Advance Software Engineering (CS 5910)

Project Title: CARPOOL ARRANGEMENT SYSTEM

Design Document

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Team C:

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1. Overview of Document

This document describes the design of carpool arrangement system. This document includes the class diagram of the entire system, interactive diagram, CRC diagram and Deployment diagram. The class diagram depicts the classes involved in the system and the relationship among them. The interactive diagram depicts the activities that take place in the system between the classes or components of the system. The CRC diagram shows the responsibilities of each class corresponding to the system. The deployment diagram depicts the overall structure of the communication that takes place in the application. At last, the document describes the milestones and responsibilities of teammates in handling the application. Tool used to draw elements of design diagrams is Astah Community.

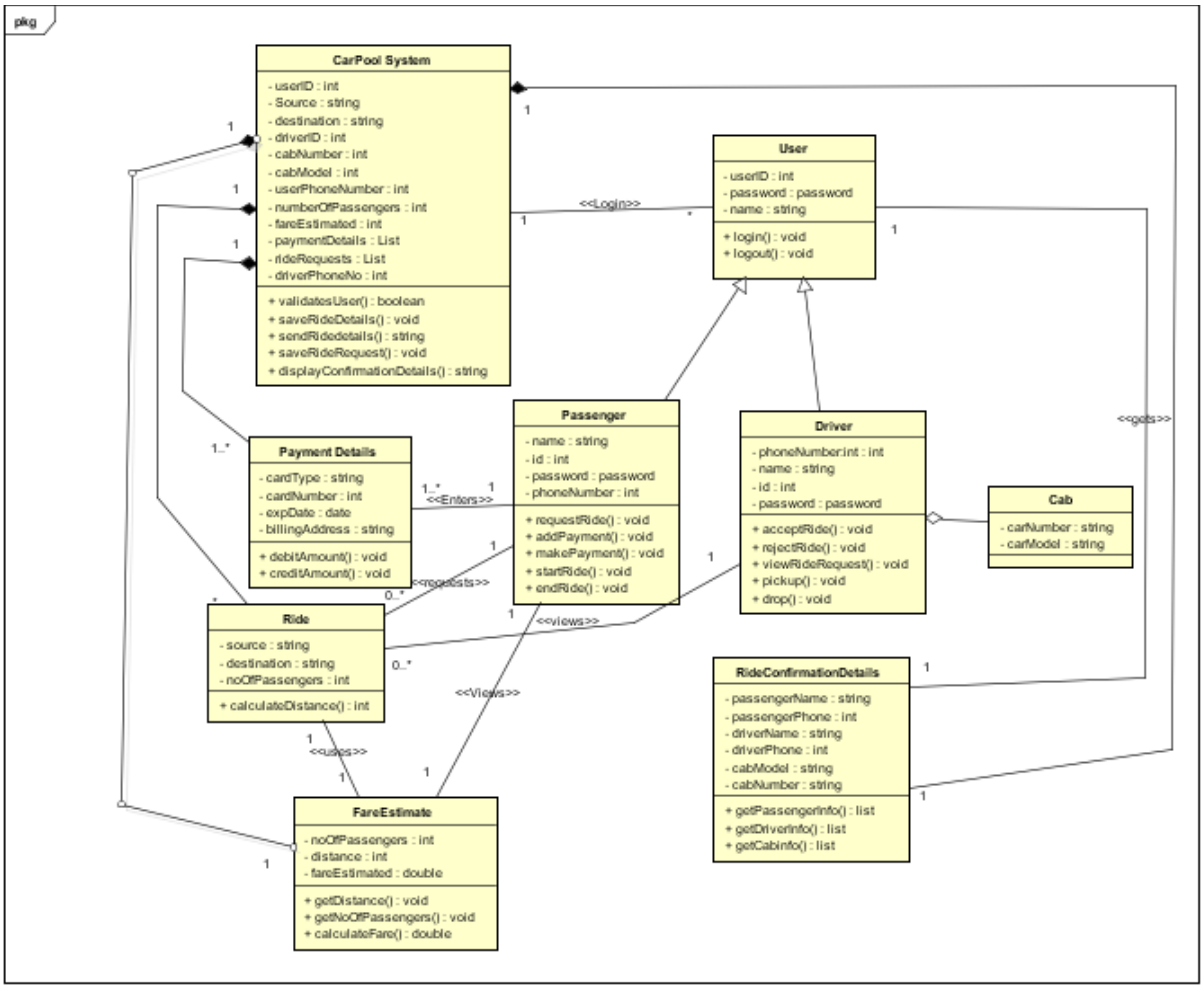
This application allows the passenger to request for a ride. And the driver accepts the request and checks for other requests till the capacity of the cab is reached. The applications display the estimated amount for the ride. In this system, the passenger shares the ride with other passengers requesting the ride in the same direction. The passenger confirms the ride by making the payment and application send the ride confirmation details. Once the ride is confirmed, the cab driver picks the passenger from the requested pickup location and drops at the destination. The application also provides the option to rate the driver. The above workflow is depicted in this document in the form of various diagrams.

