Contents

Vehicle Fleet System(GemStone/Group-7 Version History)

Version Number	Date	Author/Owner	Description of Change
0.1	30-Aug-2021	Sree Harshitha	Initial Setup and first Draft
0.2	31-Aug-2021	Niraj Chadrabhan	Problem Specification
0.3	05-Sept-2021	Sobha Nand Das	SQL Queries
0.4	14-Sept-2021	Yogesh Kumar	Rest API
0.5	28-Sept-2021	Rupesh Mittal	Table Defination
0.6	29-Sept-2021	BalKrishnan P	Normalization
0.7	25-Oct-2021	Khushnu Prashant	Model Diagram
0.8	27-Oct-2021	Ravi R	Normalization
0.9	06-Nov-2021	Ashrith Shetty	Rest API screenshot
1.0	07-Nov-2021	Surya Rayudu	Table Defination
1.1	08-Nov-2021	Anurag Kulshrestha	Overall review and ER Digram

Team Members and their Responsibilities

Project Phase	Contribution By	Resposibility
Ideation	All team members	Came up with project idea and finalized Vehicle Fleet System as unique problem which no one solved
Functional Requirement	Anurag, Harishitha, Neeraj, Sobhanand, Khushbu, Surya	Problem defination and functional definatons
Entity Identification	All team members	To find out all required entities for problem domain
ER Diagram	Anurag	Write ER Digram
Model Digram	Khushbu, Sobhanand	Write up model digram for the Vehicle Fleet System
Normalization	BalKrishnan P, Ravi R	Check all entity tables and their state corresponding to normalization
Service Code	All Team members	Write up code for all entity clasees their invocation

Problem statement & Requirement definition:

Vehicle fleet service:

Group 7 team came up with service-based product called “Vehicle Fleet service” to help customer when they want transport vehicle similar to OLA or UBER apps. Vehicle Fleet service hereafter used as “VFS” in this document. VFS allow customer to book transport vehicle based on their requirements. Vehicle will be provided by fleet vendors. Our service will match the customer requirement and available vehicle. There are three types of user in this app.

Firstly, Customer who will avail the service and book transport vehicle from one place to another. He can view the vehicle for a particular route. He can view its rating and cost. He can track the trip.

Secondly, Fleet vendor who will register their vehicle and driver information in the portal. They can approve/reject the booking. He can update the vehicle problem and stop its visibility in the system. He can end the trip.

Thirdly, Administration who will maintain the production system. He will help the fleet vendor in onboarding. He can view any booking and update cost for each vehicle type. He can generate report of all the trips.

Consider the following example explaining how the VFS service ease the life of customer and fleet vendor:

Suppose you want to shift your home, you have requirement of truck for 2 BHK home.

- You can search the available vehicle between source and destination and cost associated with them.
- You can select vehicle, source and destination and raise the booking request for a particular date.
- Fleet vendor will get this request, he can approve this request or reject it.
- After approval, invoice will be generated, and customer can do payment.
- During journey the location will updated, so that customer can track his booking.
- Customer can do payment after delivery also and write review on the vendor and booking.

Questions:

1. Who will be the users?

- Customer
- Fleet vendor
- Administrator

2. What are the benefits of this application?
    - Easy for customer to book good quality transport vehicle with good vendor support.
    - Easy for fleet vendor in managing the vehicle and booking orders.
    - Easy for tracking booking and payment for both customer and vendor.
3. List of functions and features of the application?
    - Searching and Booking vehicle
    - Tracking the trip
    - Managing the fleet of vehicle
4. How many users will use it simultaneously?
    - 2 types of user can use the application.
    - 100 users can access this application simultaneously at this point which can be further scaled based on infrastructure.

Features implemented in REST API:

Customer:

- Search fleets available from location (source) to location (destination)
- Results Will be all vehicle along with vehicle type and cost per km and carry capacity in kg and review information
- Book the vehicle (now and scheduled)
- Viewing Current trip Status (location of current state vehicle, live location)
- Payment Options – Cash
- Review Comments

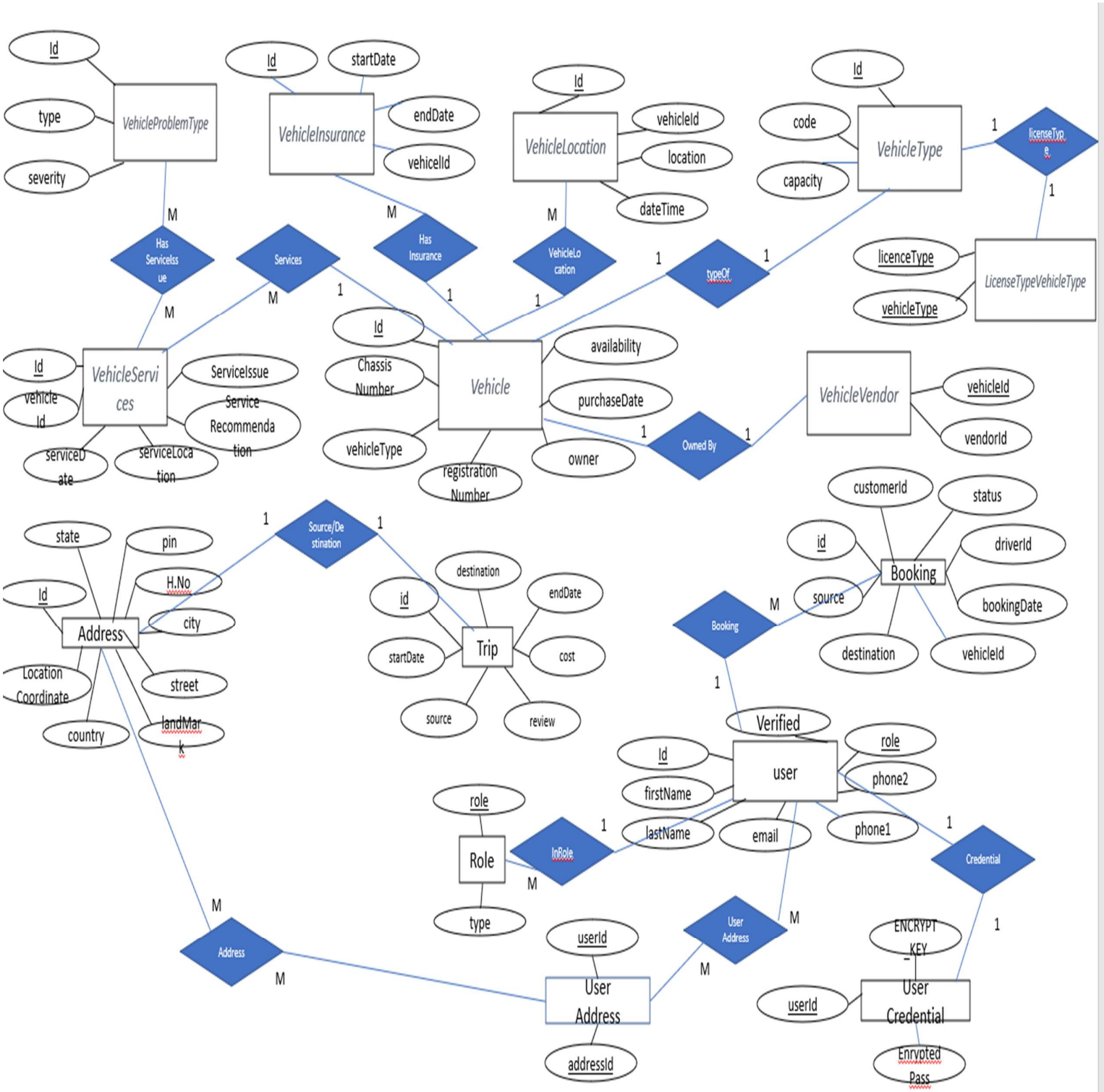
Fleet Vendor:

- Add, Delete Vehicle
- Able to Add Vehicle Service Records
- Last Service issues for Vehicle
- Add/Delete Driver Information
- View booking and approving it.
- Viewing On going Trip Information
- Customer Review
- Update of vehicle tracking information
- Reports about Vehicle health like problem occurred, date and type
- End Trip

Administrator:

- Adding per km cost for vehicle type
- Adding BHK vs suggested vehicle
- Viewing Current ongoing trips
- Monthly Summary of all trips
- Weekly Summary of all trips
- Reports on various trips
- Vehicle type addition
- Add/Delete Type of Vehicle Problem

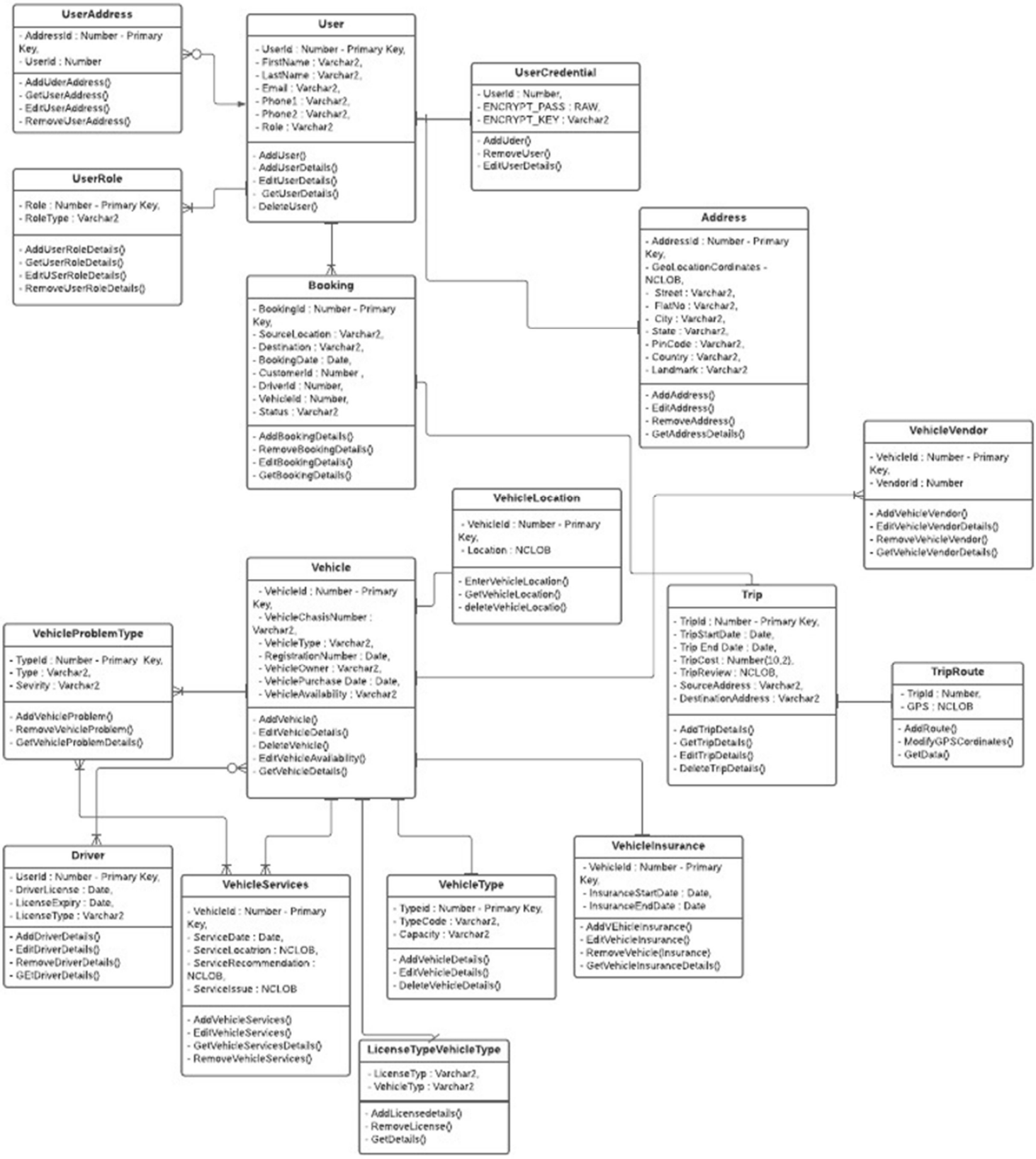
Entity Relationship Model



https://github.com/Group7-BITS/Vehicle-Fleet-System/blob/main/documents/ERDigram.pptx

