**LEBANESE AMERICAN UNIVERSITY**



COE418 – Database Systems  
Dr. Joe Tekli  
  
Project Report  
LAU Student Life

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# ABSTRACT

This report introduces a project designed to enhance student life at the Lebanese American University (LAU), namely LAU Student Life. It focuses on unifying different campus services on one platform in order to enhance students’ experience and optimize their engagement with academic services and campus activities. This paper thoroughly discusses the development, functionalities, and impact of the LAU Student Life platform, as well as its possible future extensions in enhancing the student experience of LAU students.

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# 1 INTRODUCTION

In this project report, we will dive into the objectives and applications of the LAU Student Life platform. This project was conducted over the span of the COE418 – Database Systems course in the Fall 2023 semester by three computer engineering students, namely Tracy Rizk, Hasan Dhainy, and Tony Sleiman. It was created to make life easier for students at the Lebanese American University (LAU). It is a comprehensive platform that caters to the various needs of students by improving their academic journey and campus experience.

## Objectives

The primary aim of this innovative web-based platform is optimizing and facilitating students’ lives by incorporating multiple functionalities that allow users to easily access various campus services. These services include but are not limited to study room reservation at the library, club registration, gym session bookings, parking spot reservations, housing facilities, and other. The idea is to bring everything students need onto one platform to make campus life smoother and more convenient.

## Applications

The applications of this platform include convenient access to services, enhanced campus experience, and resource reservations. In fact, LAU Student Life helps students manage their time better by allowing them to perform any campus-related activities or reservations in one click. By offering a centralized platform, it simplifies several aspects of student life. The user-friendly interface provides LAU students with simple access to essential services, saves time and effort, and promotes a more organized and enjoyable university life.

# 2 BACKGROUND

## Context

At the Lebanese American University (LAU), student life is exciting and full of opportunities. The campus is very lively, with lots of clubs and activities for everyone. LAU is known for welcoming students from different backgrounds and beliefs, creating a diverse and inclusive community.

## Problem Analysis

Despite the vibrant student life, students found it hectic to navigate everything available to them. There were many clubs, resources, and activities, but it was hard to manage them all. For instance, booking study rooms, joining clubs, or scheduling gym sessions were scattered across different platforms, making it tough for students to make the most of what LAU offers.

## Information needs

To solve these issues, the LAU Student Life platform was established. It aims to make things simpler for students. The team looked at what students liked, how they preferred to do things, as well as the problems they faced while using campus services. By understanding those needs, the goal was to create a single platform that unifies the student community.

# 3 PROPOSAL

## CDM and LDM

From our Database Systems course, we learned that a conceptual data model (CDM) helps understand and map-out relationships between different data entities and provides a clear overview of how these entities relate. We then found that a logical data model (LDM) aims to dive deeper into specific attributes and database structure. Hence, to guide us in the creation of this project, a conceptual data model (ER) was developed, and then a logical data model (relational DB schema) was derived, as follows:

A diagram of a company

Description automatically generated

Figure 1: Conceptual Data Model of the LAU Student Life Project

The Conceptual Data Model is a representation that illustrates entities, relationships, and attributes involved in a system. It provides an understanding of the data. For our project, different entities namely Student, Club, Book, Gym\_Sessions, Housing, Advisor, Meeting, Study\_Room, Parking, and Ride are illustrated above. Each of those entities possesses different attributes, based on its specific characteristics. The relationships between the entities were established and the cardinalities were added accordingly. This helped us in visualizing the data requirements, relationships, and overall structure of our project.

A computer screen shot of a diagram

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Figure 2: Logical Data Model for the LAU Student Life Project

The Logical Data Model is a more detailed and structured representation of data entities, their attributes, relationships, and constraints within a database system. In our case, we defined, in addition to the entities and their attributes, the primary keys foreign keys, and relationships between entities on a deeper scale. This improved our understanding of our schema and gave us a more implementable structure.

## Software application design and implementation

In creating the LAU Student Life platform, our software application design and implementation revolved around different factors: first, a thorough user research, then a design phase, and finally an implementation stage. The design phase involved creating a user interface focusing on the simplicity and functionality of the diverse needs of LAU Students. On the other hand, the implementation phase highlighted database creation based on the CDM and LDM and integrating various features to ensure simple and easy access to all students.

Programming languages such as CSS, HTML, and JavaScript were used for the front-end development. On the other hand, for the development of the web-based system with a database backend, we used XAMPP, PHPMyAdmin, and PHP as the programming language. This was done in five steps:

1. **Database creation with XAMPP and PHPMyAdmin:** XAMPP is a software package that includes Apache (web server), MySQL (database), PHP, and Perl. PHPMyAdmin is a web-based tool used for managing MySQL databases. In this step, we defined the system's database tables using PHPMyAdmin within the XAMPP environment.
2. **Establishing relationships:** We then defined primary key relationships between the different tables in the databases. We set up foreign keys while ensuring data integrity.
3. **Populating data:** After creating the tables and defining relationships, the tables were populated with data. We inserted relevant information of records into the tables.
4. **Linking backend with database (DBConfig):** The backend code was connected with the database in this step. DBConfig contains configurations such as database credentials (username, password), server details, and functions to connect to the database. It acted as an intermediary between the frontend and the database.
5. **Creating PHP code for frontend pages:** For each frontend page, we created PHP code files that contain code to interact with the database via the backend. When a user interacts with the frontend interface (i.e., enrolling in a club, registering a gym session, etc.), these PHP files handle the data and execute queries to manipulate data in the database based on user interactions.

In summary, the process involved frontend pages design, database creation, defining relationships, populating data, and establishing a connection between the frontend and the backend. This allowed users to interact with the database via the frontend while maintaining integrity and security.

# 4 EXPERIMENTAL EVALUATION

In conducting the experimental evaluation of the LAU Student Life project, we executed test queries as expert users through the Relational Database Management System (RDBMS) interface. In addition, non-expert users tests were established by utilizing the software application interface. To elaborate, we evaluated the different functionalities of the backend system, while taking into account the efficiency and accuracy of data storage and access. Similarly, we executed a range of test queries through the system’s graphical interface in order to assess how effective and accessible and user-friendly it was. The goal was to make the interactions (e.g., dorm bookings, parking rentals, etc.) as easy as possible for everyday users. By conducting those tests, we were able to identify weaknesses and tweak our program accordingly, ensuring that the LAU Student Life platform aligns with the needs and technical proficiencies of all users.

# 5 CONCLUSION

In conclusion, LAU Student Life is a platform combining all campus resources and activities to make things easy for students. Personally, this project taught us significant skills every computer engineer should have, such as: how to analyze information needs, produce corresponding conceptual and logical data models, implement them, store data in the DB while preserving constraints such as structural or integrity constraints, test it by manipulating and searching through the data, and lastly develop a software application in order to allow users to store, access, and manipulate the DB.

Regarding the project’s future perspectives, there are chances to add more improvements and features like event sign-ups, instructor intervention, or career guidance. Another possible extension is creating similar versions of the platform to include different schools or universities. The LAU Student Life project is not only a platform for easier campus life accessibility, but also a foundation for continuous improvement.

# References

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