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Overview

For this project, our team used Django with Python and a MySQL database to create a library management system.

Architecture

Our system architecture uses six models to store the data needed for the Library Management System. The first model is the Book model, its entries consist of an Isbn used as a primary key, and a Title. Next, is the Authors model whose entries have a primary key Author_id and a Name variable. The Book_Authors model connects Authors and Book by matching Author_ids to Isbns with foreign keys pointing to their respective models. The next model is the Borrower model. The borrower model is used to store the borrower's Card ID as a primary key, the borrower's SSN, Name, Address, and Phone Number. The SSN and Phone number are given validators to ensure they are entered in the correct format. The Book_Loans model stores information about a specific book loan that is out or that was out in the past. It includes a Loan_id that is automatically generated and unique. It is the primary key. Book_Loans also connects a borrower with the book they borrowed through foreign keys for a book Isbn and a borrower's Card ID. The Book_Loans model also contains Date_in, Due_Date and Date_out variables where Due_Date and Date_out default to the current date and the current date plus two weeks respectively. The final model we used is the Fines model. This model keeps track of the status of fines that have been paid or need to be paid for loans. This model uses a foreign key to the Loan ID of loans in the Book_Loans model and a boolean value, Paid, as well as a Fine_amt variable to keep track of what is owed. The Fine_amt variable is automatically calculated based on the associated dates in the Book_Loan model.

This is all easily accessed through the GUI that we made with Django templates and our backend which was made with Python and Django.

Assumptions

There were several points in our design where we had to make assumptions that would influence our design decisions about features that were not outlined in the project requirements. These assumptions include the following:

- It is unlikely for multiple borrowers to have the same phone number in the real world when registering for a library card/account, Card ID is generated based on the user's phone number.

- Since ISBN was given as the primary key for the book model in the schema of the project requirements, there will only ever be one copy of a unique book in the library at a time since the ISBNs have to be unique to be primary keys.

Design Decisions

During the development of this project, there were a number of design decisions that we had to decide on in making the Library System user friendly and functional. These decisions include:

- All Card IDs are based on the borrower's phone number to make it easier for the borrower to remember in the case of a Card ID being lost.
- Book Check in can be done when viewing a loan through a borrower search or a loan search, or check in can be done through its own page given a isbn and card id for ease of access.
- A menu bar is located at the top of every page in the system to allow fast and easy navigation to each page of the system.
- While the homepage has the menu bar that every other page has, it also has the same menu bar options in a list with descriptions of what each option is for and what you can do with them. This further increases the usability of our system so a user does not have to always reference the quick start guide when needing to know what a specific menu bar option is for.
- The Borrower and Book deletes are located within their respective pages that are shown when the searches are used. This allows a user to quickly look up a book or borrower and see all information about that book or borrower and then delete from the database