Software Engineering Intern

An internship report for

Course code and Course title: CSA-652 & Industry Internship

Credits: 16

Submitted in partial fulfilment of Master's Degree

in Computer Application

by

SMILEE LOPES

Seat Number: 22P0320050

ABC ID: 933017958094

PRN: 201910452

Under the Mentorship of

RICKY NORONHA / KEERTHI REVANKAR

Goa Business School

Computer Science & 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, "**Clin-Ed backend developer"** is based on the results of investigations carried out by me in the **Computer Science & Technology** at the **Online Productivity Solutions Pvt. Ltd**.,**S-1, Second Floor, Casa de Alegria, Verna, Salcette, Goa**, under the mentorship of **Mr. Ricky Noronha / Ms. Keerthi Revankar** and the same have not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University will not be responsible for the correctness of observations/experimental or other findings given the internship report.

I hereby authorize the University 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.

Smilee Lopes

Signature and Name of Student

Seat no: 22P0320050

Date: 5th June 2024

Place: Goa University

COMPLETION CERTIFICATE

This is to certify that the internship report **"Software Engineering Intern"** is a bonafide work carried out by **Ms. Smilee Lopes** under my mentorship in partial fulfilment of the requirements for the award of the degree of **MCA** in the Discipline **Computer Science & Technology** at the **Goa Business School, Goa University**.

Ricky Noronha / Keerthi Revankar

Date: Signature and Name of Mentor

Signature of Dean of School School 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/65/2023-2024

26th December 2023

Ms. Smilee Lopes
H. No. 917, Saleria,
Goa- Velha, Tiswasdi,
Goa, 403108.

Sub: OFFER OF INTERNSHIP

Dear Smilee,

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

Online Productivity Solutions Pvt. Ltd.

OPSPL/PERS/65/2023-2024
Ms. Smilee Lopes
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

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

Online
Productivity
Solutions Pvt. Ltd.

INTERNSHIP CERTIFICATE

This is to certify that Ms. Smilee Lopes, 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.

ONLINE PRODUCTIVITY SOLUTIONS PVT. LTD. GOA

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

Verna – Goa
Dated: **31st May 2024**
Ref. No.: **OPSPL/PERS/004/2024-2025**

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

ACKNOWLEDGEMENT

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**, 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, **Ms. Keerthi Revankar**, for her support and constant supervision, which contributed immensely to my personal development. I also thank her for her guidance, which was a remarkable force that enabled me to successfully complete the internship program. She 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 /Company

Online Productivity Solutions Pvt. Ltd. (OPSPL) was established in August 1995, making it Goa's oldest IT Solutions Company. They offer various IT services to clients both locally and internationally. With a strong team covering different areas like management, administration, project coordination, quality assurance, and digital marketing, OPSPL efficiently meets the needs of its clients.

Task(s) Handled

I am working as a PHP back-end developer on the Clin-Ed project, using CodeIgniter 4 to build APIs, PostgreSQL for the database, and Postman for testing. My work involves understanding the old Clin-Ed project, developing APIs, fixing bugs, and adding new features. I optimize code by creating common functions. Tasks include file uploads, image conversions, API creation, testing modules, documenting and integrating email and Excel file services. I use Git for version control, and debug APIs. I use knowledge from my Database Management Systems (DBMS) and Object-Oriented Programming (OOP) courses. My work schedule is 9:00 AM to 6:30 PM, Monday to Friday.

Learning

I have improved my skills in PHP, CI4, SonarLint, Git, and Postman by working on the Clin-Ed project. I built useful common APIs like get-faculty-list and get-survey-report and simplified code by creating common functions for image conversion, string trimming, and multiple file uploads. Not only that, but I improved existing APIs to make data filtering and presentation better in the import module. This helped reduce repetitive code and improve validation. I found that I love learning new technologies and prefer automation testing compared to manual testing. My skills match what my mentor expects, especially in testing and debugging.

Challenges

Dealing with challenges such as understanding old systems, improving performance, and integrating new technology, I encountered unexpected tasks like testing APIs, handling payloads, and creating thumbnails. Although I typically meet deadlines based on rough estimates, delays occasionally occur due to unclear information or changes in tasks.

CHAPTER 1: ORGANISATION/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 Products/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 Company

- 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

2.1 Which section(s) you worked in

I am working as a PHP back-end developer on the Clin-Ed project. 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, I refer to the existing Clin-Ed project. The next step is 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 used to communicate with senior developers or the project head. We as a team try to optimise code by creating common APIs and functions to reduce redundancy. We fix bugs and add new solutions as needed. My work involves in developing and maintaining the backend functionalities of the Clin-Ed project.

2.2 Your working schedule

The working hours are from 9:00 AM to 6:30 PM, five days a week (Monday - Friday).

