

**PEER EVALUATION SYSTEM**

By

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**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY**

**UNIVERSITI TUNKU ABDUL RAHMAN**

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**SUBMISSION OF FINAL YEAR PROJECT**

It is hereby certified that Tai Jiann Tsong (ID No: 20ACB00146 )  
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## DECLARATION OF ORIGINALITY

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## **ABSTRACT**

This project is the development of a peer evaluation system web app for academic purposes and to resolve the student's problems that occurred during the assignment or research group forming. This project will be used to solve the problem of research or assignment groups that face a high risk of getting messy with not cooperating or low attitude and performance team member, and this system as the community for students or researchers to form their group. The methodology to manage this development process is an agile methodology to maximize the flexibility of the project and shorten the development life cycle. This project will be developed as a web-based system and the architecture will be using is MVC (Model-View-Controller) architecture pattern with using of Laravel MVC framework in PHP written language. This project aimed to provide a references source to the public when they decide to form their group, they can refer to the evaluation rating and record available in the system before they accept to join, this system will allow the evaluation aspect collect from the community's users and let the suggested idea with a majority of the vote to be added to the evaluation form for fair evaluation purpose. This system also allows for group forming for research or assignment groups, and search or sort for the evaluation rating rank for them to check their peer's evaluation rating. In the development process, the MySQL database will be used for the system to manage and store the system's data. The tools involved to develop the system are the Argon Design System CSS framework to build the layout and the Object-Oriented Programming of PHP. To verify the usability of the system, it will be tested with the black box testing when it has finished development.

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## LIST OF SYMBOLS

$\Sigma$  Summation

## LIST OF ABBREVIATIONS

<i>MVC</i>	Model-View-Controller
<i>PHP</i>	Hypertext Preprocessor
<i>OpenCL</i>	Open Computing Language
<i>ASCII</i>	American Standard Code for Information Interchange
<i>MCAI</i>	Multimedia Computer Assisted Instruction
<i>SQL</i>	Structured Query Language
<i>CGI</i>	Common Gateway Interface
<i>RDBMS</i>	Relational Database Management System

# Chapter 1

## Introduction

### 1.1 Background Study

Peer refers to the person who has the same characteristics such as social, and age in the same group [1]. A journal on Innovative Higher Education discusses a case study on peer evaluation that said peer evaluation is a process to critique the performance of another student [2]. The peer evaluation process will involve a member in a group to evaluate and provide feedback to their peers based on the work or performance of their peers. A peer evaluation is usually used as a tool that helps their peers to find out their limitations on themselves so that they could refer to the review or feedback from the peer evaluation to learn or take action to improve on the aspect that is being evaluated as weaknesses or limitations. Peer evaluation is usually done by the peer as a volunteer or optional instead of forcing the peer to complete the peer evaluation to evaluate the performance [3].

In a real situation in daily life, the supervisor in a project or lecturer in the class usually uses peer evaluation to help the employee or student to improve what they had done in the past or try to help them to find out their weakness with the peer evaluation tool. A peer evaluation usually uses a question form that allows a member in the group to fill up their comment to the other member that is targeted to be evaluated. In the beginning, the member as an evaluator which refers to the students or employees in a group will be introduced to what criteria will be required to be assessed in the evaluation form, later the evaluator is provided with a simple guideline on how to fill up the evaluation form and how they should evaluate the person to be evaluated which is their group member. Later a grading will be given to the evaluated person, and the final grading of the evaluated person will be graded with the overall or median score from all the results of the evaluation form.

The peer evaluation system in this project refers to a web-based peer evaluation system for the students or employees to evaluate each other from the aspect of performance, work quality, etc done by the target peer to be evaluated in the peer evaluation system. The peer evaluation system will be able to record or save the

evaluation written by a peer to the targeted evaluated students or employees and provide the overall rating from all of the evaluations. The peer evaluation system should be able to help the users to identify the performance through peer evaluation records and rating of the new member of their teammate.

### **1.2 Problem Statement and Motivation**

In a university or college, students will need to search or find suitable group mates to form their homework group or research team. Therefore, the member of the group will be required to find a new member from the outside of their social group when they do not have enough suitable candidates among their social group. Accepting a new member with not knowing well of his/her performance, attitude, and working style will threaten the group project since there is a large chance the newly accepted member will be the one black sheep in a group of white sheep. Billy said that a bad member will cause a nightmare for the whole team and make the effort that had been done by the team get spoilt [4]. Therefore, knowing well about the background of the new member before accepting them to join the group to begin cooperation in the group is important.

In the process of recruitment, every employer or staff of the human resource department will have their candidate screening to select those closer to the requirements listed in the job description. In this process, the employer or human resource staff will face the challenge to verify and investigate the information provided by the candidate such as skills, education background, and experience. The employer or staff at the human resource department still lack of fast and accurate method to investigate or identify whether the information written in the resume submitted by the candidate is true, this would affect the speed of the screening process when they are trying to check the authenticity of the information. Failure to identify the required qualification and all the skillset will bring a challenge to the company and cause issues such as low quality of hire [5].

This proposal aims to propose a new peer evaluation system for students and employers or officers in the human resource department of a company to identify the quality of a student or potential candidates to become a new employee in the process of

screening in recruitment. The peer evaluation system will also provide a chance to get feedback from the peer to a student or employee, so that the student and employee may be able to know his/her weakness and improve it. Besides that, the peer evaluation system also helps to maintain the minimum quality of the education in the university when the feedback is online and public to other and let the student have the force to push them to improve since the student in the university will not only be examined with formal paper assessment only. They will also be evaluated by their peer in terms of performance, soft skills such as communication skills, thinking skills and so on. This project also aims to come out with a system to help scan the new teammate before accepting them to join the team.

### **1.3 Objectives**

The project aims to propose a new method for peer evaluation for students or employees to resolve the problem of a lack of sources to identify the background information and quality of new team members or employees. The following are the objective of the study:

1. To develop a peer evaluation function that can provide peer evaluation records as a reference for the public.
  - Develop peer evaluation features that could collect the evaluation record rated by the evaluator, and act as one of the reference sources for the team leader or management to decide on accepting the new member or not and as the source of information to verify the validity of background information of the new member.
2. To develop an evaluation aspect or component design function from the vote and propose results from all users that have the same professional.
  - To develop the evaluation aspect or component design features that could help to define each profession's evaluation standard and what to include for the evaluation for a specific profession, and rely on the contribution of ideas among the users in the system.



3. To develop a study or research group forming function that can suggest a student or employees list with a good rating of peer evaluation.
  - Study or research group forming function for helping the students to suggest a list of students or employees with a good rating to the users and help to publish their group information to attract other users to join them.
4. To develop a peer evaluation-based search and sorting function for students to know their self and their peers' ranking.
  - Develop the function for users to search their peers to look for the evaluation summary and rating, and help the users to sort the search result with the option such as rating score.

### **1.4 Project Scope and Direction**

The scopes of the project include developing the peer evaluation system with the use of PHP language, MySQL database and MVC framework as the backend to the peer evaluation system, while the front-end will be using HTML, CSS, JavaScript, Bootstrap, jQuery and Argon Design System. The project was proposed to deliver the web-based online peer evaluation system to the students, employees, employers, staff in the human resource department, and supervisors. The project was not proposed to cover the function of peer review to evaluate or review a research paper, journal or any other paper works written by someone. The project will be covered in the description listed below:

#### **1.4.1 Evaluation Form Component Suggestion Module**

The project includes a peer Evaluation Form Component Suggestion module that allows the users who are in the same profession to propose and vote for what kind of skills, performance, and knowledge can be added and evaluated in the peer evaluation form. The suggested evaluation form component that gains majority upvote support from all the users that upvote or downvote the item will be added to the peer evaluation form by the administrators once the item gets approved. Aside from Evaluation Form Component Suggestion, there is also the professional category suggestion function that

## CHAPTER 1

allows each user to propose a new profession and let the administrators add it to the professional category lists if the suggested profession never exists before in the list.

### **1.4.2 Peer Evaluation Module**

The project will deliver the peer evaluation module which does not need an instructor or teacher to control or assign when users perform a peer evaluation in the system, dynamic peer evaluation aspects and items get from the Evaluation Form Component Suggestion module, everyone could register an account to begin evaluation and check evaluation records. The way to evaluate is using the Likert scale rating the evaluation form component in the evaluation form with comment evaluation for the whole evaluation record, and optional document as evidence support to the evaluation record.

### **1.4.3 Search and Sorting Module**

The project also includes the search and sorting module that will allow users to search the registered users in the system and link to the evaluation summary page of the peer evaluation module. The search function will include the sort function that helps users to filter out those unrelated results, users are free to select the option such as minimum rating score, university, profession etc, the search result is also able to order by rating score.

### **1.4.4 Study and Research Group Forming Module**

The project also covers the study and research team forming module which helps the students or researcher to form their team from the list of potential students. This module will be able to provide a place for students to share their group information so that the other users that have the same idea or qualified with the requirements could send a join request to the group. This module also allows the author who shares the group information decide to accept or reject the request of other users.

## **1.5 Contributions**

The proposed peer evaluation system for students and employees brings the advantage to students, employers, and the staff of the human resource department. First, the peer evaluation provides the benefit of a faster way to help the human resource department to identify the previous experience of the new employee and help students to identify their weaknesses and also decrease the chance of getting a poor team member.

## **1.6 Report Organization**

The details of this report are shown in the following chapters. In Chapter 2, the literature review regarding similar reports or development research papers has been reviewed and compared with their pros and cons. Then, the methodology and approach, tools to use, system overview, system design, implementation issue and challenge, and user requirements collected from the public were analysed in a chart and an overview of the verification plan is discussed in Chapter 3. Next, Chapter 4 describes the module that had been done in the preliminary work. Furthermore, Chapter 5 is the conclusion for the report that describes the report in a short paragraph for an overview of the whole report.

