DATABASE DESIGN – FINAL PROJECT

November 13, 2014

Project Description:

In this project, you need to design a database system for a given domain. For this, first you need to conduct research about the domain itself and collect data requirements (such as information about the main components of the system, how the system works, how different entities interact with each other etc.) Then you will try to design a system as practical as possible. This means, assumptions you make should comply well with real-world situations/scenarios.

Objective: In this project you need to demonstrate your database design and SQL skills through a selected scenario.

Tasks:

Step 1) Draw the initial ER diagram for your system. ER diagrams should be drawn electronically. You can use any chart drawing tool of your choice.

A minimal system design should include at least:
a. two one-to-one binary relationships.
b. two one-to-many binary relationships.
c. two many-to-many binary relationships.

You can create more relationships if required.

Indicate cardinality and modality information on ER diagram. You can use different notations to show cardinality ratios. (i.e. Crow's Foot notation)

Step 2) Map the ER diagram into relational schema. Show the resulting relational schema: show your tables, primary keys and foreign keys.

Step 3) Write the functional dependencies for your system, such as SSN →Name.

Step 4) Discuss database normalization rules on your tables. If they are not already normalized, normalize your table(s) into 3NF.

Step 5) Show the final relational schema after normalization.

Step 6) SQL Part: Show the SQL statements for following queries:

a. Create tables using appropriate SQL command . Make sure to include primary key and foreign key definitions and triggered actions on foreign keys. Decide also about NULL/NOT NULL and DEFAULT values for the attributes.

b. Insert at least five (5) records into each table.

c. Demonstrate the use of SELECT command with WHERE statement on two different tables. (join operation is not required)

d. Demonstrate the use of SELECT command with GROUP BY statement on two different tables. (join operation is not required)

e. Using two related tables (meaning logically connected with primary key-foreign key pairs), run an inner join statement to show matching rows.

f. Define a "cascade delete" operation on a foreign key constraint.

g. Add a new attribute to an existing table and define that attribute as foreign key that references primary key of another table in your system.

h. First drop the foreign key constraint from the attribute you have created in step 'g', then drop the attribute.

i. Use UNION statement.

j. Delete all rows from a table, then delete the empty table from database.

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Project Report:

Project report should include team members, project theme/title, detailed project description and results for Tasks 1-6. Due date for submitting the report is December 10th, 2014. Only one member from each group is required to upload the project report through eLearning system.

Project Presentations:

Project presentations should include project description, an overview of the ER diagram and final relational schema. The in-class presentations will be conducted on December 2nd, 4th and 9th, 2014. One representative from each group will present the project; other members will take possible inquiries from the instructor and other students.