Software Engineering Internship

An Internship Report for

Course code and Course Title: CSA-652 Industry Internship

Credits: 16

Submitted in partial fulfillment of Masters Degree

In Computer Applications (MCA)

by

SMITA ANANT DIKE

Seat Number: 22P0320051

ABC ID: 438732231161

PRN: 201910377

Under the Mentorship of

MR. RICKY NORONHA / MR. CHIRAG KERKAR

Goa Business School

Computer Science and Technology

GOA UNIVERSITY

Date: June 2024

Examined by: Seal of the School

DECLARATION BY STUDENT

I hereby declare that the data presented in this Internship report entitled, **"Backend Development"** is based on the results of investigations carried out by me in **Online Productivity Solutions Pvt. Ltd.,S-1, Second Floor, Casa de Alegria, Verna, Salcete, Goa**, under the mentorship of **Mr. Ricky Noronha / Mr. Chirag Kerkar** and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will not be responsible for the correctness of observations / experimental or other findings given the internship report/work.

I hereby authorize the University authorities to upload this dissertation on the dissertation repository or anywhere else as the UGC regulations demand and make it available to any one as needed.

Date : **Smita Anant Dike**

Place : Goa University Seat no : 22P0320051

COMPLETION CERTIFICATE

This is to certify that the internship report **"Software Engineering Internship"** is a bonafide work carried out by **Ms. Smita Anant Dike** under my mentorship in partial fulfillment of the requirements for the award of the degree of **MCA** in the Discipline **Computer Science and Technology** at the **Goa Business School, Goa University**.

Date: **Mr. Ricky Noronha** (Director) **Mr. Chirag Kerkar** (Mentor)

Signature of Dean of School School/Department Stamp

Date:

Place: Goa University

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OFFER LETTER

Silver Microsoft Partner

Microsoft Sales Specialist
Server Platform
Private Cloud/Mgt & Virt
Midmarket Solution Provider

Online Productivity Solutions Pvt. Ltd.

OPSPL/PERS/66/2023-2024

26th December 2023

Ms. Smita A. Dike
Corlim – Old Goa
Goa.

Sub: OFFER OF INTERNSHIP

Dear Smita,

This is with reference to your application for an **Internship with our Company** and your subsequent meeting with us at our office.

We are pleased to inform you that we consider you suitable for association with the Company, as a **Software Engineering Intern**, on the following conditions:

- You will be on internship for a maximum period of six months. Your performance within the company and ability to assist with project work assigned to you and learn what is required of you - efficiently and independently.
- On Internship, you will be eligible for a monthly Stipend of **Rs. 8,000/- (Rupees Eight Thousand Only).**
- On completion of the Internship period and on you meeting all required conditions to complete the Internship successfully, your performance will be reviewed and if found satisfactory, you will be offered to regularise your status in the Company.
  On Regularisation, you will be entitled to all Company facilities, incentives and increments thereafter, commensurate with your performance.

This offer to join for Internship is valid till **15th January 2024**, latest by which day you should join.

You are advised to peruse the Company Personnel Policy for the relevant Company rules and regulations as will be applicable to your Internship.

We hope you will justify your association with us by taking this opportunity to perform your duties to the best of your ability.

Regards,

Mr. America (Ricky) Noronha,
Director,
for Online Productivity Solutions Pvt. Ltd.

Online Productivity Solutions Pvt. Ltd.

S-1, Casa de Alegria, Near Panchayat, Verna, Salcette-Goa, 403722, India.
Phones : (+91-832) 2887341 / 2887342, Mobile: 9422439593, TeleFax: (+91-832) 2887342
E-mail : info@opspl.com or support@opspl.com URL : http://www.opspl.com

OPSPL/PERS/66/2023-2024
Ms. Smita A. Dike
Software Engineering Intern

Terms of Internship / Job Description & Responsibilities

In the post **Software Engineering Intern**, you will be required to:

- Assist the in-house Teams develop custom software solutions and work on existing software solutions for our new and existing Company clients.
- Work with the tools and technologies that we use in-house to understand current IT solutions and assist with, specify and develop new solutions as required.
- Work with our in-house Support Team to plan and co-ordinate support for existing clients on Company software projects.
- As an Intern member of the Development Team, we expect that you will also be actively involved in the development of your knowledge on all the areas we work with here.
- Co-ordinate with appointed in-house Guide / Project Team Leader on a regular basis.
- Assist with other areas of the Company's software projects as required.

Please note that:

- You will need to make your own travel arrangements within Goa State. For travel to places out of Goa State, when required for work/training, the Company will make your travel arrangements. For travel and/or stay at places out-of-Goa State, you will be reimbursed on actual expenditure (against bills for the same).
- We are Goa's foremost IT Software Solutions Company. You will need to familiarise yourself with and understand current Best Practices in IT Software Solutions and Services and the testing and implementation of the same, the solutions we develop implement and support for clients and the different tasks and stages therein.
- As an Intern, you will need to work towards being an IT-savvy Software professional, capable of handling software design projects with existing and new clients, to their full satisfaction. Our clients are some of the best-known names in the industry.
- As an Intern with no development experience, we do understand that you may currently have limitations to your knowledge and/or exposure to IT Solutions and support. We trust you will make every endeavour to overcome these in the shortest possible time. On our part, we will provide all the necessary inputs for you to achieve this.

Mr. Americo (Ricky) Noronha
Director,
for Online Productivity Solutions Pvt. Ltd.

Online Productivity Solutions Pvt. Ltd.

INTERNSHIP CERTIFICATE

Microsoft Partner
Silver Hosting
Silver Datacenter
Silver Midmarket Solution Provider

Online Productivity Solutions Pvt. Ltd.

INTERNSHIP CERTIFICATE

This is to certify that Ms. Smita Anant Dike, Student of the Goa Business School, undergoing Masters of Computer Applications has successfully completed Internship between 2nd January 2024 to 31st May 2024 and will be here till end of June 2024; at M/s Online Productivity Solutions Pvt. Ltd.

She actively participated in the activities during the period of internship and learned the skills needed for various activities such as FOSS System Back End Developer Intern.

During her training period, we have found her to be hard working and she has applied herself well to all the work that was assigned to her.

Her attendance and conduct were found to be good and she has been cooperative and sincere.