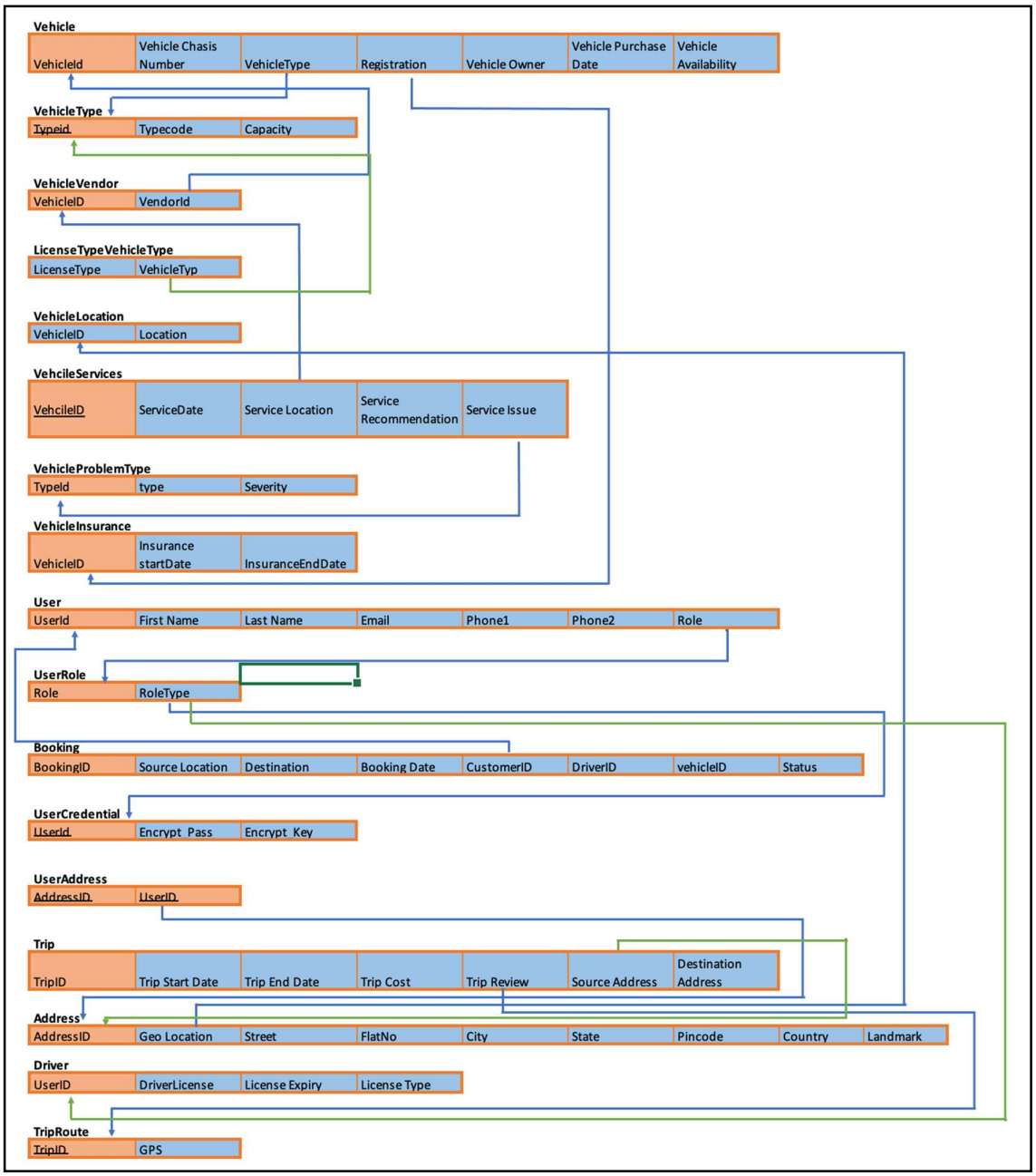
Object Model Diagram (optional)

https://github.com/Group7-BITS/Vehicle-Fleet-System/blob/main/documents/ModelDigram.jpeg



Normalization

Include the below for all the tables.



- We analysed all the 17 relations that were formed as a part of relational design .Here is what we observed:
  - All the 17 relations are already in 1NF as there were no attributes that are multivalued and stored in a single table .Hence we concluded our relational schema is in 1NF.

- We also verified and found that all the tables are also in 2NF . That is because there are no relations where any non key attribute is partially dependent on the key attribute.
    1. All of our relations have only one attribute as primary key . Since there is no composite key in these relations the concept of partial dependency does not arise here .
    2. However , table user had partial dependency, so the table was decomposed into User table, Address table and UserAddress table Hence we verifyed that none of the non key attributes are partially dependent on the composite key (AddressID,UserID).

- Next , we navigate to check if all our relations are in 3 NF or not. 3NF is based on concept of transitive dependency . We have successfully proved that all our relations are now in 3NF.
- We move one step ahead to check for BCNF . As per our observation all our relations are already in BCNF as we have no non-prime attribute that determines another non prime attribute in any of our relations . In all the relations concepts of fully functional dependency of prime attribute holds . Hence our relations are in BCNF. Hence in conclusion , our schema is in BCNF

Table Definitions and Data Contents

User

Name	Data type	Primary Key
User id	Number	Key
First name	varchar2(20)	
Last name	varchar2(20)	
Email	varchar2(50)	
Phone 1	varchar2(15)	
Phone 2	varchar2(15)	
Role	varchar2(20)	

VehicleType

Name	Data type	Primary Key
Type id	Number	Key
TypeCode	varchar2(20)	

Capacity	varchar2(3)	

TripRoute

Name	Data type	Primary Key
TripId	Number	
GPS	NCLOB	

VehicleLocation

Name	Data type	Primary Key
VehicleId	Number	Key
Location	NCLOB	

LicenseTypeVehicleType

Name	Data type	Primary Key
LicenseTyp	Varchar2(100)	
VehicleTyp	Varchar2(100)	

Vehicle

Name	Data type	Primary Key
VehicleId	Number	Key
VehicleChasisNumber	Varchar2(20)	
VehicleType	Varchar2(20)	
RegistrationNumber	Date	
VehicleOwner	Varchar2(20)	
VehiclePurchase Date	Date	
VehicleAvailability	Varchar2(20)	

VehicleProblemType

Name	Data type	Primary Key
TypeId	Number	key
Type	Varchar2(20	
Sevirity	Varchar2(20)	

VehicleInsurance

Name	Data type	Primary Key
VehicleId	Number	key
InsuranceStartDate	Date	
InsuranceEndDate	Date	

Driver

Name	Data type	Primary Key
UserId	Number	key
DriverLicense	Date	
LicenseExpiry	Date	
LicenseType	Varchar2(20)	

Trip

Name	Data type	Primary Key
TripId	Number	Key
TripStartDate	Date	
Trip End Date	Date	
TripCost	Number(10,2)	
TripReview	NCLOB	
SourceAddress	Varchar2(200)	
DestinationAddress	Varchar2(200)	

VehicleServices

Name	Data type	Primary Key
VehicleId	Number	Key
ServiceDate	Date	
ServiceLocatrion	NCLOB	
ServiceRecommendation	NCLOB	
ServiceIssue	NCLOB	

UserAddress

Name	Data type	Primary Key
AddressId	Number	Key
UserId	Number	

Address

Name	Data type	Primary Key
AddressId	Number	Key
GeoLocationCordinates	NCLOB	
Street	Varchar2(20)	
FlatNo	Varchar2(20)	
City	Varchar2(20)	
State	Varchar2(50)	
PinCode	Varchar2(20)	
Country	Varchar2(50)	
Landmark	Varchar2(200)	

UserCredential

Name	Data type	Primary Key
UserId	Number	
ENCRYPT_PASS	RAW(200)	
ENCRYPT_KEY	Varchar2(100)	

