

The README.md for project 3 is included in this document.

# Project3-RicardoRomanach

This program uses Java to interact with a MySQL database. This is for CSC-3300 Fall 2022 with Beata Kubiak.

GitHub: <https://github.com/rawii22/Project3-RicardoRomanach>

Video Guide: [https://drive.google.com/file/d/17zSjDSs4u6UR4uq3SP\\_6CfUXg\\_nz9f1q/view?usp=sharing](https://drive.google.com/file/d/17zSjDSs4u6UR4uq3SP_6CfUXg_nz9f1q/view?usp=sharing)

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## Introduction

This program is our third major project for CSC-3300 at Tennessee Technological University during Fall 2022 with Professor Beata Kubiak. It is meant to teach us how to communicate with a MySQL database with Java.

## Tools

1. **IntelliJ IDEA** - For Java development and some database navigation
2. **MySQL Server\*** - Server used for program to communicate with - try this: <https://dev.mysql.com/downloads/mysql/>
3. **MySQL Workbench** - For database navigation and testing SQL snippets
4. **GitKraken** - For git repository management and visualization
5. **Visual Studio Code** - For writing the README file and other basic tasks

\* This program requires MySQL to already be installed and running on your computer.

## Included Files

I want to make sure that this repository comes with everything it needs. I want it to be easy to clone and run this program, so I have included the following files:

1. **3300-F2022-project3-readme.pdf** - Instructions for this project.
2. **GuideForConnectingMySQLDatabaseToIntelliJ(Update-V2).pdf** - This is a guide that I personally wrote. It was intended to help my class set up a MySQL connection in IntelliJ and show them how to start talking to the database in Java. (I did this since I REALLY did not want to use Eclipse.) This file also includes a link to install IntelliJ and to the MySQL connector jar file web page.
3. **mysql-connector-java-8.0.30.jar** - This allows Java to communicate with the MySQL database. This is also included so other users don't have to install the library manually.
4. **library\_schema\_MySQL.sql\*** - Provided by Professor. This file establishes the table structure of the "library" database.
5. **libraryInsertFile\_MySQL.sql\*** - Provided by Professor. This file adds some testing data into the "library" database.

\* Make sure to run these two scripts (in this order) on your database before running the program, otherwise the program will not find your library schema.

# Compiling and Running

1. Navigate to the src folder in "~\Project3-RicardoRomanach\Project3\src". If no "bin" folder exists in the src folder, then either run the **makeBinFolder.bat** file **OR** create a folder called "bin" inside the src folder before continuing.
2. To build the program, either run the **build.bat** file **OR** execute the following commands in the src directory
  1. `javac -d bin com\rjromanach42\Main.java com\rjromanach42\LibraryDB.java`
  2. `jar cvfm Project3.jar manifest.mf -C bin .`
3. To run the program, either run the **run.bat** file **OR** execute the following command in the same src directory
  1. `java -jar Project3.jar`

**Note:** Make sure to include the dot at the end of step 2 command 2 (the jar command)

**Note:** Files of type .bat can only be used on Windows. For Linux or Mac, you will have to execute the commands manually since these scripts have not been written for those operating systems yet.

## Features

**This program should never end because of an error.** Since the contents of the primary while loop that controls the main menu is within a classic Java try/catch statement, any error should simply redirect the user back to the menu.

Every time the program asks for user input, **the user should be able to type "exit" to return to the main menu.** The only time this does not apply is in the main menu itself, where instead of typing "exit" you should enter in the appropriate option number to "Quit" the program.

When a user wants to search for the authors associated with a book (option 2), they have the choice to search for a book (or books) by title or ISBN. **They are not required to type in the full title or ISBN of a book perfectly** since the program will retrieve books with the closest match. (This is done through the SQL using the % signs around the desired title/ISBN). This is for ease of use.

Whenever the program prints a list of book COPIES, **if there is more than one copy of the same book in the list, the full book data will not be reprinted for each copy.** It will only add the copy ID of each similar book onto the "Copy ID" row.

## Limitations

Unfortunately, since this program had to be graded on a separate machine, and therefore a separate database instance, **we were not able to use sql functions or stored procedures since the grader would have been missing those functions and procedures in their database if they tried to run the program.**

With this program a user is **not allowed to renew a book more than twice.**

The total amount of money owed to the library by a certain member includes books not yet returned. However, **a late fee payment cannot be made on a book that has not been returned.** This is by design. A member can only register a payment on a book that has been returned. The menu will limit your options accordingly.

