

Project 2 – Library System

This project is designed to test your MySQL skills (creating, editing, and querying databases). The project is a database for a library system.

• The Data

The E-R (Entity-Relationship) diagram of the system is shown in Figure 1. The details of each entity (table) are as follows:

1. Author

The author entity is the author of one or many books. He/she can also be a co-author other books.

The attributes of an author are:

- **ID:** A unique value for each author. It is a string of 10 characters. It is the primary key of the table.
- **Name:** The name of the author. It is a string of 250 characters.

Here is some sample data for the author table:

ID	Name
1	Soren Lauesen
2	Robert Lafore
3	Adam Trachtenberg
4	David Sklar
5	Kevin Tatroe

2. Book

The book entity is a book that has copies in the library. Notice that this book is not the physical copy of the book. It is just the information about a book.

The attributes of a book are:

- **ISBN:** It is the primary key of the Book table. It is a string of 15 characters.
- **Title:** The title of the book. It is a string of 250 characters.
- **Edition:** The edition of a book. It is a string of 10 characters.
- **YearIssued:** The year the book was published. It is an integer.

Here is some sample data for the book table:

ISBN	Title	Edition	YearIssued
0672324539	Data Structures and Algorithms in Java	2	2002
0321181433	User Interface Design: A Software Engineering Perspective	1	2004
0201745704	Software Requirements: Styles and Techniques	2	2002
144936375X	PHP Cookbook: Solutions & Examples for PHP Programmers	3	2014
1449392776	Programming PHP	3	2013

3. Copy

The copy entity is the physical copy of a book. A book can have many physical copies at the library. The copy is what the library member borrows.

The attributes of a copy is:

- **barCode:** It is the primary key of the Copy table. It is a string of 10 characters.
- **Book_ID:** (A foreign ID) The ISBN of the book that the copy is for. It is a string of 15 characters.

Here is some sample data for the copy table:

barCode	Book_ID	Comment
1234567	0672324539	a copy of the Data Structures book (See the book table)
5432122	0672324539	Another copy of the Data Structures book (see the book table)
1237783	144936375X	A copy of the PHP Cookbook book (see the book table)
8902342	1449392776	A copy of the Programming PHP book (see the book table)
1256231	0321181433	A copy of the User Interface Design book (see the book table)
1117891	0201745704	A copy of the Software Requirements: Styles and Techniques

4. Authorship

This entity connects the author with the book tables (meaning it makes it possible for an author to write many books, and a book to be written by many authors).

The attributes of authorship are:

- **ID:** The primary key of the Authorship table. It is an auto-increment integer.
- **Book_ID:** A foreign key that points to a book record. It is a string of 15 characters.
- **Author_ID:** A foreign key that points to an author record. It is a string of 10 characters.
- **Main:** A Boolean that tells us whether an author is the main author of a book.

The combination of the book and author IDs are unique for each authorship.

Here is some sample data for the authorship table:

ID	Main	Book_ID	Author_ID	Comment
1	true	0672324539	2	The data structures book, authored by Robert Lafore (main author)
2	true	0321181433	1	The user interface book, authored by Soren Lauesen (main author)
3	true	0201745704	1	The software requirements book, authored by Soren Lauesen (main author)
4	true	144936375X	4	The PHP Cookbook book, authored by David Sklar (main author)
5	false	144936375X	3	The PHP Cookbook book, authored by Adam Trachtenberg (not the main author)
6	true	1449392776	5	The Programming PHP book, authored by Kevin Tatroe (main author)

5. Member

This entity is the library member who can borrow copies of books.

The attributes of a member are:

- **ID:** The ID of a member. It is an auto-increment integer. It is the primary key of the table.
- **Name:** The member name. It is a string of 250 characters.
- **Gender:** An integer represents the member gender. 1 means male, 2 means female.
- **email:** The member e-mail. It is a string of 250 characters.

Here is some sample data for the author table:

ID	Name	Gender	Email
1	Adam Smith	1	smith@library.us
2	Jane Jackson	2	jane@library.us
3	Joseph Davis	1	joseph@library.us
4	Yusif Kareem	1	yusif@library.us
5	Jasmin Harris	2	jasmin@library.us

6. Loan

This entity connects the member with the copy tables (meaning it makes it possible for a member to borrow many books, and a book to be borrowed by many books at different times).

The attributes of a loan are:

- **ID:** The ID of the loan. It is an auto-increment integer. It is the primary key of the table.
- **copyID:** A foreign key that points to a copy record. It is a string of 10 characters.
- **memberID:** A foreign key that points to a member record.
- **borrowDate:** The date the book was borrowed (checked out). It is of type Date.
- **returnDate:** The date the book was returned. It is of type Date.
- **status:** The status of the loan. It has these possible values: 1 (the book is currently borrowed), 2(the book has been returned), and 3 (the book is lost). The status of type integer.

