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LIBRARY MANAGEMENT SYSYEM

LMS is a Library Management system for managing books in a multi-floored High School library in Atlanta which is a 24 hour library. The system would enable the users to borrow books from the library. The books are either reserved for reading in the library itself or available for requesting for checkout. The staff of the library handles check-in check-out procedures using the LMS and is responsible for maintaining the correct book status online.
The following sections contain a functional description of the system along with some snapshots. Each section would explain a particular functionality and then present an example screen about it. You don't have to follow the UI designs shown, it is rather encouraged that you come up with your own design. A complete reorganization of the user interface is allowed as long as your application supports all the functionality listed below.

Langauges used :

Frontend : PHP

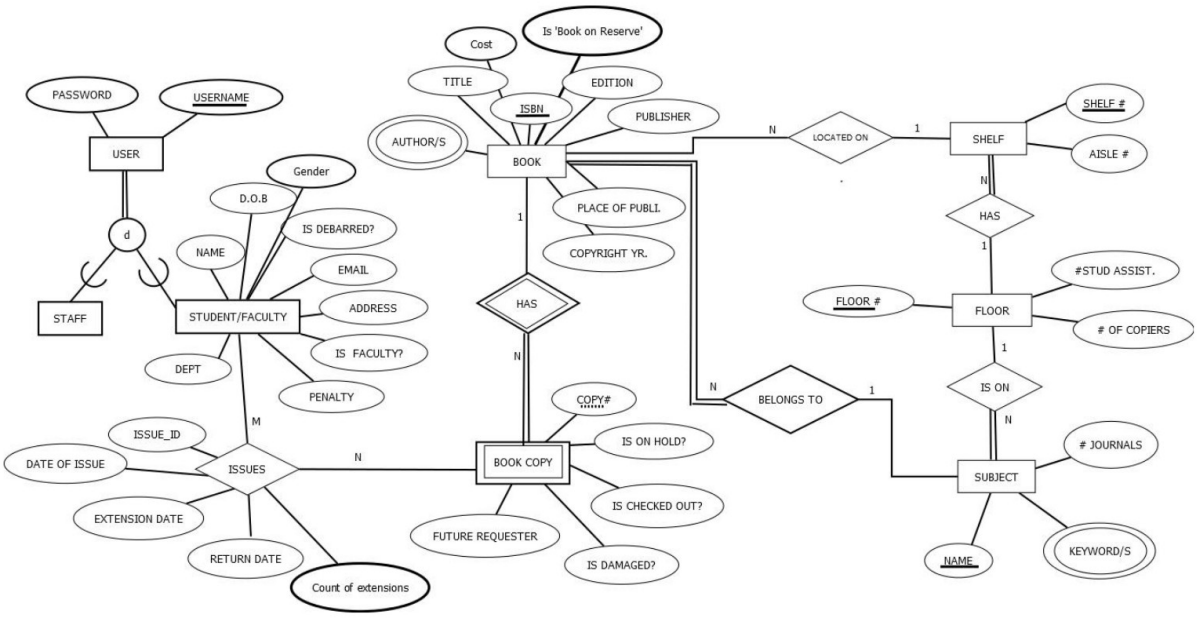
Backend : MYSQL Workbench Server

Software used :

Visual sudio code, Xampp Server

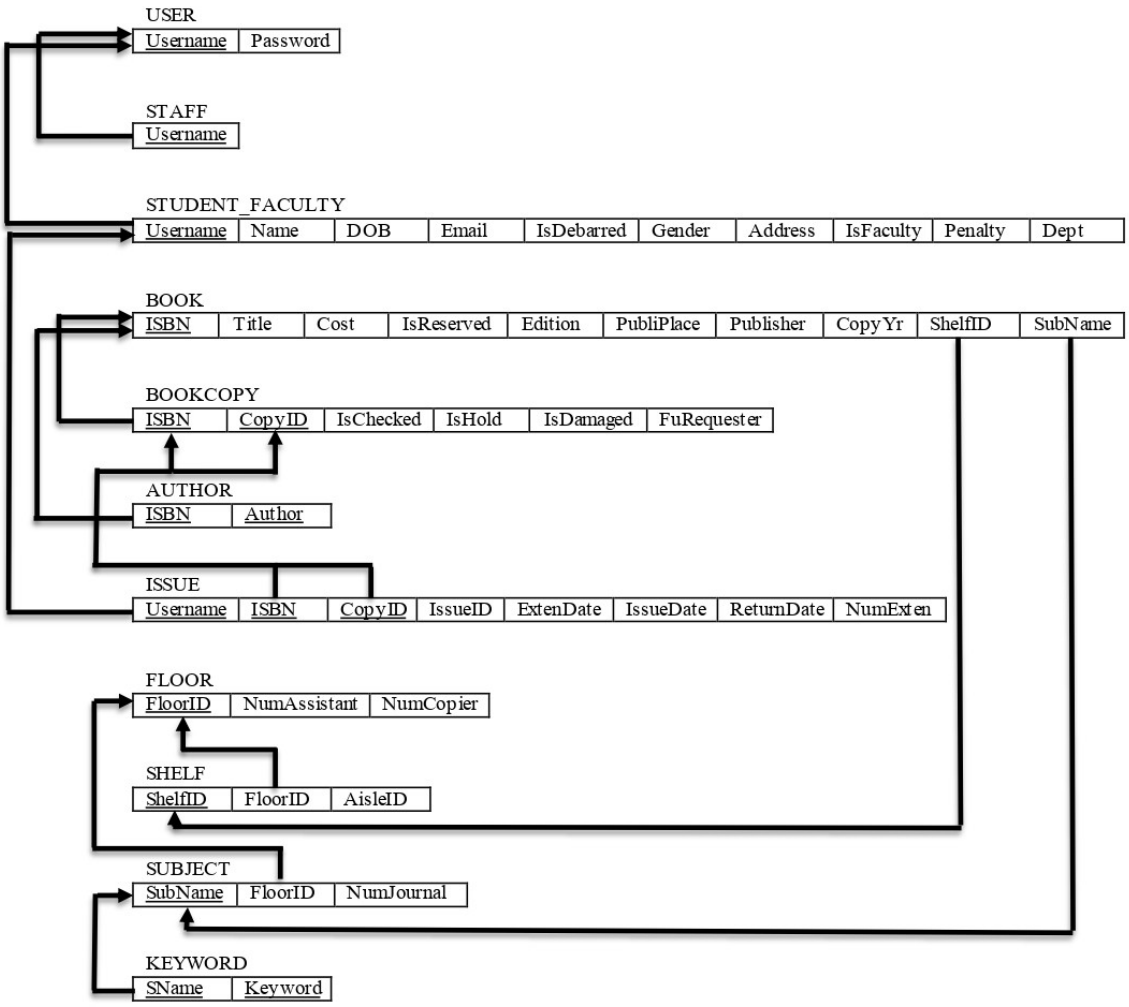
Folder 'library' contains 30 PHP front end code programs and one sql code "library.sql" which contains the database structure of library used.In xampp server login.php file has to be run.

