GREEN UNIVERSITY OF BANGLADESH (GUB)

CSE GUB Thesis/Project Orchestration System

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Declaration

I hereby declare that this project work entitled **CSE GUB Thesis/Project Orchestration System** submitted to the Department Of Computer Science And Engineering, Green University of Bangladesh, is based on the results found by myself and under the guidance and supervision of Lecturer **Mr. Mohammad Ehsan Shahmi Chowdhury**. Materials of work found by other researcher are mentioned by reference. This project, neither in whole nor in part, has been previously submitted for any degree.

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Certificate

This is to certify that the thesis entitled **CSE GUB Thesis/Project Orchestration System** has been prepared and submitted by **Sagor Majomder** , **Susmita** and **Ratul Islam** in partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science and Engineering on February 01, 2024, under the supervision of **Mohammad Ehsan Shahmi Chowdhury**, Lecturer, Department of Computer Science and Engineering.

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Abstract

CSE GUB Thesis/Project Orchestration System is a software system which can help the conducting department of the university to do thesis/project related tasks easily, automatically, quickly and efficiently. It also helps students to do their thesis/project work in an efficient way. With the help of the software system, conducting department can make committee members, board members, assigning faculty members as supervisor, making event scheduling, rules for upcoming events and also help students to get their choiceable supervisor for their thesis/project work in a robust and efficient way rather than a slow and manual way. According to our research, we found that most of the universities in our country do all the work related to thesis/project in a manual way. Due to this, universities have to go through a lot of trouble to do the same thing every year. Besides, students also faced some problem like don't get proper supervisor who is expert or interested in the topic of their thesis/project work. So we are trying to build a software system to do these tasks automatically, quickly and efficiently.

List of Acronyms

CSE	Computer Science and Engineering
GUB	Green University of Bangladesh
CERN	European Council for Nuclear Research
HTTP	Hypertext Transfer Protocol
DFD	Data Flow Diagram
CS	Computer Science
CMS	Content Management System

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Chapter 1

Introduction

Every year in each university, final year students must complete their capstone thesis/project course. To successfully complete this course, conducting department of the university and students have to go through certain tasks. Bangladesh is improving day by day in the field of science and technology. But unfortunately, all the tasks related to thesis/project course are doing by manual way in the universities. This is an software system to do the capstone thesis/project related all task with the help of technology to make this process easier for both the conducting department of the university and the students. 'CSE GUB Thesis/Project Orchestration System' helps both the conducting department of the university and the students to do all type of tasks related to thesis/project in automatic, quick and efficient way.

1.1 Problem Statement

Every year, conducting department of the university need to make a committee to maintaining thesis/project related work and making schedules for upcoming events. For that reason, so much time is waste in the initial phase. Similarly, every year final year students rush to directly meet the faculty members to know that if they will be the supervisor, what type of thesis/project they wants to supervise, how many teams they will take etc. Sometimes students don't get supervisors, sometimes students get such type of supervisor who doesn't experts or haven't interest on the topics of their thesis/projects.

Besides, students are always in touch with the supervisor to know all types of schedule, notifications, rules and updates of upcoming events. Due to this, a lot of time is lost for students and supervisors.

1.2 Motivation

We know that every year, conducting department of the university have to do certain similar type of tasks to manage huge amount of students of thesis/project course. For that reason, they faced so much trouble in every year. So to reduce the trouble of conducting department, it will be a better option to do the all task in an automatic way. Besides, students don't want to get an supervisor who doesn't expert or not interested to the topic of their thesis/project. Also it is a hassle for the students to contact directly with the faculty members cause sometimes students have to wait for a long time to meet with the faculty member. Sometimes after meet, they came to know that the faculty member already taken necessary team or he/she haven't any interest to supervise of their thesis/project topic etc. So it would be great if the students have a system that allows them to easily know which faculty member is going to be the supervisor, what subject they want to be the supervisor, how many teams they want to take etc. Considering these realistic problems, we decided that with the help of technology, we will build a software system called 'CSE GUB Project/Thesis Orchestration System' that will solve these problems automatically, quickly and efficiently.

1.3 Aims and Objectives

The main purpose of this project is with the help of technology to create a easier, automatic and smooth process for both the conducting department of the university and the students to complete thesis/project course. To obtain the purpose, we will implement some service to the system.

- Conducting department of the university can easily make committee members, board members, assigning faculty members as supervisor, making scheduling and

rules for upcoming events etc.

- Students can take their supervisor without directly contacting with the faculty members.
- Students can take proper supervisor who is expert or have interest to their thesis/project topic.
- Students can know in which phase of thesis/project, what kind of task they need to do.
- Students can know all type of notice, rules, schedule and upcoming events without communicating with the supervisor.
- Committee members, board members, supervisors, students can know all type of notice, rules, schedule and upcoming events at the same time.
- Students and supervisor can chat with each other.
- Committee member and board members can chat with each other.

1.4 Project Outline

In this paper, we discuss about our capstone thesis/project called 'CSE GUB Thesis/Project Orchestration System' in five chapter. In first chapter named **Introduction**, we discuss about the project primarily discussion that is problem statement, motivation, aim and objectives. In second chapter named **Literature Review**, we discuss about literature review which refers the existing projects that are related to the project. In third chapter named **The Design Methods and Procedures**, we discuss about our project's overall design methods and how we will procedure that design methods. Here we discuss about the project features, methodology, Use Case Diagram, Data Flow Diagram, Budget, Gantt Chart, Functional and Non-functional requirements, Tools and technologies of this project. In four chapter named **Evaluation of the Developed System**, we discuss about the evaluation of the project. Here, we demonstrated how we developed

the whole project using both front-end and back-end. In five chapter which is the last chapter of this book named **Conclusion**, we discuss about the limitations and the scope of future work of the project.

Chapter 2

Literature Review

Related work refers to existing research, studies, or publications that are relevant to a particular topic or research question. When conducting research, scholars and researchers often review and analyze the related work to gain a comprehensive understanding of the existing knowledge in the field.

2.1 Background Study

The project ”CSE GUB thesis/project orchestration system” is going to be a web application. So we need to have some background knowledge about web and web applications.

2.1.1 What is Web?

The web, also known as the World Wide Web or WWW, is a global network of interconnected documents and resources that are accessible through the internet. The web was invented by Tim Berners-Lee in 1989 as a way to share information among researchers at CERN, the European Organization for Nuclear Research. [1] The web consists of three main components: web browsers, web servers, and web protocols. Web browsers are software applications that allow users to view and interact with web pages. Web servers are computers that store and deliver web pages to browsers. Web protocols are

rules that govern how browsers and servers communicate and exchange data. The most common web protocol is HTTP which defines how web pages are requested and transmitted over the internet. The web is one of the most popular and influential applications of the internet, enabling people to access information, communicate, collaborate, create, and share content across different platforms and devices.

2.1.2 What is Web Application?

A web application is a software program that runs on a web server and can be accessed by users through a web browser. Web applications can provide various functionalities, such as online shopping, social networking, gaming, education, and more. Web applications are different from traditional desktop applications, which require installation and updates on the user's device. Web applications are more convenient and accessible, as they can be used on any device that has an internet connection and a compatible browser. However, web applications also have some challenges, such as security, performance, scalability, and compatibility issues. Web developers need to use various technologies and tools to create web applications that are user-friendly, secure, fast, and reliable.
A web application has a two development phase and they are front-end and back-end. To develop a complete web application, developer build front-end and back-end of the application.

2.1.3 Front-end

Front-end is the part of a website or web application that users interact with directly. It includes the design, layout, graphics, animations, and functionality of the web pages. Front-end developers use languages such as HTML, CSS, and JavaScript to create the front-end of a website or web application. They also use frameworks and libraries to enhance the user experience and performance of the web pages. Front-end developers work closely with back-end developers, who are responsible for the server-side logic and data management of the website or web application.

2.1.4 Back-end

Back-end is the term used to describe the part of a software system that runs on a server and handles the data processing, logic, and functionality of the application. The back-end is usually invisible to the end-user, who interacts with the front-end or the user interface. The back-end can be written in various programming languages, such as Python, Java, Ruby, PHP, etc., and can use different frameworks, databases, and tools to create and manage the software. The back-end is responsible for tasks such as authentication, authorization, data validation, business logic, data storage, data retrieval, data manipulation, security, performance, scalability, and more.

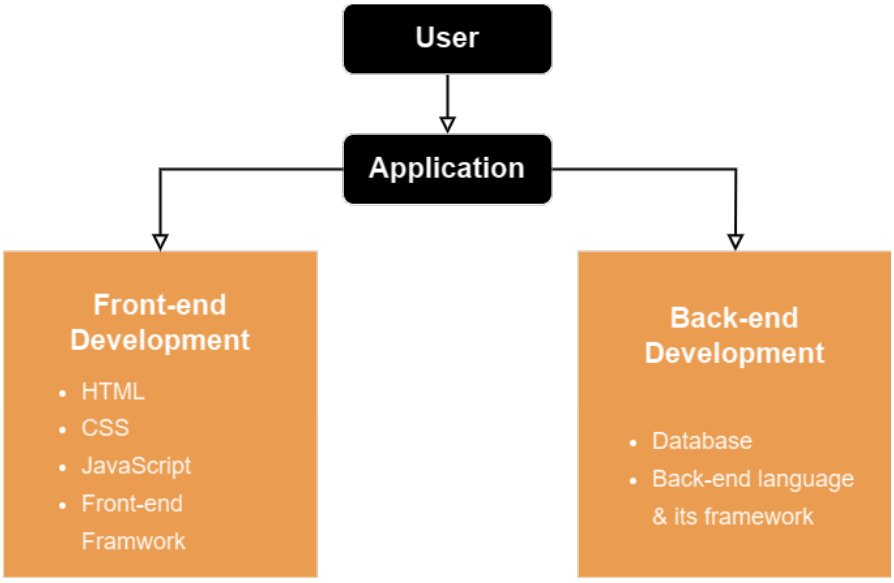

Figure 2.1: Web application workflow

2.2 Related Work

Related work are crucial for any thesis/project course. Related work inspired us to work or research on something, help us to give an overall idea of any system or work, help us to find limitations and how to improve the limitations of the existing system or work etc.

After researching, unfortunately we found that there is no live available implementation of our project's related work in the internet. So we started researching whether there is

any implementation of our project related work in different universities of our country. Although we could not survey all universities, we did not see any implementation in the universities we did survey. They also do all the thesis/project course related work manually. We also tried to research in the universities of foreign countries and found out that the universities also do these things manually. However, some universities have such a software system. But since there is no public access to them, we don't know much about those software systems. But we found thesis papers which are related to the capstone thesis/project orchestration system. Thir description are given below:

2.2.1 Capstone Management System

Capstone Management System is a project that holds the ability to streamline the entire capstone process between students and faculty members and this project is based on Ashesi University campus. The system is designed for 3 types of users: students, faculty and the computer science (cs) coordinator. The student user can select their desire faculty member as supervisor, can proposed their thesis/project topics to the supervisor, can view the milestones of their selected thesis/project topic. Faculty users can select or reject students thesis/project topic and can monitor the students. CS coordinator user can view the number of students each faculty member is working with, the names of the students and the project details.[2]

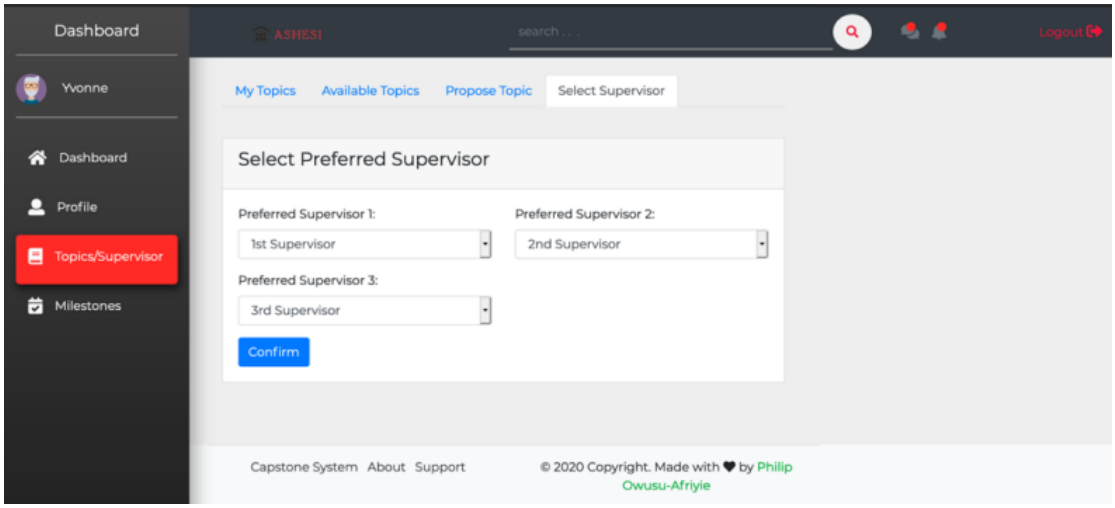

Figure 2.2: Capstone management systems' student dashboard

- Pros: student user can see thesis/project topics proposed by faculty members and also can see the milestones of their thesis/project topic.

- Cons: CS coordinator user have to add faculty members to the system, students and their supervisor can not send messages to each other, supervisor can not give any mark to the students. This project does not have any mobile implementation. This project is designed according to only Ashesi University campus.

2.2.2 Dynamic Project Management Software

This was a project carried out by MCI Corporation, a telecommunications company based in Washington DC. The purpose of this project was to come up with a system that has the capabilities to both manage and monitor the activities and processes of a typical project. "A project planning tool is used to effect the project plan including a plurality of tasks to be performed by the users in accordance with respective time schedules" [3]. Similarly, an important feature of the project is for supervisor to make tasks available to students. Tasks can be considered as assignment in capstone thesis/project course. Examples of such tasks include submission of Reference, submission of Requirements Analysis or submission of a Concept Report. Upon completion of tasks, files will be sent back to the supervisor for review.

2.2.3 Web-Based Project Management System

This was a project management system invented by Harry A. Frolick and Robert M. Wilson in the early 2000s. The invention aimed to create a management system with a shared member workspace for several team members to collaborate on any project [4]. An essential feature of the Web-based management systems is for the project manager to create a specific task. Under the task created, the project manager provides a description of the task, a title for the task, and the status of the task. This feature can be directly likened to a supervisor creating a new task or a new assignment for his or her students. Similarly, the supervisor, acting as the project manager in this instance, provides a title

and a description amongst other features that are not discussed in the Web-Based Project Management System.

2.3 Conclusion

Related work encompasses the existing body of research, studies, and publications that are relevant to a particular research question or topic. Analyzing related work is crucial for contextualizing research, building upon existing knowledge, and contributing to the advancement of a particular field. But we are really unfortunate that we didn't find any related work of our project that is live on the internet. We only find thesis papers as a related work.

Chapter 3

The Design Methods and Procedures

3.1 Introduction

Project architecture is crucial for every proposed system for several reason like smooth execution of project, meeting project goals, resource management, project monitoring and control etc. The architecture of the proposed system ”CSE GUB Thesis/Project Orchestration System”, a web application is represented in details in this chapter. This design architectures will clarify and simplify our work. At first, we will discuss about the tools and technology to develop the project then we will focus about features and design methods of the project.

3.2 Tools and Technology

At first, we will discuss about the tools and technology. There are so many tools and technology to develop any project. That's why before develop any project, we need to have a clear idea about the tools and technology for developing the project. In this way, we can choose the right tools and technology for developing the project. Since the project is a web project, it has both front-end and back-end technology. Now we will discuss both.

3.2.1 Technology used for Front-end

3.2.1.1 TypeScript

TypeScript is a free and open-source high-level programming language developed by Microsoft that adds syntax for types to JavaScript, which is another programming language. TypeScript can help developers catch errors in their code before running it, and also provide better tooling and documentation. TypeScript code can be converted to JavaScript code, which can run on any platform that supports JavaScript.[5]

3.2.1.2 React

React is Extreamly popular, declarative, component-based state driven JavaScript library for building user interfaces. React was created in 2011 by Jordan Walke, an engineer working at Facebook at the time. That's why we called it created by Facebook. React was open-sourced in 2013, and has since then completely transformed front-end web development. It allows developers to build reusable components that can manage their own state and communicate with other components. React can be used for development of web, mobile, and desktop applications. [6]

3.2.2 Technology used for Database and Back-end

3.2.2.1 NodeJS

Node.js is a cross-platform, open-source, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser. Node.js lets developers use JavaScript to write command-line tools and for server-side scripting—running scripts server-side to produce dynamic web page content before the page is sent to the user's web browser. Consequently, Node.js represents a "JavaScript everywhere" paradigm, unifying web-application development around a single programming language, rather than different languages for server-side and client-side scripts. [7]

3.2.2.2 Express

Express is a popular and versatile nodejs framework that allows developers to create web applications and APIs with minimal effort. Express provides a simple and elegant way to handle routing, middleware, error handling, and templating. Express is also highly customizable and extensible, letting developers to use various plugins and libraries to enhance its functionality. With Express, developers can build fast, scalable, and secure web applications in nodejs. [8]

3.2.2.3 MongoDB

MongoDB is a popular open-source document-oriented database that stores data in JSON like documents. MongoDB offers high performance, scalability, flexibility, and availability for a wide range of applications. MongoDB supports various features such as indexing, aggregation, text search, geospatial queries, transactions, and change streams. MongoDB also provides drivers and tools for various programming languages and frameworks, such as Java, Python, Node.js, Ruby, PHP, and more. MongoDB can be deployed on-premises, in the cloud, or as a hybrid solution. [9]

3.3 Features of the Project

Our project has four type of users. For each user, there are several features on the project. Here, we will discuss the features according to some sub-sections.

