CSC 212: Database Design and Management

Group Assignment, *due 5pm, Friday, February 28, 2025*

Scenario

You are part of a consultancy team tasked with designing and managing a database system for "BookHub," a fictional online platform where users can buy, sell, and exchange books. The platform allows users to register accounts, manage book listings, process transactions, and review books. Your job is to develop key components of this database system and demonstrate your understanding of foundational database concepts.

Tasks

- **Task 1: : Data Modelling**
  Design an Entity-Relationship (ER) Diagram for the database system that supports the following features:

  - User management (registration, login, and profiles).
  - Book listings (title, author, genre, condition, and price).
  - Transactions (buying/selling).
  - Reviews and ratings for books.
    Clearly identify entities, attributes, and relationships, including cardinalities.

  Deliverables:

  - ER Diagram (PDF or image format).
  - A brief report (2 pages max) justifying design choices (e.g., normalization considerations, entity relationships).

- **Task 2: : The Relational Model and Relational Algebra**
  Create a relational schema based on your ER Diagram. Then, write relational algebra expressions for the following:

- Retrieving all books of a specific genre with a rating above 4.
- Finding all users who have listed more than three books.
- Listing all transactions for books priced above $50.

Deliverables:

- Relational schema in tabular form (PDF).
- A document (1–2 pages) explaining the relational algebra expressions.

- **Task 3: : SQL Basics**
  Write SQL scripts for:

  - Creating tables based on your relational schema.
  - Inserting sample data for at least 10 records per table.
  - Executing the queries listed in Task 2.

  Deliverables:

  - SQL script file (.sql).
  - Screenshots showing successful execution of queries and sample data in the database.

- **Task 4: : Normalisation**
  Given a sample unnormalised dataset (provided by the instructor), normalise it up to 3NF. Clearly explain each step and the rationale behind your decisions.

  Deliverables

  - Normalised tables (PDF or Word).
  - A short explanation (2–3 pages) of the normalization process and its benefits.

- **Task 5: Database Queries and Reporting**
  Using the SQL script from Task 3, create advanced queries to:

  - Retrieve a list of the top 5 best-selling books.
  - Generate a summary report of total sales per genre.
  - Find users with no transactions.

  Deliverables

    - SQL script file (.sql).
    - Screenshots showing query results.

Submission Guidelines

- All tasks must be submitted as a zipped folder named `GroupName_Assignment.zip`, e.g. `Group_18_Assignment.zip`.
- Include a README file specifying group members and instructions to review the deliverables.
- Formats: PDF/Word for reports, image files for diagrams, `.sql` for scripts.

Assessment

- Groups will attempt *at least* three tasks, of which ***Task 1*** is mandatory.
- Groups will submit their work via email to ***etimoyoita@unicross.edu.ng***; Submission emails should be titled `CSC Group Assignment - Group X`, where X is the group number.
- **Each task will be scored over 100 marks, for a maximum score of 500 marks.**