ER DIAGRAM :



Relational schema :

Relational Schema Diagram

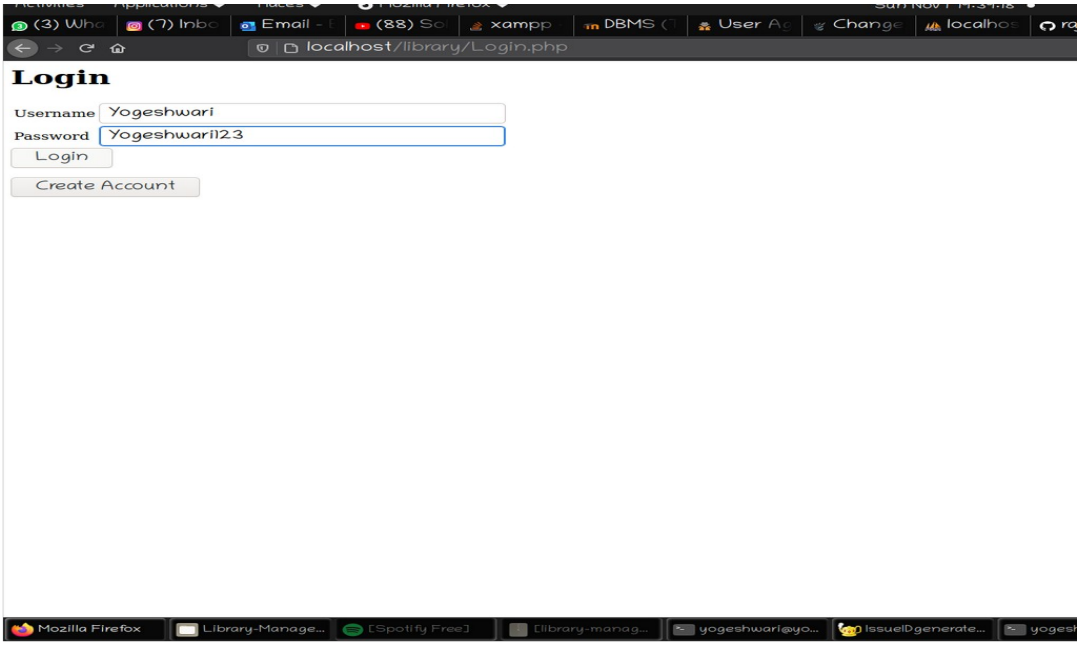


USER (Username, Password)
STAFF (Username)
STUDENT_FACULTY (Username, Name, DOB, Email, IsDebarred, Gender, Address, IsFaculty, Penalty, Dept)
BOOK (ISBN, Title, Cost, IsReserved, Edition, PubliPlace, Publisher, Copy_Yr, ShelfID, SubName)
BOOKCOPY(ISBN, CopyID, IsChecked, IsHold, IsDamaged, FuRequester)
AUTHOR(ISBN, Author)
ISSUE(Username, ISBN, CopyID, IssueID, ExtenDate, IssueDate, ReturnDate, NumExten)
FLOOR(FloorID, NumAssistant, NumCopier)
SHELF(ShelfID, FloorID, AisleID)
SUBJECT(SubName, FloorID, NumJournal)
KEYWORD(SName, Keyword)

Demonstartion of application with snapshots :