## Chapter 2

### Literature Review

#### 2.1 Previous Works on Peer Evaluation System

##### 2.1.1 e-PRS

Ismail and et al [6] proposed a research paper that was discussing the peer evaluation system in the teamwork skills assessment among the team member and the online peer evaluation system. The peer evaluation system discussed in this paper was using a web-based system to replace the manual way to grade and assess their peer later the evaluator will submit their peer evaluation form to the lecturer, and this also makes the peer evaluation no more anonymous. The effect of this manual submission to the lecturer leads to the evaluators tend to give a biased grade on the performance because the evaluator does not want to hurt the peer they are evaluating. The online peer evaluation system in this paper was called e-PRS (“Elektronik”, “Penilaian”, “Rakan”, “Sebaya”), this system will ensure the submitted evaluation form stays confidential upon the peer received the evaluation result except for the lecturer. e-PRS System was able to improve the accessibility of the peer evaluation to the student and contribution to the environment with the use of an online-based system that eliminates the use of paper form. The measurement or method to assess or evaluate in e-PRS is using a Likert scale from 1 to 5 and the component to assess or evaluate was the outcome of the course defined by the university authorities and the Ministry of Higher Education. The studied e-PRS system was used to overcome the issues of private and confidential evaluator identity upon submission of the evaluation form.

Highlighted key point:

- Web-based system
- Identity of the evaluator is private and confidential
- Reduced biased grading
- Improved accessibility of peer evaluation
- Grading by using the Likert scale only (e.g., 1 to 5)

### 2.1.2 Manry and et al's Web-Based Peer Evaluation Tool (PET)

Manry and et al. [7] proposed a web-based peer evaluation tool for students to have peer evaluation for grading purposes among the students. The suggested web-based peer evaluation tool employed an approach of adding students and instructors, assigning a course by the administrator, and allowing the teacher to post, review, and grade the students and students are limited to the rubric to evaluation provided by the instructor. The system was developed using the Java programming language with OpenCL graphics library to enable the system to run as a java applet or stand-alone program. The proposed was developed to work with an existing system in the institute and instructors are required to manually input the final peer evaluation grade to the other system. Data generated and collected in this system was stored using the ASCII text file on users' computers including the student's group, evaluation rubric, and description of the evaluation. The instructor will need to specify the peer evaluation file path to let the system analyse the result of the peer evaluation, missing any evaluation file will inform the instructor in the program. The analysis chart will use different types of colours to represent each of the evaluated students, and the shape of the icon to represent the rating average and median. The instructor can see the further detail of the evaluation such as rating from each evaluator for each type or category of aspect to be evaluated in the peer evaluation. The raw data of the Likert scale for each of the evaluation aspects can be viewed from the pop-up window. The peer evaluation tool using the calculation algorithm for variations of a distribution from Berryman from an unpublished spreadsheet, the algorithm will be able to limit the influence of peer review on grade redistribution for individual students.

Highlighted key point:

- Java application with OpenCL
- Category by course
- Course assigned by administrators
- Teachers or instructors responsible for the post, grade and define the rubric for evaluation.
- Manual input data, and no database, stored as ASCII text files
- Analysis of statistics with colourful chart, provide median and rating average
- Calculation algorithm for variations with a distribution from Berryman

### 2.1.3 Scoring by Peer Assessment System (SPAS)

Sukstrienwong [8] proposed a peer assessment tool named “Scoring by Peering Assessment System”. The student will be grouped into smaller groups and peer assessment is given to the students, content to be evaluated in the peer assessment system will be closer to the class content and the main goal of the peer assessment. The student will be required to select the peer assessment questionnaire and complete the given peer assessment. Students are given a fixed length of duration to complete the peer assessment in the system, the final score for the student will be released upon the mark has been calculated after the deadline for the peer assessment. The item or aspect to be assessed in the peer assessment system will be set or defined by the lecturer. In this proposed peer assessment system, the student is allowed to modify the peer assessment they had done before the deadline of the peer assessment. The proposed system also used the calculation formula of individual effort factor divided by the average effort rating of the group as the individual weighting factor, the individual weighting factor will further calculated with individual weighting factor times the final group project score and the result will be the mark for the student in the group. Once the assessor had done evaluate the peer, the system will return the score to the teacher to mark the final mark.

Highlighted key point:

- Small group of students
- Peer assessment carry out among the group
- Content to evaluate closer to the main goal of peer assessment
- Item or aspect to be evaluated is defined by the lecturer
- Fixed length of duration to complete the peer assessment
- Final score release upon deadline of peer assessment
- Allow modifying before the end of the deadline
- Mark graded by peer calculated with a formula for fairness
- Teacher/Lecturer mark the final mark before release.

### 2.1.4 WesPASS

Emin Kortak [9] proposed a peer assessment system named WesPASS which is also one of the peer evaluation systems for students to evaluate each other. WesPASS was developed using the PHP language and MySQL as its database back-end. This system is designed to collect the assignment from the students for peer assessment purposes. The students will be added to the system by a teacher that teaching a course and the teacher may assign an assignment to the students, create the assessment tools for the assignment, add the created assessment tools to the assignment, and monitor the process of the assignment submission. In this system the teacher is required to send the assignment to the students for peer assessment, the teacher will be able to select to hide the student who assesses or evaluate the assignment when the assignment is assessed and send it back to the students who had submitted the assignment to the system. The assignment uploaded to the system will need the self-assessment of the student to his assignment before the assignment can be sent to their peer for peer assessment purposes. When the peer evaluation results are released, the student is expected to study them and act on them to improve their assignment and resubmit the assignment to the system for the teacher to mark their assignment. The teacher later marks and assigns a mark to the assignment from a range of 0 to 100 with a short description of the evaluation, once finish marking the student will receive their grade for the submitted assignment.

Highlighted key point:

- Web-based with PHP server-side language & MySQL database
- Collect assignments for evaluation purposes
- Students are assigned manually by the teacher
- Manually create the assessment, assign, monitor submission and send for assessment by the teacher.
- Self-assessment of the student himself before sending to peer for assessment
- Teacher mark and assign mark after collecting assessment from students.

### **2.1.5 Centralized Peer Evaluation System by S. Brutus and M. Donia**

S. Brutus and M. Donia discussed the centralized peer evaluation system in their study on its effectiveness [10]. The peer evaluation system (PES) used by the students in the study was designed to be password-protected to the system portal. The peer evaluation included both quantitative and qualitative formats in the evaluation, in this evaluation system the evaluators were forced to assess their peers from the 4 dimensions in qualitative which are work ethic, contribution based on practical and conceptual, and cooperation in the team. The peer evaluation system used also to includes the quantitative assessment section that asks the students to provide comments on their peers by writing a short paragraph in narrative format. The peer evaluation system was built with anonymity to the evaluators were protected without displaying any identifying information of the evaluators to the students who receive the evaluation, the system will also have the step professor to screening all the evaluation before the system release the evaluation result to the receiver to ensure the content in the evaluation does not contain improprie feedback. The evaluation process with the peers as evaluators provided a positive effect on the attitude and behaviours of the students. The peer evaluations later give positive on the recipient's performance and an experiment with two groups of students showed that students using the peer evaluation system resulted in better performance.

Highlighted key point:

- Password-protected system
- Quantitative and qualitative evaluation format
- Focus on work ethic, cooperation, contribution based on practical and conceptual
- Comment on the evaluation with a short paragraph in narrative format
- Evaluators' identity is anonymous and protected
- Professor screening the evaluation before releasing the result



### 2.1.6 PeerEval

P. Gobel and M. Kano [11] researched a peer evaluation system named peereval.mobi that provides peer evaluation services to the teachers and students for in-class presentations. The peereval.mobi allows the teachers to use the system with or without registration, while the registration required a subscription fee, or without registration, the data for the temporary session will be expired in 96 hours. To conduct a peer evaluation for their students, the teacher is required to upload the CSV data file that includes all the information about the rubric, students' name list and session names or create it on the web page. Each session can be set up with six rubrics using the Likert scale and contain the title and description for each rubric. The students will join to begin their peer evaluation by using the session code to join the peer evaluation, and the results will be able to download once the session is ended and printed out to distribute the results to the students. The research has also carried out a questionnaire to the students who had used the system, and the result showed that the peereval.mobi was easy to install and use, they also felt that the system able to provide good comments and feedback from their peers to enable more prepare for their upcoming presentations. The result also showed that the students preferred the feedback and privacy of the peereval.mobi mobile app can provide more interactive during their presentation and increase the accuracy of evaluation compared to using the traditional method which is a paper-based method.

Highlighted key point:

- Web-based system
- Allow for not registered users to use
- Not registered is free, else a paid version provided with data save features
- Temporary session to store evaluation data for not registered users
- Upload evaluation rubric, students name list, session name as CSV data file or create on the web
- Students join evaluation using session code
- Likert scale for grading

### **2.1.7 WEB-based Evaluation System**

P. Zhang [12] discussed the new peer evaluation system in his university, and the paper also discussed the analysis of the effect of implementing a peer evaluation system on the students' attitudes. The discussed peer evaluation system was running on a web-based with use of PHP server-side language and MySQL as database and Apache as HTTP server, the characteristic of the web-based system is conducive, flexible, low operation cost and instant to use. The students are allowed to upload their works which are the experimental report to the system, view the report, update or evaluate their peers, and view the result of the evaluation. The teacher will key in the data such as the report, group list, and student list for the system to generate the score for the students. The implementation of this peer evaluation system at Southwest University in the MCAI Design course caused students to have a favourable attitude toward the peer evaluation system which increased the frequency of use of the system.

Highlighted key point:

- Web-based system
- Conducive, flexible, low operation cost and instant to use
- Upload, view, and update or evaluate the experimental report to the system
- Manual grouping of the student
- System generated evaluation score

## 2.1.8 Strengths and Weakness

Table 2.1.8. 1 Comparison of Systems Features

System	Features Anonymou s Identity of Evaluator	Peer Evaluation Without Instructor or Administrato r Monitor and Arrange	Modificatio n of evaluation record after submitted	Ability to save or view the evaluation record permanently	Available evaluatio n records to the public.
e-PRS	Yes	No	Yes	No	No
Manry and et al's Web- Based Peer Evaluation Tool (PET)	Yes	No	Yes	No	No
Scoring by Peer Assessmen t System (SPAS)	Yes	No	Yes	No	No
WesPASS	Yes	No	No	No	No
Centralized Peer Evaluation System by S. Brutus and M. Donia	Yes	No	No	No	No
PeerEval	Yes	No	No	Yes (Paid Only)	No

WEB-based Evaluation System	Yes	No	No	No	No
Peer Evaluation System (To be developed in this project)	Yes	Yes	Yes	Yes	Yes

The strength of the system in the previous studies are Likert scale of items to be evaluated in the peer evaluation system was bringing the convenience to the evaluator to give the rating from 1 to 5. Besides that, the previous studies' system also provides anonymity to the evaluator could protect the evaluator from being revenge on the evaluated person, and also reduce the chance of a biased evaluation record when the evaluated person knows who is the evaluator, and the evaluator does not want to hurt them. The developed system in previous studies also provide both quantitative and qualitative evaluation aspect, therefore the evaluation record written by the evaluator was easy to understand and more clearly expressed the content in the evaluation record compared to the Likert scale only or descriptive only evaluation form.

