



# MODERN DATA MANAGEMENT & BUSINESS INTELLIGENCE

## ASSIGNMENT 1

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MSc in  
**Business Analytics**

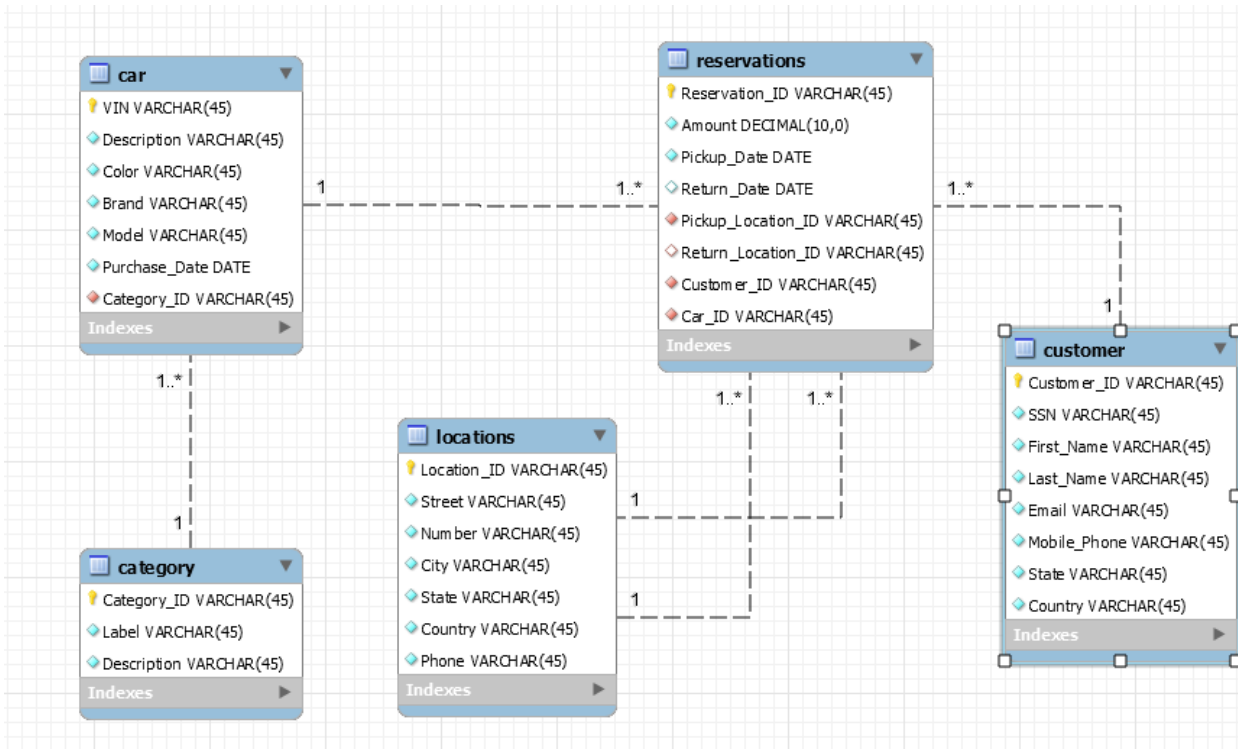
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## ASSUMPTIONS & CLARIFICATIONS

### SCHEMA

For the Database schema creation we used MySQL Workbench 8.0.  
The schema can be found bellow.



### DATABASE DATA

Regarding the tables' values, all the data was created by us. We used online tools such as random VIN generators, etc. in order to make our data more realistic. Moreover, for each table we inserted:

- Car : 20 rows
- Category: 10 rows
- Customer: 100 rows
- Locations: 10 rows
- Reservations: 100 rows

We also chose to insert non integer values to our primary keys – for example C1,C2,Cn instead of 1,2,..,n – in order to make our results more recognizable explicitly for this exercise.

## VIEWS & TABLES

Regarding the schema and the requested items, we chose to create 5 tables; Car, Customer, Reservations, Category, Locations. Although, there was a point in exercise's description where it was mentioned that every fleet location might have one or more phones, we did not create the table "Location\_Phones" as we did not find the need to exploit these data later on the exercise. Instead, we chose to insert up to one values in the Phones attribute per location ID.

We also chose not to create Views, as the data volume was not big enough and all the values were easily accessible. Instead we made calculations in order to answer each question.

## 3<sup>rd</sup> QUESTION

We chose R Language and R Studio for the 3<sup>rd</sup> question.

The Libraries that needed to be installed for the database connection were the following ones:

```
library(DBI)
library(RMySQL)
library(knitr)
```

We also installed the following packages:

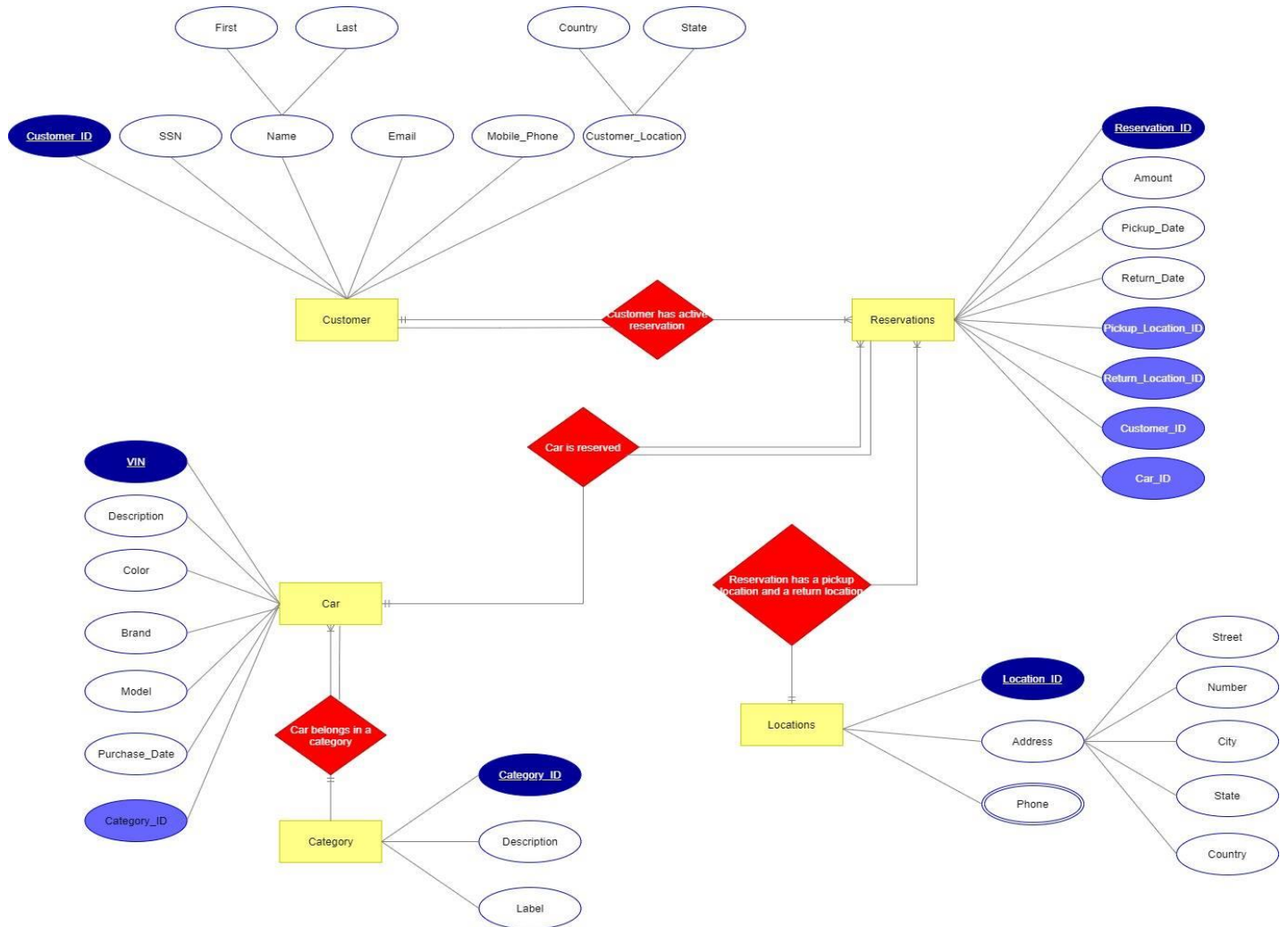
```
install.packages("DBI")
install.packages("RMySQL")
```

