

## Group 13

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## Project Title: Car Rental

**Project Description:** Our project will be based on the car rental business model.

**Database Description:** We have created our database in MYSQL. The version of MYSQL we are using is MYSQL 8.0. We used MYSQL workbench as an interface to work in the database.

The database is named rental\_car.

This database has 6 tables.

Following is the description of the tables.

We have included Candidate keys, Primary keys and Foreign keys in the descriptions.

### **Table 1: car\_types**

**Description:** This table holds car types data. Some of the examples of car types in our database are Sedan, SUV, Minivan etc.

#### **Keys:**

**Candidate Keys:** The only candidate key we have for this table is car\_type\_id and we have this key as the primary key of this table. It is an auto increment integer field.

**Primary Key:** The car\_type\_id is the primary key of the table. This will be the foreign key in the cars table.

**Foreign keys:** There are no foreign keys in this table.

**Indexes:** We have the primary key as indexed and also an additional index on car\_type field. Since car\_type is not the primary key of the table, the database will create a non clustered index on car\_type. The reason we choose to put an index on the car\_type column is because we have a search criterion on our application page where the users will be able to search a car by car\_type.

#### **Table Definition:**

##### **car\_types**

**car\_type\_id int primary key not null auto\_increment,**

**car\_type varchar(200) not null,**

**index(car\_type)**

## TABLE 2: cars

**Description:** This table holds the data for each car we have in our database. This table will be used to identify the car by its unique\_id. It holds columns like color,make,model,year and vin number of the car. There is a field called available\_yes\_no, this will be tagged as 1 if the car is available for rent else it is tagged as zero.

### Keys:

**Candidate keys:** We have two candidate keys in this table. The first one is the Car\_id and the second one is the VIN number field. For our database we are using car\_id as the primary key of this table.

**Primary key:** The car\_id is the primary key of the table. This will be the foreign key in the reservation table.

**Foreign Keys:** The car\_type\_id is the foreign key in this table, which comes from the car\_types table. The current\_location\_id is another foreign key in this table and it comes from the locations table. This field will hold the current\_location\_id of the car and if the car is in use this field will just hold null implying that the car is in use.

**Indexes:** We have one additional index on this table other than the one on the primary key. It is on column rental\_price\_per\_hour. The reason we choose to put an index on this column is because we have a search criterion on our application page where the users will be able to search a car by the price of the car.

### Table Definition:

**cars**

**Car\_id int Primary key not null Auto\_increment,**

**Car\_type\_id int not null,**

**Make varchar(200),**

**Model varchar(200),**

**Make\_Year int,**

**Color varchar(50),**

**VIN varchar(200) not null,**

**Current\_location\_id int ,**

**Available\_for\_rent tinyint not null,**

**Rental\_price\_per\_hour decimal(19,4) not null,**

**FOREIGN KEY (car\_type\_id) REFERENCES car\_types(car\_type\_id),**

**FOREIGN KEY (current\_location\_id) REFERENCES locations(location\_id),**

**index(rental\_price\_per\_hour)**

**TABLE 3: Customers**

**Description:** This table holds the customer information. Each user who wants to use the application needs to first register on the web page to be able to use the website. Each user will have to provide basic information like name contact information etc and then create a username and password for their account. All this information is then stored in the customer table.

**Keys**

**Candidate keys:** We have two candidate keys for this table. One is the customer\_login\_username which will be unique and the other one will be the customer\_id which is also unique.

**Primary key:** We have chosen Customer\_id as the primary key of this table. It will also be referenced in the reservations table as a foreign key.

**Foreign keys:** We have a foreign key in this table, it is called the customer\_address\_id and it links the customers table with customer\_address table.

**Indexes:** We have created an index on customer\_login\_username field as the username will be used to access the website.

**Table definition:**

**Customer\_id int Primary key not null auto\_increment,**

**Customer\_First\_name varchar(200) not null,**

**Customer\_last\_name varchar(200) not null,**

**Customer\_Phone\_Number varchar(30),**

**Customer\_email varchar(200) not null,**

**Customer\_login\_username varchar(200) not null,**

**Customer\_login\_password varchar(200) not null ,**

**Insurance\_yes\_no tinyint,**

**Customer\_address\_id int not null**

**FOREIGN KEY (customer\_address\_id) REFERENCES  
customer\_address(customer\_address\_id),**

**index(customer\_login\_username)**

#### **TABLE 4: Customer\_address**

**Description:** This table holds the customer address information.

#### **Keys**

**Candidate keys:** We have two candidate keys for this table. One is the customer\_address\_id which will be unique and the other one will be the combination of customer\_address1, customer\_address2, customer\_city, customer\_state attributes..