3.3.1 Features of the Students

- Registration
- Login
- Create group
- Sending supervisor request

- Todo of the week
- Chatting with supervisor
- Notice
- Profile information
- Notification

3.3.2 Features of the Supervisors

- Registration
- Login
- Accepted group information
- Requested groups
- Assign Task
- Chatting with students
- Assign Marks
- Getting board Feedback
- Contact with thesis/project committee
- Notice
- Profile
- Notification

3.3.3 Features of the Board

- Login
- Board information
- Group information
- Assign mark
- Submit feedback
- Contact with thesis/project committee
- Notice
- Profile
- Notification

3.3.4 Features of the Thesis/Project Committee

- Login
- Committee information
- Supervisors information
- Create Board and assign group
- Change supervisor
- All group information
- Groups marks
- Pending groups
- Publish Notice
- Profile

- Notification

3.3.5 Descriptions of features

Above we mention about the features of all types of users of our application. Here we will describe the all features of the application in details.

3.3.5.1 Description features of the Students

From above we see that the student user has several features on the application. Here we will discuss all the features in details.

- **Registration**

  When student registration the **capstone thesis/project** course in the university, they have to use the application which can be accessed through internet using any web browser. To use the application, they first need to registration in the application. During registration, they need to provide some information such as their name, email address, phone number, student ID, which semester currently they are in and password. Only phone number is not required here for registration. If the given student ID are doesn't match with any existing users student ID, then the registration will be successfully completed.

- **Login**

  When student successfully registration to the application, they can login in the application. During login, they need to use their email address and password, which were given in the moment of registration.

- **Create group**

  After successfully login, student can create their group. During the creating of group, the group member need to be at least two member and maximum three member.

- **Sending supervisor request**

  After creating group, student can choose their supervisor. They can choose max-

imum three supervisor. During the moment of choosing supervisor, they can see student count, which refer how many students are currently work with the supervisor. They also can see the supervisor research interest field. According to the information of student count and research interest field of the supervisor, student can decide which supervisor they need to choose. After choosing their supervisors, they can give short description about their thesis/project topic. After filling all the information, students can successfully send supervisor request.

- **Todo of the week**

  This section has the information about all the task they need to do in the current week which are given by their supervisor.

- **Chatting with supervisor**

  If student need to contact with supervisor, they can contact with supervisor using the chat features. When supervisor send messages to the group, the messages will appear in the chat.

- **Notice**

  In this features, student can see all the notices which are created by respected thesis/project committee about their thesis/project course.

- **Profile information**

  In this section, student can see their first name, last name, address, email that they provided at the time of registration to the application.

- **Notification**

  Student will get notification for certain cases like if there are any notice, if supervisor send message, if supervisor accepted group request, if supervisor assign any task etc.

3.3.5.2 Description features of the Supervisors

Here we will discuss all the features in details that a supervisor can have in the application.

- **Registration**

  All faculties of the CSE department of the university need to registration to the application. During registration, they need to provide some information such as their name, working email address, phone number, designation, their research interest field, their research cell information and password. Phone number and research cell information are not required for registration.

- **Login**

  To login in the application, they need to put their email address and password.

- **Requested Groups**

  When students send supervisor request using their dashboard, supervisor will get that request with all the information about the group that are filled by the students. According to the information, supervisor can accept or reject the group.

- **Accepted Group Information**

  Supervisor can see the list of his/her accepted group information. The information include students thesis/project title, board information that is assigned to the particular group, particular student marks etc.

- **Assign Task**

  Supervisor can assign task to a particular group for a week or with a due date. Supervisor can also upload documents with the assign task.

- **Chatting with students**

  If needed, supervisor can send messages to a particular groups using chat system. The chat system is real time chat system.

- **Assign Marks**

  Supervisor can assign marks to a particular student for pre-defense and defense phase. During assign mark, supervisor assign mark according to the rubrics and he/she assign mark between 0 to 5 score.

- **Getting Board Feedback**

  After students complete their pre-defense and defense phase, board give feedback towards a particular group. Supervisor can see that board feedback of his/her groups.

- **Contact with thesis/project committee**

  Supervisor can contact with the thesis/project committee if needed.

- **Notice**

  When the thesis/project committee publish any notice, supervisor can get that notice.

- **Profile**

  Supervisor can see his/her information in their dashboard.

- **Notification**

  Supervisor will get notification for some things like when received group request, thesis/project committee publish notice etc.

3.3.5.3 Description features of the Boards

Here we will discuss all the features in details that a board member can have in the application.

- **Login**

  Board members can login into the application using their email address and password.

- **Board Information**

  A board member can see all the information according to the board number he/she is assigned. The information includes other members information of the particular board number.

- **Group Information**

  Board member can see all the group information that were assign to his/her board

number. This information include groups thesis/project title, groups supervisor etc.

- **Assign Mark**

  Board member can assign mark to a particular student according to that student performance in the pre-defense and defense. He/she assign mark between 0 to 5 score according to some rubrics.

- **Submit Feedback**

  After pre-defense and defense, board can submit feedback to a particular group. In the application, board member can select the group and can give feedback according the group performance in their pre-defense and defense phase.

- **Contact with thesis/project committee**

  Board member can contact with thesis/project committee if needed.

- **Notice**

  When the thesis/project committee publish any notice, supervisor can get that notice.

- **Profile**

  Board member can see his/her information in their dashboard.

- **Notification**

  Board member will get notification for some things like when any group assign under their board, thesis/project committee publish notice etc.

3.3.5.4 Description features of the Thesis/Project Committee

Here we will discuss all the features in details that the thesis/project committee can have in the application.

- **Login**

  Thesis/Project committee need to login to use the application. Using their email address and password, they can login into the application.

- **Committee Information**

  Thesis/Project committee can see their own information like the committee member information, their semester information.

- **Supervisor Information**

  Thesis/Project committee can see the list of all supervisors that are going to supervise the groups of the current semester.

- **Create Board and assign group**

  Thesis/Project committee can create boards and assign faculties to a particular board. They can also assign groups to a particular boards.

- **Change supervisor**

  If needed, thesis/project committee can change supervisor for a particular group.

- **All Group Information**

  Thesis/Project committee can see the list of all the groups that have a particular faculty as a supervisor.

- **Group Marks**

  Thesis/Project committee can see the individual student mark of a group that are given by supervisors and boards in their pre-defense and defense phase.

- **Pending Groups**

  Thesis/Project committee can see the list of all groups that haven't any faculty as a supervisor. As a result, thesis/project committee can assign a particular faculty to a particular group as their supervisor.

- **Publish Notice**

  Thesis/Project committee can crate and publish different type of notice according to the pre-defense and defense phase.

- **Profile**

  Thesis/Project committee can see their information in their dashboard.

- **Notification**

  Thesis/Project committee will get notification when anyone want to contact with them, when there are pending groups etc.

3.4 Methodology

The term methodology refers to the system's technique and procedure for performing a research study. It demonstrates data collection methods and tools, system methodology, suggested system input and output, users, and system development tools. System development is a method for demonstrating how a proposed system will be built. Here, for the development of this project we will use the Agile model. The Agile model[10] is a popular iterative software development methodology that emphasizes flexibility, collaboration, and rapid response to change. Unlike traditional "waterfall" models that rely on detailed planning and sequential execution, Agile is based on the principles outlined in the Agile Manifesto and values continuous feedback and adaptation. Here are the key elements of the Agile model:

- **Iterative and Incremental Development:**

  The Agile model is based on a series of iterative and incremental development cycles called sprints. Each sprint typically lasts between 1-4 weeks, and at the end of each sprint, a working software product is delivered.

- **Cross-functional Teams:**

  Agile development is done by cross-functional teams, typically including developers, testers, business analysts, and product owners. The team works collaboratively to develop and deliver a working product incrementally in each sprint.

- **Product Backlog:**

  The product backlog is a prioritized list of features, enhancements, and bug fixes that the team will work on during the project. The product backlog is constantly refined and updated to reflect changes in priorities and user feedback.

- **Continuous Feedback and Adaptation:**

  Agile development emphasizes continuous feedback and adaptation to changing requirements and user needs. This means that the team is constantly reviewing and adjusting the product backlog, as well as the development process itself, to ensure that the product meets the needs of its users.

- **Agile Ceremonies:**

  Agile development is supported by a set of ceremonies or meetings, including daily stand-up meetings, sprint planning meetings, sprint reviews, and sprint retrospectives. These ceremonies help ensure that the team is aligned and working collaboratively towards the project goals.

- **Continuous Integration and Delivery:**

  Agile development relies on continuous integration and delivery practices to ensure that the software product is always in a releasable state. This means that the team is continuously integrating new features into the product and delivering them to users in small, frequent increments.

- **Emphasis on People and Interactions:**

  The Agile model emphasizes the importance of people and interactions over processes and tools. This means that the team values collaboration, communication, and teamwork, and is encouraged to work closely together to solve problems and achieve project goals.

In summary, the Agile model is a flexible and iterative software development methodology that emphasizes collaboration, continuous feedback, and rapid response to change. By focusing on people and interactions, the Agile model helps teams develop and deliver software products that meet the needs of their users in a timely and efficient manner.

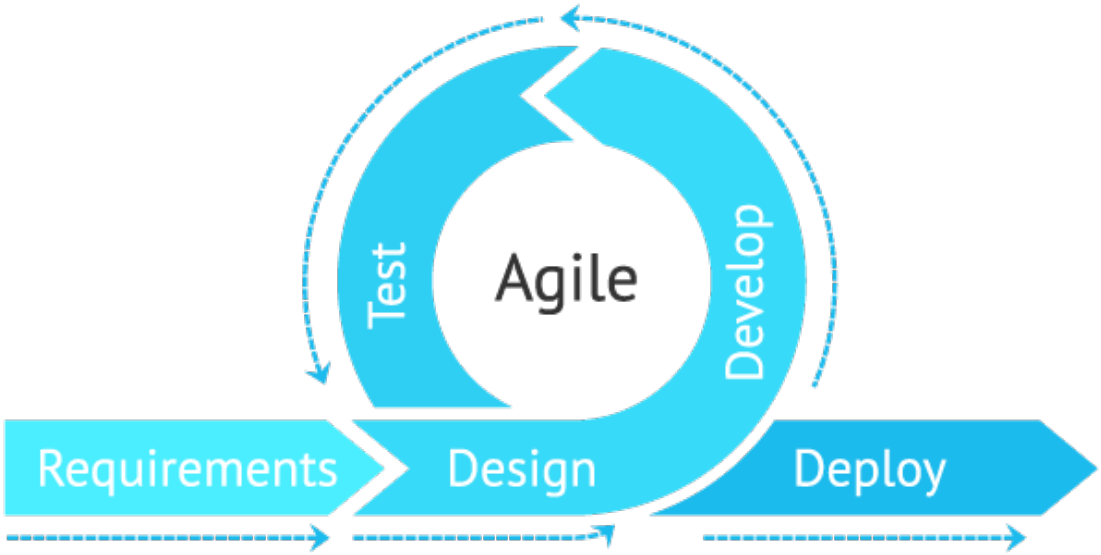

Figure 3.1: Block Diagram of Agile Model

3.5 Use Case Diagram

A use case diagram is a visual representation of the different ways and possible scenarios of using a system. The key feature of a use case diagram is that it focuses on the dynamic nature of the system or project. It is composed of actors, use cases, and their relationships. It shows the potential or key components of a project and their interaction with the external actors. It can help us design a system from the end user's perspective, and communicate the system behavior in the user's terms. The figure 3.2 is the overall use case diagram of this project.

Figure 3.2 shows that 'CSE GUB Orchestration System' have total four external actors and their use cases and relationship with the system. Here we can see that four actors must need to login into the system to complete their other use cases. That means it is the primary use case for all actors.

There are total three main use case for student actor. A student actor can see all the supervisor list, can select three supervisors among all the supervisors but for that at first they need to create their group or team with three members. That's why it has 'include' relationship between these use cases into the system. Student actor has a use case for

chat with supervisor actor. There are total four use case for a supervisor actor. Supervisor actor has also a use case for chat with student actor. Supervisor actor has use case for selecting a group or team and here supervisor can decide which group or team he/she will select or reject or just not select. That's why it shows 'extend' relationship between these use cases into the system.

There are also some 'include' and 'extend' relationship between thesis/project committee and board member actors' use cases into the system. Figure 3.2 shows that in a clear and descriptive way.

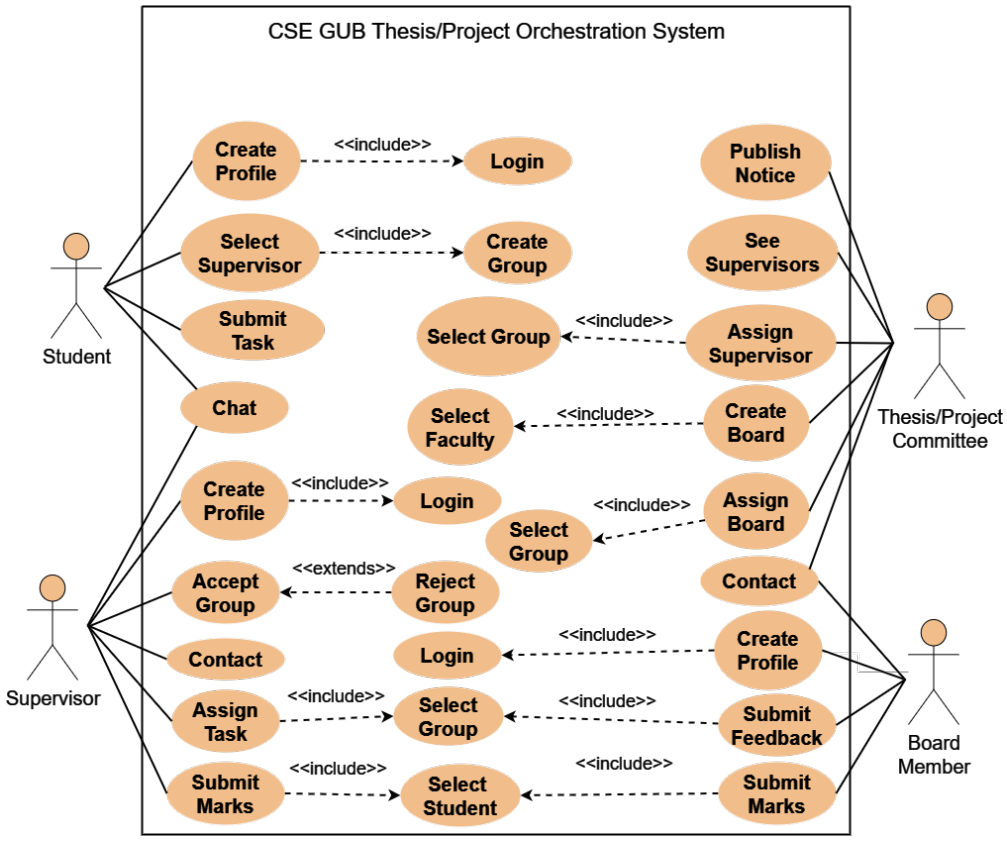

Figure 3.2: Use Case Diagram of the Project

3.6 Data Flow Diagram(DFD)

A DFD diagram helps us to better understand the complexity of a project data flow, internal processes, informational components. DFD diagram has several level to describe

how the data is flow between system and the users of the system. Figure 3.3 and 3.4 is the DFD level 0 which shows the basic data flow between users and system and DFD level 1 diagram is more descriptive data flow diagram than DFD level 0 for ”CSE GUB Thesis/Project Orchestration System” which contains four users - student, supervisor, board member and thesis/project committee.

3.6.1 DFD Level 0

Figure 3.3 shows that student, supervisor, board member, thesis/project committee is the users of the system and ’CSE GUB Thesis/Project Orchestration System’ is the system. Student user get data of supervisor info from the system which means data flow from system to user. Student user give data to the system by selecting supervisor and completing their assignment which means data flow from user to system. Supervisor user also give data to the system by selecting or rejecting group or team and assign assignment to a particular group or team. But for selecting or rejecting teams or groups, supervisor get teams or groups data from the system. In the same way other two users which are ’Board member’ and ’Thesis/Project Committee’ can get or give data to the system and the figure 3.3 shows these data flow.

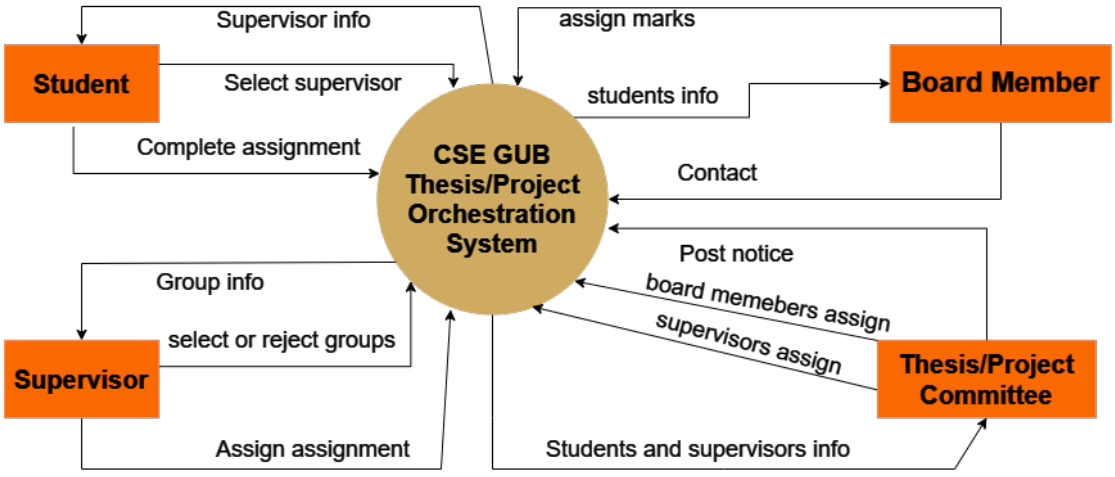

Figure 3.3: DFD Level 0 of the Project

3.6.2 DFD Level 1

DFD level 1 is the data flow diagram which shows data flow between users and system in more descriptive way than DFD level 0. Figure 3.4 shows that for registration into the system, users need to give data to the system and the system will save these data into a database. When users need to login into the system, system will retrieve data from the database. It also shows that after login, users can do different type of operations according to their use cases into the system like chat, contact, get notifications etc. and for that users given data to the system and system store these data to the database and when users need these data, system retrieve these data from database and users retrieve these data from the system. In these way figure 3.4 shows how all these data is flowed between users and system.