VehicleVendor

Name	Data type	Primary Key
VehicleId	Number	Key
VendorId	Number	

Booking

Name	Data type	Primary Key
BookingId	Number	key
SourceLocation	Varchar2(200)	
Destination	Varchar2(200)	
BookingDate	Date	
CustomerId	Number	
DriverId	Number	
VehicleId	Number	
Status	Varchar2(20)	

UserRole

Name	Data type	Primary Key
Role	Number	Key
RoleType	Varchar2(20)	

SQL Statements

```
CREATE TABLE "User" (
  "UserId" Number Primary Key,
  "FirstName  " Varchar2(20),
  "LastName" Varchar2(20),
  "Email" Varchar2(50),
  "Phone1" Varchar2(15),
  "Phone2" Varchar2(15),
  "Role" Varchar2(20)
);

CREATE TABLE "TripRoute" (
  "TripId" Number,
  "GPS" NCLOB
);

CREATE TABLE "VehicleType" (
  "Typeid" Number Primary Key,
  "TypeCode" Varchar2(20),
  "Capacity" Varchar2(3)
);

CREATE TABLE "VehicleLocation" (
  "VehicleId" Number Primary Key,
  "Location" NCLOB
);

CREATE TABLE "LicenseTypeVehicleType" (
  "LicenseTyp" Varchar2(100),
  "VehicleTyp" Varchar2(100)
```

```
);

CREATE TABLE "Vehicle" (
  "VehicleId" Number Primary Key,
  "VehicleChasisNumber" Varchar2(20),
  "VehicleType" Varchar2(20),
  "RegistrationNumber" Date,
  "VehicleOwner" Varchar2(50),
  "VehiclePurchase Date" Date,
  "VehicleAvailability" Varchar2(5)
);

CREATE TABLE "VehicleProblemType" (
  "TypeId" Number Primary  Key,
  "Type" Varchar2 (20),
  "Sevirity" Varchar2(20)
);


CREATE TABLE "VehicleInsurance" (
  "VehicleId" Number Primary Key,
  "InsuranceStartDate" Date,
  "InsuranceEndDate" Date
);

CREATE TABLE "Driver" (
  "UserId" Number Primary Key,
  "DriverLicense" Date,
  "LicenseExpiry" Date,
  "LicenseType" Varchar2(20)
);

CREATE TABLE "Trip " (
  "TripId" Number Primary Key,
  "TripStartDate" Date,
  "Trip End Date" Date,
  "TripCost" Number(10,2),
  "TripReview" NCLOB,
  "SourceAddress" Varchar2(200),
  "DestinationAddress" Varchar2(200)
);

CREATE TABLE "VehicleServices" (
  "VehicleId" Number Primary Key,
  "ServiceDate" Date,
  "ServiceLocatrion" NCLOB,
  "ServiceRecommendation" NCLOB,
  "ServiceIssue" NCLOB
);
```

```
CREATE TABLE "UserAddress" (
  "AddressId" Number Primary Key,
  "UserId" Number,
  CONSTRAINT "FK_UserAddress.UserId"
    FOREIGN KEY ("UserId") REFERENCES "User"("UserId")
);

CREATE TABLE "Address" (
  "AddressId" Number Primary Key,
  "GeoLocationCordinates" NCLOB,
  "Street" Varchar2(20),
  "FlatNo" Varchar2(20),
  "City" Varchar2(20),
  "State" Varchar2(50),
  "PinCode" Varchar2(20),
  "Country" Varchar2(50),
  "Landmark" Varchar2(200),
  CONSTRAINT "FK_Address.AddressId"
    FOREIGN KEY ("AddressId")
      REFERENCES "UserAddress"("AddressId")
);


CREATE TABLE "UserCredential" (
  "UserId" Number,
  "ENCRYPT_PASS " RAW (200),
  "ENCRYPT_KEY" Varchar2(100),
  CONSTRAINT USER_ID_REF FOREIGN KEY ("UserId") REFERENCES "User"("UserId")
);

CREATE TABLE "VehicleVendor" (
  "VehicleId" Number Primary Key,
  "VendorId" Number
);

CREATE TABLE "Booking" (
  "BookingId" Number Primary Key,
  "SourceLocation" Varchar2(200),
  "Destination" Varchar2(200),
  "BookingDate" Date,
  "CustomerId" Number ,
  "DriverId" Number,
  "VehicleId" Number,
  "Status" Varchar2(20),
  CONSTRAINT CustomerId_ref FOREIGN KEY ("CustomerId") REFERENCES
"User"("UserId"),
  CONSTRAINT DriverId_ref FOREIGN KEY ("DriverId") REFERENCES
"Driver"("UserId"),
```

```
  CONSTRAINT VehicleId_ref FOREIGN KEY ("VehicleId") REFERENCES
"Vehicle"("VehicleId")
);


CREATE TABLE "UserRole" (
  "Role" Number Primary Key,
  "RoleType" Varchar2(20)
);
```