Mr. Americo B M Noronha
Director,
for Online Productivity Solutions Pvt. Ltd

Verna – Goa
Dated: **31st May 2024**
Ref. No.: **OPSPL/PERS/005/2024-2025**

S-1, Second Floor, Casa de Alegria, Near (old) Verna Panchayat, Verna, Salcette, Goa, 403 722, India.
Mobile: (+91) 94224 39593
: info@opspl.com OR support@opspl.com : http://www.opspl.com
== Microsoft Partner, Linux, PostgreSQL and MySQL registered Consultants ==

ACKNOWLEDGMENT

I would like to express my sincere gratitude to all those who contributed to the success of my internship at Online Productivity Solutions Pvt. Ltd (OPSPL) .

First and foremost, my sincere gratitude to **Mr. Ricky Noronha**, who is the director of OPSPL. I want to thank him for giving me the opportunity to do my internship at his company. He had the kindness to accept me into his company and guide me through my internship with advice and feedback, despite his busy schedule.

I thank my mentor, **Mr. Chirag Kerkar**, for his support and constant supervision, which contributed immensely to my personal development. I also thank him for his guidance, which was a remarkable force that enabled me to successfully complete the internship program. He helped and coached me during my internship by giving me feedback and tips on how to handle and approach situations.

I am also thankful to the rest of the OPSPL staff for their support and guidance, which helped me overcome the challenges I faced during the internship.

I would like to thank my university mentor, **Ms. Yma F. Pinto**, for providing valuable advice and ensuring a smooth transition between my academic and the professional world.

Lastly, I am grateful to Goa University for providing me with the opportunity to serve as an intern, enabling me to acquire invaluable practical knowledge.

My professional development has really benefited from this internship experience, and I am thankful for everyone who helped me make it possible.

EXECUTIVE SUMMARY

❖ Organization

Online Productivity Solutions Pvt. Ltd., established in August 1995, is Goa's oldest IT Solutions Company, offering a wide range of IT services from its verdant location in Verna, Salcette. The company, a SOFTEX registered software services exporter, provides high-quality custom cloud-based system design, app development, software development, networking solutions, IT consultancy, back-office services, and digital marketing. Incorporated by experienced IT professionals, it is a Microsoft Certified Partner and a recognized consultant for Linux, MySQL, and PostgreSQL.

❖ Introduction and tasks handled

I am working at Online Productivity Solutions Pvt. Ltd as a PHP back-end developer. In my role as a PHP back-end developer, I am contributing to the Clin-Ed project for Misericordia University, which specializes in speech-language pathology. My work involves developing APIs using the CodeIgniter 4 framework, PostgreSQL as the database, and Postman for testing and validation. The project includes transitioning from the older CakePHP framework to newer technologies like React JS and CodeIgniter. I focus on understanding project modules, optimizing code, fixing bugs, and creating common functions to reduce redundancy.

My work schedule is Monday to Friday, from 9:00 am to 6:30 pm. My tasks encompass API development, integration with third-party services using JSON Web Token (JWT), PHPMailer, and dompdf, as well as manual testing, error handling, debugging, and using Git for version control. I apply classroom knowledge of DBMS, SQL Queries, and Object-Oriented Concepts to my tasks, which enhances my skills in query optimization, transaction management, design patterns, and error handling.

❖ **Learning**

Through this role, I am gaining practical exposure to PHP, CodeIgniter 4, PostgreSQL, Postman, Git, and SonarLint. I learn to create dynamic web applications, manage databases efficiently, test APIs thoroughly, and maintain high code quality. I introduce innovations in my approach, such as optimizing code by eliminating redundancy, developing new logic for API creation, and creating reusable functions.

❖ **Challenges**

Challenges included optimizing code performance, understanding legacy code, integrating new technologies into existing systems, and managing third-party API integration. Despite these challenges, I consistently met deadlines by providing rough task estimations and addressing issues promptly.

This experience strengthened my ability to manage multiple tasks simultaneously, engage in productive discussions with senior developers, and coordinate effectively with frontend developers.

CHAPTER 1 : ORGANIZATION/COMPANY

M/s Online Productivity Solutions Pvt. Ltd.

Established in August 1995. Goa's oldest IT Solutions Company.

Duly Registered SOFTEX Company and Software Services Exporter.

1.1 Birds-eye-view

- Online Productivity Solutions Pvt. Ltd. is a fully Goan Information Technology company, nestled in the verdant South-Goan village of Verna, Salcette and offering total IT services and solutions.
- Providing the highest quality services to offshore as well as domestic clients in Custom Cloud-based Systems Design and Development, App Development, Customized Software Development, Networking Solutions, IT Consultancy, Back-Office and Digital Marketing Services.
- Incorporated in 1995 by a group of experienced IT professionals, Online Productivity Solutions Pvt. Ltd. has seen the World Wide Web grow and revolutionize the world. Committed to providing the latest and most advanced solutions to partners and clients; Online – Goa is a Microsoft Certified Partner, listed Linux, Enterprise-ready, MySQL and PostgreSQL consultant.

1.2 Services

- Customized Cloud based systems design, development, implementation and support.
- App development across the Microsoft and FOSS development Platforms.
- Outsourced system development and DevOps Solutions being provided to clients in all continents on both the Microsoft and FOSS Platforms.
- Full range of Digital Marketing, SEO and SMM Services.

1.3 Sections within the organization

- Management Team
- Admin, Accounts and HR Team.
- Project Management and Coordination Team
- QA and Testing Team
- FOSS Dev Platform:
    - Back End Development Team (PHP / Python)
    - Front End Development Team (React.Js)
- Microsoft Dev Platform:
    - Back End Development Team (C#, Asp.Net, MS Azure)
    - Front End Development Team. (MS Azure, React.Js)
- UI-UX and Design Team: (React.Js)
- DevOps Team:
    - Microsoft Systems DevOps Team
    - FOSS Systems DevOps Team
- Digital Marketing and Internet research Team

CHAPTER 2 : TASK(S) HANDLED

1.1 Which section(s) I worked in

I am working as a PHP back-end developer on a live project called Clin-Ed. My responsibilities include developing APIs, testing APIs using testing software, debugging existing issues, and working on API changes. These tested APIs are given to the frontend developers for integration. We are using the CodeIgniter 4 framework to develop APIs, PostgreSQL as the project's database, and Postman to test and validate APIs.

In the process of creating APIs, we refer to the old Clin-ED project. The next step is always to understand the given task, module, and its functionalities, including how data is stored in the database, and navigate through various database tables. If I get stuck at any point in time, I always communicate with senior developers or the project head. We try to optimize code by creating common APIs and functions to reduce redundancy. We fix bugs and add new solutions as needed. My work involves developing and maintaining the backend functionalities of the Clin-Ed project.