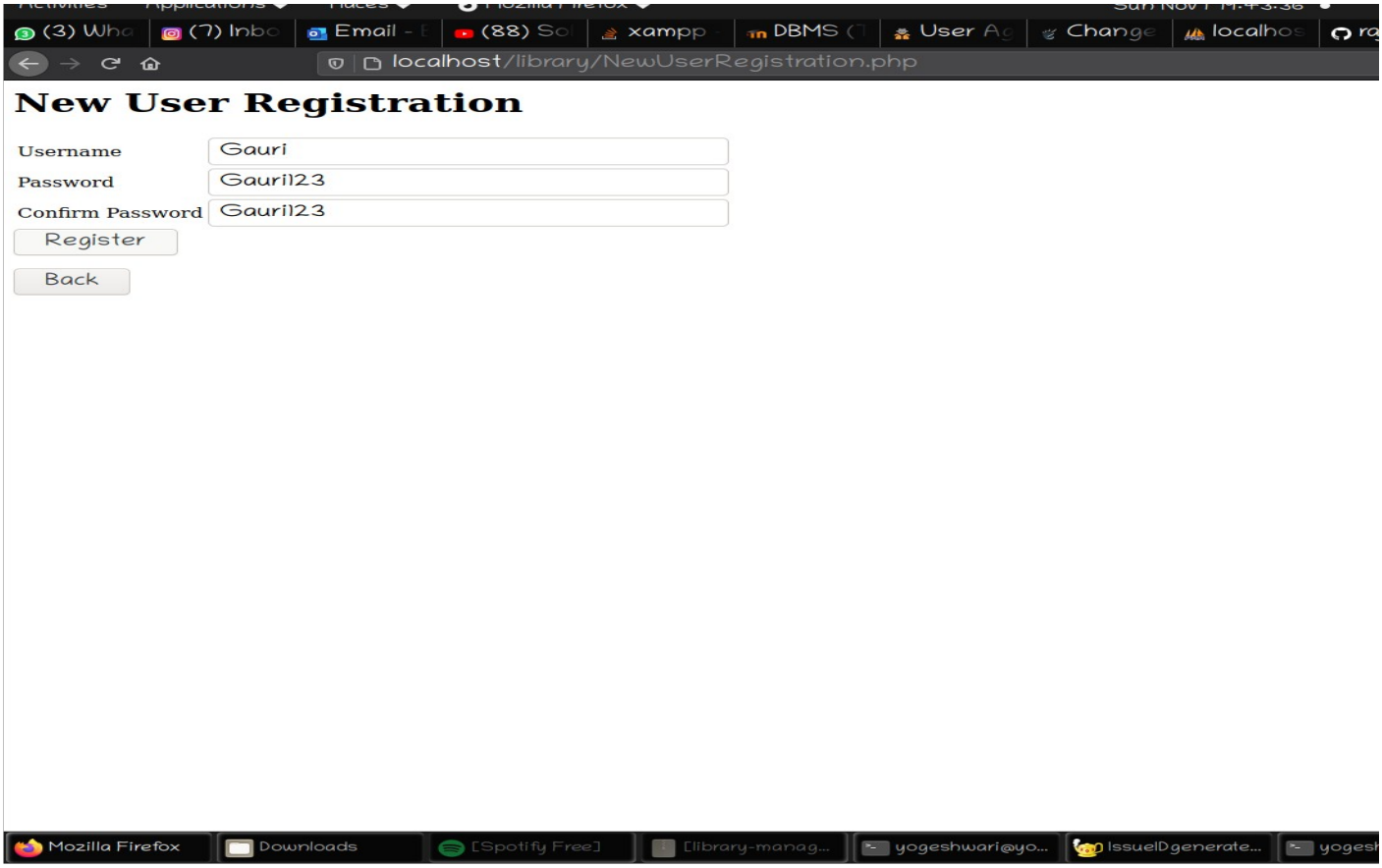
1. Logging In

There are three kinds of users of the system namely ‘students’, ‘faculty’ and ‘staff’ each identified by their Username. A valid Username and Password combination is required to log in to the system and proceed. If the user provides invalid log in credentials, an error message should be displayed and the user should be redirected to the log in screen.



