Computer Science 631

Database System Design

Term Project

In this term project, you are asked to design a small database system, create and populatethis database using ORACLE, MySQL, SQL server, DB2 and write a number of application programs to access the database. The topic of the project is to design the database system thata car dealer can use to manage car sales, service appointments and service rendering, andsome sale statistics per car type. In the following, you are given a project guideline (Section 1), the requirements for the database design (Section 2) and the requirements for application design (Section 3).

1 GENERAL GUIDELINES

The following guidelines apply for the project:

1. The projects will be done in **groups of two**. You should form your own groups and post a message in the "Module 02 Discussion 01: Term Project Groupings" discussion board on Canvas.

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 (It is better to havea Web-based application, you can use your own computer or the NJIT computers). We willput up a sign-up sheet before the demo.

3. You are required to submit a typed project report at the end of the process. This report should have minimally cover (a) a summary of the system requirements and any additions you may have made; (b) Database design (the entity-relationship design, the relational logical database design, and the application program design; (c) a user manual (instructions to use the system). For each of the items in the design part, you should identify the major design decisions that you faced and the design decisions that you madewith justifications for those decisions. Also include, as an appendix, a list of the relationalinstances you have used to populate your database. Your report should sale your work! Write your report in a way to make your design and implementation part easy to understand, and modify for a computer programmer. The user manual part should be directedtowards users with no computer background and should contain all the information needed to run the applications.

2 DATABASE DESIGN REQUIREMENTS

You oversee the design of a database to help a car dealership engage in CRM (customer relationship management). Your database should store data about each vehicle purchase, each vehicle serviced and each service appointment. You must store enough data that an analyst can use to answer the following questions:

- How recently did each customer purchase a vehicle?
- How many vehicles has each customer purchased?
- How much money has each customer spent in total on all vehicle purchases?
- How much in profit has each customer provided in total on all vehicle purchases?
- How recently did each customer make a service appointment?
- How long has each service appointment taken (from car drop-off to car pick-up)?
- How to contact a customer of interest (for prospective marketing campaigns for vehiclepurchases or vehicle maintenance)?

Your database does not have to store directly every answer to these queries. Instead, your database should store enough data from which answers to these questions can be derived. It issuggested that you use the following steps. In addition the car dealer would like the database to support the needs of the following applications

2.1 Application Program 1: Car Sale

The car dealer sales cars. When a car is sold to customer, there is some information that have to be entered into the database before a bill is printed for the customer. For instance, if the customer is not a returning customer, his/her information should be entered. The sold price and the date should also be recorded.

2.2 Application Program 2: Service scheduling and service rendering

From time to time, cars must be serviced. The car dealer services cars it sold as well as cars it did not. To schedule a car maintenance, the owner contacts the car dealer to book an appointment. An appointment is booked for a given car for a given time. For each appointment, the dealer has an idea of the time it will take for the car to be serviced. In fact, the dealer has already prepared a list of maintenance packages based on how old the car is (1-year service, 2-year service, 3-year service etc.). Each service package contains the list of tests to be performed on the cars for diagnoses, a list of parts to be replaced, the labor time to replace each of the parts or to perform each of the tests. In addition to the service packages, more services can be added depending on the results of the tests. When a car is brought in for service, the dealer records the time the car arrives and lists everything that is done to the car and charges for the cost of the parts and the labor. much every maintenance item costs. When the owner comes to pick up the car, a detailed bill is printed

and presented to him/her.

2.3 Application Program 3: Sale statistics

This program is used by dealers to analyze the sales per period. The input for this program is 2 dates (begin date and end date) and the program will return the number of car sold the profit made per car type (same make, model and year).