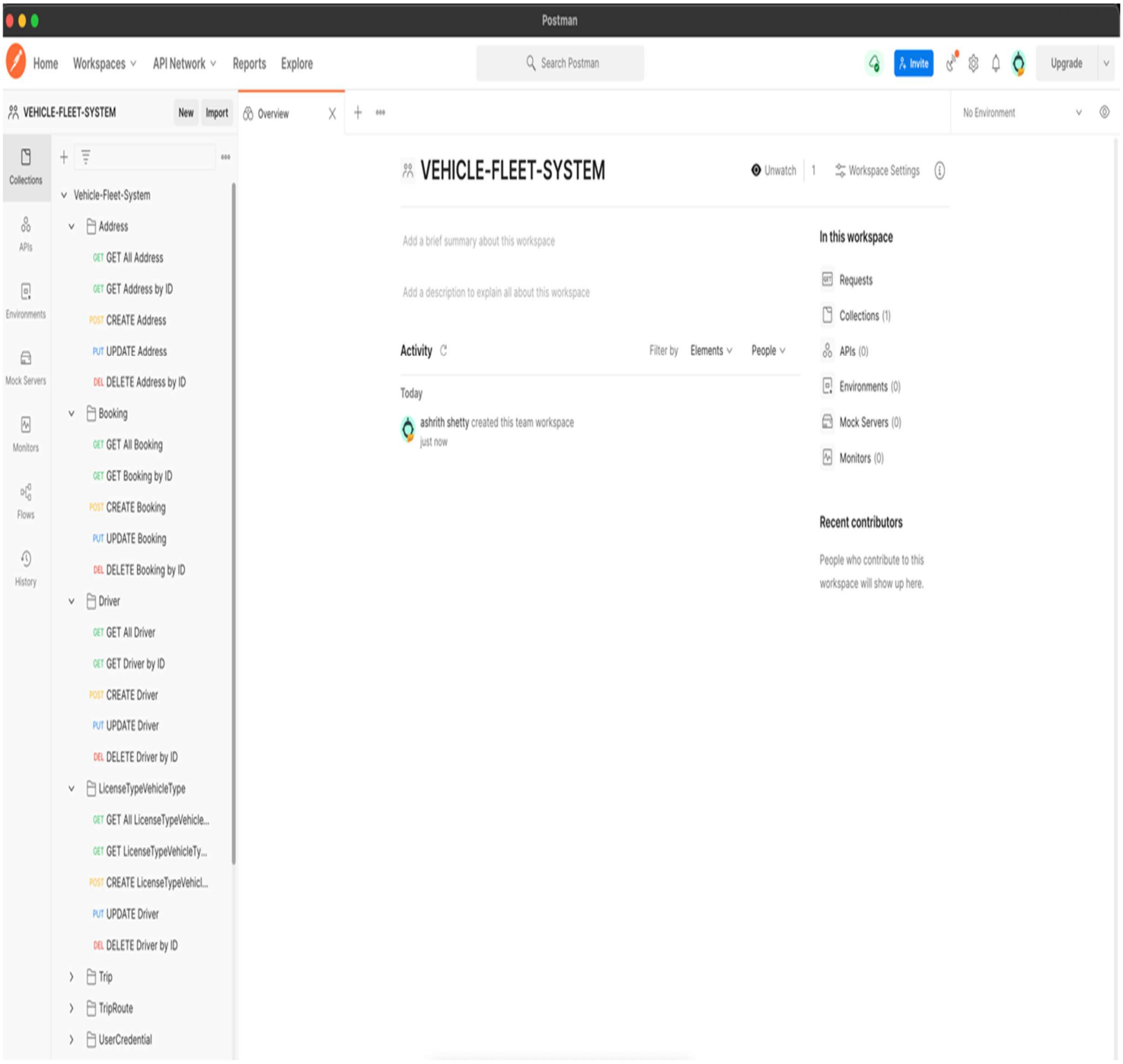
Software Stack

- **Java (JDK 8)**
- **Spring Boot**
- **Postman**
- **GIT**
- **Maven**
- **Eclipse**
- **HSQL DB**
- **JPA Entity**

User Interfaces and Database connectivity

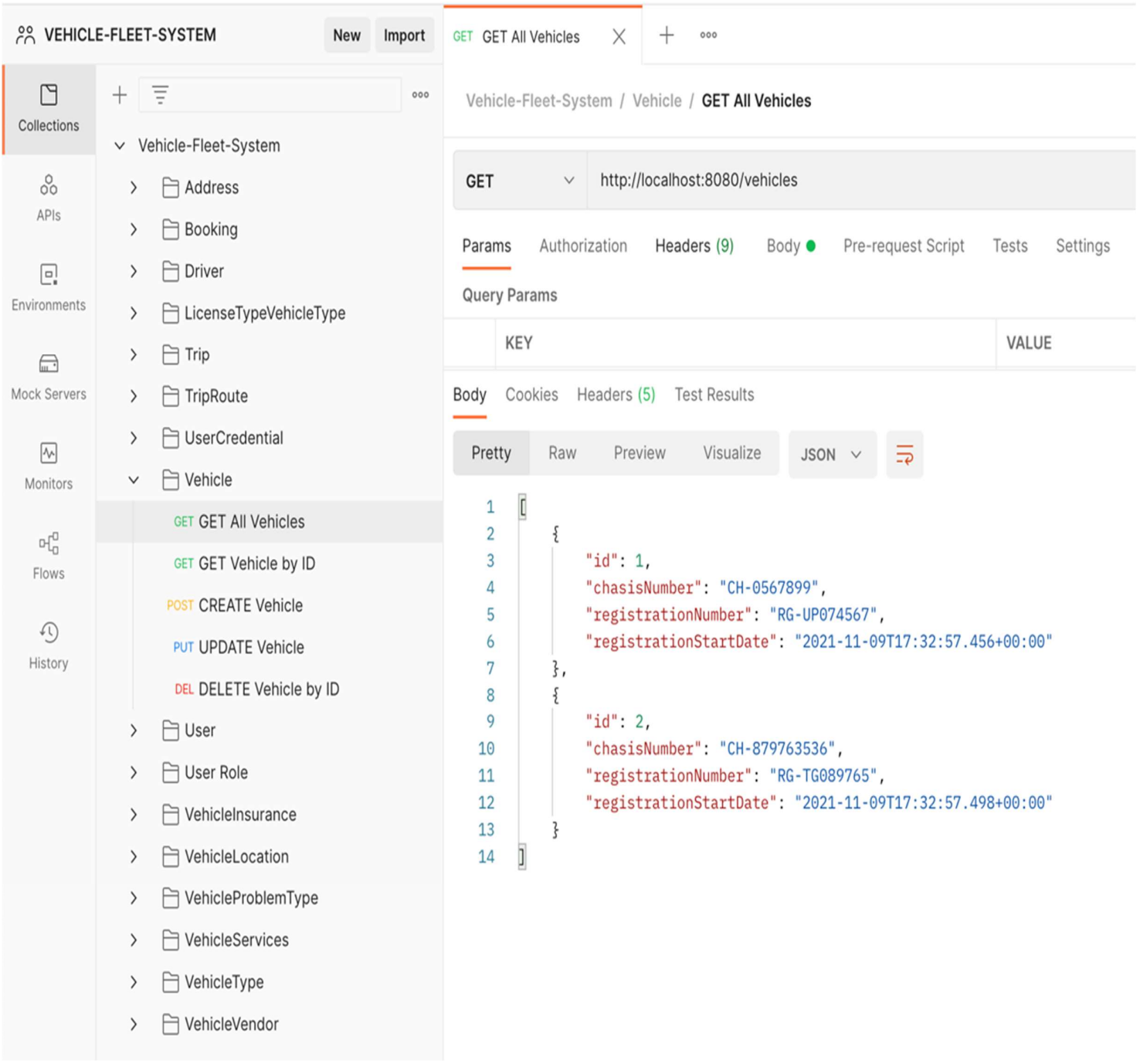
Vehicle Fleet System

This is written for all entity classes and below screen shot is for vehicle only.
For detail import below file into postman to see all entities all CRUD operations working
https://github.com/Group7-BITS/Vehicle-Fleet-System/blob/main/documents/Vehicle-Fleet-System.postman_collection.json