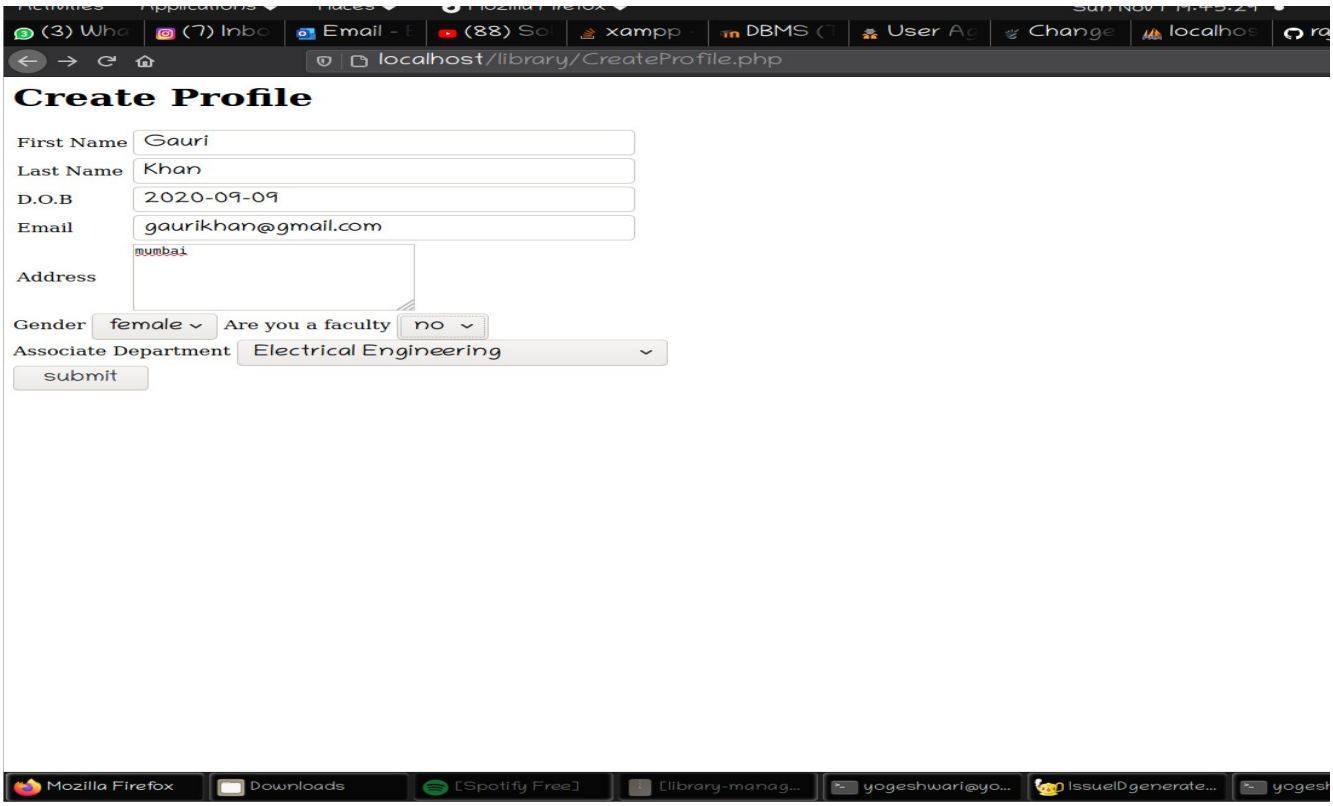
2. New User Registration

A new user needs to register before using the system. The staff personnel already have their credentials created behind the scene. Clicking the ‘Create Account’ link on the login screen displays the new user registration form. After the user clicks Register, the system should verify that all fields are filled in, that the Username has not already been registered, and that the Password and Confirm Password fields are equal. If any of these validations fail, the user should be returned to this screen to make corrections. The user should be provided with meaningful error messages so he (from here onwards we would use ‘he’ to represent the user without any intended bias) knows what to correct.



3. Make Profile

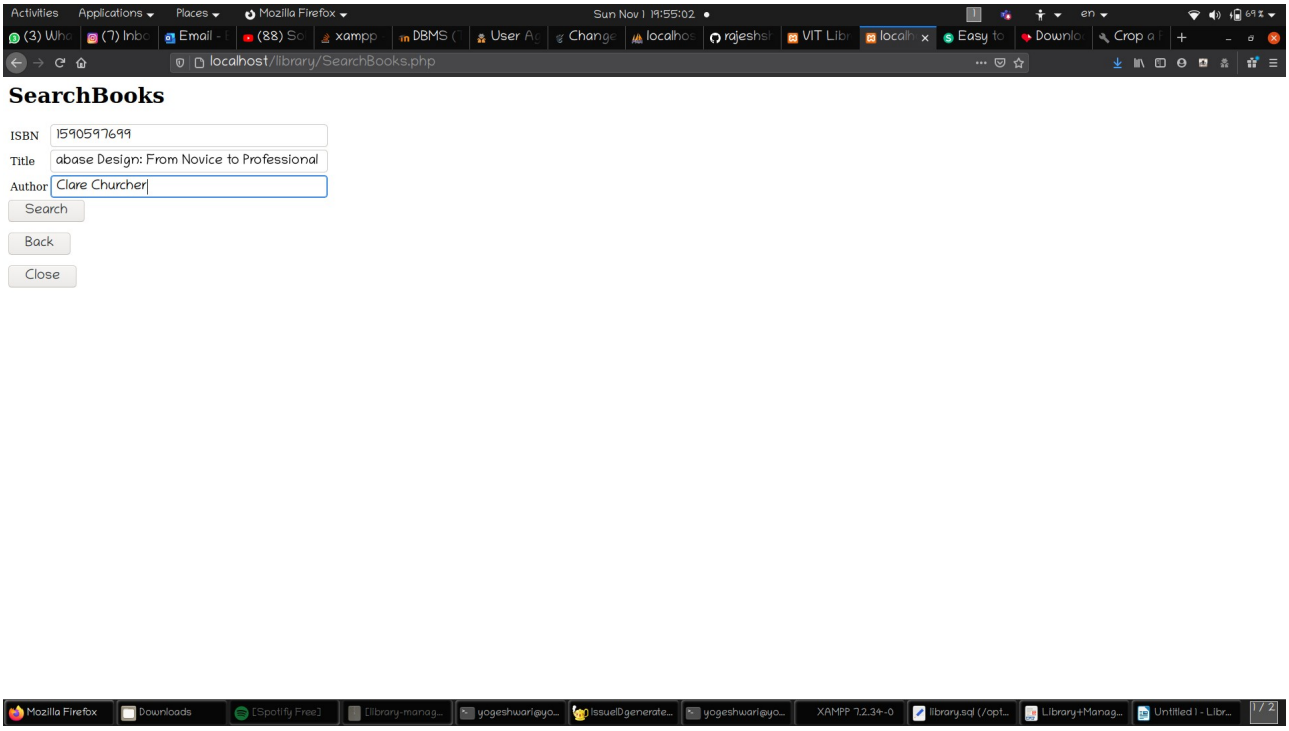
After creating an account the user has to make a profile filling their basic information. There should be a check if the user is a faculty or not and if checked yes then the faculty should be asked for his/her associated department in the university. The department field is not rendered/visible for student users.



4. Search Books

The new user after registration or the existing user after logging in should be taken to the Search Books screen. Here the user could search a book with its ISBN, Title or Author. Only one of these fields must be used to search for a book.

