TECHNISCHE UNIVERSITÄT
CHEMNITZ

Advance Management of Data

Project term Paper

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Submitted By

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Table of Contents

List of Figure

1 Introduction:

The project's goal is to create a study group meeting management system in order to achieve the final standard requirements of "Advanced Data Management". The project has two view parts. One is the FSR:IF, while the other one is the student. It was developed with the goal of offering an easy-to-maintain and management system for both FSR:IF and student, where FSR:IF can create meetings and modify the time and location of the meeting. Students, on the other hand, can join or create a study group against the meeting.

So, the aim is to build an easy-to-use system that will make it simple for FSR:IF and students to arrange a meeting and organize student groups.

1.1 Task Contribution

The whole work was done in group where we have separated our work in both Project and Report including programming and Database.

1.1.1 Project Term Paper

Md. Mehedee Zaman Khan(665630) has done 2. Technology Overview (2.2 Backend), 3.2.2 Relational Schema, 3.4 Deployment, 4. Distributed Database Scenarios, 6. References.

Misbahul Haque(655314) has written 1. Introduction, 2. Technology Overview (2.1 Frontend), 3.1. Project Description, 3.2.1. UML Diagram, 3.3 Implementation, 5. Conclusion.

1.1.2 Project

We have done the database part together. While writing queries, functions, logics in the database, we have participated equally and this database was finalised by our group discussion.

In the frontend and backend we have done individually.

Md. Mehedee Zaman Khan (665630): Responsible for student part.

Misbahul Haque (655314): Responsible for FSR part.

2 Technology Overview

2.1 Frontend

We have used Varieties of technology to shape up by JavaScript, HTML, CSS, Bootstrap and PHP to developed the management system.

2.1.1 HTML

In an internet browser, Hypertext Markup Language (HTML) is a standard markup language for documents intended to be displayed. HTML generates majority of the contents displayed in the websites, when it synchronised with other technologies like javascript, CSS etc. From a local storage or web server, internet browsers get HTML documents and put forward the files into multimedia internet pages. The different tags can manage a word or image to hyperlink somewhere else, can generate Italian format, can adjust the front size and so on.

The reason behind using this technology is, it is widely used technology and don't have to buy any additional software.

2.1.2 CSS

Cascading Style Sheets (CSS) is a styling template language utilised for delineating the role of a document written in a markup language, for example, HTML. CSS is an instinct innovation of the WWW(World Wide Web), close by HTML and JavaScript. Also it is the most widely used application in HTML to design the webpage. It illustrates how contents should be delivered on the interfaces. CSS is schematic to qualify the separation of illustration component like as colour, font, layout structure etc. It's very get-at-able and consistent in structure, update and also offer more alternatives design.

2.1.3 JavaScript

Basically Javascript is a programming or scripting language used both on server-side and client-side that consents to perform complicated features for building internet pages interactive and responsive. It is easier and quicker to develop JavaScript things like animation, interactive maps ,video players and so on with the help of JavaScript along with HTML & CSS. JavaScript is the third layer of layer cake of standard web technology.

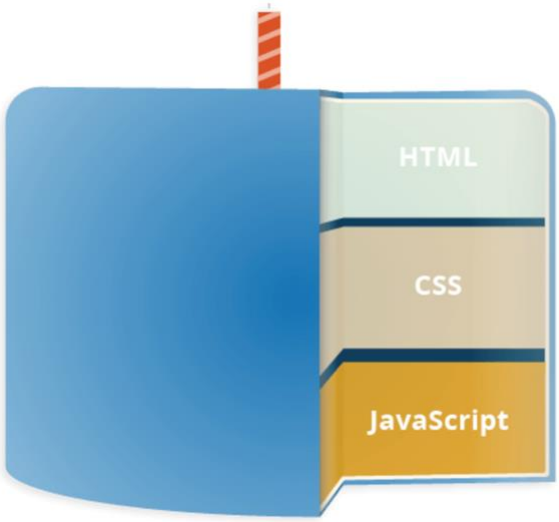


Figure - 1: Layer Cake of Standard Web Technology

2.1.4 Bootstrap

In recent days, Bootstrap has become a vital tool for the front end developers. Bootstrap is a huge collection of reusable, handy code which written in JavaScript , HTML & CSS. It also help the frontend designers and developers to make fully responsible internet pages easily and quickly. Basically, Bootstrap minimise lots of CSS code and gives more time to spend on decorating the internet pages.

The reason behind the popularity of bootstrap is it's totally free.

