CS353 Database Systems Project Proposal

School Library Database System

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Overview

- This report is the project proposal of the School Library Database System project. It includes the relevant sections such as application description, functional and non-functional requirements of the application, limitations of the application, and the entity relationship model of the database system.
- The application is based on the contemporary Library Systems and aims to add new and useful features to those which will increase the value of the School Library System. Since there are many library applications and websites, it is considerably easy to recognize the functional requirements of the system.
- We have tried as much as possible to evaluate the corner cases and needs of a library management system while designing our database system. We have tried to draw the E/R diagram in a way that it is as rich as possible in terms of the variety and number of entities and relationships in our diagram.
- The link of our project website:
  https://mohamedwasimmohamedakram.github.io/database-website/

Application Description

- Our school library database system has two different kinds of users:
  - Student
  - Instructor

- There is also database admins which are the librarians.
- Students and instructors can use the regular library features such as borrowing and returning books. They can also check which books are on-hold.
- Instructors also have the ability to assign the students some books as homework.

- Moreover, there are extra features that makes the library system more useful for the users.
- The users can post some feedback on the books if they want and all the users can see those comments with the ratings on those books.
- It is also possible to see the most borrowed books and the most liked books as well.
- In addition users can make wish lists to list the books that they are planning to read later.

Why a Database System is Needed

- A database is definitely needed for our application in order to store the books, different kinds of users, and the feedbacks together with the relevant relationships among those tables.
- The database is also needed because it would be so hard to store all of those dynamically changing datas in a file while there may be many modifications to the file from different computers and systems.

Requirements

- The following sections includes the functional and non-functional requirements of the school library database system.

Functional Requirements

Sign-up: Different types of users can register to the system using their email addresses and by generating a password.

Log-in: Different types of users can log-in to the system using their emails and the passwords that they decided.

Log-out: Users can end their sessions on the application by logging out.

Borrow Book: Users can borrow a book if the book is not on-hold. After the user borrows a book, the status of the book becomes on-hold and it is saved to the database to indicate that the specific book is borrowed by the specific user.

Return Book: After a user borrows a book, the status of the book becomes on-hold and those books are required to be returned after a while. Otherwise the status of the book remains on-hold and cannot be borrowed by another user which is not one of the desired behaviours of the system. After the user returns the book, that book can be borrowed again.

Check the On-hold Books: Users can check the status of the books that they are looking for. Namely, the users can see whether the books that they are looking for is on-hold or not.

Assign Homework: A specific type of user which is “Instructor” has the ability to assign books to the student type of users as homework. The system allows this assignment by the instructor interface and the students can also see the assigned books in their own student interface.

Send Warning: Librarians can send warnings and notifications to the users to remind them to return the books that they have borrowed if needed.

Register Books to the System: Only the librarians can register new books to the system or remove existing books from the system. Librarians can also add new users and view the accounts of the existing users.

Feedback Feature: For the books that users have borrowed, they have a chance to make comments on those books, namely they can give feedbacks about the books for the other users. They can also rate the books that they have read. For the books in the application, it is possible to see the comments and ratings of the books via the system interface.

Most Borrowed Books Check: Users can check the recently most borrowed books. By this feature it will be possible for the users to have an idea about which books are worth borrowing since many other users borrowed the same books before as well.

Most Liked Books: Users can see the most liked books in the system according to the ratings of the books. By this feature users will have a better understanding about the quality of the books if they are trying to choose a book.

Wish List: Users can list the books that they are planning to read in the future. They can add books to their wish list and they can also remove books from that

list. It is a useful feature for the users to remember their book selections in the future and do not forget to borrow them.

Non-Functional Requirements:

Scalability: For now the database system works for small amount of users including students and instructors but later on the system will also be able to support increased numbers of users as well.

Maintainability: The database system has librarians as database admins to control the database traffic. This is important for the maintainability of the system so that if there happens a problem in the system they can handle the problem since they have ability to modify, add, and remove tables and data in those tables. There can also be done regular database maintenance by the admins to make the system more reliable.

Security: For each user they have their own personal information and this information should be protected from unauthorised access. And database admins, librarians, are also responsible for the protection of the personal information of the users as well as the data kept in the database system.

Limitations of the System:

Time and Effort Cost: Since the database system for a library is relatively big, it is also costly in terms of time and effort to generate the tables and transfer the data into those tables.