2.2.1 Gantt Chart

Fig: Explains internship journey

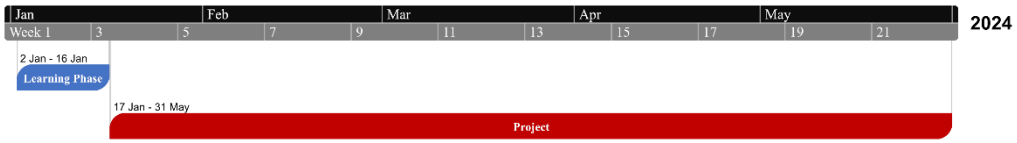


Fig: Learning Phase

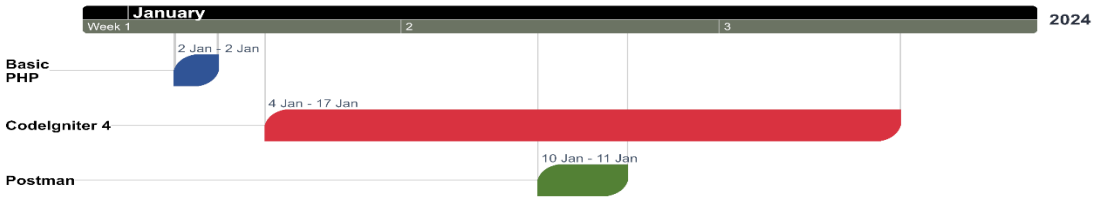
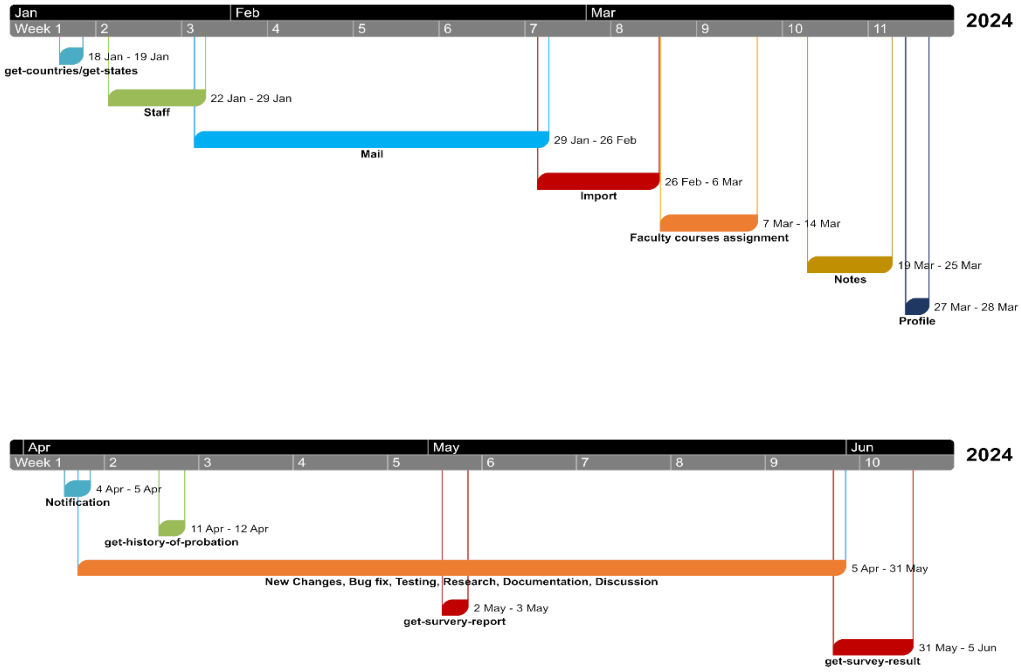


Fig: Project Phase



2.2.2 Weekly Diary

Week 1 (2nd Jan 2024 – 5th Jan 2024)

- Contract signing.
- Understanding standards and guidelines need to be used by the developer.
- Meetings with the director:
  1. Discuss the internship process.
  2. Project assign.
- Learnt basic PHP and CodeIgniter 4.

Week 2 (8th Jan 2024 - 12th Jan 2024)

- Add, edit, list, and search for added data.
- Basic Postman (Restful API).
- upload and download of pdf.

Week 3 (15th Jan 2024 - 19th Jan 2024)

- Import, edit, and upload Excel sheet.
- Email configuration.
- Overview of the project.
- Presentation on setting up CI4.
- Get-countries & get-states API completed.

Week 4 (22nd Jan 2024 -26th Jan 2024)

- Add-faculty, get-faculty-list, get-faculty-list-id API completed.
- Presentation on error handling and logging.

Week 5 (29th Jan 2024 – 2nd Feb 2024)

- Edit-faculty, get-mail-details, get-mail-report API completed.
- Meetings:
    1. Reporting work done till now on the project.
    2. Various DB used.
    3. Regarding uncomfortable situations at the workplace.
- Presentation by seniors on the topic of what not to do.
- Research for mail-type API.

Week 6 (5th Feb 2024 – 9th Feb 2024)

- Mail-type API completed.
- Worked on queries needed for get-recipient API and code for a few recipients.
- Meeting on overview of the project we are working on.

Week 7 (12th Feb 2024 - 16th Feb 2024)

- Completed get-recipient API.
- Send-mail API (send for a few types (Faculty & students) of mail & attachment completed).

Week 8 (19th Feb 2024 – 23rd Feb 2024)

- Send-mail (other (type of mail), save in DB, resend, mail-list).
- Mail-type needed changes.

Week 9 (26th Feb 2024 – 1st Mar 2024)

- Send-mail (validation) API completed.
- Library set up, initial-import API completed.
- Meeting about presentation in university.

Week 10 (4th Mar 2024– 8th Mar 2024)

- Id-import, asha-psha-import, save-record, get-faculty-courses API completed.

Week 11 (18th Mar 2024 – 22nd Mar 2024)

- Get-section, assign & re-assign courses to faculty, get-faulty-courses-history API completed.
- Get-faculty-list & get-faculty-list, edit-faculty API edited as per faculty profile needed.

Week 12 (25th Mar 2024 - 28th Mar 2024)

- Add-student-notes-esign, student-dashboard, save-student-notes-history, other-history-notes-list API completed.

Week 13 (1st April 2024 – 5th Apr 2024)

- Download-notes-documents, get-advisor-student-assign-details, save-student-profile API completed.
- Created common function to download files from the database.
- Research on surveys questions
- Login API pass is_advisor field.

Week 14 (8th Apr 2024 – 12th Apr 2024)

- Get-note-for-single-student, notification-set-viewed API completed.
- Added disclamer in Send-mail API.
- Get-all-notification, add-student-note-esign, get-student-data and login API changes.

Week 15 (15th Apr 2024 - 19th Apr 2024)

- Send-mail API optimization of code.
- Changes in other-history-notes-list, get-faculty-courses and save-student-record API.
- Get-mail-report query changed.
- Added order by clause in get-all-recipients, get-faculty-courses, get-mail-details API.
- Get-students-history-of-probation API completed.

Week 16 (22nd Apr 2024 – 26th Apr 2024)

- Changes in student-dashboard, student-registration, student-initial-import, get-all-courses, login, get-all-recipient, get-student-listing and get-all-mentor API.
- Testing student-listing, student-registration, student-edit and get-all-recipient API.