There are a few functions in this program that are **expecting the queried book data to be sorted by title.** So, if you add a new function that retrieves books, it would be a good idea to order the data by "title".

Indentations look best when this program is run on Command Prompt. Spacing might look slightly off when run inside of IntelliJ.

## Note to the grader

The instructions say that "brown" should be a user who can access the database, however that is something that must be set up on the computer's local database instance. Even if we set up a user called "brown" on our databases, your test database will not have that user. Also, we cannot create a user called "brown" on any program user's database since that would first require the program to be logged in.

The only solution to this problem was to just allow a mechanism through which the program user can sign into whichever database user they desired. So, make sure that you create a user called brown that you can sign into (with sufficient permissions if applicable)

# The following is a guide explaining each function the program offers.

This program connects to a library database and allows users to access and update certain information. They can view books, members, currently borrowed books, check late fees, pay late fees, return/renew/checkout books. **All input is validated to make sure that it is within the provided options.**

When the program starts, it will ask for a valid username and password for the local MySQL database. If you have certain users set up on your database, you should be able to sign into them. If the database user does not have enough permissions to use certain options, the program should simply return to the menu.

1. Display list of all books
  - a. This prints out a list of every book in the library.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit
> 1
-----
Title: Alice in Wonderland
-----
ISBN:          979-8749522310
Genre:         Children's
Date Published: 2021-05-06
Publisher:     Independently published
Edition:       1
Description:   This edition of the book includes original illustrations.
-----
Title: Compilers: Principles, Techniques, and Tools
-----
ISBN:          978-0321486813
Genre:         Textbook
Date Published: 2006-08-31
Publisher:     Addison Wesley
Edition:       2
Description:   On software engineering, programming languages, and computer architecture.
```

2. Get author(s) of book
  - a. This will prompt the user for either a title or ISBN and print a list of books whose title or ISBN match the closest. (This flexibility prevents the user from having to type in title or ISBN perfectly.)

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit
> 2
Please enter title or ISBN of book: database
-----
Title: Database Systems: A Practical Approach to Design, Implementation, and Management
-----
Author: Thomas M. Connolly
Author: Carolyn E. Begg
```

### 3. Display list of all book copies

- a. This will display a list of every copy of every book the library owns. For books with multiple copies, the title will only be printed once, and will be followed by a list of the copy IDs (barcodes). (See the “Database Systems” entry here for an example of this abbreviation.)

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 3

-----
Title: Alice in Wonderland
-----
ISBN:      979-8749522310
Copy ID(s): 1111
-----

Title: Compilers: Principles, Techniques, and Tools
-----
ISBN:      978-0321486813
Copy ID(s): 1115
-----

Title: Database Systems: A Practical Approach to Design, Implementation, and Management
-----
ISBN:      978-0132943260
Copy ID(s): 1101, 1102, 1103, 1104
-----
```

### 4. Display list of all library members

- a. This will print out a formatted list of every library member sorted by last name. It first prints out the last names followed by the first and middle name followed by the member’s card number.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 4
Members by last name:

Last name:      First name:      Middle name:      Card ID:
Bailey          Evan             David             333
Bailey          Keith            Logan             334
Brown           Ben              Leo               331
Green           Anna             N/A              330
Smith           Paul             N/A              332
```

## 5. Display list of currently borrowed books

- a. This option will allow you to view the books checked out by a selected member OR by all members.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 5
Please select a member to view their checked out books:
1. Bailey, Evan David
2. Brown, Ben Leo
3. Green, Anna
4. Smith, Paul
5. All members

Please enter a number:
> 1
This member has borrowed these books:
-----
Title: The Body Keeps the Score
-----
ISBN:          978-0143127741
Barcode:       1113
Date borrowed: 2022-08-01 11:31:24
Borrower:      Evan David Bailey
Number of renewals: 2
```

## 6. Return a book

- a. This option allows you to select a member for whom to return a book (it will only print out a list of members who are currently borrowing a book). Then it shows you the list of books that the selected member is currently borrowing. You can then enter the barcode of the book you wish to return.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 6
Please select a member for whom to return a book:
1. Bailey, Evan David
2. Brown, Ben Leo
3. Green, Anna
4. Smith, Paul

Please enter a number:
> 3
This member has borrowed these books:
-----
Title: Alice in Wonderland
-----
ISBN:          979-8749522310
Copy ID(s):    1111
-----
Title: Discrete Mathematics
-----
ISBN:          978-1-57766-730-8
Copy ID(s):    1100
-----

Please enter the Copy ID of the book you would like to return (or type "exit" to go back):
> 1100
Success!
```