2. Elements of Design

2.1. Complete Class Diagram

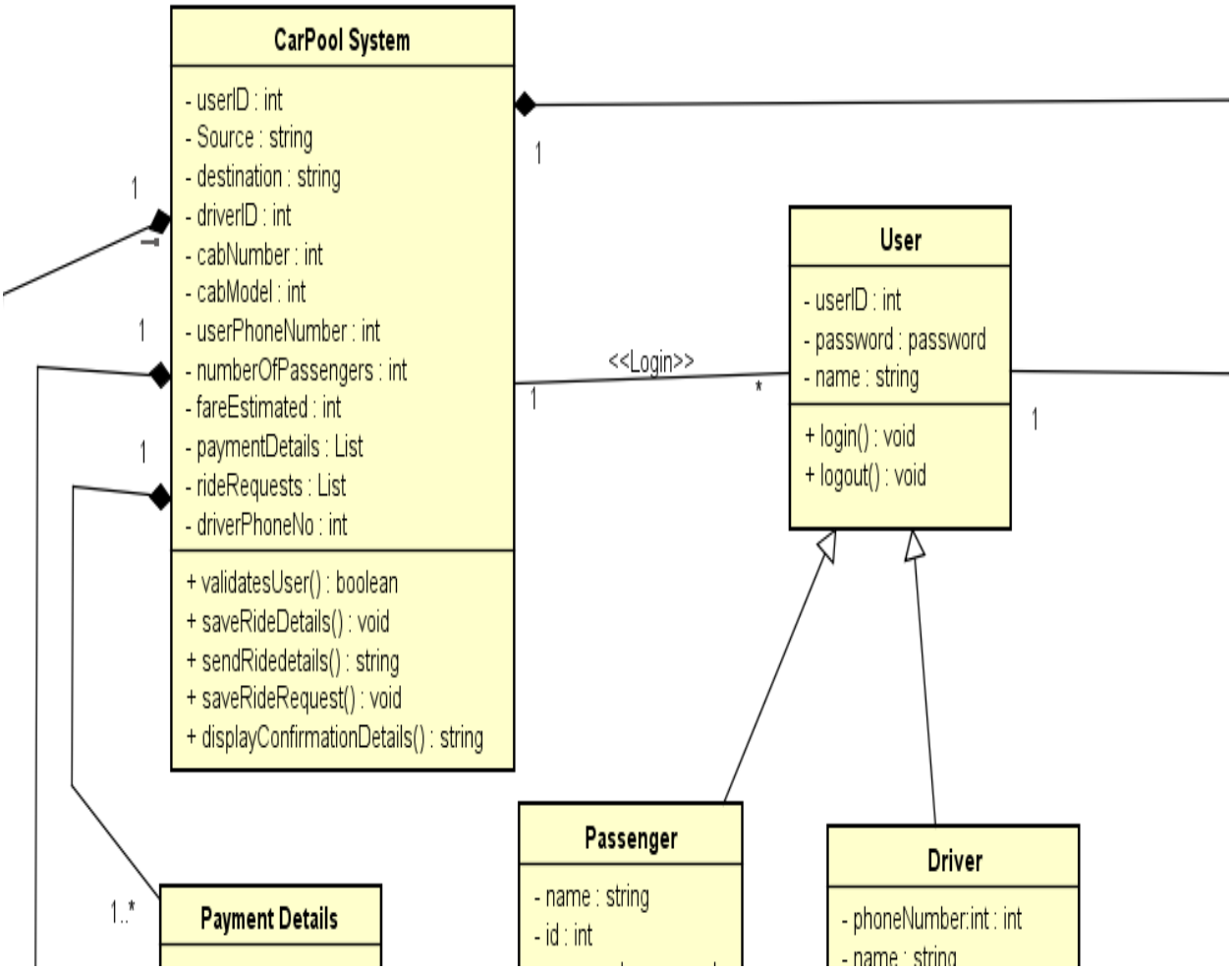
The SOLID principle that used here is dependency inversion principle where the major working of the system depends on the low-level classes and at one stage single responsibility principle is used to do some functionality (fare estimate and Ride Confirmation Details) to reduce the burden of classes.

