CEN 308 SOFTWARE ENGINEERING

PROJECT DOCUMENTATION

askIBU

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1. Introduction

1.1. About the Project

askIBU is envisioned as a student forum web application that provides the students with a platform to share their doubts and questions regarding any of the courses that they might have. It is noticeable that for some of the university courses there is a need for additional clarification and students often reach out to each other for help. Sometimes even professors create dedicated communication channels that give them an opportunity to discuss and share their issues. Our aim would be creating a universal communication channel that would also serve as a knowledge bank to the students, since every question and answer is publicly available, which indicates that if future generation students would share some of our doubts, they would already have answers waiting for them.

The forum will be organized so that the forums are categorized by faculty, department and course. Within the course forum, any student can ask a question thus starting a thread. Other students are able to reply to the same thread and each reply can be pinned by the student who posted the question. We want the user interface to be simplistic and easy to navigate, so that the students can ask their questions and get needed information in the easiest way possible.

The application is available at the following link.

1.2. Project Functionalities and Screenshots

The main functionalities of our application are the following:

- Students can create their own account through the registration form, which requires an email confirmation
- After registering and confirming their account, students can log in
- The home page displays a sidebar menu (or topbar in mobile view) which lists all of the faculties within the university
- Upon clicking on a faculty, a dropdown menu of departments is displayed
- When clicking on a department, the right-hand side of the page displays a list of all the courses within the department
- After selecting a course, the student is viewing the course forum, where all of the questions are listed, and where new questions can be posted
- Each question has its title, body and information about when and who posted it
- Questions can be expanded to view the answers as a threaded discussion, and students can reply to the thread
- Posting questions and answers is reserved for logged-in users, but anyone can view the discussion thread
- The author of a question has the option to delete the question and to pin the best answers
- The authors of answers can delete them during the 10 minutes after originally posting it

- Within the account page, users can view and edit their profile information, as well as change their password
- The website has special admin functionalities, and admins can add/remove faculties, departments and courses

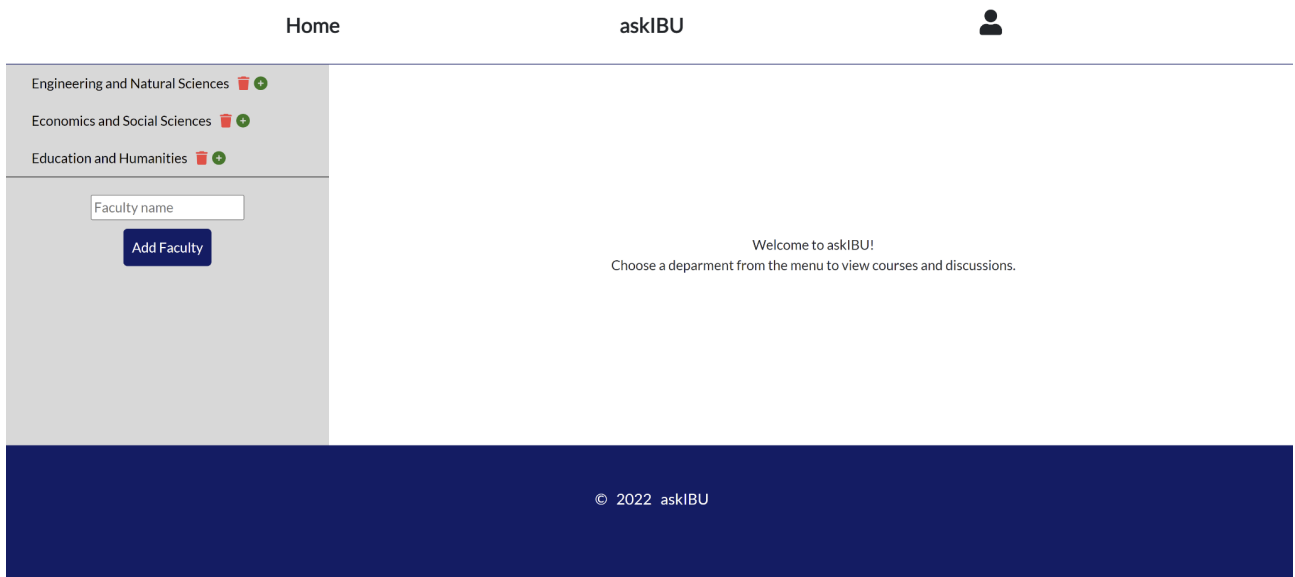Screenshots of the functionalities are available below (with a logged-in admin).

