Design Document

Library Management System

Abstract

The Library Management System provides functionality to search for books that are available from the library, and check books in and out.

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1 Introduction

1.1 System Description

The Library Management System eases book and customer management for Librarians, and to creates a convenient application to better manage the books within their library. The system also allows customers of the library to search for books available from the library and to search Google Books to request that books be added to the library.

1.2 References

System Requirements Document is a separate document.

UML Class Diagram is contained in a separate document.

1.3 Dependence, Assumptions, Risks & Constraints

- Assume, by default, the user speaks English.
- Assume the user understands basic internet navigation skills.

2 Architecture

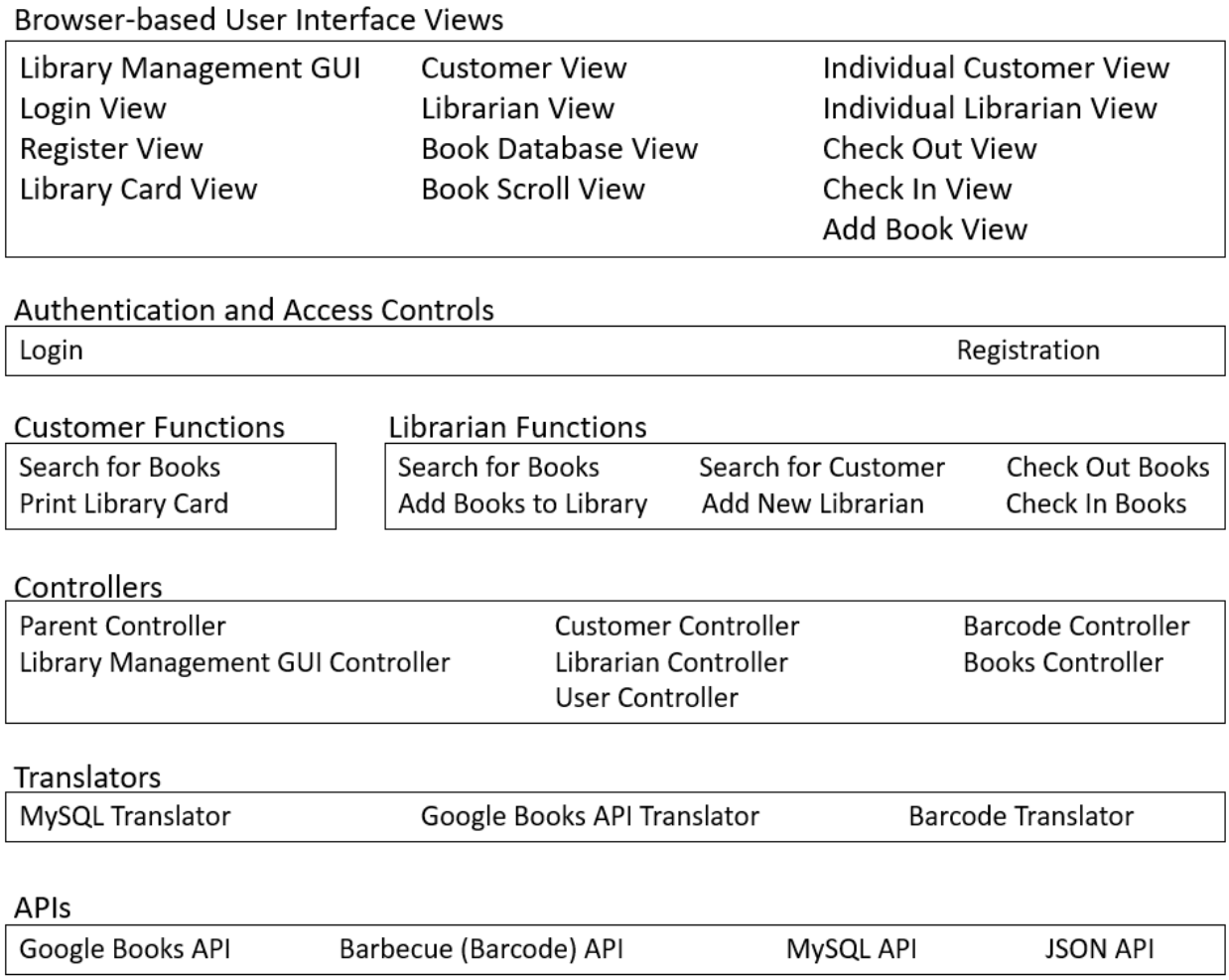
The Library Management System will be built using Java, MySQL database, Google Books API, Barcode API, and JSON API.

2.1 Architecture Diagram

Below is the architecture diagram for the Library Management System. The layers make the system easier to maintain because any changes to a layer does not impact other layers.

