

# Sri Lanka Institute of Information Technology



## Assignment 1

MLB\_03.01\_05

# Vehicle Rental System

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Information Systems and Data Modeling– IT1090

B.Sc. (Hons) in Information Technology

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# Project Tasks 1

**A.**

## **Hypothetical Scenario**

The objective of the project is to build a web-based system for AUTOWAG Vehicle Rental Company. We are focusing on online reservation as a task covered in this project. Customers and Drivers of the company will be able to use the system.

In this online vehicle reservation system, two main types of users are there who can access the system. The two categories are the guest and the customer who access the website. The system allows the guests to view the website and the customer can view the system and use the website after registering to the system. The customers who are registered can access the system by selecting the Sign In button and give a username and password to log in to the system. When entering the customer credentials if the details are invalid the system will notify the customer to check it. Guest can be a member by selecting the Sign-Up button and fill the given registration form. Once registration is done successfully the customer can be logged into the system and it displays the home page. Then the customer can search, view details of a vehicle, and reserve a vehicle according to their preference. After selecting the vehicle which the customer needs there is a button that needs to click to start the reservation of a vehicle which is named **“Book New”**. Then customer moves to the reservation form. Then customer needs to enter the details such as pickup date, return date, time, pick up location return location, vehicle type of the journey. After that selecting the next button system notify the message whether the details are valid or not. And then move to the payment page then the system display the details of cost per 1km and prices. Customers have to enter the payment details. It can be done by clicking the **“Get Payment”** button. When entering the payment details if the details are invalid the system will notify the customer to check it. End of the payment validation, the system displays to click the **“Book Vehicle”** button. Then the system sends a message to the customer whether the booking is successful or not. If the booking is successful system notifies a confirmation number. Finally, customers can give feedback about the service provided by the system.

**B.**

# **Requirements Analysis**

## **Main requirements for analysis**

### **Functional Requirements**

#### **Customer /Guest**

##### **User requirements**

1. Guest can create a new user account
2. customer should log in to the system using their username and password
3. customer can change account username and password
4. customer can logout from the system
5. customer can search a vehicle
6. customer can view details of a particular vehicle
7. customer can filter the search results using advanced search as the user preference
8. customer can select a particular vehicle using different search category
9. customer can reserve a vehicle
10. customer can cancel the reservation
11. customer can give feedback about the reservation
12. customer can manage profile (View, edit and delete their profile)
13. customer can pay the payment via credit card debit card

##### **System requirement**

14. The system allows storing all the customer details
15. The system allows for the new registration
16. The system allows checking the validity of login details
17. The system allows displaying all the list of vehicles
18. The system allows displaying available vehicle
19. The system must provide a unique reservation number during the reservation

- 20. The system allows to store payment details and check the validity
- 21. The system must be able to display reservation summary
- 22. The system allows customer profile management

## **Driver**

### **User requirements**

- 23. the driver should log in to the system using their username and password
- 24. the driver can create a new user account
- 25. the driver can change the account username and password
- 26. the driver can logout from the system
- 27. the driver can manage profile (View, edit and delete their profile)
- 28. the driver can view trips

### **29. System requirements**

- 30. The system allows storing all the customer details
- 31. The system allows for the new registration
- 32. The system allows checking the validity of login details

## **Admin**

### **User requirements**

- 33. admin should log in to the system using their username and password
- 34. admin can change account username and password
- 35. admin can logout from the system
- 36. admin can check completed reservation details
- 37. admin can confirm user requests
- 38. admin can update all the vehicle details and pricelists
- 39. admin can check current reservation details and update details
- 40. admin can check customer feedback
- 41. admin can generate a report based on records

### **System requirements**

The system allows checking the validity of login details

42. The system allows store reservation details

43. The system allows storing vehicle details and prices

44. The system allows storing customer feedbacks

## **Non-functional requirements**

### **1. Usability**

The user can know how to use the system regarding the help and support.