**Primary key:** We have chosen customer\_address\_id as the primary key of this table.

**Foreign keys:** We have no foreign keys in this table.

**Indexes:** We have no additional indexes on this table other than the one on the primary key.

#### **Table definition:**

**customer\_address\_id int Primary key not null auto\_increment,**  
**customer\_address1 varchar(500) not null,**  
**customer\_address2 varchar(200) not null,**  
**customer\_city varchar(200),**  
**customer\_state varchar(20) not null,**  
**customer\_zip varchar(10) not null )**

## TABLE 5: Locations

**Description:** This table holds location information. This will be referenced when a user creates reservations in order to specify pickup and dropoff locations.

### Keys

**Candidate keys:** The first candidate key for this table is the location\_id. The second candidate key for this table is a combination of Location\_Address1, Location\_address2, Location\_City, and Location\_State attributes. For ease of design we have chosen location\_id as the primary key for this table.

**Primary key:** Location\_id serves as a primary key for this table. It will also be referenced as a foreign key in Reservations through pickup\_location\_id and dropoff\_location\_id.

**Foreign keys:** No foreign keys

**Indexes:** We have created an index on location\_zip as this field will be frequently used to search the cars. It will be a non clustered index.

### Table definition:

Location\_id int primary key not null auto\_increment ,

Location\_description varchar(500),

Location\_Address varchar(500) not null,

Location\_City varchar(200) not null,

Location\_State varchar(30) not null,

Location\_Zip varchar(5) not null,

index(location\_zip)

## TABLE 6: Reservations

**Description:** This is a table where each reservation will be recorded. The customer will make a reservation on an available car according to his/her selection criterion. This table will hold past and current reservations for each customer. It will have details like the car on which the reservation was made, the location it was picked up from and the drop off location of the car. It will also store the total cost of that reservation.

### Keys

**Candidate key:** The reservation\_id is the candidate key for this table. Another candidate key for this table is the combination of Customer\_id, Car\_id and Pickupdatetime attributes. For the ease of database design we have chosen the reservation\_id as the primary key of this table.

**Primary key:** Reservation\_id will be the primary key of this table. It is an auto increment integer type field.

**Foreign keys:** Car\_id from the cars table will be a foreign key to this table. The customer\_id is a foreign key in this table from the customers table. Also the pickup\_location\_id and dropoff\_locations\_id are the foreign keys from the locations table.