Our user credentials for the database connections were: root/root.

In case yours differ, please change the credentials in the database connection code part:

```
connect <- dbConnect(driver, user= "root", password="root", dbname="crc_fleet",
host="localhost", port=3306)
```

## QUESTION 1: ENTITY RELATIONSHIP DIAGRAM



## QUESTION 2: CREATE TABLE STATEMENTS & INSERT RECORDS QUERIES

---

### #CREATE TABLE STATEMENTS

```
CREATE DATABASE `crc_fleet`;
```

```
USE `crc_fleet`;
```

```
CREATE TABLE `category` (  
  `Category_ID` varchar(45) NOT NULL,  
  `Label` varchar(45) NOT NULL,  
  `Description` varchar(45) NOT NULL,  
  PRIMARY KEY (`Category_ID`)  
);
```

```
CREATE TABLE `car` (  
  `VIN` varchar(45) NOT NULL,  
  `Description` varchar(45) NOT NULL,  
  `Color` varchar(45) NOT NULL,  
  `Brand` varchar(45) NOT NULL,  
  `Model` varchar(45) NOT NULL,  
  `Purchase_Date` date NOT NULL,  
  `Category_ID` varchar(45) NOT NULL,  
  PRIMARY KEY (`VIN`),  
  KEY `Category_ID_idx` (`Category_ID`),  
  CONSTRAINT `Category_ID` FOREIGN KEY (`Category_ID`) REFERENCES `category` (`Category_ID`)  
);
```

```
CREATE TABLE `customer` (  
  `Customer_ID` varchar(45) NOT NULL,  
  `SSN` varchar(45) NOT NULL,  
  `First_Name` varchar(45) NOT NULL,  
  `Last_Name` varchar(45) NOT NULL,  
  `Email` varchar(45) NOT NULL,  
  `Mobile_Phone` varchar(45) NOT NULL,  
  `State` varchar(45) NOT NULL,  
  `Country` varchar(45) NOT NULL,  
  PRIMARY KEY (`Customer_ID`),  
  UNIQUE KEY `SSN_UNIQUE` (`SSN`)  
);
```

```
CREATE TABLE `locations` (  
  `Location_ID` varchar(45) NOT NULL,  
  `Street` varchar(45) NOT NULL,  
  `Number` varchar(45) NOT NULL,  
  `City` varchar(45) NOT NULL,  
  `State` varchar(45) NOT NULL,  
  `Country` varchar(45) NOT NULL,  
  `Phone` varchar(45) NOT NULL,  
  PRIMARY KEY (`Location_ID`)  
);
```

```
CREATE TABLE `reservations` (  
  `Reservation_ID` varchar(45) NOT NULL,  
  `Amount` decimal(10,0) NOT NULL,  
  `Pickup_Date` date NOT NULL,  
  `Return_Date` date DEFAULT NULL,  
  `Pickup_Location_ID` varchar(45) NOT NULL,  
  `Return_Location_ID` varchar(45) DEFAULT NULL,  
  `Customer_ID` varchar(45) NOT NULL,  
  `Car_ID` varchar(45) NOT NULL,  
  PRIMARY KEY (`Reservation_ID`),  
  KEY `Car_ID_idx` (`Car_ID`),  
  KEY `Customer_ID_idx` (`Customer_ID`),  
  KEY `Pickup_Location_ID_idx` (`Pickup_Location_ID`),  
  KEY `Return_Location_ID_idx` (`Return_Location_ID`),  
  CONSTRAINT `Car_ID` FOREIGN KEY (`Car_ID`) REFERENCES `car` (`VIN`),  
  CONSTRAINT `Customer_ID` FOREIGN KEY (`Customer_ID`) REFERENCES `customer` (`Customer_ID`),  
  CONSTRAINT `Pickup_Location_ID` FOREIGN KEY (`Pickup_Location_ID`) REFERENCES `locations`  
  (`Location_ID`),  
  CONSTRAINT `Return_Location_ID` FOREIGN KEY (`Return_Location_ID`) REFERENCES `locations`  
  (`Location_ID`)  
);
```



## # INSERT RECORDS QUERIES

```
INSERT INTO `crc_fleet`.`category`(`Category_ID`,`Label`,`Description`) VALUES
```

```
('Categ_1','Luxury','high-end features'),
('Categ_2','Minivan','usually preferred by up to 4 people'),
('Categ_3','SUV','road and off-road features'),
('Categ_4','Sports','dynamic performance'),
('Categ_5','OffRoad','prefered for mountain destinations'),
('Categ_6','Family','normally-sized cars'),
('Categ_7','HyperCar','high speed cars'),
('Categ_8','Convertible','cars without roof'),
('Categ_9','Compact','small family car'),
('Categ_10','Economy','eco-friendly');
```

```
INSERT INTO `crc_fleet`.`customer`
```

```
(`Customer_ID`,`SSN`,`First_Name`,`Last_Name`,`Email`,`Mobile_Phone`,`State`,`Country`)VALUES
('C1','148-06-4921','James','Lucero','JamesLucero@gmail.com','202-555-0194','AK','USA'),
('C2','248-06-4921','John','Compton','JohnCompton@gmail.com','202-555-0176','AZ','USA'),
('C3','348-06-4922','Robert','Douglas','RobertDouglas@gmail.com','202-555-0113','AR','USA'),
('C4','448-06-4923','Michael','Hart','MichaelHart@gmail.com','202-555-0191','CA','USA'),
('C5','548-06-4924','William','Underwood','WilliamUnderwood@gmail.com','202-555-0107','CO','USA'),
('C6','648-06-4925','David','Garrison','DavidGarrison@gmail.com','202-555-0118','CT','USA'),
('C7','748-06-4926','Richard','Mcbride','RichardMcbride@gmail.com','202-555-0115','DE','USA'),
('C8','848-06-4927','Joseph','Watts','JosephWatts@gmail.com','202-555-0191','FL','USA'),
('C9','948-06-4928','Thomas','Briggs','ThomasBriggs@gmail.com','202-555-0135','GA','USA'),
('C10','1048-06-4929','Charles','Keller','CharlesKeller@gmail.com','202-555-0108','HI','USA'),
('C11','1148-06-4930','Christopher','Howell','ChristopherHowell@gmail.com','202-555-0132','ID','USA'),
('C12','1248-06-4931','Daniel','Castro','DanielCastro@gmail.com','202-555-0142','IL','USA'),
('C13','1348-06-4932','Matthew','Yu','MatthewYu@gmail.com','202-555-0160','IN','USA'),
('C14','1448-06-4933','Anthony','Lawrence','AnthonyLawrence@gmail.com','202-555-0161','IA','USA'),
('C15','1548-06-4934','Donald','Lindsey','DonaldLindsey@gmail.com','202-555-0159','KS','USA'),
('C16','1648-06-4935','Mark','Holder','MarkHolder@gmail.com','202-555-0141','KY','USA'),
('C17','1748-06-4936','Paul','Huerta','PaulHuerta@gmail.com','202-555-0195','LA','USA'),
('C18','1848-06-4937','Steven','Simon','StevenSimon@gmail.com','202-555-0147','ME','USA'),
```