The system should be easy for a customer to use.

### **2. Security**

The system should be secure to protect the available data.

To prevent unauthorized access, the system provides a username and password to the users.

### **3. Performance**

The system response time for each customer request must be less than 10 seconds.

### **4. Maintainability**

Service can be used to improve performance or other qualities as well as adapt to changing conditions.

### **5. Scalability**

The system should be able to contain many data functions and transportation requirements that the customer needs such as booking service and schedule list.

### **6. Availability**

The system should be accessible for a user in 24/7 hours. It is available as a mobile application.

### **7. Reliability**

System should be run without the failure, and it should not be affected to the service of the customer.

## **Data Requirements**

### **1) Customer**

- Customer first name (f\_name)
  - Customer last name(l\_name)
  - Customer ID (Customer\_id)
  - Email of the Customer (Email)
  - Contact number of the Customer (Phone\_number)
  - House number (House\_no)
  - House lane(lane)
  - City (City)
  - Customer occupation (Occupation)
  - Customer gender (Gender)
- 
- Name of the Customer
- Address of the customer

### **2) Vehicle**

- Vehicle ID (Vehicle\_id)
- Vehicle type (Vehicle\_type)
- Vehicle registration number (Vehicle\_reg\_number)
- Fuel type (Fuel\_type)
- Engine capacity (Engine\_capacity)
- Cost per 1km (Cost\_1km)

### **3) Reservation**

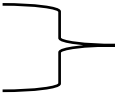

- Reservation ID (Reservation\_id)
- Vehicle type (Vehicle\_type)
- Pickup location of the customer (Pickup\_location)
- Pickup date of the customer (Pickup\_date)
- Return date of the reserved vehicle (Return\_date)
- Date of booking the vehicle (Schedule\_date)

- Number of passengers participating in the trip (No\_ passengers)


#### 4) Payment.

- Payment ID (P\_ID)
- Customer name of each payment (C\_name)
- Vehicle type (Vehicle\_type)
- Amount

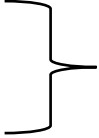
#### 5) Driver

- Driver ID(Driver\_id)
  - Driver license ID (Driver\_licence\_id)
  - First name of the driver (F\_name)
  - Last name of the driver (L\_name)
  - Contact number of the driver (C\_number)
  - Email of the driver (Email)
  - Gender of the driver (Gender)
  - Date of birth (DOB)
  - Age of the driver (Age)
  - House number of the driver (House\_no)
  - House lane of the driver (Lane)
  - City of the driver (City)
- 
 Name of the Driver
- 
 Address of the driver

#### 6) Admin

- NIC of the admin (NIC)
  - First name of the admin (F\_name)
  - Last name of the admin (L\_name)
  - Contact number of the admin (Phone\_number)
  - Email of the admin (Email)
- 
 Name of the Admin



- Gender of the admin (Gender)
  - Date of birth (Dob)
  - Age of the admin (Age)
  - House number of the admin (House\_no)
  - House lane of the admin (Lane)
  - City of the admin (City)
- 
- Address of the Admin

