Car Renting System

1. ENTITIES

a) Customer:
Customer will be the one who is using car rental system for reserving a car. Customer entity will store details like customer driving license number, address, name, and phone number.

b) Car:
Car entity will have list of cars available in the system. Each car will be associated with a car category and car will have attributes like color , model, mileage and registration number(car_id). Car will also have separate flag to check the availability of the car.

c) Car Category:
Every car has a car category. Price is calculated based on the car category. Car category will have attributes like no of person and name of category and category_ID.

d) Location
Location entity here denotes the zipcode of the city. Customer can pick up the car from the particular location and can have same or different drop off location. Location will have attributes like zipcode, city and state.

e) Reservation
Each car reservation will be monitored in the entity called Reservation. It will have attributes like Reservation_ID, from date of booking and due return date of the booking, and booking status. It will also contain an attribute for amount of the car.

f) Rental
This is similar to reservation except that it confirms that you have rented the car. It includes billID, startdate and returndate.

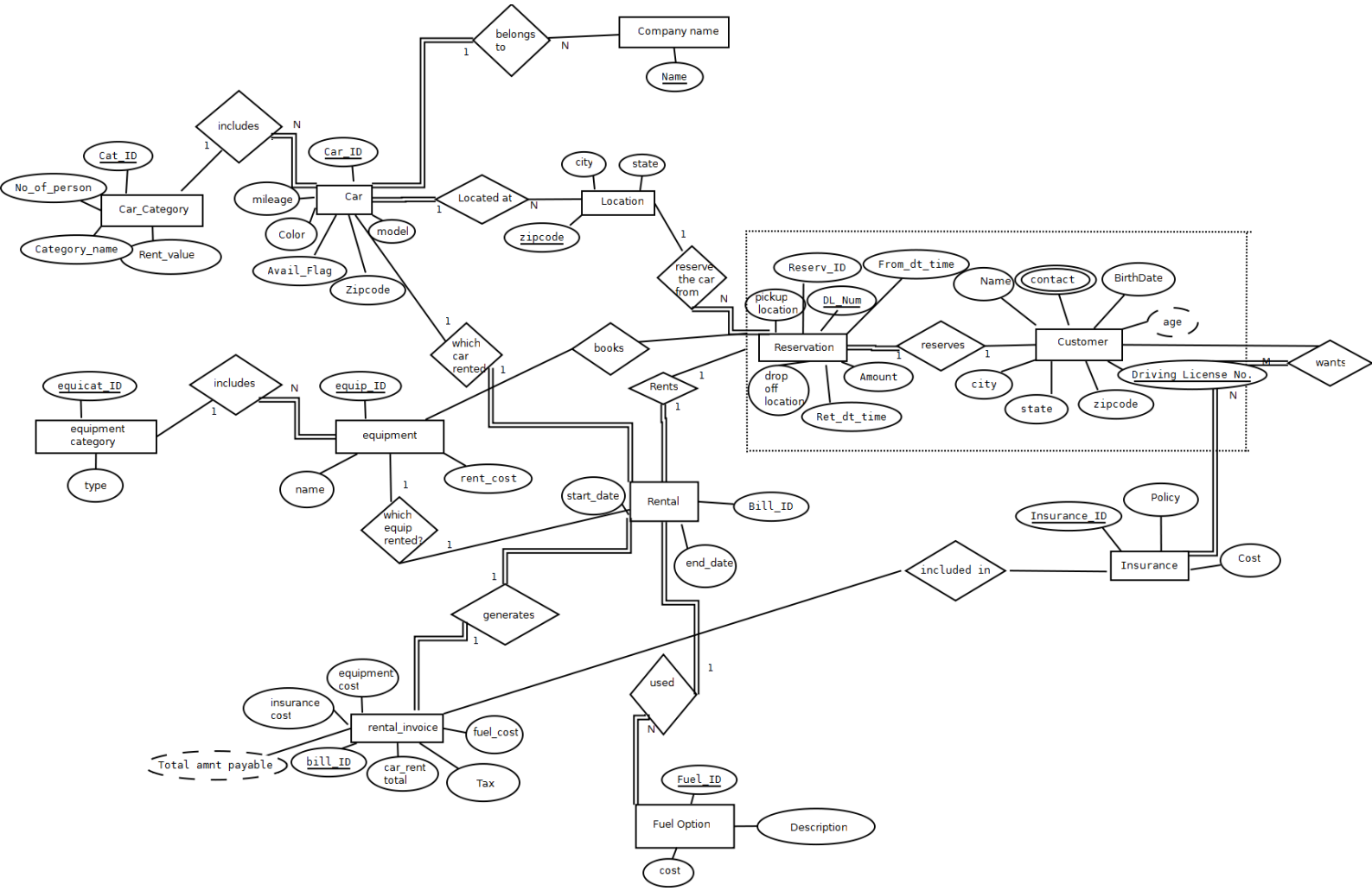
g) Equipment_Category
We have defined equipments by two categories – detachable and non detachable. This entity contains attributes equipment category ID and type of equipment.