The Design Pattern used in the system is Abstract Factory design pattern in which objects are created accordingly based on the utility of a class. Abstract design pattern delegates the responsibilities of object instantiation to another object via composition.

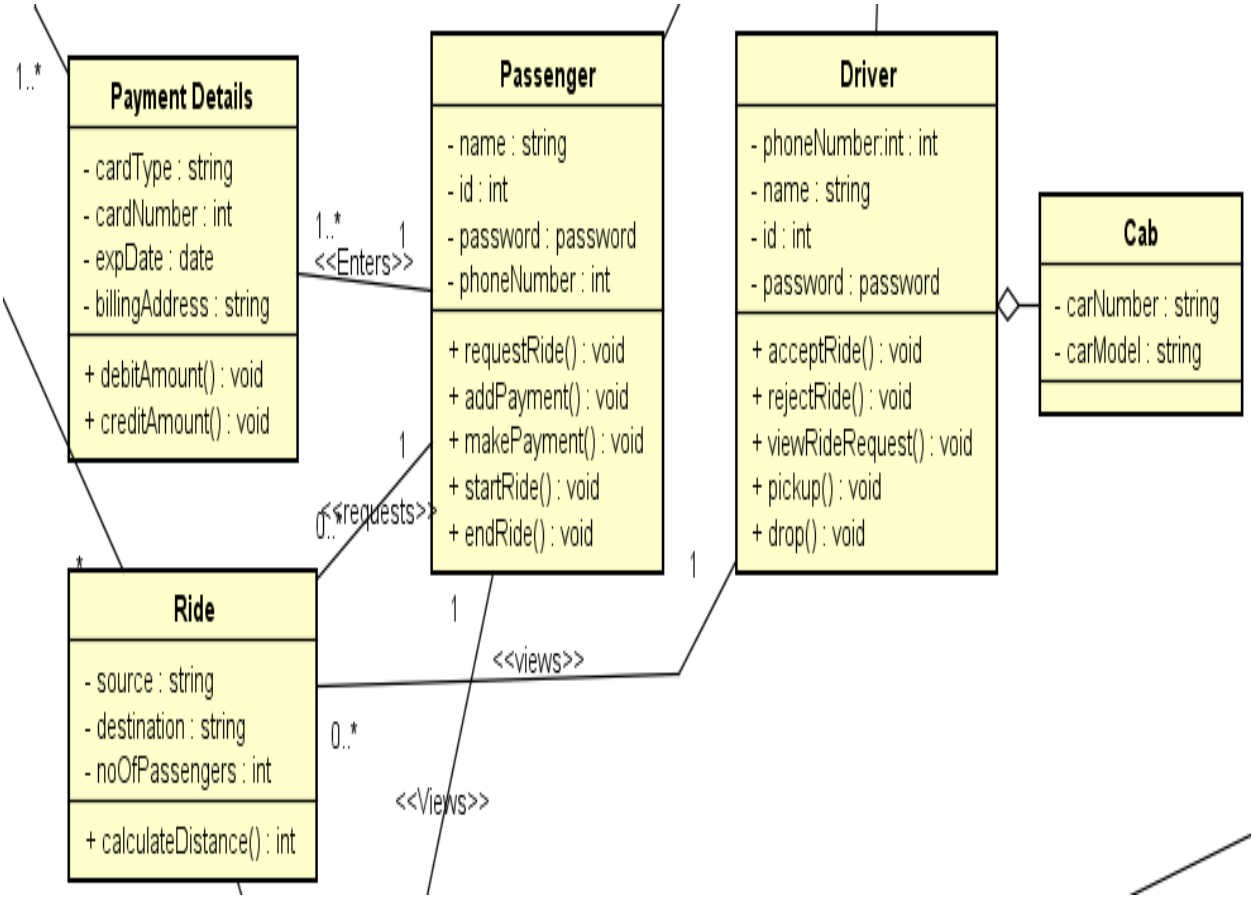


The above diagram is split into three parts for better clarity.