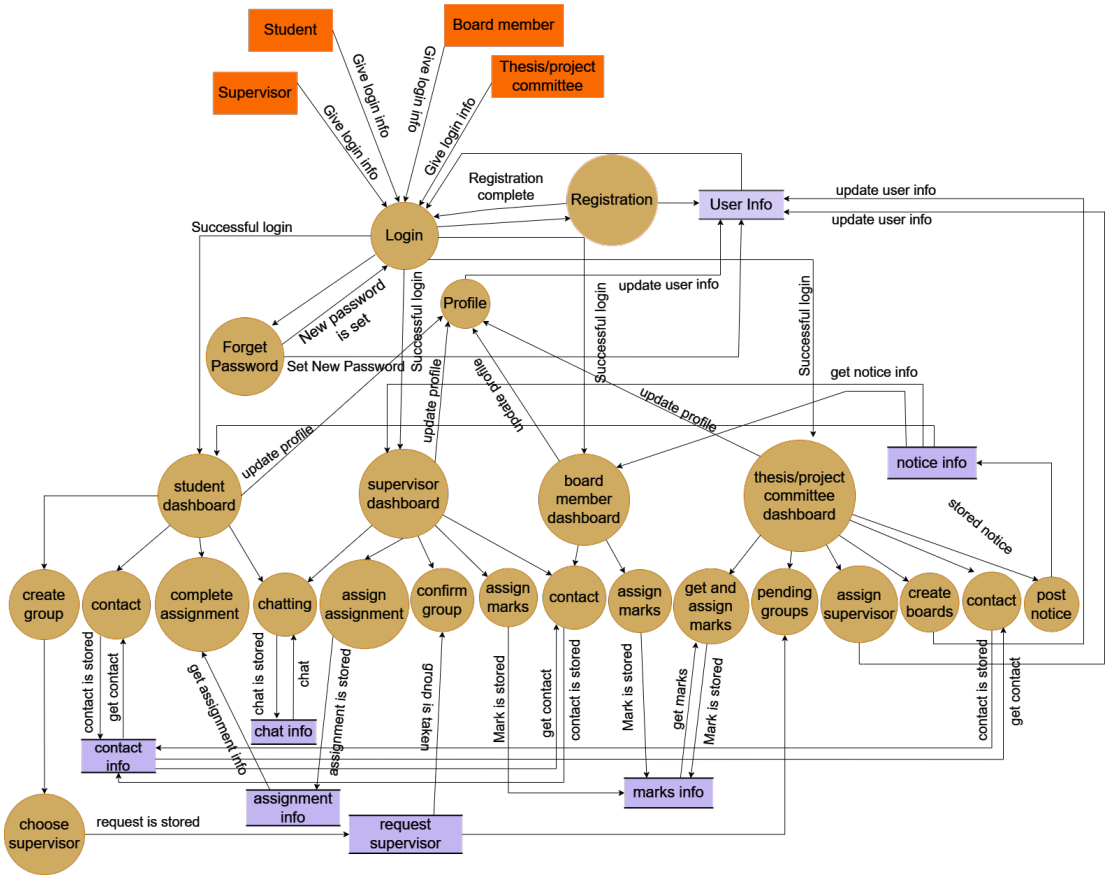

Figure 3.4: DFD Level 1 of the Project

3.7 Financial Planning for the Project

Table 3.1 shows the budget to develop the 'CSE GUB Thesis/Project Orchestration System. We can see that the team leader is being paid the highest amount of the total budget cause the team leader has so much responsibility than other team members to complete the project such as he is the main stakeholder of the project, he has secured external funding or grants for the project, and is responsible for managing and reporting on the budget. He has taken on more tasks or deliverables than the other team members. He also has negotiated a special deal or arrangement with the client or customer, and has received a larger share of the payment or revenue.

We also see that senior developers are also paid more because they have more experience, skills and knowledge in software development. They can handle complex projects, solve difficult problems and mentor other developers. They also contribute to the quality, efficiency and innovation of the software products and services. Senior developers are valuable assets for any software company.

SL	Item	Specification	Amount	Unit	Total(TK)
1	Team Meeting		1000	15	15,000
2	Project Meeting		1,500	5	7,500
3	Team Leader Salary	One time	1,00,000	1	1,00,000
4	Senior Developer	One time	80,000	1	80,000
5	Problem Analyst	One time	60,000	1	60,000
6	Designer	One time	50,000	1	50,000
7	Development Cost	One time	20,000	1	20,000
8	Cyber Security	One time	30,000	1	30,000
9	Extras		2,000	2	2,000
	Grand Total				3,53,000 BDT

Table 3.1: Budget of the Project

3.8 Gantt Chart (Around 12 months)

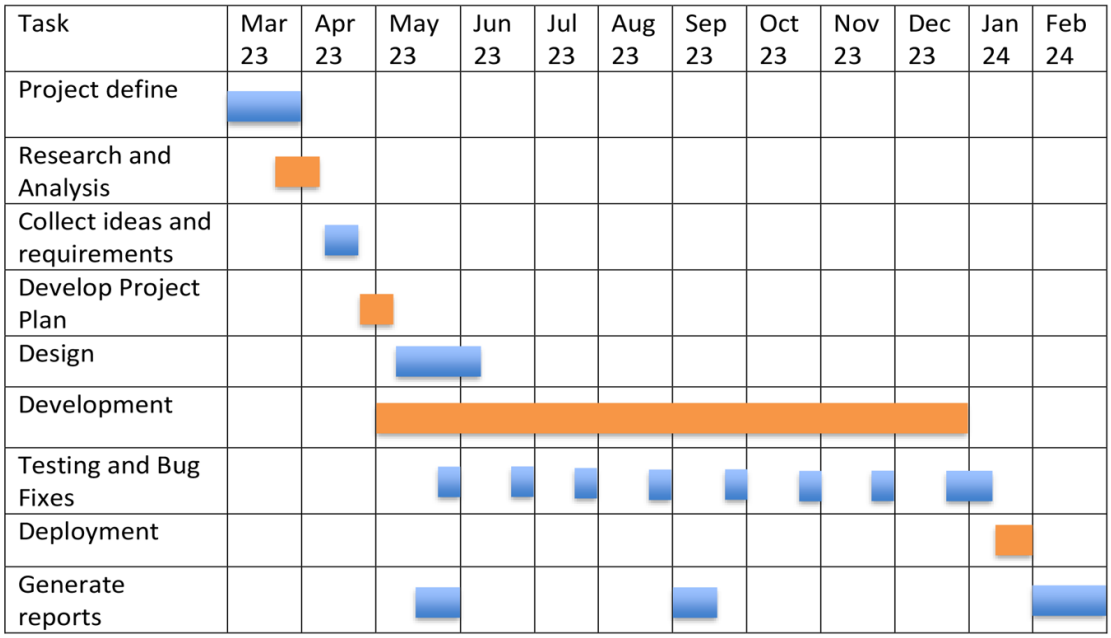

Figure 3.5: Project Gantt Chart

3.9 Functional Requirements

Functional requirements describe what a software system should do or accomplish. They are specific features or tasks that a software application must perform to meet the needs of its users. These requirements define the behavior of the system, and they can include things like input and output formats, user interface components, data processing, and error handling. Examples of functional requirements include the ability to log in, the ability to search for products, and the ability to add items to a shopping cart.

- Email verification for the students, supervisor and board member that will help to find the authentic users.
- Students, supervisors, board members, thesis/project committee have different login pages.
- Easy UI design for students, supervisors, board members, thesis/project committee.

- Students, Supervisor, board members can update their profile information.
- Students, supervisor, board member and thesis/project committee can upload multiple files.
- Supervisor, board members and the thesis/project committee can see students' information.
- Students, supervisors, board members and the thesis/project committee can contact with each other.
- Students and supervisors can chat with each other.
- Students can create their own team.
- Students can see supervisor, board members and the thesis/project committee information.
- Students can choose up-to 3 supervisors.
- Students can receive notifications created by supervisors and the thesis/project committee.
- Students can submit their assignment to their supervisor.
- Supervisor can see requested team information and can select or reject teams.
- Supervisor can create assignments for a particular team.
- Board member can assign students marks.
- The thesis/project committee can assign supervisors to teams.
- The thesis/project committee can constitute board members.
- The thesis/project committee can create and post notices.

3.10 Non-Functional Requirements

Non-functional requirements describe the qualities or characteristics that a software system should have, but they do not describe specific features or functions. Non-functional requirements are often referred to as ”quality attributes” or ”system qualities”. They describe the system's performance, reliability, usability, security, and other aspects that are important to the system's overall effectiveness. Examples of non-functional requirements include system speed, system capacity, system availability, and security features such as encryption and access control. Non-functional requirements are often more difficult to measure and test than functional requirements.

- Verify users email address.
- Check required input field error message.
- The application have easy UI/UX design to navigate.
- The application is able to handle high traffic without slowing down or crashing.
- The application is available 24/7, with minimal downtime for maintenance and updates.
- The application has robust security measures to protect users' information.
- The application functions run correctly and consistently, with minimal errors or bugs.

3.11 Conclusion

In this chapter, we have a use case diagram and a data flow diagram representing the entire process. It's crucial to identify the internal and exterior structure of the project, which includes its architecture, requirements, and project documentation. We also talk about various tools, functional and non-functional needs, etc. Therefore, it facilitates development. We outline the project's development process.

Chapter 4

Evaluation of the Develop System

4.1 Introduction

In this chapter, we will discuss about the project UI/UX, front-end and back-end. Our project is very user friendly, we will discuss about the project design, development and how easily users can use the application according to their choice. This chapter will be the overview of the project.

4.2 Development Process

To develop the project, we must first use a UI/UX for our system. And develop front-end and back-end systems according to the UI/UX. For the front-end we used React, for the back-end we used ExpressJS, for the testing we used Google Chrome as a web browser and Visual Studio Code is used as a code editor.

4.3 Web Application Pages(Student)

For student, we have student registration page, student login page and student dashboard page. Student dashboard page also includes some pages according to the student operations.

4.3.1 Student Registration Page

To registration in the application, student have to provide some information. If they provide all valid and required information, their registration will complete successfully. The registration page of the student is in figure 4.1

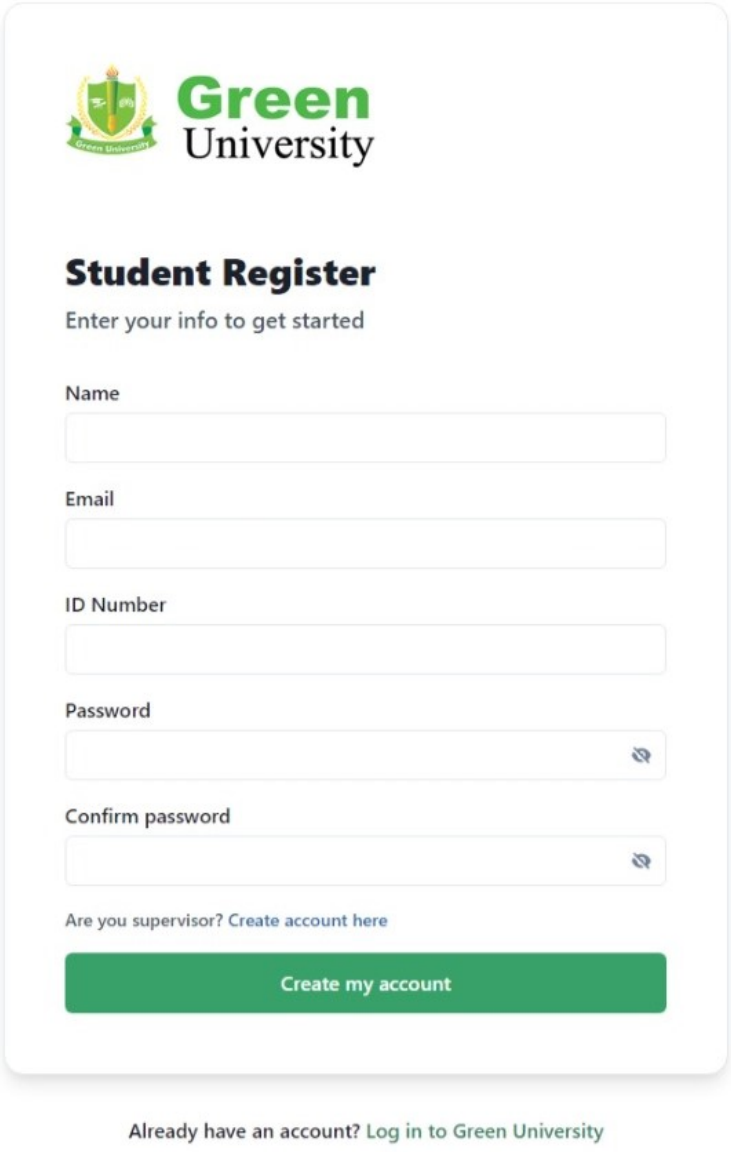

Figure 4.1: Student registration page

4.3.2 Student Login Page

Student can login into the application using their email address and password which were given by them at the moment of registration. Student login page is in figure 4.2.

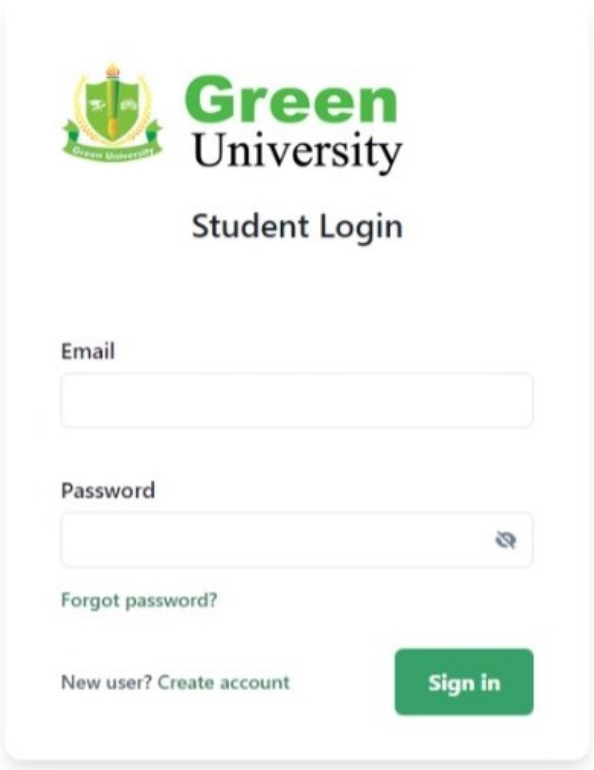

Figure 4.2: Student login page

4.3.3 Supervisors Request

Student can select maximum three faculties as their supervisor during sending supervisor request. But before they have to create their own group. In group, there have to minimum two member and maximum three member. During supervisor request, students can also see the particular supervisors' research interest field and how many students are currently working under him/her. Supervisor request page is in figure 4.3

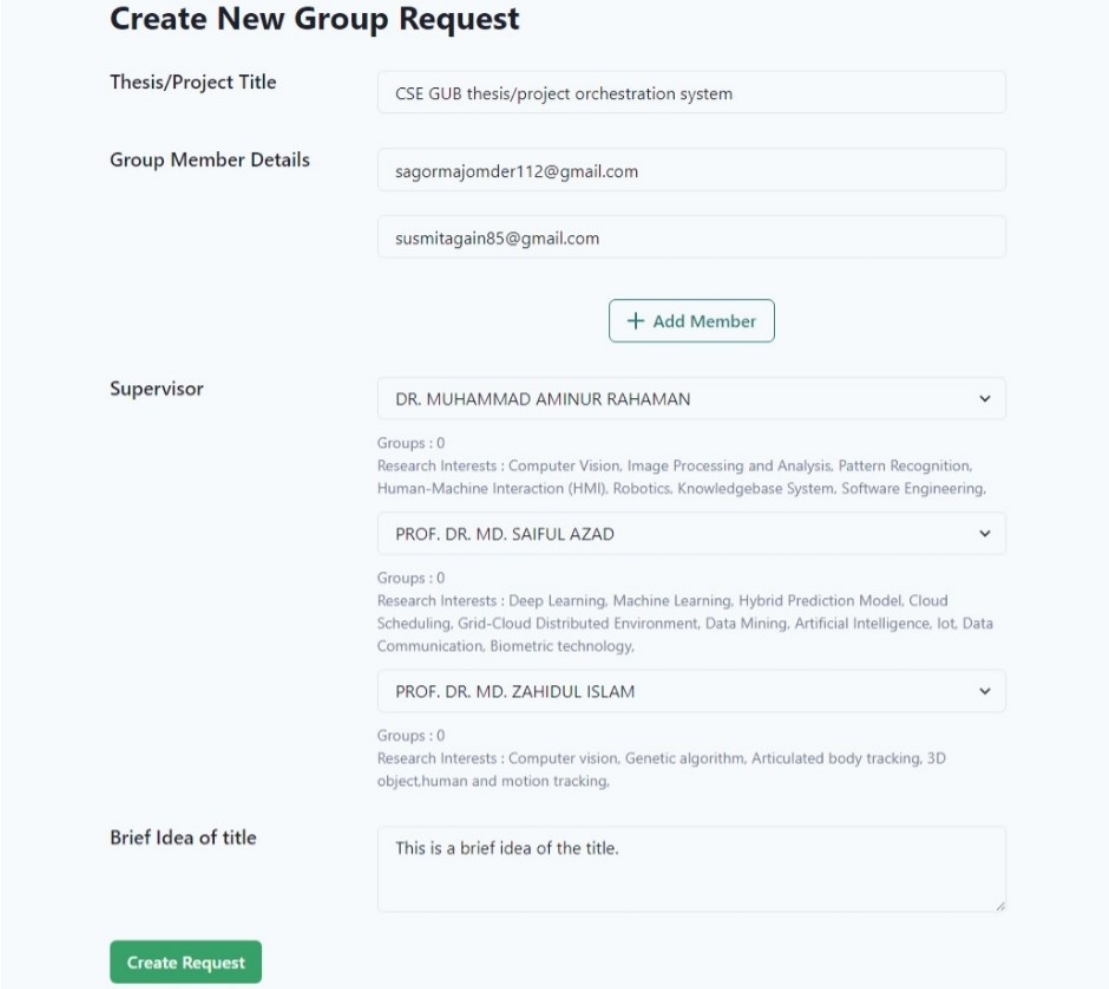

Figure 4.3: Group request page

According to the particular supervisors' research interest field and the number of students currently working under him/her, students can decide which supervisor they need to choose cause if supervisor research interest field is same with the students thesis/project topic then students will get best advise from that supervisor to complete their thesis/project. After deciding, they can send supervisor request for their group. Supervisor group request sending confirm is in figure 4.4

