SOFE3700U Data Management Systems

Project Phase 2

November 5, 2016

Group 4:

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Part A: Relational Schema

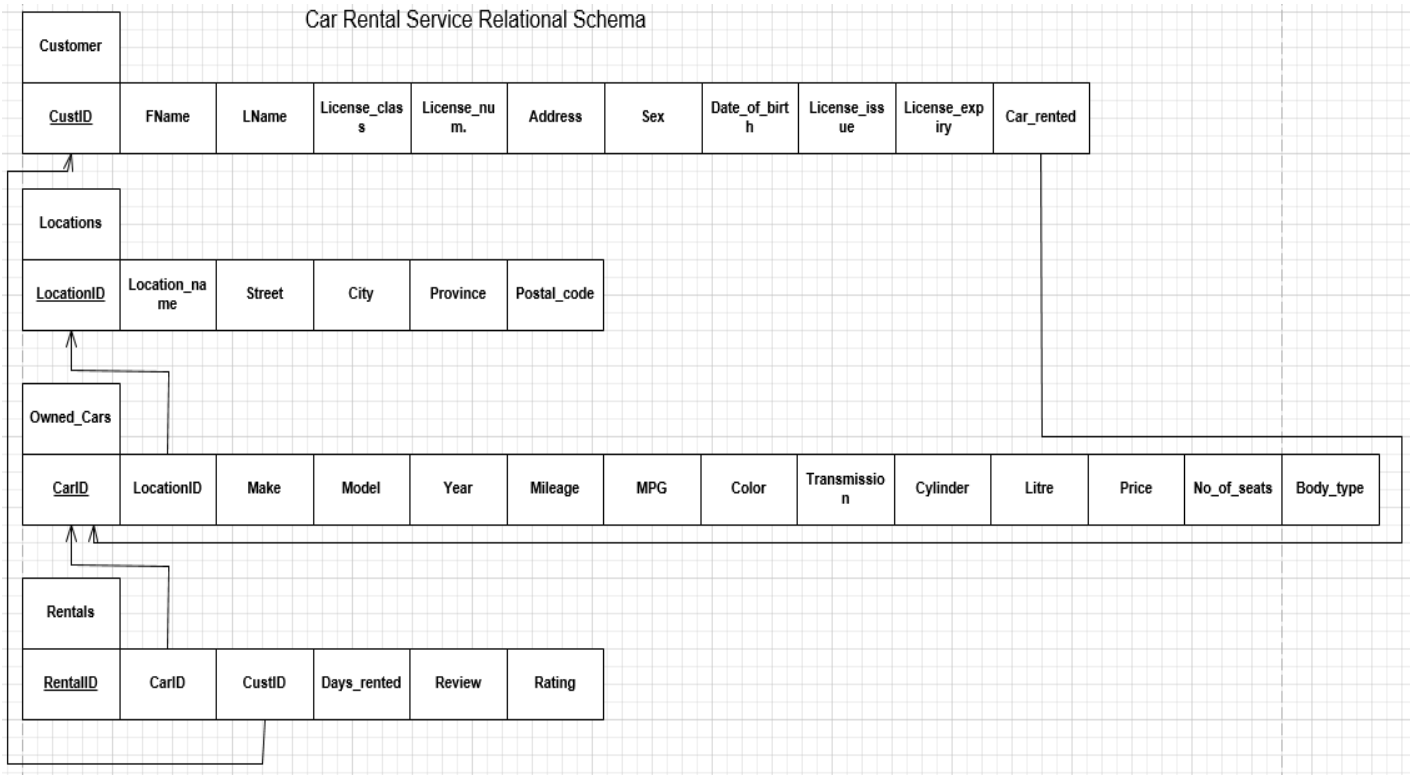
Overview: For our system, we are using four tables: Customer, Locations, Owned_cars, and Rentals.
Customer stores the information of the person who is renting the vehicle.
Locations stores the information about the place from where the car is being rented.
Owned_cars stores all of the cars the company currently owns.
Rentals stores the cars that are currently being rented by customers.