**Indexes:** We do not have any other additional indexes on this table.

### Table definition:

Reservation\_id int Primary key not null auto\_increment,

Customer\_id int not null,

Car\_id int not null,

Pickupdatetime datetime,

DropoffDatetime datetime,

Pickup\_location\_id int,

Dropoff\_Location\_id int,

Rental\_Cost decimal(19,4),

FOREIGN KEY (customer\_id) REFERENCES customers(customer\_id),

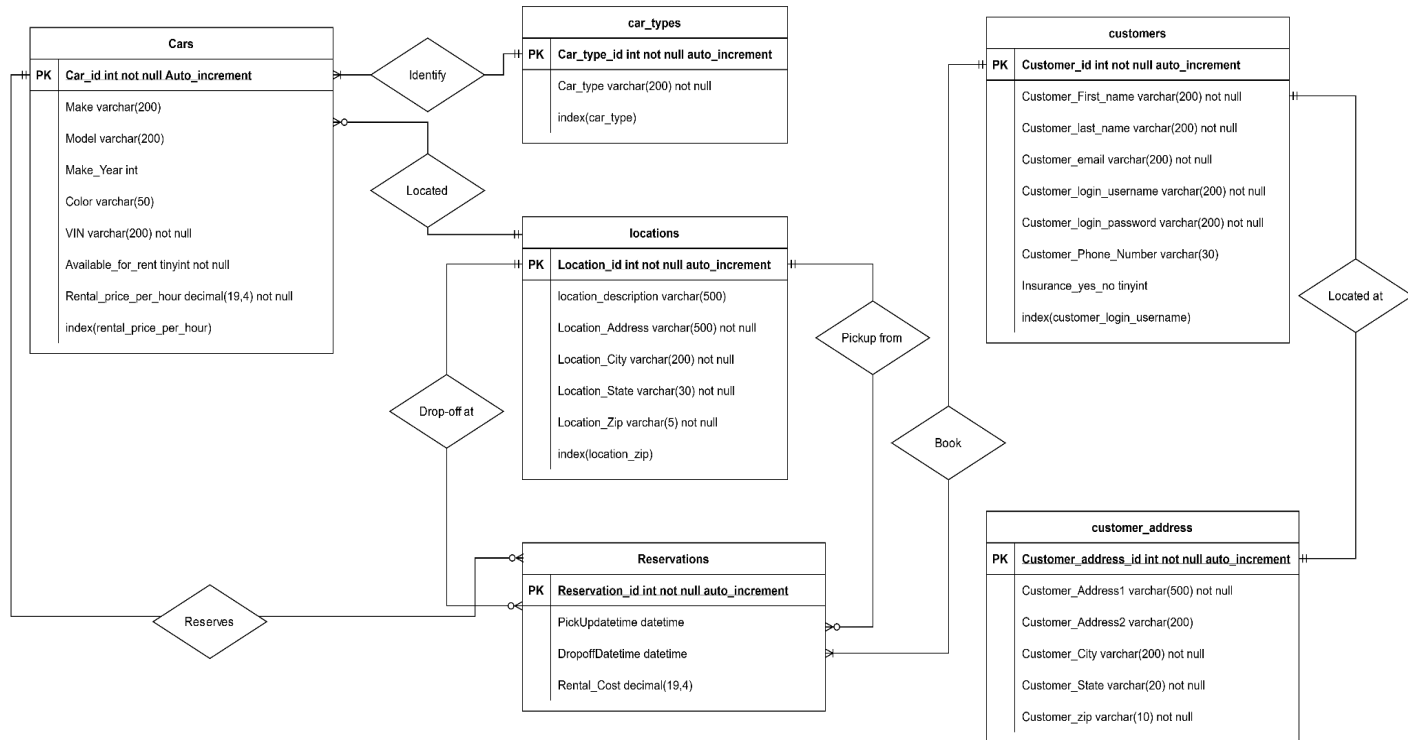


FOREIGN KEY (car\_id) REFERENCES cars(car\_id),

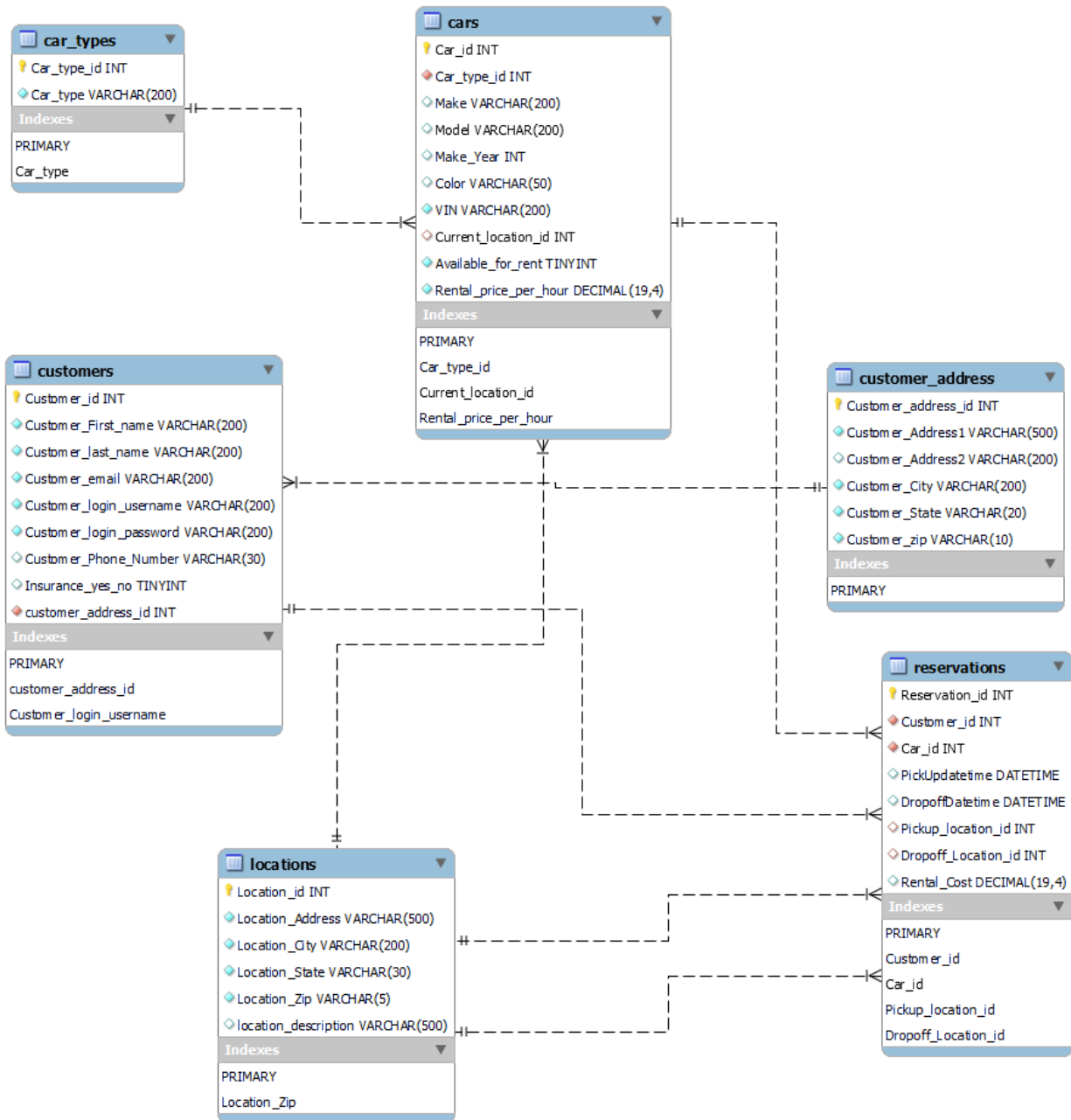
FOREIGN KEY (pickup\_location\_id) REFERENCES locations(location\_id),

FOREIGN KEY (dropoff\_location\_id) REFERENCES locations(location\_id)

# ERD



**Model Diagram from the database**



## RELATIONAL SCHEMA

1. car\_types(car\_type\_id, car\_type)

2. cars(car\_id, car\_type\_id , make, model ,make\_year ,color,VIN,Description ,Available\_for\_rent,Rental\_price\_per\_hour,current\_location\_id )

FOREIGN KEY (car\_type\_id) REFERENCES car\_types(car\_type\_id)

FOREIGN KEY (current\_location\_id) REFERENCES locations(location\_id)

**Another candidate key in the cars table other than car\_id is the VIN number field.**

3. customers(customer\_id,Customer\_First\_name ,Customer\_last\_name, Customer\_email , Customer\_login\_username , Customer\_login\_password , Customer\_Phone\_Number ,Insurance\_yes\_no,customer\_address\_id)

