare of the ride:

- Distance between source and destination (For every ride fixed 'x' dollars would be charged for first 3 kms and thereafter 'y' dollars per km. Additional 25% charge would levy on fixed rates for night rides between 11:00 pm to 5:00 am.).
- Time taken to complete the distance (Fixed 'z' dollars/cents would be charged per minute throughout the journey).
- Time of booking rides. (If someone books ride during peak hours like office hours than price of booking will increase as demand of cabs at peak hours is higher. Fix 20% extra would be charge when demand of cabs increases from a certain threshold value).
- Location of the traveller. (For metro cities prices would be bit higher as compared to countryside areas)
- Do a passenger prefer to share their ride with Co-passenger (If yes than it will reduce total fare by 'x' percent).

- f. Do a passenger wants Internet and Car TV during ride (Fare would increase by fixed 'x' dollars for a specific time interval. For example, \$2 would be charged extra per 30 minutes of ride).

Use Case name		Price Calculator
Actors		Application, Passenger, Cab driver
Preconditions		Passenger and Cab driver must be registered on application
Normal Flow	Description	Customer will give their destination and based on which our application will calculate fare of the ride based on several parameters like distance, time of ride, location, etc.
	Post Conditions	Application will display the final price of the ride. Upon completion of ride customer will do payment to cab driver which will be accepted in different forms i.e., cash, points, cards. etc.
Alternative Flows and Exceptions		If in case our taxi damages during the ride than our system would arrange new taxi for the passenger and reduce the total fare by 'x' percentage.
Non-functional requirements		The price calculation would follow all the security norms.

2.3.4 Income of Driver

The drivers can check their earnings using this feature. Below are the parameters that will affect the earnings:

1. Total Rides,
2. Incentives based on – number of rides, number of kilometres, number of hours etc.

Logic:

The actor is paying a commission to the company based on completed rides. There will be a daily target that can add incentives as reduction in commission. Suppose company is taking 20% commission, the drivers will pay less commission to the company if they complete any one of the following targets:

- i. Completed specified number of rides,
- ii. Completed specified number of kilometres,
- iii. Completed specified number of hours on one ride.

The system will connect to the database and check all the ride details based on input given by the Actor. The final calculation will be displayed on the screen.

Incentive Table based on Targets:

Target (Per day)	Commission Charged
No target completed	20%
If total rides > 8 or Distance travelled > 200 KM/Day or Hours of trip > 6 Hr/day	18%
If total rides > 10 or Distance travelled > 250 KM/Day or Hours of trip > 7 Hr/day	16%
If total rides > 12 or Distance travelled > 300 KM/Day or Hours of trip > 8 Hr/day	15%

Use Case Name		Income of driver
Actors		Driver
Preconditions		The actor must be registered in the system
Normal Flow	Description	The actor must login with his/her id, provide the date, month, or period for which earnings details are required, then click enter.
	Postconditions	The system will retrieve the total earnings of driver for that date, month, or period based on the number of rides completed and incentives.
Alternative flows and expectations		When no rides are available for the selected period, the system must inform the actor that there were no rides.
Non-Functional Requirements		The system will provide the options to actor to get their earnings on daily, monthly, or specific period basis.

2.3.5 Display the list of Rides

The user will be able to see the list of completed rides. This feature will have the below options to see the list of rides:

1. Daily
2. Monthly
3. Select a period.

Logic:

The user can select the option “Show Rides” after logging into the system. The system will check the rides in the database for the specified period and will display the result.

Use Case Name		Display the list of rides
Actors		Driver, Customer
Preconditions		The actor must have been registered in the system
Normal Flow	Description	The actor must login with his/her id, provide the date, month, or period for which ride details are required, then click enter.
	Postconditions	The system will retrieve the list of rides completed by the actor for the entered date, month, or period.
Alternative flows and expectations		When no rides available for the selected period the system must inform the actor that there were no rides.
Non-Functional Requirements		The system will display the rides in orderly manner

2.3.6 Virtual Points

Our application will have virtual points system too along with real currency for transactions. These points can be earned and used by both the Users and Drivers.