SQL Commands:

```
CREATE TABLE `customer` (
  `CustID` int(11) NOT NULL,
  `FName` varchar(20) NOT NULL,
  `LName` varchar(20) NOT NULL,
  `License_class` char(2) NOT NULL,
  `License_number` varchar(15) NOT NULL,
  `Address` varchar(50) NOT NULL,
  `Sex` char(1) NOT NULL,
  `Date_of_birth` date NOT NULL,
  `License_issue` date NOT NULL,
  `License_expiry` date NOT NULL,
  'Car_rented' int(11),
  FOREIGN KEY ('Car_rented') REFERENCES owned_cars('CarID')
  PRIMARY KEY (`CustID`)
);

CREATE TABLE `locations` (
  `LocationID` int(11) NOT NULL,
  `Location_Name` varchar(50) NOT NULL,
  `Street` varchar(150) NOT NULL,
  `City` varchar(25) NOT NULL,
  `Province` varchar(20) NOT NULL,
  `Postal_Code` varchar(6) NOT NULL,
  PRIMARY KEY (`LocationID`)
);

CREATE TABLE `owned_cars` (
  `CarID` int(11) NOT NULL,
  `LocationID` int(11) NOT NULL,
  `Make` varchar(20) DEFAULT NULL,
  `Model` varchar(20) DEFAULT NULL,
  `Year` int(11) DEFAULT NULL,
  `Mileage` float DEFAULT NULL,
  `MPG` float DEFAULT NULL,
  `Color` varchar(10) DEFAULT NULL,
  `Transmission` int(11) DEFAULT NULL,
  `Cylinder` int(11) DEFAULT NULL,
  `Litre` float DEFAULT NULL,
  `Price` float DEFAULT NULL,
  `No_of_seats` int(11) NOT NULL,
```

```
  `Body_Type` varchar(15) NOT NULL,
  PRIMARY KEY (`CarID`),
   FOREIGN KEY ('LocationID') REFERENCES Locations('locationID')
);


CREATE TABLE `rentals` (
  `RentalID` int(11) NOT NULL,
  `CarID` int(11) NOT NULL,
  `CustID` int(11) NOT NULL,
  `Days_rented` int(11) NOT NULL,
  `Review` float NOT NULL,
  `Rating` varchar(150) NOT NULL,
  PRIMARY KEY (`RentalID`)
  FOREIGN KEY ('CarID') REFERENCES owned_cars('CarID'),
  FOREIGN KEY ('CustID') REFERENCES customer('CustID')
);
```

Relational Schema Diagram:



Part B: Sample Data

```
INSERT INTO `customer` (`CustID`, `FName`, `LName`, `License_class`, `License_number`, `Address`, `Sex`, `Date_of_birth`, `License_issue`, `License_expiry`) VALUES
(1, 'ghaith', 'haddad', 'G2', 'H123456', '60 - wont tell you', 'M', '1995-08-22', '2013-10-20', '2019-11-15'),
(2, 'saleh', 'nawar', 'G2', 'N987654', '12 - somewhere in varsity', 'M', '1994-02-14', '2013-05-06', '2018-07-15'),
(3, 'malek', 'mustapha', 'G', 'M456987', '45 - dont know', 'M', '1993-12-05', '2012-09-23', '2017-10-15'),
(4, 'fawwaz', 'khayat', 'G', 'K321456', '54 - ask him', 'M', '1991-10-20', '2010-12-30', '2016-01-01'),
(5, 'mohammed', 'turki', 'G2', 'T129856', '90 - come on man', 'M', '1993-08-20', '2013-07-23', '2018-06-10'),
(6, 'sally', 'andrew', 'G', 'A984532', '23 - not sure', 'F', '1994-04-21', '2012-05-31', '2018-06-01');

INSERT INTO `locations` (`LocationID`, `Location_Name`, `Street`, `City`, `Province`, `Postal_Code`) VALUES
(1, 'North Oshawa', '50 - Simcoe Street N', 'Oshawa', 'Ontario', 'L1L0E8'),
(2, 'South Oshawa', '20 - Simcoe Street S', 'Oshawa', 'Ontario', 'N6G5K1'),
(3, 'Dundas', '20 - Dundas Sqaure', 'Toronto', 'Ontario', 'F8H1K5'),
(4, 'Square One', '503 - Square One', 'Missisuaga', 'Ontario', 'N6S9G3'),
(5, 'West Taunton', '600 - Tauton Street W', 'Oshawa', 'Ontario', 'B5G1F4'),
(6, 'East Tauton', '44 - Tauton Street E', 'Oshawa', 'Ontario', 'H3S3K5');

INSERT INTO `owned_cars` (`CarID`, `LocationID`, `Make`, `Model`, `Year`, `Mileage`, `MPG`, `Color`, `Transmission`, `Cylinder`, `Litre`, `Price`, `No_of_seats`, `Body_Type`) VALUES
(1, 6, 'Chrysler', 'Sebring', 2007, 134000, 4.2, 'Black', 4, 4, 16.83, 35, 5, 'Sedan'),
(2, 5, 'Nissan', 'Armada', 2013, 150000, 5, 'Black', 5, 6, 20, 50, 7, 'SUV'),
(3, 3, 'honda', 'civic', 2013, 115000, 4.5, 'Grey', 6, 6, 18, 30, 5, 'Sedan'),
(4, 2, 'mazda', 'mazda 3', 2011, 80000, 3.5, 'Red', 4, 6, 17.5, 25, 5, 'Sedan'),
(5, 1, 'toyota', 'corolla', 2014, 99000, 4, 'Black', 6, 4, 16.8, 30, 5, 'Sedan'),
(6, 4, 'toyota', 'camry', 2016, 109000, 4, 'White', 5, 6, 19, 28, 5, 'Sedan');

INSERT INTO `rentals` (`RentalID`, `CarID`, `CustID`, `Days_rented`, `Review`, `Rating`) VALUES
(1, 1, 3, 5, 'very nice car', 4),
(2, 2, 2, 3, 'good car, a bit unsatisfied', 3),
(3, 3, 3, 4, 'best car ever', 4.5 ),
(4, 4, 4, 2, 'could have chosen a better car', 3.5),
(5, 5, 3, 5, 'it will not fail to amaze you', 5),
(6, 6, 6, 3, 'very satisfied, prob will rent again', 4);
```

Part C: Views

View 1: Computes a join of at least three tables

```
SELECT L.Location_Name
FROM  locations AS L, customer AS S, owned_cars AS C
WHERE S.Car_rented = C.carID AND C.LocationID = L.LocationID AND S.FName LIKE 'Malek'
```

Gets the location from which Malek rented his car

View 2: Uses nested queries with the ANY or ALL operator and uses a GROUP BY clause

```
SELECT Make, Model, Color
FROM owned_cars
WHERE price < ANY (SELECT price
                   FROM owned_cars
                   WHERE color != 'Grey')
GROUP BY color
```

Gets the make, model and color of the cars that cost less than a grey car and groups them by colour

View 3: A correlated nested query

```
SELECT make, model, (SELECT owned_cars.price * days_rented FROM rentals)
FROM owned_cars
```

Gets the total cost of the rented car

View 4: Uses a FULL JOIN

```
SELECT Fname, LName, Car_rented
FROM customer
FULL JOIN rentals
WHERE customer.car_rented = rentals.carID
```

Displays all of the customers and which cars they have rented (if any).

View 5: Uses nested queries with any of the set operations UNION, EXCEPT, or INTERSECT

```
SELECT address
FROM customer
UNION
SELECT city
FROM locations
```

Gets the address of customers and the city the locations are located in.

View 6:

```
SELECT make, model
FROM owned_cars
WHERE price < 35
```

Gets the cars which cost less than $35 per day.

View 7:

```
SELECT C.*
FROM owned_cars AS C, locations AS L
WHERE C.locationID = L.locationID AND L.city LIKE 'Toronto'
```

Gets the cars available at Toronto branch.

View 8:

```
SELECT *
FROM owned_cars
WHERE no_of_seats <= 5
```

Gets the cars which have less than or equal to 5 seats.

View 9:

```
SELECT C.*, R.rating
FROM owned_cars AS C, rentals AS R
WHERE C.carID = R.carID AND R.rating > 4
```

Gets the cars with rating greater than 4.

View 10:

```
SELECT C.FName, C.LName, O.make, O.model
FROM customer AS C, owned_cars AS O, rentals AS R
WHERE C.car_rented = R.carID AND R.carID = O.carID
```

Gets the name, and the most recent car a person rented.

Part D: E-R Diagram