# Library Management System Overview

## Part 1:

For the Data Model, along with the Book, Author, and Borrower entity I wanted to include more entities to cover the standard use cases for a library. Following are the entities that I added with brief information about them.

- Genre Entity: It has one to many relationships with the book. Library has books mostly divided into Genres, so creating a Genre entity helps us with reducing redundancy, consistency, maintenance.
- BookAuthor Entity: Book and Author have one to many relationships with BookAuthor. Book and Author have many to many relationships, so having a link table like BookAuthor helps manage the relationship. One of the benefits of this is database normalization.
- Copies: Copies has One to many relationships with Holds and many to one relationship with Books. It represents the individual copies of each book. Each copy has a unique ID, a reference to the book it belongs to, and a status (e.g., available, borrowed).
- Borrow: Copies and Borrower have one to many relationships with Borrow. It represents the borrowing transactions. Each borrow record has a unique ID, references to the borrower and the copy borrowed, and dates for when the book was borrowed, returned, and is due.
- Hold: Borrower and Copies have one to many relationships with Hold. It represents holds placed by borrowers on copies. Each hold record has a unique ID, references to the borrower and the copy, and the date the hold was placed.
- Waitlist: Book and Borrower have one to many relationships with Waitlist. It represents the waitlist for books. Each waitlist record has a unique ID, references to the borrower and the book, and the date the request was made.

## Part 2:

- For the relational schema, I used if exist clause to make sure the code is reuseable without errors.

## Part 3:

- In the stored procedure, I have accounted for different cases.
  1. If the genre is new genre, insert it to the Genre entity
  2. If the book already exists, update the copyCount in Book entity and insert the record in the Copies table.
  3. If book does not exist, insert the new book in the Book entity, Copy entity. AuthorBook entity will need to be populated accordingly.

## Part 4:

- Here I have given various ways I have worked on improving the performances.