Week 17 (29th Apr 2024 – 3rd May 2024)

- get-faculty-courses-history, get-student-list, get-mail-report, send-mail, get-all-recipient changes.
- To login use university email changes in API login, check-username, forgot-password.

Week 18 (6th May 2024 – 10th May 2024)

- Get-survey-report and deactivate-faculty API completed.
- Discussion on staff module.
- Changes made in get-faculty-list, login, get-student-list API.

Week 19 (13th May 2024 – 17th May 2024)

- Changes in send-mail, get-all-recipients, get-mail-reports, get-assigned-courses, get-faculty-courses, get-section, get-student-list, get-faculty-courses-history, mail-type, get-all-courses, get-all-recipient, re-assign-course-to-faculty API.
- Plan-of-study API changes for archived students.
- Discussion on archived students.
- Written scripts for student status change table and faculty courses table.
- Discussion on mail-recipient, student module.
- Changes in import module.

Week 20 (20th May 2024 – 24th May 2024)

- Research on survey result.
- Testing student module.
- Discussion on student module.
- Get-student-listing API query changed.
- Changes in get-student-data API.

Week 21 (27th May 2024 – 31st May 2024)

- Changes in edit-faculty-details, get-all-courses, send-mail, add-faculty, get-assigned-courses and login API.
- Discussion on student module.
- Testing mail module, confidential notes and student edit.
- Get-student-note API completed.
- Get-all-recipient, get-students-history-of-probation query changed.
- Common function to trim payload.
- Get-survey-result API currently working on.

2.3 Type of task(s) you were exposed to

- **Common functions:** Multiple file upload, download of files, convert images to base64, trim the payload.
- **API Development:** Creating APIs (Application Programming Interfaces) so that it can communicate between the frontend and backend systems.
- **Testing:** Manual testing of a few modules like email, students, faculty, imports, confidential notes, etc.
- **Documentation:** Documenting the overall project in terms of user roles like system administrator, admin, faculty, students, etc.
- **Integration with Third-Party Services:** PHP Mailer is used to send emails, and PHP Spreadsheet is used for the import of Excel files.
- **Error Handling:** Always use try catch block when creating API.
- **Collaboration:** Uses Git for version control and collaboration, including branching, merging, pull requests, and code reviews. We utilize Git to manage code changes, track project history, and coordinate with other team members effectively.
- **Debugging/Issue Handling:** Debugging APIs which are developed by other team members like student, notification, login, etc modules.
- **Scripts**: Frequent changes to the database schema, such as adding new fields to tables, required the creation of scripts to ensure proper data.
- **Triggers:** An update batch was not updating the dt_updated field, writing a trigger ensures that this timestamp is automatically updated whenever a record is modified.

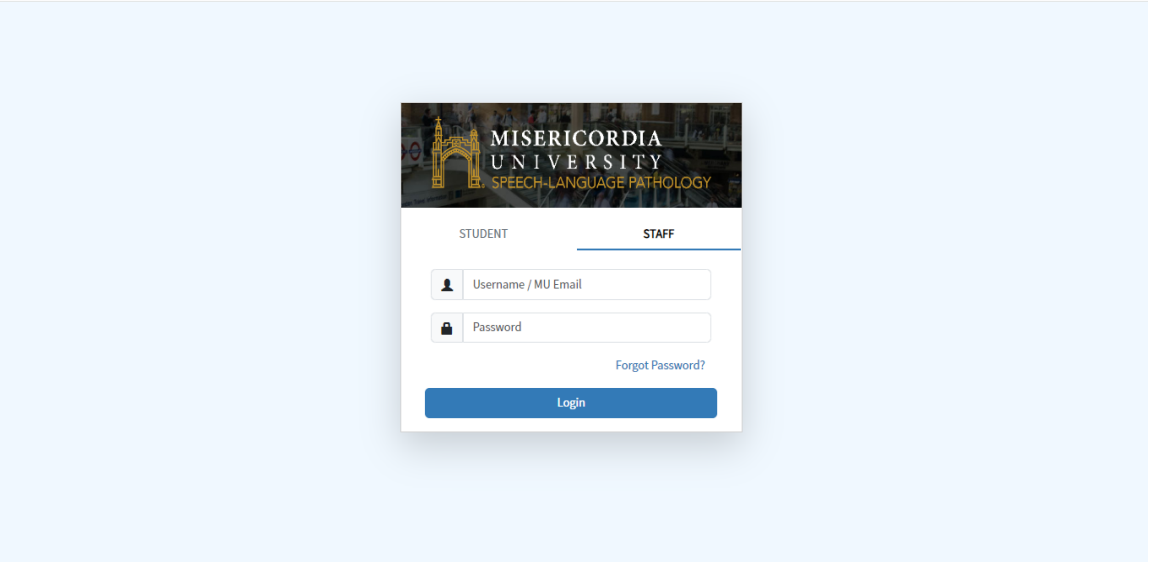
2.4 Hands-on experience

In OPSPL, I had opportunity to work on Clin-Ed project involves coding existing functionalities with CI4 alongside the integration of new features.

Clin-Ed Project Overview

The Clin-Ed project, with the Speech Language Pathology Department of Misericordia University as the client, began in 2017, with its educational components completed, deployed and in use, which paused further development due to the COVID-19 pandemic. Following the pandemic, it was decided to restart the clinical part using new technology—CI4 for the backend and React for the frontend. To ensure seamless integration, the educational part, originally developed with the CakePHP framework, is also being converted to the new technology.