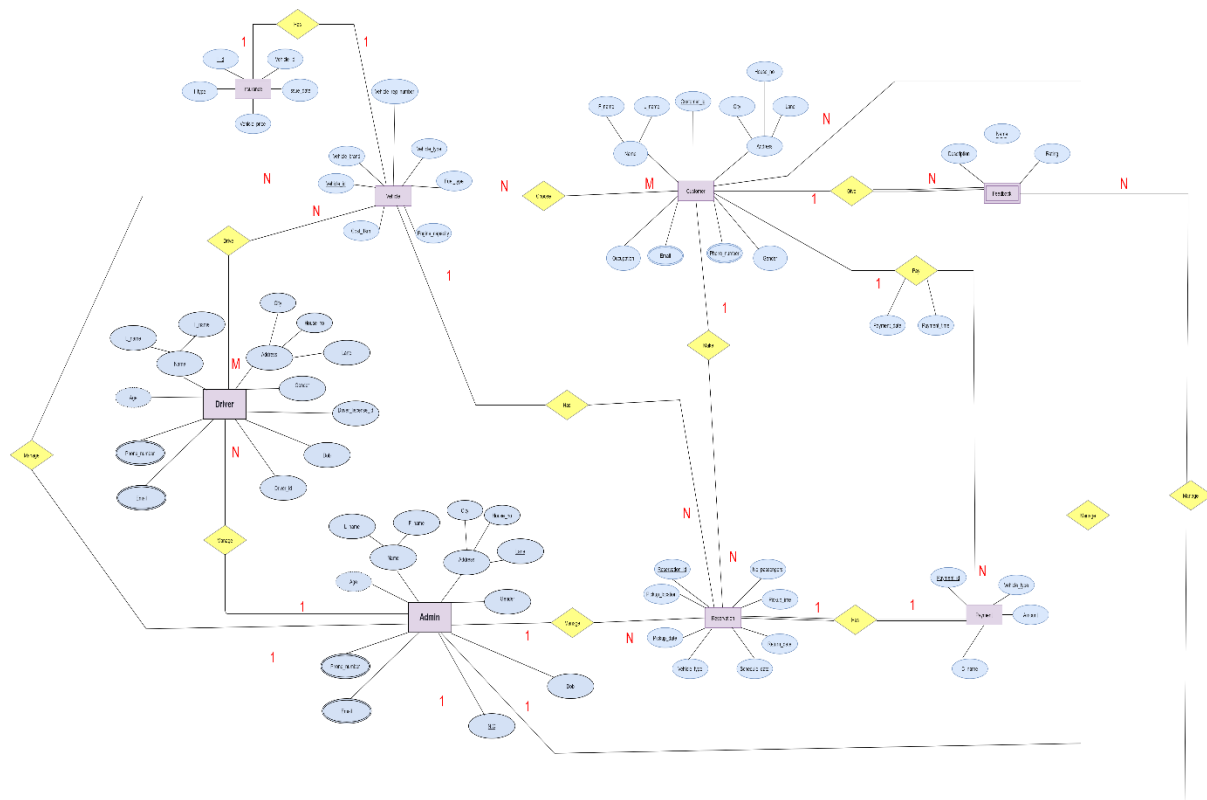
## 7) Insurance

- Insurance ID(I\_id)
- Insurance type(I\_type)
- Vehicle ID (Vehicle\_id)
- Vehicle price (Vehicle\_price)
- Insurance issue date (Issue\_date)