('C19','1948-06-4938','Andrew','Reilly','AndrewReilly@gmail.com','202-555-0157','MD','USA'),  
('C20','2048-06-4939','Kenneth','Hartman','KennethHartman@gmail.com','202-555-0140','MA','USA'),  
('C21','2148-06-4940','Joshua','Aguirre','JoshuaAguirre@gmail.com','202-555-0157','MI','USA'),  
('C22','2248-06-4941','Kevin','Simmons','KevinSimmons@gmail.com','202-555-0178','MN','USA'),  
('C23','2348-06-4942','Brian','Holloway','BrianHolloway@gmail.com','202-555-0151','MS','USA'),  
('C24','2448-06-4943','George','Patton','GeorgePatton@gmail.com','202-555-0188','MO','USA'),  
('C25','2548-06-4944','Edward','George','EdwardGeorge@gmail.com','202-555-0198','MT','USA'),  
('C26','2648-06-4945','Ronald','Bolton','RonaldBolton@gmail.com','202-555-0118','NE','USA'),  
('C27','2748-06-4946','Timothy','Livingston','TimothyLivingston@gmail.com','202-555-0119','NV','USA'),  
('C28','2848-06-4947','Jason','Gaines','JasonGaines@gmail.com','202-555-0162','NH','USA'),  
('C29','2948-06-4948','Jeffrey','Short','JeffreyShort@gmail.com','202-555-0161','NJ','USA'),  
('C30','3048-06-4949','Ryan','Miller','RyanMiller@gmail.com','202-555-0107','NM','USA'),  
('C31','3148-06-4950','Jacob','Griffin','JacobGriffin@gmail.com','202-555-0120','NY','USA'),  
('C32','3248-06-4951','Gary','Herring','GaryHerring@gmail.com','202-555-0168','NC','USA'),  
('C33','3348-06-4952','Nicholas','Shannon','NicholasShannon@gmail.com','202-555-0130','ND','USA'),  
('C34','3448-06-4953','Eric','Rivas','EricRivas@gmail.com','202-555-0198','OH','USA'),  
('C35','3548-06-4954','Jonathan','Drake','JonathanDrake@gmail.com','202-555-0159','OK','USA'),  
('C36','3648-06-4955','Stephen','Bishop','StephenBishop@gmail.com','202-555-0110','OR','USA'),  
('C37','3748-06-4956','Larry','Frey','LarryFrey@gmail.com','202-555-0142','PA','USA'),  
('C38','3848-06-4957','Justin','Odonnell','JustinOdonnell@gmail.com','202-555-0181','RI','USA'),  
('C39','3948-06-4958','Scott','Bowen','ScottBowen@gmail.com','202-555-0174','SC','USA'),  
('C40','4048-06-4959','Brandon','Wu','BrandonWu@gmail.com','202-555-0173','SD','USA'),  
('C41','4148-06-4960','Benjamin','Andrews','BenjaminAndrews@gmail.com','202-555-0137','TN','USA'),  
('C42','4248-06-4961','Samuel','Simpson','SamuelSimpson@gmail.com','202-555-0128','TX','USA'),  
('C43','4348-06-4962','Frank','Summers','FrankSummers@gmail.com','202-555-0149','UT','USA'),  
('C44','4448-06-4963','Gregory','Booth','GregoryBooth@gmail.com','202-555-0196','VT','USA'),  
('C45','4548-06-4964','Raymond','Barber','RaymondBarber@gmail.com','202-555-0168','VA','USA'),  
('C46','4648-06-4965','Alexander','Harris','AlexanderHarris@gmail.com','202-555-0170','WA','USA'),  
('C47','4748-06-4966','Patrick','Daniels','PatrickDaniels@gmail.com','202-555-0109','WV','USA'),  
('C48','4848-06-4967','Jack','Solomon','JackSolomon@gmail.com','202-555-0193','WI','USA'),  
('C49','4948-06-4968','Dennis','Randall','DennisRandall@gmail.com','202-555-0184','WY','USA'),  
('C50','5048-06-4969','Jerry','Wang','JerryWang@gmail.com','202-555-0140','NJ','USA'),  
('C51','5148-06-4970','Tyler','Odonnell','TylerOdonnell@gmail.com','202-555-0197','NM','USA'),  
('C52','5248-06-4971','Aaron','Leon','AaronLeon@gmail.com','202-555-0195','NY','USA'),

