Design Document

CSCE 361 - Fall 2017

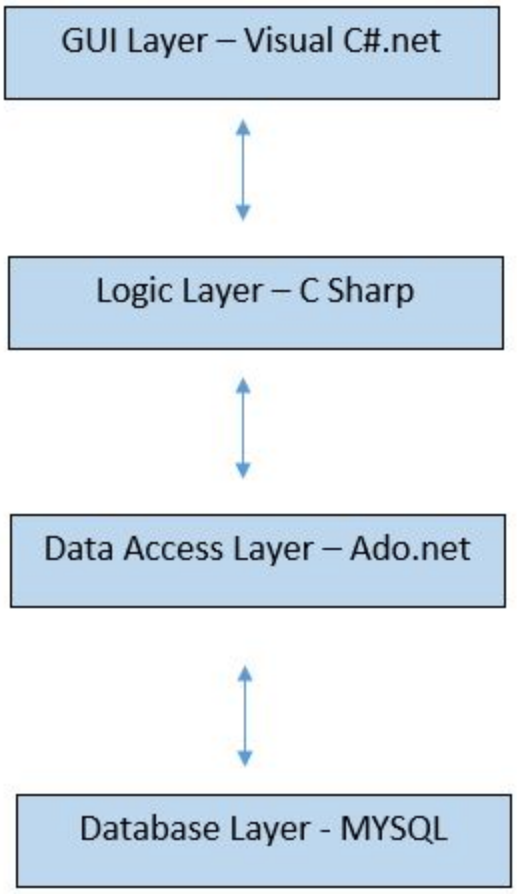
Library System

1. Introduction

The purpose of this design is to demonstrate the high level architecture and entity relations, for the Library System. This document will include entity relation diagrams and architecture presenting the relationship between different parts of the system, as well as the relationships between tables in the database. The audiences of this document are software engineers and system architects who will implement and maintain the described project.

2. Architecture

2.1 Introduction



A layered model will be the high level architectural design of the system. MYSQL database will be the lowest level of this model which stores important information. The data from the database can be accessed and written through the access layer. The data will then be converted into a

form which can be easily manipulated. The logic layer, which is written in C#, will provide the required functions. Finally, users will be able to interact with the system with the GUI interface which is also the top layer.

2.2 Modules

2.2.1 Database layer

All important data for the system are held by the database layer. It also shows the relationships between this data. As MYSQL database is easily integrated into the project through Visual Studio, the system will be using MYSQL. The data relationships are described in a more detailed manner in section 2.2.

2.2.2 Data Access Layer

Every access to and from the database will have to go through this layer. It is responsible for storing and selecting data to and from the database layer. This layer also converts database data into C# objects that can be manipulated by the Logic and GUI layer. There will be a lot of querying involved for querying tables in the database to access the required data and storing data into C# objects.

2.2.3 Logic Layer

All required C# objects will be handled by this layer. It will provide all the necessary information to the GUI layer such as a book's information. The logic layer will also communicate with the Data Access Layer if there are changes in data made by the GUI Layer so that these data are updated.