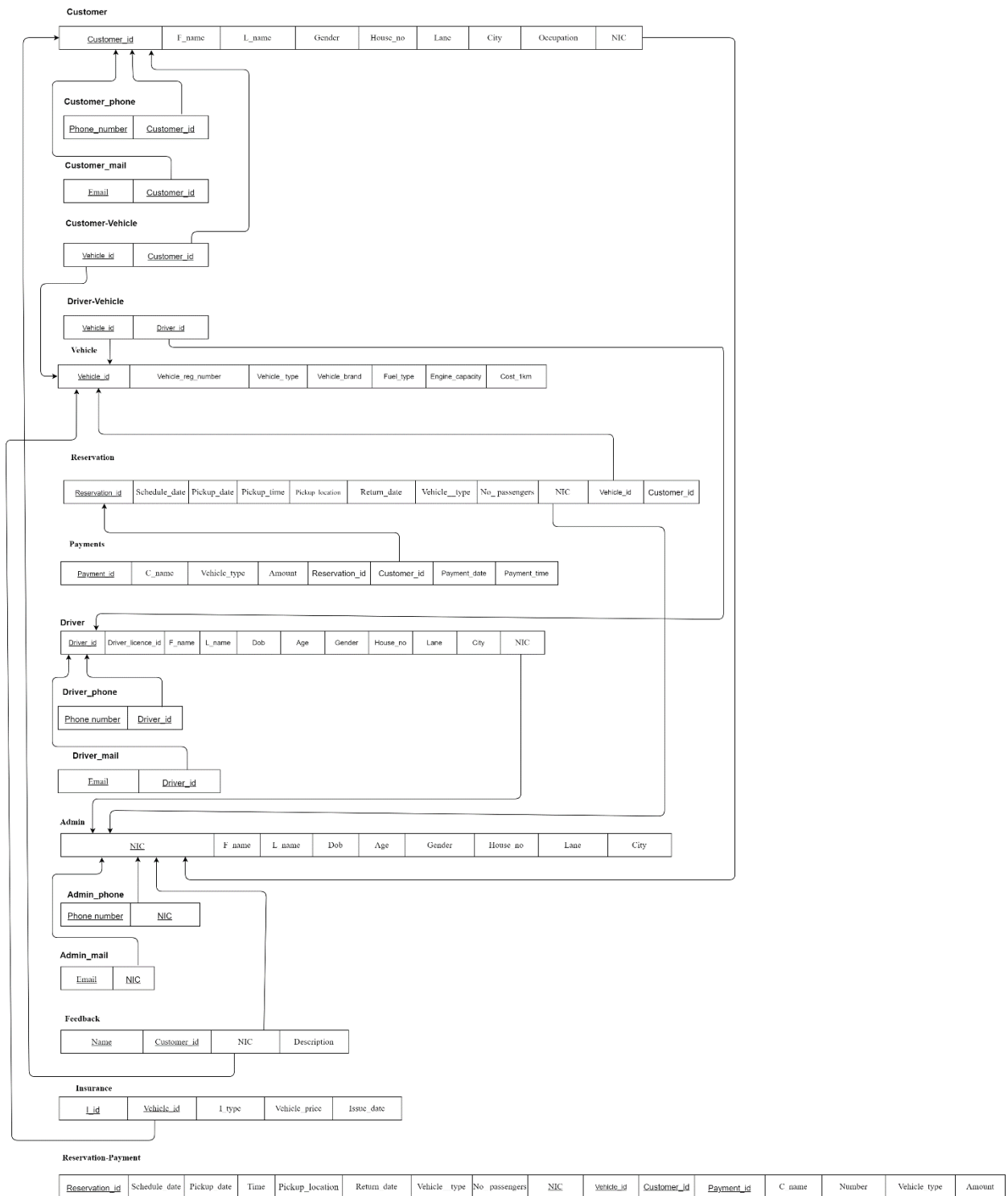
## 8) Feedback

- Customer name (C\_Name)
- Description of the feedback (Description)
- Rating (Rating)