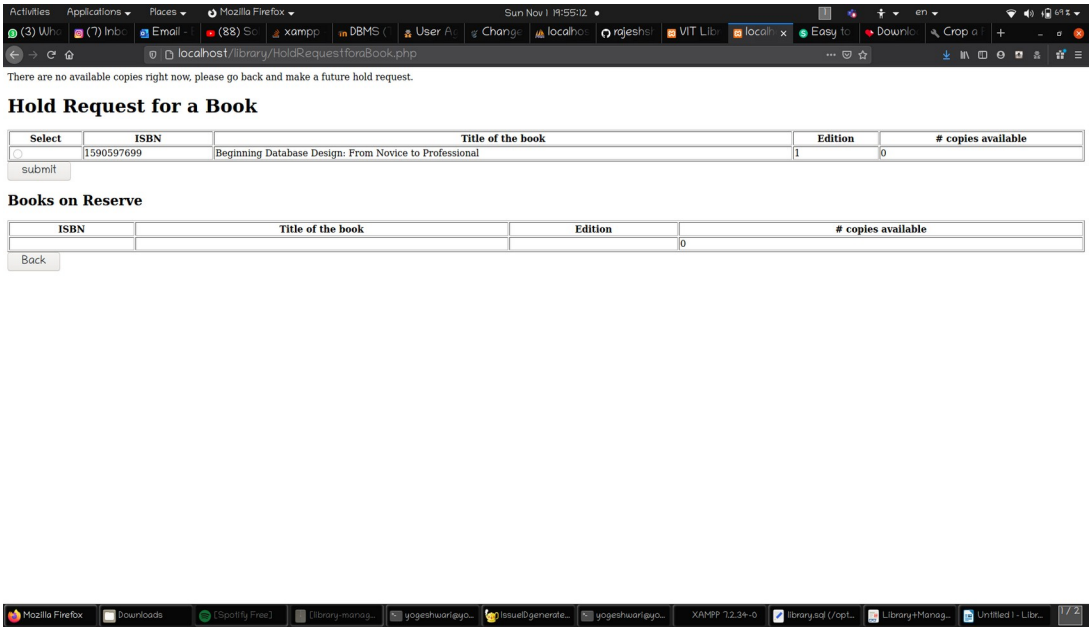
Each book in the system has information about its ISBN, Title, Author/s, Publisher, Place of Publication, Edition, whether it is a book on reserve or not (A reserved book is only available to be read in the library not for checkout), Copyright Year, and cost of the book. Remember, the ISBN is unique for each edition of a particular book. Multiple copies of the same book edition would have the same ISBN. The staff would track the copies of the same book with the copy# for that particular book. This copy# would mainly be for the staff use so that they can track each copy specifically for checking if the copy is damaged or not, and if the copy has been physically checked out of the library or not. (The copy number would be written on each physical book)



5. Request hold on a book

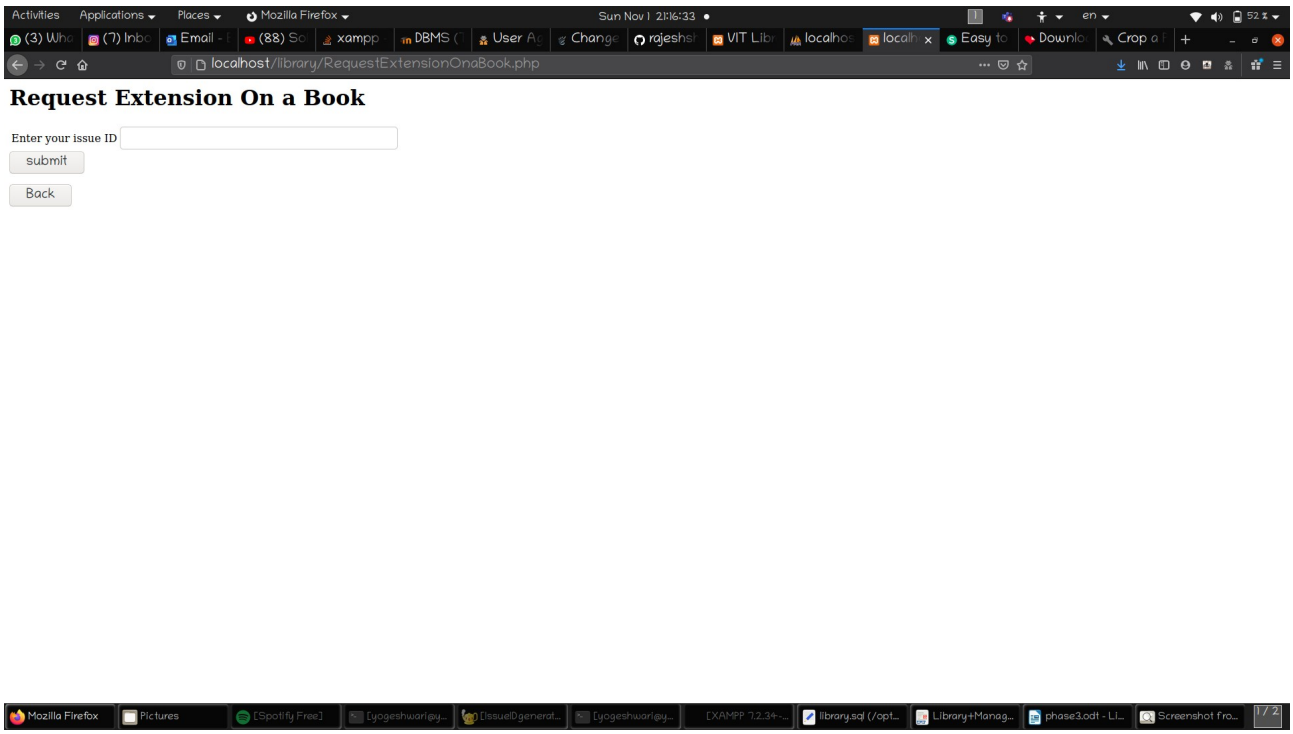
Once the availability of the book is shown, the user, if the book is available for checkout, can request a hold on the book. When a user puts a book on hold, it is valid for three days during which the user must go and check the book out. (The checkout functionality is shown under library staff functionalities). Books on hold are brought to the desk area by the check-out staff for a speedy check-out. After three days the book is put back on the shelf and becomes available to other users if not picked up. In any case, whenthe book is requested for hold, the today's system date would be taken as the hold request date and the system would automatically generate an estimated return date of 17 days later (which includes 3 days on hold and 14 more days for check-out). This is to give the user a buffer of maximum three days to pick his book from the library and a 14 day period to keep the book. When the user physically checks out the book from the library, this estimated return date is updated to exactly 14 days from the checkout date. For a particular book there can be only one hold request by one user. Hold requests on a book with multiple copies are applied to the copies in ascending order of copy number. Every time a book is placed on hold, the count of the number of copies available decreases by 1 in the database. Any attempts to make additional hold request will be rejected when all copies are on hold.

