Project 2 – Phase 1

Car Rental Database

CSE 3330-002

Prof. Guizani

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Katia Lopez

Ai Nguyen

INTRODUCTION

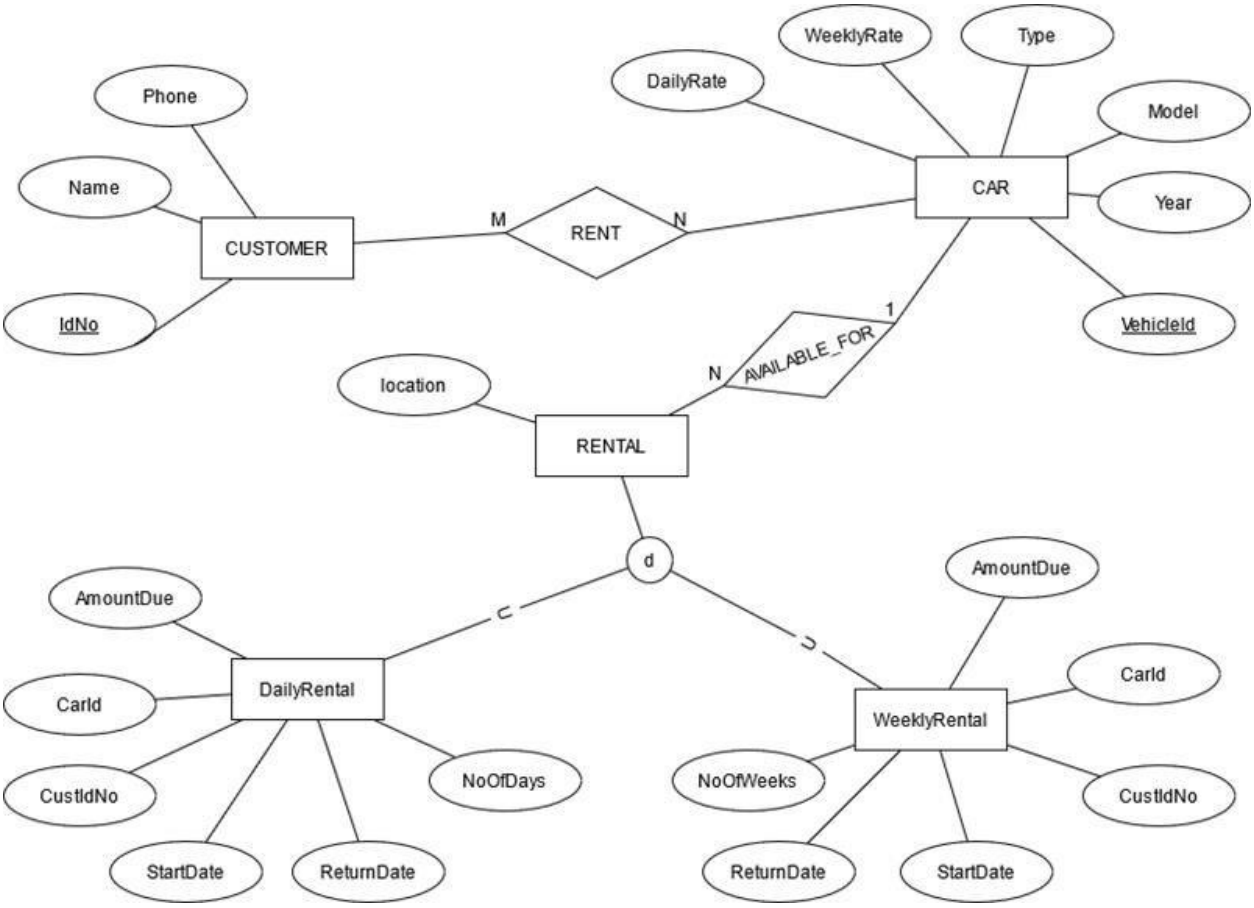
This document covers the first phase of the Car Rental Database Project. We were tasked with designing and implementing an ER/ERR schema diagram and a relational schema for the car rental database.

There will only be one location for car rental in our mini world. Each customer will be specified by a unique ID number, and additional information that are name and phone number. Customers can rent available cars. The following is the mini-world description:

1. The database keeps track of *CUSTOMER*s. Each *CUSTOMER* has a unique IdNo (assume this is a unique integer generated by the system for each new *CUSTOMER* such as 1, 2, 3, ...), a Name (assume this is a string consisting of a single initial and last name, such as "J. smith" or "N. Guizani"), and a Phone (a string of 12 character such as "817-272-5333")
2. The database keeps track of *CAR*s available for rental, they are categorized based on their type. There are six main types: compact, medium, large, SUV, truck, and van. Each type of car has its own DailyRate and weeklyRate (assume all cars of the same type have the same rental rate). There is only one rental location.
3. Each *CAR* has a VehicleID (a unique number for each car), Model (Chevy, Toyota, Ford, etc.), and Year.
4. The database will keep track of the current (active) *RENTAL*s as well as scheduled *RENTAL*s of each CAR. There are two types of RENTAL: Daily and weekly. For each *daily rental*, the information kept will include the specific *CAR* and *CUTOMER* as well as the NoOfDays, StartDate, and ReturnDate (the ReturnDate can be calculated from the StartDate and NoOfDays). For each *weekly rental*, the information kept will include the specific *CAR* and *CUSTOMER* as well as NoOfWeeks, StartDate, and ReturnDate (can be calculated from the StartDate and NoOfWeeks). Each rental will also have the AmountDue for the rental, which is a derived value that can be calculated from the other information.
5. The database will also keep track of which *CAR*s are available for rental during which periods.

