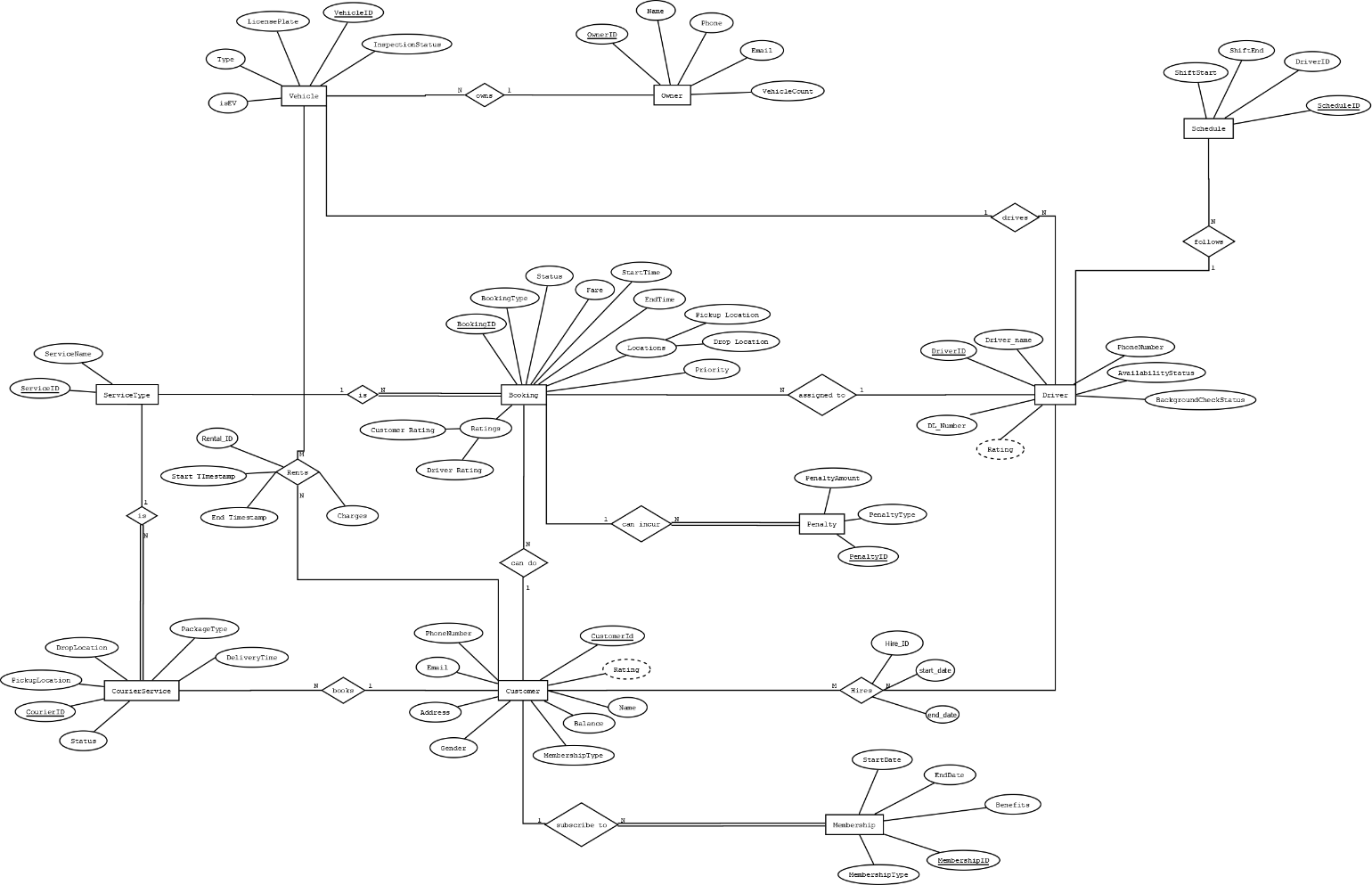
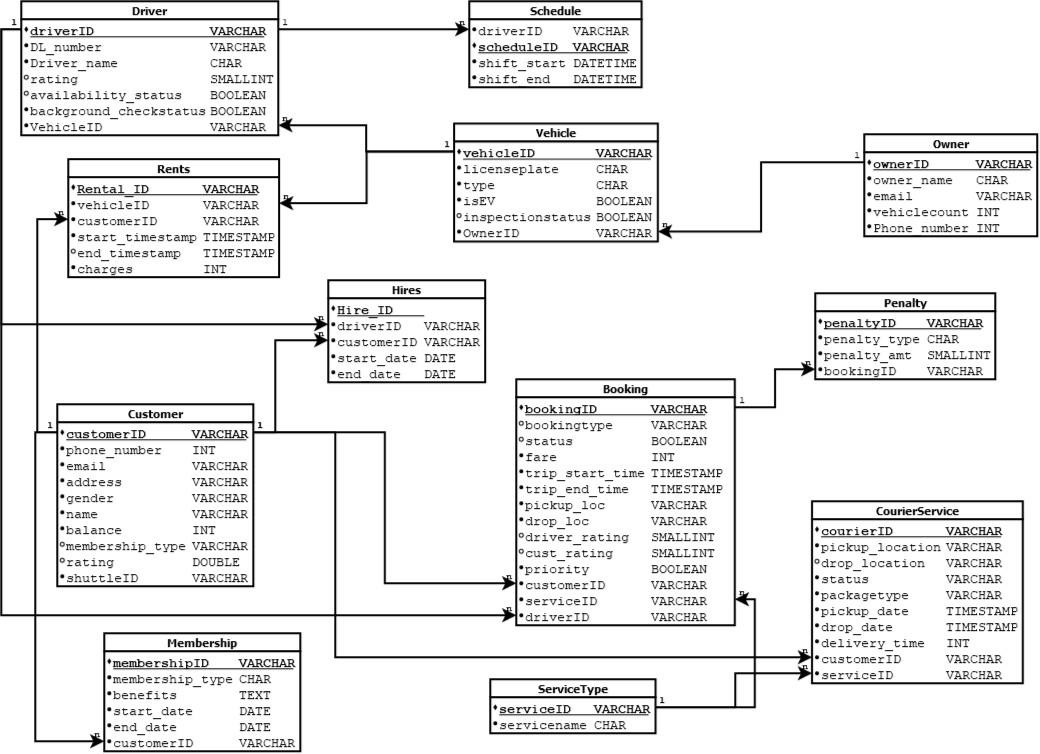
DS604: Introduction to Data Management

