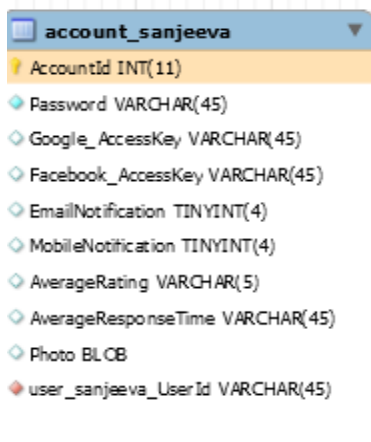


Assignment 1: ER Modeling Turo.com
Submitted by Sanjeev Ahuja (sxa178330@utdallas.edu)
UTD Id: 2021384789

On the basis of the assumptions and images shared in the pdf, the explanation on the Model and ER diagram submitted with the assignment is as below:

Details on the implementation of assumptions part from the pdf is as below:

- A user can sign up via Facebook, Google or via email and create an account



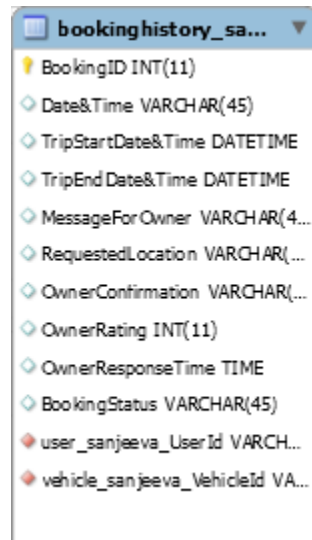
account_sanjeeva	
AccountId	INT(11)
Password	VARCHAR(45)
Google_AccessKey	VARCHAR(45)
Facebook_AccessKey	VARCHAR(45)
EmailNotification	TINYINT(4)
MobileNotification	TINYINT(4)
AverageRating	VARCHAR(5)
AverageResponseTime	VARCHAR(45)
Photo	BLOB
user_sanjeeva_UserId	VARCHAR(45)

Solution:

The basic information about the user sign up is stored in the user table, once the user shows interest to create an account by submitting email id and password or using his Facebook and Gmail details then the related information is passed to the account table.

The image shown on the left is of account table which has attributes to store email, password, facebook and google information.

- An Owner can be a Guest too.



bookinghistory_sa...	
BookingID	INT(11)
Date&Time	VARCHAR(45)
TripStartDate&Time	DATETIME
TripEndDate&Time	DATETIME
MessageForOwner	VARCHAR(4...
RequestedLocation	VARCHAR(...
OwnerConfirmation	VARCHAR(...
OwnerRating	INT(11)
OwnerResponseTime	TIME
BookingStatus	VARCHAR(45)
user_sanjeeva_UserId	VARCH...
vehicle_sanjeeva_VehicleId	VA...

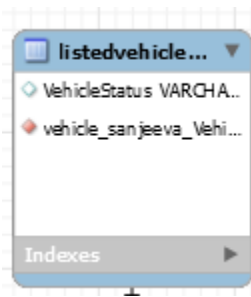
Solution:

This is implemented by storing the user id (which is created for the website visitor and accounts) and vehicle id in the booking history table.

Further, it is up to business logic to decide if the user sees his own vehicle or not while searching for the vehicle to rent.

Also the user table has details for the website user to login as guest instead of creating the account/ using the existing account while booking the vehicle.

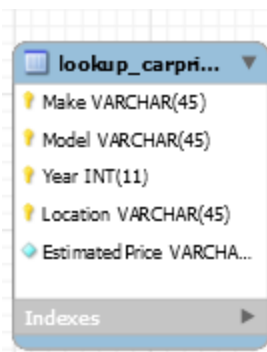
- You must capture the details of the listed cars in your design.



Solution:

The listed vehicle are stored independently in a separated table to make sure the details of the booking history does not get deleted.