2.2 Working schedule

- Work Days : Monday to Friday
- Work Timing : 9:00 am to 6:30 pm
- I start my day by reviewing my tasks and priorities for the day. Then I move on to my tasks, such as developing new APIs, testing them using Postman, and solving backend related issues. I attend team meetings with seniors to discuss progress, challenges, and next steps. I review and debug code and collaborate with front-end developers to ensure seamless integration.

- Weekly Schedule from January to May :

Month	Date	Task
January	02/01/2024 – 05/01/2024	• Explored introductory topics in PHP, Codeigniter 4, MySQL, Postgre SQL, MVC architecture, routing and Postman. • Created databases, tables, and established connections using Codeigniter 4.
	08/01/2024 – 12/01/2024	• Implemented CRUD operations, including reading, inserting, updating, and deleting data from the database. • Researched HTTP status codes, validation rules, JWT authentication, and Git commands. • Studied helper functions, naming conventions, and structural elements in Codeigniter 4.
	15/01/2024 – 19/01/2024	• Explored SQL queries, including joins, group by, concat, orderBy, and subqueries. • Integrated email functionality using built-in and custom email libraries.
	22/01/2024 – 25/01/2024	• Worked on optimizing code for better performance. • Developed APIs for user roles and GPA levels.
	29/01/2024 – 31/01/2024	• Developed APIs for student gpa.

Month	Date	Task
February	01/02/2024 – 02/02/2024	• Modified the save GPA levels API. • Created API to save student GPA. • Attended sessions on databases.
	05/02/2024 – 09/02/2024	• Created APIs to get dismissed students and to update dismissed student status. • Attended a meeting to understand project overview.
	12/02/2024 – 16/02/2024	• Continued development of APIs for saving student GPA, getting dismissed students, and updating dismissed student status. • Worked on creating an API to get GPA history of students. • Modified the get user roles API.
	19/02/2024 – 23/02/2024	• Continued development of APIs to get student GPA history. • Created an API to generate a PDF for the dismissed students list. • Worked on creating an API to get mentor students details.
	26/02/2024 – 29/02/2024	• Completed the development of APIs to get mentor students details.

Month	Date	Task
March	01/03/2024 – 08/03/2024	• Created functions and APIs for assigning or reassigning mentors. • Developed an API to change mentor status and promote students. • Implemented APIs to get promoted students and student course details.
	11/03/2024 – 15/03/2024	• Worked on creating an API to retrieve student course details and curriculum information. • Implemented functions and APIs for saving student assessment documents and course details.
	18/03/2024 – 22/03/2024	• Completed the development of APIs to save student course details and assessment documents. • Implemented functions for uploading assessment documents and managing student course details. • Created API to delete particular student's course. • Created API to approve or disapprove student assessment.
	25/03/2024 – 29/03/2024	• Implemented common function to get student course list from staff and student side. • Created APIs to update student mentor request status and to generate and download pdf of student courses. • Worked on changes of Student Gpa module.

Month	Date	Task
April	01/04/2024 – 05/04/2024	• Modified save student Gpa API and Gpa history API. • Worked on issue of change password and reset password API. • Created API to download student assessment document and also created common function to generate pdf using mpdf library.
	08/04/2024 – 12/04/2024	• Modified reset password API. • Created API and model function to get list of all questions of particular survey. • Created API to add new question to the particular survey.
	15/04/2024 – 16/04/2024	• Created APIs to edit survey questions and to delete particular question of the survey. • Created APIs to download pdf of survey questions and to change or update order of survey question.
	25/04/2024 – 26/04/2024	• Worked on changes of Edit questions API. • Worked on Internship Report.
	29/04/2024 – 30/04/2024	• Worked on Internship Report.

Month	Date	Task
May	01/05/2024 – 03/05/2024	• Modified Gpa history API to get Gpa data of previous semester. • Worked on issue of forgot / reset password API.
	06/05/2024 – 10/05/2024	• Created API to get recipients of custom survey. • Modified get student courses API and add courses API.
	13/05/2024 – 17/05/2024	• Created common functions for student courses so that APIs (get courses, add courses, save courses, delete courses) can be accessed from staff and student side. • Worked on changes of student assessment and mentors API. • Modified Gpa history API to get Gpa history of single student.
	20/05/2024 – 24/05/2024	• Worked on issue of forgot password and tested the API to check if mails are sent or not. • Worked on changes of survey recipients API and student gpa API.
	27/05/2024 – 31/05/2024	• Modified mentors API to get list of transfer students and made changes in user roles API. • Created send other survey API to send survey emails to faculty and students. • Modified export courses pdf API and view files of courses pdf.

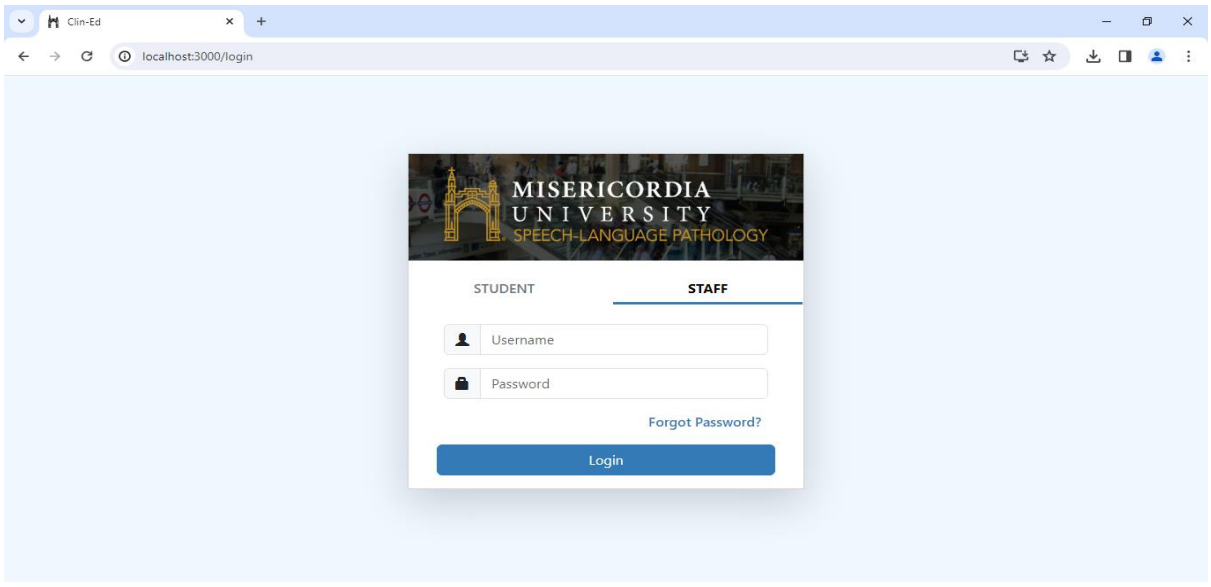
2.3 Type of task(s)

