Final Report on the Camping Car Rental System

Name: AMMAR BADRAN BIN MOHD NASIR
Student ID: 22012905

1. Requirements Analysis

Administrator functionality

Administrators can perform the following functions:

- Initialize the database (for example, table regeneration)
- Input, delete, change all tables
    - Deletion/change is performed based on the conditional e xpression entered by the user, not a single condition

- Full Table View: All records in each table can be viewed
- Check the details of the camper:
    - If you select a camper van, you can check the internal/e xternal maintenance details of the camper van
    - When selecting a part from internal maintenance: displa ying the relevant part inventory and supplier informatio n
    - When selecting an external repair shop: Display detaile d information about the repair shop

- Ability to execute any SELECT query
    - Allows administrators to enter SQL SELECT queries an d view results directly
    - More than 4 tables are joined for testing, 3 or more SEL ECT queries including Subquery and Group By are teste d

General Membership Features

Members can perform the following functions:

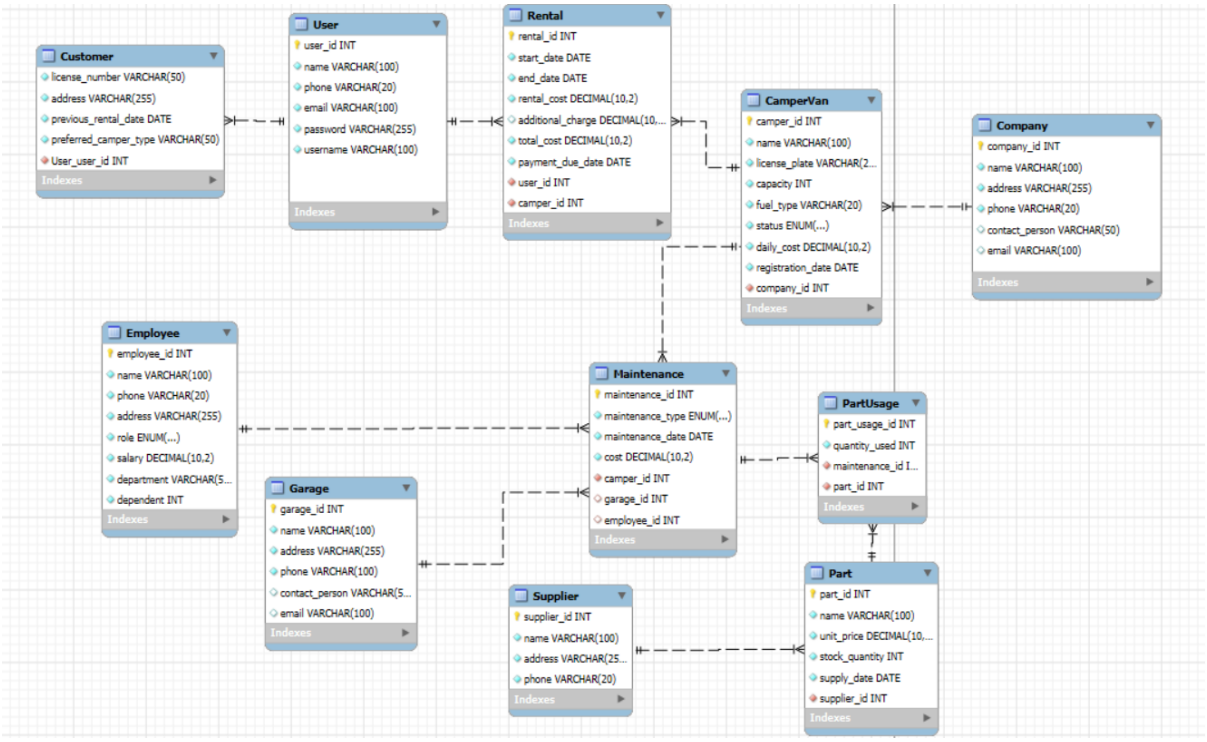
- Check the list of camper vans
- Check the rental date of each camper van
- Rent registration for selected campervans and dates
- Check the list of camping cars you rented
- Delete rental history (more than one is possible)
- Change the rental camper to another vehicle
- Change the rental schedule

2. Schema design (based on EER diagrams)

Based on the EER diagram, the following main tables and relations hips are designed:

- User: User basic information (username, name, phone, email, password, etc.)
- Customer: Member details (driver's license, address, preferr ed vehicle, etc.), 1:1 relationship with User
- Company: Camping Car Ownership Company Information
- CamperVan: camper van information (model name, license pl ate, garden, fuel type, condition, daily charge, etc.)
- Rental: Details of rental (members, vehicle, period, fare, etc.
- Employee: Employee information (name, contact, department, role, etc.)
- Garage: Maintenance shop information
- Maintenance: Maintenance details (vehicle, maintenance typ e, date, cost, personnel, etc.)
- Supplier: Parts Supplier Information
- Part: Parts information (name, unit price, inventory, etc.)
- Part Usage: Part history used during maintenance

Screen shot of the EER diagram



3. Program structure

- **Main.java**: Program start points, create main frame, and displ ay login screen
- **DBConnection.java**: Managing MySQL Connections
- **LoginScreen.java**: Login UI (administrator/member selection, authentication processing)
- **AdminPanel.java**: Administrator Features UI
- **CamperVanPanel.java**: Camping Car Inquiry UI
- Includes CRUD for each table (administrator only)

4. How to Test

Administrator Functionality Test

- Verify table regeneration and constraints with DB initializatio n button
- Check CRUD behaviour of each table (input, delete, modify)
- Check flexible deletion/modification behaviour with condition al input
- Select a camper van → Check internal/external maintenance

details → Check parts/maintenance shop details

- Direct SQL input → display results (including exceptional pro cessing)
- Composite SQL Test Query:

1.

```sql
SELECT c.model, u.name, r.start_date, r.end_date
FROM Rental r
JOIN CamperVan c ON r.camper_id = c.camper_id
JOIN Customer cu ON r.customer_id = cu.customer_id
JOIN User u ON cu.user_id = u.user_id
WHERE r.end_date < CURDATE();
```

2.

```sql
SELECT g.name AS garage_name, COUNT(m.maintenance_id)
AS maintenance_count
FROM Garage g
JOIN Maintenance m ON g.garage_id = m.garage_id
GROUP BY g.garage_id
HAVING COUNT(m.maintenance_id) > 3;
```

3.

```sql
SELECT p.name, s.name AS supplier_name, SUM(pu.quantity)
FROM Part p
JOIN Supplier s ON p.supplier_id = s.supplier_id
JOIN PartUsag epu ON p.part_id = pu.part_id
JOIN Maintenance m ON pu.maintenance_id
                    = m.maintenance_id
GROUP BY p.name, s.name
ORDER BY total_used DESC;
```

5. Member Function Test

- Check camper car list normal after logging in
- Check the rental available date function test
- Check normal behaviour for each scenario when registering t o rent a camper van
- Inquiry of personal rental history and deletion/modification te st (including vehicle or date change)
- Mechanical Maintenance Request Registration Function Test

6. Conclusions and other matters

- Configuring UI based on Java Swing, separating functions by panel
- DB connection information is for testing root/1234 (security i s required in real service)
- Set PK/FK/UNIQUE constraints on all tables → ensure integri ty
  Structuring code and SQL considering maintenance and scalin g