2.1.5 PHP

PHP stands for “hypertext preprocessor”, in the previous it was “personal home Pages”. In web developing, PHP has become the part and parcel for web developers. It first appeared in 1995. Essentially, PHP is an open source general purpose scripting language. According to W3Techs reports that,"PHP is used by 79.2% of all the websites whose server-side programming language we know.”

PHP is more popular for building dynamics web pages rather than static web pages. only that server where PHP scripts can be interpreted where that has installed. To Access the PHP scripts, the client computers just need an internet browser. A PHP file exists PHP tags and finish with the extension ".php".

2.2 Backend

Though we have to implement most of the program logic directly in the database instead of depending on the backend, we only used functions in the backend to pass the values between frontend and database.

2.2.1 Database

2.2.1.1 PostgreSQL:

PostgreSQL is a powerful, enterprise-class, and open-source Relational Database Management System (RDBMS). PostgreSQL is a very extensible database. It aids in the development of applications, the administration of data integrity, and the management of large datasets. It supports both SQL and JSON for relational and non-relational uses. PL/pgSQL (Procedural Language/PostgreSQL) is a PostgreSQL procedural language that can execute more complicated operations than SQL, such as loops, functions, and triggers. PL/pgSQL is a block-structured language that allows you to join together a block of computation and a sequence of queries inside the database server.

3 Project: Student Group Meeting Management System

3.1 Project Description

The project's frontend features two alternative perspectives. The first is for the FSR: IF, while the second is for the students. Two distinct views are controlled by the two different users.

3.1.1 FSR:IF

There will be two tables named 'fsr: if' and 'meetings' in which FSR: IF will insert the start time, end time and location of the meeting. FSR: IF can insert, update and delete meeting details. Every time a meeting is created, it is automatically hidden from the student view. Only FSR: IF can make it visible and hide the meeting again. Students can only see the meeting details that FSR: IF makes visible to them, otherwise they cannot create a study group for these hidden meetings. In addition, a meeting can also be automatically hidden if it exceeds its end time. Meetings can only be deleted by FSR: IF. In addition, FSR: IF can view the list of all study group details (subject, description, number of participants) and the members of the group that consists in the meetings.

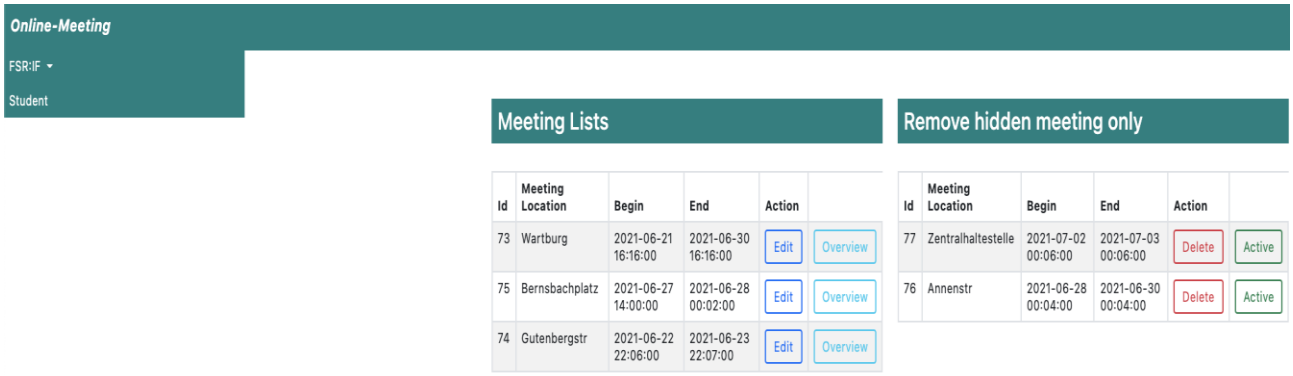


Figure - 2: Details of Meeting List

3.1.2 Student

First, a student must go through the login process. He/she can update his / her name by clicking the "Edit" button. After completing the registration process, he/she must select one of the meetings from the meeting list in order to join or create a study group for the selected meeting. On the study group page, students can see some study groups if those groups were created before the same meeting. Each study group consists of a leader and at least two members. A group leader can update the details of his study group (topic, description, student limit) but cannot force a student to leave the group. Therefore, even a leader cannot delete the study group. Only he/she can leave the group and the leadership automatically transfers to the 2nd entry in the group. If there is no longer a member in the group, the group is automatically deleted. On the Study Group page, a student can also find out his or her group if he/she has previously joined one of the study groups in that meeting. If a student clicks "Join" in another group, he/she will immediately leave his / her previous group and join the new group. The reason for this is that a student cannot stay in more than one group. In addition, by inserting the required data, a student can create a new study group. Groups are hidden when a group member is full.