Previous studies have not focused on the flexible evaluation aspects or items for the student or employee to be evaluated, the evaluation plan in previous studies fully relied on the lecturer or teacher to define or design all the aspects and items to be evaluated in the peer evaluation system. This limitation brings the limitation on the way of peer evaluation among the students and employees, this could cause the aspect to be evaluated only limited to the designed peer evaluation aspect, therefore there will be some of the aspect or item to be covered inside the peer evaluation is missing. Besides that, previous studies also do not focus on the descriptive way of the evaluator to evaluate a peer, in the existing works that had been reviewed, the peer evaluation process was carried out with the Likert scale for each of the aspect or item in the

## CHAPTER 2

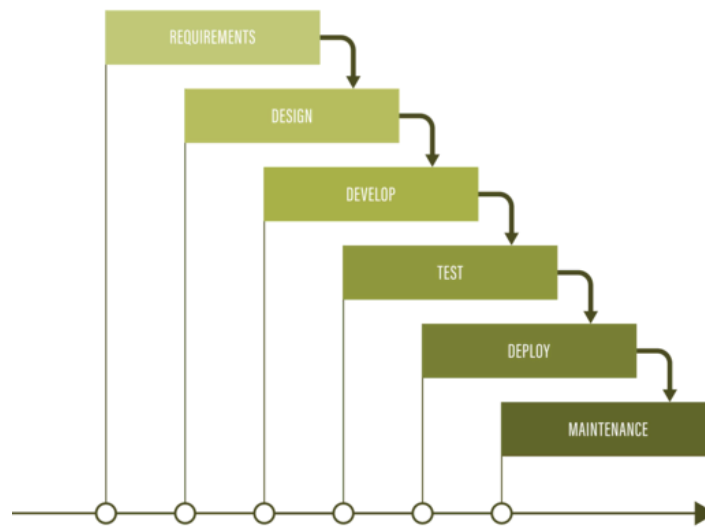
evaluation. Likert scale was the only method to let the evaluator evaluate their peer, this limitation limited the peer evaluation with only able to deliver a brief view of the evaluated aspect or items with just only the number rank in the Likert scale. Thus, the students or employees to be evaluated would not able to know what was their exact weaknesses or limitations of himself upon they received the peer evaluation result. The peer evaluation system in the previous studies limit the use of the peer evaluation system only available to the students or employees that are evaluated by their peers, this restriction lost the benefit of evaluation results as a reference during the decision making to accept the new employee or team member use by employers or staff of human resource department or leader in the research team upon the selection to accept the new employee or team member to their organization or team in future. Previous research hasn't focused on a peer evaluation system that is self-managed or without management, peer evaluation system in previous studies was conducted under the monitoring or control of the teacher or lecturer. This method of conducting the peer evaluation system will restrict the students or employees to be evaluated in the peer evaluation system are only involved with the students or employees that are under the teacher or lecturer or supervisor that are joined to conduct the peer evaluation system, and the students or employees outside this scope or area will not able to use and gain the benefit bring by this students due to the peer evaluation system in the previous studies required a person or instructor to control the process of the peer evaluation.

# Chapter 3

## System Methodology/Approach

### 3.1 System Development Models

#### 3.1.1 Traditional Waterfall SDLC

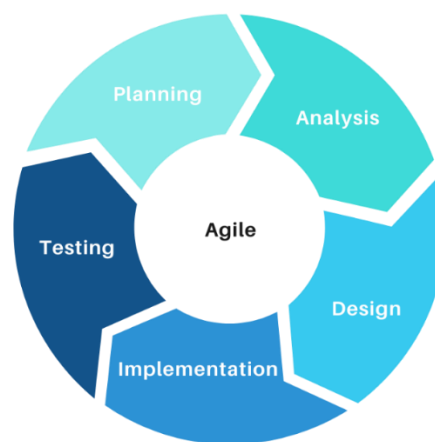


*Figure 3.1.1. 1 Waterfall Software Development Life Cycle Adapted from [17].*

The waterfall software development life cycle (SDLC) was a way of the development life cycle to create a system linearly and sequentially. The naming of it contains the waterfall because it progresses in a methodical downward way from one phase to the next, this paradigm is called Waterfall [17]. As a set law of waterfall SDLC, there is no possibility to improve on the preceding phase. Each phase will be planned carefully and clearly before beginning the development. The waterfall SDLC is only allowed to proceed to the next phase when the current phase is completed.

### 3.1.2 Agile Methodology

Agile methodology is a way of managing the development of information systems and breaking it down into phases. The client is involved in every stage of the development process with Agile methodology. The development was iterative through the following development life cycle which are planning, analysis, design, implementation, and testing. The agile method will allow the development project to be divided into short-cycle instead of the top-down life cycle as the traditional software development life cycle does. With using of agile methodology, the development project was able to decrease the project risk dues to the characteristic of being divided into small incremental builds of the project. Agile methodology repeats the software development life cycle with each incremental build and each cycle normally takes 2 to 4 weeks [13]. In agile methodology, the developer and client will collaborate to help to gather the requirement, and feedback of each of the incremental builds, client will continue testing the incremental build of the software once the developer delivers it to the client. Agile methodology can be further narrowed down into Scrum, Extreme Programming, Adaptive Project Framework and Kanban.



*Figure 3.1.1. 2 Agile Software Development Life Cycle*

### 3.1.3 Selected Software Development Model

Based on a comparison of the characteristics of both software development life cycles, the Agile methodology was chosen to develop the system for this project. The benefits of incremental development in Agile are ideal for rapid movement and shorter time frames compared to the Waterfall SDLC, which is a sequential development that can take up to seven years or more.

In addition, due to the necessity to make changes to the direction and functional requirements in the midst of the development life cycle, the Agile methodology was preferable to the Waterfall SDLC, which made it more difficult to make changes beyond the requirements gathering phase. Aside from that, the Agile technique was chosen for this project because its budget is more flexible, allowing for experimentation and direction adjustments, whereas the Waterfall SDLC has a predetermined budget from the start of the project.

On the other hand, the Agile methodology aids in concentrating on the development project, as opposed to focusing solely on customer needs. Consequently, it is advantageous for the project to have a higher quality system to be established, whereas the Waterfall SDLC prioritises meeting client requirements.

*Table 3.1.3. 1 Comparison of Waterfall SDLC and Agile Methodology*

Waterfall SDLC	Agile
Sequential development	Incremental development
Difficult or impossible to make changes once the project initiates.	Allowed to make changes at any time.
No client is involved in the development process.	Clients are involved in the project and provide feedback on every phase.
The budget is fixed and defined in the beginning.	The budget is more flexible as agile methodology encourages experimental and changes of direction.
Focus on satisfying the customers' needs.	Focus on accomplishing the project.



## **3.2 System Requirement (Technologies Involved)**

### **3.2.1 Hardware**

The minimum hardware requirement to hosting the system developed in this project required at least the specification listed as below. While there is no minimum hardware requirement for client side, except for internet connectivity to access the system.

1. 2 GHz of CPU or faster
2. Single Core or multi core CPU
3. 1GB of RAM or higher
4. At least 5GB of disk space or more.
5. Network Connectivity

### **3.2.2 Software**

#### **HTTP Server**

An HTTP web server is used to serve the HTTP request and response from a client on the internet. The HTTP server uses the HTTP protocol to process incoming network requests from clients and provides material back to the client. An HTTP request is based on the TCP/IP protocol and HTTP normally runs through a standard port 80 and a 443 port for the HTTP with SSL protection [15].

#### **PHP Server**

PHP also called Hypertext Pre-processors which a widely used and open-source server-side language that is specifically designed and built to use for web development purposes. PHP can also be embedded into HTML to allow the generation of the dynamic content of the web page. With using of PHP, the HTML content could be generated and sent to the client without the client knowing how the content of the HTML is generated. PHP was one of the extremely easy to use server-side scripting languages said [16].



*Figure 3.2.2. 1 PHP*

### **MySQL/MariaDB**

MySQL is a database that was developed based on the structured query language (SQL) and it is a relational database management system. MySQL was developed in 1994 by a company in Swedish and later MySQL was taking over ownership to Sun Microsystems and Sun Microsystem was acquired by Oracle in 2010, therefore MySQL is now practically owned by Oracle. MySQL is a database that is a place to store the data structured, the data in the dataset is organized in a table inside the MySQL database, it also supports the table to have relational among each other such as establishing a reference relation between two tables with the use of foreign key placing at the children table to refer to the parent table.



*Figure 3.2.2. 2 MySQL*

### **Laravel 9 Framework**

The MVC framework will be using is the Laravel framework that has the most required library and function integrated. The development process will stick with the Laravel framework closely to reduce the focus on the basic support or foundation of the system development. The connection of the application to the database in this project will rely on the Eloquent library integrated into the Laravel framework.

### **Argon Design System**

Argon Design System is a bootstrap 4.6 based CSS framework, and it will be used for the layout design for this project. It is convenient and faster to build the basic design of the web page, maintain the consistency of the layout design and eliminate the need to construct the user interface from scratch.

### **jQuery Library**

A JavaScript library with many of features, jQuery is quick and compact. With an intuitive API that functions across a wide range of browsers, it greatly simplifies tasks like HTML document navigation and manipulation, event handling, animation, and Ajax. Millions of people now write JavaScript differently thanks to jQuery's adaptability and extensibility.

