Florida Polytechnic University

COP 3710 Database 1, Spring 2020

Project (20%): Database System for E-Commerce

Due date: Wednesday April 15, 2020 at 11:59pm.

In this project, you are required to analyze the requirements for, design, implement, document and demonstrate a relational database system that could automate the functions of a sales company with E-Commerce. You should select specific products for your project to sale and describe specific application requirements. You should implement a database where your system must maintain a current record of inventory that is updated to reflect the transactions performed. You must keep track of customers, including their personal information, and purchase history. A catalog of information about products for sale must be maintained in a way that is searchable by customers. Your project is required to demonstrate *at least* the following functionality, but not limited to:

Data:

- **Customers:** customer ID, name, address (street, city, state, zip code), kind (home/business). If business, then business category, company gross annual income, etc. If home, then marriage status, gender, age, income, etc.
- **Products:** product ID, name, inventory amount, price, product kind w.r.t. some classification.
- **Transactions:** record of product purchased, including order number, date, salesperson name, product information (price, quantity, etc.), customer information.
- **Salespersons:** name, address, e-mail, job title, store assigned, salary.
- **Store:** store ID, address, manager, number of salespersons, region.
- **Region:** region ID, region name, region manager.

Note: the above data description is not complete, and you must add and modify it. These are NOT the only entities and attributes. You can use the above data description as guidelines for your design.

Conceptual Design (8 pts):

1) Data analysis and requirements: determining end-user views, outputs, and transaction requirements.

2) Entity Relationship Modeling: provide complete ER model which includes entities, attributes, keys, cardinality, connectivity, and relationships and their types.

3) Data Dictionary: provide complete data dictionary for your database.

Operations (7 pts):

- **Customer Browsing:** The users must be able to search the operational database for particular items based on various attributes and must also be able to do browsing (i.e., less focused searching).
- **Update Transactions:** The system must be able to handle payments and sales, new inventory, new users, etc. and other changes to the operational database that are necessary for the day-to-day running of the business.
- **Error Checking:** The system must be robust and support various application-dependent integrity constraints. For example, items should not be sold if they are not currently in stock, etc.

- **Data Aggregation:** The system must provide data aggregation queries:
    - What are the aggregate sales and profit of the products?
    - What are the top product categories?
    - How do the various regions compare by sales volume?
    - Which businesses are buying given products the most?
    - Other interesting aggregate queries that you will come up with.

Project Guidelines/Requirements (5 pts):

- This is a group project, each group must have 4 students. Include all members names in the cover page.

- The project must represent a fairly sophisticated database application. In particular, the database must contain multiple (e.g., at least seven) relations, and the database design must include primary and foreign keys, etc.

- You can make assumptions about your database design providing that: 1) they are explicitly stated in the final report, 2) they don't conflict with any of the requirements specified above, and 3) they are "reasonable".

- A final report should be submitted on Canvas for grading before the due date. The final report must contain:

    1. A short overview of the system including identification of the various types of users, administrators, etc. who will be accessing the system in various ways.

    2. A list of assumptions that you have made about the system.

    3. A graphical schema of the database using the ER diagram with a description of each entity set, relationship set and their corresponding attributes.

    4. A set of relational schema resulting from the ER diagram with identification of primary and foreign keys. The relational schema should be in some appropriate Normal Form, with identification and justification of the Normal Form.

    5. A complete data dictionary.

    6. The SQL DDL statements used to create the relational schema.

    7. The SQL DML statements and queries used to manipulate the database and perform the operations described above.

- A demo of the working DB system will be required. All members of the group must attend this demo and must be prepared to explain and demonstrate those aspects of the project for which they were responsible.