## Entity Relationship Model



# Relational Schema



## Implement the database and include some sample data to each of the table (sql code)

```
-----Admin-----
create table Admin
(
    NIC varchar(12) not null,
    F_name varchar(20),
    L_name varchar(20),
    Dob date,
    age int,
    Gender varchar(10),
    House_no varchar(5),
    Lane varchar(20),
    City varchar(20),

    constraint admin_PK primary key (NIC),
    constraint checkAdminNIC check (NIC like '[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][v\V]'),
);

-----Vehicle-----
create table Vehicle
(
    Vehicle_ID varchar(15) not null,
    Vehicle_reg_number varchar(20) not null,
    Vehicle_type varchar(20),
    Vehicle_brand varchar(20),
    Fuel_type varchar(10),
    Engin_capacity varchar(10),
    Cost_1km real,

    constraint vehicle_PK primary key (Vehicle_ID),
    constraint checkVehicleId check (Vehicle_ID like '[v\V][i\I][d-D][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'),
);

-----Customer-----
create table Customer
(
    Customer_ID varchar(15) not null,
    F_name varchar(20) not null,
    L_name varchar(20) not null,
    Gender varchar(10),
    House_no varchar(10),
    Lane varchar(30),
    City varchar(30),
    Occupation varchar(20),
    NIC varchar(12) not null,

    constraint customer_PK primary key (Customer_ID),
    constraint customer_FK foreign key (NIC) references Admin (NIC),
    constraint checkVehicleId1 check (Customer_ID like '[c-C][i-I][d-D][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'),
);
```

```
);
```

```
-----Reservation-----
```

```
create table Reservation
```

```
(
```

```
    Reservation_ID varchar(15) not null,  
    Schedule_date date,  
    Pickup_date date,  
    Pickup_time time,  
    Pickup_location varchar(50),  
    Return_date date,  
    Vehicle__type varchar(15),  
    No_passengers int,  
    NIC varchar(12) not null,  
    Vehicle_ID varchar(15) not null,  
    Customer_ID varchar(15) not null,
```

```
    constraint reservation_PK primary key (Reservation_ID),
```

```
    constraint reservation_FK1 foreign key(NIC) references Admin (NIC),
```

```
    constraint reservation_FK2 foreign key(Vehicle_ID) references Vehicle
```

```
(Vehicle_ID),
```

```
    constraint reservation_FK3 foreign key(Customer_ID) references Customer
```

```
(Customer_ID),
```

```
);
```

```
-----Driver-----
```

```
create table Driver
```

```
(
```

```
    Driver_ID varchar(15),  
    Driver_licence_id varchar(15),  
    F_name varchar(20),  
    L_name varchar(20),  
    Dob date,  
    Age int,  
    Gender varchar(10),  
    House_no varchar(10),  
    Lane varchar(30),  
    City varchar(30),  
    NIC varchar(12) not null,
```

```
    constraint driver_PK primary key (Driver_id),
```

```
    constraint driver_FK foreign key(NIC) references Admin (NIC),
```

```
);
```

```
-----Payments-----
```

```
create table Payments
```

```
(
```

```
    Payment_ID varchar(15),  
    C_name varchar(20),  
    Vehicle_type varchar(20),  
    Amount real,  
    Reservation_ID varchar(15),  
    Customer_ID varchar(15),  
    Payment_date date, --2001-01-01  
    Payment_time time, --23:59:59.00
```

```

        constraint payments_PK primary key (Payment_ID),
        constraint payments_FK1 foreign key(Reservation_ID) references Reservation
(Reservation_ID),
        constraint payments_FK2 foreign key(Customer_ID) references Customer
(Customer_ID),

);

-----Feedback-----
create table Feedback
(
    Name varchar(20),
    Customer_ID varchar(15) not null,
    NIC varchar(12) not null,
    Description varchar(100),

    constraint feedback_PK primary key (Name, Customer_ID),
    constraint feedback_FK1 foreign key(Customer_ID) references Customer
(Customer_ID),
    constraint feedback_FK2 foreign key(NIC) references Admin (NIC),

);

-----Insurance-----
create table Insurance
(
    I_ID varchar(15) not null,
    Vehicle_ID varchar(15),
    I_type varchar(50),
    Vehicle_price real,
    Issue_date datetime,

    constraint insurance_PK primary key (I_ID),
    constraint insurance_FK foreign key (Vehicle_ID) references Vehicle (Vehicle_ID),

);

-----Admin_phone-----
create table Admin_phone
(
    Phone_number varchar(10) not null,
    NIC varchar(12) not null,

    constraint Admin_phone_PK primary key (Phone_number, NIC),
    constraint insu_FK foreign key (NIC) references Admin (NIC),
    constraint checkAdminPhone check (Phone_number like '[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'),

);

-----Admin_mail-----
create table Admin_mail
(
    Email varchar(30),
    NIC varchar(12) not null,

    constraint Admin_mail_PK primary key (Email, NIC),