- API development
    - API development is the process of creating a set of instructions, standards and requirements that enable the frontend and backend system to communicate with each other.
- Integration with third party services
    - JSON Web Token (JWT) is an open standard that defines a compact and self-contained way for securely transmitting information between parties as a JSON object.
    - Installation of PHPMailer and sending emails by using PHPMailer.
    - Installation of dompdf library and generating pdf using dompdf.
- Testing
    - Manual testing of APIs using Postman.
- Error Handling
    - Error handling typically deals with scenarios that can be anticipated and managed, such as a user entering invalid data.
    - Try and catch are the blocks with the feature of exception handling, which contain the code to handle exceptions. They play an important role in exception handling.
- Debugging / Handling Issues
    - Handling issues of APIs which are developed by other team members such as forgot-password, change-password, reset password.
- Collaboration
    - Git is a distributed version control system that enables software development teams to have multiple local copies of the project's codebase independent of each other.
    - These copies, or branches, can be created, merged, and deleted quickly, empowering teams to experiment with little compute cost, before merging into the main branch. Git is known for its speed, workflow compatibility, and open source foundation.
- Common functions : Created common function for generating pdf using mpdf.

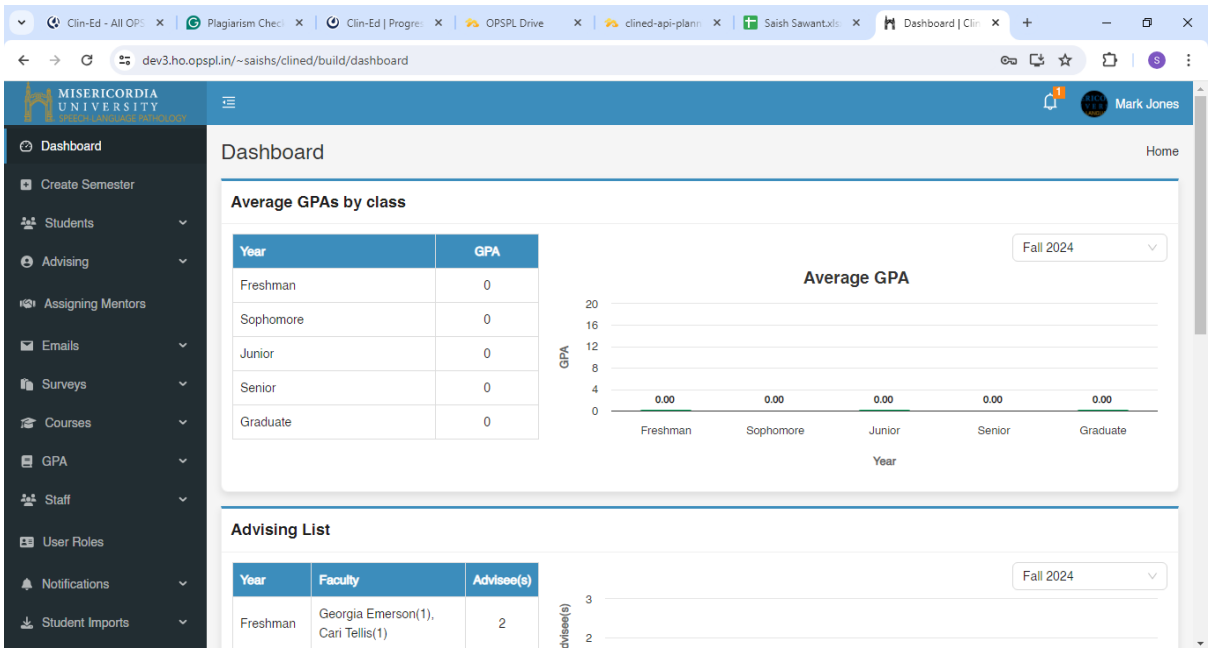
2.4 Hands-on experience

- ❖ I am currently working as a backend developer on a live project called Clin-Ed.
- ❖ The client for this project is Misericordia University, which specializes in speech-language pathology. It was initiated in 2017.
- ❖ The project consists of mainly two components: academic and clinical.
- ❖ The academic or educational component of the Clin-Ed project was completed, deployed, and in use before the COVID-19 pandemic, but the clinical part was put on hold due to the pandemic. After the pandemic, it was decided to restart the project, focusing on its clinical part using new technologies such as React JS and CodeIgniter.
- ❖ To ensure seamless integration, the educational part, which was originally developed with the CakePHP framework, is also being converted to these new technologies.

➢ Login page :