Earning points:

To earn points there will be tasks for both the users and drivers to complete and targets to achieve.

For Drivers:

- Drivers will have to complete certain targets to get the points.
- Rating will also impact the points earning.
- Drivers can earn the points in the tip also where the customer will select to tip the driver in points and those points will be transferred to the Driver's account.
- Drivers can also convert the points into money whose value will be calculated based on number of points need to be converted, actual price of points at the time, driver rating, driver service.

For Customers:

- Customers can earn the points by completing certain tasks created based on their personal preferences and routine.
- Completing certain number of rides will also add some points into their account.
- Points can be bought with real money (Connected to payment Feature).
- Price of points will be generated based on areas, currency value, profit in that area.
- User can gift or transfer the points to other users and can also use the points to book their rides.
- Special discounts will be generated based on the points usage, area of service, customer density as incentives to buy or earn more points.

Common:

- Both driver and customer can use the points with the business partners (Like: Walmart, Atlantic) or for booking movies tickets, etc.
- Actual value of points can vary with the area of service and many other factors.
- Discounts on the points will be generated based on customer density in that area, demand of points (if the demand is low then the discounts will be more to make people adapt with point system), Value of points in that area.

Waiting Time Games:

- Customers will have an option to play games while waiting for the cabs or during their travel. Games will be designed for single or multi players (example: Sudoku (single player), Ticktacktoe (Multi player))
- User can earn points while playing these games.

Use Case Name		Earn Points
Actors		Customer
Preconditions		Complete the rides and/or complete the tasks
Normal Flow	Description	Actor will get points which will be calculated based on rides, distance travelled, rating, games played etc.
	Postconditions	Points will be added to the users account and can be used for booking rides, with the business partners, for booking tickets, transferring to a friend, etc.
Alternative flows and expectations		Actor cancelled the ride, or the rating of actor is too low then the points will not be added.
Non-Functional Requirements		Discounts should apply to the purchases through points automatically and notified to the actor.

Use Case Name		Earn Points
Actors		Driver
Preconditions		Completed certain years/ Special occasion/ completed the ride.
Normal Flow	Description	Actor will get the points which will be calculated based on the number of years served for the company, rating maintained, special occasions like anniversary/ birthday.
	Postconditions	Points will be added to the users account and can be used for Converting to cash, with the business partners, for booking tickets, transferring to a friend, etc.
Alternative flows and expectations		Actor cancelled the ride, or the rating of actor is too low then the points will not be added.
Non-Functional Requirements		For converting the points into cash, the current price will be automatically applied with tax.

Use Case Name		Consume Points
Actors		Customer, Driver
Preconditions		Points should be present in the account and sufficient for the purchase
Normal Flow	Description	Actor will get offers and vouchers in application to buy with the points. Actors can also pay for the ride with those points.
	Postconditions	Points will be reduced from the account of actor after using.
Alternative flows and expectations		Actor can cancel the purchase and in certain cases can also revert the purchase. In that case the amount will be added back to the actor's account.
Non-Functional Requirements		Amount deducted and reverted should be the same irrespective of the market value of points.

Use Case Name		Buy Points with money
Actors		Customer, Driver
Preconditions		Payment options should be accepted
Normal Flow	Description	Actors can buy the points with real money and the conversion will be based on the market value set for the points. This value can be based on the area of service, customer density, profit, etc.
	Postconditions	Points will be added to the customer account after purchase is confirmed with the bank.
Alternative flows and expectations		Actor can cancel the purchase and in certain cases can also revert the purchase. In that case the amount will be added back to the actor's account.
Non-Functional Requirements		Amount deducted and reverted should be the same irrespective of the market value of points.

2.3.7 Star Ratings and Score

Every driver and user are unrated and unscored upon registering. They are given 10 rides to get familiar with the rating and scoring process and then they are given an initial rating and score of 4.0 out of 5.0. Maintaining their overall score is totally dependent upon themselves. The drivers and the users have an option of giving each other a 'star' rating out of 5 after every ride. These star ratings do not have any metric attached to them; they are given based on the overall experience. The overall star rating is the average number of stars received after every ride. Also, these star ratings affect the overall score.

