PDS Project – Car Rental

GURURAJ SHINDE

GSS399

Project Description

- A car rental company CRC provides services like renting a car to the customer depending on the car type, location and the number of hours to rent a particular car. The company wants to develop a relational database to monitor it's customers, car types, rentals and the locations.

Tables

- car – One record for describing every car
- car_type – One record for describing every car type of the car
- crc_office – One record for each location of the office
- office_tel – One record for each office present
- customer – One record describing each customer
- reservation – One record each describing reservation details

car table

Field	Description
carID	A unique ID assigned to each car unique
currentLocationID	The current location Id for the car depending on its current location
typeID	The type of the car to which it belongs to, acts as foreign key here
brand	The brand of the car
model	The model of the car
color	The color of the car
purchDate	The purchase date of the car

car_type table:

Field	Description	
typeID	A unique type for each car to which it belongs	unique
typeLabel	A label for each like Sedan, SUV, Truck, etc	
typeDecsr	A detailed description for the type of the car	

customer table

Field	Description	
customerID	A unique customer ID	unique
SSN	The SSN of each customer	
firstName	The first name of each customer	
lastName	The last name of each customer.	
mobile	The mobile number of the customer	
email	The email of the customer	
state	The state where the customer lives	
country	The country where the customer lives	

reservation table

Field	Description	
reservationID	A unique reservation ID when a particular car is rented	unique
carID	The car ID from the Car table	
customerID	The customer ID from the customer table	
pickupLocationID	The pickup location ID for the car	
returnLocationID	The return location ID for the car	
pickupDate	The pickup date for the car rented	
returnDate	The return Date for the car rented	
amount	The amount for the particular car to be rented	

crc_office table:

Field	Description	
locationID	The location ID for the CRC office where it is located	unique
defaultTel	The phone number of the office	
street	The street location of the office	
number	An alternative number for the office	
city	The city where the office is located	
state	The state where the office is located	
Country	The country where the office is located	

office_tel table:

Field	Description	
defaultTel	A default office number of the CRC rental services	unique
tel1	Alternative telephone number 1 of the CRC office depending on the location	
tel2	Alternative telephone number 2 of the CRC office depending on the location	
tel3	Alternative telephone number 3 of the CRC office depending on the location	

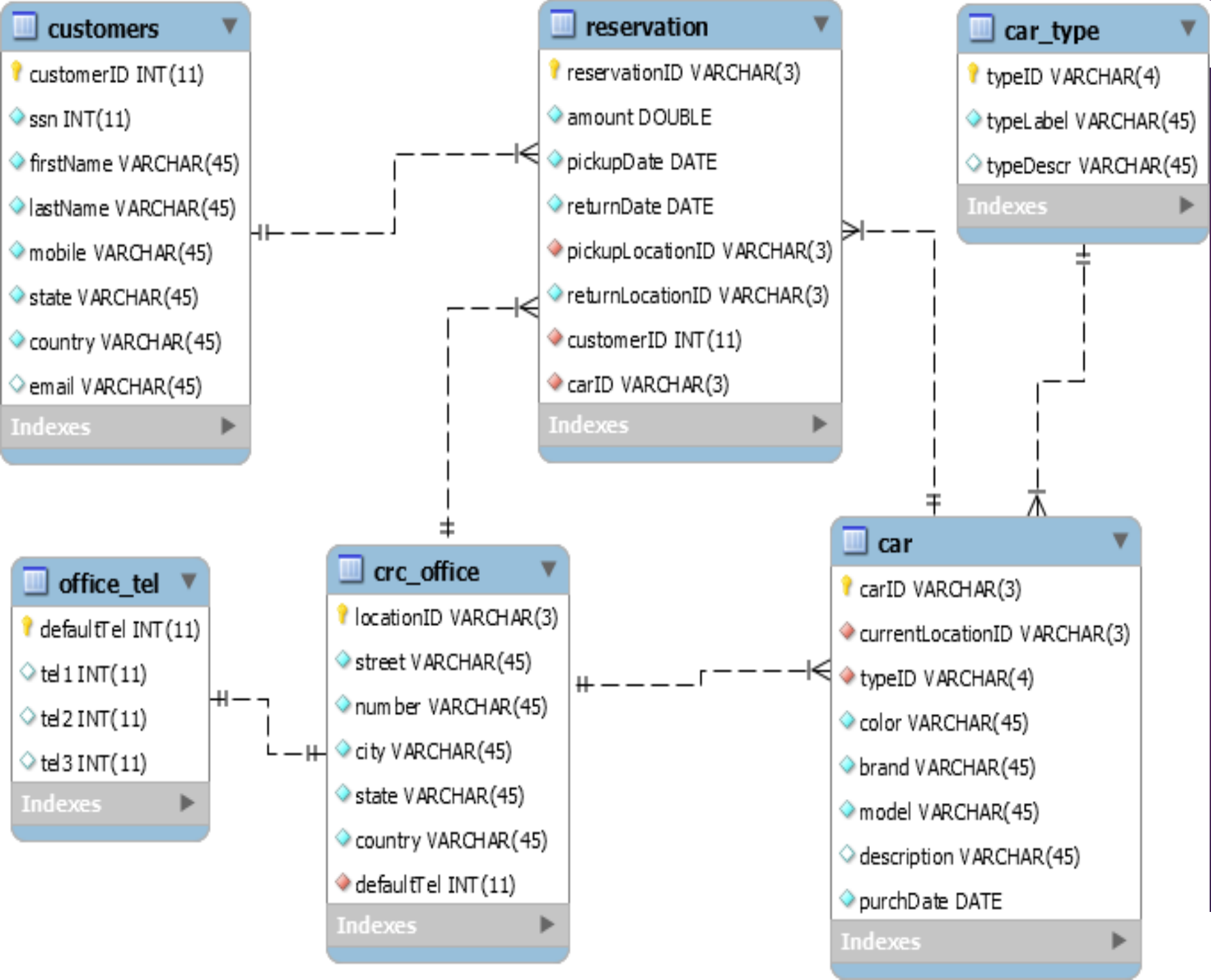
Semantic Rules(Real world rules):

