Project Team 1 Car Rental Database

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Database Specification: Database Purpose, Business Problems Addressed, Business Rules, and Design Decisions.

Database purpose:

The purpose of this database is to support the various operations of a car rental service by managing data about stores, staffs, customers, cars, rentals, payments, etc. It will be used to streamline rental processes, enhance customer service, improve the rental service efficiency, and enable accurate tracking of vehicle inventory, payments, and reviews.

The database will be used by the sales staffs, sales managers from car rental stores and data scientists from the third party.

Business Problems Addressed:

- Allow staff to manage car rentals, monitor car status, and handle customers' rental information.
- Allow staff and manager to track multiple payment methods for a single rental and ensures accurate billing and discounts.
- Help maintain membership information and allows customers to review services, aiding in customer retention and satisfaction.
- Provide detailed insights into car availability across multiple store locations, ensuring efficient car allocation and maintenance.
- Allow data scientists from Project Team 1 generate descriptive reports based on the data in the database.

Business Rules:

Staff:
- Each staff must belong to zero or one store. (A staff member may be in training and not yet assigned to work in any store.)
- Each staff must work on zero or more car rentals.
- Each staff can be self-referred to a manager in the same entity, except the highest level staff.

Store:
- Each store must have zero or more staff members. (A store, which is currently under

development and not yet opened, has zero staff assigned to it.)
- Each store must have zero or more cars. (A store, which is currently under development and not yet opened, has zero car assigned to it.)
- Each store must engage in zero or more car rentals.

Car:
- Each car must have exact one car status.
- Each car must belong to zero or one store (A car may be in delivery or in maintenance.)
- Each car must engage in zero or more car rentals.

CarStatus:
- Each car status must be applied on zero or more cars.

Customer:
- Each customer must have exact one membership status.
- Each customer must participate in zero or more car rentals.

MembershipStatus:
- Each membership status must be used on zero or more customers.

CarRental:
- Each car rental must have exact one staff working on it.
- Each car rental must have exact one car rented.
- Each car rental must have exact one store engaged.
- Each car rental must have exact one customer engaged.
- Each car rental must have zero or more payments.
- Each car rental must have exact one car rental status.
- Each car rental must have zero or one car rental review.

CarRentalStatus:
- Each car rental status must be used by zero or more car rentals.

CarRentalReview:
- Each car rental review must be commented on exact one car rental.

Payment:
- Each payment must be under exact one car rental.
- Each payment must be paid in exact one payment method.
- Each payment must have exact one payment status.

Payment method:
- Each payment method must be used by zero or more payments.

PaymentStatus:
- Each payment status must be used by zero or more payments.

Design Decisions:

Entity Name	Why Entity included	How the entity is related to other entities
Staff	The Staff entity is essential to manage the employees who handle rentals, customer interactions, and store operations. It helps to track who is responsible for various transactions within the company and identify the employee hierarchies.	Each staff is associated with a specific store and can work on multiple car rentals. The staff entity also has a self-referencing relationship for higher level employees (for example managers, store owner).
Store	The Store entity represents the physical rental locations and places for customers to pick up and return vehicles. Keeping store details enables management to monitor performance and resource allocation across multiple locations.	Each store can have multiple staff members and cars. It is linked to car rentals, as each rental occurs at a store location.
Car	The Car entity is critical for managing the rental vehicles, tracking each car's details, status, and location. It supports vehicle allocation, maintenance scheduling, and availability monitoring to meet customer demands effectively.	Each car is associated with one store and has a car status. Cars are linked to car rentals to represent the vehicle being rented.
CarStatus	The CarStatus entity helps categorizing each vehicle's availability, such as "available", "rented", or "maintenance". This entity ensures that only cars in appropriate statuses can be rented out, improving inventory control and operational efficiency.	Each car has one status at a time, while each car status can apply to multiple cars.
Customer	The Customer entity is essential for storing customer details, enabling efficient handling of rental transactions. It supports customer relationship management for now, and potentially marketing promotions if we expand the business in the near future.	Customers are linked to car rentals as renters. Each customer has one membership status.
MembershipStatus	The MembershipStatus entity categorizes customers based on their membership level, which may determine access to special offers or discounts. It helps in distinguishing between different types of customers,	Each membership status can apply to multiple customers.

	such as regular or premium members, and allows for tailored service offerings.	
CarRental	This entity is the most important part of the database and every other entities are basically designed to serve for this entity. The CarRental entity records all details of each rental, including the staff, car, customer, and rental period. It helps tracking rental history and revenue, supporting operational analysis and financial reporting.	Each rental links to one staff, one car, one store, and one customer. It also connects to payments, car rental status, and possibly customer reviews.
CarRentalStatus	The CarRentalStatus entity tracks the current phase of each rental transaction, such as “reserved”, “in-progress”, or “completed”. It enables monitoring of rental progression and ensures accurate status updates.	Each rental has one status, and each rental status can apply to multiple rentals.
CarRentalReview	The CarRentalReview entity collects feedback from customers on their rental experience, supporting continuous improvement in service quality. It helps in measuring customer satisfaction on either any specific staffs or any specific stores.	Each review is associated with one car rental. Each car rental may have one review.
Payment	The Payment entity is critical for capturing financial data related to rental transactions, including total amounts paid, discounts, and payment dates. It is one of the most important entities in the database since the car rental business is profit-oriented.	Each payment is linked to a car rental and must have one payment method and one payment status.
PaymentMethod	The PaymentMethod entity stores the types of accepted payment, such as “cash”, “credit card”, “prepaid card”, or “not-yet-decided” (if the car rental is in reserved status). It is necessary for allowing diverse customer preferences and ensuring transactions can be processed through various channels.	Each payment method is used by multiple payments.
PaymentStatus	The PaymentStatus entity indicates the current state of each payment transaction, such as “pending”, “completed”, or “failed”. This entity	Each payment has one status, and each status can apply to multiple payments.

	supports monitoring of payment flows of each car rental.	