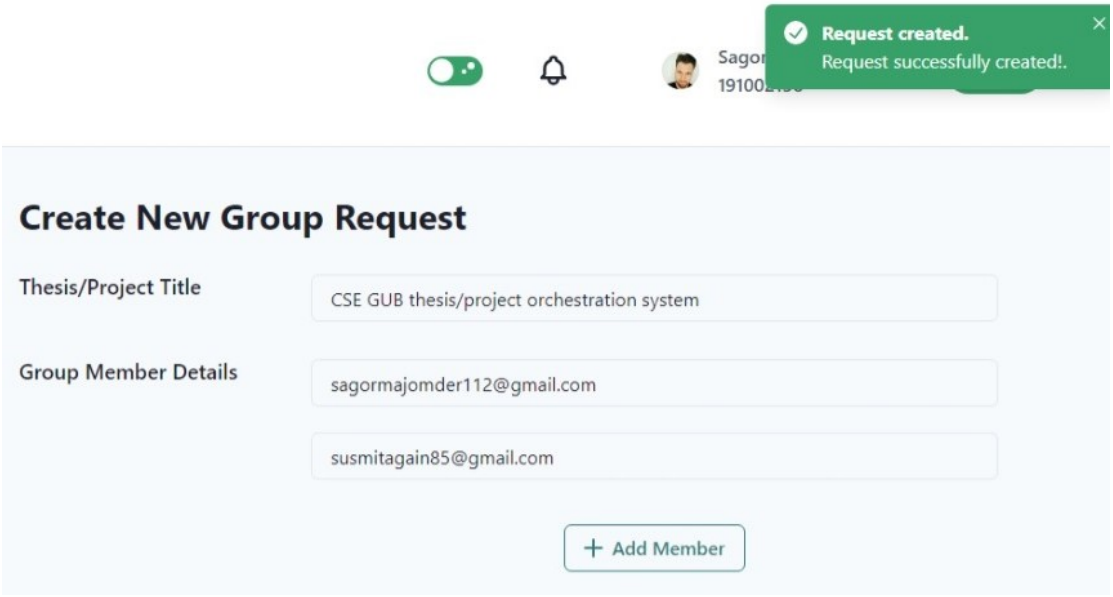

Figure 4.4: Group request sending confirm

4.3.4 Group Information

In group information, student can see their own group information. They can see their thesis/project title, their own group members information and their selected supervisor. Group information page is in figure 4.5

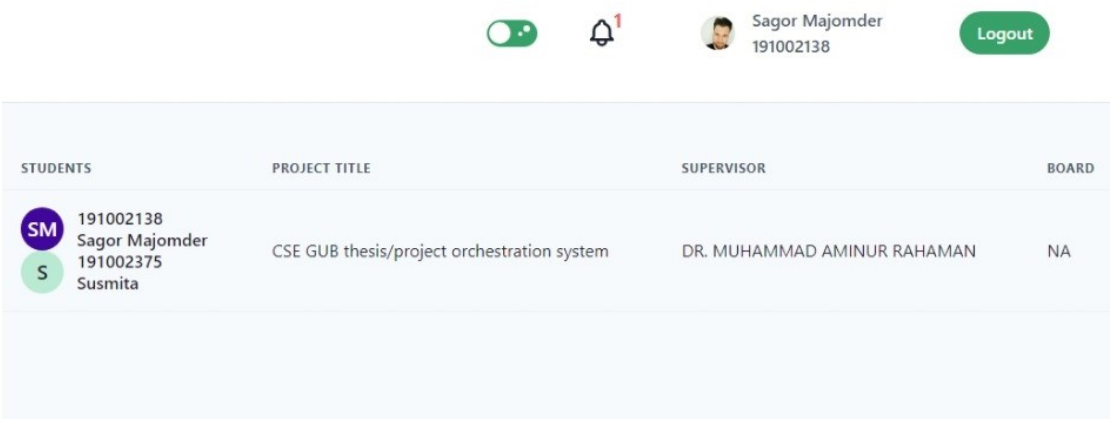

Figure 4.5: Group information page

4.3.5 Todo/Task

In Todo/task page, student can see what kind of task their supervisor assign them and what is the due date of the task. After completing the task, they can submit their task with documents upload. Student todo/task page is in figure 4.6

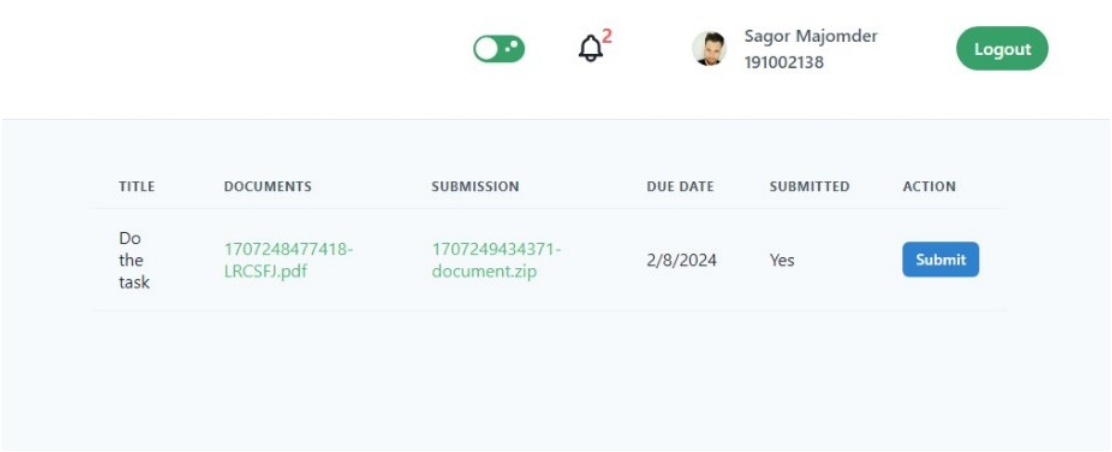

Figure 4.6: Todo/Task page

4.3.6 Chat

Student can send messages to their supervisor and can receive messages from supervisor in real time. Student chat page is in figure 4.7

Figure 4.7: Chat page

4.3.7 Notice

Whenever thesis/project committee publish any notice related to students, student can see the list of that notices in their dashboard, figure 4.8

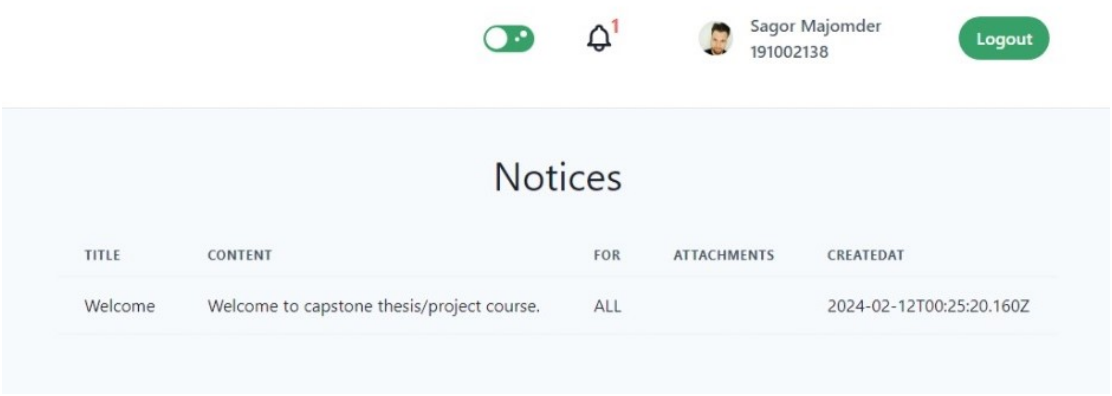

Figure 4.8: Notice page

4.3.8 Notification

Student can get notifications if supervisor accept their request, if supervisor send messages, if there are have any notice etc. figure 4.9

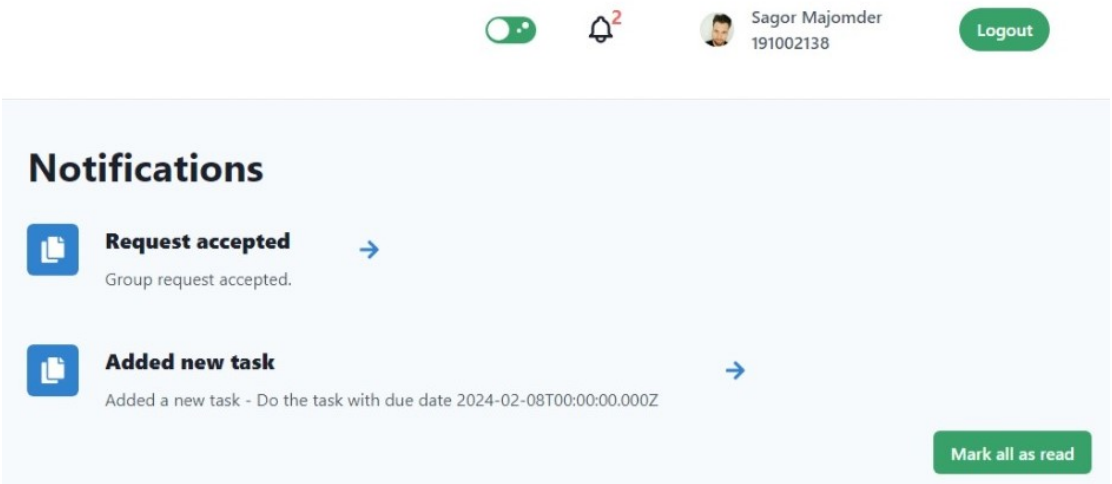

Figure 4.9: Notification page

4.3.9 Profile

In student dashboard, student can go to their profile where they can see their information. They can see their Name, email address info. Also they can see currently which semester they are in. Student profile page is in figure 4.10

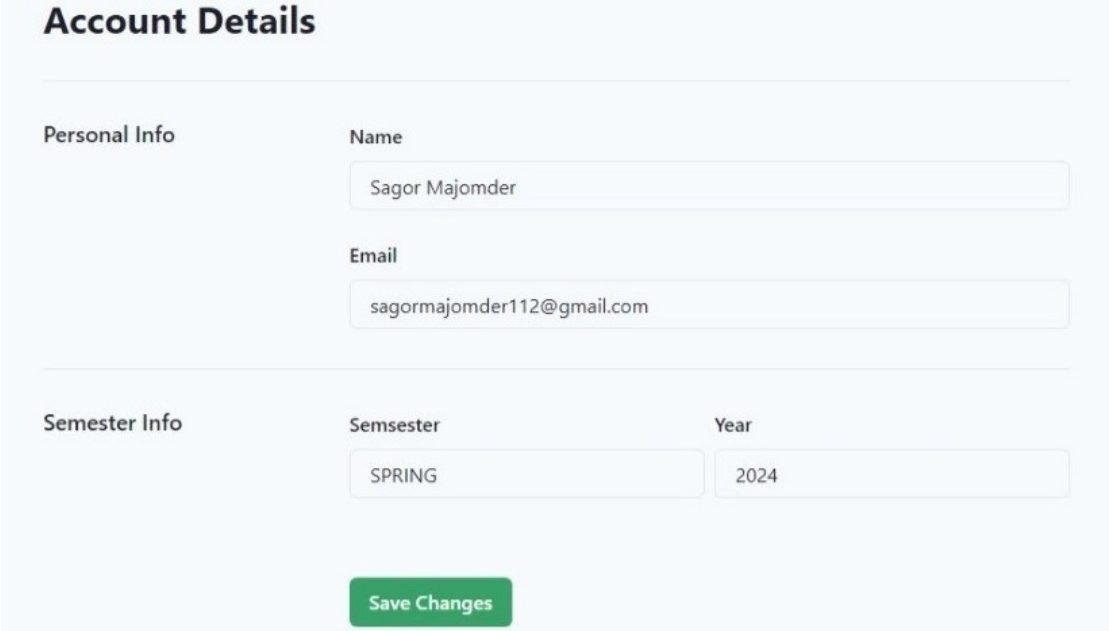

Figure 4.10: Profile page

4.4 Web Application Pages(Supervisor)

For Supervisor, we have Supervisor registration page, Supervisor login page and Supervisor dashboard page. Supervisor dashboard page also includes some pages according to the Supervisor operations.

4.4.1 Supervisor Registration Page

Supervisor have to registration in the application. During registration, they have to provide some information such as their name, email address, research interest field and password for registration. If they provide valid and required information, then the registration will be successful. Supervisor registration page is in figure 4.11

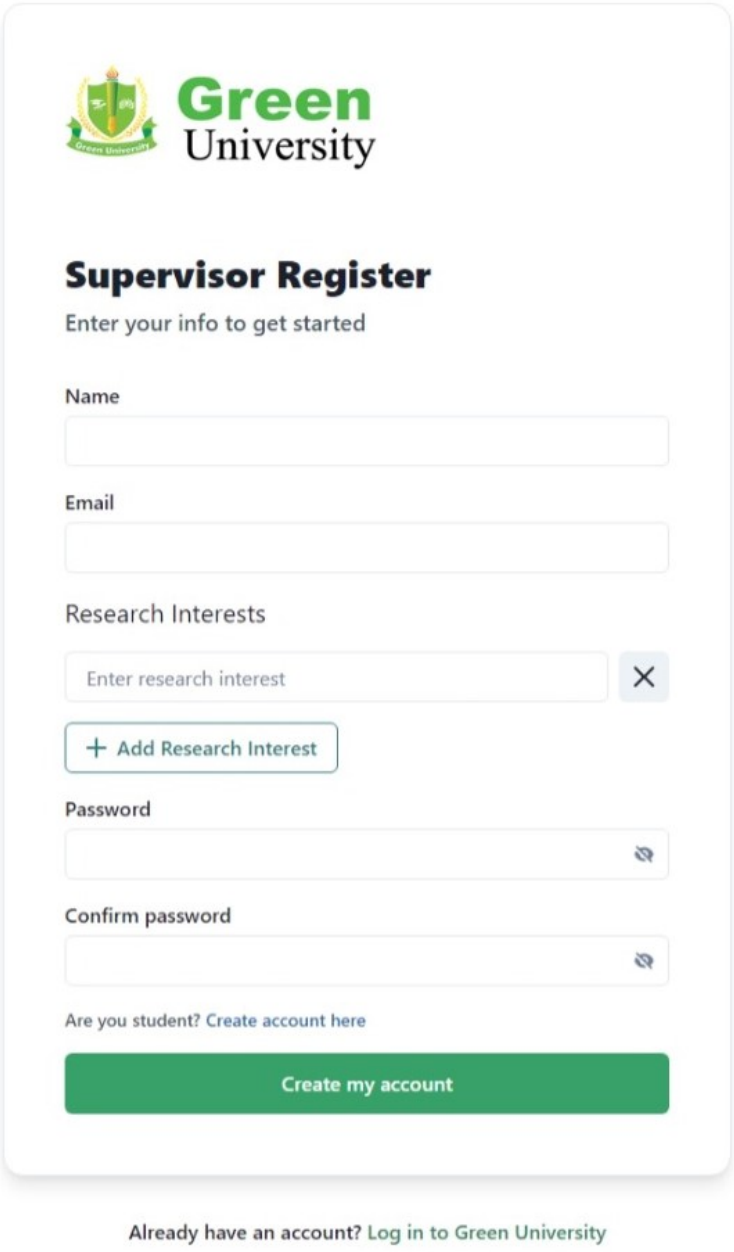

Figure 4.11: Supervisor registration page

4.4.2 Supervisor Login Page

To login, supervisor need to use their working email address and password. Supervisor login page is in figure 4.12

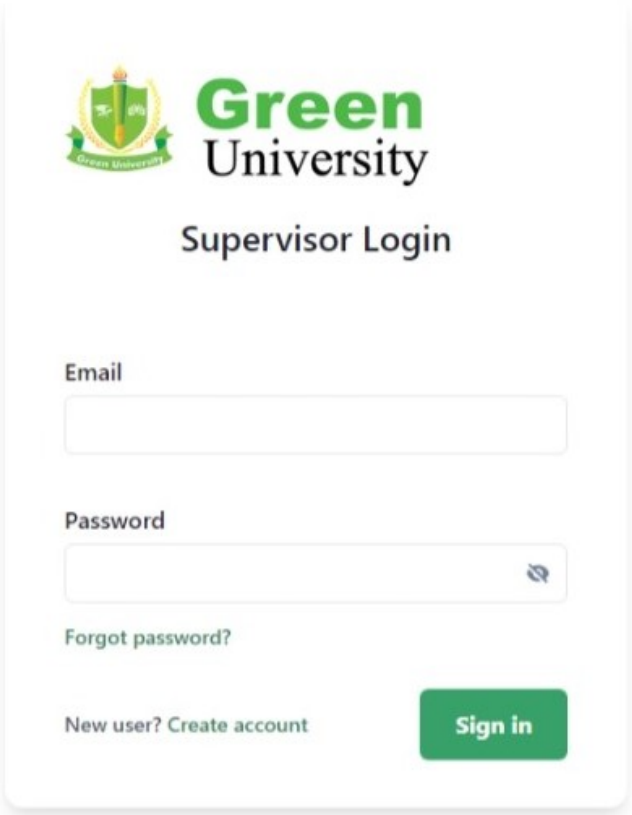

Figure 4.12: Supervisor login page

4.4.3 Group Information

Supervisor can see all the group list he/she accepted in different semester by selecting the semester info from the above. After select the semester, all group information will show. In group info, supervisor can see the thesis/project title, students name and their student id, board information, mark of individual student and can assign marks to individual student of a particular group, figure 4.13

