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COS 221 Practical Assignment 1

- Date Issued: **24th March 2021**
- Date Due: **7th April 2021** before **11:00 (in the morning)**
- Submission Procedure: **Upload to the web server (`wheatley`) and ClickUP**
- This assignment consists of **8 tasks** for a total of **50 marks**.

1 Introduction

During this practical assignment you will be required to create a database for a simple library system. The system includes the members and books. A member can borrow one or more books, this gets recorded in the 'borrowed' table. Borrowed books are identified by their ISBN and the ID of the member borrowing it. An ER-Diagram of the database is given in Figure 1.

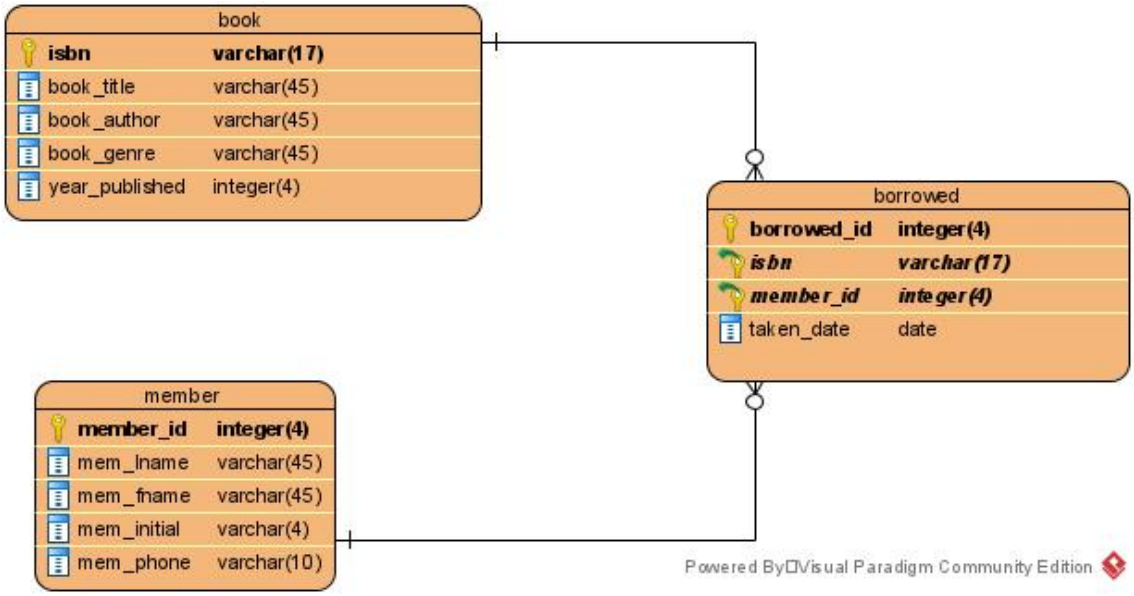


Figure 1: The ERD

HINT: Translate the Crow's Foot notation into the notation used in the textbook. Note, a ring and crow's foot specifies a cardinality of 0 or more. A dash represents a cardinality of 1.

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

- create databases, tables and populate them with data;
- interpret ER-diagrams, even when given in in an alternative notation such as Crow's Foot;
- implement referential integrity constraints like the primary key, foreign key and composite key in different relationships between entities; and

- learn how to export databases (database dump) for purposes of backing up a database so that its contents can be restored in the event of data loss.

2 Constraints

1. You must complete this assignment individually.
2. The SQL scripts will be marked
   (a) Scripts which run and perform what they are supposed to do get full marks
   (b) Scripts which run but do not perform as required, will receive partial marks
   (c) Scripts which do not run will be allocated partial marks based on the functionality they would have exhibited.
3. You may ask the Teaching Assistants for help but they will not be able to give you the solutions.
4. You may utilise any text editor or IDE, upon an OS of your choice. Usage of MySQL Workbench and MySQL Server for Windows are both outlined in this practical.

3 Submission Instructions

You are required to upload all .txt files, screenshots and a MySQL dump (in an archive) to ClickUP. You also need to make sure that `wheatley` mirrors what you uploaded to ClickUP and works on the web server before the deadline. You may work with a MySQL server installed locally on your PC, and then export your dump to `wheatley` afterwards. 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 MySQL database and running queries.