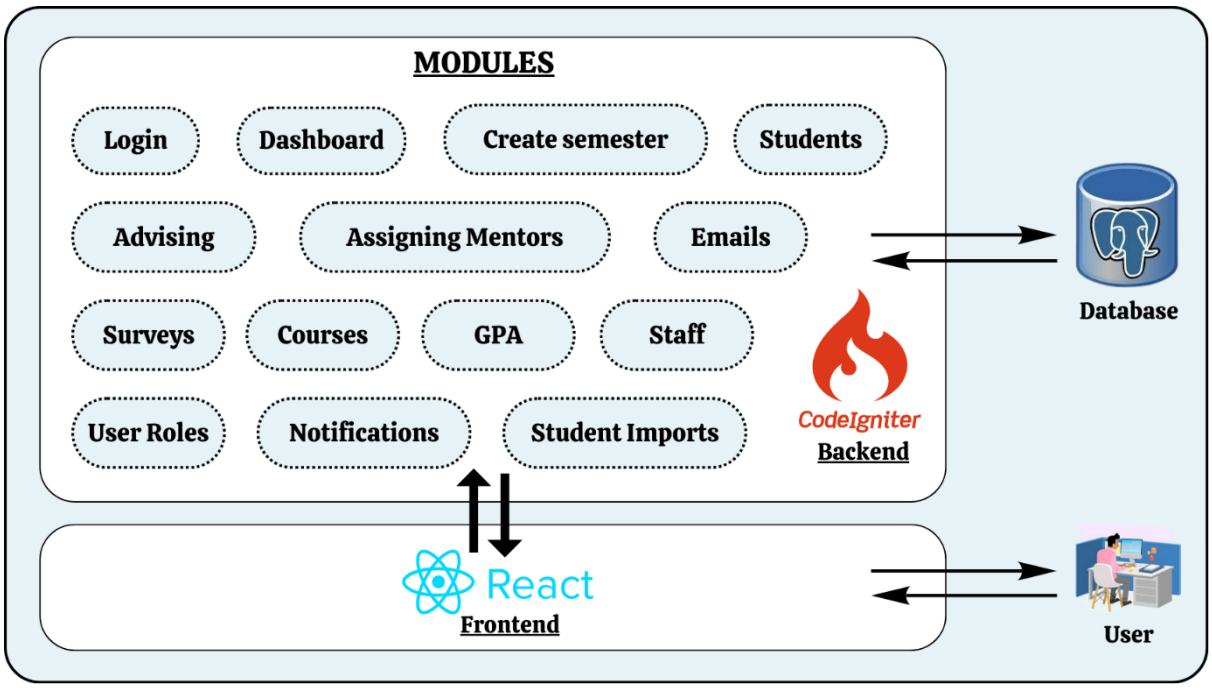


- Dashboard page



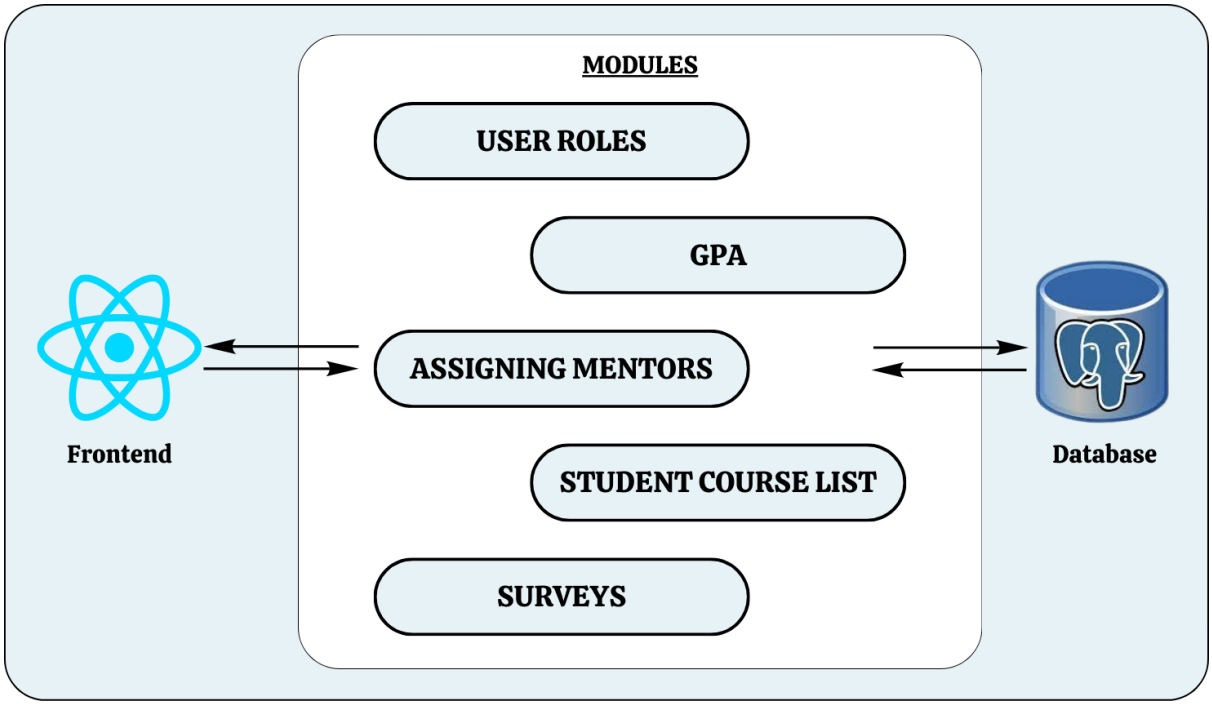
- **Overview of Clin-Ed project**

  The following figure showcases all the modules of the Clin-Ed project, the technologies used, and how the user interacts with the website.