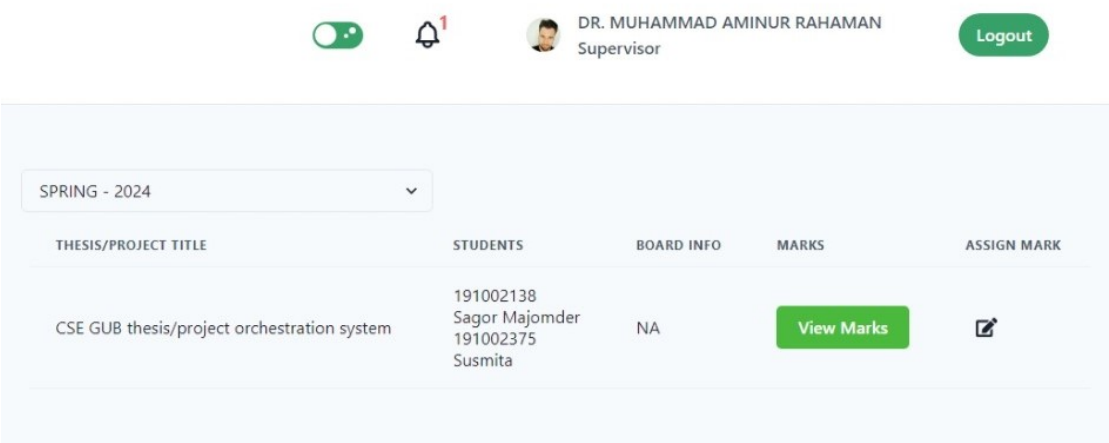

Figure 4.13: Group information page

4.4.4 Assign Mark

Supervisor can assign mark to individual student of a group. He/she can assign mark to the student in pre-defense and defense phase according to the performance of the students in these two phase, figure 4.14

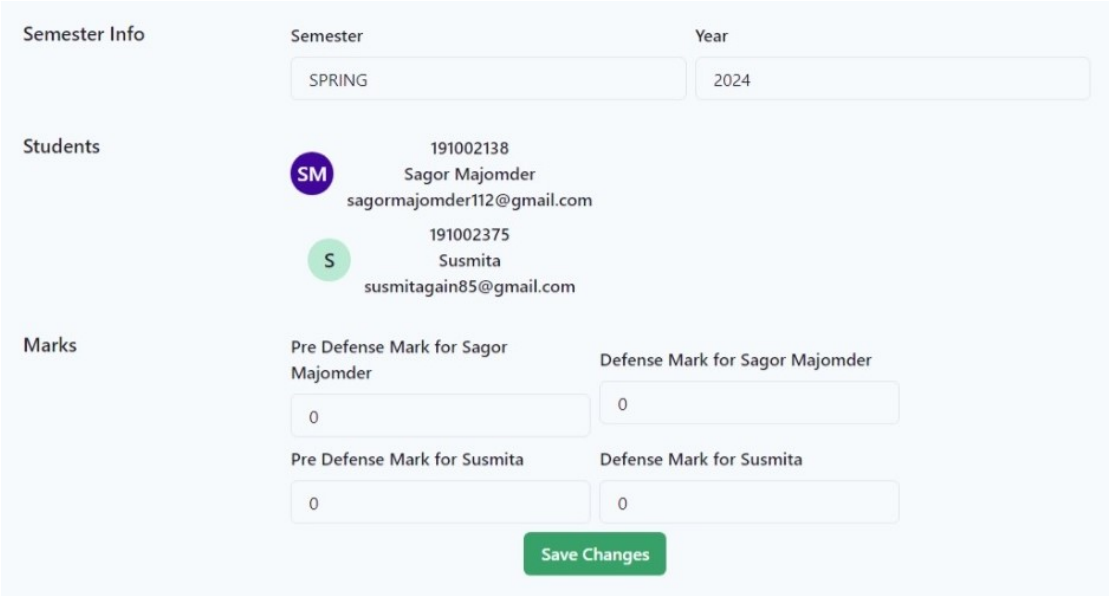

Figure 4.14: Supervisor assign mark to students

4.4.5 Requested groups

Supervisor can get all the requests that the students send them. According to the group information, he/she can accept or reject the group. Requested groups page for supervisor is in figure 4.15

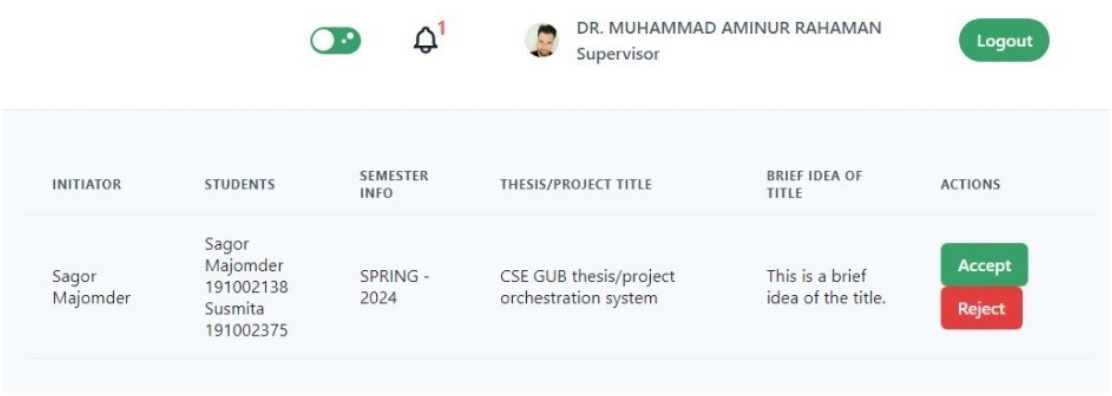

Figure 4.15: Group request page

When supervisor accept a particular group request, a confirmation popup will show to the page, figure 4.16.

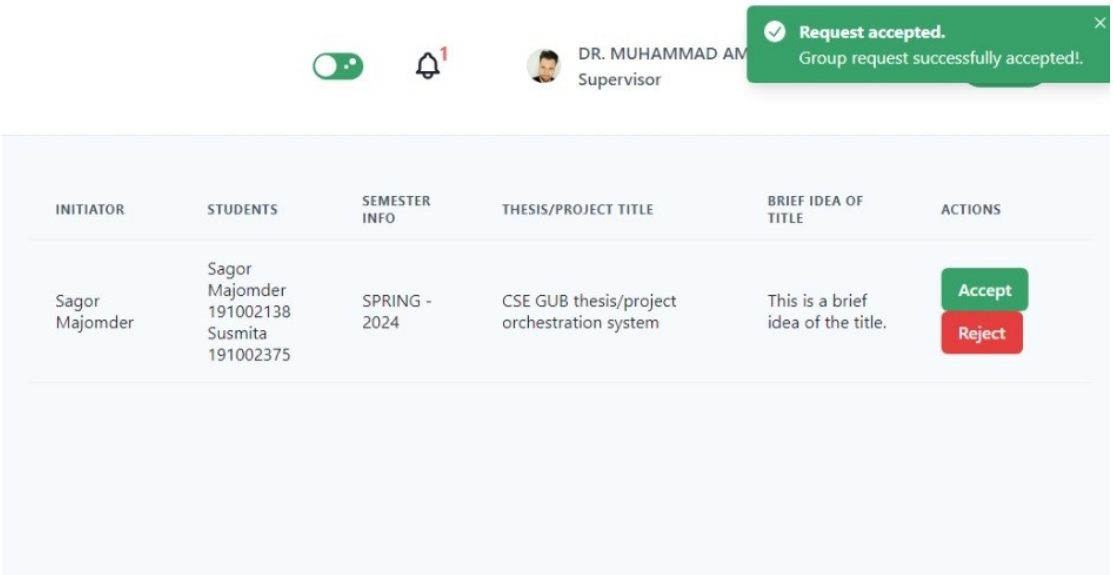

Figure 4.16: Group request accepted

4.4.6 Todo/Task

Supervisor can give assignment to the students as a todo/task. During create task, supervisor can select which group he/she is going to give task, can select due date for the task and some details about the task. Supervisor can also upload documents related to the task, figure 4.17

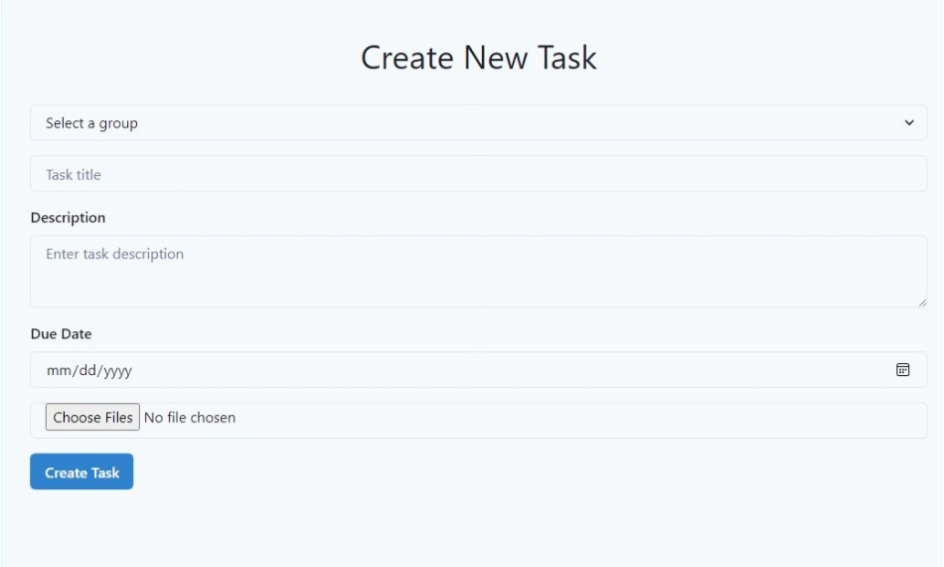

Figure 4.17: Task page

After creating the task, supervisor can see all task list he/she created, figure 4.18

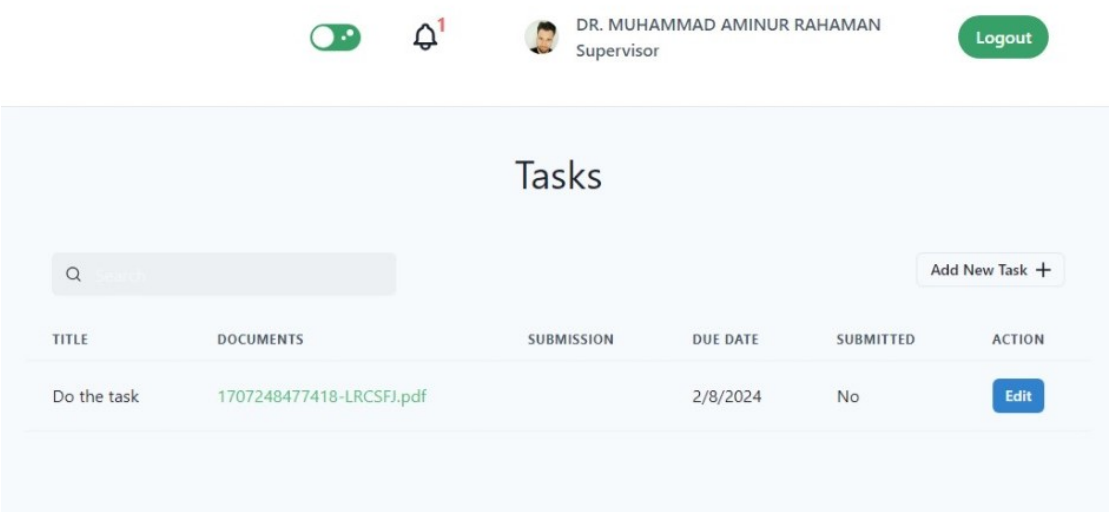

Figure 4.18: Assign task to students

4.4.7 Contact

If supervisor want to contact with thesis/project committee, he/she can do that using his/her contact form from his dashboard, figure 4.19

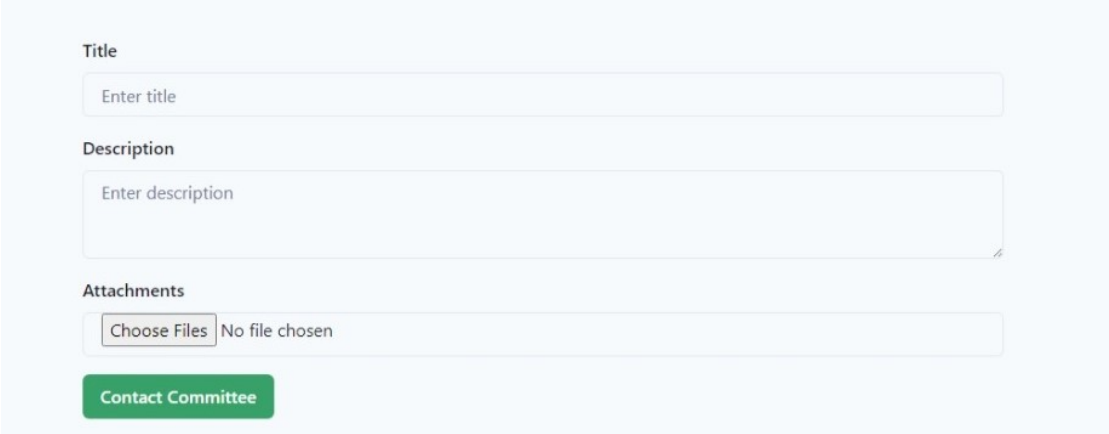

Figure 4.19: Contact page

4.4.8 Notice

Whenever thesis/project committee publish any notice related to supervisors, supervisor can see the list of that notices in their dashboard, figure 4.20

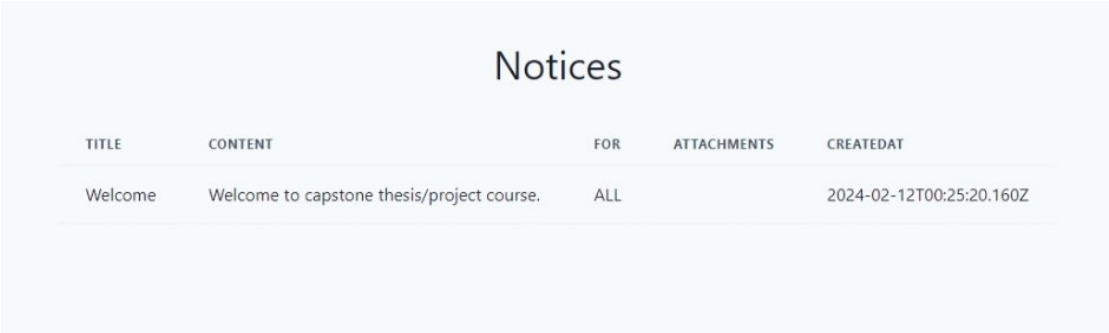

Figure 4.20: Notice page

4.4.9 Chat with students

Supervisor and student can send messages each other with the use of application chat system. Before sending message, supervisor can select which group he/she want to

send message. After select the group, he/she can send message and also see the older messages between him/her and the groups, figure 4.21

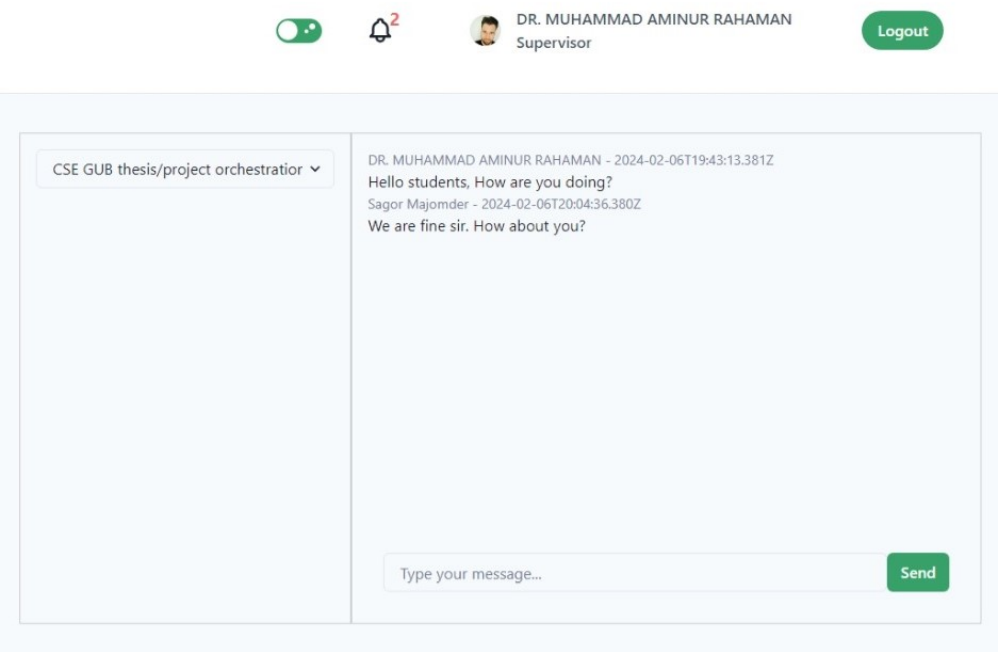

Figure 4.21: Chat with students

4.4.10 Notification

Supervisor can received notification regarding group request received from students, received message from students, received notice etc. figure 4.22

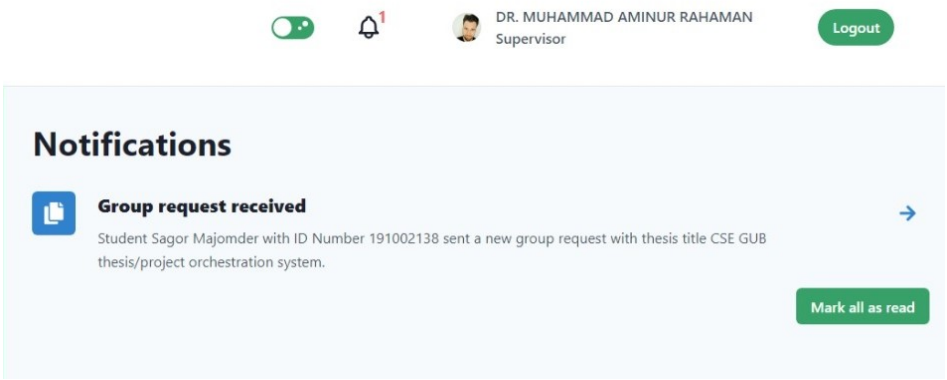

Figure 4.22: Notification page

4.4.11 Profile

In profile section, supervisor can see all the information related to him/her such as his/her personal information and the semester information, figure 4.23