**Project SAFAR**

**ER Diagram**



**Relational Schema**



**Normalization Proof’s**

For a table to be in BCNF, the following must hold:

## It must be in 3NF (Third Normal Form), 2NF (Second Normal Form) and 1NF (First Normal Form).

1. For every non-trivial functional dependency, **X → Y**, X must be a **superkey** (meaning that X alone should uniquely determine Y).

## BCNF Check for Each Table:

1. **Driver Table:**
   * Primary Key: driverID
   * Functional Dependencies: driverID → DL\_number, driver\_name, rating, availability\_status, background\_checkstatus, vehicleID
   * This table seems to be in BCNF since there are no partial or transitive dependencies, and the primary key (driverID) uniquely determines all attributes.

## Schedule Table:

* + Primary Key: scheduleID
  + Functional Dependencies: scheduleID → driverID, shift\_start, shift\_end
  + This is in BCNF, as scheduleID uniquely determines all attributes.

## Vehicle Table:

* + Primary Key: vehicleID
  + Functional Dependencies: vehicleID → licenseplate, type, isEV, inspectionstatus, ownerID
  + This is in BCNF, as vehicleID is a superkey and there are no partial or transitive dependencies.

## Owner Table:

* + Primary Key: ownerID
  + Functional Dependencies: ownerID → owner\_name, email, vehiclecount, Phone number
  + This is in BCNF since ownerID uniquely determines all other attributes.

## Rents Table:

* + Primary Key: Rental\_ID
  + Functional Dependencies: Rental\_ID → vehicleID, customerID, start\_timestamp, end\_timestamp, charges
  + This table is in BCNF because Rental\_ID is the primary key and uniquely determines all other attributes.

## Hires Table:

* + Primary Key: Hire\_ID
  + Functional Dependencies: Hire\_ID → driverID, customerID, start\_date, end\_date
  + This table is in BCNF since Hire\_ID uniquely determines all other attributes.

## Customer Table:

* + Primary Key: customerID
  + Functional Dependencies: customerID → phone\_number, email, address, gender, name, balance, membership\_type, rating, shuttleID
  + This table is in BCNF because customerID is the primary key and uniquely determines all other attributes.

## Membership Table:

* + Primary Key: membershipID
  + Functional Dependencies: membershipID → membership\_type, benefits, start\_date, end\_date, customerID
  + This is in BCNF since membershipID uniquely determines all attributes.

## Booking Table:

* + Primary Key: bookingID
  + Functional Dependencies: bookingID → bookingtype, status, fare, trip\_start\_time, trip\_end\_time, pickup\_loc, drop\_loc, driver\_rating, cust\_rating, priority, customerID, serviceID, driverID
  + This is in BCNF because bookingID uniquely determines all attributes.

## Penalty Table:

* + Primary Key: penaltyID
  + Functional Dependencies: penaltyID → penalty\_type, penalty\_amt, bookingID
  + This is in BCNF because penaltyID uniquely determines all other attributes.

## CourierService Table:

* + Primary Key: courierID
  + Functional Dependencies: courierID → pickup\_location, drop\_location, status, packagetype, pickup\_date, drop\_date, delivery\_time, customerID, serviceID
  + This is in BCNF because courierID uniquely determines all other attributes.