('C53','5348-06-4972','Jose','Moyer','JoseMoyer@gmail.com','202-555-0139','NC','USA'),  
('C54','5448-06-4973','Henry','Mccullough','HenryMccullough@gmail.com','202-555-0115','ND','USA'),  
('C55','5548-06-4974','Adam','Ferguson','AdamFerguson@gmail.com','202-555-0176','OH','USA'),  
('C56','5648-06-4975','Mary','Huang','MaryHuang@gmail.com','202-555-0123','OK','USA'),  
('C57','5748-06-4921','Patricia','Hughes','PatriciaHughes@gmail.com','202-555-0186','RI','USA'),  
('C58','5848-06-4921','Jennifer','Mullen','JenniferMullen@gmail.com','202-555-0174','SC','USA'),  
('C59','5948-06-4922','Linda','Gregory','LindaGregory@gmail.com','202-555-0142','SD','USA'),  
('C60','6048-06-4923','Elizabeth','Callahan','ElizabethCallahan@gmail.com','202-555-0151','TN','USA'),  
('C61','6148-06-4924','Barbara','Parks','BarbaraParks@gmail.com','202-555-0188','TX','USA'),  
('C62','6248-06-4925','Susan','Beltran','SusanBeltran@gmail.com','202-555-0198','UT','USA'),  
('C63','6348-06-4926','Jessica','Munoz','JessicaMunoz@gmail.com','202-555-0118','VT','USA'),  
('C64','6448-06-4927','Sarah','Byrd','SarahByrd@gmail.com','202-555-0119','LA','USA'),  
('C65','6548-06-4928','Karen','Nielsen','KarenNielsen@gmail.com','202-555-0162','ME','USA'),  
('C66','6648-06-4929','Nancy','Le','NancyLe@gmail.com','202-555-0161','MD','USA'),  
('C67','6748-06-4930','Lisa','Peters','LisaPeters@gmail.com','202-555-0107','MA','USA'),  
('C68','6848-06-4931','Margaret','English','MargaretEnglish@gmail.com','202-555-0120','MI','USA'),  
('C69','6948-06-4932','Betty','Joseph','BettyJoseph@gmail.com','202-555-0168','MN','USA'),  
('C70','7048-06-4933','Sandra','Lucero','SandraLucero@gmail.com','202-555-0130','MS','USA'),  
('C71','7148-06-4934','Ashley','Pratt','AshleyPratt@gmail.com','202-555-0198','MO','USA'),  
('C72','7248-06-4935','Dorothy','Adkins','DorothyAdkins@gmail.com','202-555-0159','MT','USA'),  
('C73','7348-06-4936','Kimberly','Hahn','KimberlyHahn@gmail.com','202-555-0110','NE','USA'),  
('C74','7448-06-4937','Emily','Harrington','EmilyHarrington@gmail.com','202-555-0142','NV','USA'),  
('C75','7548-06-4938','Donna','Herring','DonnaHerring@gmail.com','202-555-0181','AR','USA'),  
('C76','7648-06-4939','Michelle','Murillo','MichelleMurillo@gmail.com','202-555-0174','CA','USA'),  
('C77','7748-06-4940','Carol','Liu','CarolLiu@gmail.com','202-555-0173','CO','USA'),  
('C78','7848-06-4941','Amanda','Norman','AmandaNorman@gmail.com','202-555-0137','CT','USA'),  
('C79','7948-06-4942','Melissa','Potter','MelissaPotter@gmail.com','202-555-0128','DE','USA'),  
('C80','8048-06-4943','Deborah','Black','DeborahBlack@gmail.com','202-555-0191','FL','USA'),  
('C81','8148-06-4944','Stephanie','Miller','StephanieMiller@gmail.com','202-555-0135','GA','USA'),  
('C82','8248-06-4945','Rebecca','Lara','RebeccaLara@gmail.com','202-555-0108','NE','USA'),  
('C83','8348-06-4946','Laura','Molina','LauraMolina@gmail.com','202-555-0132','NV','USA'),  
('C84','8448-06-4947','Sharon','Matthews','SharonMatthews@gmail.com','202-555-0142','NH','USA'),  
('C85','8548-06-4948','Cynthia','Li','CynthiaLi@gmail.com','202-555-0160','NJ','USA'),  
('C86','8648-06-4949','Kathleen','Tapia','KathleenTapia@gmail.com','202-555-0161','NM','USA'),

```
('C87','8748-06-4950','Amy','Gardner','AmyGardner@gmail.com','202-555-0159','NY','USA'),
('C88','8848-06-4951','Shirley','Bryant','ShirleyBryant@gmail.com','202-555-0141','NC','USA'),
('C89','8948-06-4952','Angela','Phillips','AngelaPhillips@gmail.com','202-555-0195','ND','USA'),
('C90','9048-06-4953','Helen','Walls','HelenWalls@gmail.com','202-555-0147','OH','USA'),
('C91','9148-06-4954','Anna','Petty','AnnaPetty@gmail.com','202-555-0157','OK','USA'),
('C92','9248-06-4955','Brenda','Owen','BrendaOwen@gmail.com','202-555-0140','OR','USA'),
('C93','9348-06-4956','Pamela','Shannon','PamelaShannon@gmail.com','202-555-0157','ID','USA'),
('C94','9448-06-4957','Nicole','Mclean','NicoleMclean@gmail.com','202-555-0178','IL','USA'),
('C95','9548-06-4958','Samantha','Patterson','SamanthaPatterson@gmail.com','202-555-0151','IN','USA'),
('C96','9648-06-4959','Katherine','Chavez','KatherineChavez@gmail.com','202-555-0188','IA','USA'),
('C97','9748-06-4960','Emma','Stevens','EmmaStevens@gmail.com','202-555-0198','KS','USA'),
('C98','9848-06-4961','Ruth','Barron','RuthBarron@gmail.com','202-555-0118','KY','USA'),
('C99','9948-06-4962','Christine','Bailey','ChristineBailey@gmail.com','202-555-0119','LA','USA'),
('C100','10048-06-4963','Catherine','Summers','CatherineSummers@gmail.com','202-555-0162','ME','USA');
```

**INSERT INTO`crc\_fleet`.`car` (`VIN`,`Description`,`Color`,`Brand`,`Model`,`Purchase\_Date`,`Category\_ID`)**

**VALUES**

```
('JTDKN3DU2E1820025','new tires and engine','Red','TOYOTA','2014PRIUS','2014-10-20','Categ_10'),
('1HGEM21271L042737','has one big scratch','Blue','HONDA','2001CIVIC','2002-06-15','Categ_4'),
('1FTYR44U64PA70824','perfect condition','Silver','FORD','2004RANGER','2004-05-03','Categ_6'),
('1FAFP42R14F135005','reservations to golden customers only','Black','FORD','2004MUSTANG','2014-05-20','Categ_1'),
('1G1ZB5E10BF127193','turbo engine','Blue','CHEVROLET','2011MALIBU','2011-08-16','Categ_1'),
('1GKDS13S322424265','has two big scratches','Black','GMC','2002ENVOY','2002-02-10','Categ_3'),
('5FNRL3H23AB090544','good condition, suggested for road trips','Black','HONDA','2010ODYSSEY','2011-05-16','Categ_9'),
('1G1PG5SB9E7371588','great condition, new tires','Gold','CHEVROLET','2014CRUZE','2015-10-22','Categ_1'),
('3GNCA23B89S633314','available upon request','Black','CHEVROLET','2009HHR','2010-05-20','Categ_6'),
('2G2WP552061172513','very good condition','White','PONTIAC','2006GRANDPRIX','2007-06-15','Categ_2'),
('3FA6P0LU4ER196350','good condition','Blueblack','Ford','2014FUSION','2015-07-22','Categ_1'),
('1G6KF52Y3RU230535','old car','Red','CADILLAC','1994DEVILLE','1995-01-10','Categ_5'),
('2T2BK1BA1DC199677','very good condition','Black','LEXUS','2013RX','2013-09-09','Categ_3'),
('JA4MW51R72J005049','perfect for off road','Red','MITSUBISHI','2002MONTERO','2007-09-09','Categ_2'),
('1GNLVFED5AS121133','luxurious','Silver','CHEVROLET','2010TRAVERSE','2011-08-07','Categ_1'),
('1FAHP35N59W183237','family car','Black','FORD','2009FOCUS','2011-07-19','Categ_6'),
```

```
('1HGCM56457A009744','Economy-great condition','Beige','HONDA','2007ACCORD','2008-08-08','Categ_9'),
('2GCEC13J981259223','good condition','Silver','CHEVROLET','2008SILVERADO','2009-08-13','Categ_8'),
('JH2PC37096M306944','excellent condition','Blue','BMW','2008528I','2009-03-19','Categ_7'),
('WVWAA71F48V001339','good condition','Black','VOLKSWAGEN','2008EOS','2009-07-20','Categ_2');
```