The system would also generate an 'issue_id' associated with a request which would be recorded and displayed to the user for editing his request at a later date if needed.



6. Request extension for an issued Book

If a user wants to keep the book for a longer time period than assigned, he can request an extension (reissue) from the system as well. He can only use this functionality on a book that he has physically checked out from the library. For a student maximum 2 extensions are allowed per issue of a book. For faculty this number is 5. The estimated return date of the book updates to 14 days from the date of the extension request if that request is accepted. Note that a student can only keep a book for a maximum of 28 days from the original check-out date whereas a faculty can keep it for up to 56 days. .
When the book is first checked out the checkout date and extension-request-date are same and the expected- return-date is 14 days from check-out. Thereafter, with every extension, the extension-request-date is updated,and the expected-return-date is updated. The original checkout date is always recorded to check that a user can keep a book for a maximum of 28 days. Also, the extension of a book is only allowed if that book has not already been requested for future hold by another user.
Each user is allowed 2 extensions for each issue of a book. (For a new check-out of the same book by a user, 2 extensions will be granted again for each new issue.) This information about how many times a user rechecks out a book is recorded. And if the user is a faculty then he is allowed 5 such requests.

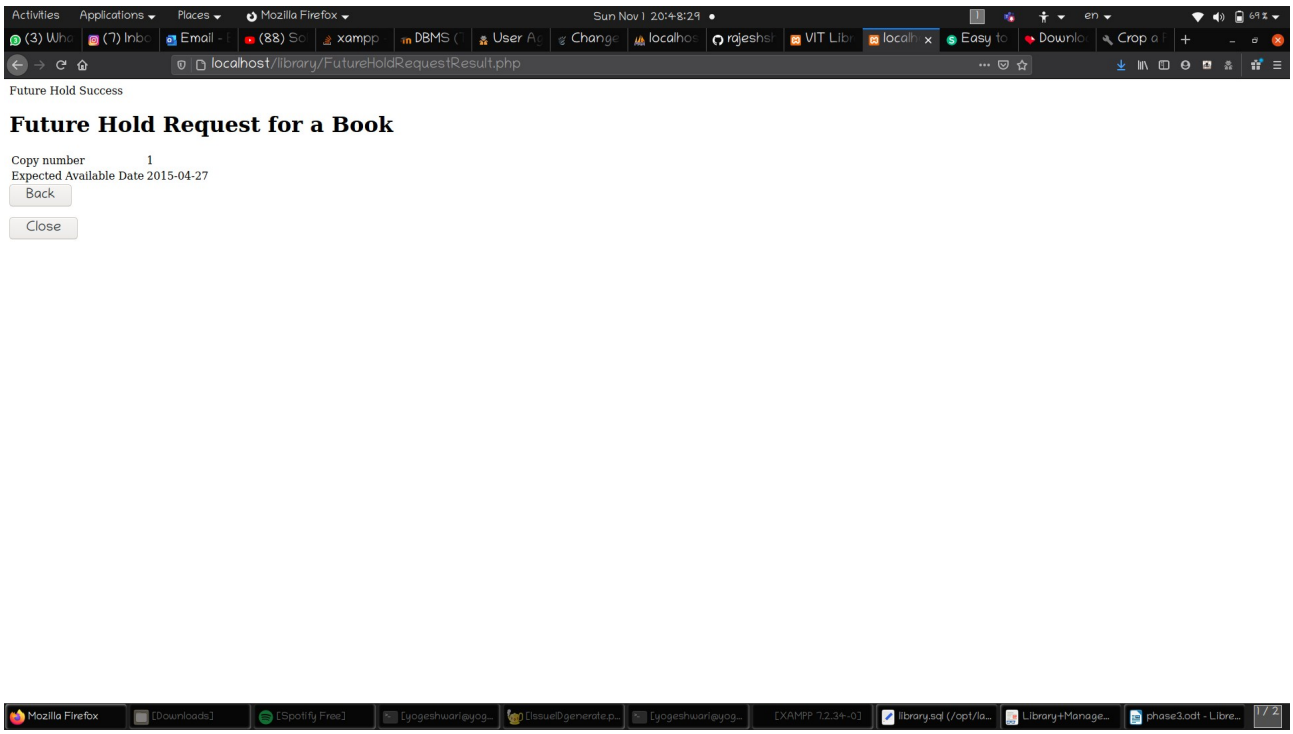


7. Future Hold Request for a Book

This feature allows a user to have his username recorded against a book as a future hold requester. The system automatically sends a message to the requester one day before the available date for the book he requested that the book is now available. (You are not responsible for this functionality of sending a message.) You just have to record in the database if a book has been requested for hold by any user.