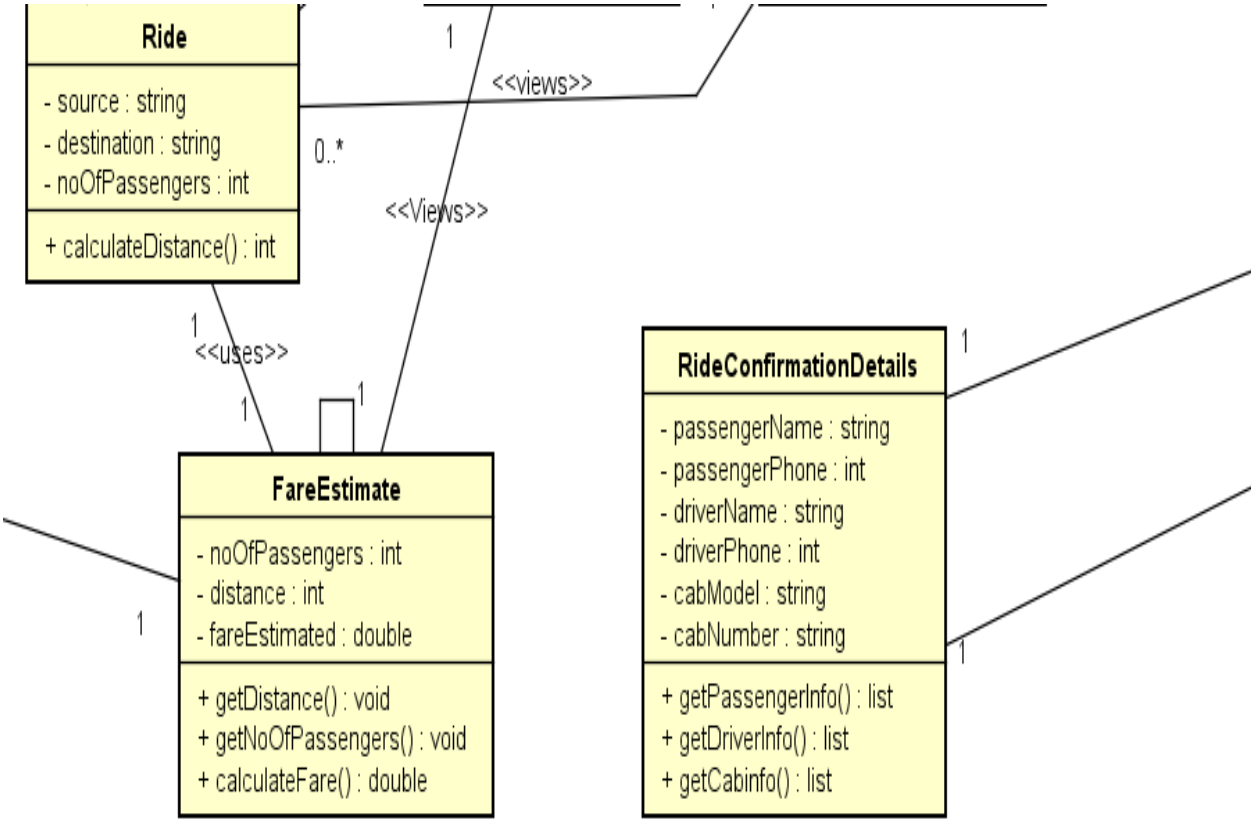
Part 1:



Part 2:


Payment Details
- cardType : string
- cardNumber : int
- expDate : date
- billingAddress : string
+ debitAmount() : void
+ creditAmount() : void
Passenger
- name : string
- id : int
- password : password
- phoneNumber : int
+ requestRide() : void
+ addPayment() : void
+ makePayment() : void
+ startRide() : void
+ endRide() : void
Driver
- phoneNumber:int : int
- name : string
- id : int
- password : password
+ acceptRide() : void
+ rejectRide() : void
+ viewRideRequest() : void
+ pickup() : void
+ drop() : void
Cab
- carNumber : string
- carModel : string
Ride
- source : string
- destination : string
- noOfPassengers : int
+ calculateDistance() : int
1..*
1
<<Enters>>
1
0..*
<<requests>>
1
<<views>>
0..*
<<Views>>