**INSERT INTO `crc\_fleet`.`locations`**

**(`Location\_ID`,`Street`,`Number`,`City`,`State`,`Country`,`Phone`)**

**VALUES**

```
('L1','Atlantic St.',49,'Boston','MA','USA','203-555-0574'),
('L2','Mayfield St.',22,'Newport','RI','USA','204-555-0259,202-555-0108'),
('L3','Locust St.',37,'Columbia','SC','USA','202-555-0246,202-555-1684'),
('L4','East High Noon St.',115,'Rapid City','SD','USA','202-555-0753'),
('L5','Bohemian Avenue',87,'Newark','NJ','USA','202-555-2468'),
('L6','South Poplar Street',55,'Huston','TX','USA','202-555-1354'),
('L7','Prince St.',482,'Salt Lake','UT','USA','202-555-2378'),
('L8','Williams Rd.',119,'New York','NY','USA','202-555-2357'),
('L9','Berkshire Court',338,'Los Angeles','CA','USA','202-555-1479'),
('L10','Creeside Road',552,'Miami','FL','USA','202-555-5784');
```

**INSERT INTO `crc\_fleet`.`reservations`**

**(`Reservation\_ID`,`Amount`,`Pickup\_Date`,`Return\_Date`,`Pickup\_Location\_ID`,`Return\_Location\_ID`,`Customer\_ID`,`Car\_ID`)**

**VALUES**

```
('1R',125,'2014-01-01','2014-01-29','L3','L5','C1','JTDKN3DU2E1820025'),
('2R',300,'2014-01-02','2014-01-31','L6','L2','C2','1HGEM21271L042737'),
('3R',245,'2014-01-19','2014-02-03','L3','L3','C3','1FTYR44U64PA70824'),
('4R',235,'2014-01-19','2014-02-05','L2','L1','C65','1FAFP42R14F135005'),
('5R',753,'2014-01-19','2014-02-15','L1','L3','C66','2G2WP552061172513'),
('6R',658,'2014-02-01','2014-02-17','L3','L3','C67','1G6KF52Y3RU230535'),
('7R',462,'2014-02-19','2014-03-19','L5','L2','C68','1FAFP42R14F135005'),
('8R',326,'2014-03-29','2014-04-01','L4','L5','C69','1G1ZB5E10BF127193'),
('9R',2425,'2014-03-31','2014-04-19','L5','L4','C70','1FTYR44U64PA70824'),
('10R',245,'2014-04-03','2014-04-20','L3','L5','C71','2G2WP552061172513'),
('11R',242,'2014-04-05','2014-04-20','L5','L3','C72','2GCEC13J981259223'),
```

('12R',357,'2014-04-15','2014-05-01','L2','L5','C44','1G6KF52Y3RU230535'),  
('13R',878,'2014-04-17','2014-05-19','L3','L2','C45','1G1ZB5E10BF127193'),  
('14R',468,'2014-05-19','2014-05-29','L1','L3','C46','1FTYR44U64PA70824'),  
('15R',264,'2014-05-01','2014-05-11','L3','L1','C47','1GKDS13S322424265'),  
('16R',368,'2014-05-19','2014-05-21','L5','L3','C48','1HGEM21271L042737'),  
('17R',2356,'2014-05-20','2014-06-01','L7','L3','C49','JTDKN3DU2E1820025'),  
('18R',25,'2014-05-20','2014-06-19','L9','L5','C50','JH2PC37096M306944'),  
('19R',242,'2014-05-01','2014-06-01','L10','L7','C51','1G1ZB5E10BF127193'),  
('20R',567,'2014-06-19','2014-07-19','L3','L9','C52','1G1PG5SB9E7371588'),  
('21R',343,'2014-06-29','2014-07-19','L8','L10','C23','3GNCA23B89S633314'),  
('22R',578,'2014-06-30','2014-07-01','L9','L3','C24','2G2WP552061172513'),  
('23R',563,'2014-06-30','2014-07-19','L6','L8','C25','1FAFP42R14F135005'),  
('24R',567,'2014-07-01','2014-07-19','L10','L9','C26','JH2PC37096M306944'),  
('25R',327,'2014-07-19','2014-08-19','L2','L6','C27','1FTYR44U64PA70824'),  
('26R',835,'2014-07-01','2014-08-01','L3','L2','C28','1FAFP42R14F135005'),  
('27R',375,'2014-07-19','2014-08-19','L8','L1','C29','1HGCM56457A009744'),  
('28R',247,'2014-08-19','2014-09-29','L6','L3','C30','5FNRL3H23AB090544'),  
('29R',972,'2014-05-01','2014-09-30','L7','L5','C78','JTDKN3DU2E1820025'),  
('30R',478,'2014-09-19','2014-09-30','L2','L4','C79','1FTYR44U64PA70824'),  
('31R',2356,'2014-08-19','2014-09-11','L5','L5','C80','1FAFP42R14F135005'),  
('32R',235,'2014-08-19','2014-09-12','L7','L3','C81','JTDKN3DU2E1820025'),  
('33R',278,'2014-09-01','2014-09-14','L9','L4','C82','1G6KF52Y3RU230535'),  
('34R',573,'2014-09-19','2014-09-25','L10','L5','C83','1G1ZB5E10BF127193'),  
('35R',468,'2014-10-29','2014-11-30','L3','L7','C84','1FAFP42R14F135005'),  
('36R',368,'2014-10-31','2014-11-02','L8','L9','C85','1G1ZB5E10BF127193'),  
('37R',367,'2014-10-31','2014-11-12','L2','L10','C86','1GKDS13S322424265'),  
('38R',222,'2014-11-11','2014-11-15','L1','L3','C89','JH2PC37096M306944'),  
('39R',863,'2014-11-12','2014-11-16','L3','L8','C90','1G1PG5SB9E7371588'),  
('40R',964,'2014-11-14','2014-11-17','L5','L2','C91','3GNCA23B89S633314'),  
('41R',246,'2014-11-25','2014-12-17','L4','L1','C92','2GCEC13J981259223'),  
('42R',567,'2014-11-30','2014-12-17','L5','L3','C93','1HGCM56457A009744'),  
('43R',234,'2014-12-02','2014-12-11','L7','L8','C94','5FNRL3H23AB090544'),  
('44R',65,'2014-12-12','2014-12-17','L9','L9','C95','1G1ZB5E10BF127193'),  
('45R',436,'2014-12-15','2014-12-17','L10','L6','C96','1FAFP42R14F135005'),