## ServiceType Table:

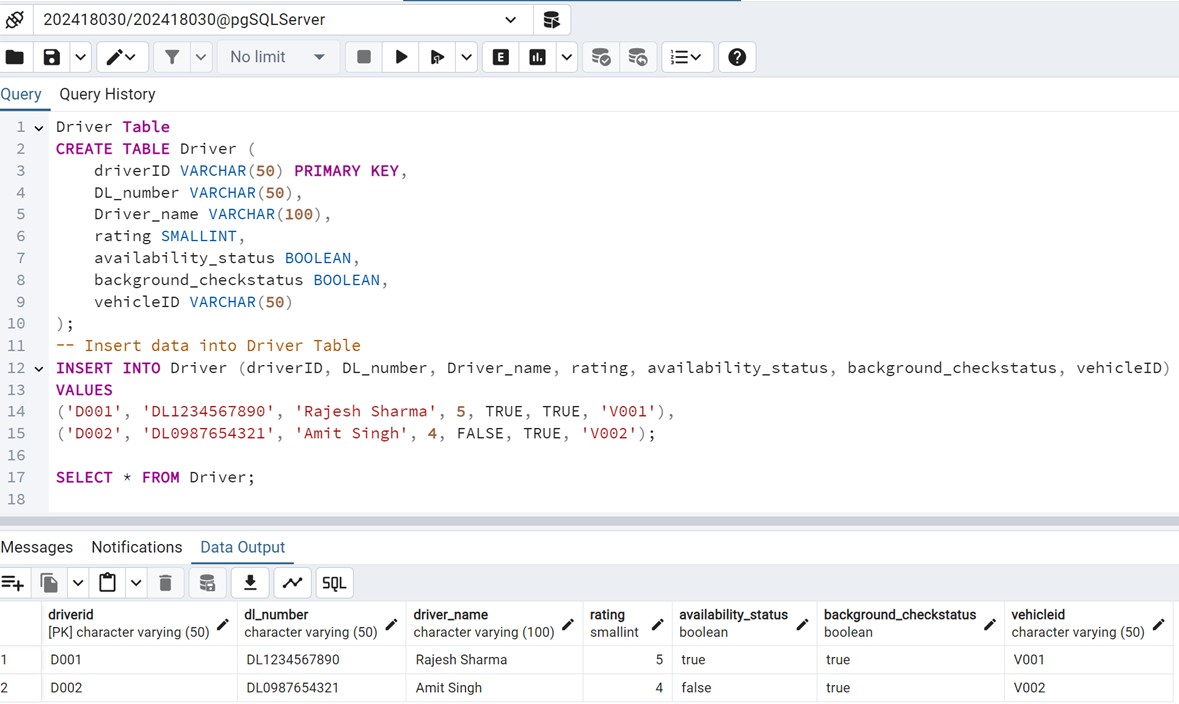
* + Primary Key: serviceID
  + Functional Dependencies: serviceID → servicename
  + This is in BCNF since serviceID uniquely determines all other attributes.

# Conclusion:

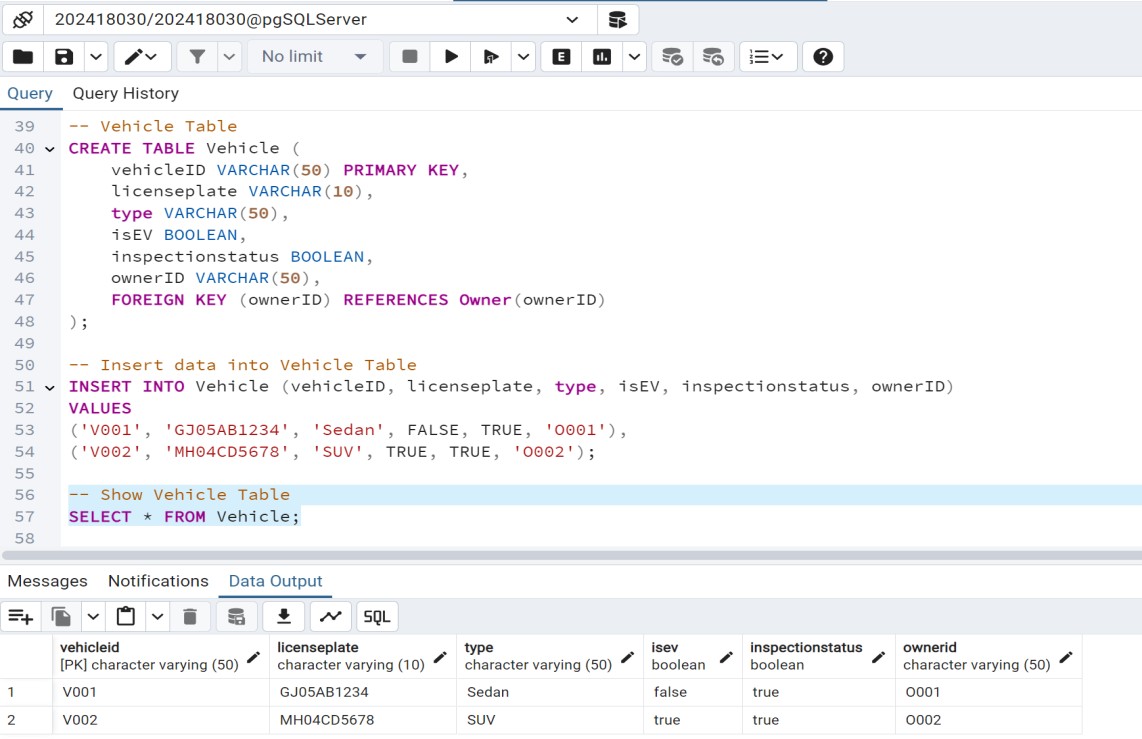
## All the tables in the schema seem to be in BCNF. Each table has a primary key (or superkey) that uniquely determines all other attributes, and there are no partial or transitive dependencies.