An assumption we made that was not part of the requirements above is that DailyRental and WeeklyRental are subtypes of RENTAL. In addition, since DailyRental and WeeklyRental needed information about the specific CAR and CUSTOMER, we added two foreign keys. We named these keys CarId and CustIdNo. We also assumed that in order to check if a RENTAL is current or scheduled, we can use the StartDate and ReturnDate.

ER/ EER Schema Diagram



We chose to create five entities: CUSTOMER, CAR, RENTAL, DailyRental, WeeklyRental. DailyRental and WeeklyRental are subtypes of RENTAL.

CUSTOMER has three attributes: Name, IdNo (primary key), Phone

CAR has six attributes: VehicleId (primary key), Year, Model, Type, WeeklyRate, DailyRate

RENTAL has one attribute: Location

DailyRental has six attributes: CarId (foreign key), CustIdNo (foreign key), StartDate, ReturnDate, NoOfDays, AmountDue

WeeklyRental has six attributes: CarId (foreign key), CustIdNo (foreign key), StartDate, ReturnDate, NoOfWeeks, AmountDue

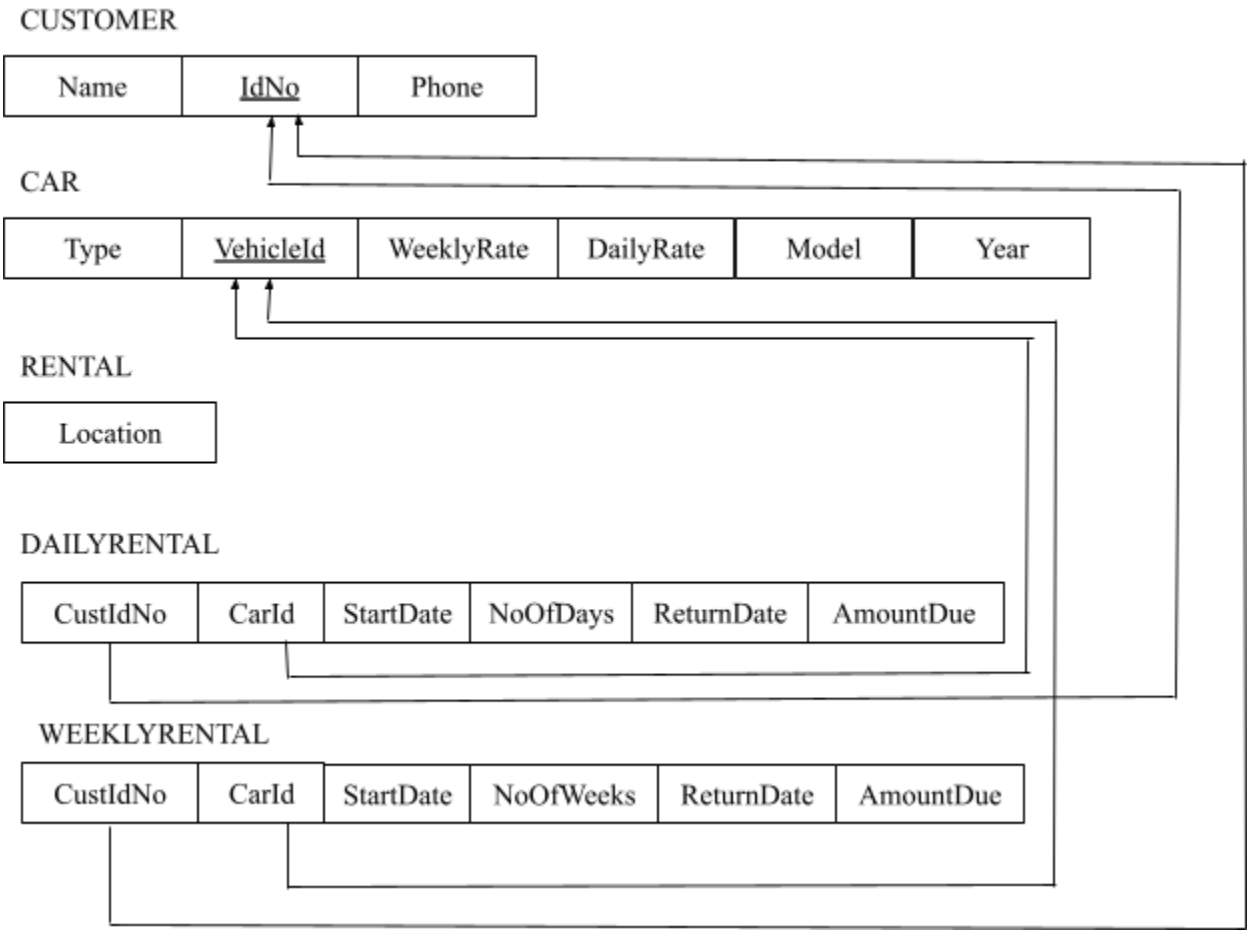
ER/ ERR Schema Diagram

We chose to create two relationships. “CUSTOMER rents CAR” and “CAR is available for RENTAL”.

For the cardinality ratios, we chose M CUSTOMER : N CAR because many customers can rent many cars at different times.

We chose 1 CAR : N RENTAL because a car can be available for more than one rental.

Relational Database Schema



The relational database schema follows the ER Diagram with total of 5 entities (CUSTOMER, CAR, RENTAL, DAILYRENTAL, WEEKLYRENTAL) and their respective attributes as well as primary keys (if applicable). The primary keys are underlined.

DAILYRENTAL and WEEKLYRENTAL each contains foreign keys CustIdNo (references to IdNo from CUSTOMER) and CarId (references to VehicleId from CAR), shown by the mapping arrows.

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