Database System

SELECT * FROM CAR

Developed by

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Rental Car Booking
Group 37

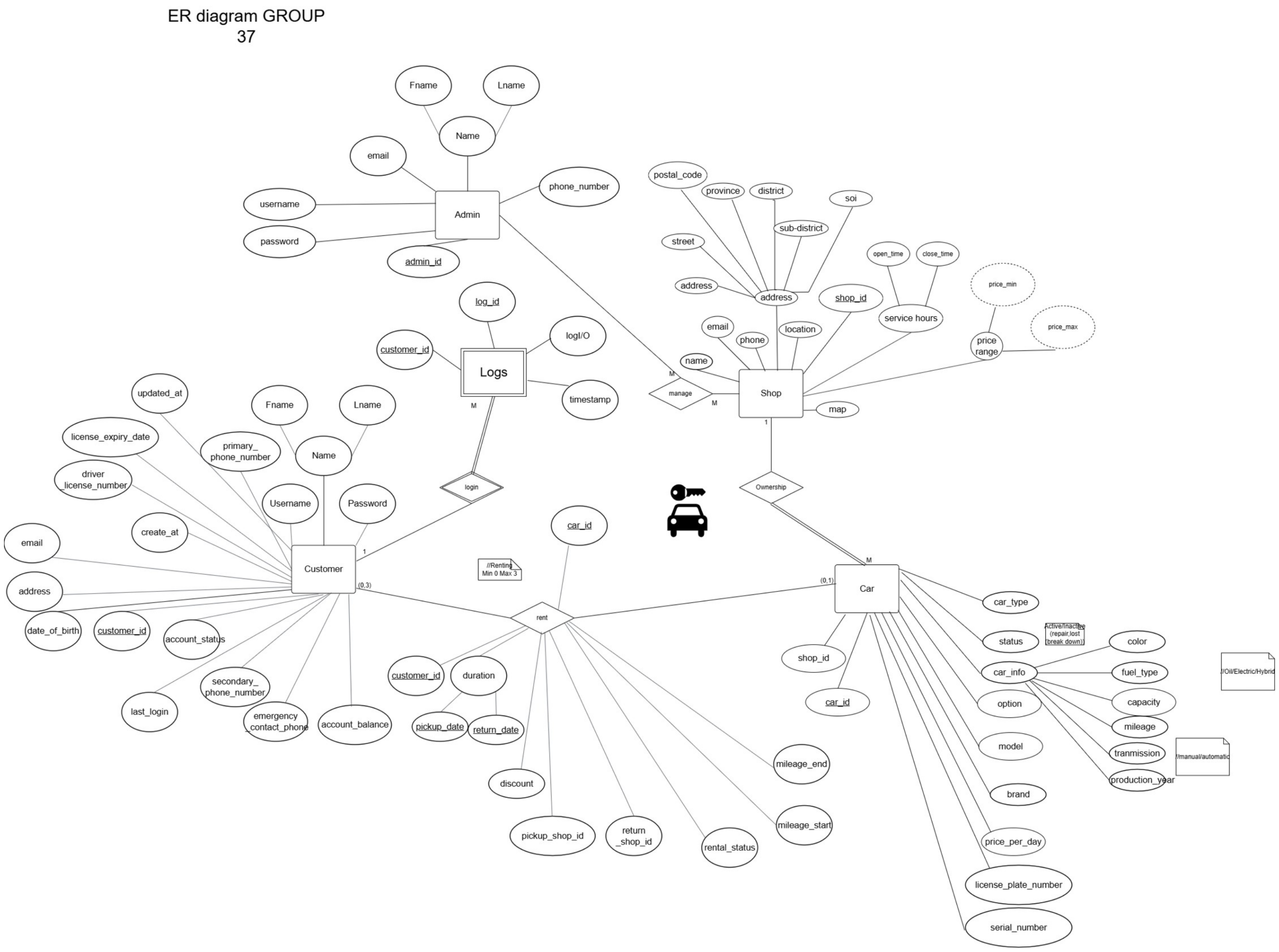
Abstract

This web-based application is used for car booking. When customers want to book a car, customer need to register their username, password, and their info (name, driver's license number, email, and phone number). Then, the system will generate customer_id for this user.