**DDL SCRIPT**

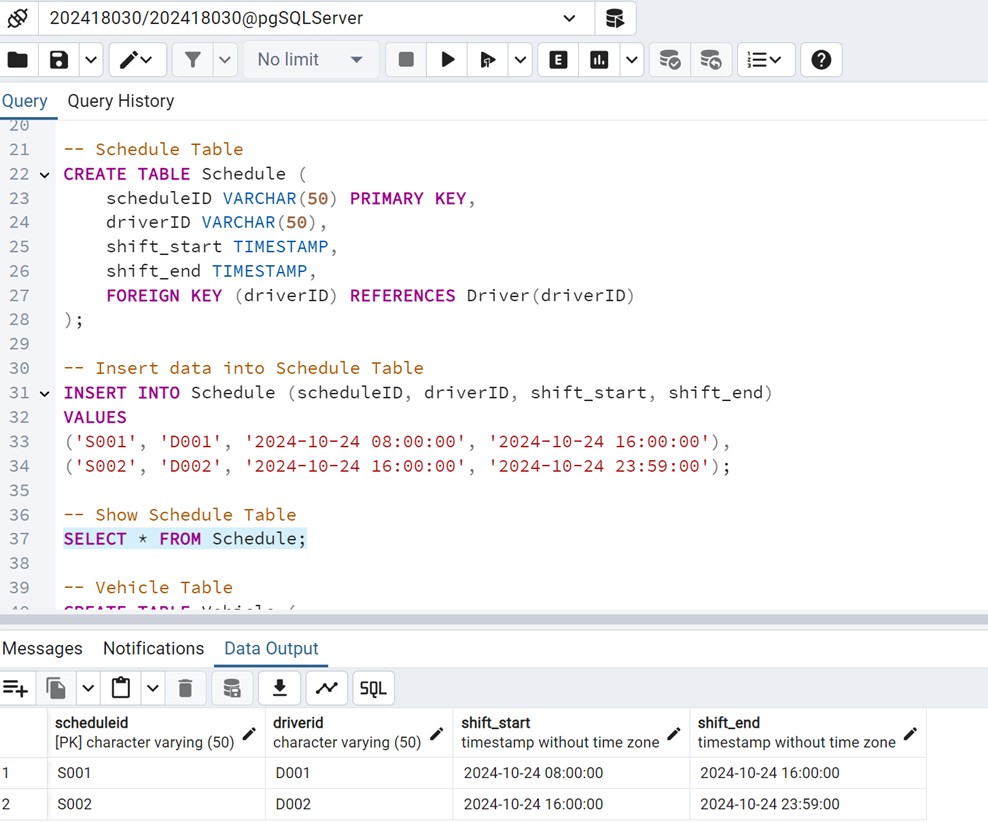
**Driver’s Table**



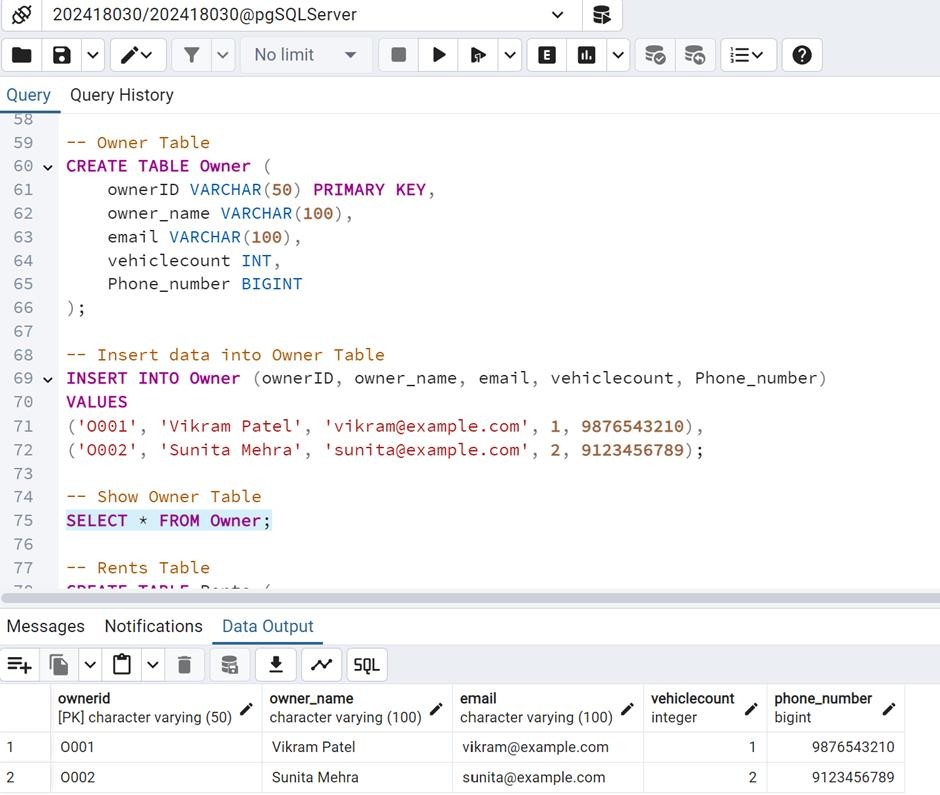