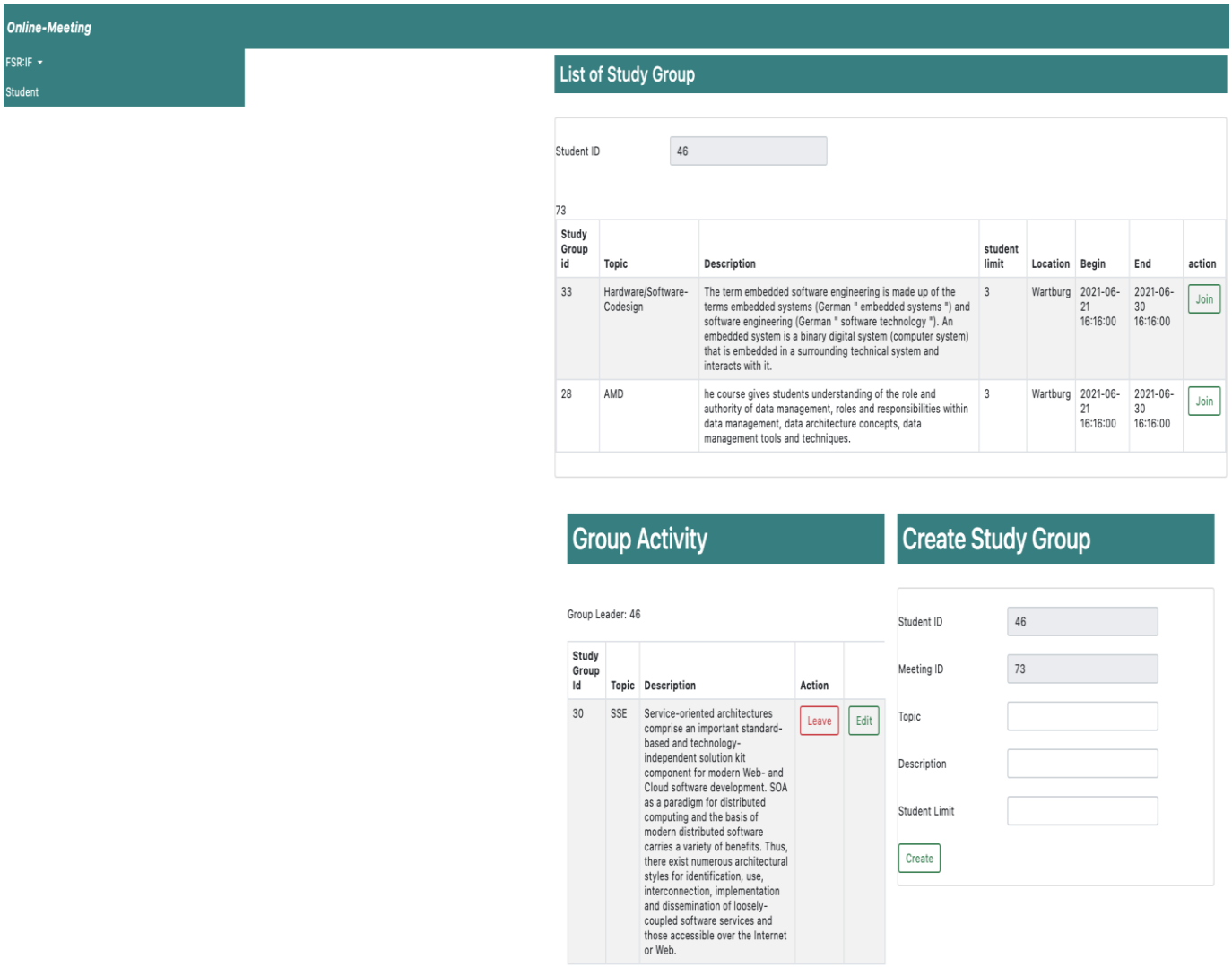


Figure -3: Create Join, Edit and Leave Study Group.

3.2 Database Design

We used five tables in our database for this project. The (Unified Modeling Language) UML diagram and relational schema supporting the current implementation reflect the relationship between such tables, as well as the properties of their respective tables, as well as their types, primary keys, foreign keys, and so on.

3.2.1 UML Diagram

UML is a set of diagrams that can be used to visualize a software program. The parts are similar to components that can be connected in a variety of ways to create a complete UML diagram..UML helps in the modeling of a system's structure by showing the system's classes, properties, and specific data types, as well as the functions and relationships between objects. To describe our project structure and make it more visually clear, we used a UML diagram.