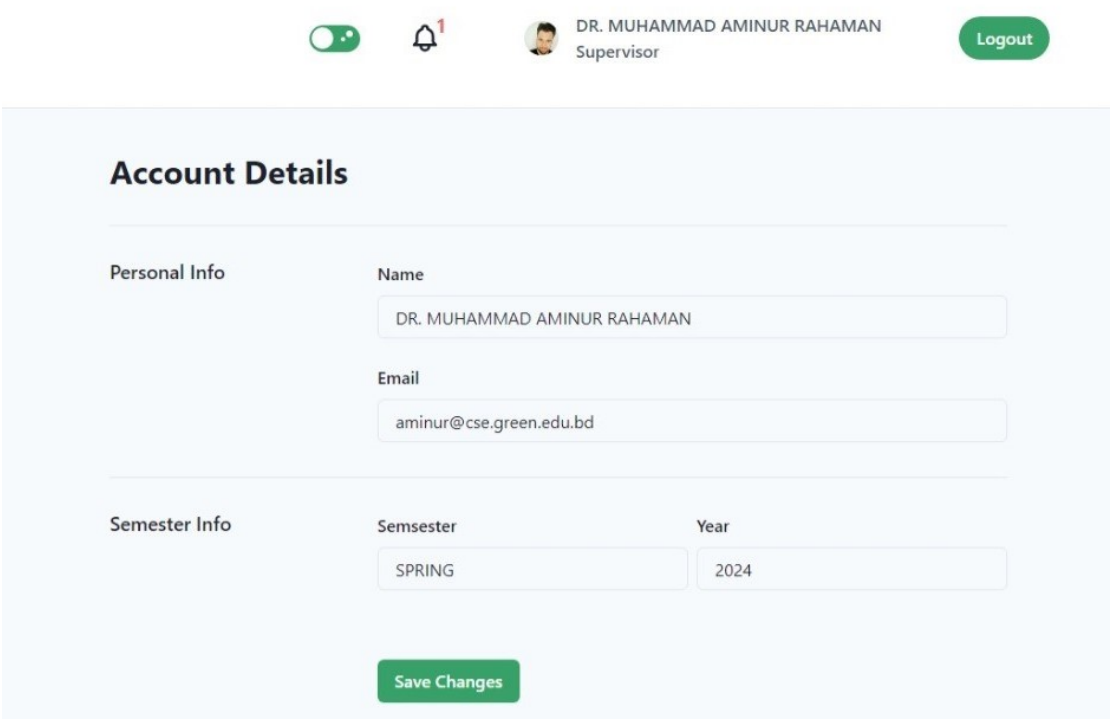

Figure 4.23: Profile page

4.5 Web Application Pages(Board)

For Board, we have Board login page and Board dashboard page. Board dashboard page also includes some pages according to the Board operations.

4.5.1 Board Login Page

To login, Board member need to use their working email address and password. Board member login page is in figure 4.24

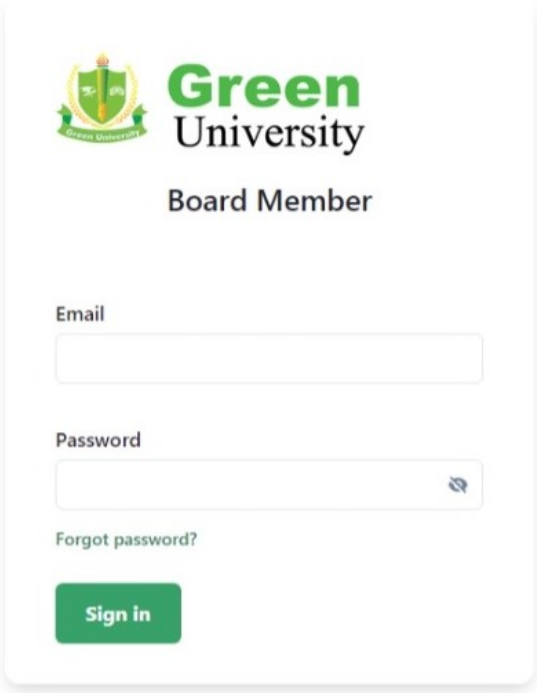

Figure 4.24: Board login page

4.5.2 Group information

A board member can see all the groups list he/she was assign by the thesis/project committee in different semester. In group info, board member can see the thesis/project title, students information, board information, mark of individual student and can assign marks to individual student of a particular group, figure 4.25

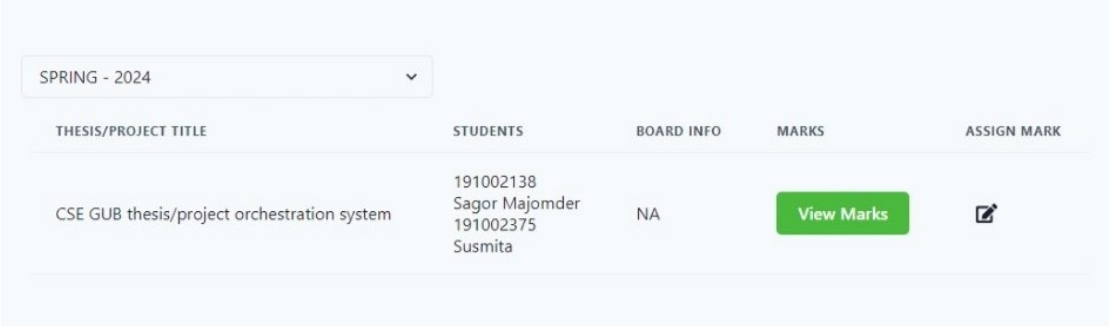

Figure 4.25: Group information page

4.5.3 Board information

In board information page, a board member can see his/her board related information such as which board number he/she is in, other member information of the same board including him/her, figure 4.26

Figure 4.26: Board information page

4.5.4 Contact

A board member can contact with the thesis/project committee. He/she can do that using his/her contact form from his dashboard, figure 4.27

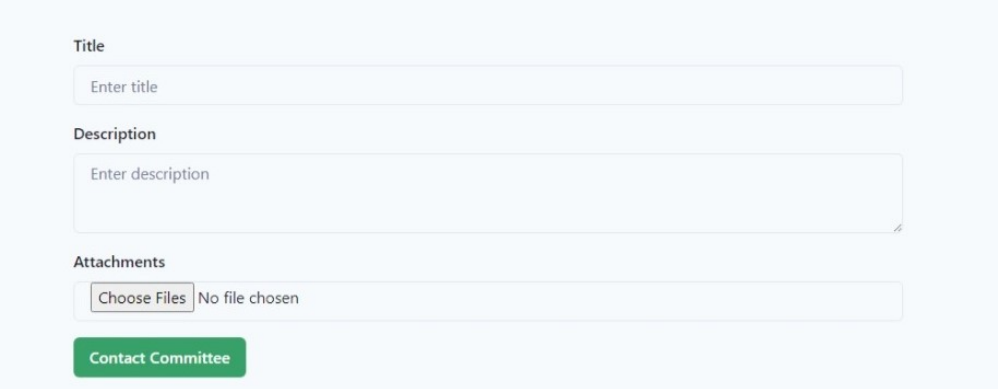

Figure 4.27: Contact page

4.5.5 Assign Marks

A board member can assign mark to individual student of a group. He/she can assign mark to the student in pre-defense and defense phase according to the performance of the students in these two phase. figure 4.28

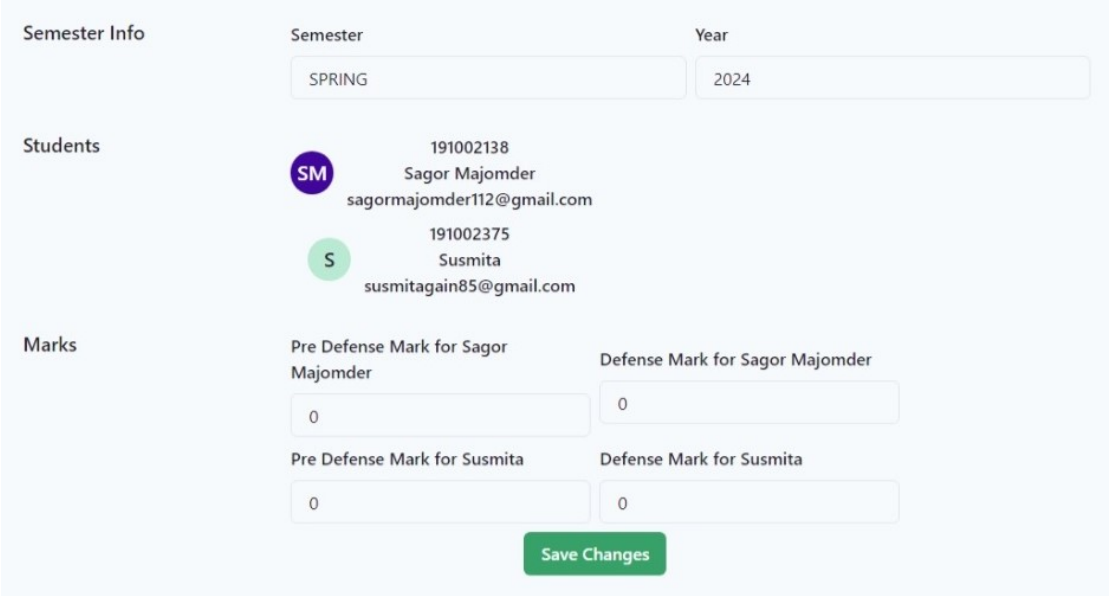

Figure 4.28: Assign mark to students

4.5.6 Notice

Whenever thesis/project committee publish any notice related to boards, board can see the list of that notices in their dashboard, figure 4.29

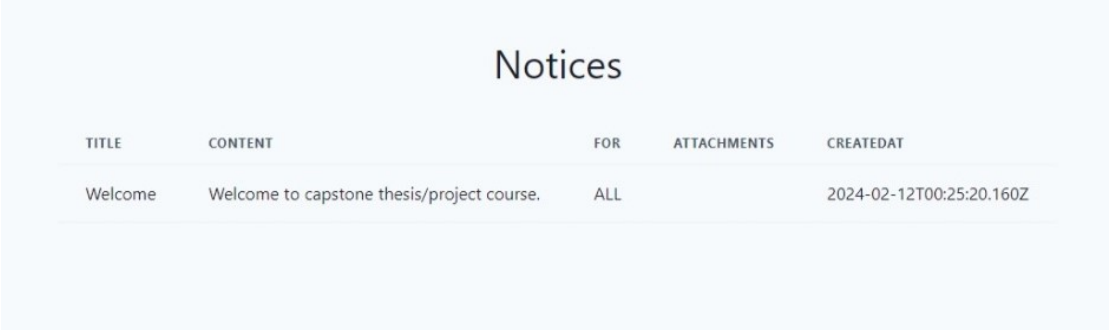

Figure 4.29: Notice page

4.5.7 Profile

In profile section, boards member can see all the information related to him/her such as his/her personal information and the semester information, figure 4.30

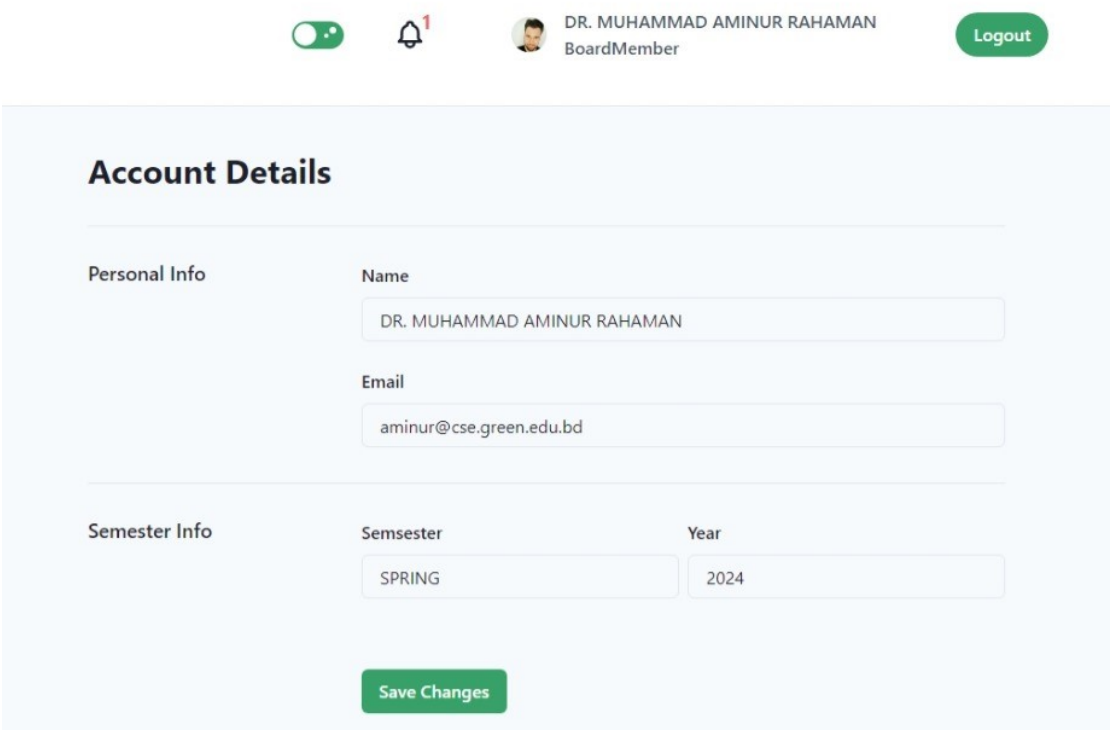

Figure 4.30: Profile page

4.6 Web Application Pages(Thesis/Project Committee)

For Thesis/Project Committee, we have Thesis/Project Committee login page and Thesis/Project Committee dashboard page. Thesis/Project Committee dashboard page also includes some pages according to the Thesis/Project Committee operations.

4.6.1 Thesis/Project Committee Login Page

To login, Board member need to use their working email address and password. Board member login page is in figure 4.31

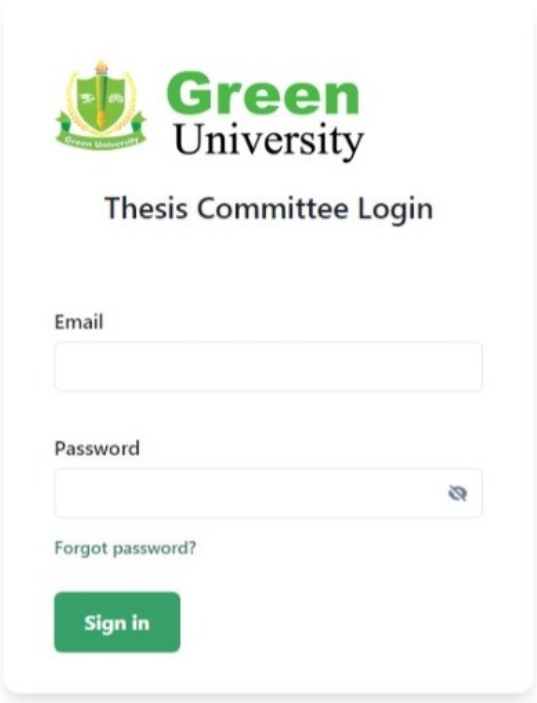

Figure 4.31: Thesis/Project Committee login page

4.6.2 Create Boards

Thesis/Project committee can create different boards by assigning faculty members into different board numbers, figure 4.32

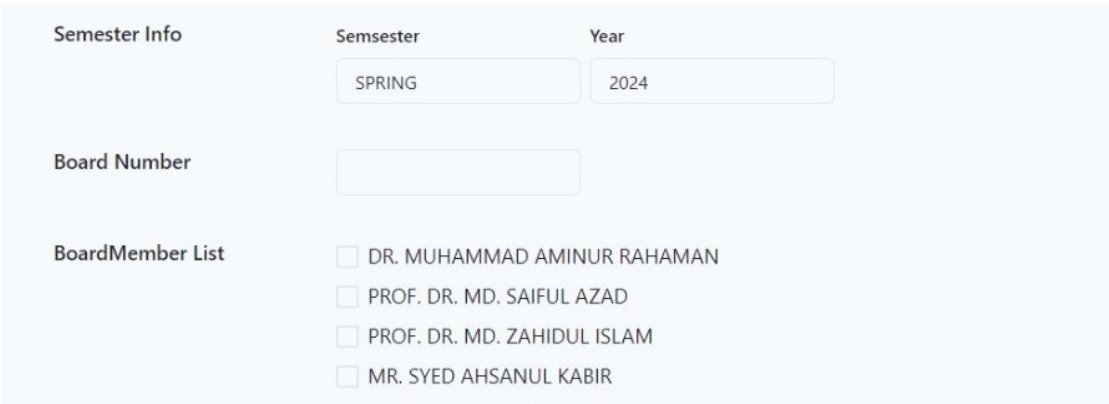

Figure 4.32: Board creation page

4.6.3 Boards Information

After creating boards, thesis/project committee see the list of all boards. They can also delete or edit a particular board, figure 4.33

