CS631 Fall 2016
Library Management System

Himalaya Patel
Aashka Pala
Jeremy Hochheiser

Goal:

To design and implement a management system application for libraries using a relational DBMS that is controlled by SQL queries. The system will eliminate the paper work by staff to maximize efficiency and eliminate human errors.

The system will have a login page where different types of users can enter their credentials to access the system. This application will allow readers to reserve and borrow documents from the library. This eliminates the process of having to manually search for a document. Documents can be reserved online and then checked out at the library branch that the document was reserved at. The employees and administrator control check in and check out actions in the system as well as add and remove documents and users.

Description of Database Schema and Application Programs:

Technologies used were MySQL Server in which the database was created. Tables are created based on the EER Diagram from the previous phases of the project and the data was populated manually. The only change made was adding a table, Borrowed_History which keeps track of previously borrowed documents and calculates fines.

MySQL syntax was tested independently before implementation into the Java code where variables were introduced. The Java JDBC driver helped to establish connection to the MySQL database. With the connection is established, SQL functions were able to be implemented along with variables. This allowed for a dynamic interactivity based on what the Reader and/or Admin is doing. Some MySQL statements were inserted directly into the executeSQL function, while others were in the form of Prepared Statements.

All team members placed an equal effort in the creation and generation of Database Schema, Tables, Relationships, Triggers, Population, SQL Queries,SQL Updates, and one team member was responsible for the integration and implementation of the SQL into the Java code.

User Guide

The user guide contains information on how the system works from the readers' and staff members' perspective.

Logging in

To log into the application, go to the website https://jeremyhoc.com/citylib/Login. There are two options to log in. The first is the Reader Login Card Number, for which the Reader will input the card number issued by a staff member during registration. The second is an administrative login which staff members will use to login. If the user enters invalid credentials, the website is directed back to the log in screen and an error message appears.

Adding a User

In order for someone to use the system, they must register first. Only an administrator can add a user. Upon logging in, click on the "readers" tab on the top right and click on "Add". A form will be displayed in which a new user can be added. The new user cannot be added if any of the required fields are not filled in. If this happens, the administrator be returned to the new user registration page and will be provided error messages to correct information. The administrator can add additional staff members.

How to Search for a Document

After a reader logs into the system, they can search for documents by clicking on top right button "Documents" and under that "Search." The following are methods of search:

- All books, journals, and conference proceedings are filtered automatically in the search bar by "Document ID", "Title", or the "Publisher".
- Documents can be arranged in chronological order by selecting a column such as title.
- Reader can select 10, 25, 50, or 100 entries to see on one page.

For added convenience, the reader can reserve, cancel the reservation, checkout, or return a document under the action column.

How to Reserve a Document

When a reader logs into the system, they can reserve documents by clicking on the top right button "Documents" and under that "Search." After searching for the document, the reader is given the status of the document under the actions column. The reader can reserve the document if it is available, and if the reader has 10 documents reserved or checked out, a message will tell the reader to return documents or cancel reservations before reserving or checking out another document. If the reader does not pick up the document by 6pm the same day, the reservation is canceled. The reader can view the status of their reserved documents by clicking on the top right button "Documents" and under that, "On Reserve."

How to Cancel a Reserved Document

Once a reader logs into the system, they can cancel their reserved documents by clicking on the top right button "Documents" and under that, "On Reserve." The reader can cancel the reservation here.

How to Checkout a Document

After a reader logs into the system, they can checkout documents by clicking on the top right button "Documents" and under that "Search." After searching for the document, the reader can check the document out. Once the document is checked out, a return date is assigned.

How to Return a Document

Once a reader logs into the system, they can return their documents by clicking on the top right button "Documents" and under that, "Checked Out." The reader can return documents here.

How to Check Due Date and Fine of Document

Subsequently a reader logs into the system, they can return their documents by clicking on the top right button "Documents" and under that, "Checked Out." The reader can see the due date, number of days late, and fine amount here.

How to Renew a Document

To renew a document, the reader must return and then checkout the document again.

Administrator Functions:

Search Copies of Documents

After the administrator logs into the system, they can search for copies available by clicking on the top right button "Documents" and under that "Search." Upon clicking search, you can see the status and additional information about the document.

Add Documents

Once the administrator logs into the system, they can add documents by clicking on the top right button "Documents" and under that "Add." A form will be displayed in which a new document can be added. The new document cannot be added if any of the required fields are not filled in. If this happens, the administrator be returned to the new document page and will be provided error messages to correct information.

Search Readers

When the administrator logs into the system, they can search readers by clicking on the top right button "Readers" and under that "Search." The reader information is provided.

View Branch Information

Once the administrator logs into the system, they can view branch name and location by clicking on the top right button “Branch.” The Branch information is provided.

View Top 10 Most Frequent Borrowers In A Branch And The Number Of Documents Each Has Borrowed

After the administrator logs into the system, they can view this information by clicking on the top right button “Branch”. In the statistics column, this information can be viewed by selecting top docs/readers.

Top 10 Most Borrowed Documents In A Branch

Once the administrator logs into the system, they can view this information by clicking on the top right button “Branch”. In the statistics column, this information can be viewed by selecting top docs/readers.

Top 10 Most Popular Documents of the Year

After the administrator logs into the system, they can view this information in their dashboard.

Problems Encountered and Solutions

- It was very difficult to populate the tables with relevant sample data in order to sufficiently perform and illustrate all required tasks.
- Computing Fines took up a lot of time as we had to use a lot of trial and error queries before getting desired results. We made a new table Borrow_History in order to keep track of old borrowed documents and compute average fine per reader according to it.
- The constraint that specifies that every reserved document will be cancelled if not picked up by 6PM was hard to implement. We used Scheduled Events on MySQL and took care of it.