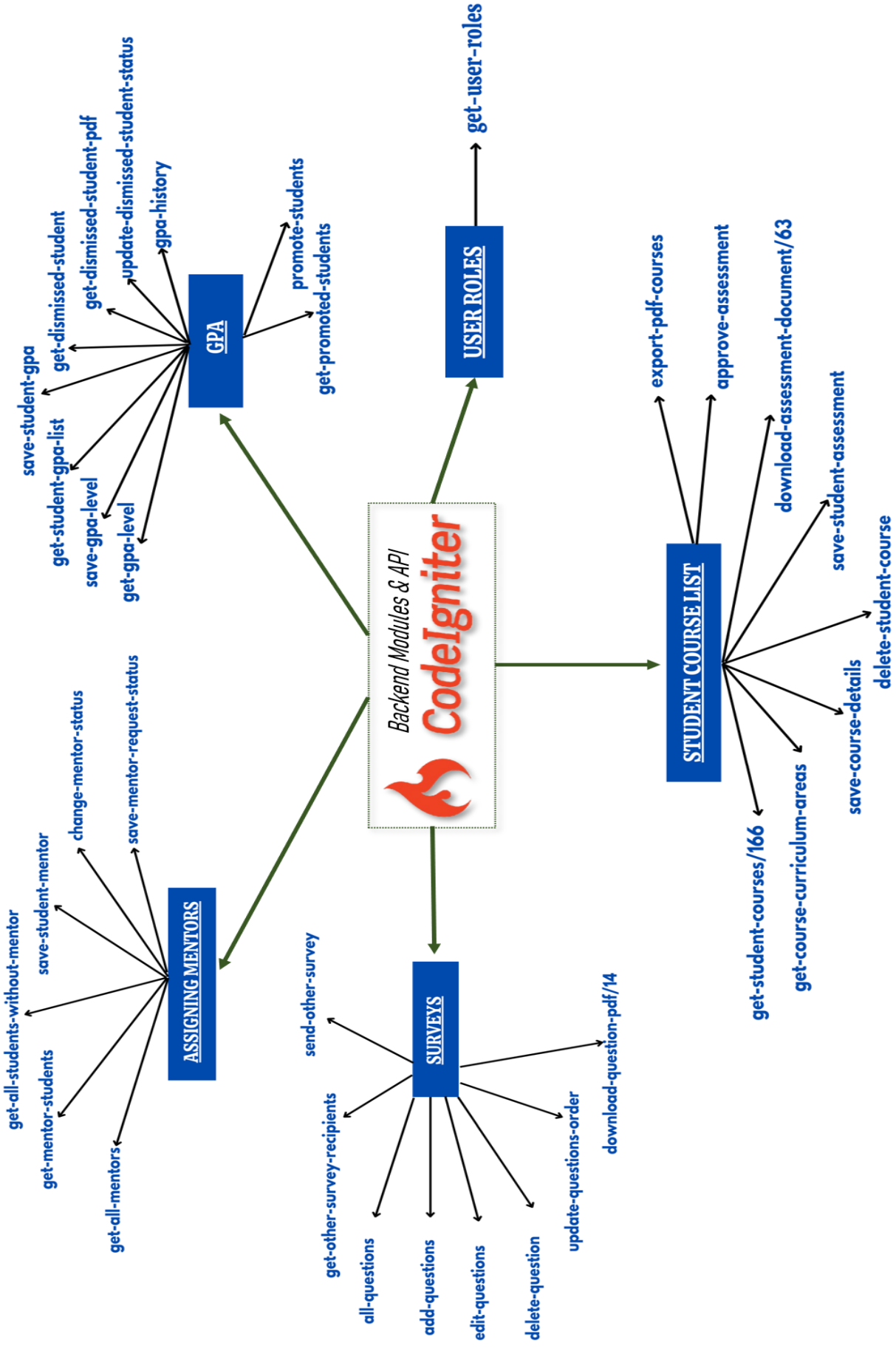


- **API modules developed by me**

The following figure shows the modules that I worked on:



API List : APIs developed under each module



Description of APIs

1) User Roles

User roles displays a table showing the number of faculties in each role and the names of the active and inactive faculty in each role.

a) get-user-roles : This API retrieves all the active and inactive faculty with their role, name and count of active and inactive faculty.

2) GPA

a) Academic Specification

The admin can view and set minimum GPA specification or GPA level for each Semester with respect to each year.

i) get-gpa-levels : This API retrieves all the specified GPA levels of each year with respect to each semester.

ii) save-gpa-levels: This API is used to save new GPA specification or level for a particular year and semester and also can be used to update the existing GPA level of the year and semester.

b) Student GPA

The admin can view GPA of all students and also can set or update GPA for all students in the list. The user can filter the students based on their type, year and status using the drop-down menus provided.

i) get-student-gpa-list : This API retrieves GPA of all current year students with their names, active status and other necessary fields.

ii) save-student-gpa : This API is used to save new GPA for students and also can be used to update the existing GPA of a student.

iii) get-promoted-students : This API retrieves details of students who are eligible to get promoted to next semester.

iv) promote-students : promote-students API is used to promote selected students to new semester.

c) Dismissed List

Dismissed List displays lists of all the students who are dismissed. The drop down menus can be used to filter students based on type a year.

i) get-dismissed-list : Retrieves all dismissed students.

ii) update-dismissed-student-status : Selecting a student allows user to activate a deactivated student and vice versa.

iii) get-dismissed-list.pdf: This API generates and downloads the dismissed list pdf.

d) GPA History

Shows a table with all the students with their GPA for each semester and year.

i) Gpa-history : Retrieves GPA of students for previous year and current year

.

3) Assigning Mentors

a) get-all-mentors : This API will display a list of students who have not yet accepted the mentor request, list of students who have accepted the mentor request and list of all students who have rejected the mentor request email.

b) get-all-students-without-mentor : Retrieves details of current year students who do not have a mentor yet.

c) get-mentor-students : Retrieves details of student who has already been assigned a mentor.

d) save-student-mentor : The user can assign or reassign new mentor to the student.

e) Change-mentor-status : This API is used to change status of student that is if the student is mentor than he is moved to the list under rejecting request and vice versa.

f) save-mentor-request-status : The answer of student to the mentor request is saved through this API.

4) Student Course List

a) get-student-courses : This API retrieves all the courses a student has opted for in current year and semester and also retrieves previous year courses of student.

b) get-course-curriculum-areas : Retrieves list of courses which are not taken by student in current year.

c) save-course-details : This API is used to save new course for a particular student and also used to update the current course of student.

d) delete-student-course : The user can delete a particular course which is taken by student.

e) approve-assessment : The admin or faculty can approve or disapprove assessment taken by student.

f) download-assessment-document : This API downloads the assessment file submitted by student.

g) export-pdf-courses : This API generates and downloads the pdf of courses which are taken by student in current year and in previous year (using mpdf library).

h) save-student-assessment : The student can taken assessments and it will be stored using this API in database.

5) Survey Questions

a) all-questions : This API retrieves all the list of questions of a particular survey.

b) add-questions : This API is used to add new questions to the particular survey.

c) edit-questions : This API is used to edit or update questions of the survey.

d) delete-question: Deletes particular question of the survey.

e) download-question-pdf : This API is used to download pdf of all the questions of survey.

f) update-questions-order : Used to update order of questions in which they are displayed.

6) **Send Survey**

   a) get-other-survey-recipients : Retrieves details of students and faculty to whom survey can be send.

   b) send-other-survey : This API is used to send custom survey email to students and faculty.

I was tasked with working on APIs initially developed by another team member. My responsibilities included resolving existing issues and making necessary enhancements.

7) **Forgot Password and Reset password**

   a) I worked on changes of forgot password API and reset password API.

      Above tasks performed include:

      - Debugging and Issue Resolution: I identified and fixed bugs in the API, which improved its reliability and performance.
      - Enhancements and New Features: I added new endpoints and features to the API, ensuring they aligned with the evolving project requirements.

2.5 Relationship of the task with the course I studied in the classroom

- DBMS and SQL Queries
    - The Basics of DBMS: DBMS Course provides good knowledge about how data is organized, stored, and retrieved in databases.
    - SQL Queries : Through the DBMS course, I gained knowledge of writing queries to perform operations like insertion, updating, data retrieval, and deletion.
    - SQL Query Optimization : Students are made familiar with SQL commands and optimization techniques within the DBMS course. This knowledge is important for PHP backend developers, as the ability to construct optimized SQL queries facilitates essential database operations such as insertion, updating, data retrieval, and deletion.
    - Transaction Management : Understanding transaction management principles taught in DBMS courses is important for ensuring data integrity and consistency in backend systems. I specifically use it when we insert or update a record.