When the user submits an ISBN, the system looks up the copy with the earliest expected available date, informs the user, and records his username as the future requestor against that copy in the database.

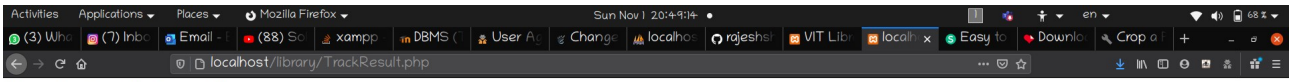
If a book is checked out or on hold, it has an expected return date which is taken as the expected available date; such a book can be requested for future and the system will accept the request and populate the “future requester” field for the book with the username of the requester.



8. Track location

This functionality helps one locate a book in the library. Each book is associated with a subject category and each book can belong to only one subject. Each subject has a name, number of journals, and keywords associated with it. The library has three floors. Each floor has a floor number, number of copiers, and a number of student assistants. Each floor can hold books on multiple subjects. All books of thesame subject are on the same floor. And there can be multiple shelves on each floor. Each shelf has a shelf number, an aisle number and can hold multiple books. The grey boxes are the output boxes.

We are assuming that all copies of the same book are placed together on the same shelf.



Track Book Location

ISBN 0124077269
Floor Number 3
Aisle Number 31
Shelf Number 312
Subject Computer Architecture

Back

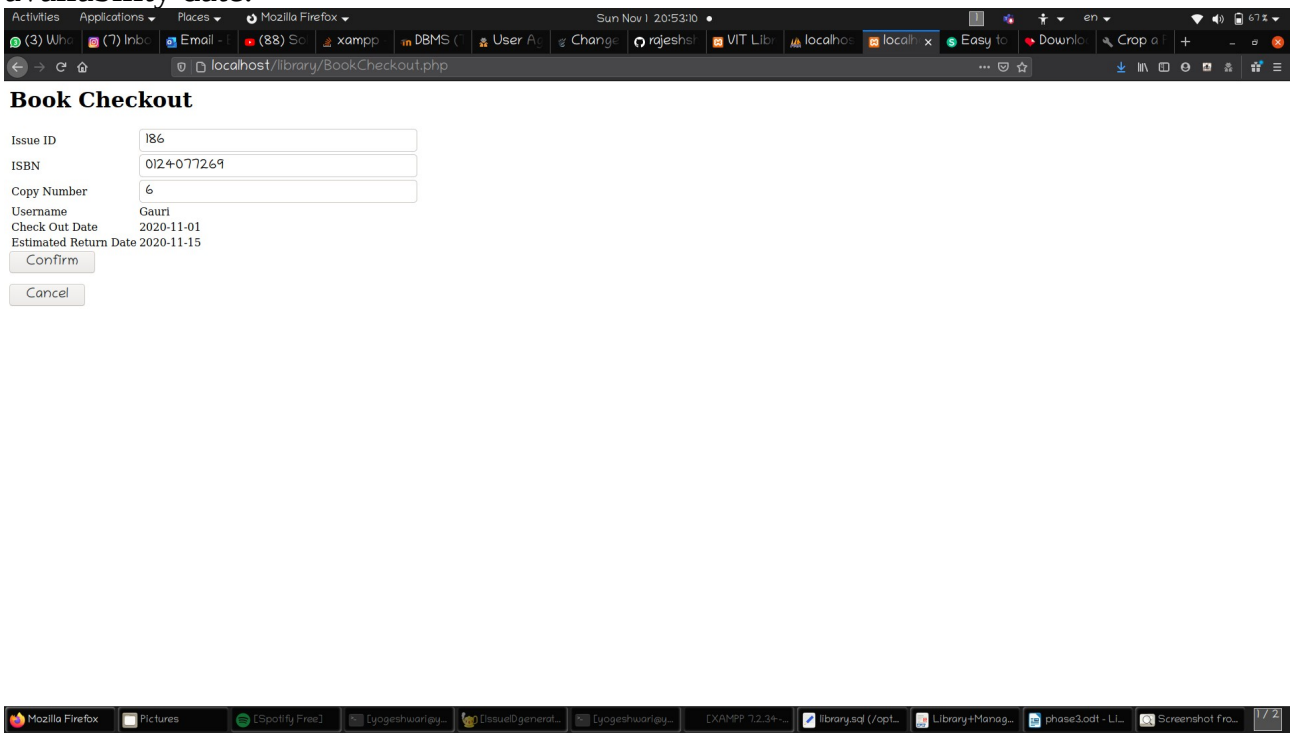
Close

The Functions of Library Staff
There is a station where the user physically checks out a book that he requested to be put on hold or he just took out from the shelves. There is another return station where users return a book. Both stations are manned by library staff to make sure no user leaves the library without using the checkout screen, and to make sure when the user is returning a book, it is getting checked for any damage done. So there is always a record of when a user returns the book, and if he returns it in a damaged condition, or if the book is lost and not returned on time. (The loss of book may be informed by the user by some means. Lost books are so recorded in the database.)