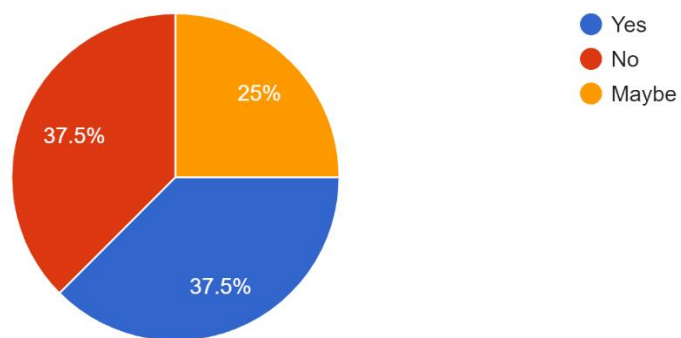
### 3.3 Functional Requirements

During the development of this project to define the user requirements, a simple survey or questionnaire was designed and distributed to the public to collect some of the user requirements and get responses from the respondents to the user requirements that are available in the existing similar studies or system. In this questionnaire, the questions are designed and collected using the Google Forms platform and 16 respondents had submitted a response to the Google Form. The analysis of the result of the questionnaire is shown in the following paragraph.

#### 1. Do you hear peer evaluation before?

Do you hear peer evaluation before ?

16 responses



*Figure 3.3. 1 Do you hear peer evaluation before?*

There are 4 respondents (25%) who have responded with maybe they had heard the peer evaluation before and 6 (37.5%) people of them said yes, they were heard peer evaluation before, while there is 6 (37.5%) of them said no. From the result above, we know that the respondents were not very familiar with peer evaluation and most of them had still not heard of peer evaluation before.

## 2. Based on your understanding, what is the peer evaluation system use for?

Based on your understanding, what is the peer evaluation system use for?  
16 responses

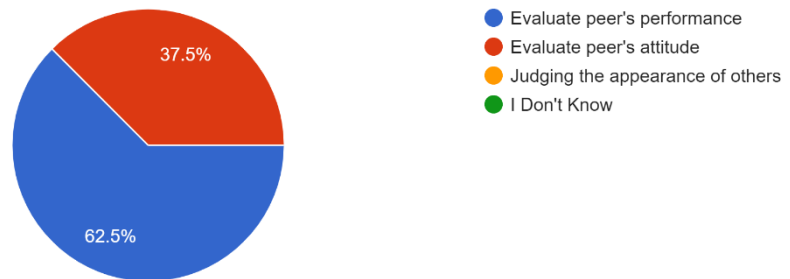


Figure 3.3. 2 Based on your understanding, what is the peer evaluation system use for?

This question was used to confirm the respondents whether understand what was the peer evaluation system used for and what the main purpose of this system is built for. Most of the respondents with 10 respondents (62.5%) of them said a peer evaluation system was used to evaluate peer's performance, while there are 6 respondents (37.5%) of them said evaluate peer's attitudes and there are no respondents to said "judging the appearance of others" and "I Don't Know". From the pie chart of the collected result, the respondents know what was the main purpose of the system and some of them might lesser exposure to these types of systems so they are choosing the evaluate peer's attitudes other than choosing to evaluate peer's performance which includes all the aspect that are required to evaluate in the evaluation.

3. If you are the user of peer evaluation system, what kind of the function or features you wish to have in the system? (Multiple Selection)

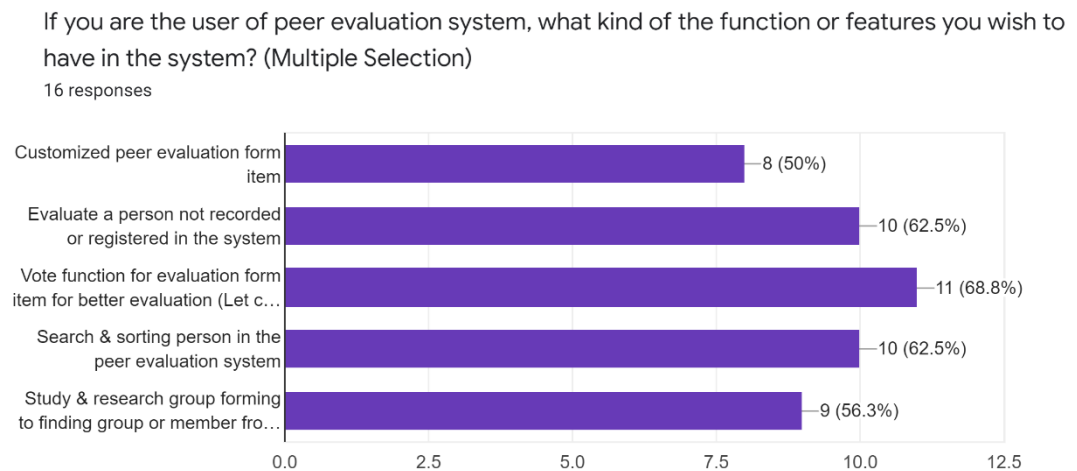


Figure 3.3. 3 If you are the user of peer evaluation system, what kind of the function or features you wish to have in the system? (Multiple Selection)

The third question is to collect the idea of the respondents about the existing functions and features that are available in the existing similar system or studies. There are 8 respondents (50%) out of 16 respondents selected to have customized peer evaluation form components in the peer evaluation system. The result shows that slightly more than half agree to have the peer evaluation form component to be customized. The second item is “Evaluate a person not recorded or registered in the system”, and there are 10 respondents (62.5%) out of 16 with the majority of them wishing to evaluate a person who does not register in the system. The third item is “Vote function for evaluation form component for better evaluation (Let the community decide for each professional standard for evaluation)” which refers to community users defining the evaluation form component for each of the professional standards, there are 11 respondents (68.8%) who have said yes to this function wish to define the evaluation standard. The fourth item is “Search & sorting person in the peer evaluation system” which is used for searching the person who has the evaluation record in the system and sorting it with rank such as average rating score, professional, etc. There are 10 respondents (62.5%) who have agreed to have the search and sorting function. The last item is “Study & research group forming to finding a group or member from the community” which is a function

that helps to form the group for study and research, there are 9 respondents (53.3%) who have chosen this function to have in the system to help them for group forming. Based on the result collected, most of the users wish to have the most freedom to use the system, especially the functions involved with letting users make the decision.

4. Do you think that peer evaluation should be done in anonymously? (Evaluator)

Do you think that peer evaluation should be done in anonymously? (Evaluator)  
16 responses

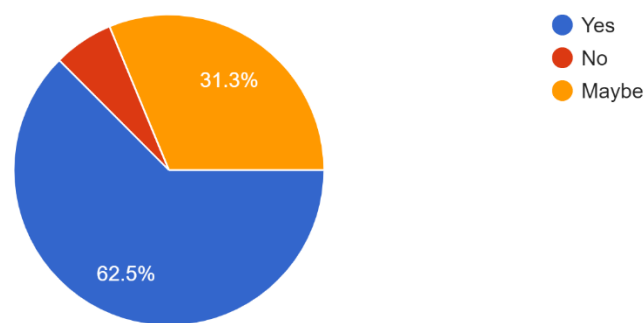


Figure 3.3. 4 Do you think that peer evaluation should be done in anonymously? (Evaluator)

This question was asking the respondents do they think the evaluation should be done anonymously which means the evaluator's identity should be hidden to avoid some negative impacts on the evaluation result when the identity of the evaluator is not hidden. There are 10 respondents (62.5%) was opting yes to evaluate with the evaluator's identity anonymously, while there are 5 respondents (31.3%) were neutral to the evaluator's identity should be anonymous or not, and the rest of the respondents was stated no for done evaluation with evaluator's identity anonymously. From the result, the majority of them are wishing to protect the identity of the evaluator so that the evaluator could provide the most closed to the real's evaluation comment.

5. Besides the functions or features listed in the previous questions, do you have any suggestions regarding the function to be added to the system?

Regarding the responses from all respondents, this survey had received 6 responses while others were said no or does not provide any suggestion about the function should have in the system. The suggestion provided is ad below:

## CHAPTER 3

- Rating system (1 respondent)
- “Report features that stated of certain ranking about the person attitude/student quality of different university” (1 respondent)
- Summary or report the result of their peer evaluation (2 respondents)
- Get notification when someone evaluated the users. (1 respondent)
- Blog (1 respondent)



### 3.4 Project Milestone

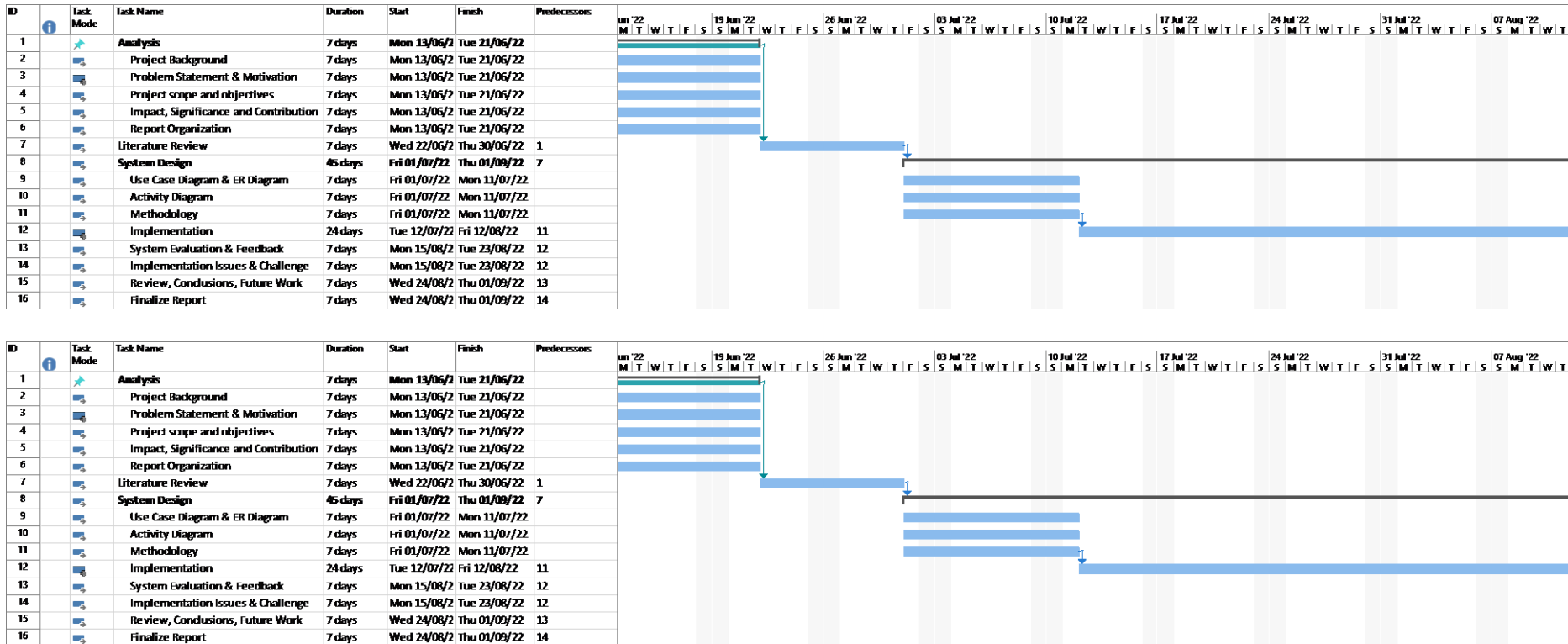


Figure 3.4. 1 Project Milestone

### 3.5 Estimated Costs

The estimated cost to run this project in production was the only hosting cost for the project. The system will be hosting on the Azure Virtual Machine, the costs to have the system hosting on the Azure is as the table below.