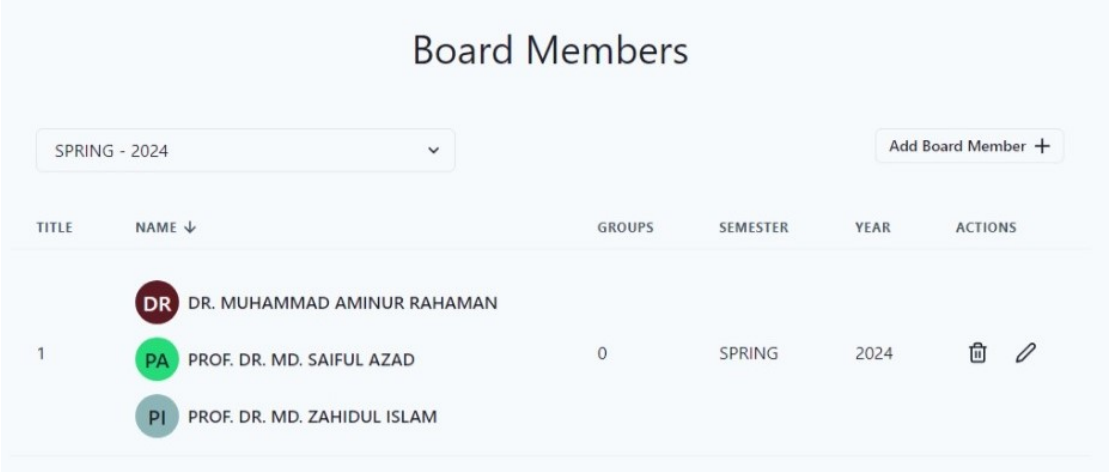

Figure 4.33: Board list page

4.6.4 Groups information

Thesis/Project committee can see all the list of groups which has a faculty member as a supervisor, figure 4.34

Figure 4.34: Group information page

If needed, they can also change a supervisor for a particular group. After click edit button, a popup will show and can select another supervisor for the group, figure 4.35

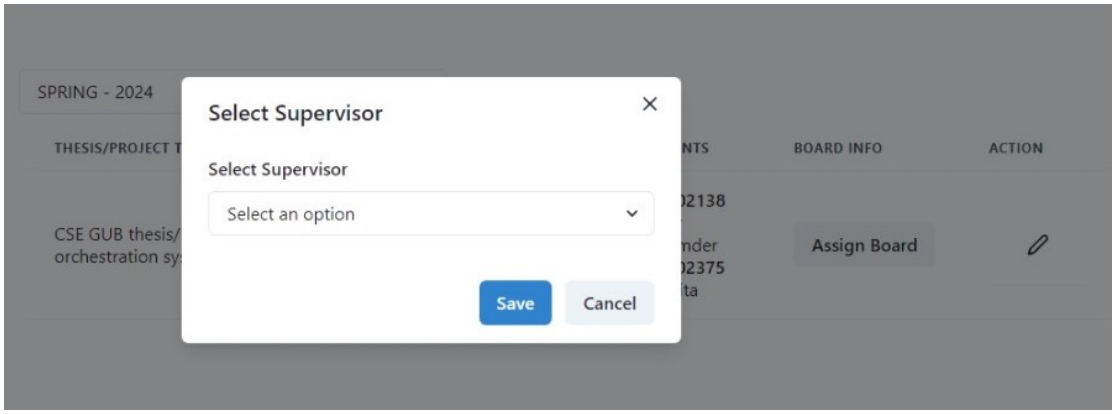

Figure 4.35: Change supervisor popup

They can also assign boards by clicking ”Assign Board” button. After click, again a popup will show and can select board number for the group. After assign board and change supervisor, the information will updated and the list of the group page is in figure 4.36

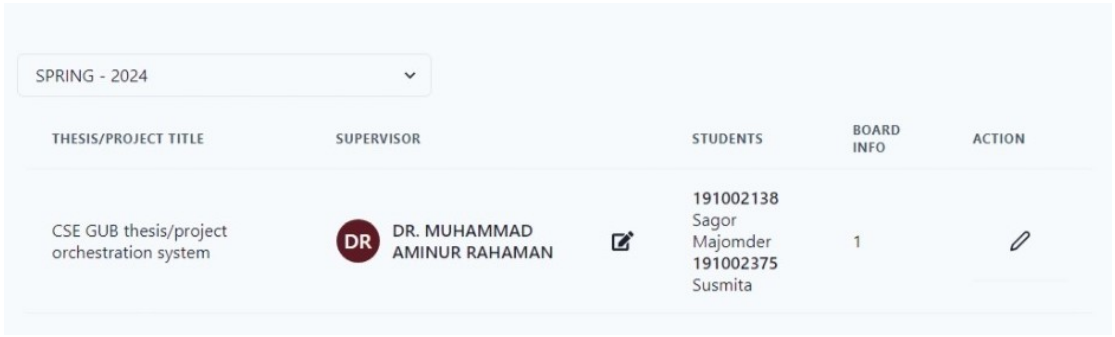

Figure 4.36: Group information page after assign board

4.6.5 Supervisors Information

Thesis/Project committee can see the list of all supervisors who are agree to supervised the students for their capstone thesis/project course under this thesis/project committee and also can see how many students are currently working with a particular supervisor, figure 4.37

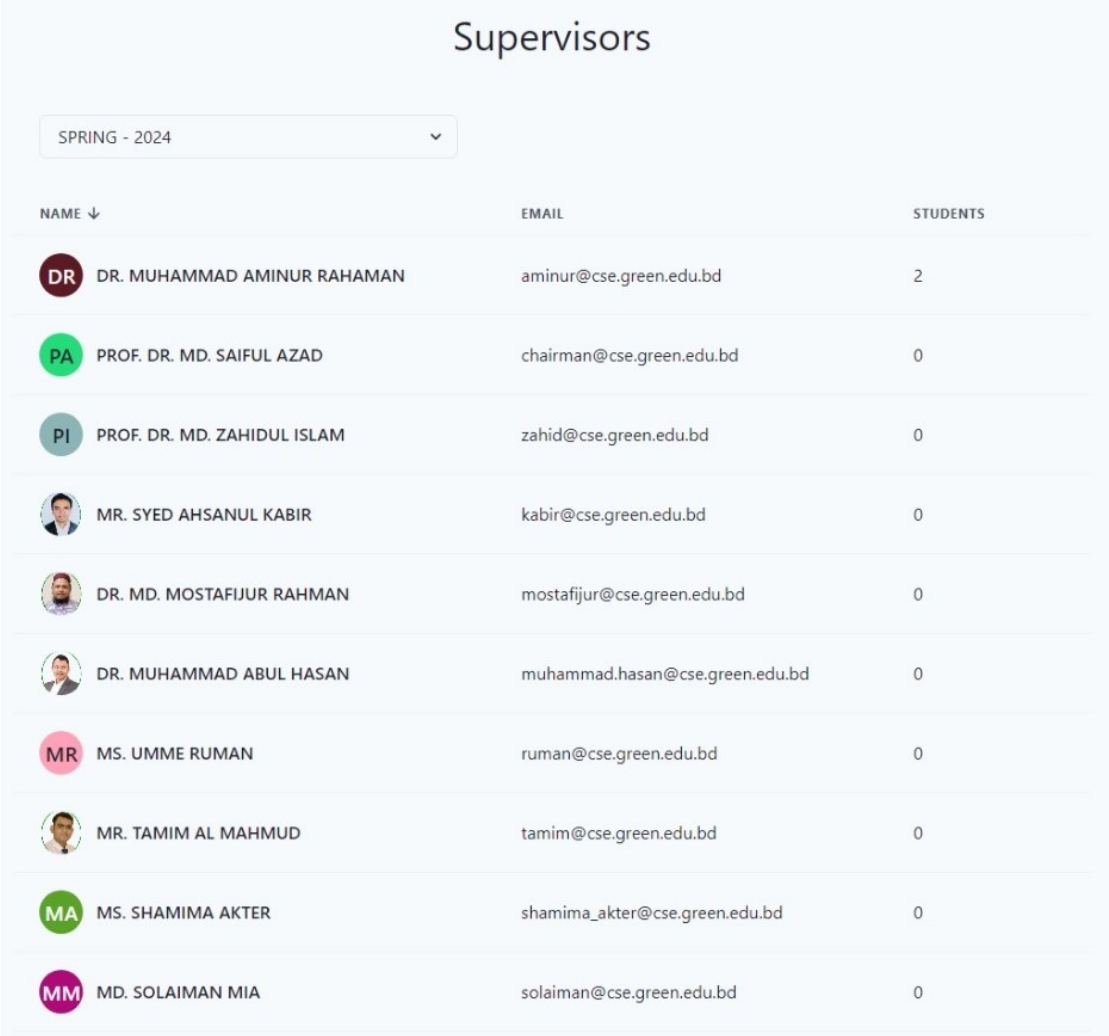

Figure 4.37: Supervisors list page

4.6.6 Contact with Supervisors

Thesis/Project committee can contact with supervisors. They need to select a particular supervisor, input title and input description for the purpose of contact and if needed documents can be uploaded, figure 4.38

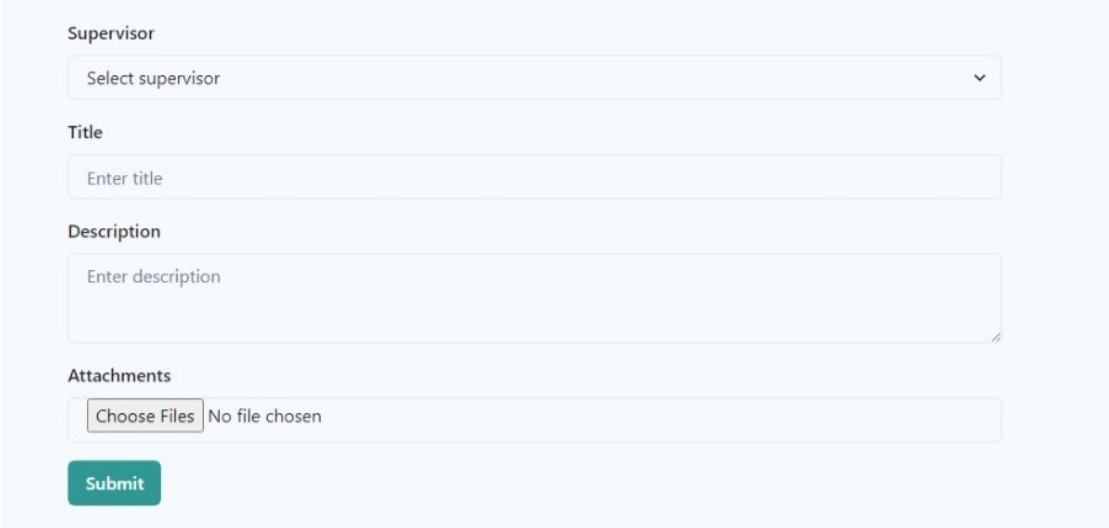

Figure 4.38: Contact with supervisors page

4.6.7 Contact with Boards

Thesis/Project committee can contact with boards. They need to select a particular boards member, input title and input description for the purpose of contact and if needed documents can be uploaded, figure 4.39

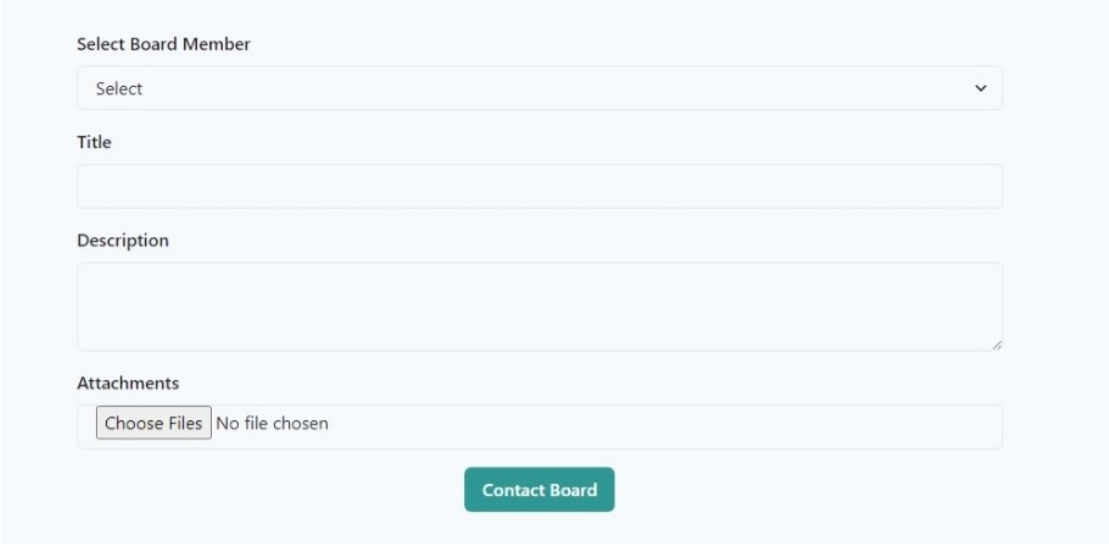

Figure 4.39: Contact with boards page

4.6.8 Create notice

Thesis/Project committee can create notice for different purpose and for different users. For create the notice, thesis/project committee can input notice title, description and select which type of user should see the notice. They can also upload documents if needed, figure 4.40

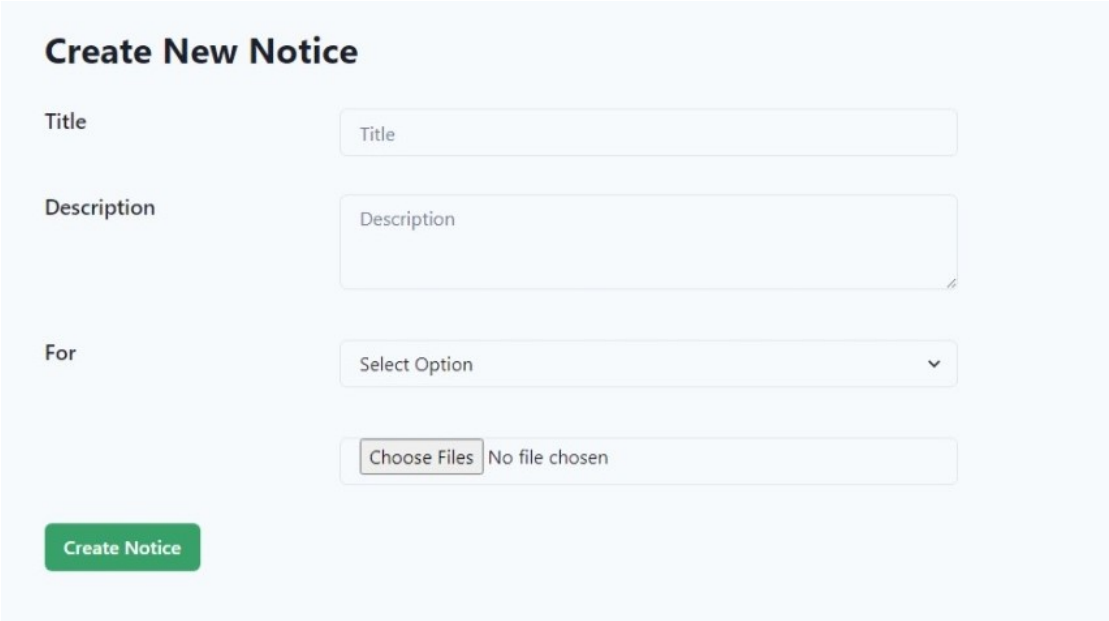

Figure 4.40: Notice creation page

After create the notice, thesis/project committee can see the list of notice they were published with for which user and creation time, figure 4.41

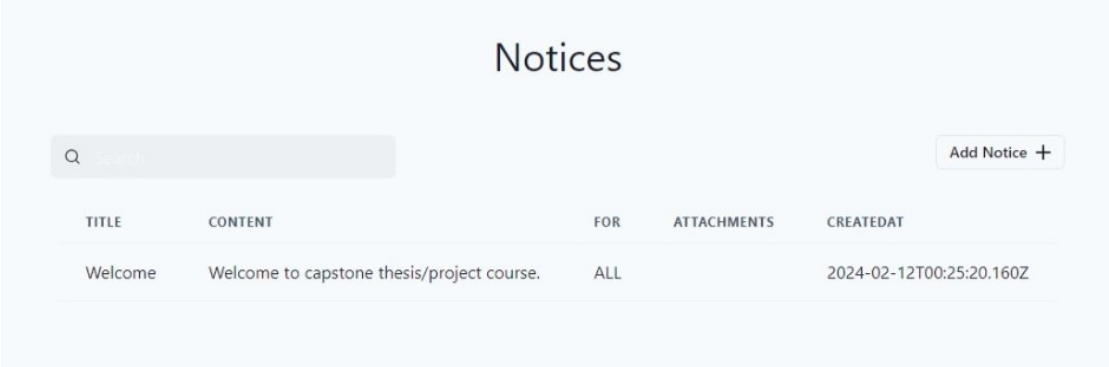

Figure 4.41: Notice publish page

4.6.9 Profile

In profile section, thesis/project committee can see all the information related to him/her such as his/her personal information and the semester information, figure 4.42

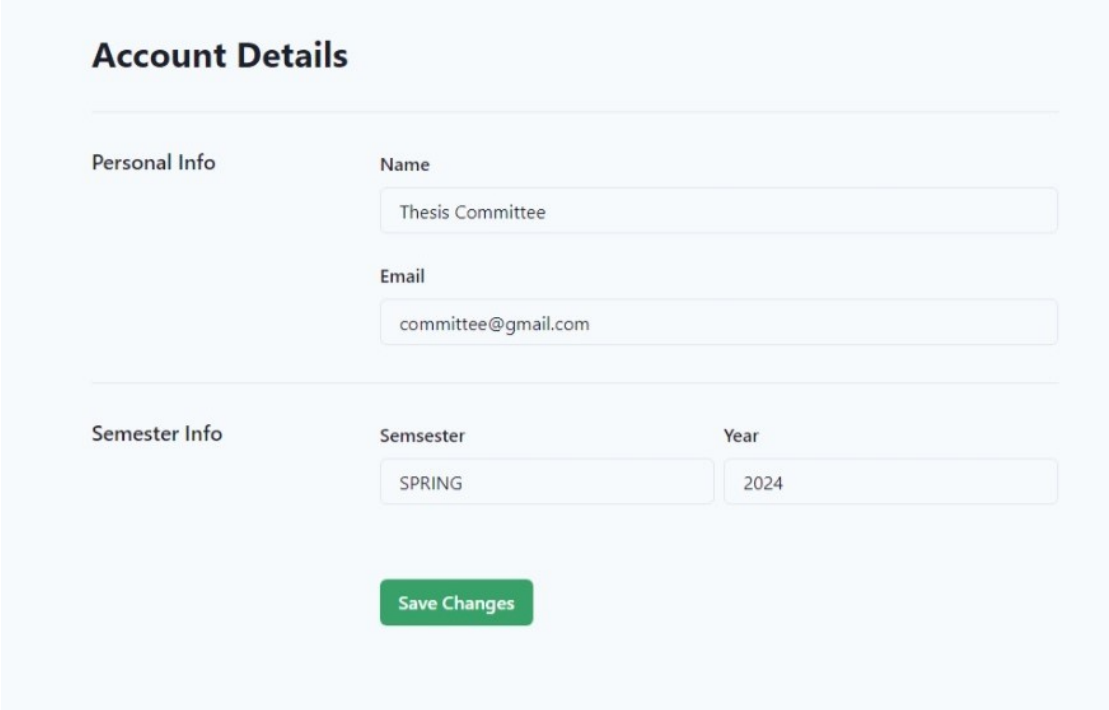

Figure 4.42: Profile page

4.7 Application Responsiveness

Responsiveness of any application means that the application looks fine and works well in any devices. An application that is responsive adopts to fit the platform and screen size of the user.