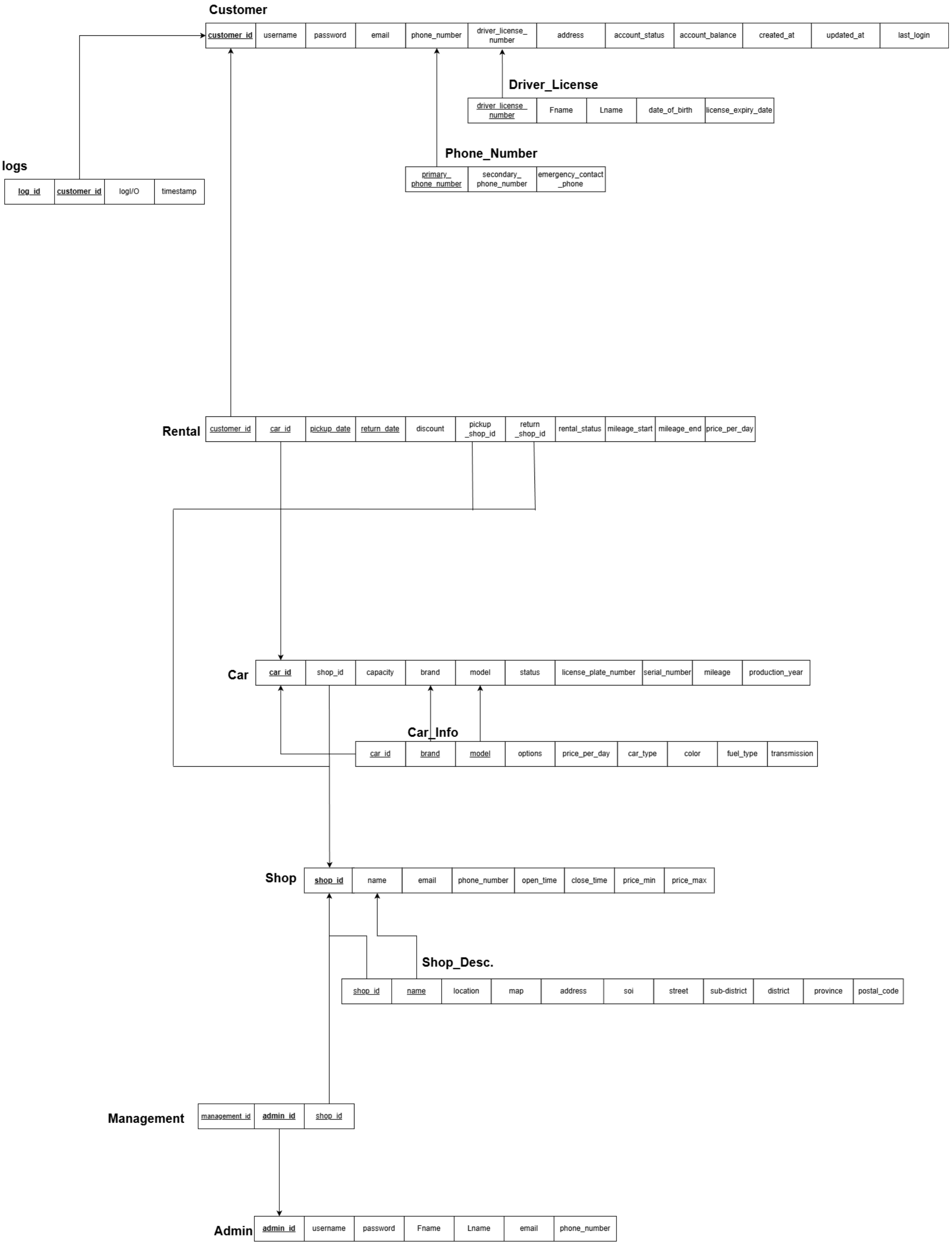
Customers who log in/log out will keep in logs using customer_id and logI/O. Customers are allowed to look for cars in shops. The shop will have their own shop_id, which has control over its cars by car_id.