('46R',79,'2014-12-16','2014-12-25','L3','L3','C97','JTDKN3DU2E1820025'),  
('47R',42,'2014-12-17','2014-12-31','L8','L8','C98','1HGEM21271L042737'),  
('48R',787,'2014-12-17','2015-01-19','L2','L9','C34','1FTYR44U64PA70824'),  
('49R',643,'2014-12-17','2015-01-01','L1','L10','C35','1GKDS13S322424265'),  
('50R',796,'2014-12-11','2015-01-19','L3','L3','C36','3GNCA23B89S633314'),  
('51R',346,'2014-12-12','2015-01-19','L8','L8','C37','1G6KF52Y3RU230535'),  
('52R',987,'2014-12-14','2015-01-19','L9','L2','C38','1G1PG5SB9E7371588'),  
('53R',63,'2014-12-25','2015-02-01','L6','L1','C39','1FAFP42R14F135005'),  
('54R',646,'2014-12-31','2015-02-19','L4','L3','C40','5FNRL3H23AB090544'),  
('55R',634,'2015-01-19','2015-03-29','L5','L5','C41','1G1PG5SB9E7371588'),  
('56R',902,'2015-01-01','2015-03-31','L3','L4','C42','3GNCA23B89S633314'),  
('57R',462,'2015-01-19','2015-04-03','L5','L5','C43','2G2WP552061172513'),  
('58R',657,'2015-01-19','2015-04-05','L2','L7','C44','1HGCM56457A009744'),  
('59R',952,'2015-01-19','2015-04-15','L3','L3','C3','1G1ZB5E10BF127193'),  
('60R',664,'2015-02-01','2015-04-17','L1','L8','C4','1GKDS13S322424265'),  
('61R',673,'2015-02-19','2015-05-19','L3','L2','C5','5FNRL3H23AB090544'),  
('62R',242,'2015-03-29','2015-05-01','L3','L1','C6','1G1PG5SB9E7371588'),  
('63R',478,'2015-03-31','2015-05-19','L2','L3','C7','3GNCA23B89S633314'),  
('64R',574,'2015-04-03','2015-05-20','L1','L8','C8','2G2WP552061172513'),  
('65R',375,'2015-04-05','2015-05-20','L3','L9','C9','1G1PG5SB9E7371588'),  
('66R',573,'2015-04-15','2015-05-01','L5','L6','C10','1FAFP42R14F135005'),  
('67R',573,'2015-04-17','2015-06-19','L4','L4','C11','1G1ZB5E10BF127193'),  
('68R',357,'2015-05-19','2015-06-29','L5','L5','C12','1GKDS13S322424265'),  
('69R',853,'2015-05-01','2015-06-30','L8','L3','C33','1HGCM56457A009744'),  
('70R',584,'2015-05-19','2015-06-30','L8','L2','C34','1HGCM56457A009744'),  
('71R',457,'2015-05-20','2015-07-01','L5','L1','C35','1FAFP42R14F135005'),  
('72R',246,'2015-05-20','2015-07-19','L9','L3','C36','2GCEC13J981259223'),  
('73R',266,'2015-05-20','2015-07-01','L9','L5','C37','1FAFP42R14F135005'),  
('74R',462,'2015-05-20','2015-07-19','L8','L4','C38','1FAFP42R14F135005'),  
('75R',84,'2015-06-29','2015-08-19','L1','L5','C39','2G2WP552061172513'),  
('76R',462,'2015-06-30','2015-05-01','L3','L10','C40','1G1PG5SB9E7371588'),  
('77R',469,'2015-06-30','2015-09-19','L5','L2','C41','3GNCA23B89S633314'),  
('78R',362,'2015-07-01','2015-08-19','L4','L3','C42','5FNRL3H23AB090544'),  
('79R',467,'2015-07-19','2015-08-19','L5','L8','C43','1G1PG5SB9E7371588'),

```
( '80R',246,'2015-07-18','2015-09-01','L7','L6','C44','1FAFP42R14F135005'),
( '81R',375,'2015-08-19','2015-09-19','L9','L7','C45','1G6KF52Y3RU230535'),
( '82R',473,'2015-08-19','2015-10-29','L10','L1','C46','1HGCM56457A009744'),
( '83R',563,'2015-05-01','2015-10-31','L7','L3','C47','1FTYR44U64PA70824'),
( '84R',966,'2015-09-19','2015-10-31','L5','L5','C48','1FAFP42R14F135005'),
( '85R',537,'2015-08-19','2015-11-11','L2','L9','C49','2G2WP552061172513'),
( '86R',573,'2015-08-19','2015-11-12','L3','L10','C50','1HGCM56457A009744'),
( '87R',846,'2015-09-01','2015-11-14','L1','L7','C66','1G6KF52Y3RU230535'),
( '88R',357,'2015-09-19','2015-11-25','L3','L5','C67','JTDKN3DU2E1820025'),
( '89R',135,'2015-10-29','2015-11-30','L3','L2','C68','1HGEM21271L042737'),
( '90R',747,'2015-10-31','2015-12-02','L2','L3','C69','3GNCA23B89S633314'),
( '91R',95,'2015-10-31','2015-12-12','L5','L3','C70','2G2WP552061172513'),
( '92R',245,'2015-11-11','2015-12-15','L4','L2','C71','1G1PG5SB9E7371588'),
( '93R',532,'2015-11-12','2015-12-16','L5','L5','C72','3GNCA23B89S633314'),
( '94R',52,'2015-11-14','2015-12-17','L3','L4','C73','5FNRL3H23AB090544'),
( '95R',457,'2015-11-25','2015-12-17','L5','L5','C74','1FAFP42R14F135005'),
( '96R',246,'2015-11-30','2015-12-17','L2','L3','C57','1G1ZB5E10BF127193'),
( '97R',266,'2015-12-02','2015-12-11','L3','L5','C58','1GKDS13S322424265'),
( '98R',462,'2015-12-12','2015-12-12','L1','L2','C59','5FNRL3H23AB090544'),
( '99R',84,'2015-12-15','2015-12-14','L3','L3','C60','1G1PG5SB9E7371588'),
( '100R',637,'2015-12-16','2015-12-25','L6','L1','C61','2G2WP552061172513');
```



## QUESTION 3: WRITE SQL QUERIES


### # A. SHOW THE RESERVATION NUMNER AND THE LOCATION OF ALL RENTALS ON 5/20/2015

```

SELECT Reservation_ID, Location_ID
FROM reservations as R, locations as L
WHERE R.Pickup_Location_ID = L.Location_ID
AND R.Pickup_Date = '2015-05-20';

```

	Reservation_ID	Location_ID
▶	71R	L5
	72R	L9
	73R	L9
	74R	L8

 4 23:43:47 SELECT Reservation\_ID, Location\_ID FROM reservations as R, locations as L WHE... 4 row(s) returned


In case that by active rentals you also refer to the ones for which the Return Location is '2015-05-20', the query is the following one.

```

SELECT Reservation_ID, Pickup_Location_ID , Return_Location_ID
FROM reservations as R, locations as L
WHERE R.Pickup_Location_ID = L.Location_ID
AND (R.Pickup_Date = '2015-05-20' OR R.Return_Date = '2015-05-20');

```

	Reservation_ID	Pickup_Location_ID	Return_Location_ID
▶	64R	L1	L8
	65R	L3	L9
	71R	L5	L1
	72R	L9	L3
	73R	L9	L5
	74R	L8	L4

 19 19:04:53 SELECT Reservation\_ID, Pickup\_Location\_ID , Return\_Location\_ID FROM reservat... 6 row(s) returned


## # B. SHOW THE FIRST AND THE LAST NAME AND THE MOBILE PHONE NUMBER OF THESE CUSTOMERS THAT HAVE RENTED A CAR IN THE CATEGORY THAT HAS LABEL = 'LUXURY'

```

SELECT First_Name, Last_Name, Mobile_Phone
FROM customer as Cust, reservations as Resv, car as C, category as Categ
WHERE Cust.Customer_ID = Resv.Customer_ID
AND Resv.Car_ID = C.VIN
AND C.Category_ID = Categ.Category_ID
AND Categ.Label = 'Luxury';

