COS 221 Practical Assignment 1

- Date Issued: **19 Februaury 2025**
- Date Due: **26 February 2025** before **11:00 AM**
- Submission Procedure: **Upload to ClickUP**
- This assignment consists of **7 tasks** for a total of **55 marks**.

1 Introduction

Welcome to DriveEase, a company dedicated to providing customers with access to a diverse selection of vehicles for rental. As a new recruit at DriveEase, you've been tasked with developing a database system to streamline the rental process and enhance customer satisfaction. In this assignment, you will explore database design and implementation within the context of DriveEase's operations. Your objective is to create a robust database system that effectively manages customer information, tracks vehicle availability, and records rental transactions.

The system holds a catalog of vehicles that customers may rent from DriveEase. The name of a customer who wants to rent a vehicle is captured in the database if it is not already present. A customer may rent one or more vehicles, and this is recorded by the system. When a customer returns a vehicle, it becomes available once again for another customer to rent. The system should provide functionality to generate lists, such as available vehicles in the DriveEase fleet, rented vehicles, and which customers have rented which vehicles.

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

- create a conceptual design for a database system

- implement the conceptual design in MariaDB by:

  - create databases, tables and populate them with data;

  - Identify integrity constraints like the primary key, foreign key and composite key in different relationships between entities;

- Export databases from MariaDB

- Execute simple queries

2 Constraints

1. You must complete this assignment individually or in pairs.

2. Populate the created database with at least 20 entries

3. The scripts will be marked

   (a) Scripts that run and perform what they are supposed to do get full marks

   (b) Scripts that run but do not perform as required, will receive partial marks

   (c) Scripts that do not run will be allocated partial marks based on the functionality they would have exhibited.

4. You may ask the Teaching Assistants for help but they will not be able to give you the solutions.

5. *For the conceptual design task, you are required to use draw.io `https://app.diagrams.net/` or `https://draw.io/` or a similar software to create your design. Unless explicitly stated otherwise, use **Chen's notation** for ER modeling. Failure to adhere to these requirements may result in marks being deducted. This diagram must be submitted as a **.pdf**, **.jpg**, or a **.png***

3   Submission Instructions

You are required to upload a pdf document, all .txt files, screenshots, and a dump (in an archive) to ClickUP. No late submissions will be accepted, so make sure you upload in good time. Please ensure that the archive contains all the required files for the assignment. Only a PDF document, image files (.jpg, .png, etc.), and the SQL dump will be considered for marking.

4   Online resources

The following resources will help with setting up of your database and running queries.

Getting started with MySQL and Maria DB: `https://www.digitalocean.com/community/tutorials/how-to-import-and`

Maria DB database creation Tutorial: `https://www.mariadbtutorial.com/mariadb-basics/mariadb-create-database/`

The following resources will help with drawing the conceptual design:

Draw.io: `https://app.diagrams.net/` or `https://draw.io/`

5   Rubric for marking

Database Design	
Conceptual design of the database	10
Database Creation	
Screenshot of database creation in the command line	3
Creating tables	
Table names	3
Column names	3
Use of datatypes	5
Implementation of foreign constraints	4
Implementation of primary keys	5
Populating tables	
Use of correct clauses	4
correct data entry	6
Retrieval	
Customer Query	4
Fleet Query	4
Database dump	
Exporting database	2
Importing database	2
Total	**55**

6 Assignment Instructions

Task 1: Installing Maria db server .... (0 marks)
Follow the instructions provided in the practical tutorial for Maria db installation.

Install the JDBC connector `https://mariadb.com/kb/en/installing-mariadb-connectorj/`

Task 2: Conceptual design of the database .... (10 marks)
Design the database by drawing an ER-diagram for the given scenario. If any assumptions are necessary for the design, please document them alongside the ER-diagram.

*For this conceptual design task, you are required to use draw.io `https://app.diagrams.net/` or `https://draw.io/` or a similar software to create your design. Unless explicitly stated otherwise, use **Chen's notation** for ER modeling. Failure to adhere to these requirements may result in marks being deducted. This must be submitted as a **.pdf**, **.jpg**, or a **.png***

Task 3: Creating a database .... (3 marks)
Create a database named uXXXXXXXX_carhiresystem where XXXXXXXX is your student number. *(Please include both student numbers when working in a pair.)*

Task 4: Creating tables .... (20 marks)
Create the relevant tables with appropriate constraints and attributes.
Please refer to page 91 of the prescribed textbook (6th Edition) and page 185 (7th Edition).

Task 5: Populating tables .... (10 marks)
Populate the tables with the data sets (at least 20 entries).
Please make use of page 108 of the prescribed textbook (6th Edition) and page 198 (7th Edition).

Task 6: Simple query .... (8 marks)
Write and execute the following two queries:

- Retrieve the customer details of the customers who have rented more than one vehicle.

- Retrieve the make, model, and type of all vehicles added to the fleet after 2017

Copy the command used into a text file named uXXXXXXXX.txt, where XXXXXXXX is your student number. Clearly mark which question you are answering in the text file.

Task 7: Database dump .... (4 marks)
Make use of `mysqldump` to export the database and add the dump to your archive which you will upload to ClickUP. Once exported, include instructions for importing this dump file in the text file you created. Clearly mark which question you are answering in the text file when describing the import.

IMPORTANT NOTE: Please refer to the rubric for the detailed allocation of marks.