4.7.1 Desktop View

Desktop view is a term that refers to the way a website or an application is displayed on a computer screen, as opposed to a mobile device. Desktop view typically offers more features, options and information than mobile view, which is optimized for smaller screens and touch-based interactions. Desktop view may also have a different layout,

design and navigation than mobile view, depending on how the website or application is developed. Some websites or applications allow users to switch between desktop view and mobile view, either automatically or manually. This can be useful for users who prefer a certain view or want to access certain functions that are not available in the other view. For example, some websites may have more options or settings in desktop view than in mobile view, or some applications may have more tools or functions in mobile view than in desktop view, figure 4.43

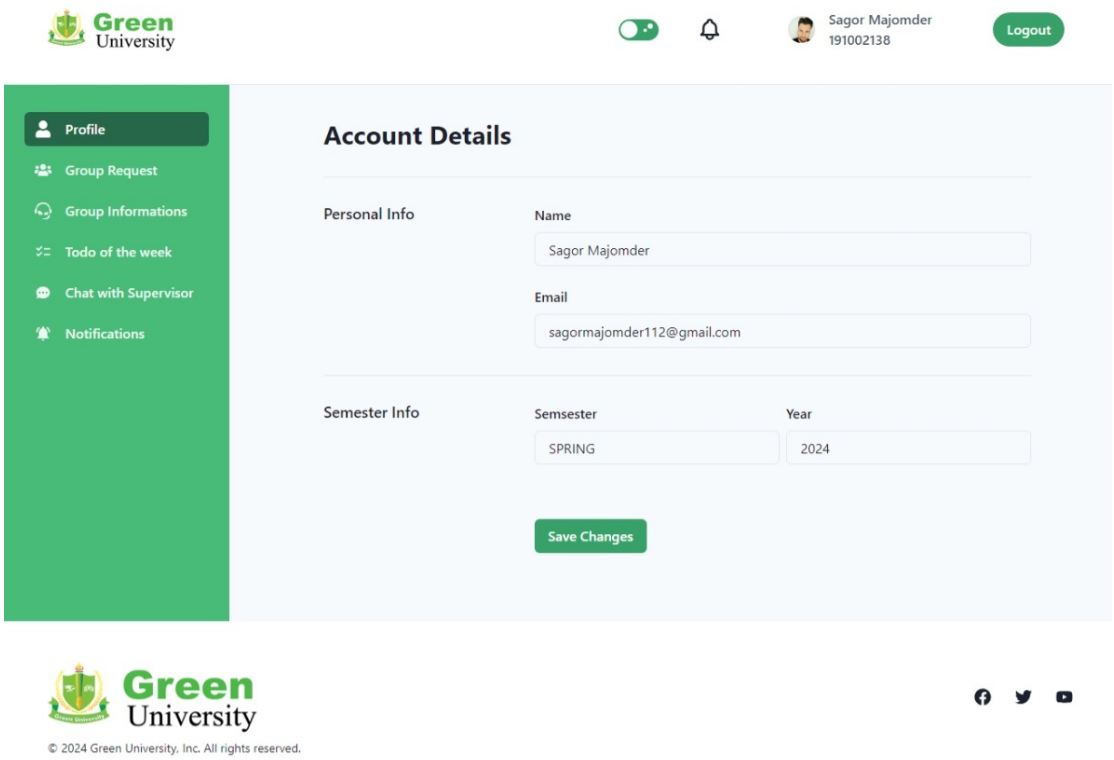

Figure 4.43: Desktop view

4.7.2 Tablet View

Tablet view is a feature that allows user to adjust the layout of a website or app to fit the screen size of a tablet device. Tablet view can help developer to optimize the user experience and accessibility of a website or web application or app content for tablet users, who may have different preferences and needs than desktop or mobile users. The

table view of the applicaiton is in figure 4.44

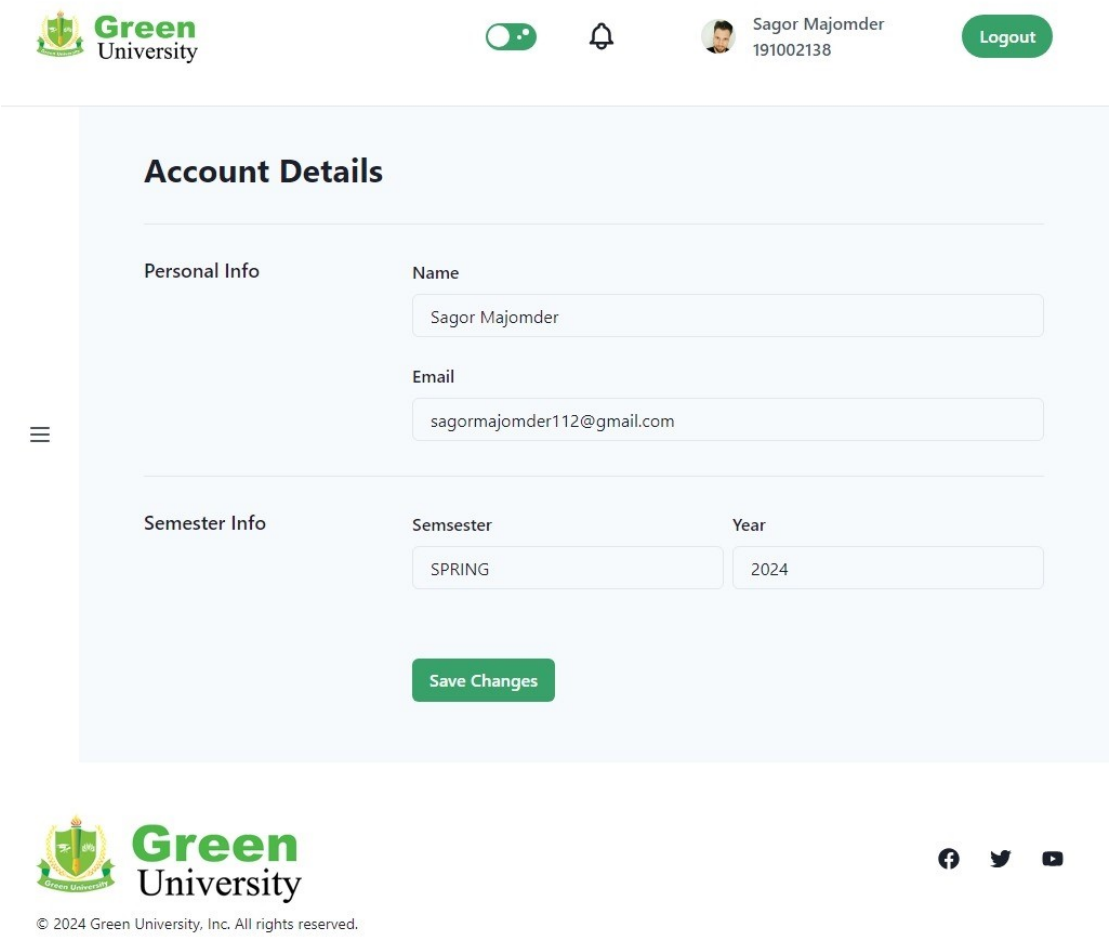

Figure 4.44: Tablet view

4.7.3 Small device View

Small device view is a feature that allows users to see how website or web application or app will look on different types of smartphone devices. It can help developers to optimize their design and layout for different screen sizes and orientations, as well as test the functionality and usability of the website or web application or app on Small devices. Small device view can be accessed through various tools, such as web browsers, emulators, simulators, or online services, figure 4.45.

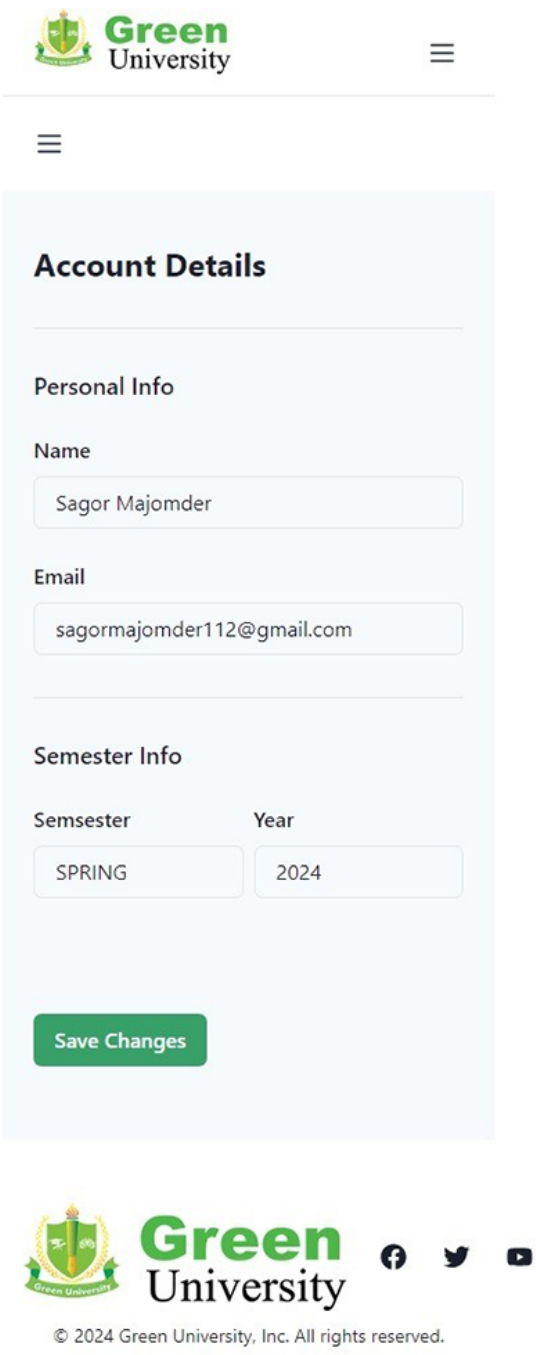

Figure 4.45: Small device view

4.8 Testing

Before launching the application to the server, it must undergo some testing phases. In these test cases, we evaluate the application whether there are any issues. The testing of a project enhances the project performance, accuracy, security, usability etc. As this application is in development phase, we have done several testing on the project and shown the output of the testing in below tables.

4.8.1 Student Login and Registration

Step No	**Category**	**Step Details**	**Expected Results**	**Actual Result**	**Pass or Fail**
1	Registration	Name,Student ID, Semester, Email, Phone Number, Password, Confirm Password	If the user already has an account with the student id then an error will be generated and shown to the user. Otherwise a new account will be created successfully	As Expected	Pass
2	Login	Email and Password	If given email and password are correct then successfully login otherwise en error will be generated and shown to the user.	As Expected	Pass

Table 4.1: Test Result for Student Login and Registration

4.8.2 Supervisor Login and Registration

Step No	**Category**	**Step Details**	**Expected Results**	**Actual Result**	**Pass or Fail**
1	Registration	Name, Email, Designation, Phone Number, Research Interest Field, Research Cell, Password, Confirm Password	If the user already has an account with the email then an error will be generated and shown to the user. Otherwise a new account will be created successfully	As Expected	Pass
2	Login	Email and Password	If the given email and password are correct then successfully login otherwise an error will be generated and shown to the user.	As Expected	Pass

Table 4.2: Test Result for Supervisor Login and Registration

4.8.3 Board Login

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Login	Email and Password	If the given email and password are correct then successfully login otherwise an error will be generated and shown to the user.	As Expected	Pass

Table 4.3: Test Result for Board Login

4.8.4 Thesis/Project Committee Login

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Login	Email and Password	If the given email and password are correct then successfully login otherwise an error will be generated and shown to the user.	As Expected	Pass

Table 4.4: Test Result for Thesis/Project Committee Login

4.8.5 Student Group Request Create and Send

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Group request create and send	Thesis/project title and description, students email, supervisors	Students can create a group with two or three members, can select three supervisors and see research interest fields and currently active students of each supervisor. If given all valid information, students send group requests successfully. Otherwise an error will be generated and shown to the user.	As Expected	Pass

Table 4.5: Test Result for Student Group Request Create and Send

4.8.6 Student Task and Chat

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Task	Task check, task submit	See the list of task assigned by the supervisor with due date and documents. If there are any task available, students can submit required documents according to their tasks' objectives and finish the task.	As Expected	Pass
2	Chat	Send message	If students have any confusion or query or need to contact with supervisor like query for available task or thesis/project topic, they can send messages to the supervisor in real time.	As Expected	Pass

Table 4.6: Test Result for Student Task and Chat

4.8.7 Mark Assign to Student

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Supervisor mark assign	Assign mark to a particular student	Supervisor can assign mark to individual student for the pre-defense and defense phase. He/she assigned mark between the range of 0 to 5 score according to the some rubrics that is defined by the thesis/project committee.	As Expected	Pass
2	Board mark assign	Assign mark to a particular student	Board can assign mark to individual student in the pre-defense and defense phase between the range of 0 to 5 score according to the some rubrics that is defined by the thesis/project committee.	As Expected	Pass

Table 4.7: Test Result for Mark Assign to Student

4.8.8 Board Create and Supervisor Change

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Create board	Board Number, faculty selection	Thesis/Project committee can create a particular board by giving a particular number input according to the previous created board and assign some faculty member with an input for external member to that particular board.	As Expected	Pass
2	Change supervisor	remove supervisor, add new supervisor	If needed, thesis/project committee can change a particular groups' supervisor by assigning new supervisor to that group.	As Expected	Pass

Table 4.8: Test Result for Board Create and Supervisor Change

4.8.9 Assign Supervisor and Board to Groups

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Assign Supervisor to pending groups	check pending group, select group, assign supervisor	If there are groups which does not have any faculty as supervisor, thesis/project committee can see that list and assign supervisor to the groups.	As Expected	Pass
2	Assign Board to groups	Check group list, select group, assign board	Thesis/Project committee can see all the group list which have supervisor, can select any particular group among the list and can assign any board to that particular group.	As Expected	Pass

Table 4.9: Test Result for Assign Supervisor and Board to Groups

4.8.10 Create Notice and Publish

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Create notice for different users	Input notice subject, input notice details, select user, document upload	Thesis/Project committee can create notice and publish for different users such as only for boards, only for supervisors, only for students or for all users.	As Expected	Pass
2	Show the notices	check notice, view notice details, view notice documents	When thesis/project committee publish notices for different users such as only for boards, only for supervisors, only for students or for all users then the respective users get that notices. Users can view the notice details and also can view the notice documents if have.	As Expected	Pass

Table 4.10: Test Result for Create Notice and Publish

4.8.11 Contact

Step No	Category	Step Details	Expected Results	Actual Result	Pass or Fail
1	Contact with the thesis/project committee	Input contact subject, input contact message, document upload	Supervisors and boards can contact with the thesis/project committee by filling the contact form.	As Expected	Pass
1	Contact with boards and supervisors	select board or supervisor, input contact subject, input contact message, document upload	If needed, thesis/project committee can contact with boards and supervisors by filling the particular contact form.	As Expected	Pass

Table 4.11: Test Result for Contact

4.9 Discussion

The web application for "CSE GUB Orchestration System" has been implemented. The foundation of four user interfaces have been implemented. The applications are highly user friendly and easy to access. All the functionalities are working fine as the project has passed the testing phase.

Chapter 5

Conclusion

The purpose of the ”Thesis/Project Orchestration System” was to established a better initialization of universities' capstone thesis/project course by using a software system to do thesis/project related tasks easily, automatically, quickly and efficiently. And from the above sections it is clear that primarily our proposed method can do it.
The application is not only benefit students to do their work automatically such as to get their choice-able supervisor, help contact with supervisor quickly and getting task what they need to do in a due date but it also helps the conducting department to do their works like make committee members, board members, assigning faculty members as supervisor, making event scheduling, setting rules for upcoming events etc. in a robust and efficient way rather than a slow and manual way.
Though the application now only applicable for CSE department of the university but it can also adjust itself to work with all other department of the university as well.

5.1 General Discussion

The GUB Thesis/Project Orchestration System functions as an educational hub, facilitating the exchange of various academic elements such as Learning Demonstration, Original Contribution, Professional Development, Critical Thinking, Assessment, skills, and Credentialing Completion. The facilities that users can get from here :An enables departments to manage committees, assign supervisors, individual students

get marks , feedback and effortlessly. Students benefit by easily selecting expert supervisors, tracking their progress, and accessing important information without direct communication. The system fosters seamless communication and collaboration among all stakeholders, enhancing efficiency and transparency in completing thesis/project courses.

5.2 Limitation of the research

Though our application can do its work perfectly but it has some limitation.

- Security: The application now has only basic security. We have to implement better security for all users of the application so that the privacy of the information are not broken. For that we have to contact with security specialist with proper business idea.
- Adjust with other department: The application now only applicable for CSE department of the university. To get all benefits of the university capstone thesis/project course, it need to adjust with all the department of the university.
- Scalability: The application have used MongoDB cloud database in the back-end. The MongoDB give limited read, write, delete, and storage of data in free service.

5.3 Future Works

Looking ahead, the GUB Thesis/Project Orchestration System will focus on enhancing feedback mechanisms, integrating learning analytics, expanding supervisor matching, enabling mobile accessibility, implementing advanced communication tools, integrating external platforms, offering customization, and ensuring security measures. These efforts aim to optimize effectiveness, usability, and support for student success while maintaining a safe environment for all users.

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