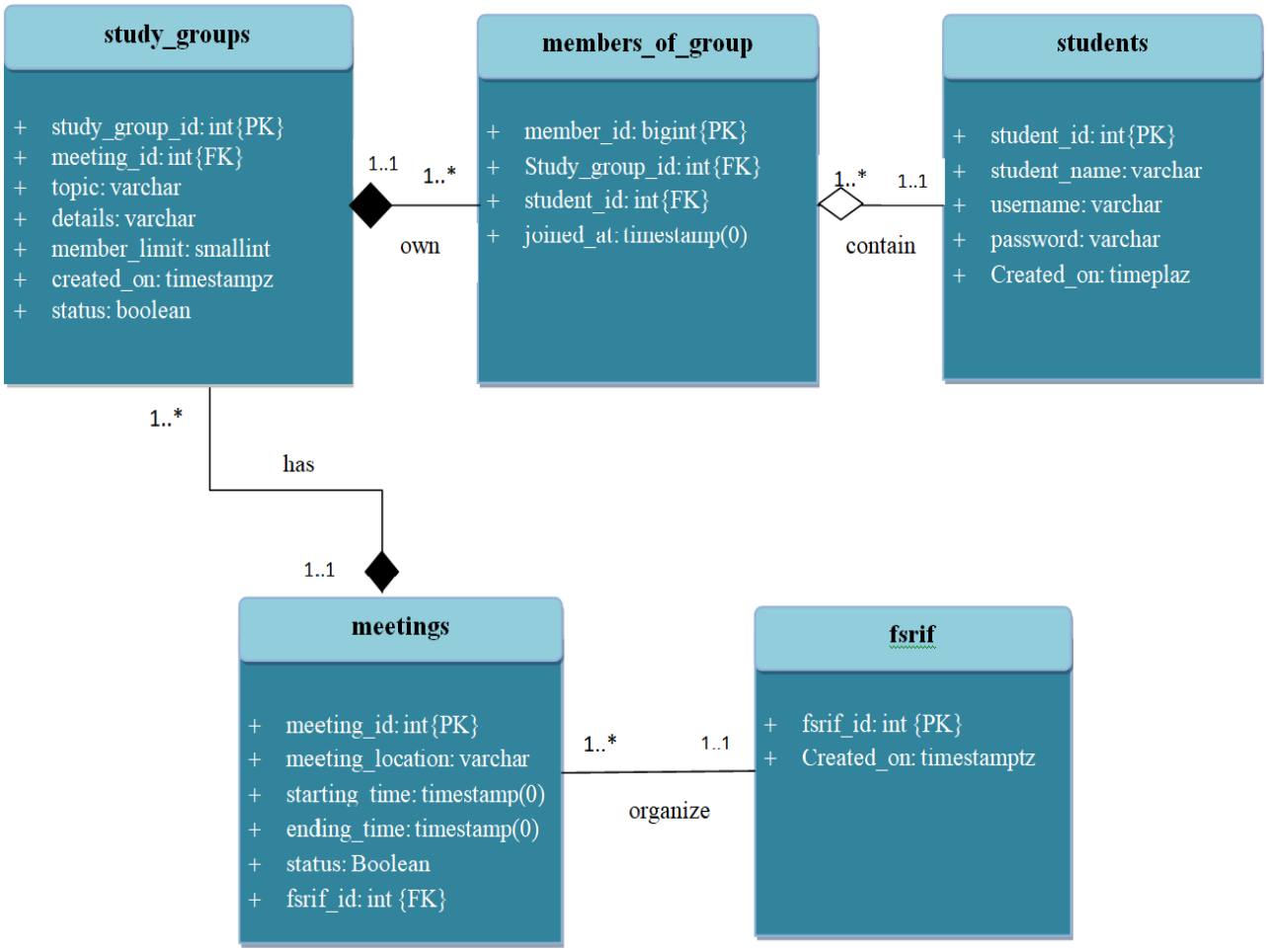


Figure -4: UML Diagram

3.2.1 Relational Schema

A relational schema gives you both a high-level and a comprehensive perspective of the database design. In terms of logic and business principles, it is utilized to construct a relational database. However, the figure below illustrates the fully-featured conceptual relational structure that supports the current implementation.