- The Owner can let Turo come up with an estimate of the rental or set a price himself/herself

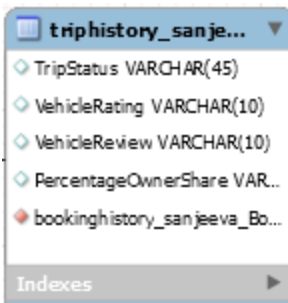


Solution:

As per the information on their blog there are certain attributes which account for the car pricing <https://blog.turo.com/insights/how-turo-pricing-works>

To make the model simple, I have chosen make, model, year and location to be the primary key in a look up table which define the estimate price. Also all the vehicles listed on the website will have information in the lookup table.

- The Owner gets a share of the trip amount. The database design should track the results of the pricing and payment for each Owner.



Solution:

Once the trip is completed or cancelled in between the information is stored in the trip history and this table also has the attribute for percentageownershare.

As per the information available on the website it depends on the protection or insurance plan of the vehicle : <https://support.turo.com/hc/en-us/articles/203992000-What-will-I-earn-and-how-do-I-get-paid->

- A Guest can browse for cars based on makes and model to find the car he/she prefers to rent.

vehicle_sanjeeva	
VehicleId	VARCHAR(45)
Year	INT(11)
Make	VARCHAR(45)
Model	VARCHAR(45)
Transmission	VARCHAR(45)
Odometer	VARCHAR(45)
Trim	VARCHAR(45)
Style	VARCHAR(45)
DateAndTimeOfRecord	VARCHAR(45)
account_sanjeeva_AccountId	INT(11)

Solution:

The information on makes and model is stored in vehicle_sanjeeva table which can be queried by guest to find relevant vehicles.

The assumption is that results of vehicle id generated on the choice of makes and model will further generate relevant information for the vehicle such as photos, vehicle description etc.

- The Guest can request to book a car by looking up the location and date for which he/she wishes to rent the car (if its available) or book a car instantly.

trippreferences_sanjeeva	
AdvanceNotice	INT(11)
ShortestPossibleTrip	INT(11)
LongestPossibleTrip	INT(11)
RequestLongerTrips	VARCHAR(45)
BookInstantly	TINYINT(4)
WillConsiderLongTrips	VARCHAR(45)
vehicle_sanjeeva_VehicleId	VARCHAR(45)
Indexes	

vehiclelocation_sanjeeva	
CarLocation	VARCHAR(100)
LicensePlateNumber	VARCHAR(45)
City	VARCHAR(45)
Instructions	VARCHAR(45)
ParkingDetails	VARCHAR(45)
Latitude	VARCHAR(45)
Longitude	VARCHAR(45)
IssuingCountry	VARCHAR(45)
vehicle_sanjeeva_VehicleId	VARCHAR(45)

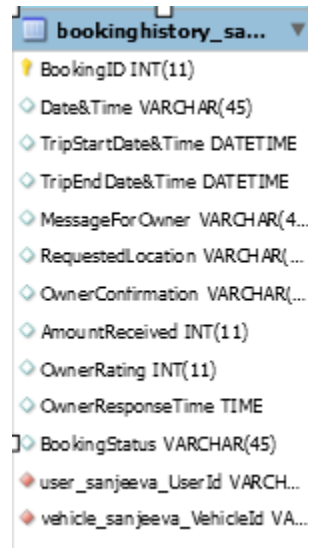
bookinghistory_sanjeeva	
BookingID	INT(11)
Date&Time	VARCHAR(45)
TripStartDate&Time	DATETIME
TripEndDate&Time	DATETIME
MessageForOwner	VARCHAR(45)
RequestedLocation	VARCHAR(45)
OwnerConfirmation	VARCHAR(45)
OwnerRating	INT(11)
OwnerResponseTime	TIME
BookingStatus	VARCHAR(45)
user_sanjeeva_UserId	VARCHAR(45)
vehicle_sanjeeva_VehicleId	VARCHAR(45)

listedvehicle_sanjeeva	
VehicleStatus	VARCHAR(45)
vehicle_sanjeeva_VehicleId	VARCHAR(45)
Indexes	

Solution:

Basis on the information of CarLocation from vehicleLocation_sanjeeva table and dates information of ShortestPossibleTrip, LongestPossibleTrip and BookInstantly from trippreferences_sanjeeva table, the required vehicle id can be searched if the vehicle is available in the listed vehicle table or if the unavailable vehicles will be available as per the dates in the booking history table.

