COMP3019J University Website Project
Design Document

October 2024

Bohan Zhang 22207251
Yunhan Gao 22207250
Le Liu 22207256

Contents

1 Introduction

1.1 Project Goals

The primary goal of this project is to design and implement a comprehensive university website that offers a personalized and functional experience for different types of users. The website will provide students, teachers, and other university personnel with an interface to manage their profiles, interact with others, and access university resources based on their roles. The website is expected to enhance user engagement, facilitate communication, and streamline administrative processes within the university. Additionally, the project will focus on secure data handling and innovative functionalities to differentiate the website from existing solutions.

1.2 Target Users and Use Cases

The target users of the website include students, teachers, library staff, security personnel, administrative staff and external visitors. Each user type has specific features tailored to their role:

- **Students**: Students will have access to their profiles, which display timetables, dormitory information, and enrolled courses. They can register for courses, interact with teachers and fellow students, borrow library books, and manage their electric bike licenses.
- **Teachers**: Teachers will have a profile that shows the courses they teach, office hours, and office location. They can create and manage courses, interact with students, and participate in the library system by borrowing resources or creating electric bike licenses
- **Library staff**: Library staff will have access to features that allow them to manage book inventories, track book loans, and assist users with book reservations. They can also update library resources and monitor the availability of digital content for users.
- **Security personnel**: Security personnel will manage electric bike licenses and oversee vehicle registrations on campus. They will also have access to the profiles of students, teachers, and library staff to approve bike license applications.
- **Administrative staff**: Administrative users will have full control over the system, including managing user registrations, overseeing course creation, and handling overall database management to ensure smooth system operation.
- **External visitors**: Unregistered users will have limited access to parts of the website, such as viewing general information about the university, available library resources, and public course listings, without the ability to register for courses or interact with internal functions.

1.3 Technological Stack Overview

The university website will be built using a modern and robust technological stack to ensure reliability, security, and scalability. The core technologies to be used include:

- **Frontend**: The user interface will be developed using HTML, CSS, and JavaScript to create an interactive and responsive design. Libraries like Bootstrap or Material UI may be incorporated for consistent styling across the website.
- **Backend**: The server-side logic will be implemented using Flask (Python), providing a flexible framework for managing user authentication, database interactions, and session management.
- **Database**: MySQL will be used as the primary database management system to store user profiles, course data, library resources, electric bike licenses, and forum information. The database will include the design of tables with appropriate relationships, such as primary and foreign keys, to ensure data integrity and support efficient querying and management.
- **Security**: The website will ensure secure handling of sensitive data, such as passwords, using encryption mechanisms. Proper user authentication and authorization will be implemented to protect user privacy and data access.

This technology stack has been chosen for its simplicity, flexibility, and suitability for the scale of the university website project, ensuring a smooth user experience and maintainability.

2 Website Functionalities

2.1 User Registration and Account Management

2.2 User Types and Role-Specific Features

2.3 Profile Customization and Display

2.4 User Interaction and Communication

2.5 Unregistered User Access

2.6 Security and Data Protection

2.7 Administrative Features

2.8 Extra Functionality

3 Database Design

3.1 Entity-Relationship Diagrams

The database for the university website currently includes several key tables: `user`, `student_profile`, `teacher_profile`, `library_staff_profile`, `security_personnel_profile`, `course`, `course_registration`, `library_resources`, `library_loan`, `e_bike_license`, `forum_post` and `forum_reply`.

These tables represent the foundational structure for managing users and their interactions with the system, such as course enrollment and profile management. To support additional functionalities outlined in the introduction, tables have been added to manage library resources, electric bike licenses, and forum discussions. These expansions ensure that students, teachers, library staff, and security personnel can effectively interact with the system in their respective roles.