- Object-Oriented Concepts
    - Design Patterns: A good understanding of design patterns such as MVC (Model-View-Controller) helps in developing scalable and maintainable PHP applications.
    - OOP Concepts: OOP concepts provide knowledge about abstraction, encapsulation and inheritance, which enable the creation of easy, simple and maintainable code.
    - Reusability and Modularity: OOP encourages code reusability and modularity.
    - Error Handling and Transactions: Considerations pertaining to error handling and transaction management within database systems are typically addressed in OOP concepts.
    - PHP backend developers must adeptly manage errors and ensure data integrity through proficient transaction handling during database operations within their applications.

CHAPTER 3 : LEARNING

3.1 What did you learn from the practical exposure

- **PHP**
  - PHP (Hypertext Preprocessor) is a versatile and widely used server-side scripting language for creating dynamic and interactive web applications.
  - It is an open-source, interpreted, object-oriented server-side scripting language for web development.

- **CODEIGNITER 4**
  - CodeIgniter is an Application Development Framework - a toolkit - for people who build websites using PHP.
  - Its goal is to enable you to develop projects much faster than you could if you were writing code from scratch, by providing a rich set of libraries for commonly needed tasks, as well as a simple interface and logical structure to access these libraries.
  - Core Features of CodeIgniter
    - CodeIgniter is an MVC framework with a small footprint.
    - This framework gives exceptional performance.
    - This is an MVC framework with zero configuration.
    - No command-line configuration setup or dependencies installation to start.
    - No need to learn about advanced concepts like PEAR.
    - No need to learn template engine rendering.
    - Simple, Clear and easy to understand documentation.

- **POSTGRESQL**
  - PostgreSQL is an advanced relational database system. It supports both relational (SQL) and non-relational (JSON) queries. It is free and open-source.
  - Features :
    - **Postgres is an ORDBMS**

      Postgres is often categorized as an ORDBMS due to its ability to handle complex data types and store and retrieve objects.
    - **ACID compliance**

      Postgres has the four properties of ACID complianc to make sure that database transactions are handled reliably.
    - **Extensibility and High performance**

      The database supports a wide range of data types and can be easily extended with custom functions and operators and it is known for its high performance, especially when handling large amounts of data and complex queries.

- **POSTMAN**
  - Postman is an API development and testing platform that offers a variety of features. It allows developers to easily create and share API requests and collections, automate testing, mock APIs, and monitor performance.
  - Features of Postman :
    - The Postman API : It allows you to programmatically access data stored in your Postman account. Perform all the classic CRUD operations on your collections, environments, mocks, and more.
    - Postman Visualizer : Postman provides a programmable way to visually represent your request responses.
    - Built-in Libraries : Postman has a suite of external libraries available to use in the Pre-request and Test script tabs.

- Workflow Control : In a collection with multiple requests, oftentimes it makes sense for the requests to be run in sequential order.

❖ Git

- Git allows me to manage and track changes in my codebase efficiently and facilitates collaboration with other developers by enabling branching, merging, and pull requests.
- It provides a reliable backup of the code and helps in recovering previous versions when needed.

❖ Sonar Lint

- SonarLint helps in identifying and fixing coding issues on the fly, ensuring higher code quality.
- Performs static analysis to detect bugs, vulnerabilities, and code smells early in the development process and enforces coding standards and best practices, leading to more maintainable and readable code.

3.2 Innovative in handling tasks

I had the opportunity to introduce innovative practices that will improve the efficiency and quality of the codes and API outputs.

- I took the initiative to optimize my code by identifying and avoiding duplicate code segments and refactoring the code into reusable functions and modules.
- Instead of relying on the logic used in previous tasks and functions, I used my own logic and understanding to create or develop APIs and solve problems.
- Also created common functions, which helped in reducing most of the duplicate codes.

3.3 Expectation of Reporting Officer

- As a backend developer, my primary strength is managing multiple tasks at once. This includes developing APIs, resolving issues, engaging in discussions with senior developers, and coordinating with frontend developers.

- Throughout the internship process, I worked with my mentor and senior developers, ensuring that all tasks were completed to their satisfaction. I was able to match their expectations by delivering good-quality work within stipulated timelines and adhering to best practices.

CHAPTER 4 : CHALLENGES

- Performance Optimization: Optimizing queries and code performance is important to handle large amounts of data.
- Research and learning : Exploring and learning by referring to an old Clin-ED website to create new APIs and understanding the flow of work is challenging.
- New technology: Learning new technologies and merging them into existing systems can be difficult.
- Integration Challenges: Integrating projects with third-party APIs or services can be challenging in terms of managing data formats and ensuring compatibility.
- Working on another developer's code: Working with another developer's code requires understanding their approach and making adjustments accordingly.
- Version control system: Managing code changes and rolling back changes can be challenging.

4.1 The activity that I was unaware about

- I was unaware about the payloads and API testing.
- Payloads: Payloads serve as the medium for exchanging information within APIs, web application requests and responses and communication protocol messages.
- API testing: Postman is a tool for API testing providing user-friendly interface to send requests, receive responses, and validate API behaviour.

4.2 Meeting the deadlines

Mentor or I provide rough task estimations and we usually finish them before or on time.

Sometimes due to insufficient information or changes in requirements, tasks may become challenging, leading to delays in completion as additional time is needed to overcome difficulties.

Appendix I

SAMPLES OF THE WORK DONE

❖ Controller function : (API)

```php
/**
* API: staff/get-user-roles
* Method: GET
* Description: API to retrieve user roles.
*/
public function getUserRoles() {
    try {
        $userRoles = $this->facultiesModel->getUserList();
        if (!empty($userRoles)) {
            $this->respondWithData(DATA_SUCCESS, $userRoles);
        } else {
            $this->respondWithData(NO_DATA, null);
        }
    } catch (\Exception $e) {
            $errorMessage = DATABASE_ERROR . $e->getMessage();
            return $this->respondWithData(null, $errorMessage);
    }
}
```