Getting started with MySQL: `https://dev.mysql.com/doc/mysql-getting-started/en/`

SQL Tutorial: `https://www.w3schools.com/sql/sql_create_table.asp`

Documentation for Workbench GUI interface: `https://dev.mysql.com/doc/workbench/en/`

Data export/import documentation: `https://dev.mysql.com/doc/workbench/en/wb-admin-export-import-management.html`

5 Rubric for marking

Screenshot of local connection	3
Screenshot of `wheatley` connection	3
Creating a database	2
Creating tables	
Table names	3
Column names	3
Use of datatypes	6
Implementation of foreign constraints	4
Implementation of primary keys	5
Populating tables	
Use of correct clauses	3
correct data entry	6
Query	3
Database dump	
Exporting database	2
Importing database	2
Total	**45**

6 Assignment Instructions

Task 1: Installing a MySQL client and MySQL server on Windows ..... (0 marks)

You can download the MySQL installer which will allow you to install MySQL Workbench and MySQL Server or any MySQL product without hassles (recommended): `https://dev.mysql.com/downloads/windows/installer/8.0.html`

Alternatively, MySQL Workbench and Server can be downloaded from the following links: `https://dev.mysql.com/downloads/workbench/` and `https://dev.mysql.com/downloads/mysql/`

To run the MySQL client through the command line, install MySQL Workbench, open cmd and navigate to where the client is installed (e.g. `C:\ProgramFiles\MySQL\MySQLWorkbench8.0`).

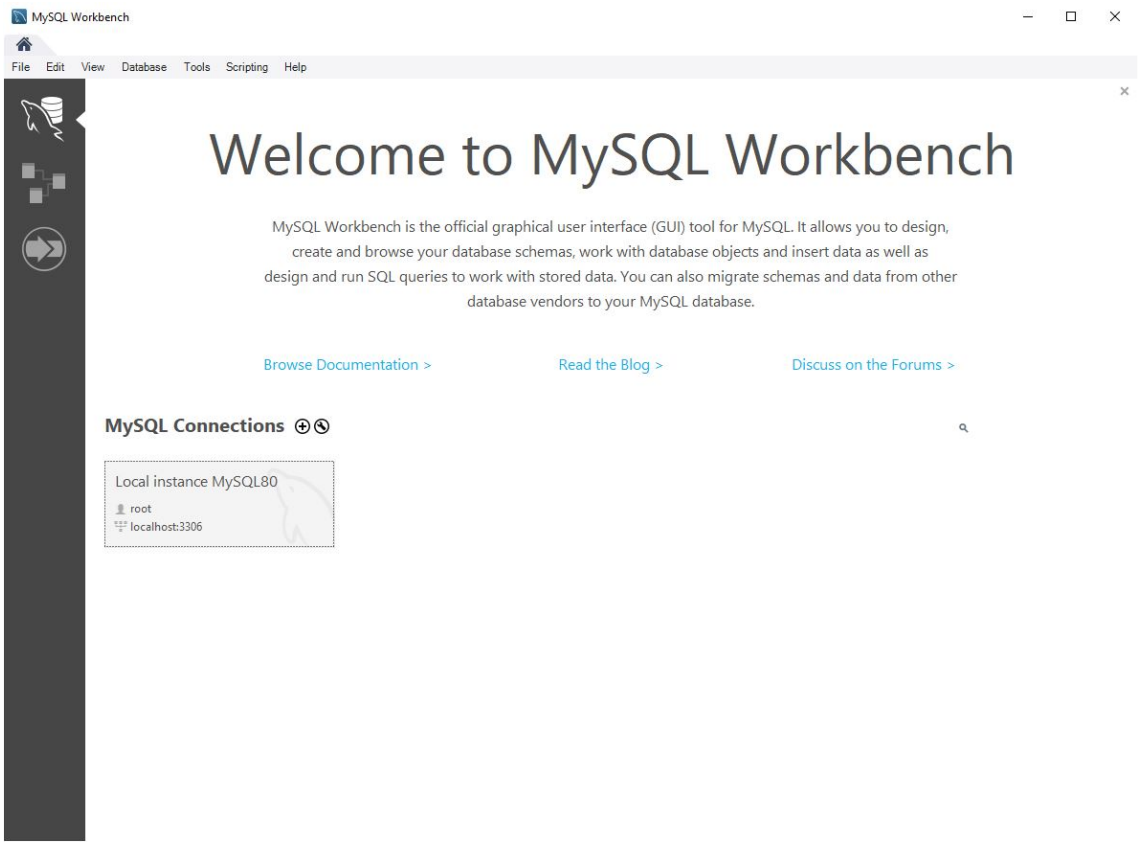
The Workbench GUI interface may be used instead of the command line. The same commands are used for both the command line and Workbench interface.