If the customer wish to rent a car, customer can choose from brand, model, vehicle’s capacity, fuel type, transmission, and extra options such as wheelchair accessibility etc. The customer chooses the car, then adds the pickup date, return date, pickup shop, and return shop. When the rental invoice is completed, you will get the rental_id which can be use to view, change, or cancel the rental.

ER Diagram


ER diagram GROUP 37
Admin
Name
Fname
Lname
email
username
password
admin_id
phone_number
manage
M
M
Shop
name
email
phone
address
location
shop_id
service hours
open_time
close_time
price range
price_min
price_max
map
address
street
postal_code
province
district
sub-district
soi
1
Ownership
M
Logs
log_id
customer_id
logI/O
timestamp
M
login
1
Customer
updated_at
license_expiry_date
driver _license_number
primary_ phone_number
Fname
Lname
Name
Username
Password
create_at
email
address
date_of_birth
customer_id
account_status
last_login
secondary_ phone_number
emergency contact_phone
account_balance
(0,3)
//Renting Min 0 Max 3
rent
car_id
customer_id
duration
pickup_date
return_date
discount
pickup_shop_id
return _shop_id
rental_status
mileage_start
mileage_end
(0,1)
Car
shop_id
car_id
car_type
status
Active/Inactive (repair,lost (break down))
car_info
color
fuel_type
//Oil/Electric/Hybrid
capacity
mileage
tranmission
//manual/automatic
production_year
option
model
brand
price_per_day
license_plate_number
serial_number

Referential Integrity



Customer

customer_id	username	password	email	phone_number	driver_license_number	address	account_status	account_balance	created_at	updated_at	last_login

Driver_License

driver_license_number	Fname	Lname	date_of_birth	license_expiry_date

Phone_Number

primary_phone_number	secondary_phone_number	emergency_contact_phone

logs

log_id	customer_id	logI/O	timestamp

Rental

customer_id	car_id	pickup_date	return_date	discount	pickup_shop_id	return_shop_id	rental_status	mileage_start	mileage_end	price_per_day

Car

car_id	shop_id	capacity	brand	model	status	license_plate_number	serial_number	mileage	production_year

Car_Info

car_id	brand	model	options	price_per_day	car_type	color	fuel_type	transmission

Shop

shop_id	name	email	phone_number	open_time	close_time	price_min	price_max

Shop_Desc.

shop_id	name	location	map	address	soi	street	sub-district	district	province	postal_code

Management

management_id	admin_id	shop_id

Admin

admin_id	username	password	Fname	Lname	email	phone_number

SQL Query

Q.1

Suppose user have register with username, password, name,telephone number, email, driver_license (dl_number, date_of_brith, expiry_date), and address with this information (supposing user is the 67th members of the site)

Username : John123
Password : John88
First name : John
Last name : Doe
Primary phone number : 085-5555555
Secondary phone number : 087-7455654
Emergency phone number : 092-6346561
Email : johndoe123@example.com
Driver License Number : 00007543
Date of birth: 2000-01-01
Expiry date : 2030-12-31
Address : 123,Some Road,Some District, Some Country

[account_status is used for user flagging. If account_status is false ,user is getting banned or on investigation which will caused account to unusable/freeze]

Query:

```
INSERT INTO Customer (customer_id, username, pwd, email, phone_number,
dl_number, address, account_status)
VALUES
(67,'John123','John88','johndoe123@example.com','0855555555','00007543',
'123,Some Road,Some District, Some Country ',true);

INSERT INTO driver_license (customer_id, dl_number, fname, lname,
date_of_birth, expire_date)
VALUES (67, '00007543', 'John', 'Doe', '2000-01-01', '2030-12-31');

INSERT INTO phone_number
(customer_id,primary_number,secondary_number,emergency_number)
VALUES (67,'085-5555555', '087-7455654', '087-7455654');
```