```

```

        constraint Admin_mail_FK foreign key (NIC) references Admin (NIC),
    );

-----Driver_phone
create table Driver_phone
(
    Phone_number varchar(15),
    Driver_ID varchar(15),

    --constraint Driver_phone_PK primary key (Phone_number,Driver_ID),
    constraint Driver_phone_FK foreign key (Driver_ID) references Driver (Driver_ID),
    constraint checkDriverPhone check (Phone_number like '[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'),
);

-----Driver_mail-----
create table Driver_mail
(
    Email varchar(30),
    Driver_ID varchar(15) not null,

    constraint Driver_mail_PK primary key (Email,Driver_ID),
    constraint Driver_mail_FK foreign key (Driver_ID) references Driver (Driver_ID),
);

-----Customer_phone-----
create table Customer_phone
(
    Phone_number varchar(15),
    Customer_ID varchar(15),

    constraint Customer_phone_PK primary key (Phone_number,Customer_ID),
    constraint Customer_phone_FK foreign key (Customer_ID) references Customer
(Customer_ID),
    constraint checkCustomerPhone check (Phone_number like '[0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]'),
);

-----Customer_mail-----
create table Customer_mail
(
    Email varchar(30),
    Customer_ID varchar(15),

    constraint Customer_mail_PK primary key (Email,Customer_ID),
    constraint Customer_mail_FK foreign key (Customer_ID) references Customer
(Customer_ID),
);

-----Customer_Vehicle-----
create table Customer_Vehicle
(
    Vehicle_ID varchar(15),
    Customer_ID varchar(15),

```

```

        constraint Vehicle_id_PK primary key (Vehicle_ID, Customer_ID),
        constraint Vehicle_id_FK foreign key (Vehicle_ID) references Vehicle (Vehicle_ID),
        constraint Customer_id_FK foreign key (Customer_ID) references Customer
(Customer_ID),
);
-----Driver_Vehicle-----
create table Driver_Vehicle
(
    Vehicle_ID varchar(15),
    Driver_ID varchar(15),

    constraint Vehicle_id_PK11 primary key (Driver_ID, Vehicle_ID),
    constraint Vehicle_id_FK11 foreign key (Vehicle_ID) references Vehicle
(Vehicle_ID),
    constraint Driver_id_FK11 foreign key (Driver_ID) references Driver (Driver_ID),
);

-----insert in to Admin-----
insert into Admin values('901234567V', 'Shamal', 'Aravinda', '1990-03-
23', 31, 'Male', '22/7', 'Araliya Lane', 'Piliyandala')
insert into Admin values('921234567V', 'Chathura', 'Gamage', '1992-09-
08', 28, 'Male', '11/B', 'Samagi mawatha', 'Kahathuduwa')
insert into Admin values('881234567V', 'Tharuki', 'Wijesinghe', '1988-01-
23', 32, 'Female', '08', 'Asiri lane', 'Homagama')
insert into Admin values('861234567V', 'Kumari', 'Siriwardhana', '1986-11-
11', 34, 'Female', '18/A', 'River road', 'Rathmalana')
insert into Admin values('951234567V', 'Pasindu', 'Dissanayake', '1995-08-
12', 25, 'Male', '06', 'Temple road', 'Kottawa')

-----insert in to Vehicle-----
insert into Vehicle
values('VID1234567', 'V12345', 'Car', 'Toyota', 'Petrol', '2600CC', '50.00')
insert into Vehicle
values('VID9876543', 'V34567', 'Van', 'Mitsubishi', 'Diesel', '2500CC', '80.00')
insert into Vehicle values('VID3456823', 'V98765', 'Bus', 'Tata', 'Diesel', '3000CC', '120.00')
insert into Vehicle values('VID1357926', 'V57689', 'Jeep', 'Range
rover', 'Petrol', '4000CC', '250.00')
insert into Vehicle values('VID1324356', 'V24696', 'Car', 'Honda', 'Petrol', '2300CC', '60.00')

-----insert in to Customer-----
insert into Customer values('CID1234567', 'Amali', 'Thenuwara', 'Female', '34/A', 'Saman
Mawatha', 'Rajagiriya', 'Teacher', '901234567V')
insert into Customer values('CID9876543', 'Jhon', 'Silva', 'Male', '03', 'Kumudu
Mawatha', 'Galle', 'Engineer', '921234567V')
insert into Customer values('CID5784560', 'Damith', 'Asanka', 'Male', '25/3', 'Welakubura
road', 'Dehivala', 'Doctor', '881234567V')
insert into Customer values('CID1369846', 'Thanuja', 'Nayomi', 'Female', '12/B', 'Kahawatta
Road', 'Nugegoda', 'Clark', '861234567V')
insert into Customer values('CID3546576', 'Lahiru', 'Vidumina', 'Male', '06', 'Sapumal
Mawatha', 'Boralasgamuwa', 'Lawyer', '951234567V')

-----insert in to Reservation-----
insert into Reservation values('RID1234567', '2021-08-03', '2021-08-
05', '08:00:00', 'Nuggegoda', '2021-08-06', 'Car', 4, '901234567V', 'VID1234567', 'CID1234567')

