Module: Introduction to Databases
Academic Year: 2022/23, Sem 1
Programs:
Assessment type: Continuous assessment
Weight: 40%
Deadline: Sunday November 20th 2022 23:55

Background:

This project is intended to assess students' understanding of database design and implementation including Conceptual data modelling, logical & physical data modelling, Data Definition Language, and Structured Query language.

Part 1: Conceptual Design - 40%

1. Suggest a situation where you can use a database to manage and record daily transactions. (200-400 words).

(10 marks)

2. Draw a suitable ER diagram for your database; consider the following in your conceptual design:

   - Include at least five entities.
   - The relationship between entities should include one-to-one, one-to-many and many-to-many.
   - Provide an example of a derived attribute in your design.

   Derived attribute This type of attribute does not include in the physical database. However, their values are derived from other attributes present in the database. For example, age should not be stored directly. Instead, it should be derived from the DOB of the employee.

(15 marks)

3. Convert the conceptual design in part 2 to a logical model. Make sure that the tables are in a 3rd normal form.

(15 marks)

Part 2: Physical design - 20% (5 marks each)

1. Create the corresponding database using DDL

2. Create all the necessary tables identified above using DDL

3. Populate at least three of your tables with some data using DML (insert into statement)

4. Populate your database with a large data set representing a one-year transaction (01/01/2022 - 31/12/2022) on each table. (Use online data generators such as Mockaroo or generate data to generate synthetic data.)

Part 3: Write SQL Statements to answer the following queries - 40%

1. Show the total number of transactions your database is storing and, depending on your database, the most sold/listed item or customer with the highest number of purchases.
(4 marks)

2. Write a query statement that includes "Order by" and "Group by".
(6 marks)

3. Write a query statement that uses pattern matching (example: customer living in a given street, number of Johns, people with today's birthday…).
(6 marks)

4. Show information from three tables based on criteria of your choice (hint: join).
(6 marks)

5. Create a view that includes information from the most frequent seven transactions (customer names or most sold items …).
(6 marks)

6. Create a set of queries that summarises the annual transactions. For example, if your transaction table is about selling product, you can create queries that:

    - Shows the total number of transactions with corresponding details every month,
    - Shows customer purchase value per month,
    - Shows name of product and number sold each month

(12 marks)

Submission checklist:

1. A pdf/word document containing the answers to each of the above questions. Please add all your answers including descriptions, SQL Scripts and diagrams (ERD, report charts or graphs in this file) for each of the questions where applicable.
2. An SQL script file that contains all the SQL statements used for part 2 and part 3. Each answer should have a clear label indicating the question number.
3. The dump file (self-contained SQL script) of the full database, including triggers and stored procedures.

Submission Guideline:

1. Submit your word document file separately using Turnitin
2. The SQL script file and the dump (self-contained) file in a folder and compress to a single zip folder. All your file names should use the following file name pattern.

YourFirstName_YourLastName_Description.doc/pdf
YourFirstName_YourLastName_SQL.sql
YourFirstName_YourLastName_Dump.sql
YourFirstName_YourLastName_Project.zip

Example:

Eugene_McLaughlin_Description.doc