A user and driver are matched with each other based on their overall scores. Our aim is to match the driver with an overall score equal to or more than the overall score of a user. Suppose a user with an overall score of 4.4 is trying to book a cab, then we aim to match a driver with a score equal to or more than 4.4. A driver can get a user with a score less than their overall score, but the reverse is not true.

The scoring process:

For Driver:

Arrival/Drop before the last minute of estimated time: +0.2

Arrival/Drop within the last minute of estimated time: +0.1

Arrival/Drop after the estimated time: -0.1 for every additional 2 minutes

5-star rating from the user: +0.3

4-star rating from the user: +0.1

3-star rating from the user: -0.1
2-star rating from the user: -0.3
1-star rating from the user: -0.5
Cancellation after accepting the ride and before reaching the pick-up point: -0.1
Cancellation after accepting the ride and reaching the pick-up point: -0.5

For User:

Boarding the cab within 1 minute of its arrival: +0.2
Boarding the cab within 1-2 minutes of its arrival: +0.1
Boarding the cab after 2 minutes of its arrival: -0.1 for every additional minute
5-star rating from the driver: +0.3
4-star rating from the driver: +0.1
3-star rating from the driver: -0.1
2-star rating from the driver: -0.3
1-star rating from the driver: -0.5
Cancellation after driver's arrival: -0.5
Cancellation before driver's arrival: -0.2
Cancellation within 1 minute of booking the ride: -0.1

Logic:

Backend:

Sum of all Star received (S) = (From the Database)
Total Number of Rides (N) = (From the Database)

Overall Star Rating = Sum of all Stars received (S) / Total Number of Rides (N)

Star Rating Received (NS) = Received from user/driver after every ride
Updated Overall Star Rating (US) = $(S + NS) / (N + 1)$

Overall Score (score) = (From the Database)
Updated Score (new score) = score + or - score points received as per performance

Frontend:

"Please give Star Rating"
>> NS

Overall Star Rating = US
Overall Score = new score

2.3.8 Deregistration of a Driver

- Average star rating less than 2.0 for 20 consecutive rides or one month, whichever is earlier.
- Overall Score less than 2.5 for 20 consecutive rides or one month, whichever is earlier.
- Breaking of laws while driving (we will get to know about this with the help of their license numbers):
- Drink and Drive: Immediate deregistration of the driver.
- Over speeding: Deregistration after 3 tickets.
- Red light jump: Deregistration after 3 tickets.
- Breaking of any other law: Deregistration subjective to a collective decision of a core committee.
- Non-settlement of cash receipts based on the contract: Deregistration subjective to the outcomes of an immediate investigation by a core committee.
- Safety-related complaints from users: Deregistration subjective to the outcomes of an immediate investigation by a core committee.

2.4 Mock-ups

2.4.1

**** CAB BOOKING APPLICATION ****

For Registration:

Choose an option to proceed: 1. Enter as an Admin 2. Enter as a Driver 3. Enter as a Customer >> User Selected 1	Choose an option to proceed: 1. Enter as an Admin 2. Enter as a Driver 3. Enter as a Customer >> User Selected 2	Choose an option to proceed: 1. Enter as an Admin 2. Enter as a Driver 3. Enter as a Customer >> User Selected 3
Choose an option to proceed: 1. Sign in 2. Sign up >> User Selected 2	Choose an option to proceed: 1. Sign in 2. Sign up >> User Selected 2	Choose an option to proceed: 1. Sign in 2. Sign up >> User Selected 2
Register as an Admin: Enter Employee ID: Enter First Name: Enter Last Name: Enter Address: Enter Contact Details: Enter Email Address: Enter Password: Register (Yes/No):	Register as a Driver: Enter First Name: Enter Last Name: Enter Address: Enter Contact Details: Enter Email Address: Enter Password: Enter Car Details: Enter Driver License: Enter ID Proof Number: Register (Yes/No):	Register as a Customer: Enter First Name: Enter Last Name: Enter Address: Enter Contact Details: Enter Email Address: Enter Password: Register (Yes/No):