Q.2.1

Suppose same user ,which have user_id '67', is login (update logs) [logI/O is used for online status. If logI/O is false, user is inactive (logged-out) but if logI/O is true then user is active (logged-in)]

Query:

```
INSERT INTO logs (log_id, customer_id, "logI/O", timestamp)
VALUES(108,67,true,now());
```

Q.2.2

Suppose same user ,which have user_id '67', is logout (update logs) [logI/O is used for online status. If logI/O is false, user is inactive (logged-out) but if logI/O is true then user is active (logged-in)]

Query:

```
INSERT INTO logs (log_id, customer_id, "logI/O", timestamp)
VALUES(109,67,false,now());
```

Q.3

Suppose user ,which have user_id '67',is booking a car ,car_id '1234', from shop ,shop_id '30', from 2026-04-15 to 2026-04-18 and will return at the same shop with no discount

Query:

```
INSERT INTO "Rental"
(customer_id,car_id,pickup_date,return_date,discount,"pickupShop_id","return
Shop_id",rental_status,mileage_start,mileage_end,price_per_day)
VALUES (67,1234,'2026-04-15','2026-04-18',0,30,30,true,0,null,250);
```

Q.4

Suppose same user ,which have user_id '67', want to view all of his/her booking which are still active

Query:

```
SELECT * FROM "Rental"
WHERE customer_id = 67
AND return_date >= CURRENT_DATE;
```

Q.5

Suppose same user, which have user_id '67', want to edit return_date from 2026-04-18 to 2026-05-01 of the rental of car_id '1234'

Query:

```
UPDATE "Rental"
SET return_date = '2026-05-01'
WHERE customer_id = 67 AND pickup_date = '2026-04-15' AND car_id = 1234;
```

Q.6

Suppose same user, which have user_id '67', want to cancel the rental of car_id '1234'

Query:

```
DELETE FROM "Rental"
WHERE customer_id = 67 AND pickup_date = '2026-04-15' AND return_date =
'2026-05-01' AND car_id = 1234;
```

Q.7

Suppose the admin want to view all the rental car bookings between March 15th 2026 and March 18th 2026.

Query:

```
SELECT * FROM "Rental"
WHERE return_date >= '2026-04-15' AND return_date < '2026-04-19';
```

Q.8

Suppose the admin want to edit price_per_day of all rental car bookings by increasing the price by $1000.

Query:

```
UPDATE "Rental"
SET price_per_day = price_per_day + 1000;
```

Q.9

Suppose the admin want to delete all rental car bookings that its rental_status is false.

