CSE4110 – Database System

Project1. E-R design and Relational Schema design

Spring 2021

Automobile company

"You are a DBA in this company"

Goal : The goal of this project is to provide a realistic experience in the conceptual design, logical design, implementation, operation, and maintenance of a relational database and associated applications.

Application description :

The application is an automobile company, such as General Motors, Ford, Toyota, or Volkswagen (or maybe a company from yesteryear like Studebaker, Hudson, Nash, or Packard). In our hypothetical company, it has been decided to redesign a major part of the database that underlies company operations. Unfortunately, the manager assigned to solicit database design proposals is not very computer literate and is unable to provide a very detailed specification at the technical level. Fortunately, you are able to do that.

The company needs to keep quite a bit of data, but we shall focus on the following aspects of corporate operations.

Here are a few points to consider :

- vehicles: Each vehicle as a vehicle identification number (VIN). Lots of stuff is encoded in real VINs (they are well described on Wikipedia), but you can just make them up if you want.
- brands: Each company may have several brands (for example, GM has Chevrolet,

Pontiac, Buick, Cadillac, GMC, Saturn, Hummer, Saab, Daewoo, Holden, Vauxhall, and Opel and Volkswagen has Volkswagen, Audi, Lamborghini, Bentley, Bugatti, Skoda, and SEAT)

• models: Each brand offers several models (for example, Buick's models are the Enclave, LaCrosse, and Lucerne, and Mercury's models are the Mariner, Milan, Sable, and Grand Marquis). Each model may come in a variety of body styles (4-door, wagon, etc.)

• options: We'll stick to color, and maybe engine and transmission.

• suppliers: suppliers supply certain parts for certain models

• company-owned manufacturing plants: Some plants supply certain parts for certain models; others do final assembly of actual cars.

• customers: In reality, lots of demographic data are gathered. We'll stick to name, address, phone, gender, and annual income for individual buyers. The customer may also be a company (e.g. Hertz, Avis, or other companies that maintain corporate fleets, but we'll skip that).

• We'll skip data on corporate finance, pending bailouts, bankruptcy status etc. Not that these data are unimportant, but we need to keep the project within bounds.

Project Requirements :

1. E-R Model

• Construct an E-R diagram representing the conceptual design of the database.

• At minimum you must include all the entity and relationship sets implied by this description. You may go beyond the minimum. Remember that the manager who defined the specifications is not computer literate so the specifications should not be viewed as necessarily being precise and complete.

• Be sure to identify primary keys, relationship cardinalities, etc.

2. Relational Schema Diagram

- After creating an E-R model, reducing it into Schema diagram
- Create the schema diagram in ERwin Data Modeler we discussed in practice session.
- Be sure to allow us to store information without unnecessary redundancy.
- Be sure to identify primary keys, foreign keys, relationship cardinalities, relationship type, allowing nulls and so far.
- Every entities should have name and primary key(s).

3. Queries

The queries listed below are those that your client wants turned in. They may provide further hints about database design, so think about them at the outset of the project.

- Show sales trends for various brands over the past 3 years, by year, month, week. Then break these data out by gender of the buyer and then by income range.
- Suppose that it is found that transmissions made by supplier Getrag between two given dates are defective. Find the VIN of each car containing such a transmission and the customer to which it was sold. If your design allows, suppose the defective transmissions all come from only one of Getrag's plants.
- Find the top 2 brands by dollar-amount sold in the past year.
- Find the top 2 brands by unit sales in the past year.
- In what month(s) do convertibles sell best?
- Find those dealers who keep a vehicle in inventory for the longest average time.

What to turn in :

- E-R diagram (not hand drawn) made by any chosen tools (e.g. MS Powerpoints)
- Relational Scheme diagram ERwin file (.erwin)
  - student_id.erwin (submitted filename) e.g. 20219999.erwin
  - Be sure to same display options in practice session. (IE notation, display relationship cardinality)
  - Use the title in schema diagram and description if you needed.
- Report file (.pdf)
  - [project1] student_id.pdf (submitted filename)

    e.g. [project1] 20219999.pdf
  - Describe the detail explanation about your E-R model and Schema diagram that you made.
  - MAKE YOUR OWN DESCRIPTION on every entities and relationships you made.
  - Feel free to use any template you made.

NOTICE :

- 2020.04.16(Fri) 23:59
- Submit your soft copy with title "[DBproject1] student_id" to

sogang879@gmail.com (softcopy includes erwin and pdf file you wrote)

- Submit your hardcopy to box in front of AS816 before the deadline. (hardcopy includes one E-R model picture and one report you wrote)
- **DON'T COPY ANYTHING FROM YOUR FRIENDS AND WEB SOURCES. IF YOU VIOLATE THIS, YOU WILL GET F FOR THIS COURSE.**