Lab 7: Database Design II (6% of total grade)

Submission: Use the included Google Sheets template linked to in 'Assessments > Lab 7 - Database Design II' on Blackboard. Create a copy of this so you can edit your own version. When submitting this lab, select 'Share' and change the setting to 'Anyone with the link' & 'Commenter'. Select 'Copy link' and paste that link in the submission text box on Blackboard.

Name your file: HTTP5126-L7-DatabaseDesign-*LastNameFirstName*, replace *LastNameFirstName* with your name as displayed in Blackboard.

Purpose: To practice database design skills by identifying foreign keys, relationships between tables, and constraints on columns. Also normalizing tables with the first 3 normal forms and creating Entity Relationship Diagrams

Pre-Lab

Copy over the progress you have made from Lab 6 into the file provided for lab 7. You may apply any feedback given from Lab 6.

*Ensure all your table and column names follow all naming conventions from class.

Section 1: Design Database (1.5%)

Section 1 can be used to organize your database design for section 2. Use each part as a checklist to ensure all parts of your database design are included.

Part 1: Identify Relationships (0.5%)

Using the 'Relationships' sheet in your document.

i. Identify the relationship types between tables using the template provided. Example: a country has many cities, a city has one country. Therefore this could be shown as:

"country one-to-many city" **OR** ***"****city many-to-one country"*

"one country to many city" **OR** *"many city to one country"*

**Use the "Justification" column to explain the relationships in a full sentence.*

Your design **does not need to have every relationship type.*

ii. ***If you identify any many-to-many relationships***, create a bridge table in your *'Table Drafts'* sheet to fulfill that relationship. Create a table example in your '*Table Draft Examples'* sheet for the bridge table as well.

Part 2: Specify Constraints (0.5%)

Using the 'Table Drafts' sheet in your document.

i. Identify the constraints in each of your tables. Constraints include:
    a. Foreign Keys (**FK**)
    b. Primary Keys (**PK**)
    c. Any Unique (**U**), or Not Null (**NN**) constraints on columns.

Part 3: Normalize Step-by-Step (0.5%)

Using the 'Table Draft Examples' sheet, ensure all your tables meet the first 3 Normal Forms.

i. First Normal Form (1NF)
    a. Each attribute (column) has a unique name
    b. Domain of attributes must not change (same data type)
    c. Each row is uniquely identifiable (no duplicate rows)
    d. Each cell must have only a single value, no lists (atomicity)
ii. Second Normal Form (2NF) – Including 1NF
    a. Every column is dependent on the whole primary key
iii. Third Normal Form (3NF) – Including 1NF, 2NF
    a. All non-key columns are functionally dependent on the primary key

Section 2: Create an Entity Relationship Diagram (ERD) (4.5%)

Using the information organized in section 1, create an Entity Relationship Diagram.

1. Your ERD should describe your entire database schema including:
    a. All the entities (tables) identified
    b. Fields (columns) of each table
    c. Data types of each table (VARCHAR, INT, DATE, etc.)
    d. Constraints of each table (PK, FK, U, NN)
    e. The relationships between tables, using the arrow connector images provided
2. Your ERD should match the ERD format shown in the Week 7 slides or templated in the Lab 7 file.
3. The design of the database should be normalized up to the 3rd normal form.

Tip: When creating the relationships between tables, if the arrow connection is not oriented to fit your desired schema layout use the 'Drawing' feature in google sheets to orientate the arrow correctly. First copy the image of the connector you wish to rotate. Select 'Insert->Drawing' and paste the image of the connector. Use the circle on the top of the image to rotate it.