```



```

insert into Reservation values('RID3456780','2021-09-12','2021-09-15','14:00:00','Boralasgamuwa','2021-09-17','Van',12,'921234567V','VID9876543','CID9876543')
insert into Reservation values('RID4534232','2021-10-15','2021-10-20','10:30:00','Homagama','2021-10-23','Bus',30,'881234567V','VID3456823','CID5784560')
insert into Reservation values('RID1324345','2021-07-23','2021-07-28','18:00:00','Rathmalana','2021-08-02','Jeep',5,'861234567V','VID1357926','CID1369846')
insert into Reservation values('RID8585898','2021-10-11','2021-10-14','11:00:00','Kottawa','2021-10-19','Car',5,'951234567V','VID1324356','CID3546576')

```

-----insert in to Driver-----

```

insert into Driver values('DID1234567','SL1234567','Lal','Jayasena','1980-09-13',40,'Male','06','Samagipura','Kalutara','901234567V')
insert into Driver values('DID9876543','SL0987654','Nimal','Yapa','1975-10-26',45,'Male','12/C','Isuru Mawatha','Gampaha','921234567V')
insert into Driver values('DID3456789','SL1029387','Chandana','Sirikumara','1985-11-22',35,'Male','08','Gonamaditt a road','Seeduwa','881234567V')
insert into Driver values('DID7263549','SL3456789','Kasun','Danushka','1992-07-09',28,'Male','29/A','Gadabuwana road','Ragama','861234567V')
insert into Driver values('DID1029384','SL2837456','Gamini','Fernando','1979-02-12',42,'Male','12','Siripura Mawatha','Malabe','951234567V')

```

-----insert in to Payments-----

```

insert into Payments values('PID1234567','Amali Thenuwara','Car','1000.00','RID1234567','CID1234567','2021-08-05','08:00:00')
insert into Payments values('PID0987654','Jhon Silva','Van','2220.00','RID3456780','CID9876543','2021-09-15','14:00:00')
insert into Payments values('PID3456789','Damith Asanka','Bus','7800.00','RID4534232','CID5784560','2021-10-20','10:30:00')
insert into Payments values('PID3546578','Thanuja Nayomi','Jeep','3260.00','RID1324345','CID1369846','2021-07-28','18:00:00')
insert into Payments values('PID1527476','Lahiru Vidumina','Car','5030.00','RID8585898','CID3546576','2021-10-14','11:00:00')

```

-----insert in to Feedback-----

```

insert into Feedback values('Amali Thenuwara','CID1234567','901234567V','All went very smoothly')
insert into Feedback values('Jhon Silva','CID9876543','921234567V','Everything was good with my trip')
insert into Feedback values('Damith Asanka','CID5784560','881234567V','Extreme surprised and impressed with quality of the service')
insert into Feedback values('Thanuja Nayom','CID1369846','861234567V','Best company for any car rental')
insert into Feedback values('Lahiru Vidumina','CID3546576','951234567V','Everything went 100% problem free and very smoothly')