- User Interface Layer is the web browser that the users choose to use
- Authentication and Access Control Layer manages access to the system and the system functionality based on user type of Customer or Librarian
- Customer Functionality and Librarian Functionality Layer provides the functions that are available to users by type
- Controller Layer provides interface between the user functionality and the Translators
- Translators Layer provides access to APIs
- APIs provide access to system interfaces

Figure 1. System Architecture



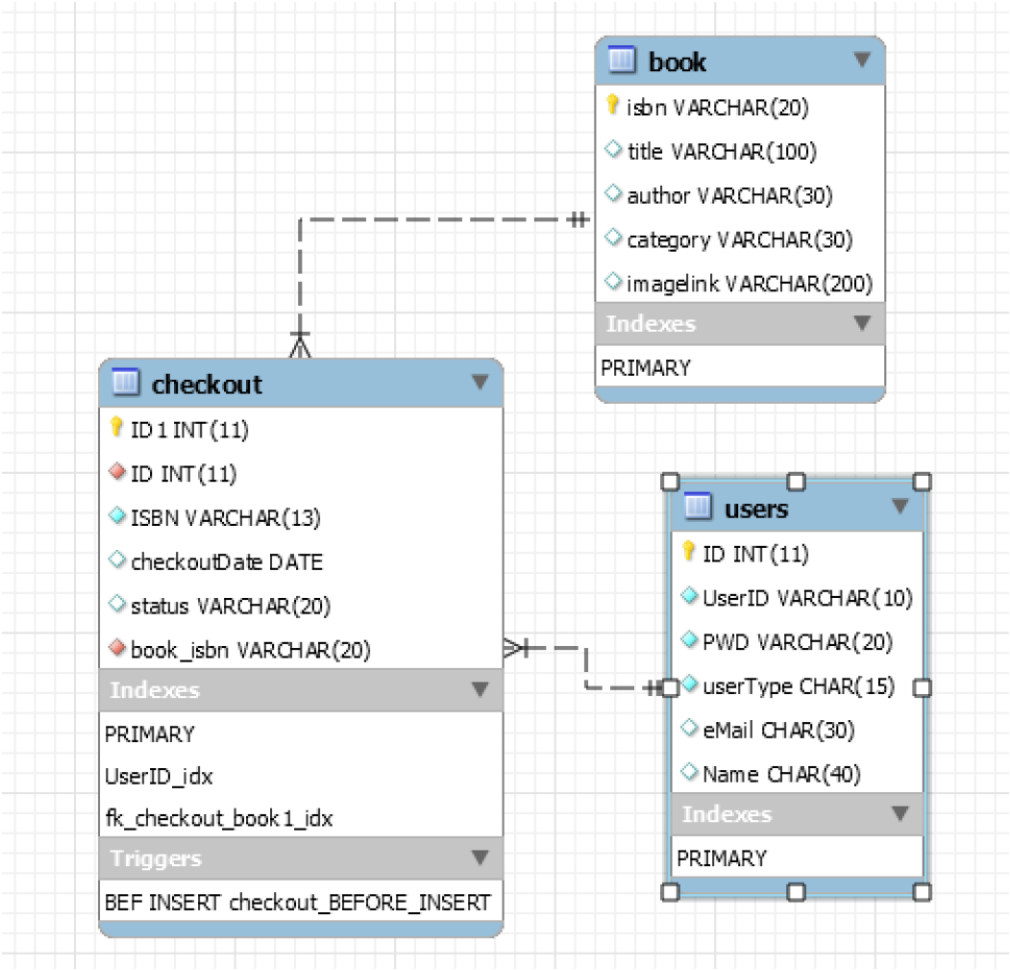
2.2 Programming Language

The Library Management System will be developed using Java.

2.3 Database

MySQL will be used to maintain the library data. It maintains information about users of the library (customers and librarians), the books in the library, and the books that customers have requested or checked out. A diagram of the MySQL database is provided below.

Figure 2. Database Diagram



2.4 API

2.4.1 Google Books API

The Google Books API provides the ability to search a large list of available books that Google has catalogued. It is used by the Library Management System to obtain information about a book that is being added to the library. The librarian scans the book's barcode, and the Google API returns the book's title, author, category, and a link to an image of the book. This information is available when users search the library database.

2.4.2 JSON API

The JSON API is used to parse the results from the Google API Search to extract fields of interest.

2.4.3 Barbecue (Barcode)

The Barbecue API is used to read, decode, encode and display barcodes. When books are added to the library, the book's ISBN barcode is scanned and the book's information is pulled from Google Books to add information about the book to the library database.

Barcodes are also used when books are check in or out of the library. The customer's library card has a barcode unique to the customer. When a book is check out, the customer's library card is scanned and then the books that the customer is checking out are scanned. This information is used to record the customer's check out books in the database. When a book is returned, the books barcode is scanned and the book is removed from the customer's list of checkout books in the database.

2.4.4 MySQL API

The MySQL API is used to access the library database.

2.5 Infrastructure

The Library Management System can be deployed to any system that support a Java Runtime environment. It is hosted on GitHub.

3 Detailed Software Design

3.1 UML Diagram

The UML diagram is in a separate file due to size. The UML diagram depicts the components of the system.

4 Appendix

4.1 Supporting Documents

- System Requirements Document
- UML Diagram

4.2 Revision History

Version #	Date of Change	Summary of Change	Author
0.1	3/2/2019	Initial Draft	Charles Brady
1.0	4/27	Updated database due to design change to add a status of a book check versus deleting the checkout.	Charles Brady