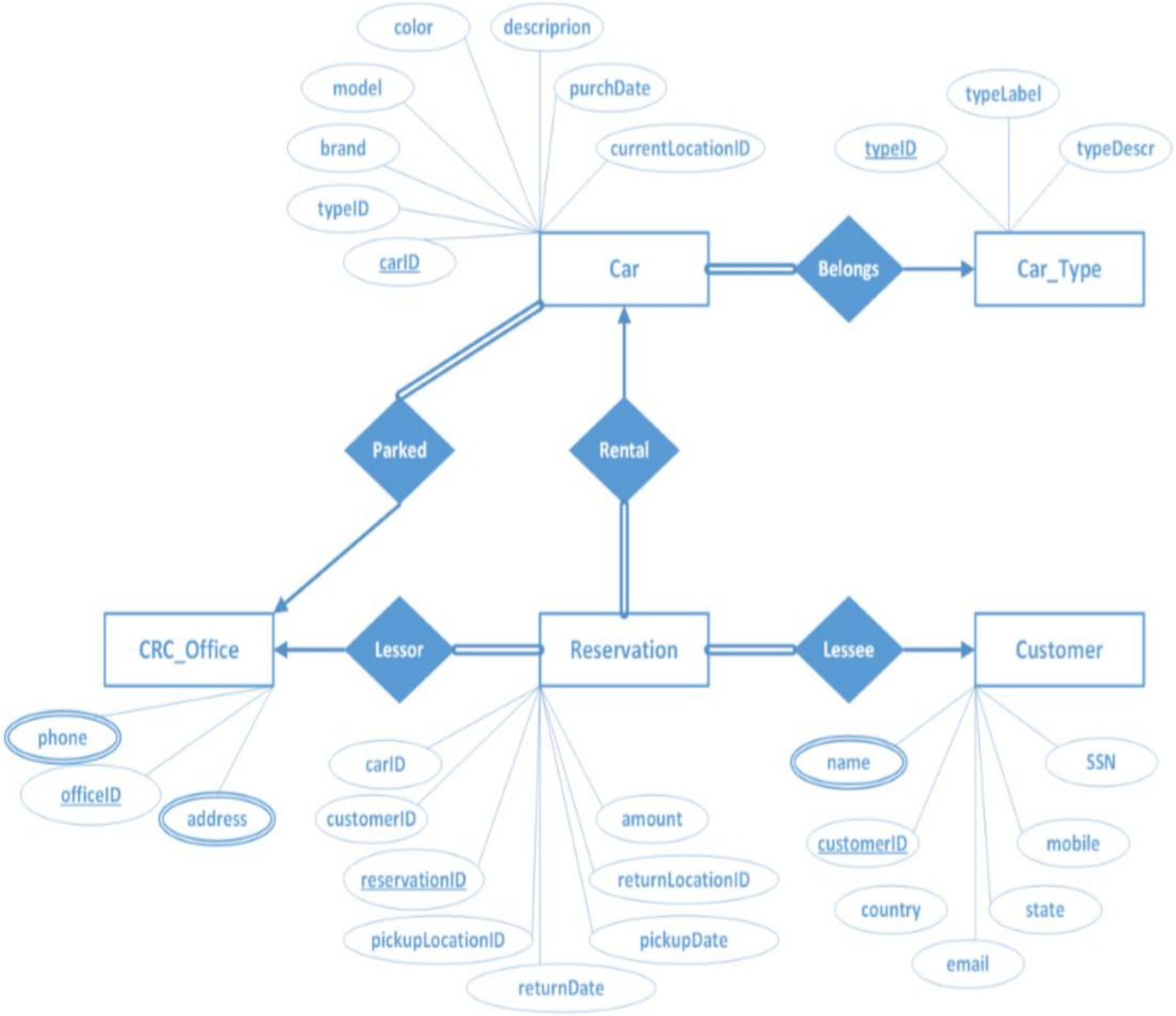
- The carID of Car is unique
- The typeID of Car_type is unique
- The customerID of customer is unique
- The reservationID of reservation is unique
- The defaultTel of office_tel is unique
- The locationID of the CRC_office is unique
- A car may belong to exactly one type of car
- Customer can rent car from one location known as pickup location and drop off at another location known as return location