Login:



Dashboard:

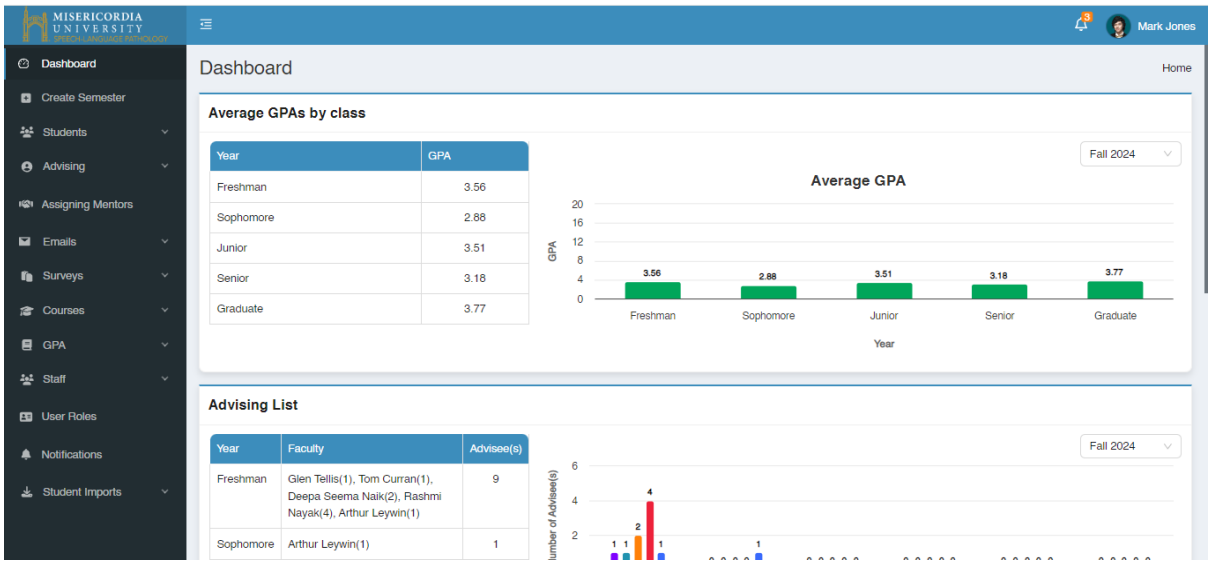


Fig: Explains the general view of Clin-Ed project in terms of backend modules.

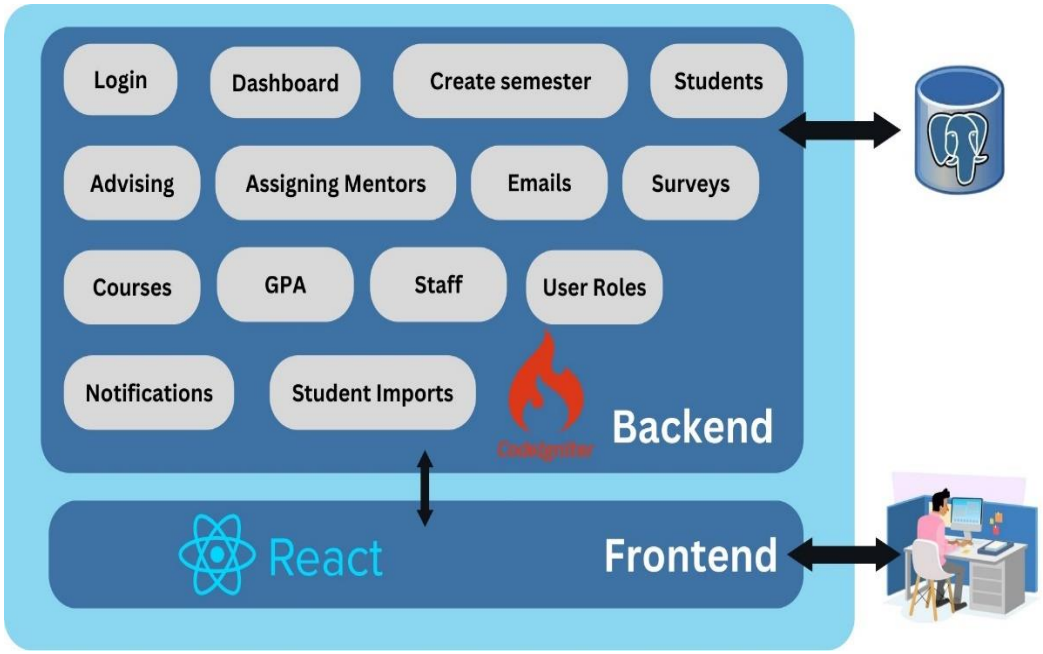


Fig: Modules which I worked on.

