COS 221 Practical Assignment 4

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- Date Issued: **5th April 2023**
- Date Due: **10 May 2023** before **11:00 (in the morning)**
- Submission Procedure: **Upload to ClickUP**
- Submission Format: **zip or tar + gzip/bzip2 archive**
- This assignment consists of **6 tasks** for a total of **80 marks**.

1 Introduction

You are required to use the Sakila Sample DVD rental database. Sakila provides a well-defined normalised database for a DVD rental store. The database models various concepts one would expect to find in a store use-case where stock is managed.

In the given database, you can find various tables such as customer, address, country, film, film category, etc. Explore the tables to have an idea of what the database is about. The database also represents a category to which a DVD is assigned, such as action, animation, horror, children, romantic, comedy, etc. You are given a *staff* table to assist customers looking to do a rental of a DVD.

After successful completion of this assignment you should be able to:

- model an existing database;
- analyse and understand database extensions from other sources;
- build a Graphical User Interface (GUI); and
- utilise the GUI to query and manipulate a relational database.

2 Constraints

1. You must complete this assignment individually or in pairs.
2. You may ask the Teaching Assistants for help but they will not be able to give you the solutions.
3. The PDF, database dump, and GUI will be marked.
4. The GUI interfaces:
   (a) which runs and performs what they are supposed to do get full marks
   (b) which runs but does not perform as required, will receive partial marks
   (c) which does not run will be allocated partial marks based on the functionality they would have exhibited.
5. You need to use your MariaDB or MySQL Workbench.
6. You may utilize any text editor or IDE, upon an OS of your choice (i.e: pgAdmin).
7. **Hint:** You **ARE NOT REQUIRED** to use git source code revision for **THIS** practical. Usage of Git will be **REQUIRED** for Practical Assignment 5. You would thus find it beneficial to start learning Git and GitHub.com to code simultaneously on your project if you working in pairs. For individuals working individually, you will still find the exercise valuable to use Git.

3 Submission Instructions

You are required to upload a single archive that includes the following files:

- An archive containing your project representing your GUI application.

- A pdf containing the answers to the tasks where required.
- A **readme.txt** file informing the marker what they should do to build, connect your application to the database, and execute your application.

Upload your archive to ClickUP. No late submissions will be accepted, so make sure you upload in good time.

4 Online resources

The following resources will help with creating your GitHub

- Git: `https://git-scm.com`
- GitHub: `https://github.com`
- MariaDB: `https://mariadb.com`

Getting Started with MariaDB at: `https://mariadb.com/get-started-with-mariadb/`

To download MariaDB and access the documentation on your computer. Use the official MariaDB site – `https://www.mariadb.com/`

5 Rubric for marking

Obtain and install the database	3
Choose a canned application (DB Tool)	
Specify the preferred DB Tool and a screenshot of installation	2
Imported database tables	3
(E)ER-diagram	
Generated Diagram	3
Store Table	5
Graphical User Interface	
Staff Listing	6
Staff Filter	4
Films Listing	2
Films extension	6
Genre Consolidate Report	6
Client Notification	2
Client Creation	3
Client Update	6
Client Deletion	4
Client Listing	2
Client drop	5
Total	**46**
Bonus Marks	
Secured Credentials	6
Git & GitHub Usage	5
Advanced SQL	2
Total Bonus	**13**
Demo preparation	5
Possible Marks	**80**
Full Marks	**67**

6 Assignment Instructions

Task 1: Obtain the database ..... (3 marks)

Obtain the database by downloading the archive from:
`https://drive.google.com/file/d/1DJPTJlTi9a4xgYaJBDIHHTPmft_xh_3_/view?usp=share_link`.
Import the database into your MariaDB instance and name it `uXXXXXXXX_sakila` where `XXXXXXXX` is your student number. If you are working in a pair, include both student numbers in the naming of the database, that is `uXXXXXXXX_uYYYYYYYY_sakila`. Make sure that your instance has correctly imported.

Task 2: Choose a canned application (DB Tool) ..... (5 marks)

Use a canned application to explore and better understand the schema.

2.1 Specify the chosen canned application. (2)

2.2 Provide a screenshot of the canned application showing the imported database tables. Make sure the database name is clearly visible in the screenshot. (3)

Task 3: (E)ER-diagram ..... (8 marks)

3.1 Generate an (E)ER-diagram using the chosen canned application. Include the (E)ER-diagram in your PDF. (3)

3.2 Explore the `Store` table structure by explaining in your PDF the data this relation holds, the data types, constraints present as well as how it links to other relations in the schema. (5)

Note: For the tasks given above, ensure that in your screenshot your database name **WITH** your student number is **CLEARLY** visible.

Task 4: Graphical User Interface ..... (46 marks)

Design and implement a Graphical User Interface (GUI) in Java that defines a front-end to the database. The GUI must include at least 4 tabs. The details of which are given in the instructions below.

4.1 For the Staff tab add a table component to show at a minimum the first name, last name, address, address2, district, city, postal code, phone, store where employee works, and whether they are active. (6)

4.2 Add to the Staff tab a textbox allowing the user to filter the returned results. (4)

4.3 On the Films tab add a button to trigger a popup which allows the user to add new data to the database. Make sure that when the user adds the data and closes the popup, that the original table reloads the new data. (8)

4.4 The owner would like an up to date consolidated report to be generated each time the Report tab is opened. This report must provide the number of movies in each store for each genre. You should return the store name, the genre name and the number of movies in the genre. (6)

4.5 The owner uses the DVD rental store system to send his clients notifications on specials and new 'files' that are added to the inventory. Your application should allow the owner to create, update, delete and list all clients in the system in the Notifications tab. (17)

4.6 Add a table of clients that drop their rental subscription. Include a searchable list of all clients, past and present in the Notification tab. (5)

Hint: Use a build tool such as Maven, or download and install the jar file that provides the API to access your database from a Java application.

Task 5: Bonus Marks ..... (13 marks)

5.1 Storing your database credentials inside a configuration file, allows for easy exposure of your credentials. Amend your application to use the following environment variables to connect to your database instance. (6)

- dvdrental_DB_PROTO
- dvdrental_DB_HOST
- dvdrental_DB_PORT
- dvdrental_DB_NAME

- dvdrental_DB_USERNAME
- dvdrental_DB_PASSWORD

5.2 One (Individual)/ both (Pair) member(s) committing code using git and more than 8 commits on GitHub.com (5)

5.3 Make sure to mention in your uploaded PDF any advanced, non-standard use of SQL in your application. Note that SQL presented in lectures 1 – 20 will be considered standard SQL. (2)

Task 6: Demo preparedness ..... (5 marks)

IMPORTANT NOTE(S):

- Please refer to the rubric for the detailed allocation of marks.
- Plan your study time and start well in advance with this practical.