FOREIGN KEY (customer\_address\_id) REFERENCES customer\_address(customer\_address\_id)

**Another candidate key in the customer table other than customer\_id is the customer\_login\_username field.**

4. customer\_address: (customer\_address\_id, customer\_address1,customer\_address2,customer\_city,customer\_state,customer\_zip)

**Another candidate key in this table other than customer\_address\_id is the combination of customer\_address1,customer\_address2,customer\_city,customer\_state attributes.**

5. locations(location\_id ,location\_description,location\_Address ,location\_City ,location\_state ,location\_Zip)

**Another candidate key in this table other than location\_id is the combination of location\_Address ,location\_City ,location\_state attributes.**

6. reservations(Reservation\_id ,Customer\_id, car\_id ,PickUpdatetime , DropoffDatetime, Pickup\_location\_id ,Dropoff\_Location\_id ,Rental\_Cost )

Another candidate key for this table other than the reservation\_id is the combination of Customer\_id ,Car\_id and PickUpdatetime keys.

FOREIGN KEY (customer\_id) REFERENCES customers(customer\_id)

FOREIGN KEY (car\_id) REFERENCES cars(car\_id)

FOREIGN KEY (pickup\_location\_id) REFERENCES locations(location\_id)

FOREIGN KEY (dropoff\_location\_id) REFERENCES locations(location\_id)