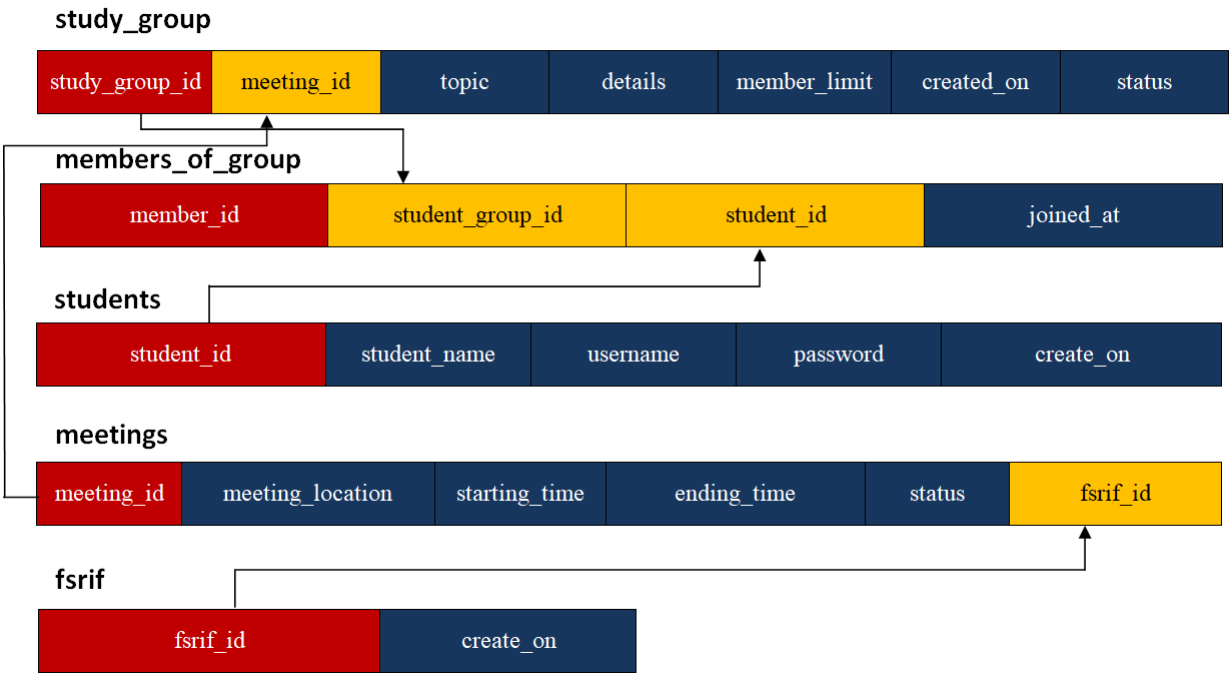


Figure -5: Relational Schema

3.3 Implementation

3.3.1 Work flow diagram

In this project, both users (FSR and Student) will submit requests to the backend based on their activity through the frontend using a URL. All requests will work as functions on the backend, and all characteristics will be supplied as parameters. The primary job of the backend is to transmit all functions to the database management system (DBMS), which is where all of the program logic is implemented.

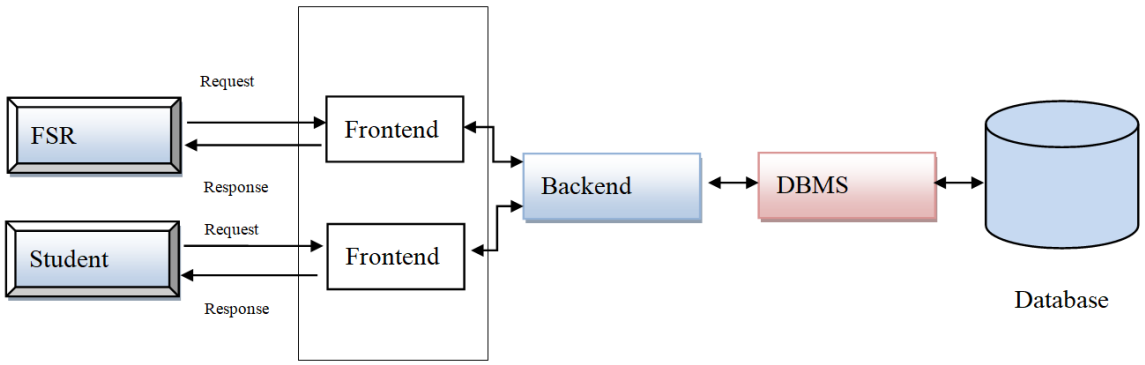


Figure - 6: Workflow Diagram of FSR Management System

3.3.2 Database queries & Functions

We tried to develop the best feasible approach for getting data from the database in this project. In this project, five tables are developed to manage the database's data flow. We were able to effectively implement these fundamental queries into the database, including Insert, Update, Show, and Delete, as well as the use of numerous functions, including join. We developed 28 methods to handle the total database, with a few functions being utilized to collect data from different tables through join for frontend display.

