



# COS 221 Practical Assignment 1

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- Date Issued: **1st March 2023**
  - Date Due: **8th March 2023** before **11:00 AM**
  - Submission Procedure: **Upload to ClickUP**
  - This assignment consists of **7 tasks** for a total of **55 marks**.
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## 1 Introduction

In this assignment you are required to design and implement the design of a database for a small communal student library. Students wanting to borrow a book from the library, do so using the command line interface of the database system. The system holds a list of books that the students may borrow from the library. The name of a student who wants to borrow a book is captured in the database, if it is not already in the database. A student may borrow one or more books from the library and this is captured by the system. When a student returns a book, the book once again becomes available for another student to borrow. The system should provide a means to draw lists, such as which books are in the library, which books have been borrowed and which students have which books.

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.

### 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.

### 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-export-databases-from-mysql-to-mariadb>

Maria DB database creation Tutorial: <https://www.mariadb-tutorial.com/mariadb-basics/mariadb-create-database/>

### 5 Rubric for marking

Conceptual design of the database	10
Screenshot of database creation in the command line	3
Screenshot of tables creation	3
Minimum of 20 entries	2
<b>Creating tables</b>	
Table names	3
Column names	3
Use of datatypes	6
Implementation of foreign constraints	4
Implementation of primary keys	5
<b>Populating tables</b>	
Use of correct clauses	3
correct data entry	6
Query	3
<b>Database dump</b>	
Exporting database	2
Importing database	2
<b>Total</b>	<b>55</b>

## 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 you need to make assumptions about the design, include them as text with the design.

### **Task 3: Creating a database** ..... (2 marks)

Create a database named uXXXXXXXX\_bookshopsystem where XXXXXXXXX is your student number.

### **Task 4: Creating tables** ..... (21 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** ..... (9 marks)

Populate the tables with the data sets (at least 20 entry) 3.

*Please make use of page 108 of the prescribed textbook (6th Edition) and page 198 (7th Edition).*

### **Task 6: Simple query** ..... (3 marks)

Write and execute a query to return student ID of students who have borrowed more than one book. Copy the command used into a text file named uXXXXXXXX.txt, where XXXXXXXXX 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.

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