

Computer Science 631

Database Management Systems Design

Term Project

In this term project, you are asked to design a small database system, create, and populate this database using ORACLE. In the following, you are given the requirements for the database design.

1 GENERAL GUIDELINE

The following guidelines apply for the project:

1. The projects will be done in **groups of two**. You should form your own groups and update the file on google drive if you have not done it yet.
2. You are required to demonstrate your programs. You should treat these demonstrations as if you were giving them to your customer. So, prepare them professionally. The demonstrations will take place at the end of the term after classes are over.
3. You are required to submit a typed project report at the end of the process. This report should minimally cover (a) a summary of the system requirements and any additions you may have made (b) the entity-relationship design, and (c) the (relational) logical database design. For each of these, you should identify the major design decisions that you faced and the design decisions that you made with justifications for those decisions. Also include, as an appendix, a list of the relational instances you have used to populate your database and the code written for the application.
4. Grading will be done as follows: (a) design report: 40%; (b) database design: 60%. The report must be typed and should be written clearly. The presentation (language and communication of ideas) of the report is very important. Please have it read by someone else before you submit it.
5. In general, each member of a group will be assigned the same grade. However, if I notice that one member of the group is doing all (or most of) the work, I reserve the right to assign differential grades.

2 DATABASE DESIGN REQUIREMENTS

CS631-RentACar wishes to implement a database to control all aspects of its operations, including tracking car inventories, rental contracts, and billing. The following statements of business rules and relationships are used to construct a relational model:

- 1- Cars are assigned to locations, and each location has one or more cars.
- 2- A customer who wants to rent a car makes a reservation. The reservation is made for the pickup of a particular class of car at a specific location. The same customer may make more than one reservation over time.
- 3- In the normal course of events, a reservation results in a rental agreement, which is established when the customer comes to the location to pick up the car. However, this is not always the case, since a reservation may be canceled or the customer with a reservation may not show up.
- 4- A rental agreement is for a specific vehicle. At any point in time, a specific vehicle may have participated in zero, one, or more rental agreements.

Car rental rates are determined by the class of the car. CS631-RentACar has two rental rates for each class: daily and weekly. The car model includes a make (Ford, Honda, etc.), the year of the model, and the model name. Each car is uniquely identified by a vehicle identification number (VIN). The branch to which the vehicle is assigned has an address and a location ID.

The process of renting a car is as follows. Typically, a customer first makes a reservation with a location by telephone prior to arriving at the branch location to pick up the car. The CS631-RentACar service representative takes the customer's name and address and the class of a vehicle and the period of rental (date and time in and out) that the customer desires.

The customer is informed of the rental rate.

When the customer arrives at the branch location to pick up the car, the service representative first checks for a reservation and, if a reservation exists, she draws up a rental agreement. At that time the service representative obtains other customer information, such as his operator's license number and the state that issued it, and the customer's credit card type and number, including the expiration month and year. If the customer has made a reservation, then the reservation information is used to assign a specific vehicle to the rental agreement. If the customer is a walk-in (no reservation), the service representative fills out the reservation information first as part of the process. All rentals must be associated with a reservation. The rental agreement has a contract number that uniquely identifies it, the VIN number of the vehicle that is being rented, the current date and time for the rental to start, and a current odometer reading. The customer is given a copy of the rental agreement along with the keys to the car. This ends the activities at the time the vehicle is picked up.

After use, the car is returned to the branch location. Information that will be filled in when the car is returned is the date and time at which the rental ends and the editing odometer reading. When the rental agreement is completed, the actual cost of the rental is computed using the class rental rate, and the cost is charged to the customer's credit card. No other form of payment is accepted.

This is the end of the requirements report. You are now expected to work on this report to come up with your database design. This requires the development of (a) an entity-relationship model for the conceptual design, and (b) a relational schema design for the logical design. You are also expected to populate this database with some sample data of your own so that you can demonstrate the functionality to your customer.