Here is some sample data for the loan table:

ID	copyID	memberID	borrowDate	returnDate	status	Comment
1	1234567	1	06/01/2010	06/10/2010	2	Adam Smith borrowed a copy of "Data Structures" on June 1, 2010, and returned it on June 10, 2010.
2	1234567	2	02/15/2011	02/20/2011	2	Jane Jackson borrowed a copy of "Data Structures" on Feb 15, 2011, and returned it on Feb 20, 2011
3	5432122	1	07/01/2011	07/05/2011	2	Adam Smith borrowed a copy of "Data Structures" on July 1, 2011, and returned it on July 5, 2011.
4	1237783	5	07/15/2012	08/01/2012	2	Jasmin Harris borrowed a copy of "PHP Cookbook" on July 15, 2015, and returned it on August 1, 2012.
5	1237783	4	02/01/2013		3	Yusif Kareem borrowed a copy of "PHP Cookbook" on February 1, 2013, and lost it.
6	8902342	3	10/12/2013		1	Joseph Davis borrowed a copy of "Programming PHP" on October 12, 2013. The book hasn't been returned yet.

• Requirements

1. (Weight: 30%) Write `CREATE TABLE` Statements that create all the tables.
2. (Weight: 25%) Write `INSERT` statements that populate the tables with the data mentioned above (in the data section).
3. (Weight: 40%) Write SQL statements that return the following:

- 3.1. Return the names of all authors who wrote books that were published in 2002 (*Don't repeat the names of the authors in case they published more than a book in 2002*).
- 3.2. Return the number of copies for each book. This is what your query should return (*the order doesn't matter*):

Title	Number Of Copies
Data Structures and Algorithms in Java	2
User Interface Design: A Software Engineering Perspective	1
Software Requirements: Styles and Techniques	1
PHP Cookbook: Solutions & Examples for PHP Programmers	1
Programming PHP	1

- 3.3. Return information about the copies that have been borrowed between the years 2010 and 2012. This is what your query should return (*Don't display information about a copy twice*) (*the order doesn't matter*):

copyID	Book Title
1234567	Data Structures and Algorithms in Java
5432122	Data Structures and Algorithms in Java
1237783	PHP Cookbook: Solutions & Examples for PHP Programmers

- 3.4. Return information about the members who haven't returned the books they borrowed yet (*excluding the ones who lost the borrowed books*). This is what your query should return:

Member ID	Name	Copy ID	Book Title
3	Joseph Davis	8902342	Programming PHP

4. (Weight: 5%) Write `UPDATE` statement that updates the loan with ID "6". The statement sets the return date to "October 30, 2013", and the status to "2".

- **Submission**

Make 4 SQL files (.sql). This is what the files should have:

File Name	Contents
create.sql	All the CREATE statements, one after the other.
Insert.sql	All the INSERT statements, one after the other.
select.sql	All the SELECT statements, one after the other.
update.sql	The UPDATE statement.

Put the four files in one folder. Zip the folder and submit it (if you are the one who is making the submission, also put your individual report in there).

- **E-R Diagram**

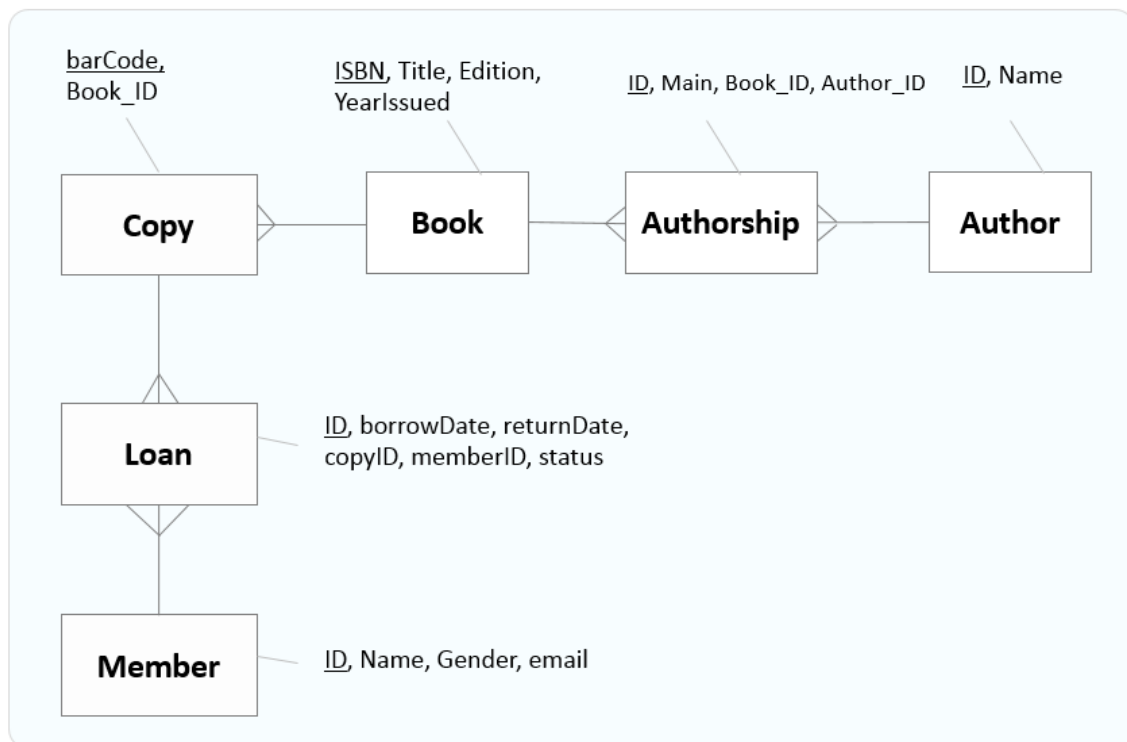


Figure 1: The E-R diagram of the library system