Query:

```
DELETE FROM "Rental"
WHERE rental_status = FALSE;
```

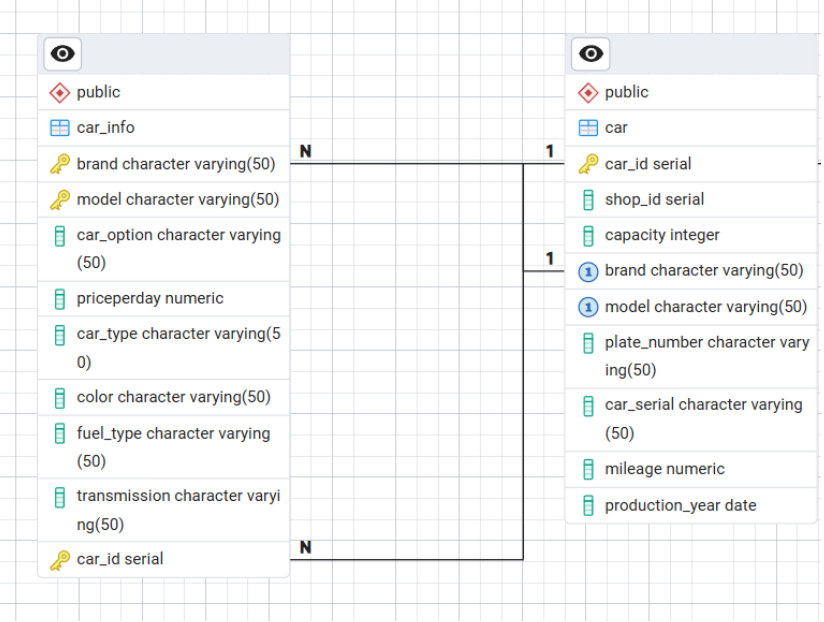
SQL Complex Query

Complex Query show the 5 busiest car brands from the last 90 days, but only the ones making more money than average.

```
SELECT
    booking_rank AS "Rank",
    brand AS "Brand",
    total_bookings AS "Total Bookings"
FROM (
    SELECT
        brand,
        total_bookings,
        brand_revenue,
        DENSE_RANK() OVER (ORDER BY total_bookings DESC) AS booking_rank
    FROM (
        SELECT
            brand,
            COUNT(car_id) AS total_bookings,
            SUM(daily_revenue) AS brand_revenue
        FROM (
            SELECT
                c.car_id,
                c.brand,
                r.customer_id,
                r.price_per_day * (r.return_date - r.pickup_date) AS daily_revenue
            FROM "public"."car" c
            INNER JOIN "public"."Rental" r ON c.car_id = r.car_id
            WHERE r.rental_status = true
              AND r.pickup_date >= CURRENT_DATE - INTERVAL '90 days'
        ) rental_data
        GROUP BY brand
        HAVING SUM(daily_revenue) > (
            SELECT AVG(brand_revenue)
            FROM (
                SELECT SUM(price_per_day * (return_date - pickup_date)) AS brand_revenue
                FROM "public"."car" c
                JOIN "public"."Rental" r ON c.car_id = r.car_id
                WHERE r.rental_status = true
                  AND r.pickup_date >= CURRENT_DATE - INTERVAL '90 days'
                GROUP BY c.brand
            ) avg_calc
        )
    ) brand_metrics
) ranked_brands
WHERE booking_rank <= 5
ORDER BY booking_rank ASC, brand_revenue DESC, brand ASC;
```

Document-based design schema 1 collection

ER Diagram


public
car_info
brand character varying(50)
model character varying(50)
car_option character varying (50)
priceperday numeric
car_type character varying(50)
color character varying(50)
fuel_type character varying (50)
transmission character varying(50)
car_id serial
N
1
1
N
public
car
car_id serial
shop_id serial
capacity integer
brand character varying(50)
model character varying(50)
plate_number character varying(50)
car_serial character varying (50)
mileage numeric
production_year date

JSON

```
{
title: "car",
required: ["_id", "shop_id"],
properties: {
 _id: { bsonType: "objectId" },
 car_id: { bsonType: "int" },
 shop_id: { bsonType: "int" },
 capacity: { bsonType: "int" },
 brand: {
  bsonType: "string",
  maxLength: 50
 },
 model: {
  bsonType: "string",
  maxLength: 50
 },
 plate_number: {
  bsonType: "string",
  maxLength: 50
 },
 car_serial: {
  bsonType: "string",
  maxLength: 50
 },
 mileage: { bsonType: ["double", "int", "decimal"] },
 production_year: { bsonType: "date" },
 car_option: {
  bsonType: "string",
     maxLength: 50
    },
    priceperday: { bsonType: ["double", "int", "decimal"] },
    car_type: {
     bsonType: "string",
     maxLength: 50
    },
    color: {
     bsonType: "string",
     maxLength: 50
    },
    fuel_type: {
     bsonType: "string",
     maxLength: 50
    },
    transmission: {
     bsonType: "string",
     maxLength: 50
    }
   }
  }
 }
}
```