2.2.4 GUI Layer

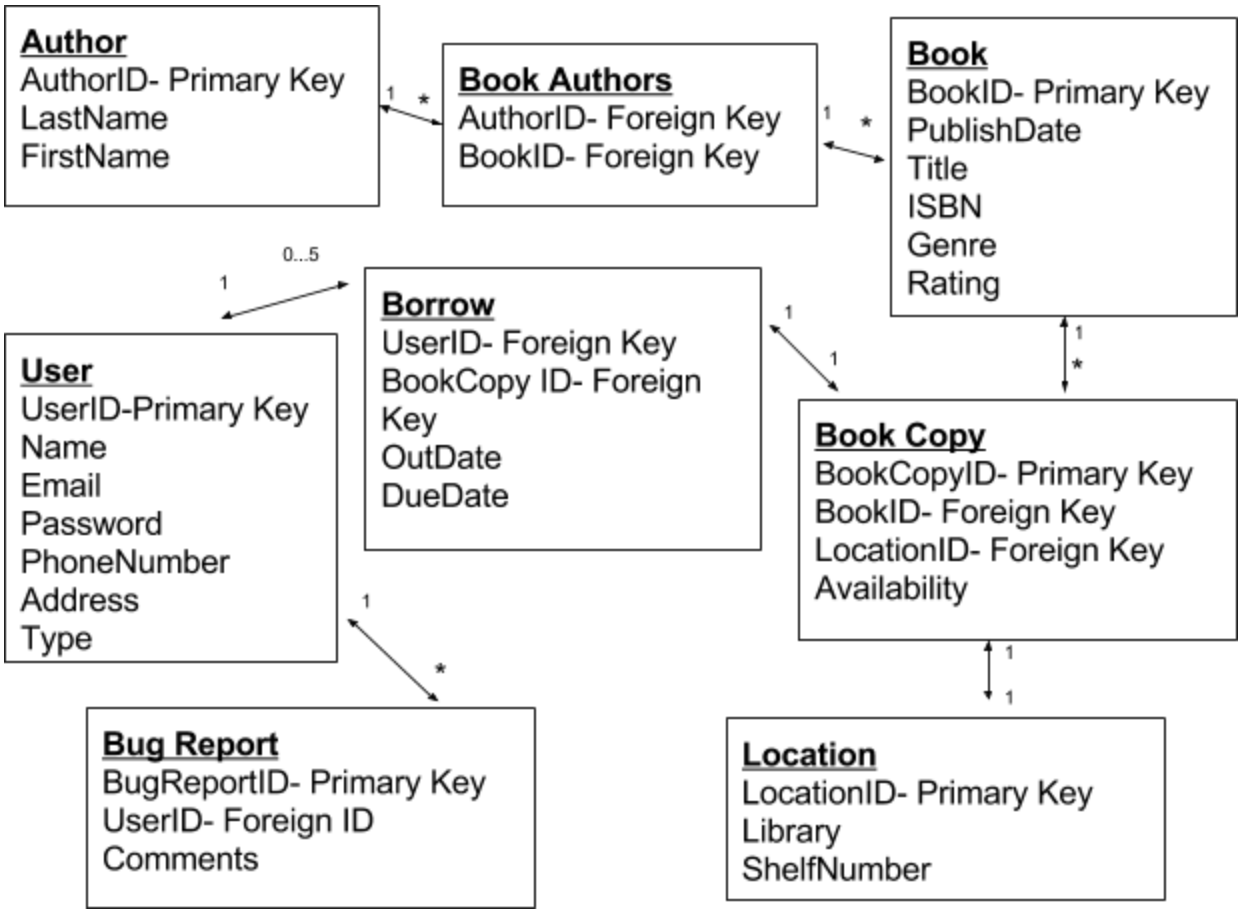
Layer which allows user to interact with the system. Here, it allows user to be able to login to the system and access the library functions specified for specific users only. Normal users are able to check book availability, borrowing books, etc; Admin users are able to update, add, and delete books.

3. Class Diagrams

3.1 Data table classes

All necessary data will be held by the system using MYSQL database. This includes information on users and books and the relationship between them. The figure below shows each table that will be in the database with its respective columns as well as the relationship between the different tables.

3.1.1 Schema



3.1.2 Schema Information

The data in the database shall be organized in the following tables and columns

Author: Holds the data for an author, such as first and last name.

Book Author: This table represents the relationship between the Author section and the Book section. Each record will have author(s) to a single book.

Book: This table will represent the different books that are available. Each book will have a publish date, title, ISBN, genre, and rating.

Book Copy: Holds the data for a specific copy of a book as well as its availability status.

User: Holds the data for a single user of the system including information such as their first name, last name, password, phone number, and address

Borrow: This table represents the relationship between users and book copy. Each record will have book copy(s) to a single user

Bug Report: This holds the errors which have been reported.

Location: This table holds the data of where a copy of a book is located including the library in which it is at and the shelf it is on.

3.2 Class Information

Classes will be implemented in C# and used throughout the application. These classes will replicate the database schema above with each table corresponding to a different C# class. For example a Book class will be implemented with variables such as PublishDate, Title, ISBN, Genre, and Rating.

3.3 GUI Layer

The GUI layer of the system consists of the login page, registration page, the search page, the borrow page, and the bug report page.. The user will first be directed to the login page and will be asked to input their email and password to log in. If correct information is entered, the user is logged in. If not they will be told something was incorrect and to try again or to make an account.

The registration page will appear if the user choses to make an account in the login page. After the registration page appears, it will ask for five inputs, a name, an email, a password, a phone number, and an address. The password must be entered in two fields and be the same in both to be confirmed

The search page will start with all the other parts of the page besides the search bar blank. Once a title, author, genre, or ISBN is searched, a list of books will appear below the search bar. Once a book is chosen, an area to the right of the list will display information about the book.

The borrow page will be available when a copy of a book is selected and the borrow option is selected. It will first check to see if the selected copy of the book is available. If it is it will then check out the book by using your email and create a return by date. Finally it will change the status of the availability of the book.

The Bug report function will be available so that users will be able to send a message and bring into attention any possible bugs that are in the system.