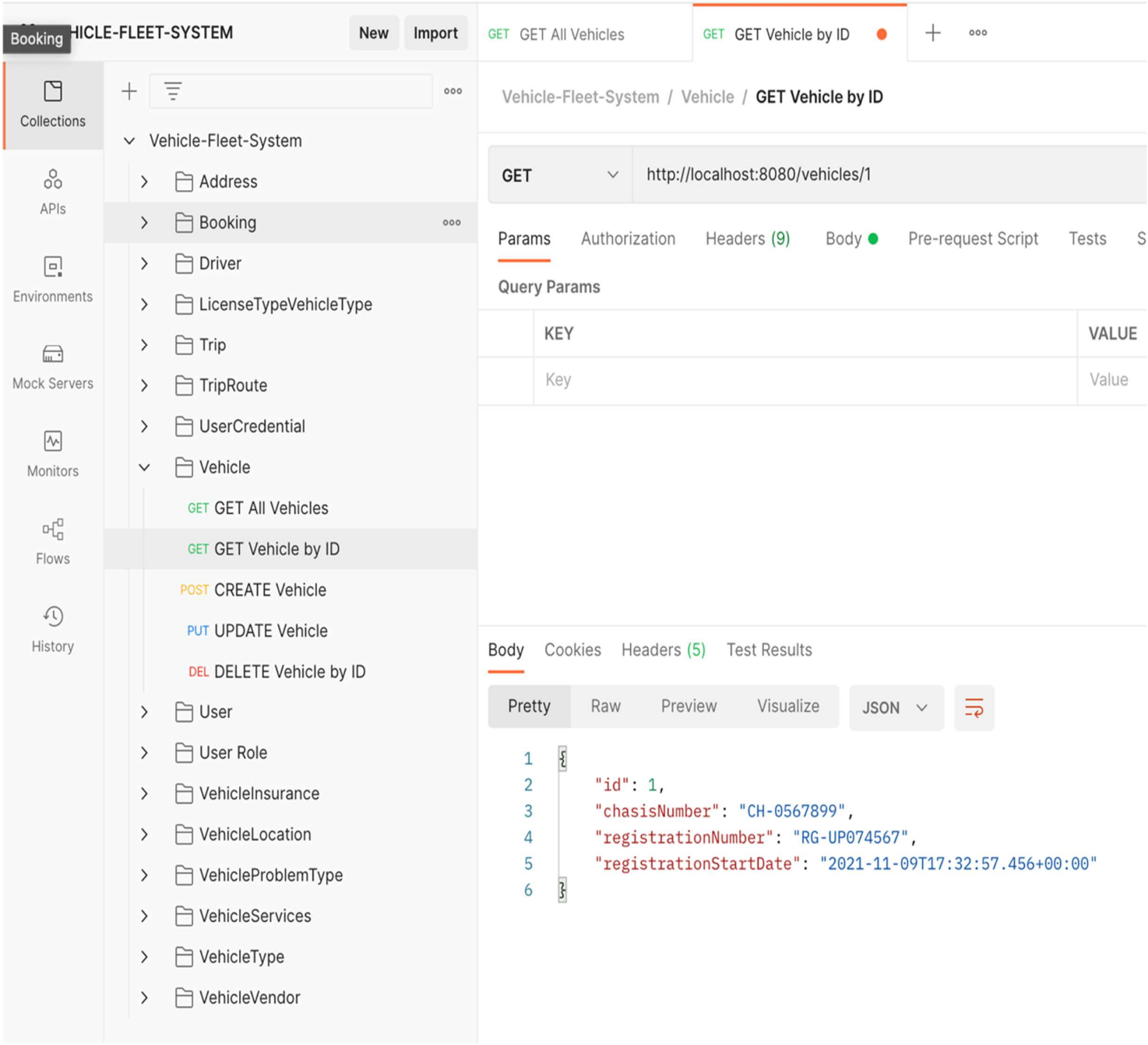


Vehicles

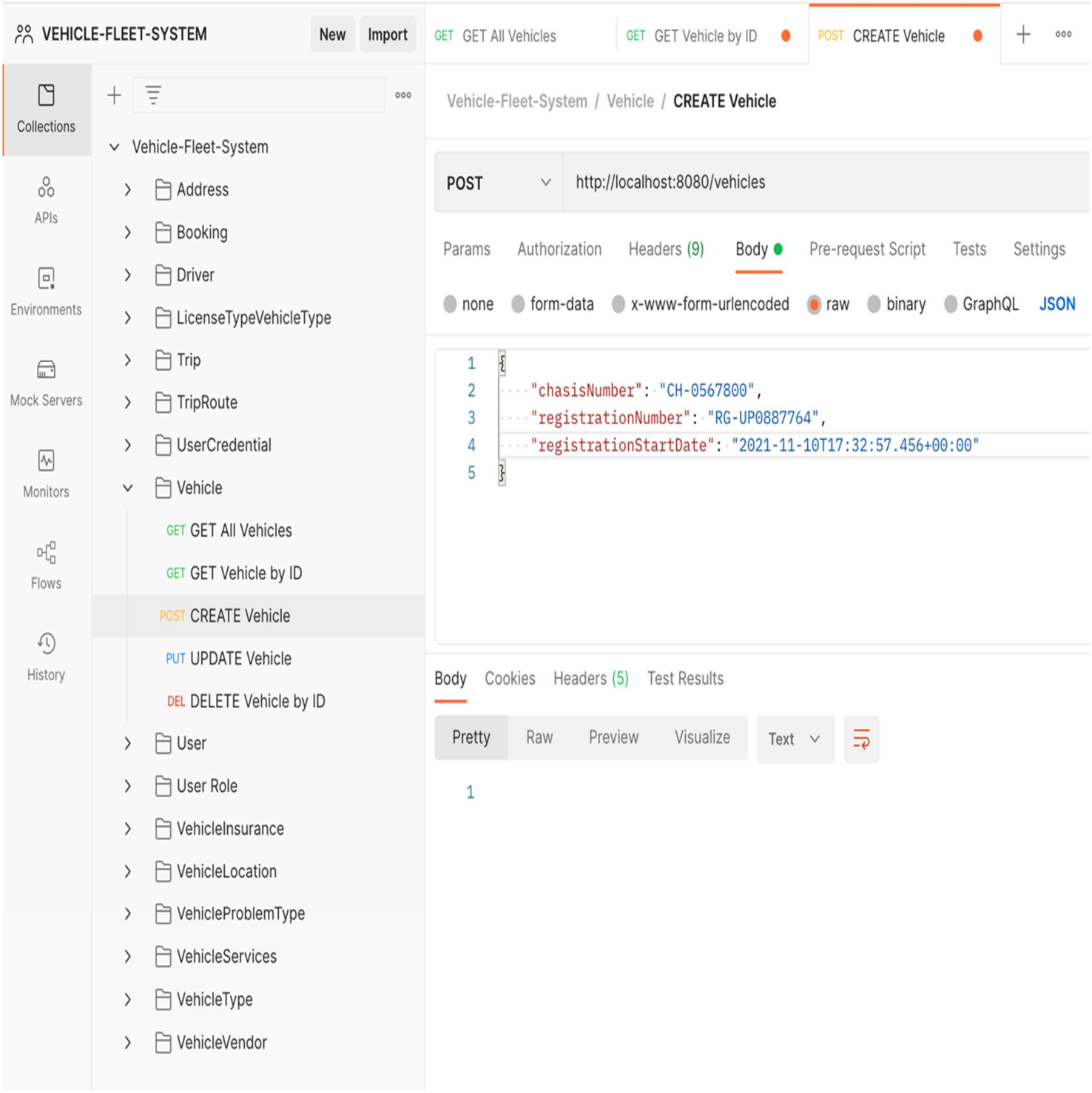
1. Get All Vehicles

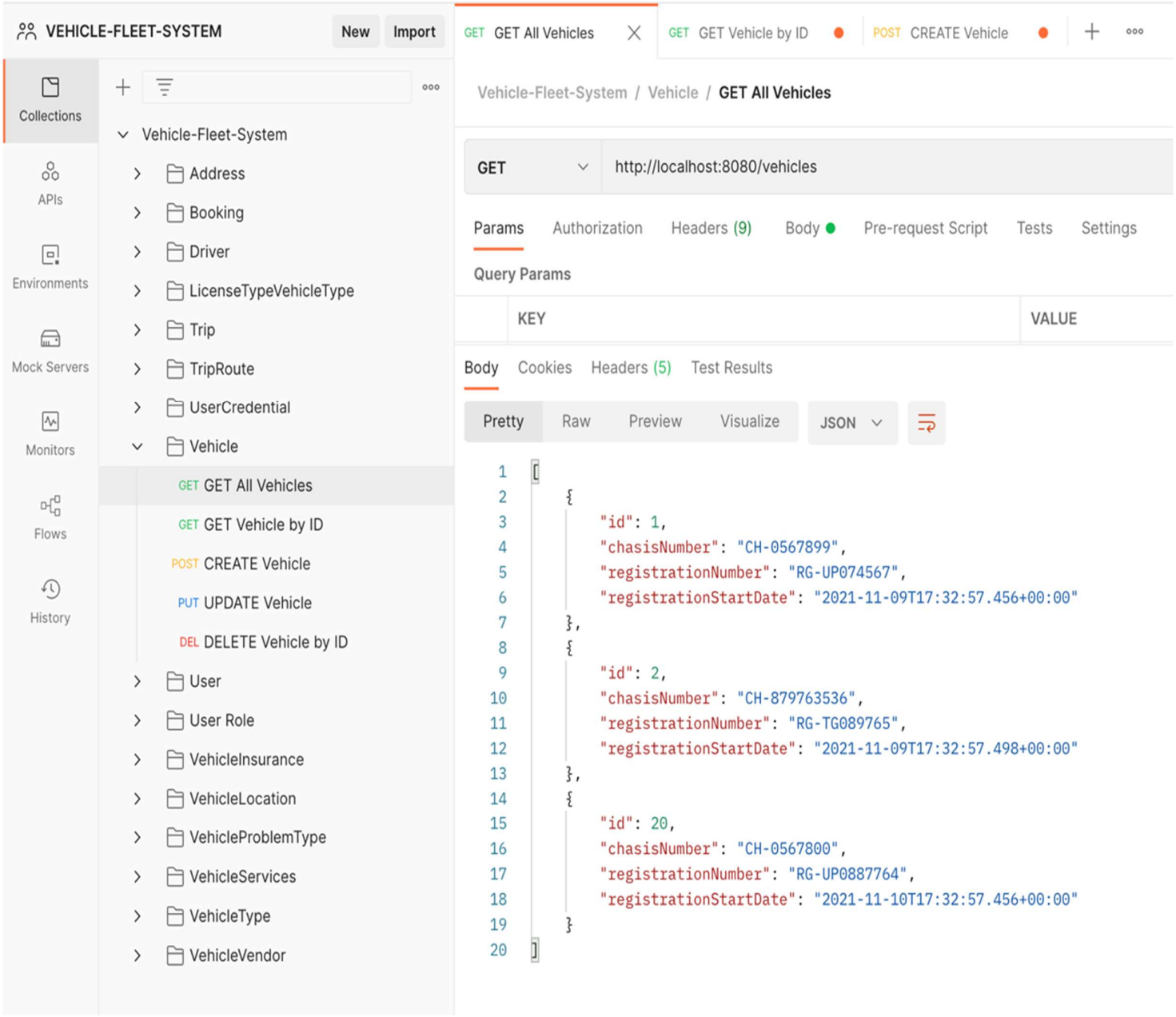


2. Get Vehicle By ID



3. Create Vehicle




VEHICLE-FLEET-SYSTEM
New
Import
Collections
APIs
Environments
Mock Servers
Monitors
Flows
History
Vehicle-Fleet-System
Address
Booking
Driver
LicenseTypeVehicleType
Trip
TripRoute
UserCredential
Vehicle
GET GET All Vehicles