Task 2: Connecting to MySQL locally and on wheatley ..... (6 marks)

Local: Use command mysql –u root –p {password} where {password} is chosen during installation of MySQL server
Wheatley: Use command mysql –u{username} –p{password} –h{host server ip} where {username} is your student number starting with u, {password} is your CS password and {host server ip} is wheatley.cs.up.ac.za

Creating a connection through the Workbench interface uses the same details: `https://dev.mysql.com/doc/workbench/en/wb-mysql-connections.html`
Connections created through the command line will appear under "Connections" when MySQL Workbench is opened.

Please include screenshots of the MySQL connections displayed in the Workbench interface or in the command line, for **both** connections (local and wheatley), in the archive you will submit.
For example:



Task 3: Displaying available databases ..... (0 marks)

After launching MySQL through the command line or Workbench, type the command `show databases;` you should be able to see a database named uXXXXXXXX where XXXXXXXX is your student number.

Task 4: Creating a database ..... (2 marks)

Create a database named uXXXXXXXX_librarysystem where XXXXXXXX is your student number.

Task 5: Creating tables ..... (21 marks)

Create the corresponding tables shown in the ER-diagram in Figure 1 with appropriate constraints and attributes.

Please refer to page 91 of the prescribed textbook (6th Edition) and page 185 (7th Edition).

Task 6: Populating tables ..... (9 marks)

Populate the tables with the data sets in Figure 2 and Figure 3.

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

Book

isbn	book_title	book_author	book_genre	year_published
978-0-7981-8166-2	Donkerdrif	Deon Meyer	Crime	2020
978-0307474278	The Da Vinci Code	Dan Brown	Mystery	2003
978-0345391803	The Hitchhiker's Guide to the Galaxy	Douglas Adams	Science Fiction	1979
978-1455519132	Egghead	Bo Burnham	Poetry	2013
978-1983699740	The Prince Of Milk	Exurb1a	Science Fiction	2018
9780241257265	How to Play Chess	Claire Summerscale	Non Fiction	2016
9780330241182	To Kill a Mockingbird	Harper Lee	Domestic Fiction	1960
9780451532244	Frankenstein	Mary Shelley	Horror Fiction	2013
9780804172264	Inferno	Dan Brown	Mystery	2013
9781250010292	White Crow	Marcus Sedgwick	Horror Fiction	2010
9781439149034	Under the Dome	Stephen King	Horror Fiction	2009
9781841351414	The Secret Island	Enid Blyton	Adventure	2002

Member

member_id	mem_lname	mem_fname	mem_initial	mem_phone
1010	Jefferson	Mike	W	0833335345
1011	Smith	Kayla	A	0844842223
1012	Botha	Kyle	F	0623478921
1013	Thomas	George	H	0849236712
1014	Dunne	Amy	Y	0612783490
1015	Williams	Michelle	M	0825280001
1016	De Beer	Johan	B	0725142783
1017	Hoenderdos	Dylan	D	0831119081
1018	Govender	Brent	E	0741789012
1019	Meyer	Marlize	P	0824462842

Figure 2: Dataset for book and member

Borrowed

borrowed_id	isbn	member_id	taken_date
1110	978-0345391803	1013	2021-02-10
1111	9780241257265	1018	2021-02-15
1112	9781250010292	1016	2021-02-12
1113	9780330241182	1010	2021-02-20
1114	978-0-7981-8166-2	1016	2021-02-22
1115	9781841351414	1012	2021-02-26
1116	9781439149034	1019	2021-03-05
1117	978-0307474278	1018	2021-03-10
1118	9780451532244	1010	2021-03-14

Figure 3: Dataset for borrowed

Task 7: Simple query ..... (3 marks)

Write and execute a query to retrieve books in the "Horror Fiction" genre. 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.
Apply the commands on page 98 of the textbook (6th Edition) and page 188 (7th Edition).

Task 8: 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 in task 7. Clearly mark which question you are answering in the text file.

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