*Table 3.5. 1 Project Costs*

Items	Cost per Month	Quantity	Sub Total
Azure Virtual Machine	10 USD / per month	3 Month	30 USD
Total			30USD

### **3.6 Concluding Remark**

Agile methodology was selected as the software development strategy for this project because it is ideal for shorter project life cycles and can adapt to rapidly changing requirements. Nginx HTTP Server, PHP server, MySQL/MariaDB database server, Laravel Framework, and Argon Design System were essential software in this project. In the functional requirement analysis derived from the user survey, the need for anonymous evaluation, a summary record of evaluation results, and an understanding of the peer evaluation's purpose were identified. This project's milestone was anticipated to be completed in early September of 2022. Hosting the project with a virtual machine for three months was anticipated to cost approximately thirty dollars. It is anticipated that the system's users include students or researchers, and administrators.

# Chapter 4

## System Design

### 4.1 System Architecture

The overall system was developed to consist of software that is web-based applications. The development of this system will be using Nginx as the HTTP server to serve the client and as the middle man between the clients and the backend server which is the PHP server that is responsible for responding to the client's HTTP request and processing the data from the clients or fetch data from MySQL database server.

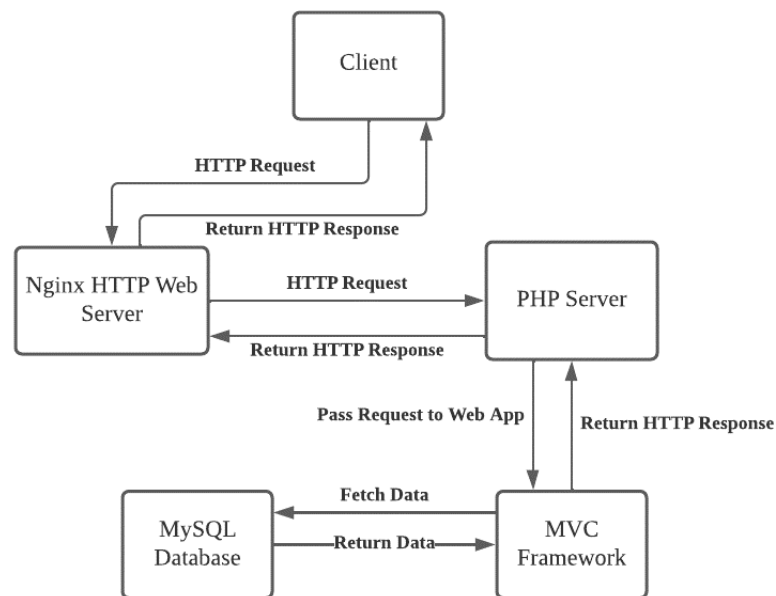


Figure 4.1. 1 Overview of the working process of HTTP Request

In the developed system, the client request will be sent to the Nginx HTTP server to forward the HTTP request to the PHP server to further process the application logic through the method of fast-CGI, in the PHP server the MVC framework-based web application was used to run the application logic and process the data obtained from the MySQL database. The peer evaluation system web application will query or update the data from the MySQL database and render it as a full web page and return to the Nginx HTTP web server as the HTTP response through the PHP server, once the Nginx HTTP web server receives the response from the PHP server, it will return the HTTP response to the client and HTTP response will be decoded and display on the client's browser.

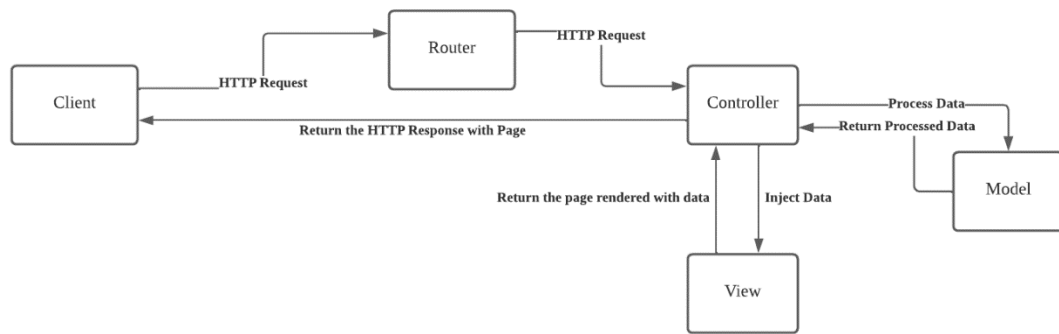
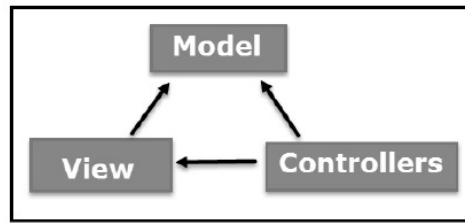


Figure 4.1. 2 Overview Inside the HTTP Request to MVC Framework

The client request to the peer evaluation system web app will send to the router of the web app of the MVC framework, the router will define where should the request required to send to which controller, once the controller received the request, the controller will run its app logic and choose the right model to fetch or obtain the data from the database and return it to the controller. The controller will receive the processed data and send it to the view for rendering the page, and the views will render the data that came from the controller into the template of the web page and return it to the controller. The controller will responsible for sending back the HTTP response along with the rendered web page from the view to the clients.

### MVC Architecture Pattern

The Model-View-Controller (MVC) is an architecture pattern design that separates the information system into 3 separated components as Figure 3.2.1. Each of the components is designed to handle a specific task of the information system, and the 3 separated component is model, view and controller. MVC is one of the most architectural patterns used in the industry. The model component will responsible to manage the data in the database, the model component will have the logic to decide how the data to store and retrieve, and return the data to the view [14]. The view component will have the user interface layout and the view component define how the data is going to display to the users, view component will get the data pass by the controller and render it to the layout. The controller component will act as the interface to the view and model component, the incoming request from the users will pass to the controller and the controller will decide what kind of model component and view component will be used to generate the result for the client, the controller first fetching the data from the model component and later it passes the data to the view to render the data and return it to the client to display it.



*Figure 4.1. 3 MVC Architecture Pattern*

## 4.2 System Design Diagram

### 4.2.1 Use Case Diagram

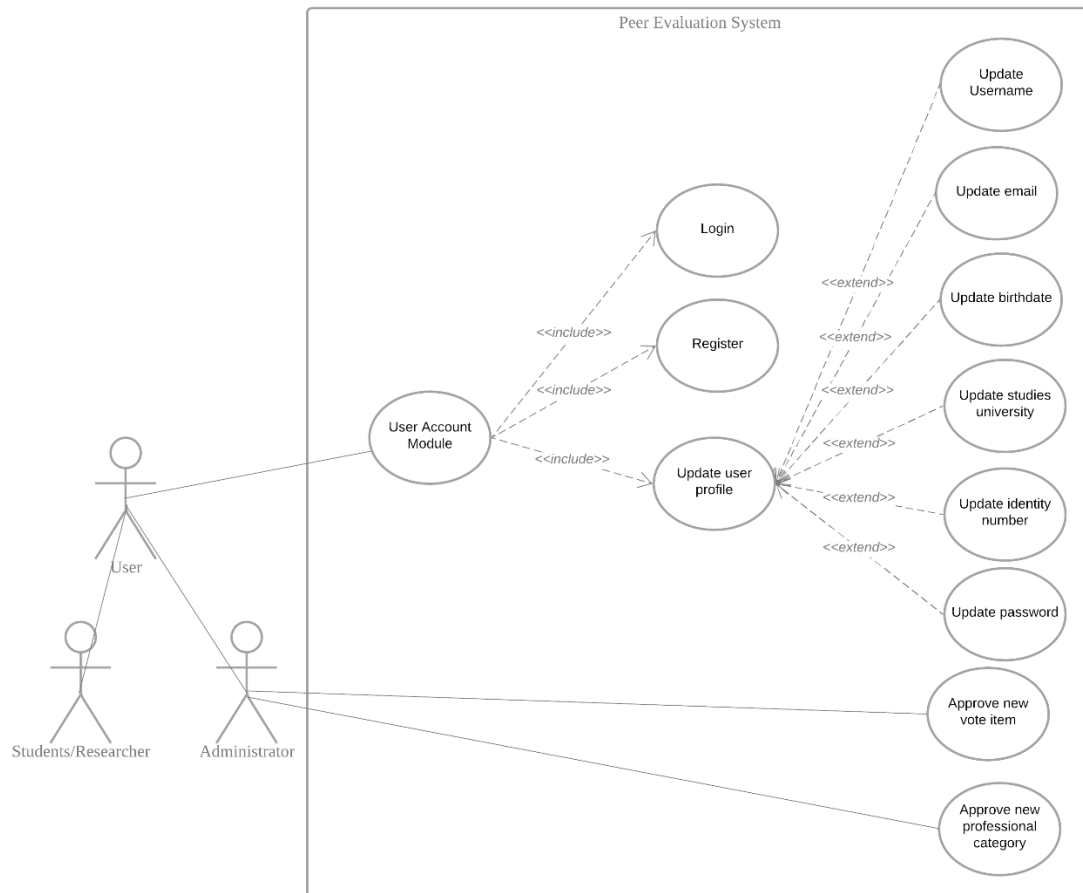


Figure 4.2.1. 1 Basic User & Admin Use Case

The user will have two types of roles which are administrator, and students/researcher (Normal User), the basic access of all users will be able to access the user account module which consists of login, registration and update the user profile. The updated user profile use case was extended by update username of the account, update email, update birthdate, update studies university, update identity number, and update password which was used to manipulate the item inside their user profile. The administrator will also have extra access to the approve new suggestion item that is come from the Evaluation Form Component Suggestion module and approve the new professional category that is submitted by the user at the evaluation item suggestion module.