- The Guest can meet the Owner at the location to get the keys or make a request to have the car delivered to a specified location



Solution:

The bookinghistory_sanjeeva table has an attribute which has details of RequestedLocation.

While submitting the booking the user can check a field and the particular input can be taken.

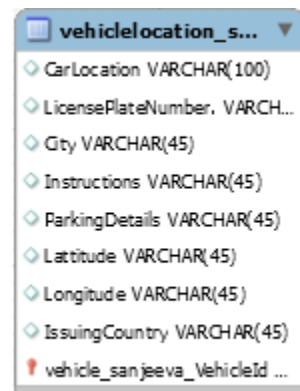
- A Host (when listing a car) provides information such as – license plate number, issuing country, state, photos of the car, location of the car, year, make, model, transmission, odometer, owner's photo, owner's date of birth, details of car availability, car description and car features

Solution: Refer to the ER diagram for attributes and tables, all of the attributes mentioned in the above point have been captured in the design.

- A guest can search for a car based on relevance, price, distance, instant booking, delivery, vehicle type, vehicle make, features, category, vehicle years, vehicle colors, transmission and distance included. The guest can also mention the location, date and time (duration) for when the car is needed.

Solution: Search can be performed using the tables which start with vehicle and using join among them. All the attributes mentioned above have been captured please refer to the ER diagram.

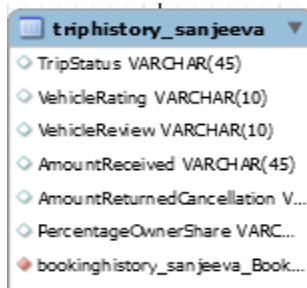
- Guests could select area using the map feature available on the website. You should translate that into the Zip codes the cars are available in.



Solution: The latitude and longitude coordinates basis the location entered by the user are fetched using an api or service like one available on <https://www.gps-coordinates.net/>

And are further stored automatically in the table to display them on the map.

- The guest can leave reviews for the car after the trip

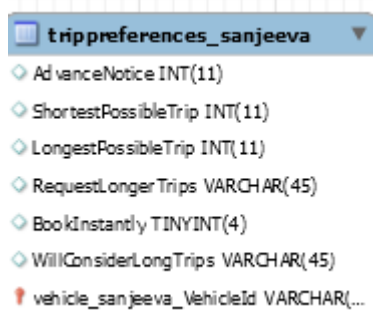


triphistory_sanjeeva	
◇	TripStatus VARCHAR(45)
◇	VehicleRating VARCHAR(10)
◇	VehicleReview VARCHAR(10)
◇	AmountReceived VARCHAR(45)
◇	AmountReturnedCancellation V...
◇	PercentageOwnerShare VARC...
◇	bookinghistory_sanjeeva_Book...

Solution:

This is captured in the triphistory_sanjeeva table which has variables to capture car rating and review.

- The guest can select the car from the list/map and make a request to book/book instantly



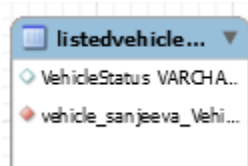
trippreferences_sanjeeva	
◇	AdvanceNotice INT(11)
◇	ShortestPossibleTrip INT(11)
◇	LongestPossibleTrip INT(11)
◇	RequestLongerTrips VARCHAR(45)
◇	BookInstantly TINYINT(4)
◇	WillConsiderLongTrips VARCHAR(45)
◇	vehicle_sanjeeva_VehicleId VARCHAR(...)

Solution:

By default the value of the BookInstantly attribute in trip preference table can be set to 1 for the vehicles when they are listed. So unless the owner/account disables it does not change.

Also basis this information the guest can book/book instantly from the list.

- The system keeps track of the car availability based on what's booked and the timeframe selected

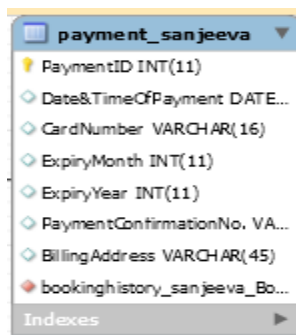


listedvehicle...	
◇	VehicleStatus VARCHA...
◇	vehicle_sanjeeva_Vehi...

