ICS 324: Database Systems (211) Course Project

Database Systems Project (PHASE 1) High-Level Requirements

Due**: November 20, 2021**

In this project you will develop a database system for the library KFUPMLIBSYS. Your finished product should contain information about books, book authors, publishers, employees, inter library loans, late penalties and borrowers.

Each project group should go through the following steps in completing the phase 1 of the project:

1. Describe constraints, including business related, e.g., one person can only check out five books a time; and technical constraints, such as primary keys, foreign keys, check constraints, and not null constraints, for the tables and attributes, etc.
2. Design the database, following an EER approach; then go through the normalization process to come up with a collection of tables that are in Third normal forms.
3. Use any SQL database to create the normalized tables.
4. Find out how the most recent version of your database implements the concept of triggers and then create at least one trigger for your database. For example, one such trigger could be that someone wants to search or check out a book on how to cheat in exams or how to make homework look original work without actually doing it.
5. Populate the database by using SQL insert statements or with some GUI interface such as PhpMySQLAdmin in case you are using MySQL.

The list of requirements with constraints/business rules are as follows:

a) Any library member should be able to search books by their title, author, subject category as well by the publication date.

b) Each book will have a unique identification number (ISBN) and other details including a rack number which will help to physically locate the book.

c) There could be more than one copy of a book, and library members should be able to check-out and reserve any copy. We will call each copy of a book, a book item.

d) The system should be able to retrieve information like who took a particular book or what are the books checked-out by a specific library member.

e) There should be a maximum limit (5) on how many books a member can check-out.

f) There should be a maximum limit (90) on how many days a member can keep a book.

g) The system should identify fines for books returned after the due date.

h) Members should be able to reserve books that are not currently available.

i) The system should be able to send notifications whenever the reserved books become available, as well as when the book is not returned within the due date.

j) Each book and member card will have a unique barcode. The system will be able to read barcodes from books and members' library cards.

k) If a book is not available, the system will check with other libraries and get a book through an Inter Library Loan. The details of such books are maintained.

We have three main actors in our system:

- **Librarian:** Mainly responsible for adding and modifying books, book items, and users. The Librarian can also issue, reserve, and return book items.
- **Member:** All members can search the catalog, as well as check-out, reserve, renew, and return a book.
- **System:** Mainly responsible for sending notifications for overdue books, canceled reservations, etc.

Phase 1 Deliverables

A detailed report (pdf) which contains:

- Cover page (Title, Group Number, IDs & Names, Date)
- The report must include the following
  - All constraints and business rules identified.
  - EER and Relational Schema.
  - All the tools and resources that you used.
  - A table which lists the tasks done by each group member.

Database Systems Project (PHASE 2) Functional Requirements

Due**: December 15, 2021**

Functions of a Librarian

- **Add/Remove/Edit book:** To add, remove or modify a book or book item.
- **Register new Account/Cancel Membership:** To add a new member or cancel the membership of an existing member.
- **Request a book** as Inter Library Book.

Functions of a Member

- **Search catalog:** To search books by title, author, subject or publication date.
- **Check-out book:** To borrow a book from the library.
- **Reserve book:** To reserve a book which is not currently available.
- **Renew a book:** To re-borrow an already checked-out book.
- **Return a book:** To return a book to the library which was issued to a member.

General Function

- **Login** and **Logout**

Reports

- **New members** who were added this year but did not check out any book.
- **List all** members and their penalty amounts.
- **List members** who more than 3 books and who have exceeded 120 days for at least one book.
- **List members** who check out books but return them at least one day before due date.

Phase 2 Deliverables

Implement the project application using any language of your choice and submit a pdf report which contains the following:

- Cover page (Title, Group Number, IDs & Names, Date)
- All what you submitted in Phases 1.
- How you implemented Phase 2.
- All the tools and resources that you used.
- All the problems you faced.
- All the things that you learned from the project.
- A table which list the percentage completion of each required operation.
- A table of all the extra things done. (For bonus points)
- A table which lists the tasks done by each group member.
- Suggestions to improve ICS 324 future projects.