**Vehicle’s Table**



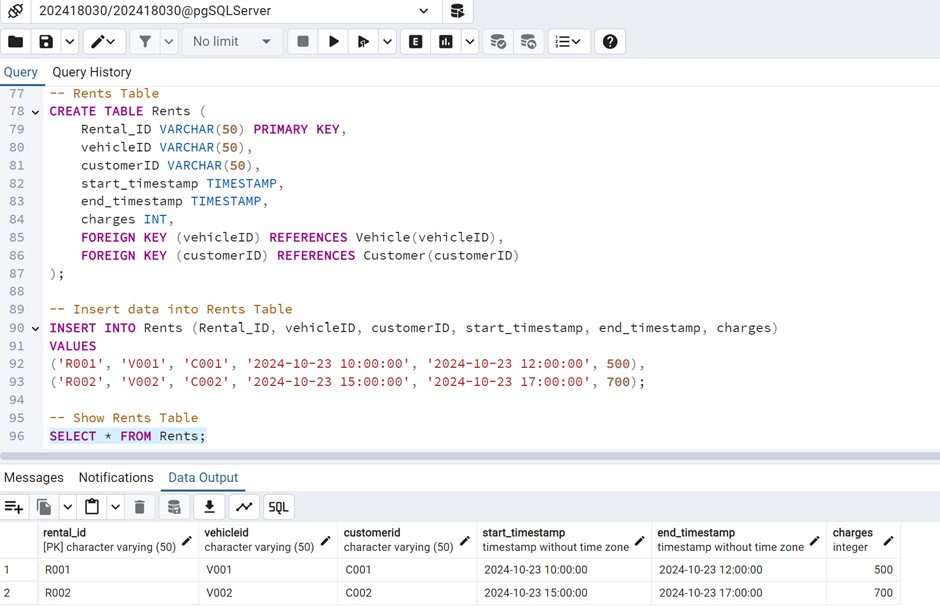
**Schedule’s Table**



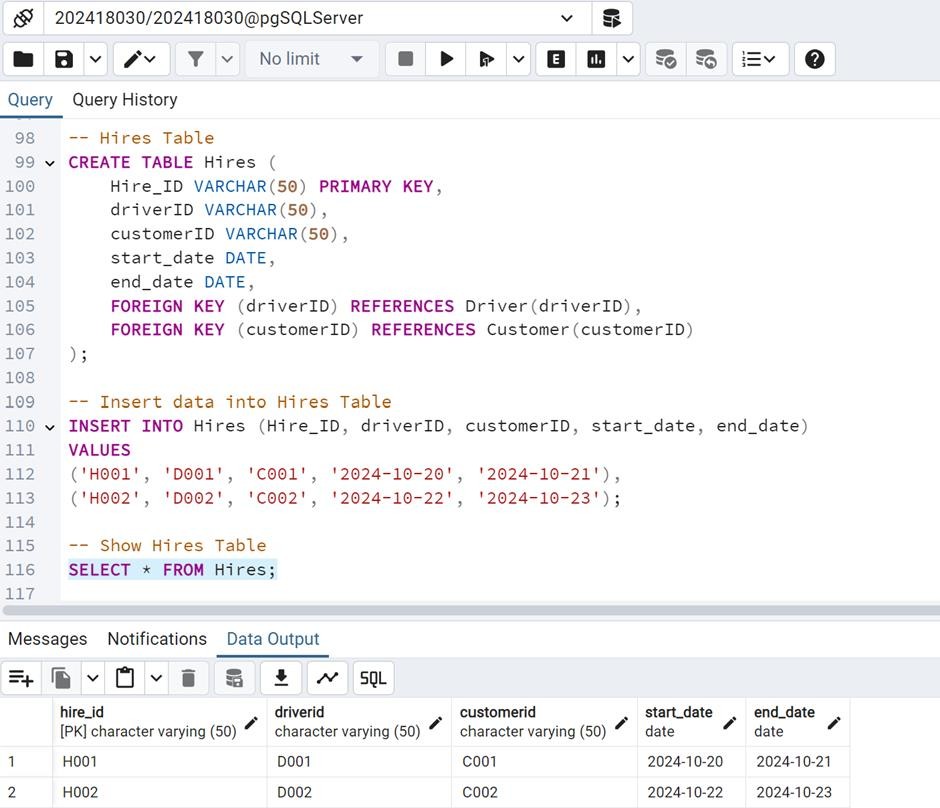