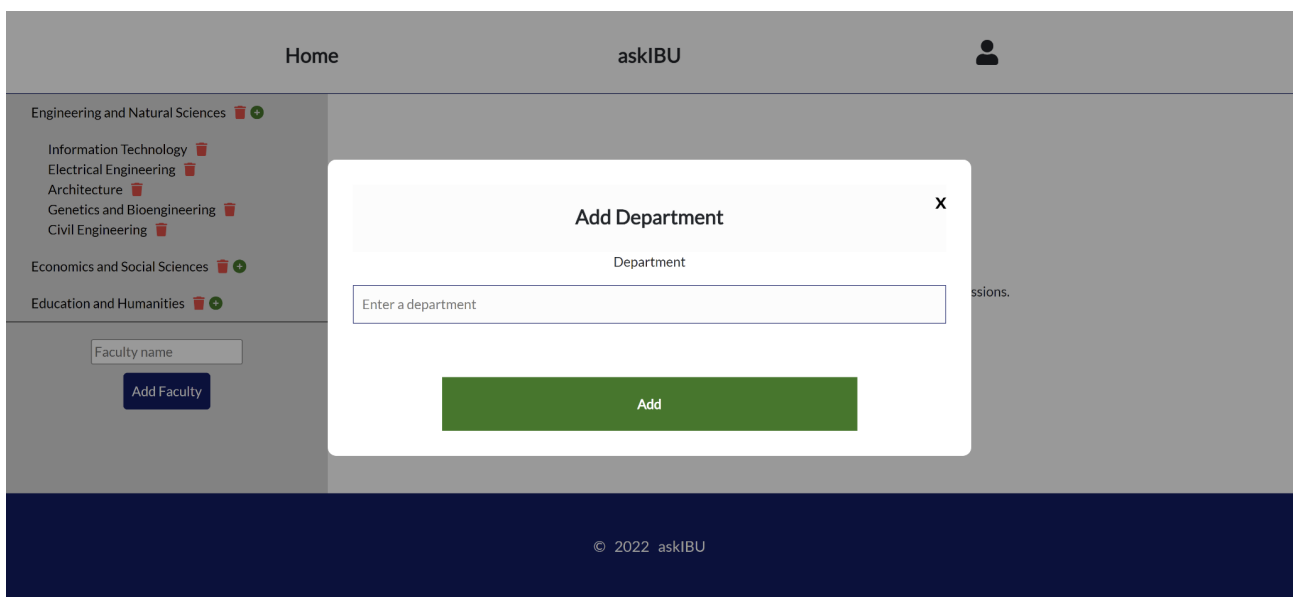Image 1: Default home page - faculties are in the sidebar with the option to add more

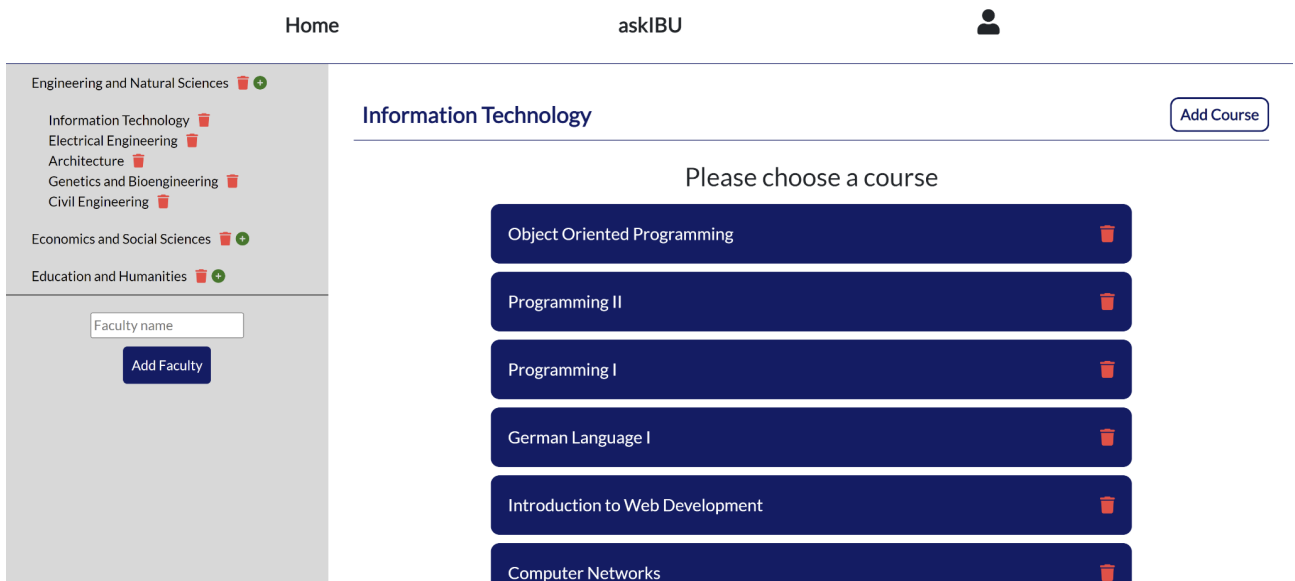Image 2: Adding a department to faculty via modal - expanded departments in the sidebar