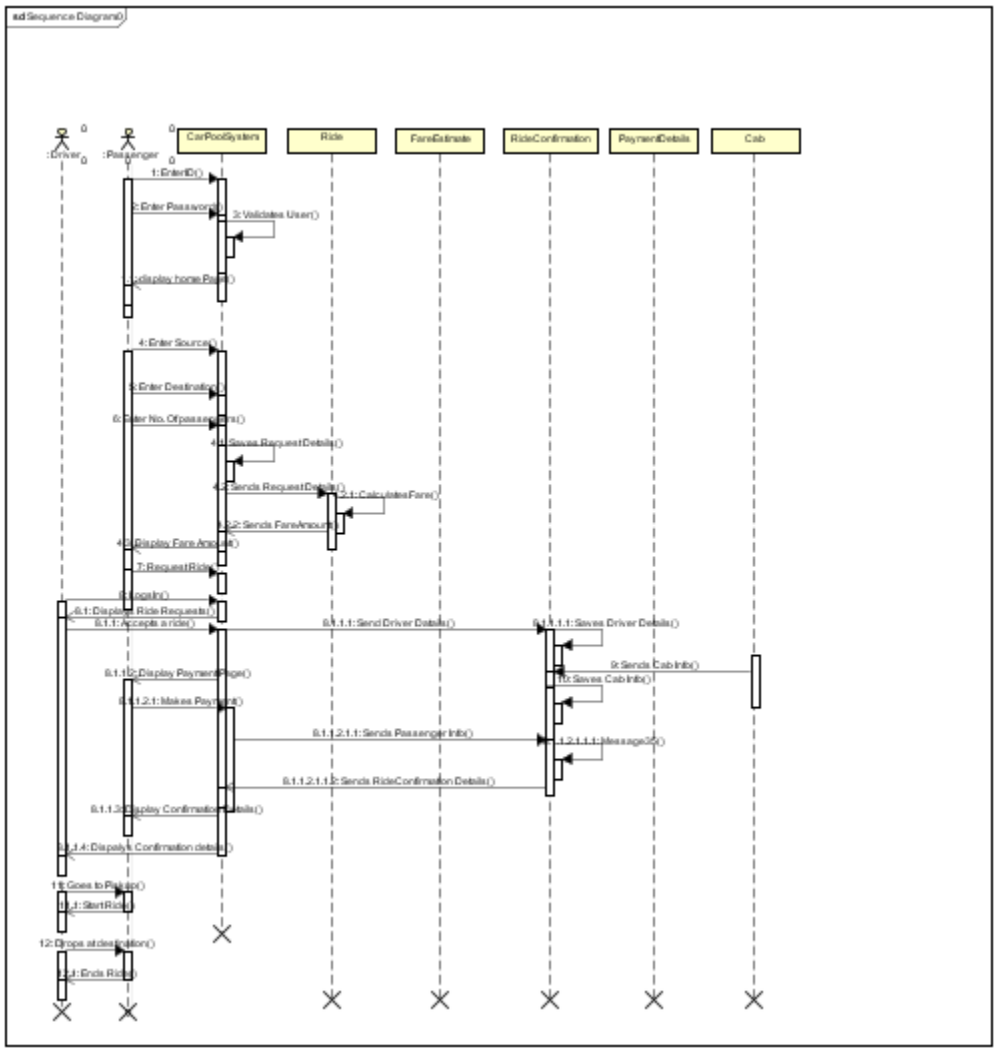
Part 3:


Ride
- source : string
- destination : string
- noOfPassengers : int
+ calculateDistance() : int
1
<<views>>
0..*
<<Views>>
1
<<uses>>
1
1
FareEstimate
- noOfPassengers : int
- distance : int
- fareEstimated : double
+ getDistance() : void
+ getNoOfPassengers() : void
+ calculateFare() : double
1
RideConfirmationDetails
- passengerName : string
- passengerPhone : int
- driverName : string
- driverPhone : int
- cabModel : string
- cabNumber : string
+ getPassengerInfo() : list
+ getDriverInfo() : list
+ getCabinfo() : list
1
1