Solution

A table by the name listedvehicle_sanjeeva tracks this information. The reason why this is not being kept as part of the vehicle table as the booking history table will have the details of all the vehicles.

- The system should keep track of the transaction details every time a booking is made



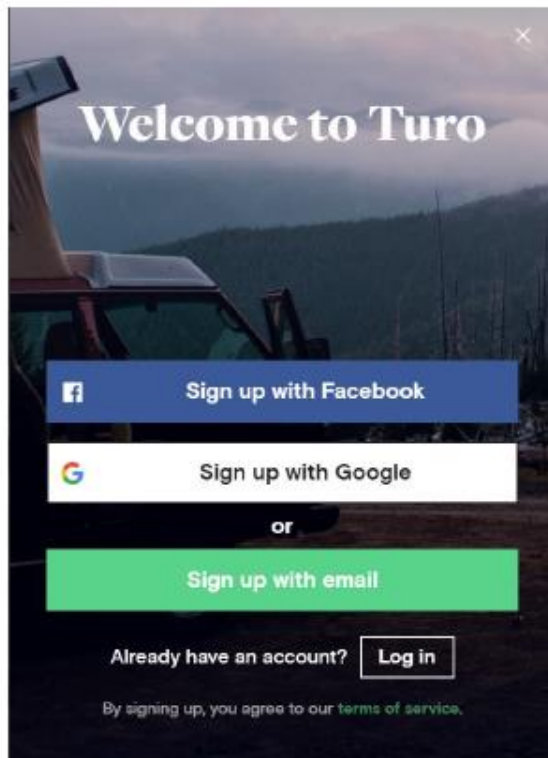
payment_sanjeeva	
◇	PaymentID INT(11)
◇	Date&TimeOfPayment DATE...
◇	CardNumber VARCHAR(16)
◇	ExpiryMonth INT(11)
◇	ExpiryYear INT(11)
◇	PaymentConfirmationNo. VA...
◇	BillingAddress VARCHAR(45)
◇	bookinghistory_sanjeeva_Bo...
Indexes ▶	

Solution:

The payment table tracks the transaction details every time a booking is made.

Details on implementation of Snapshots

1. Login Page



user_sanjeeva	
UserId	VARCHAR(45)
Email	VARCHAR(45)
Mobile	VARCHAR(20)
FirstName	VARCHAR(45)
LastName	VARCHAR(45)
UserDOB	VARCHAR(45)
Date&TimeofUserCreation	DATETIME
LoginasGuest	TINYINT(4)
PromotionsAnnouncement	TINYINT(4)
Indexes	

account_sanjeeva	
AccountId	INT(11)
Password	VARCHAR(45)
Google_AccessKey	VARCHAR(45)
Facebook_AccessKey	VARCHAR(45)
EmailNotification	TINYINT(4)
MobileNotification	TINYINT(4)
AverageRating	VARCHAR(5)
AverageResponseTime	VARCHAR(45)
Photo	BLOB
user_sanjeeva_UserId	VARCHAR(45)

2. Image for the add vehicle page and table implementation

TELL US ABOUT YOUR CAR

Where is your car located?

Year: 2013
Make: Honda
Model: Accord
Transmission: Automatic

Odometer: 0-50k miles
Trim optional: Select
Style optional: Select

☒ My car has never had a branded or salvage title. (?)

Next

Table implemented

vehicle_sanjeeva
VehicleId VARCHAR(45)
Year INT(11)
Make VARCHAR(45)
Model VARCHAR(45)
Transmission VARCHAR(45)
Odometer VARCHAR(45)
Trim VARCHAR(45)
Style VARCHAR(45)
DateAndTimeOfRecord VARCHAR(45)
account_sanjeeva_AccountId INT(11)

CAR AVAILABILITY

How much advance notice do you need to confirm a trip?

Advance notice: 1 day

Block trips that don't give you enough advance notice.