**Owner’s Table**



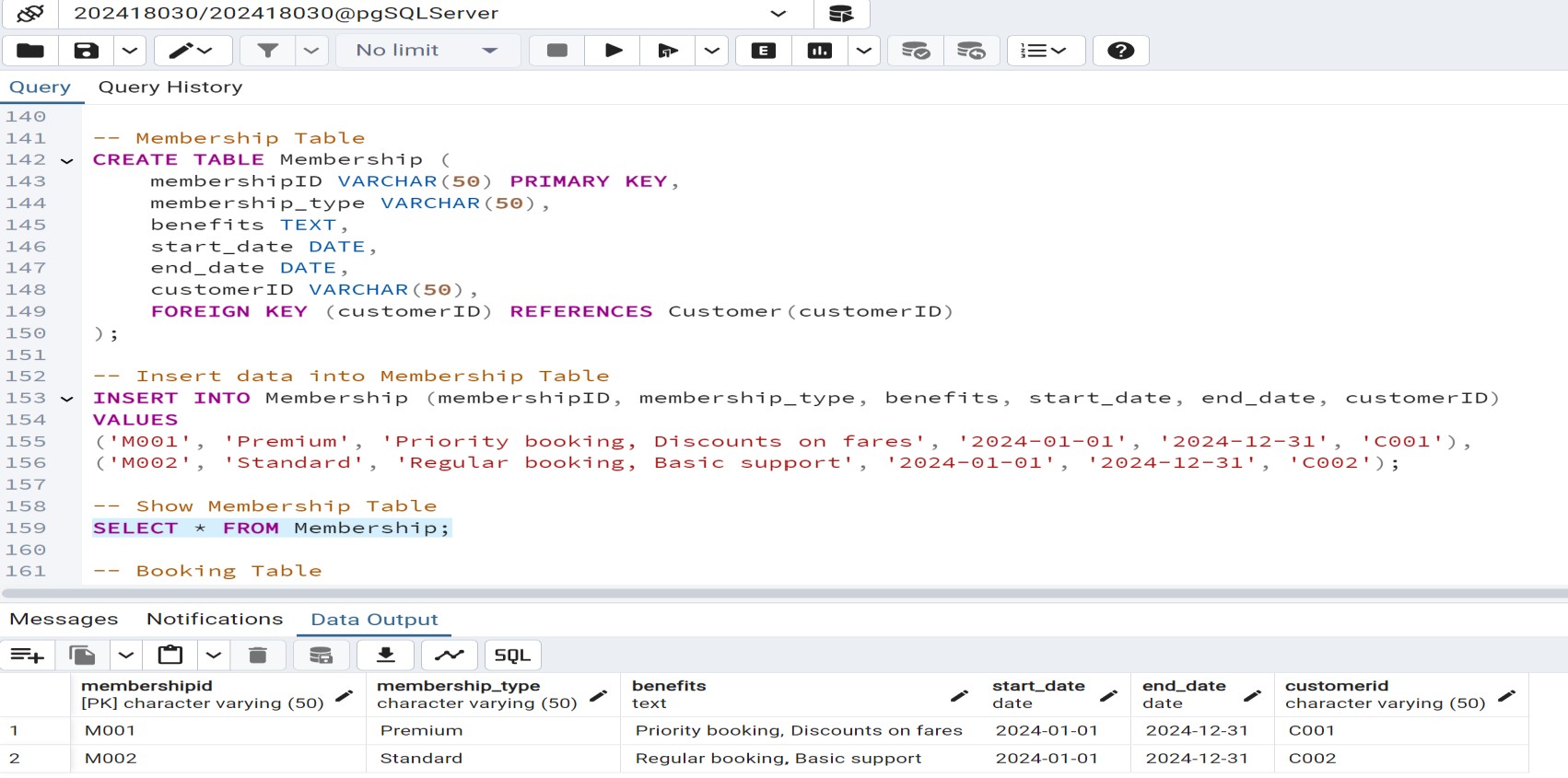
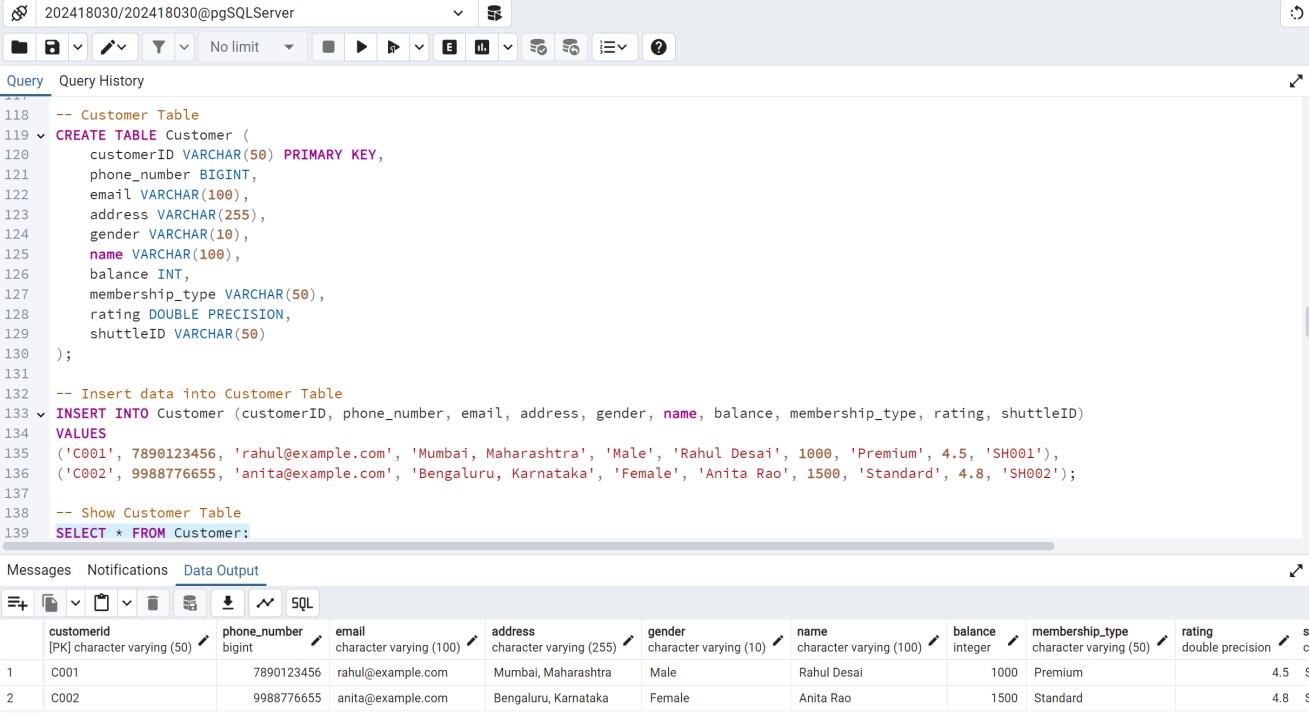
**Rent’s Table**