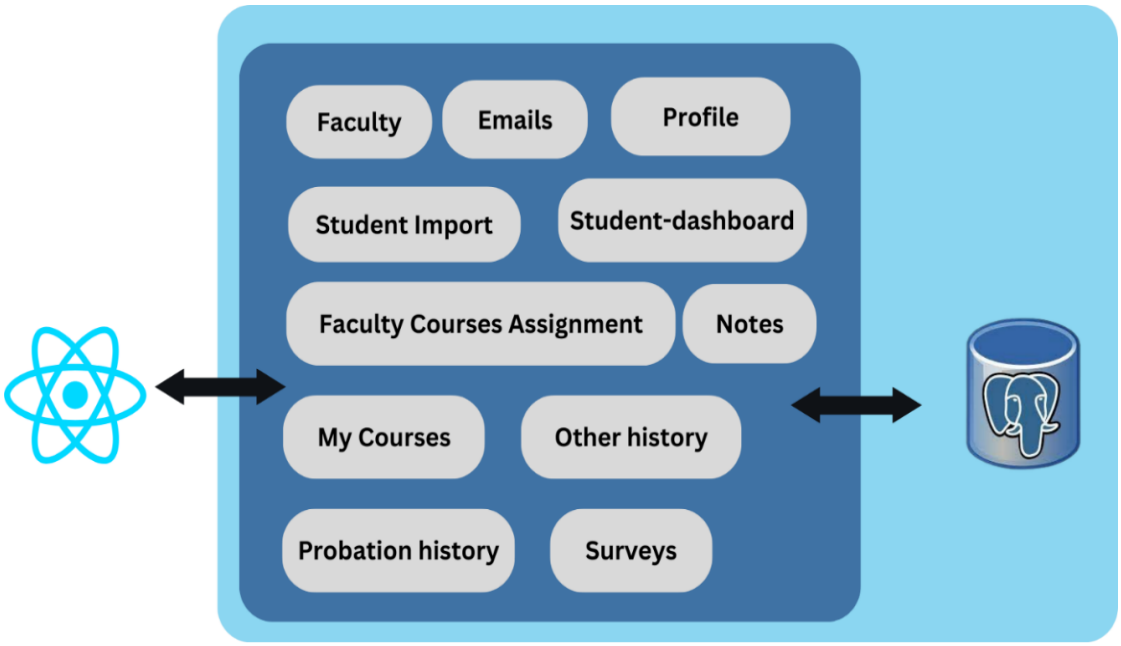


Fig: Each module API list

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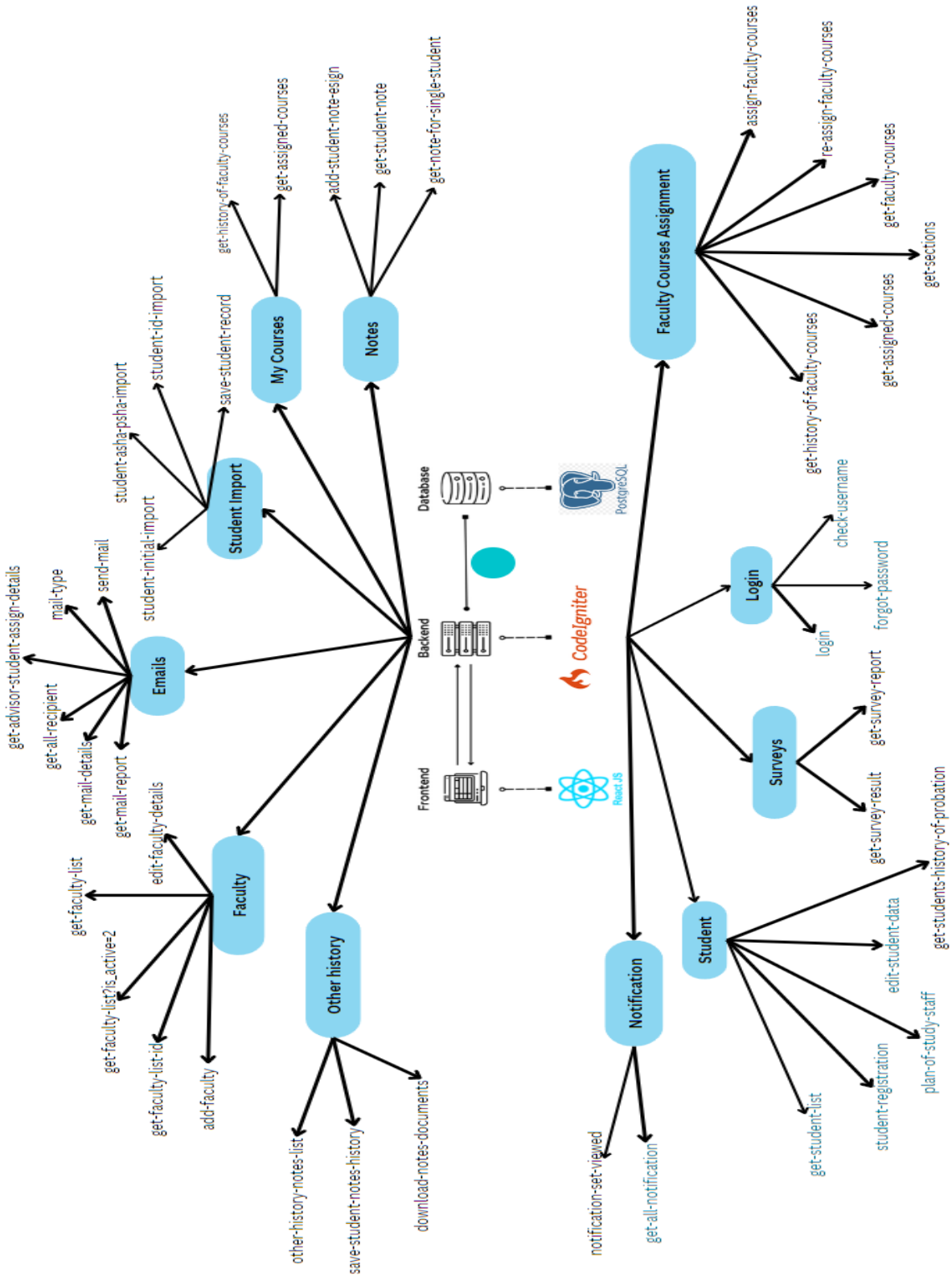


Note:- The colored APIs are those I modified.

API List

1. **get-countries**
    - Fetch all the county data from the database.
    - Ensure that the United States is listed first.
    - Sort the remaining countries alphabetically.

2. **get-states**
    - Get all states data by country ID in the database.

3. **get-faculty-list/get-faculty-list-id**
    - Common function to retrieve faculty data from a database.
        1. All faculties are present.
        2. Single faculty details by ID
        3. Active faculties
        4. Inactive faculties
        5. Archived faculties.
    - Convert the faculty image to base64.

4. **add-faculty**
    - Save faculty data in a database.
    - Store Image:
        1. Save the image in the database.
        2. Save the original image in a specified folder.
        3. Save the thumbnail image in a separate folder. Use the existing common function to generate the thumbnail image.

- If the permanent and current addresses are the same, ensure that both fields are populated by checking a single checkbox.

5. edit-faculty-details

- Check if faculty are present in the database.
- If any changes are made to faculty details, save them in the database.
- Validations are performed when anything changes, such as an email address.
- The same API is used for profile editing with a few changes.

6. get-mail-details

- Retrieve the recipient's details by email ID, like name, email, sent or not, etc.