Foreign Keys:

- car table:
  - car.currentLocationID references crc_office.locationID
  - car.typeID references car_type.typeID
- crc_office table:
  - crc_office.defaultTel references office_tel.defaultTel
- reservation table:
  - reservation.pickupLocationID references crc_office.locationID
  - reservation.customerID references customers.customerID
  - reservation.carID references car.carID

Database Diagram:




color
descriprion
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Belongs
typeLabel
typeID
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Car_Type
Parked
Rental
CRC_Office
Lessor
Reservation
Lessee
Customer
phone
officeID
address
carID
customerID
reservationID
pickupLocationID
returnDate
amount
returnLocationID
pickupDate
name
customerID
country
email
SSN
mobile
state

E-R diagram:

MySQL Script to create Database:

- Create database RentCar;
- use RentCar;

Create car table:

```
CREATE TABLE car (
    carID varchar(3) NOT NULL,
    currentLocationID varchar(3) NOT NULL,
    typeID varchar(4) NOT NULL,
    color varchar(45) NOT NULL,
    brand varchar(45) NOT NULL,
    model varchar(45) NOT NULL,
    description varchar(45) DEFAULT NULL,
    purchDate date NOT NULL,
    PRIMARY KEY (carID),
    UNIQUE KEY typeID_UNIQUE (typeID),
    UNIQUE KEY currentLocationID_UNIQUE (currentLocationID),
    UNIQUE KEY carID_UNIQUE (carID),
    CONSTRAINT currentLocationID foreign key (currentLocationID) references crc_office (locationID) ON DELETE NO ACTION ON UPDATE NO ACTION,
    CONSTRAINT locationID foreign key (currentLocationID) references crc_office (locationID) ON DELETE NO ACTION ON UPDATE NO ACTION,
    CONSTRAINT typeID foreign key (typeID) references car_type (typeID) ON DELETE NO ACTION ON UPDATE NO ACTION
    ) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

Create car_type table:

```
CREATE TABLE car_type (
    typeID varchar(4) NOT NULL,
    typeLabel varchar(45) NOT NULL,
    typeDescr varchar(45) DEFAULT NULL,
    PRIMARY KEY (typeID),
    UNIQUE KEY typeID_UNIQUE (typeID)
    ) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

Create customer table:

```
CREATE TABLE customers (
    customerID int(11) NOT NULL,
    ssn int(11) NOT NULL,
    firstName varchar(45) NOT NULL,
    lastName varchar(45) NOT NULL,
    mobile varchar(45) NOT NULL,
    state varchar(45) NOT NULL,
    country varchar(45) NOT NULL,
    email varchar(45) DEFAULT NULL,
    PRIMARY KEY (customerID),
    UNIQUE KEY ssn_UNIQUE (ssn),
    UNIQUE KEY customerID_UNIQUE (customerID)
    ) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

Create reservation table:

```
CREATE TABLE reservation (
    reservationID varchar(3) NOT NULL,
    amount double NOT NULL,
    pickupDate  date NOT NULL,
    returnDate  date NOT NULL,
    pickupLocationID varchar (3) NOT NULL ,
    returnLocationID varchar(3) NOT NULL,
    customerID int(11) NOT NULL,
    carID varchar (3) NOT NULL,
    PRIMARY KEY (reservationID),
    UNIQUE KEY  reservationID_UNIQUE (reservationID),
    KEY pickupLocationID_idx (pickupLocationID),
    KEY customerID_idx (customerID) ,
    KEY carID_idx (carID),
    CONSTRAINT carID FOREIGN KEY (carID) REFERENCES car (carID) ON DELETE NO ACTION ON UPDATE NO ACTION,
    CONSTRAINT customerID FOREIGN KEY (customerID) REFERENCES customers (customerID) ON DELETE NO ACTION ON UPDATE NO ACTION,
    CONSTRAINT pickupLocationID FOREIGN KEY (pickupLocationID) REFERENCES crc_office (locationID) ON DELETE NO ACTION ON UPDATE NO ACTION
) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