h) Equipment
There are various equipments that can be rented with the car. It contains attributes like equipment ID, name and rent of the equipment. The equipment has to be returned when the car is returned.

i) Insurance
Customer may already have car rental insurance or can buy one while booking the car. Car rental insurance will have attributes like insurance code, coverage type, name and cost per day.

j)FuelOption
Customer has three types of options to choose how he wants the fuel tank to be filled. This entity contains attributes like fuel_ID, description and cost.

2. ER DIAGRAM



3. Functional Dependencies

-->Car Category(CarCat_ID, Category_Name, Rent) : IN BCNF

CarCat_ID --> Category_Name

-->Car(Car_ID, Model, Color, Availability_flag, zipcode,Mileage): IN BCNF

Car_ID --> Model
Car_ID --> Color
Car_ID --> Availaibility_flag, zipcode, mileage

-->Company(Company_Name, Car_ID): IN BCNF

Company_Name --> Car_ID

-->Location(zipcode, city, state): IN BCNF

zipcode --> city, state

-->Customer(DL_Number, CustName, Birthdate, city, state, zipcode)

DL_number--> CustName,BirthDate, city, state, zipcode
zipcode --> city, state

IN BCNF after decomposition:

R1(DL_number, CustName,Birthdate,zipcode)
R2(zipcode,city,state)
R2 already exists as Location relation so it need not be repeated again.

-->Contact(DL_number, phone_number): IN BCNF

DL_Number--> phone_number

-->Reservation(Reservation_ID, Car_Reg, DL_Number, pick-up location, drop-off location, amount, booking_status, from_dt_time, ret_dt_time): IN BCNF

Reservation_ID --> Car_Reg, Dl_number, pickuplocation, drop-off location, amount, booking_status, from_dt_time, ret_dt_time

-->Rental(DL_Number, Car_ID, Bill_ID, Start_Date, End_Date, InsCode, FuelOption) : IN BCNF

Bill_ID --> DL_number, Car_ID, startdate, EndDate, InsCode, FuelOption

-->Equipment Category(EquipCat_ID, type) : IN BCNF

EquipCat_ID--> type

-->Equipment(<u>Equip_ID</u> ,EquipCat_ID, Name, Rent_Cost): IN BCNF

Equip_ID --> Name, rent_cost, EquipCat_ID

-->Rental Invoice(<u>Bill_ID</u>, Reservation_ID, TotalCarRentCost, TotalEquipCost, InsuranceCost, FuelCost, Tax, Total_Amount): IN BCNF

Bill_ID-->Reservation_ID, TotalCarRentCost, TotalEquipCost, InsuranceCost, FuelCost, Tax, Total_Amount

-->Fuel Option(<u>Car_ID</u>, <u>Fuel_ID</u>, Description, Cost) : IN BCNF

Fuel_ID--> Description, Cost

-->Insurance(<u>Insurance_ID</u>, Policy, Cost_per_Day): IN BCNF

Insurance_ID-->Policy, cost_per_day