2.4.2

For Login:		
Choose an option to proceed: 1. Enter as an Admin 2. Enter as a Driver 3. Enter as a Customer >> User Selected 1	Choose an option to proceed: 1. Enter as an Admin 2. Enter as a Driver 3. Enter as a Customer >> User Selected 2	Choose an option to proceed: 1. Enter as an Admin 2. Enter as a Driver 3. Enter as a Customer >> User Selected 3
Choose an option to proceed: 1. Sign in 2. Sign up >> User Selected 1	Choose an option to proceed: 1. Sign in 2. Sign up >> User Selected 1	Choose an option to proceed: 1. Sign in 2. Sign up >> User Selected 1
Login as an Admin: Select an option: 1. Sign In 2. Sign Up >> User Selected: 1 Enter your credentials: Username: user@gmail.com Password: ***** >> Sign in Successful **** Main Menu **** Choose an option to proceed: 1. Account Information 2. Add Cabs 3. Verify Drivers 4. Logout	Login as a Driver: Select an option: 1. Sign In 2. Sign Up >> User Selected: 1 Enter your credentials: Username: user@gmail.com Password: ***** >> Sign in Successful **** Main Menu **** Choose an option to proceed: 1. Account Information 2. Display Earnings 3. Display Rides 4. Confirm Booking 5. Logout	Login as a Customer: Select an option: 1. Sign In 2. Sign Up >> User Selected: 1 Enter your credentials: Username: user@gmail.com Password: ***** >> Sign in Successful **** Main Menu **** Choose an option to proceed: 1. Account Information 2. Book Rides 3. Display Rides 4. Logout

2.4.3

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**** CAB BOOKING APPLICATION ****

CAB SELECTION

Select Cab type
1. Sedan
2. XUV
3. Premium Sedan
>>> User Selected : 2

Based on your preference we found 3 fastest reaching Cabs at your location.
(Cab-1, Cab-2, Cab-3)

Do you further want to apply filters ?
1. Yes
2. No
>>> User selected : 1

Choose the filter type
1. Gender and Age
2. Ratings
>>> User selected : 1

Select the gender and age of cab driver
1. Male and (18< Age < 45 )
2. Male and (45 <Age <60)
3. Female
>>> User selected : 3

Thanks for your Inputs !!!
Hold on we are fetching Cabs .....!

Woo-hoo ( Your Cab: Cab-2 is arriving in few minutes )

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2.4.4

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**** CAB BOOKING APPLICATION ****

PRICE CALCULATOR

Enter Destination
>>> Passenger entered : Halifax

Do you want to share this ride with someone
1. Yes
2. No
>> User selected : 2

Do you want Internet and Car TV facility during your ride.
1. Yes
2. No
>> User selected : 2

Wait a minute we are calculating fare for your ride.....!!

Total fare : $10
We wish you happy and safe journey ..!!
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2.4.5

```
***** Earnings Menu *****
1. Daily Earnings
2. Monthly Earnings
3. Earnings between a specific period
0. Return to the main menu
Please enter a selection: 1

Enter the date in DD/MM/YYYY format: 01/04/2021

Total earnings on 01/04/2021 is $ <value>

***** Earnings Menu *****
1. Daily Earnings
2. Monthly Earnings
3. Earnings between a specific period
0. Return to the main menu
Please enter a selection: 2

Enter the month in MM/YYYY format: 04/2021

The total earnings in 04/2021 is $ <value>

***** Earnings Menu *****
1. Daily Earnings
2. Monthly Earnings
3. Earnings between a specific period
0. Return to the main menu
Please enter a selection: 3

Enter the start date (DD/MM/YYYY): 01/04/2021
Enter the end date (DD/MM/YYYY): 20/05/2021

Total earnings between 01/04/2021 and 20/05/2021 is $<value>
```