Create crc_office table:

```
CREATE TABLE crc_office (
    locationID varchar(3) NOT NULL,
    defaultTel int(11) 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,
    PRIMARY KEY (locationID),
    UNIQUE KEY locationID_UNIQUE (locationID),
    UNIQUE KEY defaultTel_UNIQUE (defaultTel),
    KEY defaultTel_idx (defaultTel),
    CONSTRAINT defaultTel foreign key (defaultTel) references office_tel (defaultTel) ON DELETE CASCADE ON UPDATE CASCADE
    ) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

Create offile_tel table:

```
CREATE TABLE office_tel (
    defaultTel int(11) NOT NULL,
    tel1 int(11) DEFAULT NULL,
    tel2 int(11) DEFAULT NULL,
    tel3 int(11) DEFAULT NULL,
    PRIMARY KEY (defaultTel),
    UNIQUE KEY defaultTel_UNIQUE (defaultTel)
    ) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

Load car table with insert:

- insert into car values(1, 'Brk', 101, 'Grey', 'Fiat', 'Basic', 'Family drive', '2020-05-01');
- insert into car values(2, 'Mhn', 102, 'Green', 'Mercedes', 'Medium', 'Romantic drive', '2015-05-01');
- insert into car values(5, 'Spr', 105, 'Pink', 'Fiat', 'Top End', 'Extended Family drive', '2018-02-20');

Load car_type table with insert:

- insert into car_type values(101, 'SUV', 'Good for Off-road’);
- insert into car_type values(102, 'Sedan', 'Good luxury feel’);
- insert into car_type values(103, 'Hatchback', 'Mini car to get through traffic’);
- insert into car_type values(104, 'Truck', 'For the Adventurer’);
- insert into car_type values(105, 'Bus', 'For the huge extended family');

Load customer table with insert:

- insert into customers values(111, 45678246, 'Sam', 'Hodd', '3474569087', 'NY', 'USA', 'sam.hodd@gmail.com');
- insert into customers values(112, 76251027, 'Sanj', 'Jang', '3256794561', 'LA', 'USA', 'sanj@hotmail.com');
- insert into customers values(113, 52463917, 'Tejas', 'Rathod', '4561237890', 'MD', 'USA', 'tejas@gmail.com');
- insert into customers values(114, 12539027, 'Kim', 'Un', '6789075634', 'NY', 'USA', 'kimun@outlook.com');
- insert into customers values(115, 42815292, 'Mahe', 'Gayles', '2451345678', 'IL', 'USA', 'mgayles@yahoo.com');
- insert into customers values(116, 28262821, 'Tassamai', 'Sawetpibul', '6785641324', 'NJ', 'USA', 'ts@hotmail.com');
- insert into customers values(117, 63827383, 'Katrina', 'Kaif', '7896785534', 'NY', 'USA', 'kkkaif@gmail.com');
- insert into customers values(118, 23519625, 'Aish', 'Kore', '5678905680', 'IL', 'USA', 'kasih@yahoo.com');

Load reservation table with insert:

- insert into reservation values(10, 500, '2020-05-01', '2020-05-03', 'Brk', 'Mhn', 111, '1');
- insert into reservation values(11, 700, '2020-05-02', '2020-05-03', 'Mhn', 'Brk', 117, '2');
- insert into reservation values(12, 2500, '2020-05-03', '2020-05-05', 'Mhn', 'Spr', 114, '5');
- insert into reservation values(13, 3700, '2020-05-01', '2020-05-06', 'Spr', 'Brk', 115, '2');
- insert into reservation values(9, 4700, '2020-03-05', '2020-03-08', 'Brk', 'Spr', 117, '5');
- insert into reservation values(8, 5500, '2020-02-13', '2020-02-17', 'Brk', 'Blt', 111, '2');

Load crc_office table with insert:

- insert into crc_office values('Brk', 1234567890 , '634 74th Street', '3472554501', 'NYC', 'NY', 'USA');
- insert into crc_office values('Mhn', 456789679 , '45th West Street', '567890123', 'NYC', 'NY', 'USA');
- insert into crc_office values('Spr', 1452729122 , '46th SpringField Street', '347271036', 'SpringField', 'IL', 'USA');
- insert into crc_office values('Bru', 671819833 , '4th Brunswick Street', '567890123', 'New Brunswick', 'NJ', 'USA');
- insert into crc_office values('Blt', 572819382 , '104th Baltimore Street', '671463903', 'Baltimore', 'MD', 'USA');

Load office_tel table with insert:

- insert into office_tel values(1234567890, 567890123, 671463903, 347271036);
- insert into office_tel values(1452729122, 567890123, 671463903, 347271036);
- insert into office_tel values(456789679, 567890123, 671463903, 347271036);
- insert into office_tel values(671819833, 567890123, 671463903, 347271036);
- insert into office_tel values(572819382, 567890123, 671463903, 347271036);

car table data:

carID	currentLocationID	typeID	color	brand	model	description	purchDate
1	Brk	101	Grey	Fiat	Basic	Family drive	2020-05-01
2	Mhn	102	Green	Mercedes	Medium	Romantic drive	2015-05-01
5	Spr	105	Pink	Fiat	Top End	Extended Family drive	2018-02-20

car_type table data:

typeID	typeLabel	typeDescr
101	SUV	Good for Off-road
102	Sedan	Good luxury feel
103	Hatchback	Mini car to get through traffic
104	Truck	For the Adventurer
105	Bus	For the huge extended family

customer table data:

customerID	ssn	firstName	lastName	mobile	state	country	email
111	45678246	Sam	Hodd	3474569087	NY	USA	sam.hodd@gmail.com
112	76251027	Sanj	Jang	3256794561	LA	USA	sanj@hotmail.com
113	52463917	Tejas	Rathod	4561237890	MD	USA	tejas@gmail.com
114	12539027	Kim	Un	6789075634	NY	USA	kimun@outlook.com
115	42815292	Mahe	Gayles	2451345678	IL	USA	mgayles@yahoo.com
116	28262821	Tassamai	Sawetpibul	6785641324	NJ	USA	ts@hotmail.com
117	63827383	Katrina	Kaif	7896785534	NY	USA	kkkaif@gmail.com
118	23519625	Aish	Kore	5678905680	IL	USA	kasih@yahoo.com

reservation table data:

reservationID	amount	pickupDate	returnDate	pickupLocationID	returnLocationID	customerID	carID
10	500	2020-05-01	2020-05-03	Brk	Mhn	111	1
11	700	2020-05-02	2020-05-03	Mhn	Brk	117	2
12	2500	2020-05-03	2020-05-05	Mhn	Spr	114	5
13	3700	2020-05-01	2020-05-06	Spr	Brk	115	2
8	5500	2020-02-13	2020-02-17	Brk	Blt	111	2
9	4700	2020-03-05	2020-03-08	Brk	Spr	117	5

crc_office table data:

locationID	defaultTel	street	number	city	state	country
Blt	572819382	104th Baltimore Street	671463903	Baltimore	MD	USA
Brk	1234567890	634 74th Street	3472554501	NYC	NY	USA
Bru	671819833	4th Brunswick Street	567890123	New Brunswick	NJ	USA
Mhn	456789679	45th West Street	567890123	NYC	NY	USA
Spr	1452729122	46th SpringField Street	347271036	SpringField	IL	USA

office_tel table data:

defaultTel	tel1	tel2	tel3
456789679	567890123	671463903	347271036
572819382	567890123	671463903	347271036
671819833	567890123	671463903	347271036
1234567890	567890123	671463903	347271036
1452729122	567890123	671463903	347271036

Sql Queries

1. Show the first and the last name and the mobile phone number of those customers that have rented a car in the category that has label = ‘sedan’

- select distinct c.firstName, c.lastName, c.mobile
- from customers as c, reservation as r, car_type as t, car
- where c.customerID=r.customerID and r.carID=car.carID and car.typeID=t.typeID and t.typeLabel='Sedan';

Output:

firstName	lastName	mobile
Katrina	Kaif	7896785534
Mahe	Gayles	2451345678
Sam	Hodd	3474569087

2. Show the total amount of rentals per car's category ID and month.

- select car.typeID, extract(year from r.pickupDate) "Year", extract(month from r.pickupDate) "Month", count(r.carID) "No. of Cars“
- from reservation as r, car
- where r.carID=car.carID
- group by car.typeID, year, month
- order by car.typeID ASC, year ASC, month ASC;

Output:

typeID	Year	Month	No. of Cars
101	2020	5	1
102	2020	2	1
102	2020	5	2
105	2020	3	1
105	2020	5	1

Thank you