❖ Model function

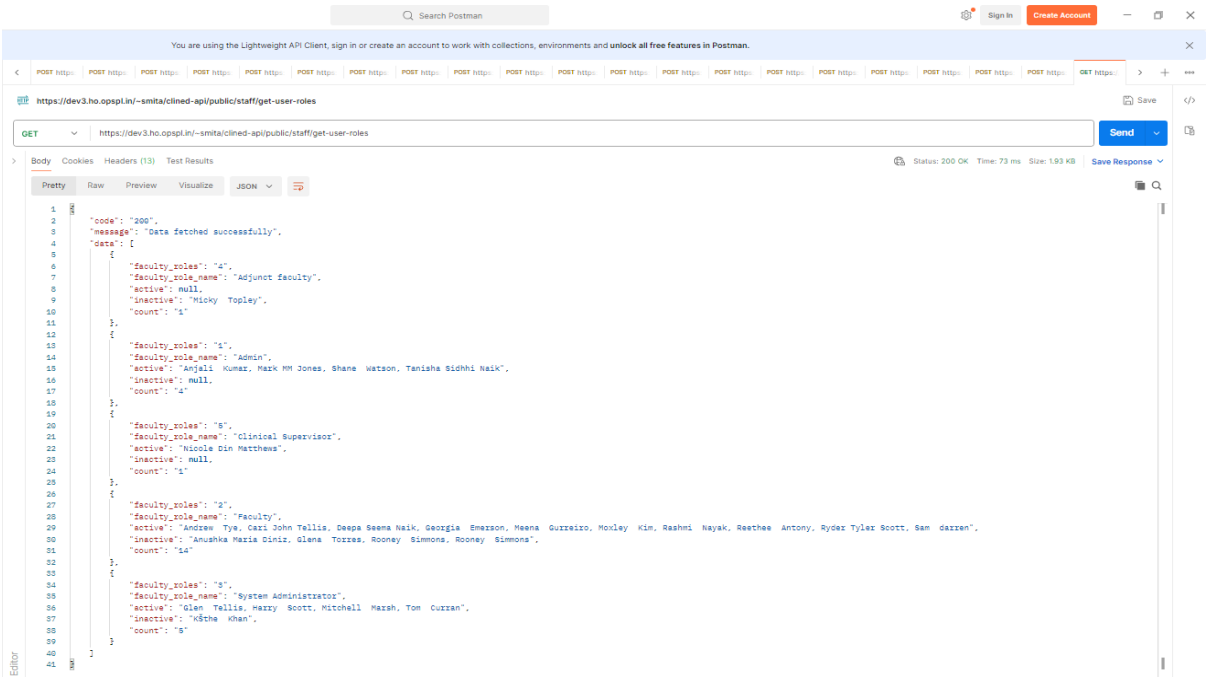
```php
/*Function to get user list*/
public function getUserList() {
    $userQuery = "SELECT faculty_roles,
    (CASE WHEN faculty_roles = 1 THEN 'Admin'
          WHEN faculty_roles = 2 THEN 'Faculty'
          WHEN faculty_roles = 3 THEN 'System Administrator'
          WHEN faculty_roles = 4 THEN 'Adjunct faculty'
          WHEN faculty_roles = 5 THEN 'Clinical Supervisor' ELSE NULL END) AS faculty_role_name,
    STRING_AGG(CASE WHEN is_active = 1
                    THEN CONCAT(faculty_first_name, ' ', COALESCE(faculty_middle_name, ''), ' ', faculty_last_name) END, ', ' ORDER BY faculty_first_name) AS Active,
    STRING_AGG(CASE WHEN (is_active = 0 OR is_active = 2)
                    THEN CONCAT(faculty_first_name, ' ', COALESCE(faculty_middle_name, ''), ' ', faculty_last_name) END, ', ' ORDER BY faculty_first_name) AS Inactive,
    COUNT(CASE WHEN is_active IN (0, 1, 2) THEN 1 END) AS count FROM faculties GROUP BY faculty_roles ORDER BY faculty_role_name";
    return $this->db->query($userQuery)->getResult();
}
```

❖ API Route

```php
$routes->get('get-user-roles', 'Staff\FacultiesController::getUserRoles');
```

❖ Postman

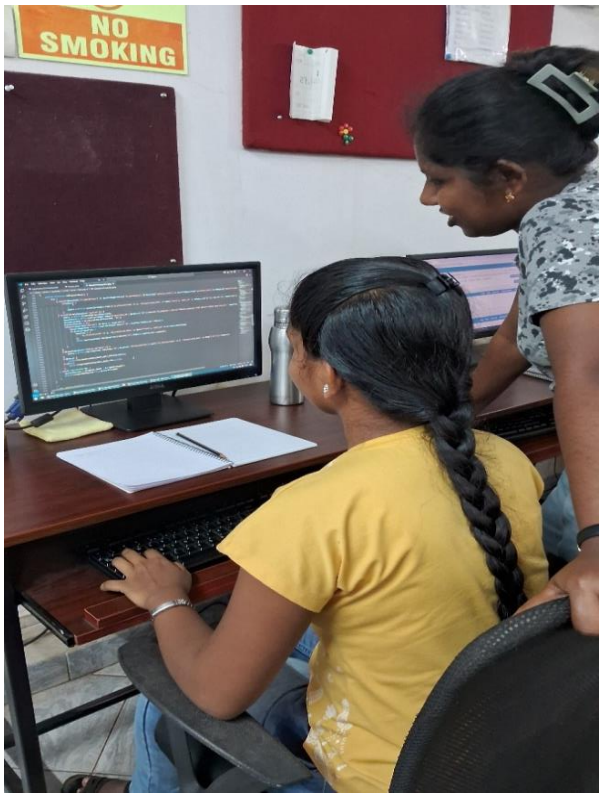
Response of get-user-roles API.




```
{
"code": "200",
"message": "Data fetched successfully",
"data": [
    {
        "faculty_roles": "4",
        "faculty_role_name": "Adjunct faculty",
        "active": null,
        "inactive": "Micky  Topley",
        "count": "1"
    },
    {
        "faculty_roles": "1",
        "faculty_role_name": "Admin",
        "active": "Anjali  Kumar, Mark MM Jones, Shane  Watson, Tanisha Sidhhi Naik",
        "inactive": null,
        "count": "2"
    },
    {
        "faculty_roles": "5",
        "faculty_role_name": "Clinical Supervisor",
        "active": "Nicole Din Matthews",
        "inactive": null,
        "count": "1"
    },
    {
        "faculty_roles": "2",
        "faculty_role_name": "Faculty",
        "active": "Andrew  Tye, Cari John Tellis, Deepa Seema Naik, Georgia  Emerson, Meena  Gurreiro, Moxley  Kim, Rashmi  Nayak, Reethee  Antony, Ryder Tyler Scott, Sam  darren",
        "inactive": "Anushka Maria Diniz, Glena  Torres, Rooney  Simmons, Rooney  Simmons",
        "count": "14"
    },
    {
        "faculty_roles": "3",
        "faculty_role_name": "System Administrator",
        "active": "Glen  Tellis, Harry  Scott, Mitchell  Marsh, Tom  Curran",
        "inactive": "KŠtha  Khan",
        "count": "5"
    }
]
```

Appendix II

PHOTOS WHILE I AM AT WORK


NO
SMOKING