The Entity-Relationship Diagrams are on the next page:

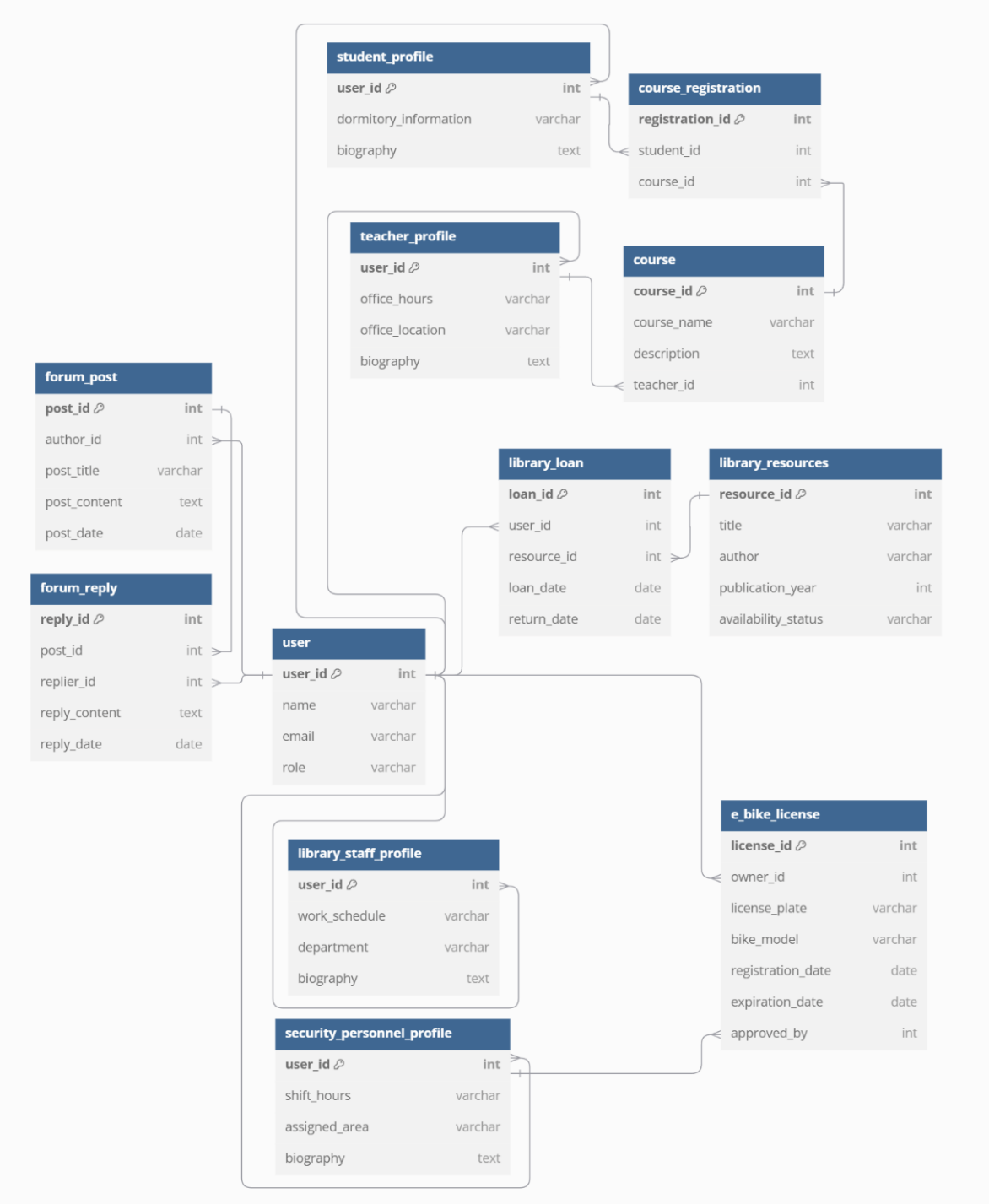

Figure 1: Entity-Relationship Diagram

3.2 Table Structures and Relationships

Below are the current and proposed tables, along with their respective fields and relationships:

- `user`: Contains user information common to all user types. Fields include:
  - `user_id` (Primary Key)
  - `name`
  - `email`
  - `role` (e.g., student, teacher, library staff, security personnel)
- `student_profile`: Stores additional information specific to students. Fields include:
  - `user_id` (Foreign Key referencing `user`)
  - `dormitory_information`
  - `biography`
- `teacher_profile`: Stores additional information specific to teachers. Fields include:
  - `user_id` (Foreign Key referencing `user`)
  - `office_hours`
  - `office_location`
  - `biography`
- `library_staff_profile`: Stores additional information specific to library staff. Fields include:
  - `user_id` (Foreign Key referencing `user`)
  - `work_schedule`
  - `department`
  - `biography`
- `security_personnel_profile`: Stores additional information specific to security personnel. Fields include:
  - `user_id` (Foreign Key referencing `user`)
  - `shift_hours`
  - `assigned_area`
  - `biography`

- `course`: Contains information about the courses offered. Fields include:
  - `course_id` (Primary Key)
  - `course_name`
  - `description`
  - `teacher_id` (Foreign Key referencing `teacher_profile`)
- `course_registration`: Tracks student registrations for courses. Fields include:
  - `registration_id` (Primary Key)
  - `student_id` (Foreign Key referencing `student_profile`)
  - `course_id` (Foreign Key referencing `course`)
- `library_resources`: Manages library books and resources. Fields include:
  - `resource_id` (Primary Key)
  - `title`
  - `author`
  - `publication_year`
  - `availability_status`
- `library_loan`: Tracks book loans by students and other users. Fields include:
  - `loan_id` (Primary Key)
  - `user_id` (Foreign Key referencing `user`)
  - `resource_id` (Foreign Key referencing `library_resources`)
  - `loan_date`
  - `return_date`
- `e_bike_license`: Manages electric bike licenses for students, teachers, and library staff. Fields include:
  - `license_id` (Primary Key)
  - `owner_id` (Foreign Key referencing `user`)
  - `license_plate`
  - `bike_model`
  - `registration_date`
  - `expiration_date`
  - `approved_by` (Foreign Key referencing `security_personnel_profile`)

- `forum_post`: Stores user-created posts for the forum. Fields include:
  - `post_id` (Primary Key)
  - `author_id` (Foreign Key referencing `user`)
  - `post_title`
  - `post_content`
  - `post_date`
- `forum_reply`: Stores user replies to forum posts. Fields include:
  - `reply_id` (Primary Key)
  - `post_id` (Foreign Key referencing `forum_post`)
  - `replier_id` (Foreign Key referencing `user`)
  - `reply_content`
  - `reply_date`

3.3 Primary and Foreign Key Design

Each table contains a primary key that uniquely identifies each record. Foreign keys are used to establish relationships between users and the entities they interact with. For example:

- The `user_id` field in `student_profile`, `teacher_profile`, `library_staff_profile`, and `security_personnel_profile` links the profiles to the core `user` table.
- The `course_id` field in `course_registration` links students to the courses they have enrolled in.
- The `license_id` in the `e_bike_license` table allows students, teachers, and library staff to register electric bikes, which are approved by security personnel.
- The `post_id` and `reply_id` in the `forum_post` and `forum_reply` tables link forum posts and their replies to the users who created them.

3.4 Data Population Strategy

The initial data for the `user`, `course`, and `library_resources` tables will be seeded by administrators during development and testing phases. As users interact with the system, data will be dynamically added to the `course_registration`, `library_loan`, `e_bike_license`, `forum_post`, and `forum_reply` tables. The system will ensure that all data remains up-to-date and consistent across these entities.

4 Web Page Design

4.1 Mockups and Layout Overview

4.2 Color Schemes and Style Guidelines

4.3 User Experience Considerations

4.4 Responsive Design

5 Technical Details

5.1 File and Directory Structure

5.2 Code Components and Dependencies

5.3 API and Database Interaction

5.4 Version Control and Repository Details

6 Conclusion

6.1 Summary of Features

6.2 Future Development Plans