2.2. Interactive Diagram

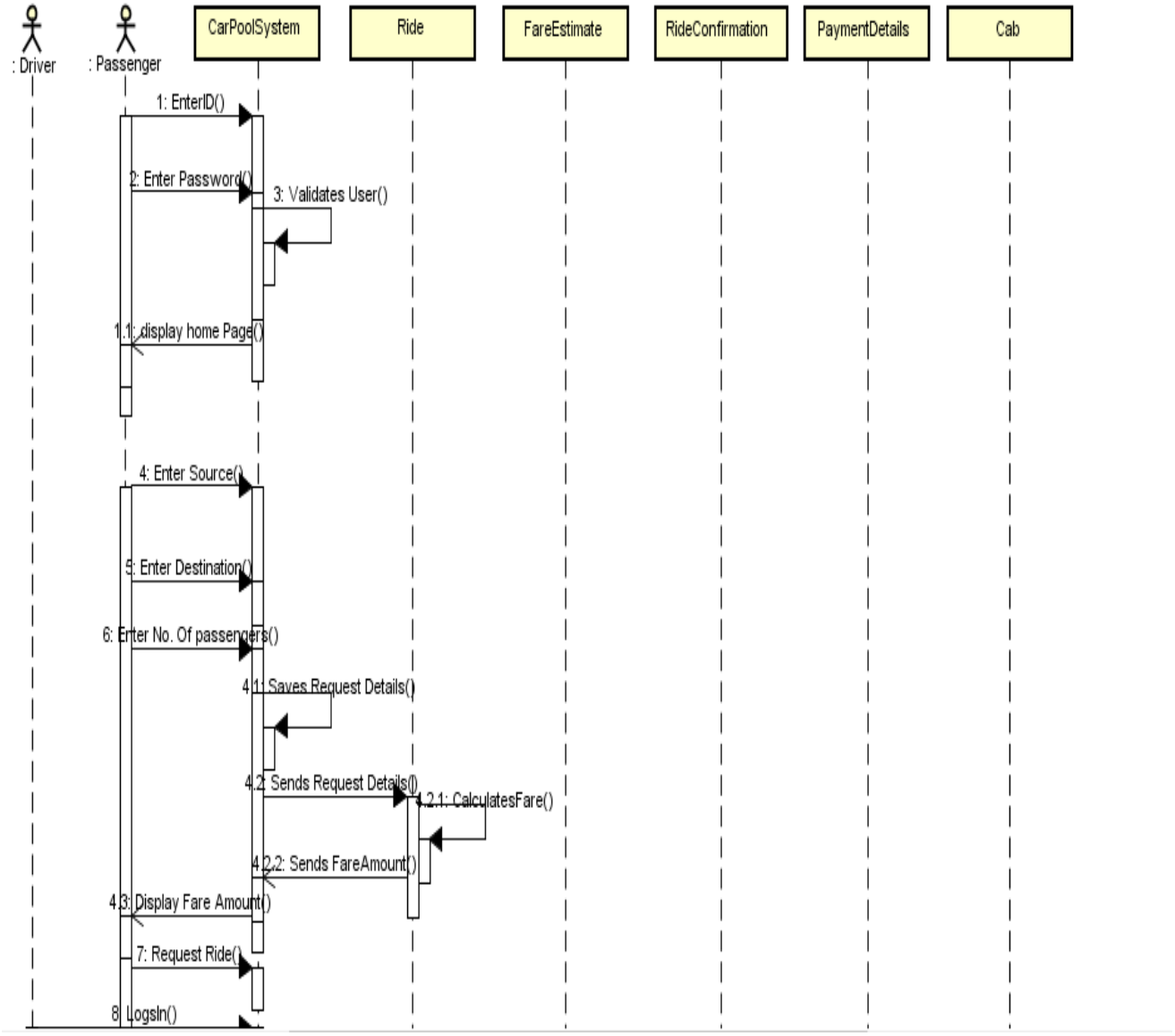
Sequence Diagram

The below sequence diagram shows the steps that are performed in using the system, right from the user login, booking a ride, to taking a ride.