2.4.6

**** Rides Menu ****

1. Daily Rides
2. Monthly Rides
3. Rides between a specific period
0. Return to the main menu

Please enter a selection: 1

Enter the date in DD/MM/YYYY format: 01/04/2021

Ride Details →

Ride -> 1, Pickup -> S1, Destination -> T1, Price -> <value>, Status = Completed

**** Rides Menu ****

1. Daily Rides
2. Monthly Rides
3. Rides between a specific period
0. Return to the main menu

Please enter a selection: 2

Enter the month in MM/YYYY format: 04/2021

Ride Details →

Ride -> 1, Pickup -> S1, Destination -> T1, Price -> <value>, Status = Completed

Ride -> 2, Pickup -> S2, Destination -> T2, Price -> <value>, Status = Completed

**** Rides Menu ****

1. Daily Rides
2. Monthly Rides
3. Rides between a specific period
0. Return to the main menu

Please enter a selection: 3

Enter the start date (DD/MM/YYYY): 01/04/2021

Enter the end date (DD/MM/YYYY): 20/04/2021

Ride Details →

Ride -> 1, Pickup -> S1, Destination -> T1, Price -> <value>, Status = Completed

Ride -> 2, Pickup -> S2, Destination -> T2, Price -> <value>, Status = Completed

Ride -> 3, Pickup -> S3, Destination -> T3, Price -> <value>, Status = Completed

3. Tools and Technologies Used

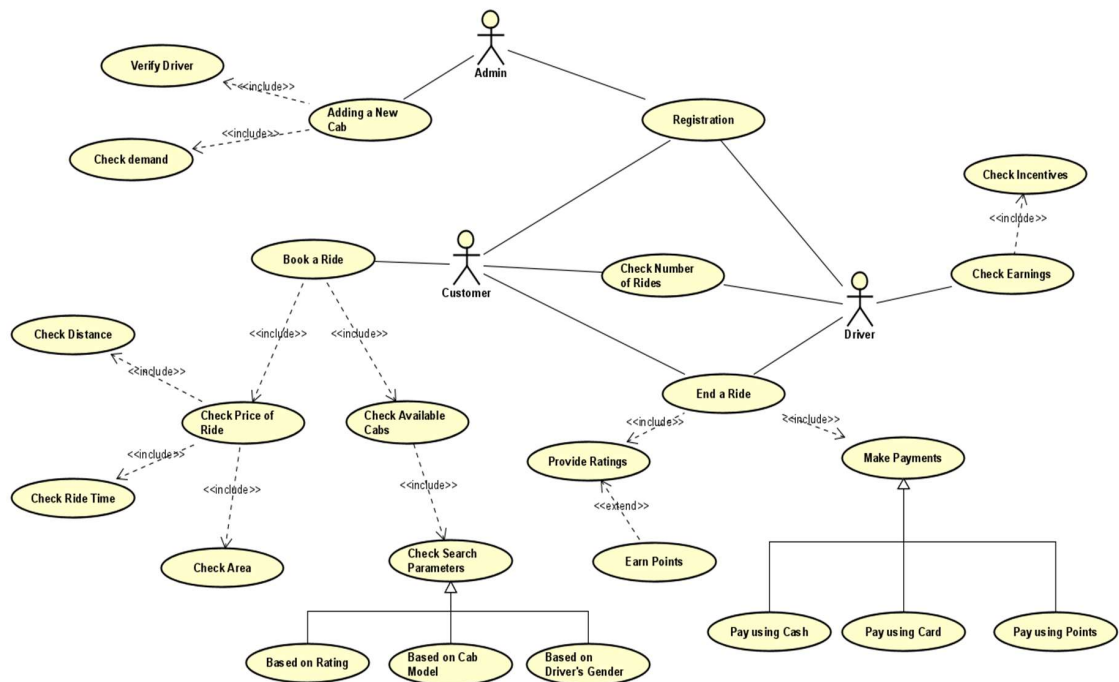
3.1 Software Interface

Software	Description
Java	It is an Object-oriented programming language and used with SOLID principles in our project.
My SQL	MySQL provides data persistency in this project.
GitLab	It is used to maintain the commits of all the team members at branch level.
Jira	It is used to track User Stories and tasks in the Sprints
Operating System	Windows, Mac

3.2 User Interface

Tool	Description
Command Line	Our application results will be displayed on Command Line tool

4. Logical Flow of Application (Using Use Case Diagram)



5. Project Plan