```

	First_Name	Last_Name	Mobile_Phone
	Scott	Bowen	202-555-0174
	Charles	Keller	202-555-0108
	Jonathan	Drake	202-555-0159
	Larry	Frey	202-555-0142
	Justin	Odonnell	202-555-0181
	Margaret	English	202-555-0120
	Gregory	Booth	202-555-0196
	Jack	Solomon	202-555-0193
	Emily	Harrington	202-555-0142
	Aaron	Leon	202-555-0195
	Helen	Walls	202-555-0147
	Justin	Odonnell	202-555-0181
	Benjamin	Andrews	202-555-0137


 20 19:07:29 SELECT First\_Name, Last\_Name, Mobile\_Phone FROM customer as Cust, reservatio... 34 row(s) returned


## # C. SHOW THE TOTAL AMOUNT OF RENTALS PER LOCATION ID (PICK UP)

```

SELECT sum(Amount) as Total_Amount, Pickup_Location_ID
FROM reservations
GROUP BY Pickup_Location_ID;

```

	Total_Amount	Pickup_Location_ID
▶	4716	L1
	2291	L10
	5216	L2
	11096	L3
	2398	L4
	12853	L5
	1810	L6
	4606	L7
	3373	L8
	2820	L9


 21 19:11:34 SELECT sum(Amount) as Total\_Amount, Pickup\_Location\_ID FROM reservations G... 10 row(s) returned


#### # D. SHOW THE TOTAL AMOUNT OF RENTALS PER CAR'S CATEGORY ID AND MONTH

```

SELECT sum(Amount) as Amount, Categ.Category_ID,
month(R.Pickup_Date) as Month, year(R.Pickup_Date) as Year
FROM reservations as R, category as Categ, car as C
WHERE R.Car_ID = C.VIN
AND C.Category_ID = Categ.Category_ID
GROUP BY Categ.Category_ID, Month, Year
ORDER BY Categ.Category_ID, Year ASC, Month ASC;

```

	Amount	Category_ID	Month	Year
▶	235	Categ_1	1	2014
	462	Categ_1	2	2014
	326	Categ_1	3	2014
	878	Categ_1	4	2014
	242	Categ_1	5	2014
	1130	Categ_1	6	2014
	835	Categ_1	7	2014
	2356	Categ_1	8	2014
	573	Categ_1	9	2014
	836	Categ_1	10	2014
	863	Categ_1	11	2014


 22 19:23:50 SELECT sum(Amount) as Amount, Categ.Category\_ID, month(R.Pickup\_Date) as Mo... 82 row(s) returned


## # E. FOR EACH RENTAL'S STATE (PICK UP) SHOW THE TOP RENTING CATEGORY

```

SELECT TOP_CAT.State, TOP_CAT.Label, TOP_CAT.TOP_RENT
FROM
(
    SELECT R.Label, R.State, R.Category_ID, R.TOP_RENT,
    DENSE_RANK() OVER (PARTITION BY R.State ORDER BY R.TOP_RENT DESC) as DR
    FROM
    (
        SELECT Cat.Label ,L.State, C.Category_ID, count(C.Category_ID) as
        TOP_RENT
        FROM locations as L, reservations as R, car as C, category as Cat
        WHERE L.Location_ID = R.Pickup_Location_ID
        AND C.VIN = R.Car_ID
        AND C.Category_ID = Cat.Category_ID
        GROUP BY L.State, C.Category_ID
        ORDER BY count(C.Category_ID) DESC
    ) as R
    ) TOP_CAT
WHERE TOP_CAT.DR = 1;

```

	State	Label	TOP_RENT
▶	CA	Luxury	3
	FL	Luxury	3
	MA	Minivan	3
	NJ	Luxury	8
	NY	Compact	3
	RI	Family	5
	SC	Luxury	10
	SD	Luxury	3
	TX	Luxury	2
	UT	Economy	3


 25 19:37:04 SELECT TOP\_CAT.State, TOP\_CAT.Label, TOP\_CAT.TOP\_RENT FROM ( SELECT... 10 row(s) returned

## # F. SHOW HOW MANY RENTALS THERE WERE IN MAY 2015 IN 'NY', 'NJ' AND 'CA' (IN THREE COLUMNS)

```

SELECT DISTINCT
count(CASE WHEN L.State = "NY" THEN R.Reservation_ID END) "NY",
count(CASE WHEN L.State = "NJ" THEN R.Reservation_ID END) "NJ",
count(CASE WHEN L.State = "CA" THEN R.Reservation_ID END) "CA"
FROM reservations as R, locations as L
WHERE R.Pickup_Location_ID = L.Location_ID
AND R.Pickup_Date like '2015-05%';

```

	NY	NJ	CA
▶	3	2	2

✓ 26 19:40:18 SELECT DISTINCT count(CASE WHEN L.State = "NY" THEN R.Reservation\_ID EN... 1 row(s) returned

## # G. FOR EACH MONTH OF 2015, COUNT HOW MANY RENTALS HAD AMOUNT GREATER THAN THIS MONTH'S AVERAGE RENTAL AMOUNT

```

SELECT month(R_OUT.Pickup_Date) as MONTHS, COUNT(*) as ABOVE_AVG
FROM reservations as R_OUT
WHERE R_OUT.Amount >
(
    SELECT A.AVERAGE_AMOUNT FROM
    (
        SELECT MONTH(R_IN.Pickup_Date) AS INNER_MONTHS, AVG(R_IN.AMOUNT) AS AVERAGE_AMOUNT
        FROM reservations as R_IN
        WHERE YEAR(R_IN.Pickup_Date)=2015
        GROUP BY MONTH(R_IN.Pickup_Date)
    )A
    WHERE INNER_MONTHS = MONTH(R_OUT.Pickup_Date)
)
AND YEAR(R_OUT.Pickup_Date)=2015

```

**GROUP BY** MONTH(R\_OUT.Pickup\_Date)

**ORDER BY** MONTH(R\_OUT.Pickup\_Date) ASC;

	MONTHS	ABOVE_AVG
▶	1	2
	2	1
	3	1
	4	3
	5	3
	6	2
	7	2
	8	2
	9	2
	10	1
	11	2
	12	2

✓ 27 19:44:13 SELECT month(R\_OUT.Pickup\_Date) as MONTHS, COUNT(\*) as ABOVE\_AVG FRO... 12 row(s) returned

## # H. FOR EACH MONTH OF 2015, SHOW THE PERCENTAGE CHANGE OF THE TOTAL AMOUNT OF RENTALS OVER THE TOTAL AMOUNT OF RENTALS OF THE SAME MONTH OF 2014

```

SELECT MONTH_2015,
concat(round(100*(CURRENT.TOTAL_AMOUNT_2015 - PREVIOUS.TOTAL_AMOUNT_2014) /
PREVIOUS.TOTAL_AMOUNT_2014),'%') AS PERCENTAGE_DIFFERENCE
FROM
(
    #FIND THE TOTAL AMOUNT OF EACH MONTH OF 2015
    SELECT MONTH(CURR_RSV.Pickup_Date) AS MONTH_2015 ,
           SUM(CURR_RSV.AMOUNT) AS TOTAL_AMOUNT_2015
    FROM reservations as CURR_RSV
    WHERE YEAR(CURR_RSV.Pickup_Date)=2015
    GROUP BY MONTH(CURR_RSV.Pickup_Date)
           ORDER BY MONTH(CURR_RSV.Pickup_Date) ASC
) CURRENT
LEFT JOIN