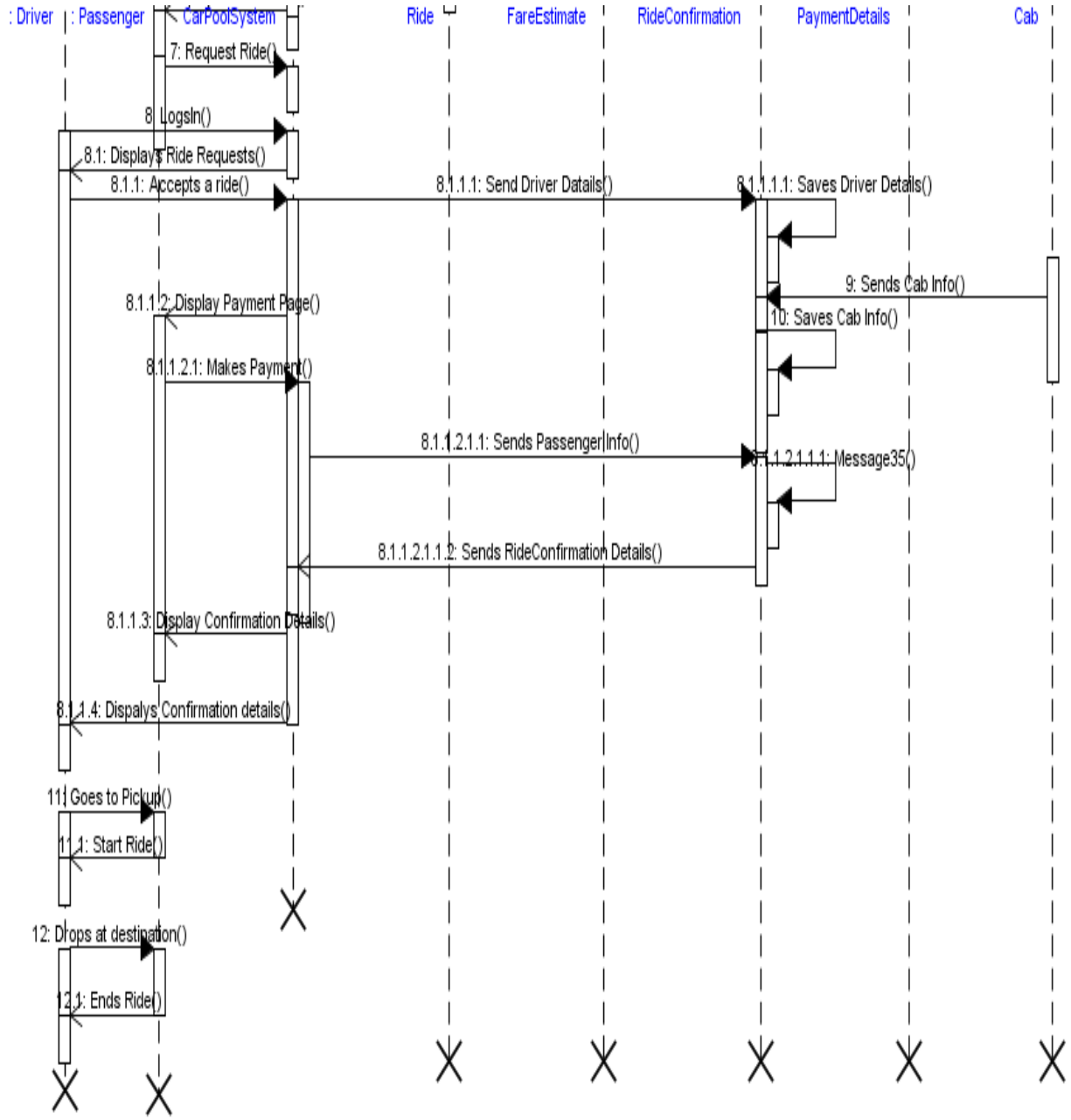


The above diagram is divided into two parts for better clarity.

Part 1:



Part 2:


: Driver
: Passenger
CarPoolSystem
Ride
FareEstimate
RideConfirmation
PaymentDetails
Cab
7: Request Ride()
8: LogsIn()
8.1: Displays Ride Requests()
8.1.1: Accepts a ride()
8.1.1.1: Send Driver Datails()
8.1.1.1.1: Saves Driver Details()
9: Sends Cab Info()
10: Saves Cab Info()
8.1.1.2: Display Payment Page()
8.1.1.2.1: Makes Payment()
8.1.1.2.1.1: Sends Passenger Info()
8.1.1.2.1.1.1: Message35()
8.1.1.2.1.1.2: Sends RideConfirmation Details()
8.1.1.3: Display Confirmation Details()
8.1.1.4: Dispalys Confirmation details()
11: Goes to Pickup()
11.1: Start Ride()
12: Drops at destination()
12.1: Ends Ride()

2.3 Class-Responsibility-Collaboration

This shows the responsibilities of a class and Collaboration a class with other classes to perform the responsibilities.