GET GET Vehicle by ID
POST CREATE Vehicle
PUT UPDATE Vehicle
DEL DELETE Vehicle by ID
User
User Role
VehicleInsurance
VehicleLocation
VehicleProblemType
VehicleServices
VehicleType
VehicleVendor
GET GET All Vehicles
GET GET Vehicle by ID
POST CREATE Vehicle
Vehicle-Fleet-System / Vehicle / GET All Vehicles
GET
http://localhost:8080/vehicles
Params
Authorization
Headers (9)
Body
Pre-request Script
Tests
Settings
Query Params
KEY
VALUE
Body
Cookies
Headers (5)
Test Results
Pretty
Raw
Preview
Visualize
JSON
[
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},
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"registrationStartDate": "2021-11-09T17:32:57.498+00:00"
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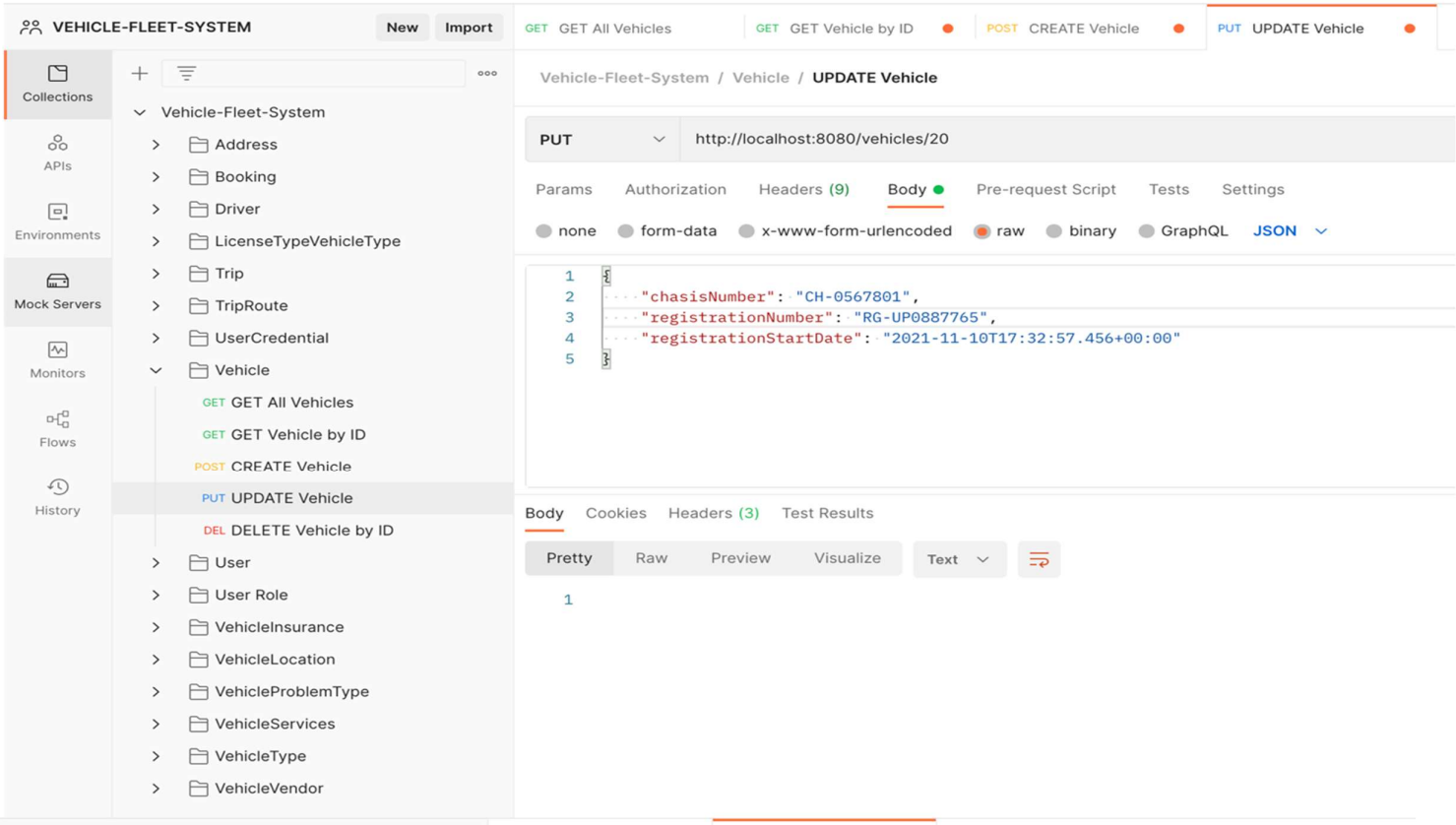
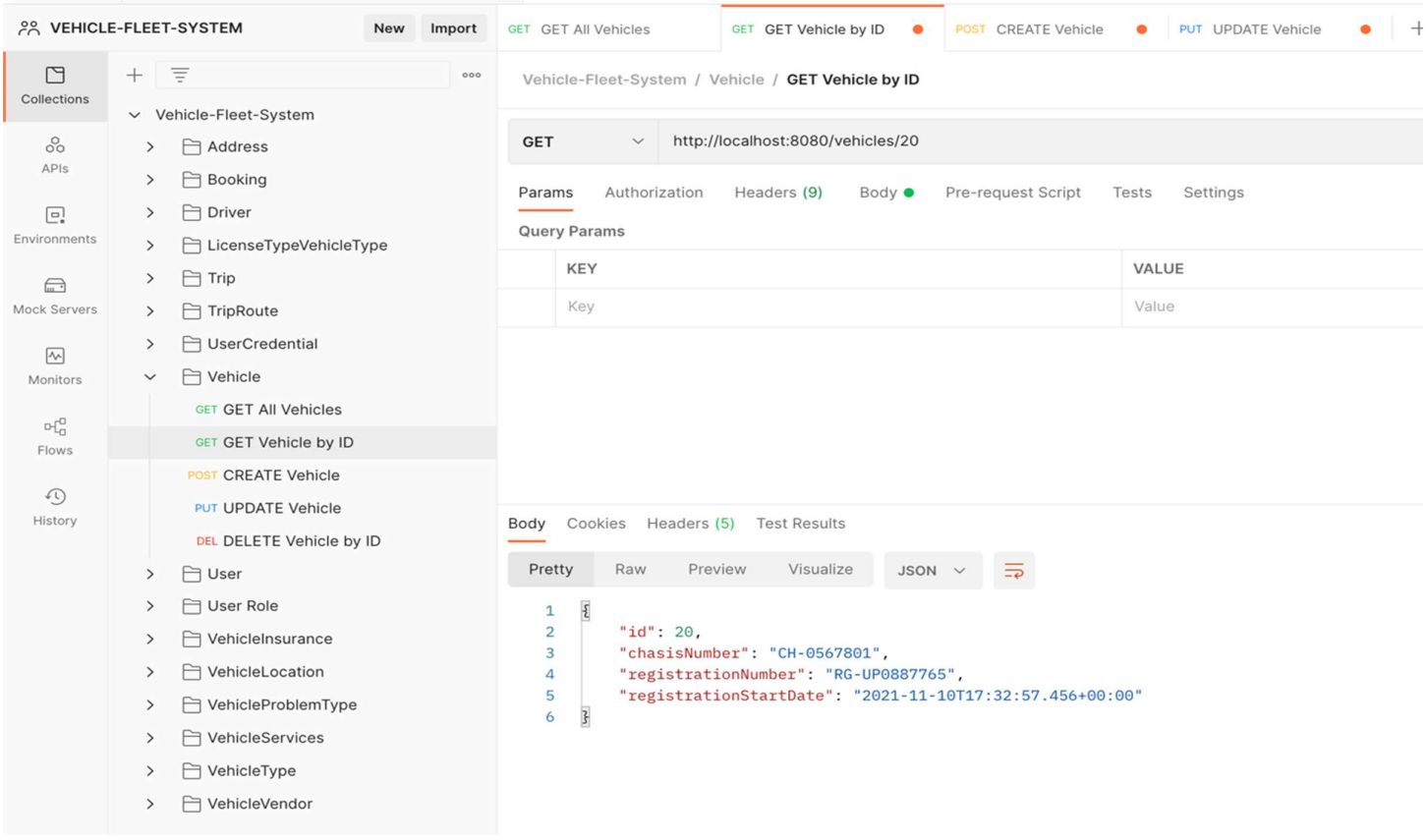
}
]

4. Update Vehicle





5. Delete Address