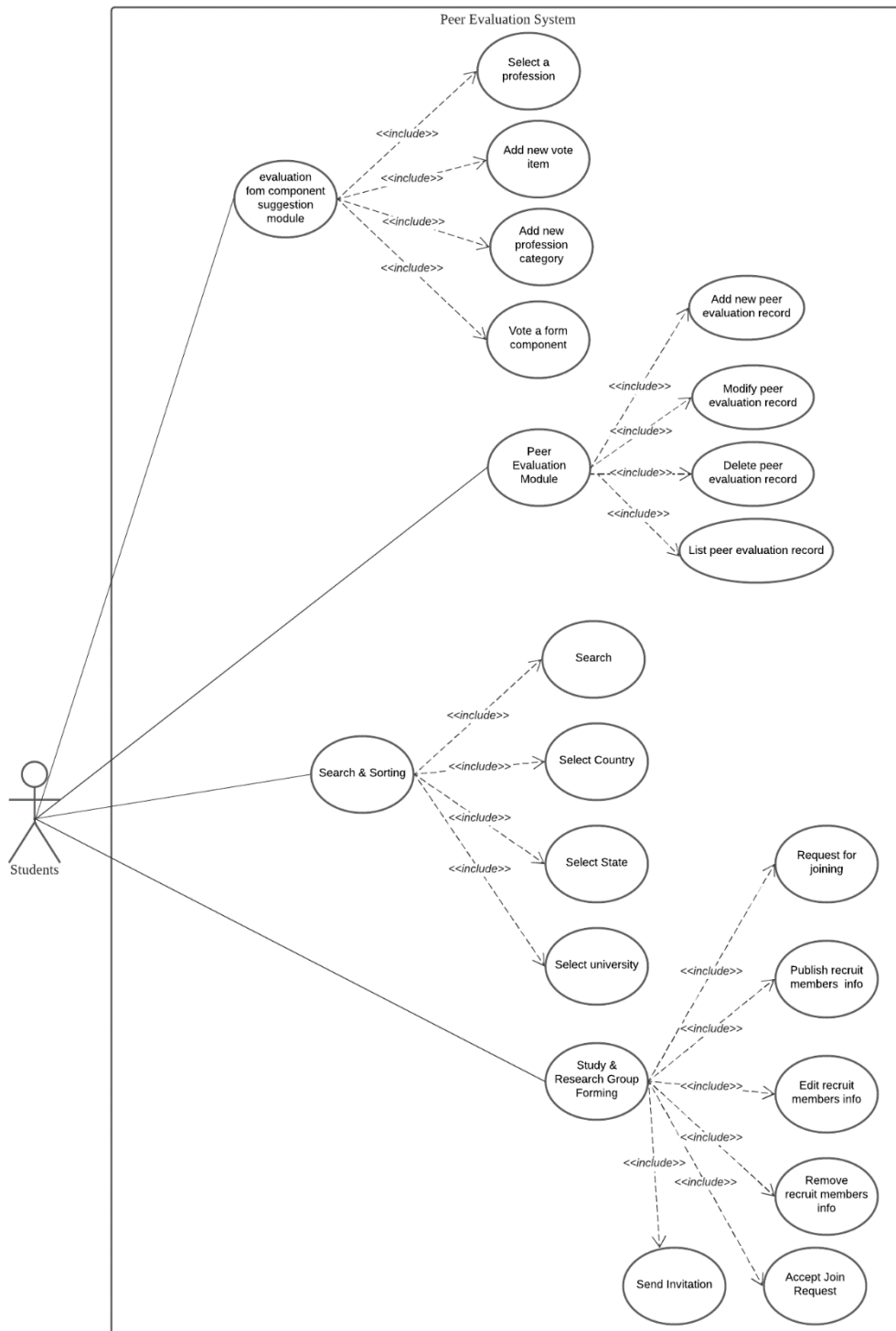


Figure 4.2.1. 2 Main Module Use Case

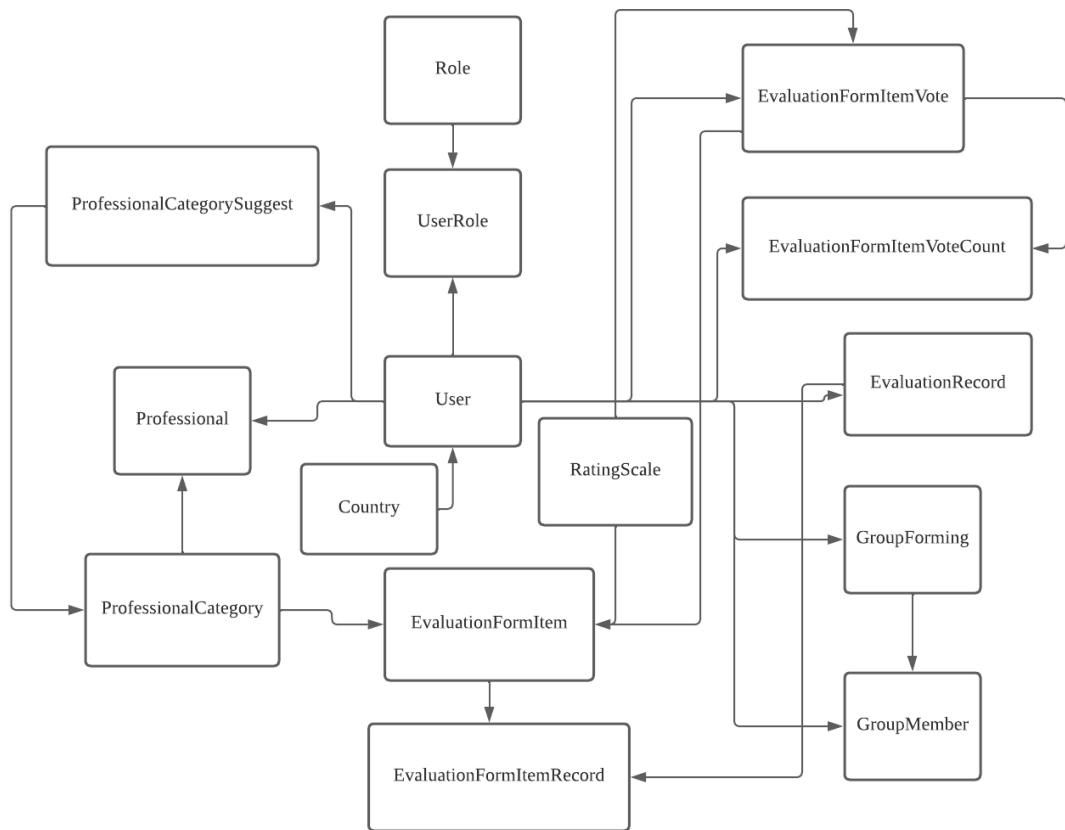
The student or researcher user will have access to the peer Evaluation Form Component Suggestion module and it includes the select a professional use case to select the professional that the user wants to suggest an evaluation form component for which profession, add new vote item to suggest the new evaluation form component to the administrator and let other users to upvote or downvote, add a new professional



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category there are missing in the professional category list, and vote an item suggested by other users. Student or researcher user will be able to access the peer evaluation module, the peer evaluation module will include the add new peer evaluation record use case to add new evaluation record to a specific user, modify peer evaluation record to modify evaluation record, delete peer evaluation records and listing all the peer evaluation records. The student or researcher will be able to access the search and sorting module which includes the search, select country, select state and select university use case to search and sort the peer available in the system. The student and researcher users will be able to group forming using the study and research group forming module, the module includes the list of users in the name list, request for joining, publish recruit members info, and remove recruit members info, and send invitation use cases to forming their group with using the system.