3.3.3 Screenshots

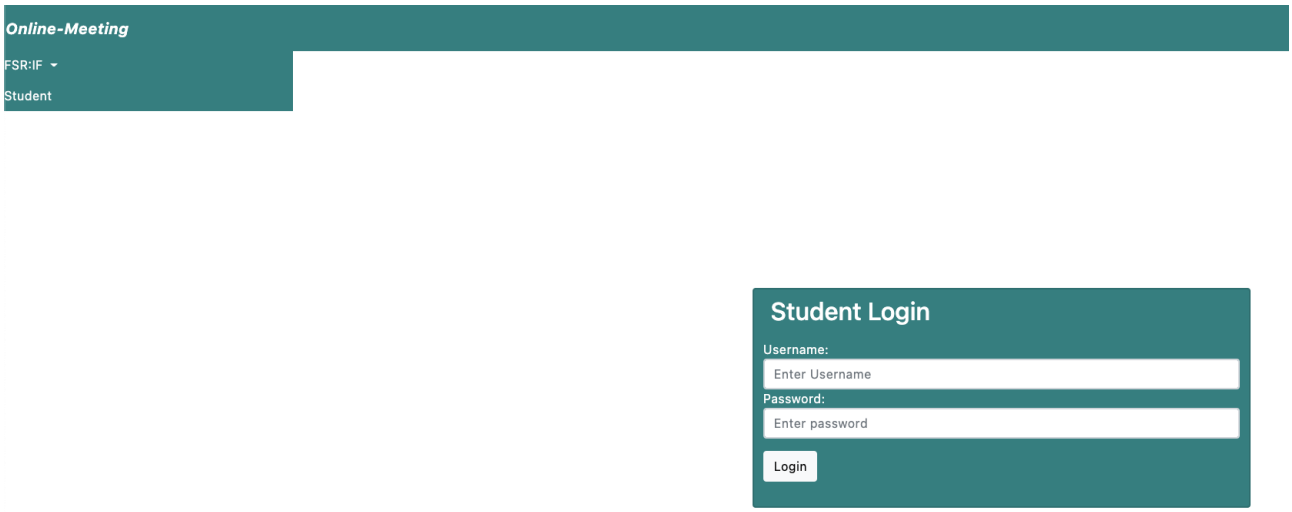


Figure - 7: Student Login

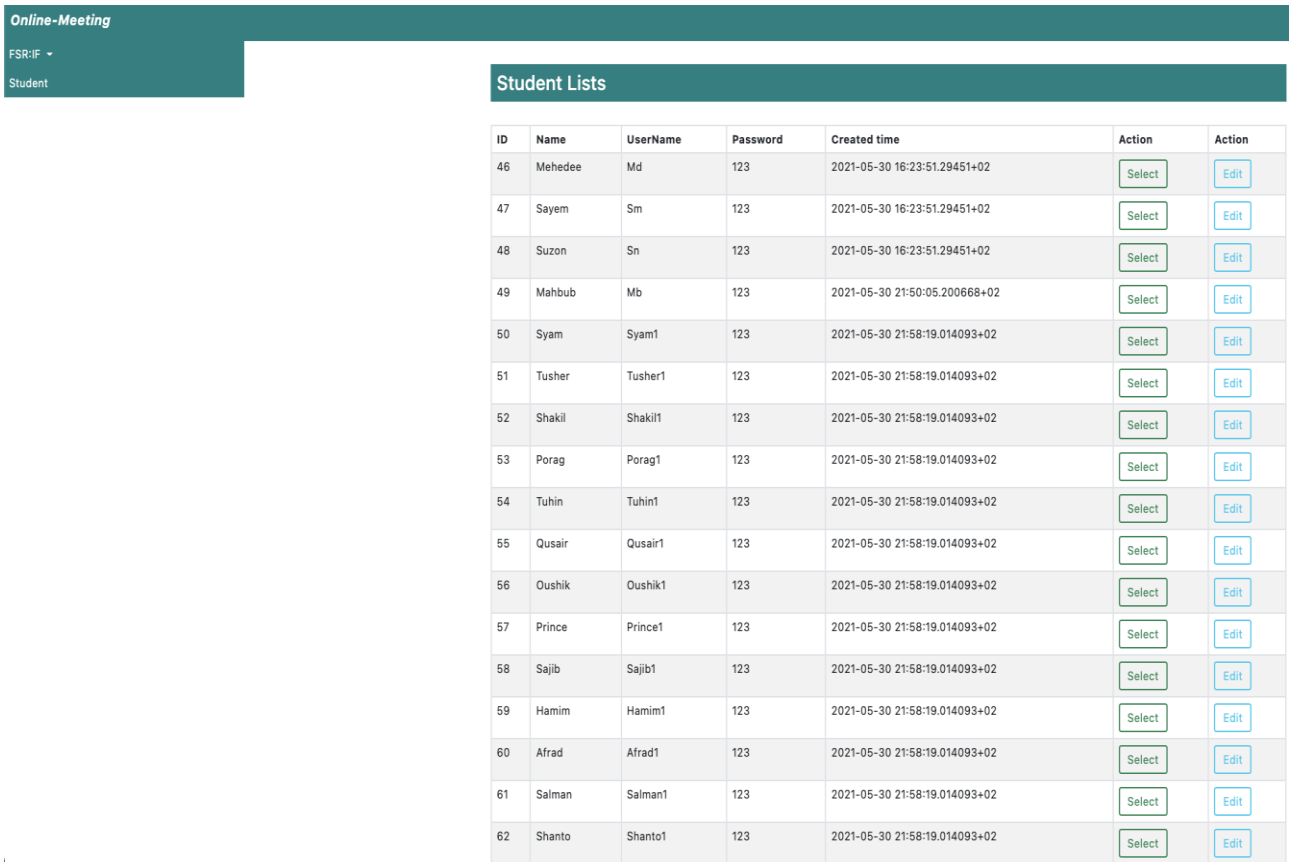