How long would you like trips to last?

Shortest possible trip: 1 day

Longest possible trip: 3 days

Back Next

Table implemented

trippreferences_sanjeeva
AdvanceNotice INT(11)
ShortestPossibleTrip INT(11)
LongestPossibleTrip INT(11)
RequestLongerTrips VARCHAR(45)
BookInstantly TINYINT(4)
WillConsiderLongTrips VARCHAR(45)
vehicle_sanjeeva_VehicleId VARCHAR(...)
Indexes

DETAILS

License plate number

 Texas

Your license plate information won't be publicly visible

Car description

A detailed description will help you get more trips.

Describe the basics and unique features of your car.

No need to include your contact info; travelers will receive it once you've confirmed their trip.

Car features

- | | | |
|---|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> Hybrid | <input type="checkbox"/> GPS | <input type="checkbox"/> Audio input |
| <input type="checkbox"/> Bike rack | <input type="checkbox"/> Ski rack | <input type="checkbox"/> Convertible |
| <input type="checkbox"/> All-wheel drive | <input type="checkbox"/> Bluetooth | <input type="checkbox"/> Pet friendly |
| <input type="checkbox"/> Child seat | <input type="checkbox"/> USB input | <input type="checkbox"/> Toll pass |
| <input type="checkbox"/> Snow tires or chains | <input type="checkbox"/> Heated seats | <input type="checkbox"/> Sunroof |

[Back](#)[Next](#)


Table implemented

vehicledetails_sanjeeva	
VehicleDescription	VARCHAR(45)
BasicVehicleDetails	VARCHAR(45)
Features	VARCHAR(45)
FAQ	VARCHAR(45)
Color	VARCHAR(45)
Guideline	VARCHAR(45)
vehicle_sanjeeva_VehicleId	VARCHAR(45)
Indexes	

CAR PHOTOS

It's important for travelers to see your car before the request it. Once you have a good photo that shows the whole car, add more photos displaying the car's details and interior. Learn more about [taking great photos](#).

Photos must be at least 640px by 320px.


Add photo

[Back](#)[Next](#)

Table implemented

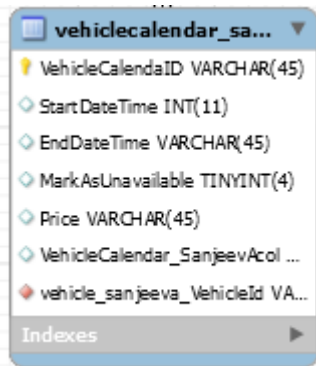
vehiclephotos_sanjeeva	
VehiclePhotosId	VARCHAR(45)
Photos	BLOB
vehicle_sanjeeva_VehicleId	VARCHAR(45)
Indexes	

- Once the table is published then further information is as below:

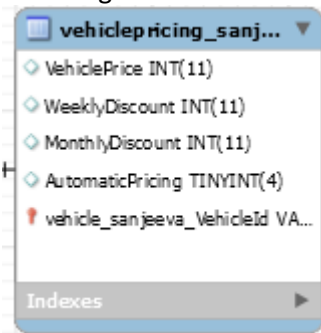


Tables implemented are as below:

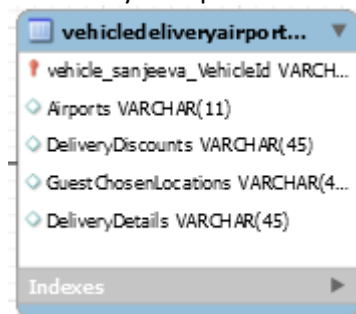
1. Vehicle Calendar



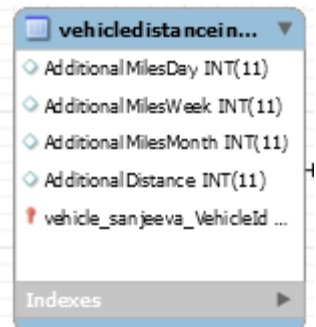
2. Pricing



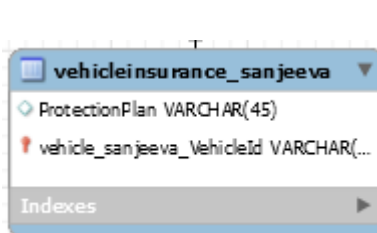
3. Delivery & airports



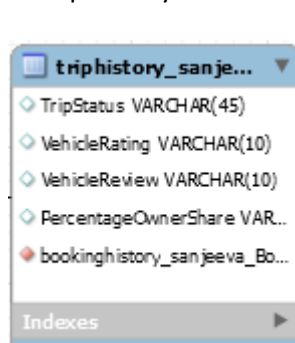
4. Distance Included



5. Vehicle Insurance



6. Trip history



4. Deleting a vehicle from listing

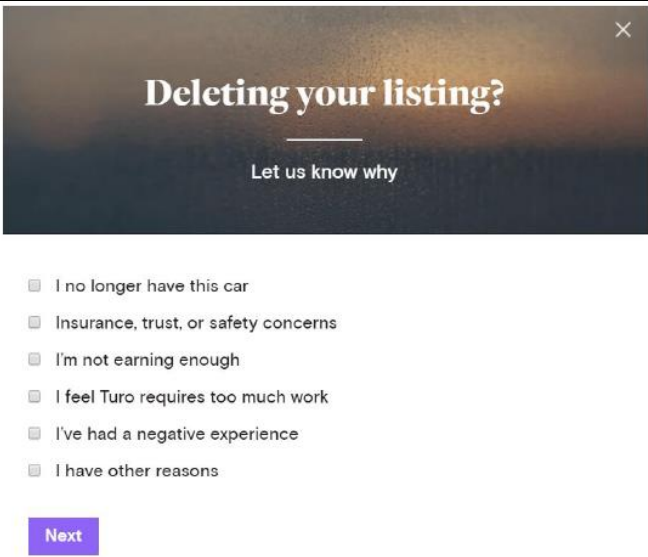
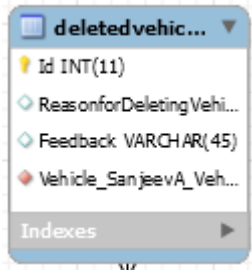


Table implemented:




once the vehicle is deleted it is removed from the listing table however the record is still maintained in the database for the booking history tracking.

5. Guest search

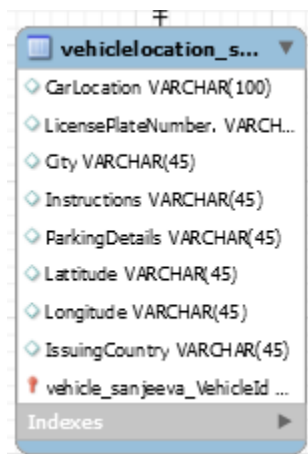
Where Dallas, TX

From 09/22/2017 ~ 10:00 AM ~

Until 09/22/2017 ~ 11:00 AM ~



The results can be generated using api to find the latitude and longitude and then matching with the latitude and longitude from the below table.



Further it require additional details and basis on the information of ShortestPossibleTrip, LongestPossibleTrip and BookInstantly from trippreferences_sanjeeva table, the required vehicle id can be searched if the vehicle is available in the listed vehicle table or if the unavailable vehicles will be available as per the dates in the booking history table.

trippreferences_sanjeeva <ul style="list-style-type: none">AdvanceNotice INT(11)ShortestPossibleTrip INT(11)LongestPossibleTrip INT(11)RequestLongerTrips VARCHAR(45)BookInstantly TINYINT(4)WillConsiderLongTrips VARCHAR(45)vehicle_sanjeeva_VehicleId VARCHAR(...) Indexes	vehiclelocation_s... <ul style="list-style-type: none">CarLocation VARCHAR(100)LicensePlateNumber VARCHAR...City VARCHAR(45)Instructions VARCHAR(45)ParkingDetails VARCHAR(45)Latitude VARCHAR(45)Longitude VARCHAR(45)IssuingCountry VARCHAR(45)vehicle_sanjeeva_VehicleId ...	bookinghistory_sa... <ul style="list-style-type: none">BookingID INT(11)Date&Time VARCHAR(45)TripStartDate&Time DATETIMETripEndDate&Time DATETIMEMessageForOwner VARCHAR(4...RequestedLocation VARCHAR(...)OwnerConfirmation VARCHAR(...)OwnerRating INT(11)OwnerResponseTime TIMEBookingStatus VARCHAR(45)user_sanjeeva_UserId VARCH...vehicle_sanjeeva_VehicleId VA...
listedvehicle... <ul style="list-style-type: none">VehicleStatus VARCHA...vehicle_sanjeeva_Vehi... Indexes		