Upgrade Cost: There might be needed to add new functionalities to the application and also new tables or relations to the database. The cost to implement those upgrades might be high and should be cared.

Required Database Admins: Since the system is complex and there are many relations and relationships, there needed enough number of database admins, namely librarians to handle both the data traffic and the database maintenance.

Process Time Limitations: By the database system gets bigger and bigger, there happens a large amount of books, users, and feedbacks which might lead to increase the processing time of the application to run the queries in the database.

Entity Relationship Diagram:

- The diagram in *Figure 1* represents the initial conceptual design of the School Library Database System using the E/R model. The diagram is drawn using “creately” which is an online diagram drawing tool [1].

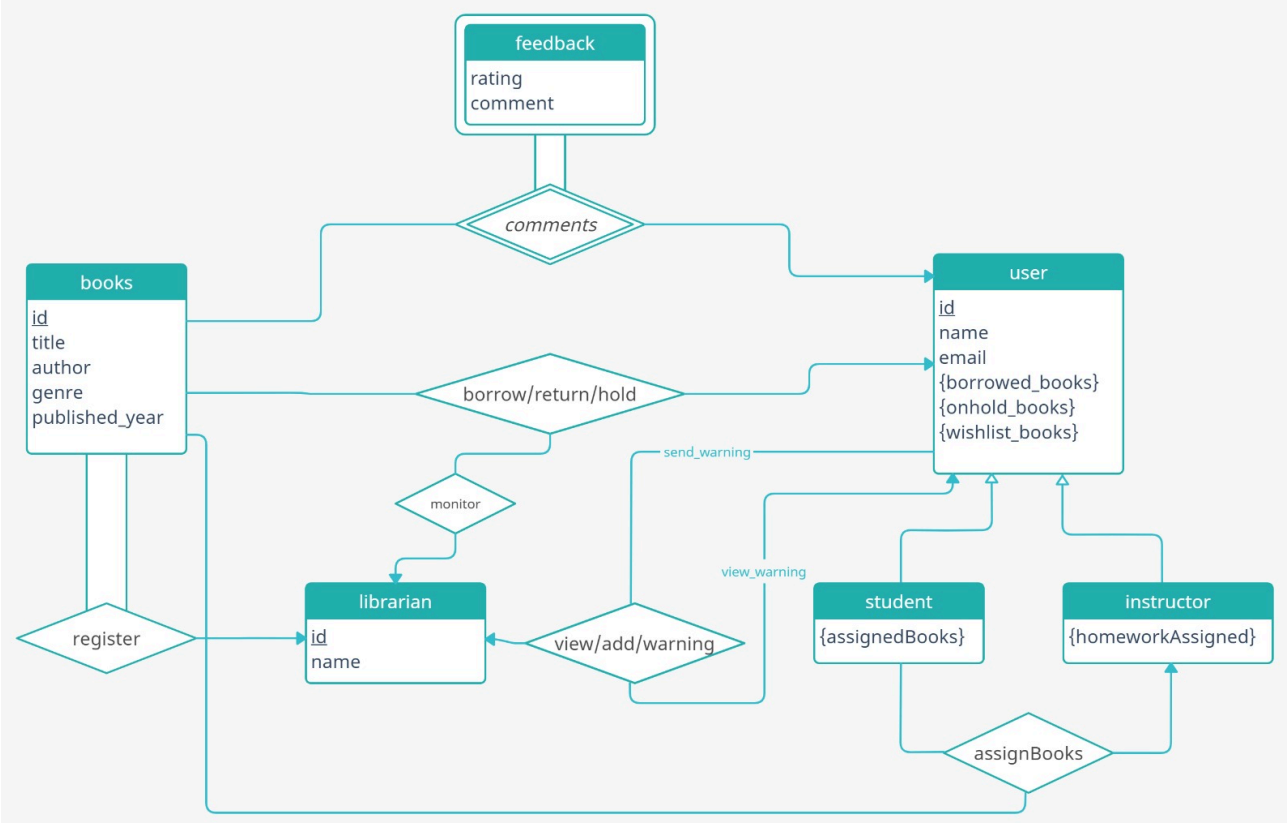

Figure 1: E/R Diagram of the School Library Database System

References

[1] *Chart, Diagram & Visual Workspace Software*. Creately. (2019, July 10). Retrieved February 28, 2022, from https://creately.com/