Figure - 8: Student List

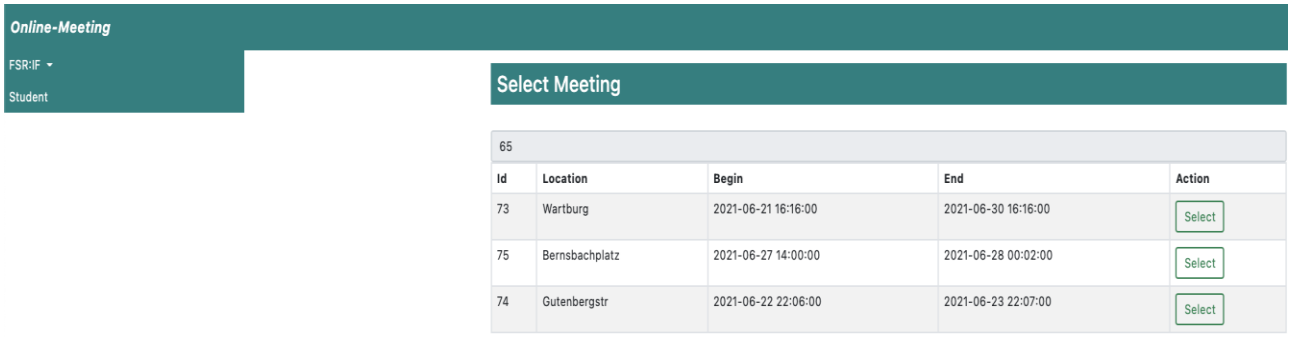
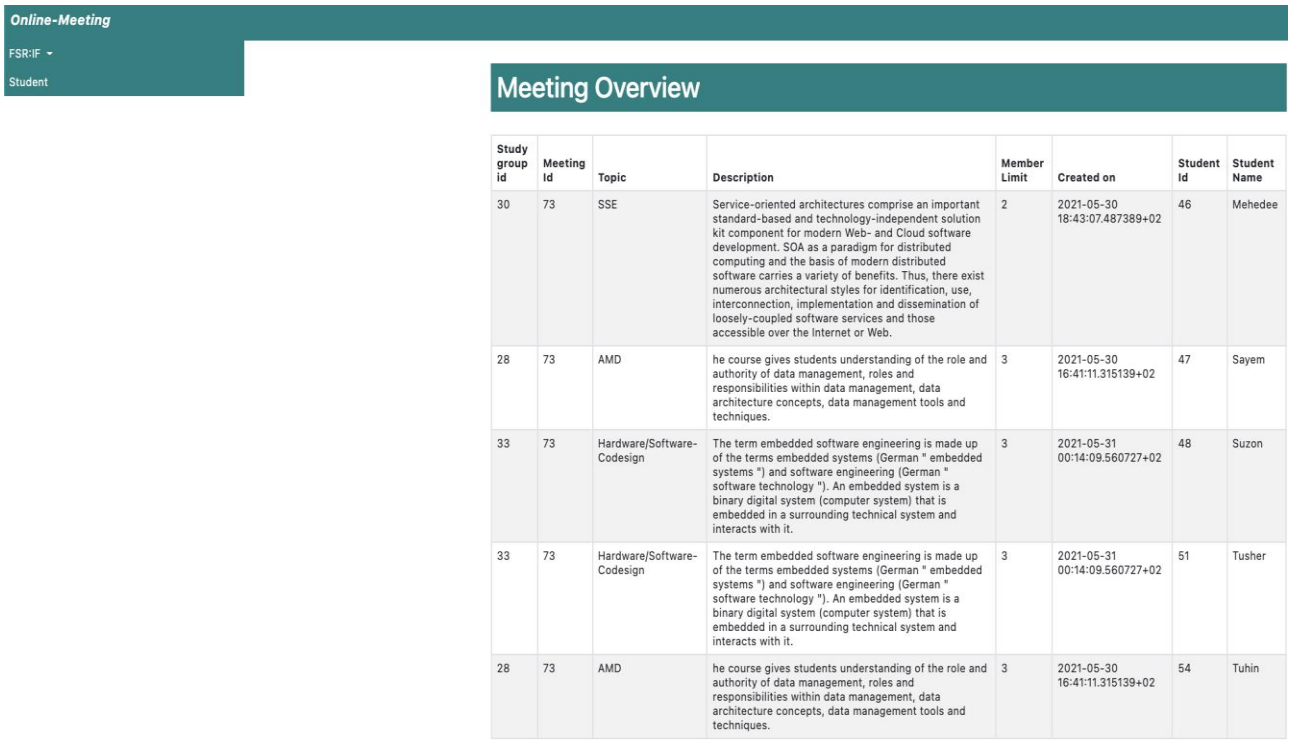