4.2.2 Class Diagram



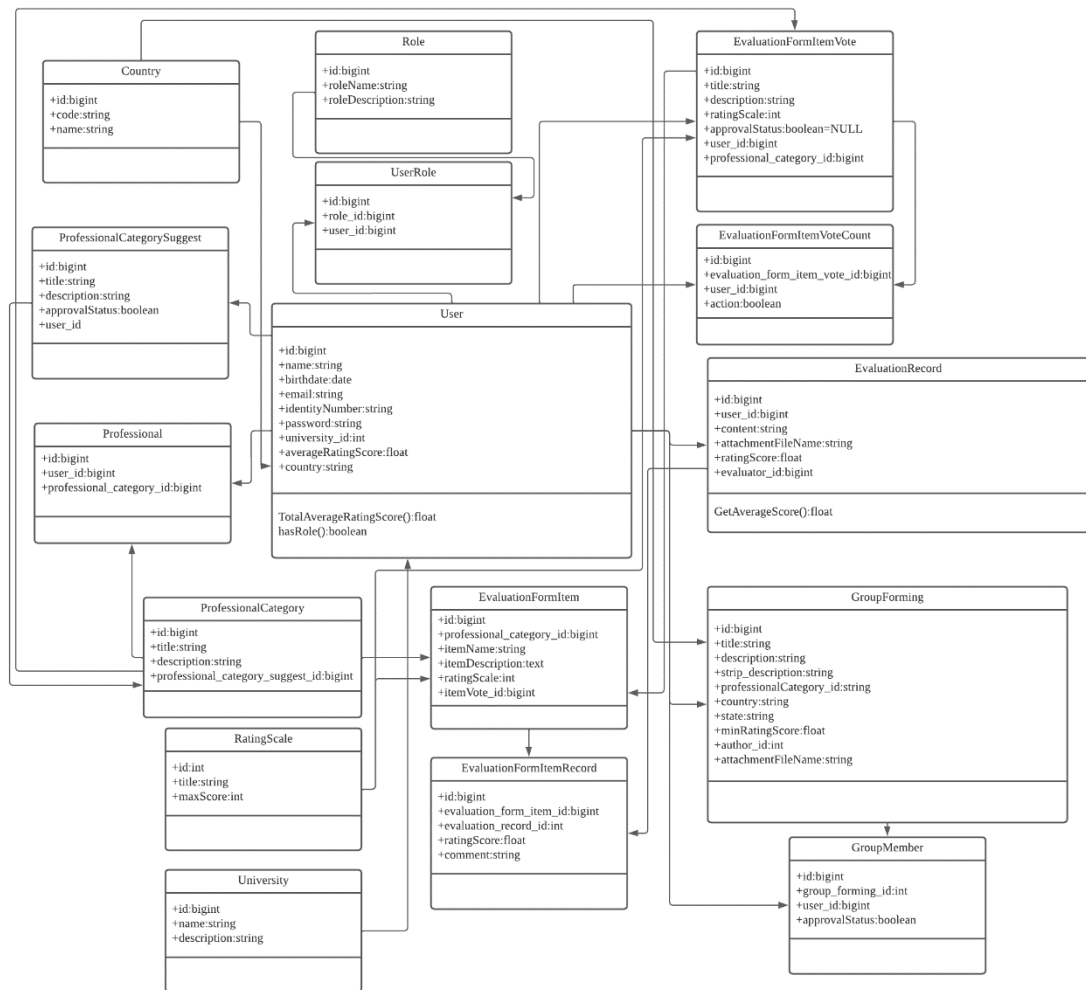


Figure 4.2.2. 1 Class Diagram

In the class diagram shown on 3.2.2.1 as the overview of the class diagram, the user will have multiple roles while the assigned role will be stored in the user role class and as the intermediate to link the user and role. There will be an evaluation form item vote class that will store the information of the suggested evaluation form component, and link to the evaluation form item vote count and both classes will link to the user to identify the action done by the user and the rating scale came from the rating scale table. The evaluation record class will store the evaluation record while the evaluation form component record class will store each of the evaluation record items that are come from the evaluation record, the evaluation record item record class will come from the available evaluation form component class that are evaluated according to each of the professional category class, each of the users will have the professional category that is linked using the professional class. The group forming module will be using the two-class which are the group forming class and group member class, the group forming class will contain the information of the group for research or study group, while the

group member will be the class to store the member joined the group. With the help of the Laravel framework, the built-in eloquent library would reduce the coding for managing the model and its object, each of the operations such as fetching all objects from the database, finding certain objects, where clause SQL search, getting the first record was provided.

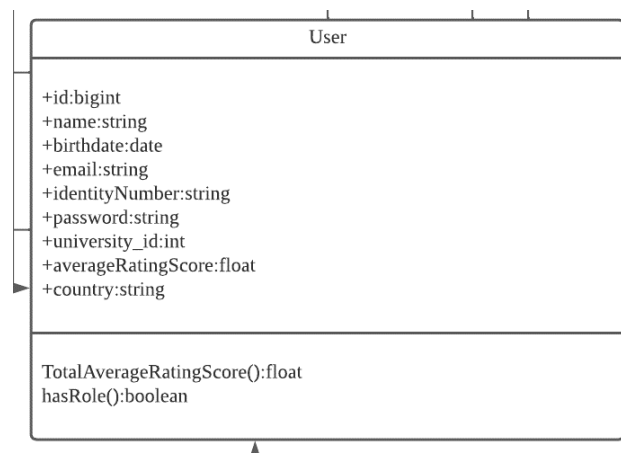


Figure 4.2.2. 2 User Class

The user class will contain the user\_id as user id, first name, last name, birth date, email, identity number, password and the university\_id, average rating score and country. The TotalAverageRatingScore method will calculate an average rating score that the user gets from all of his/her evaluation records, while the hasRole method check for the user role.

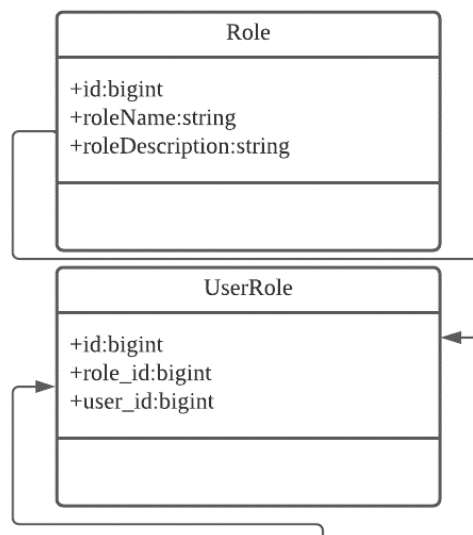


Figure 4.2.2. 3 Role Class & UserRole Class

The Role class will contain the role id as urid and role name and description, the class also contain the getter and setter of the role name and description.

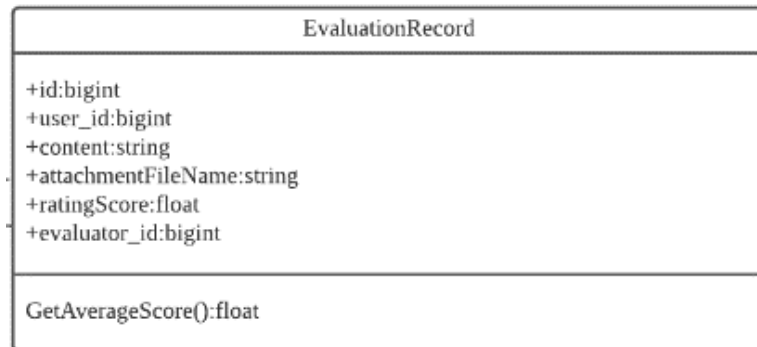


Figure 4.2.2. 4 Evaluation Record Class

The evaluation record class will have the id as the evaluation record id, user\_id as the reference to user, content, attachment file name as the attachment that was uploaded from the user, rating score, modified date, and evaluator id which who write this record and reference from the user table. The evaluation record class also have the GetAverageScore method that will go through each of the evaluation form component records and calculate its average score for the evaluation record and update the ratingScore in the evaluation record.

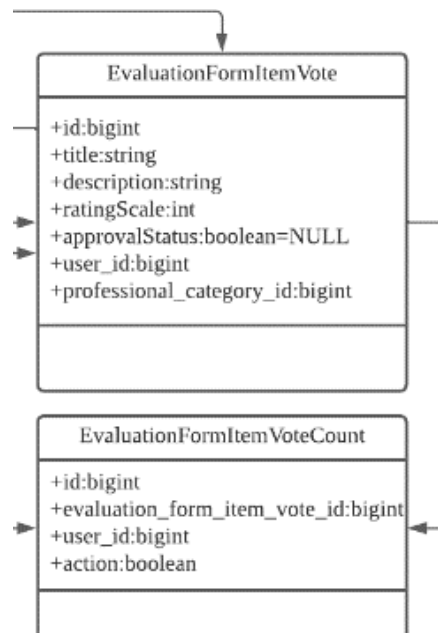
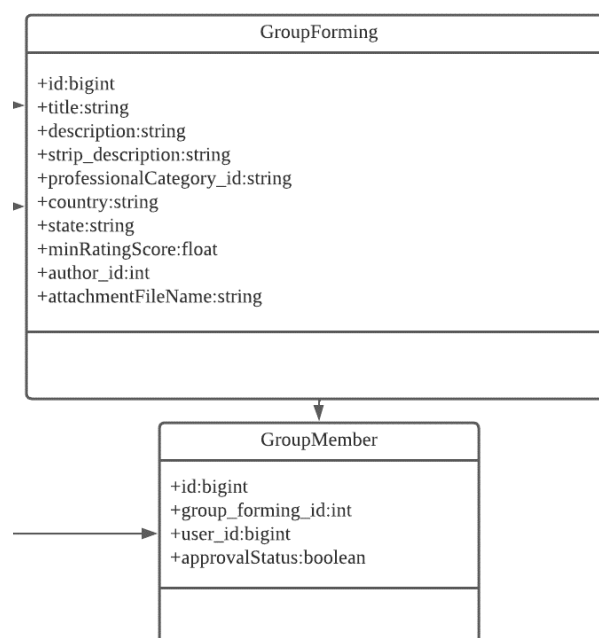


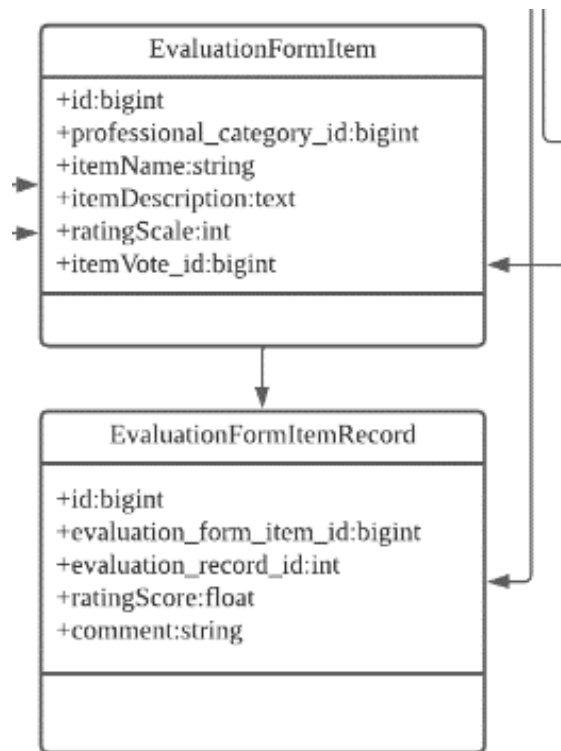
Figure 4.2.2. 5 Evaluation Form Item Vote & Evaluation Form Item Vote Count Class

The evaluation form component vote will have id as the primary key in the table and as the unique number to identify, title, description, rating scale foreign key from rating scale table's primary key, approval status to describe the evaluation form component suggested by the users, a professional category id to indicate the item belongs to which professional category. The evaluation form component vote count class will be the place to record all the votes from the users to the suggested form component from the evaluation form component vote class, and it contains the id as the primary key for the table, evaluation\_form\_item\_vote\_id from the evaluation form component vote and user\_id from the user class, action as Boolean to mention the form component is upvote or downvote by a user.