```

-----insert in to Insurance-----

```

insert into Insurance values('IID1234567','VID1234567','Rental reimbursement insurance','5460.00','2020-10-30')
insert into Insurance values('IID0987654','VID9876543','Emergency roadside assistance','8260.00','2021-02-13')
insert into Insurance values('IID3456789','VID3456823','Mechanical breakdown insurance','9490.00','2019-09-26')
insert into Insurance values('IID4758690','VID1357926','Pay-as-you-go insurance','7480.00','2021-03-02')

```

```
insert into Insurance values('IID3845690','VID1324356','Rental reimbursement insurance','6970.00','2020-10-02')
```

```
-----insert in to Admin_phone-----
```

```
insert into Admin_phone values('0772234517','901234567V')
insert into Admin_phone values('0721326746','921234567V')
insert into Admin_phone values('0712348954','881234567V')
insert into Admin_phone values('0709853265','861234567V')
insert into Admin_phone values('0772098767','951234567V')
```

```
-----insert in to Admin_mail-----
```

```
insert into Admin_mail values('shamal123@gmail.com','901234567V')
insert into Admin_mail values('chathura_n@gmail.com','921234567V')
insert into Admin_mail values('tharuki222@gmail.com','881234567V')
insert into Admin_mail values('kumari_f@gmail.com','861234567V')
insert into Admin_mail values('pasindu890@gmail.com','951234567V')
```

```
-----insert in to Driver_phone-----
```

```
insert into Driver_phone values('0772234567','DID1234567')
insert into Driver_phone values('0709878893','DID9876543')
insert into Driver_phone values('0778294382','DID3456789')
insert into Driver_phone values('0709853209','DID7263549')
insert into Driver_phone values('0772098897','DID1029384')
```

```
-----insert in to Driver_mail-----
```

```
insert into Driver_mail values('lal123@gmail.com','DID1234567')
insert into Driver_mail values('nimal_n@gmail.com','DID9876543')
insert into Driver_mail values('chandra452@gmail.com','DID3456789')
insert into Driver_mail values('kasun_f@gmail.com','DID7263549')
insert into Driver_mail values('Gamini000@gmail.com','DID1029384')
```

```
-----insert in to Customer_phone-----
```

```
insert into Customer_phone values('0771234567','CID1234567')
insert into Customer_phone values('0709898783','CID9876543')
insert into Customer_phone values('0778098722','CID5784560')
insert into Customer_phone values('0712345678','CID1369846')
insert into Customer_phone values('0772095677','CID3546576')
```

```
-----insert in to Customer_mail-----
```

```
insert into Customer_mail values('amali123@gmail.com','CID1234567')
insert into Customer_mail values('jhon_nrt@gmail.com','CID9876543')
insert into Customer_mail values('Damith146@gmail.com','CID5784560')
insert into Customer_mail values('thanuja_p@gmail.com','CID1369846')
insert into Customer_mail values('lahiru@gmail.com','CID3546576')
```

```
-----insert in to Customer_Vehicle -----
```

```
insert into Customer_Vehicle values('VID1234567','CID1234567')
insert into Customer_Vehicle values('VID9876543','CID9876543')
insert into Customer_Vehicle values('VID3456823','CID5784560')
```

```
insert into Customer_Vehicle values('VID1357926','CID1369846')
insert into Customer_Vehicle values('VID1324356','CID3546576')
```

```
-----insert in to Driver_Vehicle -----
insert into Driver_Vehicle values('VID1234567','DID1234567')
insert into Driver_Vehicle values('VID9876543','DID9876543')
insert into Driver_Vehicle values('VID3456823','DID3456789')
insert into Driver_Vehicle values('VID1357926','DID7263549')
insert into Driver_Vehicle values('VID1324356','DID1029384')
```