CarPoolSystem	
Responsibilities:	Collaborators:
Validates the user Saves the source, destination and number of passengers Displays estimated fare amount to the passenger Saves the payment method entered by the passenger Completes the transaction via saved payment method Shows list of ride requests to driver Sends ride confirmation details to the passenger and driver	Passenger Driver Ride FareEstimate RideConfirmationDetails PaymentDetails

Passenger	
Responsibilities:	Collaborators:
Login into the system Enter ride details Request ride details Adds payment method Makes the payment Takes the ride	CarPoolSystem Ride PaymentDetails Driver

Driver	
Responsibilities:	Collaborators:
Login into the system Accepts a ride from the list of available ride requests Pickups and drops the passenger	CarPoolSystem Ride Passenger

Ride	
Responsibilities:	Collaborators:
Gets Source, destination and number of passengers from CarPoolSystem and saves them Calculates the distance Sends distance and number of passengers to fare estimate	CarPoolSystem Passenger Driver FareEstimate

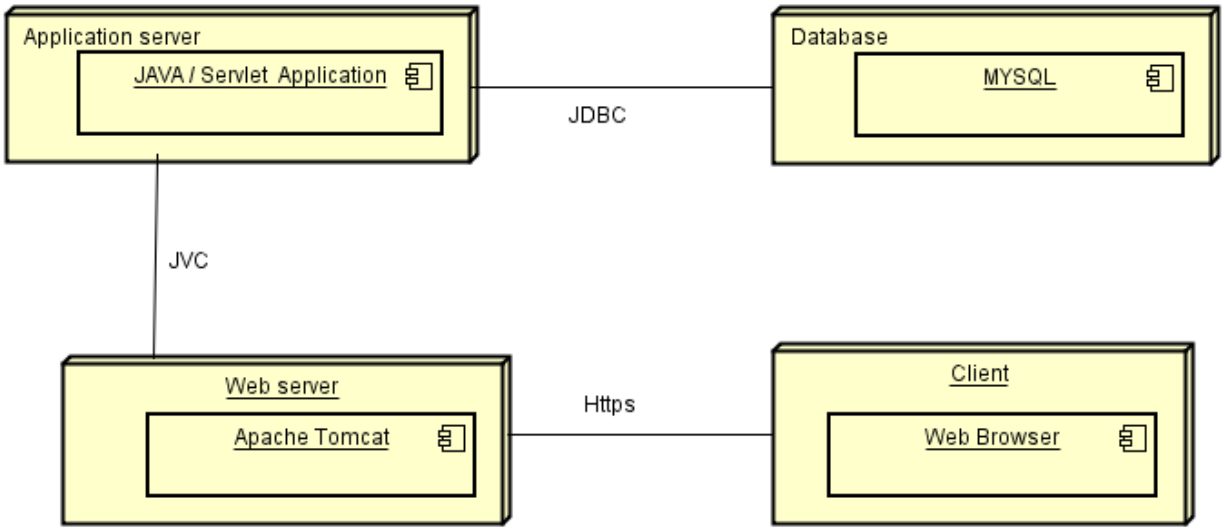
FareEstimate	
Responsibilities:	Collaborators:
Takes the distance and number of passengers from the Ride and calculates the fare. Sends estimated fare amount to the car pool system	CarPoolSystem Ride

RideConfirmationDetails	
Responsibilities:	Collaborators:
Gets driver details, passenger details, cab details and save them Sends the ride confirmation details to the carpool system	CarPoolSystem Passenger Driver

PaymentDetails	
Responsibilities:	Collaborators:
Adds the payment method Saves the payment method Sends the saved payment method to the carpool system	CarPoolSystem Passenger

2.4 Deployment Diagram

All users can use the system using a web browser. Web browser communicates with the web server that uses apache tomcat, through HTTP protocol. Web server then communicates with the application server that uses JAVA or servlet for communication. Then Application server communicates the MYSQL database for the data.



3. Schedules and Milestones

Design Document	-	11/04/2018
Implementation	-	11/15/2018
User Acceptance Testing	-	11/ 17/2018
Deployment	-	11/25/2018
Final release with bug fixing	-	12/09/2018

4. Teammate Responsibility

Rajesh Reddy Burra - developing the front end of the application, implementation, and documentation

Baldev Yellapu - developing the backend of the application, implementation and documentation.