7. get-mail-report

- Retrieve all emails sent to date from the database.
- Order by the latest sent email.

8. mail-type

- Templates were created for different types of emails.
- Templates can be editable with something un-editable, for example: Dear Name.
- It is saved in one folder, with each template named as its own function, so it can easily be tracked for future changes.

9. get-all-recipient

- Retrieve different types of recipient’s (all, staff, students, etc.) data as selected by the user.

10. send-mail

- Used a third-party PHP mailer.
- Attachment: any file or image. Save it in one folder.
- Send email: send to as many recipients as are selected.
- Listing email: example: From faculty listing selected faculties send email.
- Resend email: If you already sent an email, you have to resend it to the selected recipient.
- An already-created function used to send emails
    1. Added attachment
    2. Logo
    3. Disclamier
- Notify the recipient when an email is sent on this web application.
- Save data like the type of email, recipient details, etc.
- Additional data is only sent when certain types of emails are sent.
- Replace certain data in the template. Example: Dear Name has to change to data as the recipient selected the name.
- Created a lot of small functions to optimize and reduce the redundancy of the code.

11. get-advisor-student-assign-details

- Retrieve the list of students assigned to a specific faculty advisor in order to send an email.

12. student-initial-import

- Used third-party libraries.
- Created a common function to get data from an Excel sheet.
- The inserted file was saved in the folder.
- As required validation for existing emails, required fields are used.
- After processing the entire Excel sheet, display the invalid ro

- Get the data from the Excel sheet and save it to the database.
- Additional data is to be entered in different tables as required.

13. student-id-import/student-asha-pasha-import

- Get data from an Excel sheet and update the data using a personal email in the database.

14. save-student-record

- Validations like required fields, numeric fields, and existing emails.
- Save failed import data in the database.
- Handle insertion (student-initial-import) and updating (student-id-import/student-asha-pasha-import).

15. get-faculty-courses

- Fetch details of the courses assigned to each faculty member.
- This API retrieves:
  1. All faculty, excluding visiting faculty and administrators.
  2. Visiting faculty
- For the scenarios mentioned above, both newly joined faculty and existing (old) faculty are included.

16. get-sections

- Retrieve all courses showing the section assigned, remaining to be assigned, which course to discontinue, etc.

17. assign-course-to-faculty

- Save the course assigned to faculty in the database

18. get-assigned-courses

- Retrieve course details for each faculty ID.
- Show how many students took that course and their names.

19. re-assign-course-to-faculty

- Multiple courses can be re-assigned to other faculty.
- Validation to see if the correct data is sent is done, like if any field is empty.

20. get-faculty-courses-history

- Retrieve the full history of each faculty-assigned course.
- Retrieve a single faculty member taught courses history.

21. add-student-note-esign

- Using notes ID, save student e-signs in the database so that faculty can get to know the student who has received the notes.

22. get-note-for-single-student

- Retrieve notes send by faculty to student.

23. get-student-notes

- Retrieve all notes send to student and recent one first.
- Added filter by student year in program.

24. student-dashboard

- Retrieves mentors and faculty advisors details of contact by using student ID.

25. update-student-profile

- Save the details students want to change, like profile image, address, and email address.
- Validation for an existing email address.
- Changes are done, module.

26. save-student-notes-history

- Save multiple files or images.
- Created a common function to save multiple files in the database.

27. other-history-notes-list

- The saved files and images notes above it is retrieve for the selected student.

28. download-notes-documents

- Created a common function to download file from the database.

29. get-all-notification

- Bug fixing.
- Handling required new changes to handle my view with a student or faculty ID.

30. notification-set-viewed

- If user cancel the notification than save in database the date viewed so notification disappear.

31. login, check-username, forget-password

- Added functionality to use university email instead of a username for login.

32. login

- Added a lot of fields, like images of faculty and students converted to base64.
- Made a common function to convert any image to base64.
- Error handling.

33. get-students-history-of-probation

- Retrieve the students who were in probation in previous year in program.

34. student-listing

- Added new fields as new requirements arose.
- The query changed as new functionality was used.

35. get-student-data

- Added fields needed to retrieve in update profile.

36. get-survey-report

- Created a common API to retrieve answered, pending and sent survey report.
- Added filter for students by year in program and faculty by its type (example: admin, faculty, etc).

37. plan-of-study

- API already existing just needed few more things to be added for archived students.

38. get-all-courses

- Added order by and converted date into MM DD, YYYY.

39. get-survey-result

- Currently working on to retrieve the results of different type of survey.

2.5 Relationship of the task with the course you studied

As a backend developer, I have a strong relationship with Database Management Systems (DBMS) and Object-Oriented Programming (OOP) courses.

1. Database Management Systems (DBMS):

- **SQL Queries:** Through DBMS courses, I gained knowledge of writing queries to perform operations like insertion, updating, data retrieval, and deletion.
- **Query Optimization:** The DBMS course taught us to optimize database queries. As a backend developer, I use this knowledge to write efficient SQL queries that reduce query execution times and improve overall system performance.
- **Database Connectivity:** Backend developers frequently interact with databases using programming languages such as PHP. DBMS courses provide a foundation for understanding database connectivity APIs.
- **Transaction Management:** Developers implement transactional logic to handle concurrent access, rollbacks, and error recovery in database operations. I specifically use it when we insert or update a batch.

2. Object-Oriented Programming (OOP):

- **Encapsulation, Inheritance**: OOP concepts provide knowledge about encapsulation and inheritance which enable the creation of easy, simple and maintainable code.
- **Reusability and Modularity:** OOP encourages code reusability and modularity.
- **Design Patterns:** We use MVC (Model-View-Controller) design patterns.
- **Error Handling**: We use try-catch block commonly for exception handling.

CHAPTER 3: LEARNING

3.1 What did you learn from the practical exposure

3.1.1 PHP

PHP (Hypertext Preprocessor) is an open-source, interpreted, and object-oriented scripting language that can be executed at the server-side. PHP is well suited for web development. Therefore, it is used to develop web applications (an application that executes on the server and generates the dynamic page.).