**Hire’s Table**

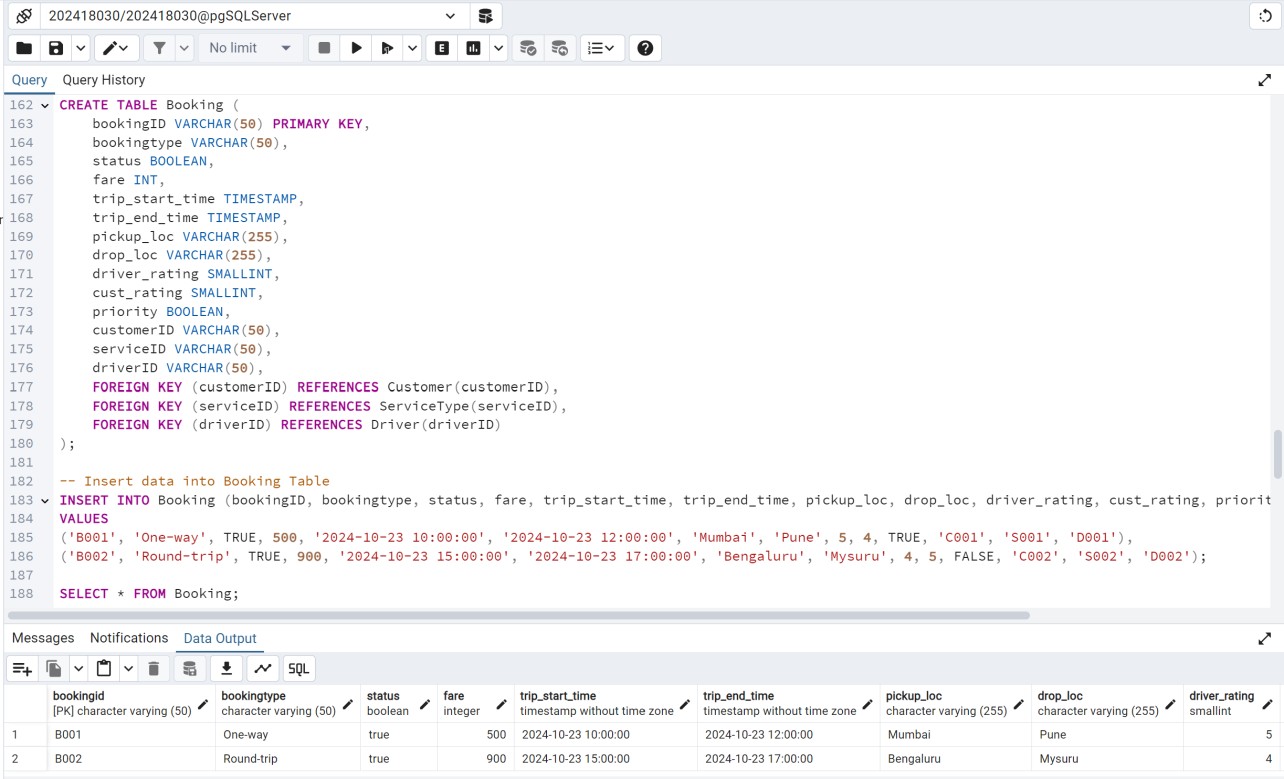


**Customer’s Table**

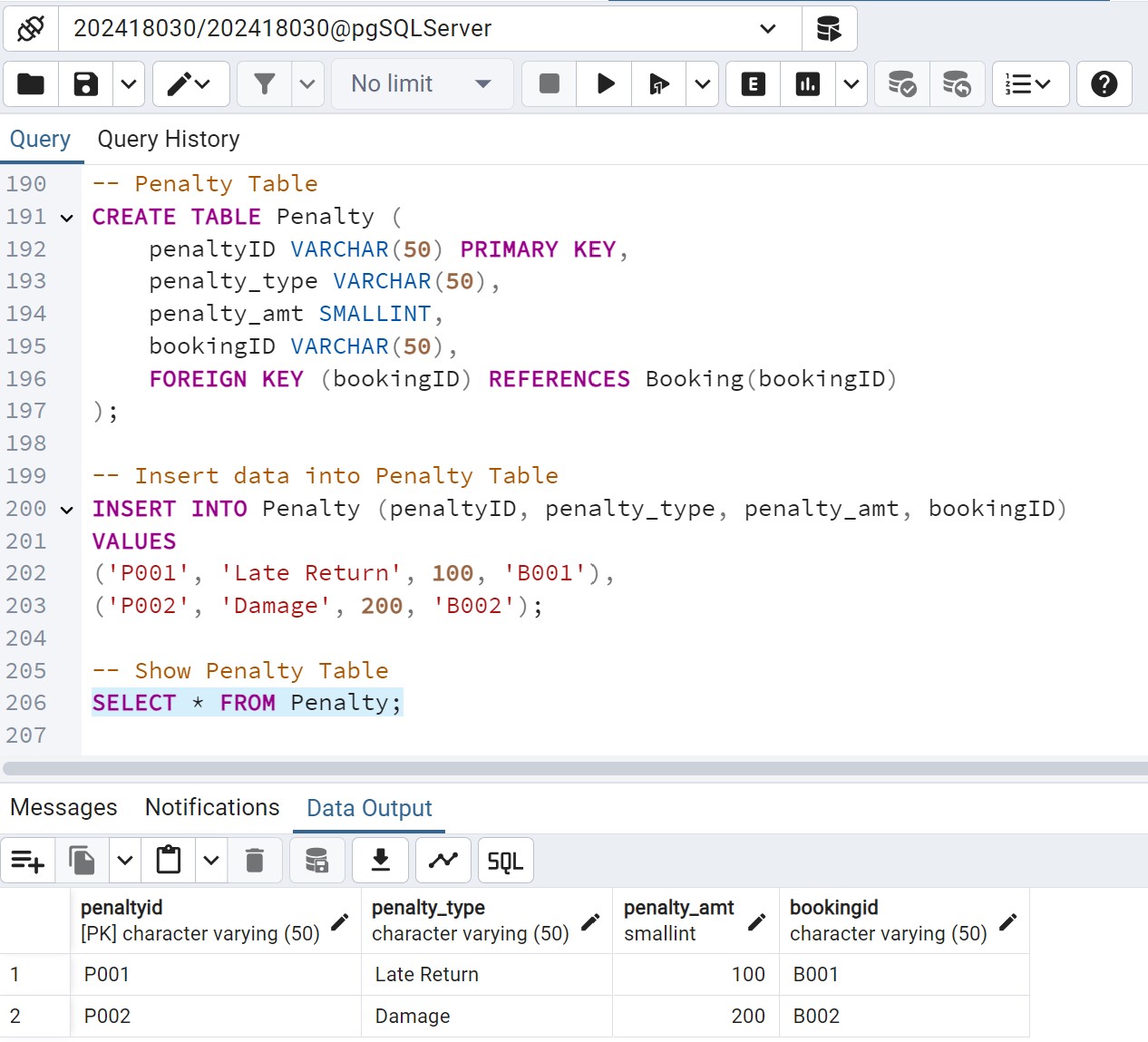