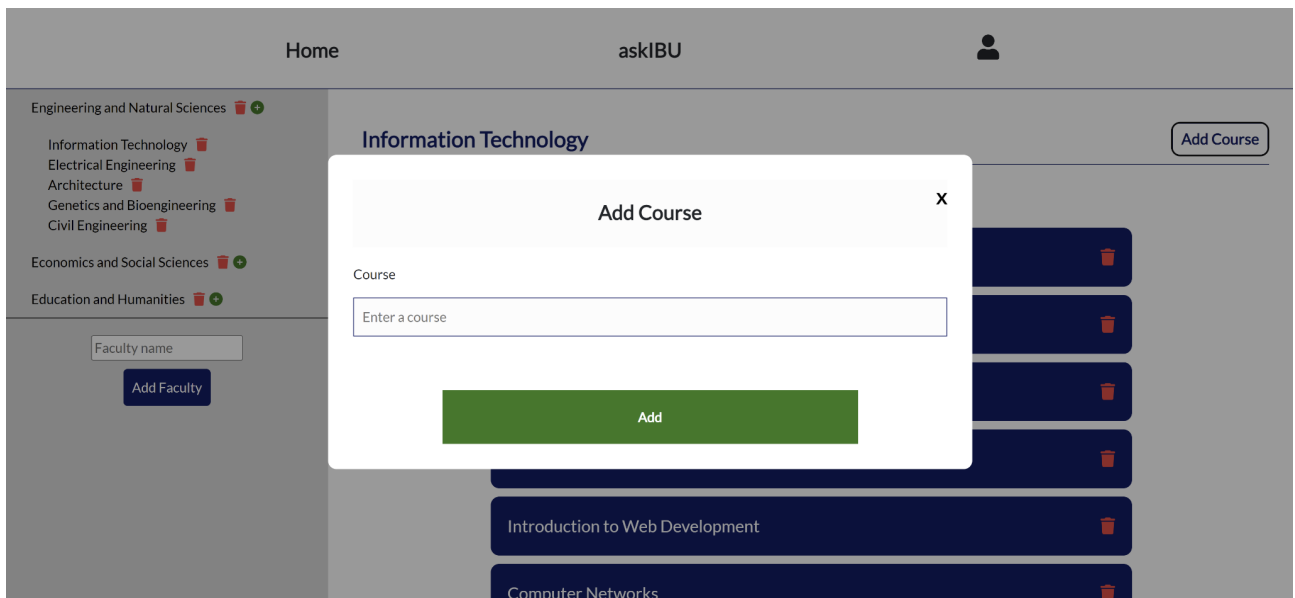Image 3: Choosing a course within a selected department

Image 4: Adding a course to a department via modal

Information Technology → **Machine Learning**   Add question

Project deadline   *Posted at 2022-06-24 18:50:34*
When is the project deadline? I heard that stage II and II   *By Admir Krilašević*
will be submitted together, but can someone confirm?
                                                        Delete   View Answers

What is clustering?   *Posted at 2022-06-24 20:35:04*
Is it unsupervised learning?   *By Admir Krilašević*

                                                        Delete   View Answers

Image 5: Viewing questions for a course

What is clustering?   *Posted at 2022-06-24 20:35:04*
Is it unsupervised learning?   *By Admir Krilašević*

                                                        Delete   Hide Answers

— Yes, it is.   *Posted at 2022-06-24 12:50:23*
                                                                 By Admir Krilašević

                                                                       Add answer

Image 6: Expanding a question and adding an answer

Midterm makeup
When is the midterm makeup?