Relationship mapped in the ER diagram are as below:

1. User Entity and Account Entity
 - a. A user id is generated for every website visitor
 - b. A user can choose to sign up or login as guest
 - c. If the user signs up then the information of user id is stored in the account table
 - d. Every account will have 1 and only 1 user id associated with it.
2. User Entity and Vehicle Entity
 - a. An account created can add 0 or many vehicles
 - b. Every vehicle will have only one account associated with it
3. Vehicle Entity and Vehicle Photos Entity
 - a. A vehicle can have one or more photos and every photo will have one or more vehicle id associated with it
4. Vehicle Entity and Vehicle Calendar Entity
 - a. A vehicle will have 0 or many vehicle calendar and each vehicle will have only one vehicle entity associated with it
5. Vehicle Entity and Vehicle details Entity
 - a. A vehicle will have one vehicle details (min=1, max =1)
6. Vehicle Entity and vehicle Location Entity
 - a. A vehicle will have only one vehicle location (min=1, max=1)
7. Vehicle Entity and ListedVehicle Entity
 - a. A vehicle will have only one and only one listing (min=1, max=1)
8. Vehicle Entity and DeletedVehicle Entity
 - a. A vehicle can have 0 or 1 entry in the deltedvehicle entity
9. Vehicle Entity and Vehicle Pricing Entity
 - a. A vehicle will have 1 Vehicle pricing entity and visa versa (min=1, max=1)
10. Vehicle Entity and Delivery Airport Entity
 - a. A vehicle will have only one vehicle deliveryairport (min =1, max=1)
11. Vehicle Entity and Vehicle Insurance Entity
 - a. A vehicle will have one and only one insurance (min=1, max =1)
 - b. A vehicle insurance will be associated with one vehicle entity (Min=1, max=1)
12. Vehicle Entity and trip Preference entity
 - a. Each vehicle will have one trip preference entity and visa versa
13. Vehicle Entity and Distance included entity
 - a. Each vehicle will have one trip preference entity and visa versa
14. User Entity and booking Entity
 - a. A user can have 0 or many booking history but every booking history will have one and only one user id associated with it.
15. Vehicle Entity and booking Entity
 - a. A vehicle can have 0 or many booking history associated with it
 - b. Every booking will have one and only one vehicle associated with it.
16. Trip history Entity and Booking Entity
 - a. Each trip history will have a booking id associated with it
17. Cancellationandrefund Entity and Booking Entity
 - a. A cancellationandrefund entity can have 0 or 1 booking entity associated with it

18. Payment Entity and Booking history Entity

- a. Each payment will have one booking history associate with it
- b. Each booking history will have one payment associated with it

Other related tables which serve as look up table in the ER diagram are as below:

- 1. Car pricing lookup
- 2. Lookup promo code
- 3. Lookup protectionplan

Information of data in database

There are 22 entries for the user, 21 created account and one was guest (sanjeeveees@gmail.com) . Out of 21 accounts only 20 listed vehicles. As soon these vehicles were added each of them was made available in the listed vehicle.

There were 6 account (vehicle id 1000-1006) who deleted the vehicle after listing, this information is in the deleted table and were removed from the listed table.

Out of the remaining 14 vehicles, 7 are available for booking and the remaining 7 which are not available are because of the trip in progress and are in the booking history as they still have the trip in progress.

3 of the available vehicle (1008, 1009 and 1011) have are available for booking as they have completed the trip and their trip information is there in booking history, payment history and trip history.