**Membership’s Table**

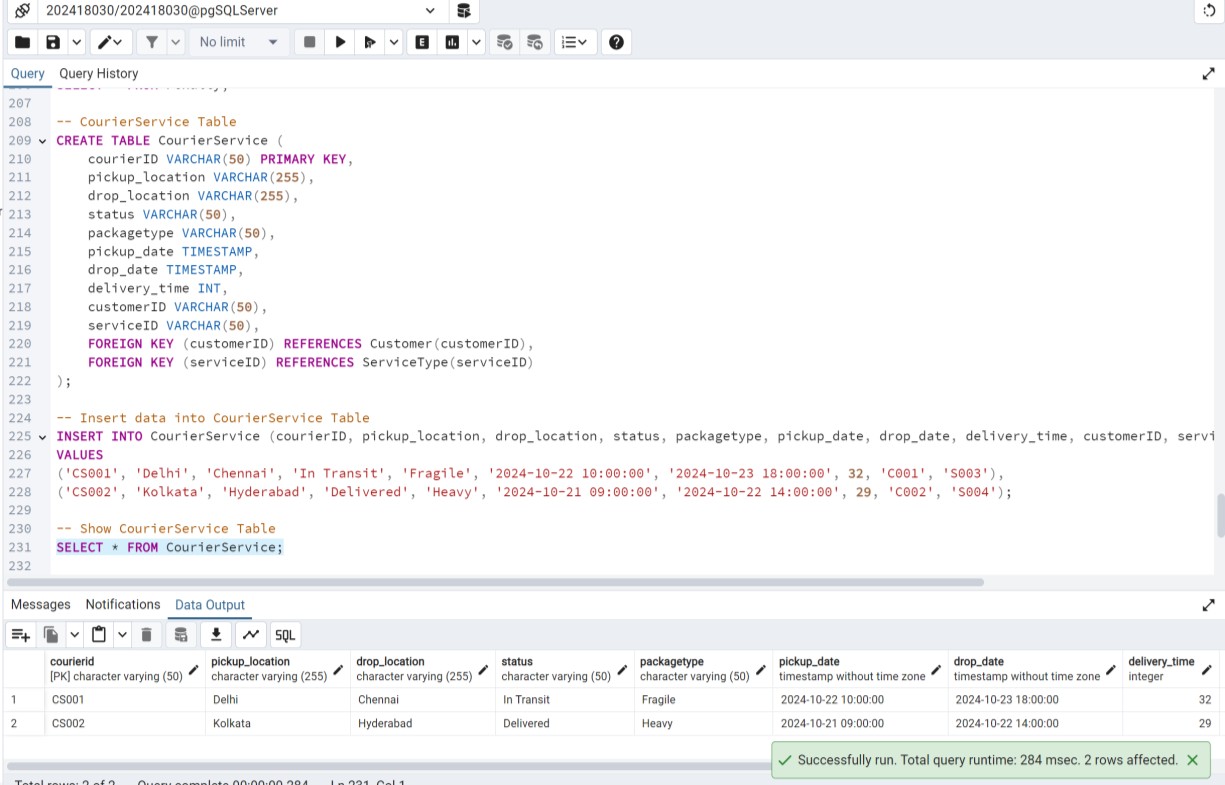
**Booking’s Table**



**Penalty’s Table**



**Courier Service’s Table**



**Service’s Table**