Figure - 9: Select Meeting



Study group id	Meeting Id	Topic	Description	Member Limit	Created on	Student Id	Student Name
30	73	SSE	Service-oriented architectures comprise an important standard-based and technology-independent solution kit component for modern Web- and Cloud software development. SOA as a paradigm for distributed computing and the basis of modern distributed software carries a variety of benefits. Thus, there exist numerous architectural styles for identification, use, interconnection, implementation and dissemination of loosely-coupled software services and those accessible over the Internet or Web.	2	2021-05-30 18:43:07.487389+02	46	Mehedee
28	73	AMD	he course gives students understanding of the role and authority of data management, roles and responsibilities within data management, data architecture concepts, data management tools and techniques.	3	2021-05-30 16:41:11.315139+02	47	Sayem
33	73	Hardware/Software-Codesign	The term embedded software engineering is made up of the terms embedded systems (German " embedded systems ") and software engineering (German " software technology "). An embedded system is a binary digital system (computer system) that is embedded in a surrounding technical system and interacts with it.	3	2021-05-31 00:14:09.560727+02	48	Suzon
33	73	Hardware/Software-Codesign	The term embedded software engineering is made up of the terms embedded systems (German " embedded systems ") and software engineering (German " software technology "). An embedded system is a binary digital system (computer system) that is embedded in a surrounding technical system and interacts with it.	3	2021-05-31 00:14:09.560727+02	51	Tusher
28	73	AMD	he course gives students understanding of the role and authority of data management, roles and responsibilities within data management, data architecture concepts, data management tools and techniques.	3	2021-05-30 16:41:11.315139+02	54	Tuhin

Figure - 10: Meeting Overview

3.4 Deployment

3.4.1 Tools

3.4.1.1 pgAdmin 4

PgAdmin is the most widely used and feature-rich administration and development environment for PostgreSQL, the world's most powerful Open Source database. It provides a simple and intuitive user interface that simplifies the creation, maintenance, and use of database items.We utilized pgAdmin 4 as a database IDE (Integrated Development Environment) to implement all of PostgreSQL's queries and functions while working on the project.

4 Distributed Database Scenarios

A distributed database is a group of conceptually connected databases that are linked together across a computer network. The primary goal of a distributed database management system is to allow users to access data from several locations.

When the database of the Student group Meeting Management System is accessed from branches in various places, we must apply a distributed database management system because of its dependability. If any linked computer system fails, it will assist other systems in completing the work.

Modulation is another significant characteristic of a distributed database management system that might be used in our project. By establishing and connecting with a distributed database system, it will assist in controlling, accessing, and installing the system without failure or interruption.

5 Conclusion

From the viewpoint of both FSR:IF and the student, the project the Student group Meeting Management System met all of the provided requirements. The experience of working on the project was well worth the mental challenge. The most valuable aspect of this project was the opportunity to work with PostgreSQL, from which we learned about PL/pgSQL and how to use functions, inner joins, triggers, cursors, and other features. In addition, we have gained an understanding of UML and Relational Schema diagrams in order to construct the project properly. For us, implementing all of the programming logic in the database was a new and difficult experience. On the other hand, we have attempted to investigate all of the most appropriate technologies for this project. We used not only HTML, CSS, and JavaScript to make the application visually beautiful, but also Bootstrap which was quite exciting. Last but not the least, the project requirements were well-defined, easy to understand, and useful in avoiding errors during the project's development.

6 References

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