9. Checkout Screen

After requesting a hold on the book, the user has to check out the book from the library. He can come to the library, go pick up the book and then go to the terminal where he'll checkout from this screen. The process will be facilitated by the staff. The user can enter the issue_id and the book will have the information about the ISBN and copy number which will be scanned and shown on the screen along with the user name. (Imagine that the user scans his card which automatically populates his username and name.) The date fields are also auto-populated from the database. If there was a hold request placed by that user on that copy, then it will be dropped from the system when the book is checked out against it.
Remember that when this check out is done, the estimated return date for the issue is to be updated to 14 days from this checkout date or the last allowed date(based on the maximum number of days allowed to him and the maximum number of extensions allowed to him), and the isCheckedout flag has to be updated as well. Also, in case the user is coming to pick up his book after the admissible grace period of 3 days, the system should throw him an error saying

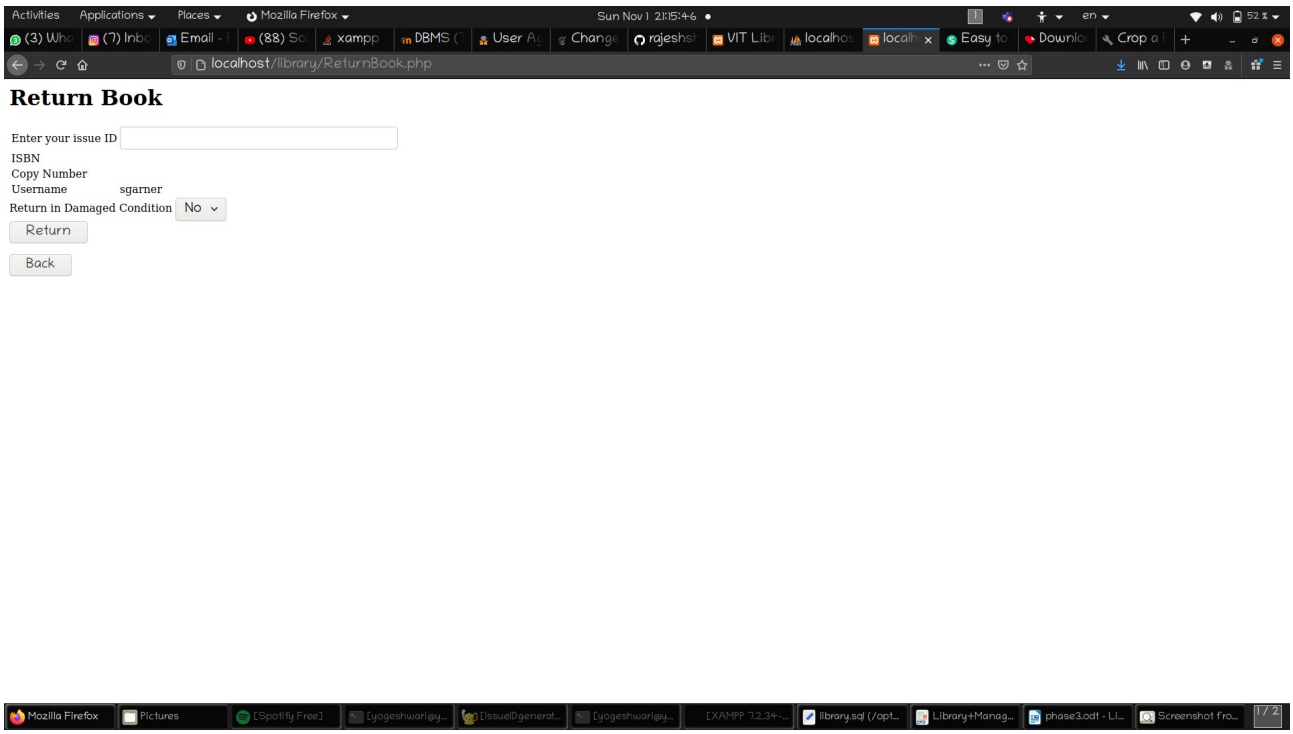
that his hold has been dropped. If a copy of that book is still physically in the library, he can locate it, and still check it out. If no copy is physically available,he may place a “request for future” on a copy that has the lowest estimated availability date.



10. Return Book Screen

Similar to the checkout function, the terminal would have a return book function for the user. When the user comes in to return a book, the staff would check if the book is damaged or not. If it is damaged, the staff will go to the Penalty charges screen shown next to charge the user account. Otherwise, the staff accepts the book and system marks the isCheckedout flag as zero.

If the book is being returned after the due date, then the user account would be automatically charged with the late penalty. Penalty is assessed at $0.50 per day for each late day (regardless of days of the week). The penalty is recorded in a user billing account – users are expected to settle these charges in another financial system which is not covered here. (When 30% and 40% limits are reached and thebook is still not returned, an automated message and reminder will be sent to the user). Users who reach a cumulative penalty of more than $100 (this covers the penalty for late returns, lost books, damaged books) are debarred (their Debarred Status is activated) and they are not allowed to check a book for the current semester. (The messaging and debarring functionality is outside our scope. Do not worry about it. You just have to record the correct cumulative penalty amount against a user.) It is assumed that once the book is back in the library, the staff members replace it at the designated location on the shelf.



11. Penalty charges for lost/damaged book

The staff would charge penalty to the user student account if the book is lost or damaged by the borrower. E.g., for a damaged book, the user would be charged a penalty equal to 50% of the price of the book. And if the book is reported as lost, then the user would be charged the cost of the book.

The system time would be taken as current time. Once the library staff clicks on ‘Look for the last user’, the application should take the book ISBN, copy# and the current time, based on which the result should return the last user of the book as shown in the bottom half of the screen. The staff would then manually enter the penalty charges on the user account. Once a book is marked damaged, it cannot be used for any future issues (is not available for borrowing anymore).