Posted at 2021-06-28 16:02:25
By Veka Peka

Hide Answers

— Monday.

Posted at 2021-06-28 15:44:40
By Selak Vedran

— It's next monday.

Posted at 2021-06-28 13:14:09
By Selak Vedran

— Yes, at 10.

Posted at 2021-06-28 15:39:41
By Selak Vedran

Image 7: Viewing non-authored thread

Information Technology → Calculus I

Add Question

Add Question

Subject

Body

Add

Hide

Image 8: Adding a question to a course discussion via form

Home askIBU 👤

Profile Settings LOG OUT

User Info

Name

Admir Krilašević

Email

admirkrilasevic@gmail.com

Faculty

Engineering

Image 9a: Account page - profile section

Department

Information Technology

Save Changes

Image 9b: Account page - profile section (scrolled down)

Home askIBU 👤

Profile Settings LOG OUT

Change Password

Current password

New password

Change password

Image 10: Account page - settings section - changing a password

Login

Email

Password

Login

Don't have an account?　　　　　　　　　　**Sign in**

Image 11: Login form

Register

Name

Email

Password

Faculty

Image 12a: Register form

Choose a faculty

Register

Image 12b: Register form (scrolled down)

2. Project Structure

2.1. Technologies

The backend of our project is done in **PHP**, using frameworks like FlightPHP for building our RESTful API, and Swagger for documenting it. The coding standard that we applied is PSR-12, using Intelephense as a code formatter to apply it.

For the frontend, we used **ReactJS** along with the Airbnb JSX coding standard, relying on Prettier and ESLint for formatting. We used additional frameworks, such as Axios, and React Router to implement sending HTTP requests and navigation.

As for the database, it is a **MySQL** database that was accessed via tools such as the MySQL Workbench and SQLYog.

The application is deployed using **Heroku**.

2.2. Database Entities

- users
- questions
- answers
- faculties
- departments
- courses

2.3. Architectural Pattern

The architectural pattern used is the **layered** pattern, and in our case the layers are the:

- data access object (DAO) layer
- business logic (BL) layer
- presentation layer (UI)

We have applied the aforementioned pattern to separate the logic of each layer and work on it independently. This allowed a certain level of abstraction, so that when debugging a certain issue it was easier to identify at which layer the problem is occurring and provided a faster way to resolve it.

Additionally, since this is a paired project, it was easier to organize the workflow in such a way that one of us can work on an implementation in the DAO layer, then the other follows up in the BL layer.

2.4. Design Patterns

- **DAO** - used on backend, in the dao folder
  - As we mentioned above, the architectural pattern that we used is the layered one, which implements a DAO layer, therefore using this design pattern goes hand in hand with the architecture

- **Singleton** - used on frontend, in api.jsx file
    - When using Axios for our API calls, we wanted to make sure that every request gets intercepted and modified by our requirements. Specifically, we wanted to add an authorization header to all of the requests, so that we can always easily identify the user sending it. In this way, we ensured that there is a single Axios instance and that every request is going through it.

3. Conclusion

Our vision for this application was to provide the students with a place to share their questions and doubts, and after implementing it, we certainly think that we have achieved our goal. The forum functions as intended and is fully operable. However, no product is ever perfect, and we think that the greatest improvement that could be made is regarding the user interface design - it could be more appealing to users and utilize a more diverse color scheme.

Additionally, some functionalities that we envisioned were not completely implemented. For example, having a dashboard with the hottest and latest questions would be an interesting feature, and we did create some API endpoints to implement it, but our time constraint did not allow us to go through with it completely.

Luckily, there were no difficulties in the project and we completed all of our tasks with ease, but our time management could have been improved and we could have potentially implemented more interesting features to attract users/students, but in the end, the main goal was achieved.