```

```

(
#FIND THE TOTAL AMOUNT OF EACH MONTH OF 2014
SELECT MONTH(PRE_RSV.Pickup_Date) AS MONTH_2014 ,
        SUM(PRE_RSV.AMOUNT) AS TOTAL_AMOUNT_2014
FROM reservations as PRE_RSV
WHERE YEAR(PRE_RSV.Pickup_Date)=2014
GROUP BY MONTH(PRE_RSV.Pickup_Date)
        ORDER BY MONTH(PRE_RSV.Pickup_Date) ASC
) PREVIOUS
ON PREVIOUS.MONTH_2014 = CURRENT.MONTH_2015;

```

	MONTH_2015	PERCENTAGE_DIFFERENCE
▶	1	118%
	2	19%
	3	-74%
	4	22%
	5	-19%
	6	-51%
	7	-49%
	8	-31%
	9	63%
	10	-19%
	11	-46%
	12	-72%



 28 19:50:33 SELECT MONTH 2015, concat(round(100\*(CURRENT.TOTAL AMOUNT 2015 - P... 12 row(s) returned

**# I. FOR EACH MONTH OF 2015, SHOW IN THREE COLUMNS: THE TOTAL RENTALS' AMOUNT OF THE PREVIOUS MONTHS, THE TOTAL RENTALS' AMOUNT OF THIS MONTH AND THE TOTAL RENTALS' AMOUNT OF THE FOLLOWING MONTHS**

```
SELECT R_PRE.PREVIOUS_AMOUNT, CURRENT_AMOUNT, (TOTAL_AMOUNT - R_PRE.PREVIOUS_AMOUNT -  
CURRENT_AMOUNT) AS NEXT_AMOUNT  
  
FROM  
  
(  
  
    SELECT PREVIOUS.MONTH_2015, abs(sum(PREVIOUS.CURRENT_AMOUNT) OVER (ORDER BY  
MONTH_2015) - CURRENT_AMOUNT) AS PREVIOUS_AMOUNT, CURRENT_AMOUNT  
  
    FROM reservations as R_PRE,  
  
    (  
  
        SELECT MONTH(R_CURR.Pickup_Date) AS MONTH_2015, SUM(R_CURR.AMOUNT) AS  
CURRENT_AMOUNT  
  
        FROM reservations as R_CURR  
  
        WHERE YEAR(R_CURR.Pickup_Date)=2015  
  
        GROUP BY MONTH(R_CURR.Pickup_Date)  
  
    ) PREVIOUS  
  
    WHERE YEAR(R_PRE.Pickup_Date)=2015  
  
    GROUP BY MONTH_2015  
  
    ) R_PRE  
  
INNER JOIN  
  
(  
  
    SELECT SUM(R.Amount) AS TOTAL_AMOUNT  
  
    FROM reservations as R  
  
    WHERE YEAR(R.Pickup_Date)=2015  
  
    ) NEXT  
  
GROUP BY MONTH_2015;
```



	PREVIOUS_AMOUNT	CURRENT_AMOUNT	NEXT_AMOUNT
▶ 0	3607	3607	18115
	3607	1337	16778
	4944	720	16058
	5664	2095	13963
	7759	3788	10175
	11547	1015	9160
	12562	1075	8085
	13637	1958	6127
	15595	2169	3958
	17764	977	2981
	18741	1532	1449
	20273	1449	0

 29 19:55:51 SELECT R\_PRE.PREVIOUS\_AMOUNT, CURRENT\_AMOUNT, (TOTAL\_AMOUNT ... 12 row(s) returned

The calculations we performed in order to estimate the previous and next amount are shown below:

	PREVIOUS_AMOUNT	CURRENT_AMOUNT	NEXT_AMOUNT
▶ 0	3607	3607	18115
	3607	1337	16778
	4944	720	16058
	5664	2095	13963
	7759	3788	10175
	11547	1015	9160
	12562	1075	8085
	13637	1958	6127
	15595	2169	3958
	17764	977	2981
	18741	1532	1449
	20273	1449	0

Total Amount = 21722

Calculations shown in the table:
 

- Row 3: 4944 = 3607 + 1337
- Row 4: 5664 = 4944 + 720
- Row 8: 13637 = 12562 + 1075
- Row 9: 1958 = 13637 - 12562
- Row 9: 6127 = 1958 \* 3.125 (approximate)

## QUESTION 4: AUTOMATION

---

**USING THE PROGRAMMING LANGUAGE OF YOUR CHOICE, CONNECT TO THE DATABASE AND IMPLEMENT QUERY (I) ABOVE – WITHOUT USING GROUP BY SQL STATEMENTS, I.E. YOU ARE ONLY ALLOWED TO USE SELECT...FROM...WHERE**

```
#install packages

install.packages("DBI")
install.packages("RMySQL")


#import libraries

library(DBI)
library(RMySQL)
library(knitr)


#setup db connection

driver <- dbDriver("MySQL")

connect <- dbConnect(driver, user= "root", password="root", dbname="crc_fleet",
host="localhost", port=3306)


#create a list with months

months = list()


for(i in 1:12)
{
  SELECT <- paste("SELECT sum(amount) FROM reservations WHERE year(pickup_date)=2015
AND month(pickup_date)=", i, ";", sep = "")

  sendquery <- dbSendQuery(connect, SELECT)

  data <- fetch(sendquery, n=1)

  dbClearResult(sendquery)

  data$month <- i

  months[[i]] <- data
}
```

```
}

#create a table with columns Month and Total Amount of current month

TotalAmount = do.call(rbind, months); names (TotalAmount) <-
c("CurrentAmount", "Month")

View(TotalAmount)


PreviousAmount <- 0
NextAmount <- sum(TotalAmount$CurrentAmount)
Totals <- list()
Totals <- NULL

for(i in 1:12)
{

  CurrentMonth <- TotalAmount[i,1]
  NextAmount <- NextAmount - CurrentMonth
  Totals[[i]] <-c(i, PreviousAmount, CurrentMonth, NextAmount)
  PreviousAmount <- PreviousAmount + TotalAmount[[i, 1]]
}

Totals <- data.frame(do.call(rbind, Totals)); names(Totals) <- c("Month", "Previous
Months", "Current Month", "Next Months");

print(Totals)
```

Console					
Terminal x					
Jobs x					
~/					
prime(10000)					
	Month	Previous Months	Current Month	Next Months	
1	1	0	3607	18115	
2	2	3607	1337	16778	
3	3	4944	720	16058	
4	4	5664	2095	13963	
5	5	7759	3788	10175	
6	6	11547	1015	9160	
7	7	12562	1075	8085	
8	8	13637	1958	6127	
9	9	15595	2169	3958	
10	10	17764	977	2981	
11	11	18741	1532	1449	
12	12	20273	1449	0	
>					