Why use PHP?

PHP is a server-side scripting language, which is used to design dynamic web applications with MySQL databases.

- It handles dynamic content, database as well as session tracking for the website.
- You can create sessions in PHP.
- It can access cookies variables and also set cookies.
- It helps to encrypt the data and apply validation.
- PHP supports several protocols such as HTTP, POP3, SNMP, LDAP, IMAP, and many more.
- Using the PHP language, you can control the user to access some pages of your website.
- As PHP is easy to install and set up, this is the main reason why PHP is the best language to learn.
- PHP can handle the forms, such as - collect the data from users using forms, save it into the database, and return useful information to the user. For example - Registration form.

3.1.2 CodeIgniter

CodeIgniter is an application development framework, which can be used to develop websites, using PHP. It is an Open source framework. It has a very rich set of functionality, which will increase the speed of website development work.

It has a very rich set of libraries and helpers. By using CodeIgniter, you will save a lot of time, if you are developing a website from scratch. Not only that, a website built in CodeIgniter is secure too, as it has the ability to prevent various attacks that take place through websites.

Core Features of CodeIgniter:

- CodeIgniter is a framework with zero configuration.
- You can use CodeIgniter without a command-line configuration or setup. and also you can say CodeIgniter does not have any command line dependencies.
- CodeIgniter is not restricted to any naming convention or coding rules.
- For working with CodeIgniter you need not learn about an advanced concept like PEAR.
- And the most important it has a Simple, Clear and easy to understand documentation.

Features of CodeIgniter 4:

- CodeIgniter's earliest version was based on PHP 5.6 or lower but CodeIgniter 4 is Featured with PHP 7.2 functionality and compatibility.
- In CI4 if you want to use CURL Request then you need lib curl installed.
- CodeIgniter supported Databases are –
  - MySQL (5.1+)
  - PostgreSQL

- SqLite3
- CI 4 also supports command-line programs. as per the latest trends, maximum frameworks provide CLI usability and library. So now CodeIgniter 4 has also adopted this feature and now you can use Command line in the latest version of CI.
- CI 4 provides a public folder, intended as the document root for your app.
- CI 4 has a server like Laravel and you can start it using PHP spark serve.

3.1.3 Postman

Postman is an API (application programming interface) development tool that helps to build, test and modify APIs. Almost any functionality that could be needed by any developer is encapsulated in this tool.

Features of Postman:

1. **The Postman API:** The Postman API allows you to access data stored in your Postman account.
2. **Postman Echo:** Postman Echo is a service that is built as a bit of a sanity checker and learning tool. It allows you to test your REST clients and make sample API calls. users send requests through various protocols (GET, POST, PUT), explore different authentication methods, and play around with different parameters.

3. **Postman Visualizer:** Postman provides a way to visually represent request responses. Using HTML, CSS, and JavaScript, can add visualization for the response body right into Postman.
4. **Built-in Libraries:** Postman has external libraries available to use in the Pre-request and Test script tabs.

3.1.4 PostgreSQL

PostgreSQL is Relational database management systems (RDMS). It is open-source software. Anyone with the right skills is free to use, modify, and distribute PostgreSQL in any form. It supports both relational and Non-Relational JSON Queries.

Advantages of PostgreSQL:

- PostgreSQL has the feature of write-ahead logging.
- Many replication methods are supported.
- It has the ability to make large-scale web applications because it is robust and powerful.
- It is easy to learn.
- According to the organization we can edit and modify it easily because PostgreSQL is available for free with its opensource licence.

3.1.5 SonarLint

SonarLint is a free and Open Source IDE extension that identifies and helps you fix Code Quality and Code Security issues as you code. Analogous to a spell checker, SonarLint squiggles flaws and provides real-time feedback and clear remediation guidance so you can deliver clean code from the get-go.

3.1.6 Git

Git is an open-source distributed version control system. It is designed to handle minor to major projects with high speed and efficiency. It is developed to co-ordinate the work among the developers. The version control allows us to track and work together with our team members at the same workspace.

3.2 Have you had an opportunity to be innovative in handling task(s)?

Yes, I have had multiple opportunities to be innovative in handling backend tasks.

1. **Common API**

   a) get-faculty-list

   - Common function to retrieve faculty data from a database.

     1. All faculties are present.

2. Single faculty details by ID.
3. Active faculties.
4. Inactive faculties.
5. Archived faculties.

b) get-survey-report

- Created a common API to retrieve sent, pending and answered list of survey reports and changed order by.

2. Common function

- Convert image into base64.
- Trim the string payloads even if in array.
- Multiple file upload.
- Download file from the database.

3. New changes in API

a) get-section

Retrieve all available courses along with their sections, showing only the sections left to be assigned. Previously, it showed all courses and sections and would display an error if a course or section was already allotted. The new implementation filters out unavailable options before presenting them to the user, thereby preventing errors proactively.

b) get-survey-report

Created a common API to retrieve sent, pending and answered list of survey reports and changed order by. This API is for both faculty and students with filters. Previously it has separate APIs for sent, answered, and pending and made only for student survey reports.

c) Import Module

A common API save-student-record handle the three type of failed import save in the database. Lot of validation are used. Previously, for each import there was a separate API to save failed import and not handled lot of validations which was required.

d) When the flexibility to refer to old code, I opted to use my own logic to develop new solutions.

3.2 Have you learned something about yourself

Likes

- Excited to learn new things and continuously expand my knowledge.

Dislike

- Use for automation testing to quickly identify bugs and improve efficiency compared to manual testing.

Your abilities vis-à-vis expectations of your reporting officer

- First-level Testing.
- Debugging.

CHAPTER 4: CHALLENGES

- **Research and learn:** Understanding the flow of work and creating APIs is challenging by referring to an old Clin-ED website due to lack of documentation.
- **Performance Optimization:** Optimizing queries and code performance is important to handle large amounts of data.
- **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 you were unaware about

I was unaware of the thumbnail generation, payloads, and API testing.