## 7. Check out a book

- a. This option allows you to select a member for whom to check out a book.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 7
Please select the member checking out a book:
1. Bailey, Evan David
2. Bailey, Keith Logan
3. Brown, Ben Leo
4. Green, Anna
5. Smith, Paul

Please enter a number:
> 4

-----
Title: Alice in Wonderland
-----
ISBN:      979-8749522310
Copy ID(s): 1111
-----
Title: Compilers: Principles, Techniques, and Tools
```

...

```
-----
Title: Oregon Archaeology
-----
ISBN:      978-0870716065
Copy ID(s): 1109, 1110
-----
Title: The Body Keeps the Score
-----
ISBN:      978-0143127741
Copy ID(s): 1113
-----
Please enter the Copy ID of the book you would like to check out (or type "exit" to go back):
> 1100
Success!
```

## 8. Renew a book

- a. This will allow a selected user to check out one their currently borrowed book up to two times.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 8
Please select a member for whom to renew a book:
1. Bailey, Evan David
2. Brown, Ben Leo
3. Green, Anna
4. Smith, Paul

Please enter a number:
> 3
This member has borrowed these books:

-----
Title: Alice in Wonderland
-----
ISBN:      979-8749522310
Copy ID(s): 1111
-----

Please enter the Copy ID of the book you would like to renew (or type "exit" to go back):
> 1111
Successfully renewed!
```

## 9. Get money owed by member

- This allows you to view the amount of money owed by a selected member for late fees. The amount owed includes books not yet returned.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 9
Please select a member to get their balance owed:
1. Bailey, Evan David
2. Bailey, Keith Logan
3. Brown, Ben Leo
4. Green, Anna
5. Smith, Paul

Please enter a number:
> 1
Evan David Bailey owes the library $14.50.
(Includes fees for late books not yet returned)
```

## 10. Get money owed by member per book

- This option allows you to display a list of each book a selected member has a late fee for.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 10
Please select a member to get their fee information:
1. Bailey, Evan David
2. Bailey, Keith Logan
3. Brown, Ben Leo
4. Green, Anna
5. Smith, Paul

Please enter a number:
> 3
The selected member owes the library for the following books:

Record number: 1
-----
Title: Little Women
-----
ISBN:          978-1950435098
Copy ID:       1105
Date Borrowed: 2022-06-15 12:07:13
Date Returned: 2022-08-25 18:30:30
Renewals:      0
Fee:           $14.25

Record number: 2
-----
Title: Little Women
-----
ISBN:          978-1950435098
Copy ID:       1105
Date Borrowed: 2022-09-03 17:56:00
Date Returned: Not returned
Renewals:      0
Fee:           $13.25
```



## 11. Make payment on late fee

- a. This allows a selected member to register a payment for a late fee. Late fees can only be paid on books that have already been returned.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 11
Please select a member to get their fee information:
1. Bailey, Evan David
2. Bailey, Keith Logan
3. Brown, Ben Leo
4. Green, Anna
5. Smith, Paul

Please enter a number:
> 3
The selected member owes the library for the following books:

Record number: 1
-----
Title: Little Women
-----
ISBN:          978-1950435098
Copy ID:       1105
Date Borrowed: 2022-06-15 12:07:13
Date Returned: 2022-08-25 18:30:30
Renewals:      0
Fee:           $14.25

Please select record number to make a payment for (or type "exit" to go back) (You can only make payments for returned books):
Please enter a number:
> 1
Fee successfully paid!
```

## 12. Quit

- a. This closes the connection with the database and ends the program.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Quit

> 12

Thank you for using the library database system. Goodbye!
```

# UPDATE

A new option has been added to logout of the database in case the user wants to sign into a different database user.

Option 12 has been replaced with "Logout," and the "Quit" option is now option 13.

```
Please select an option:
1. Display list of all books
2. Get author(s) of book
3. Display list of all book copies
4. Display list of all library members
5. Display list of currently borrowed books
6. Return a book
7. Check out a book
8. Renew a book
9. Get money owed by member
10. Get money owed by member per book
11. Make payment on late fee
12. Logout
13. Quit

> 12
Logged out successfully!

Please login to the library database.
Username:
```