- **API testing:** Postman is a tool for API testing, providing user-friendly interface to send requests, receive responses, and validate API behaviour.
- **Payloads:** Payloads serve as the medium for exchanging information within APIs, web application requests and responses and communication protocol messages.
- **Thumbnail Generation:** Instead of trying to access original images, we generate thumbnails to provide users with quick previews of images.

4.2. Meeting The Deadlines

Mentor or I provide rough task estimations, and I usually finish them before or on time. Sometimes, due to insufficient information or changes in requirements or tasks they may become challenging, leading to delays in completion as additional time is needed to overcome difficulties.

REFERENCE

https://blog.postman.com/10-postman-features-everyone-should-know/

https://www.technologyrevision.com/what-are-the-new-features-in-codeigniter-4/

https://www.javatpoint.com/php-tutorial

https://marketplace.visualstudio.com/items?itemName=SonarSource.SonarLintforVisualStudio2022

Appendix I

Samples of the work done

Code to get states based on country ID.

Route:

```
195   $routes->get('get-states/(:num)', 'StatesController::getStatesbycountry/$1');
```

Model:

StatesModel.php

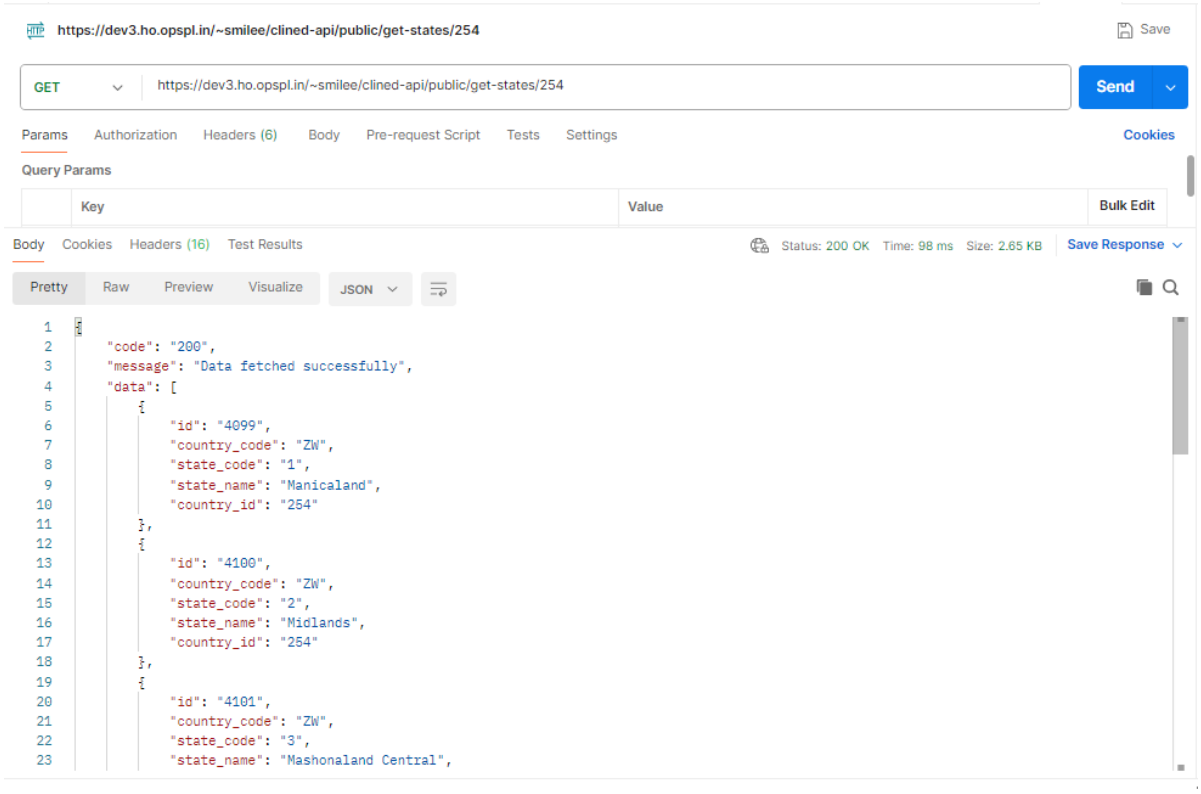
```
C: > Users > Smilee > AppData > Local > Temp > fz3temp-2 > StatesModel.php
1   <?php
2
3   namespace App\Models;
4   use CodeIgniter\Model;
5
6   class StatesModel extends Model
7   {
8       protected $table            = 'states';
9       protected $primaryKey       = 'id';
10      protected $useAutoIncrement = true;
11      protected $allowedFields    = ['id', 'country_code', 'state_code', 'state_name', 'country_id'];
12
13      /*
14      Function to get states based on country selected
15      */
16      public function getStatesbycountry($countryId)
17      {
18          return $this->where('country_id', $countryId)->get()->getResult();
19      }
```

Controller:

StatesController.php

```
C: > Users > Smilee > AppData > Local > Temp > fz3temp-2 > StatesController.php
1   <?php
2
3   namespace App\Controllers;
4   use App\Controllers\MainController;
5   use App\Models\StatesModel;
6
7   class StatesController extends MainController
8   {
9       protected $statesModel;
10      public function __construct() {
11          $this->statesModel = new StatesModel();
12      }
13
14      /**
15       * API: get-states
16       * Method: GET
17       * Description: API to Get states list
18      */
19      public function getStatesbycountry($countryId)
20      {
21          try {
22              $states = $this->statesModel->getStatesbycountry($countryId);
23              if (empty($states)) {
24                  $this->respondWithData(NO_DATA, null);
25              } else {
26                  $this->respondWithData(DATA_SUCCESS, $states);
27              }
28          } catch (\Exception $e) {
29              $errorMessage =  DATABASE_ERROR . $e->getMessage();
30              $this->respondWithData(null, $errorMessage);
31          }
32      }
33  }
34
```

Postman for API testing:



Appendix II

Photos while at work