*Figure 4.2.2. 6 Group Forming Class & Group Member Class*

The group forming class will store the id as the primary key in the database table, title, description, strip\_description, required professional country, state, minRatingScore, author id from the user table, and attachment file name. The group member will store the joined group member for the group forming class and it includes the id as the primary key in the database table, group\_forming\_id from the group forming class, user\_id from the user table as the member's id, and approval status with default false value to indicate the member is accepted by the author or not.



*Figure 4.2.2. 7 Evaluation Form component Class & Evaluation Form component Record*

The evaluation form item class will store each of the professional's evaluation form component, and it contains id as the primary key in a database table, professional\_category\_id from the professional category class, item name, item description, rating scale foreign key from the rating scale table's primary key, and an itemVote\_id foreign key from the evaluation item vote table to refer to which record contribute to this evaluation form component. The evaluation form item record class will contain an id as the primary key in the database, evaluation\_form\_item\_record\_id from the evaluation form component class, evaluation\_record\_id from the evaluation record class, rating score, and the comment.

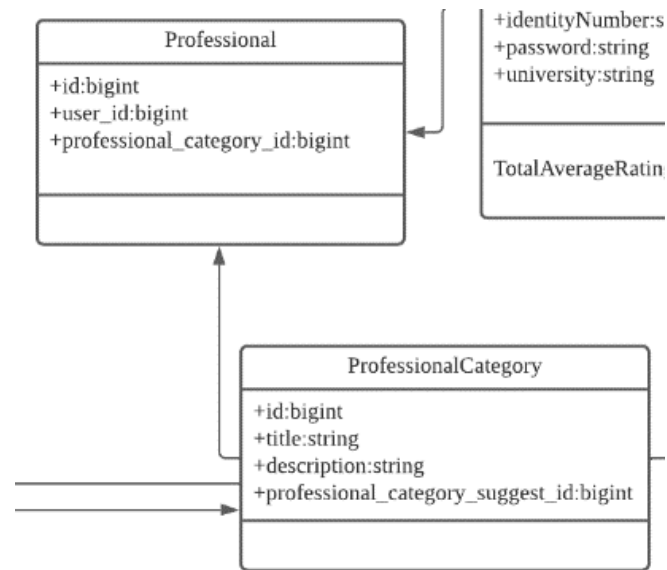


Figure 4.2.2. 8 Professional Class & Professional Category Class

Professional Class would act as the table to link the Professional Category and the users to store the information about a user-related to which professional. The professional class will have the user\_id, and professional\_category\_id from the professional category class. While the professional category class will store information about all types of professional category's title and the description with id as primary key while there is also a professional category suggest id as a foreign key reference to the professional category suggest table's id.

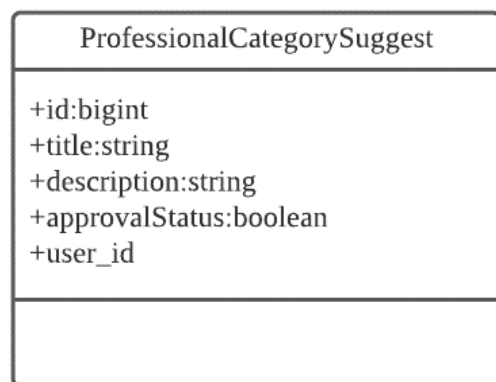


Figure 4.2.2. 9 Professional Category Suggest Class

The professional category suggest class will use for collecting the professional category collected from users and store the id as the primary key, title, description, approvalStatus to determine whether the administrator approved or not, and user\_id from the users' table to indicate who has proposed this professional category.



## 4.2.3 Activity Diagram

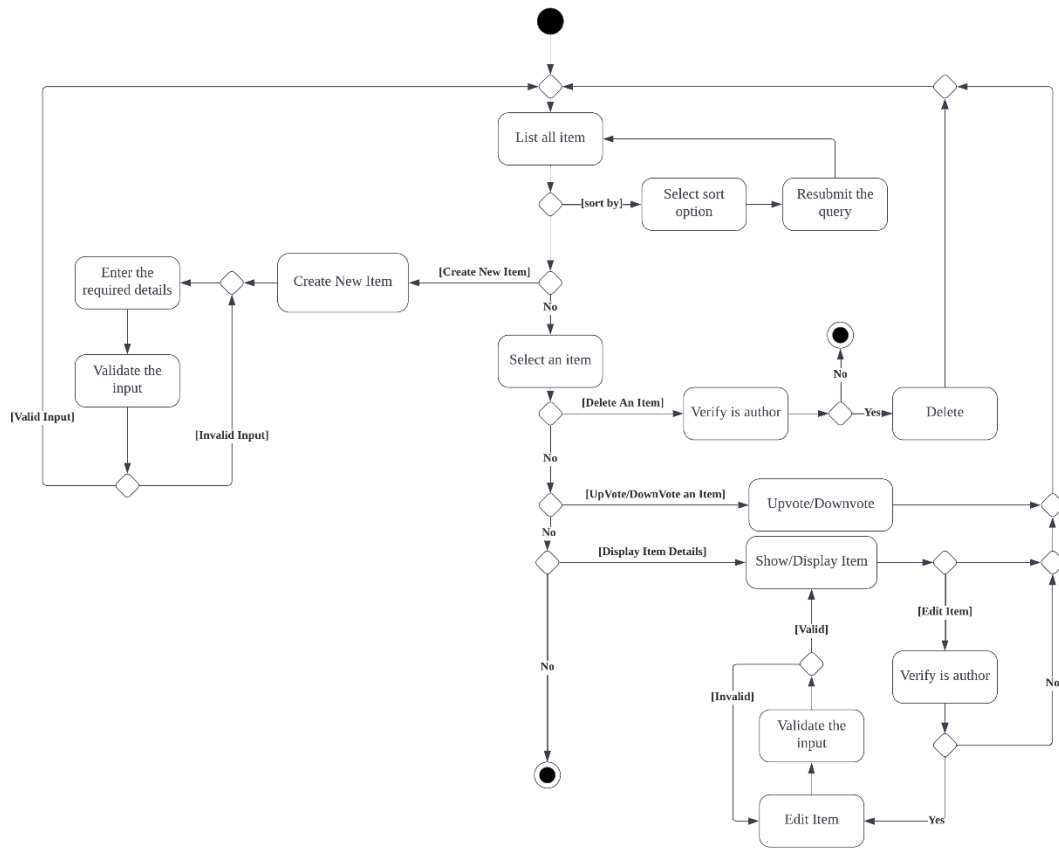
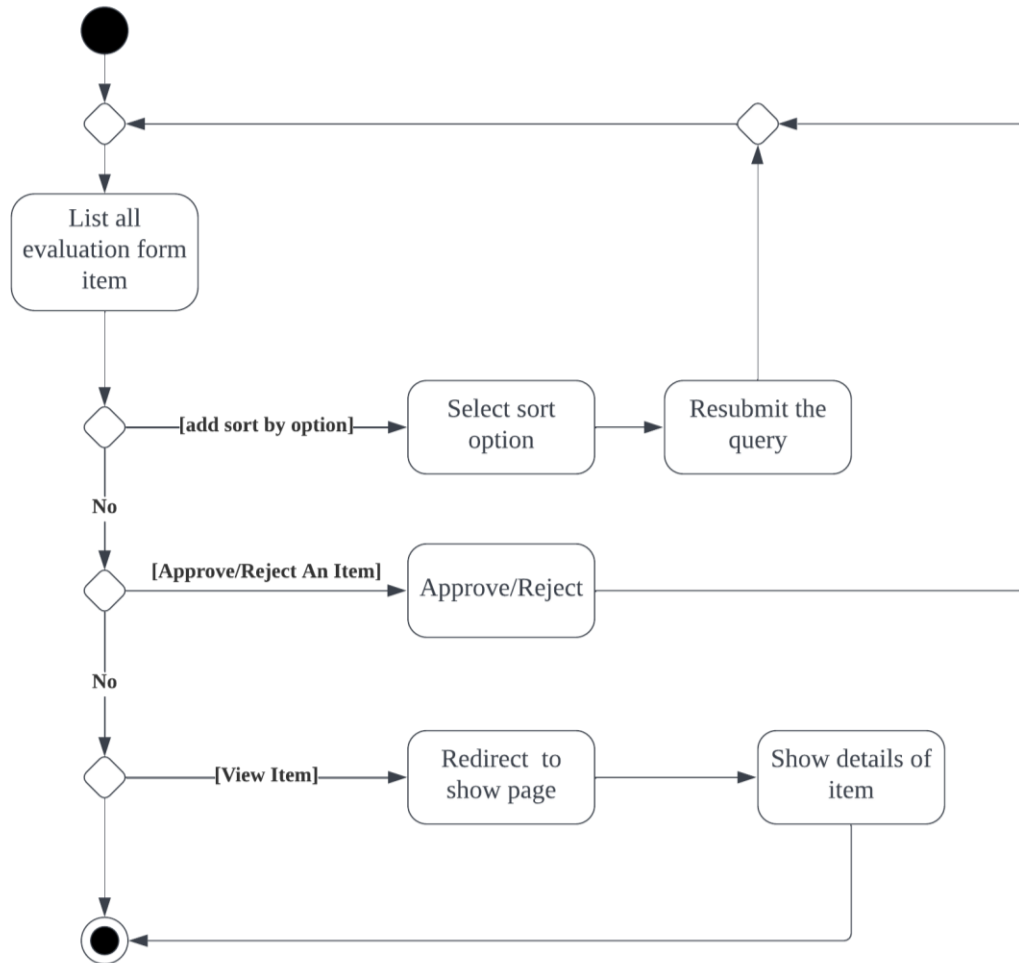


Figure 4.2.3. 1 Evaluation Form Component Suggestion Activity Diagram (User)

First, the users will be shown a page to list all the items, and users may select to sort the list item according to the option available or not, if yes, the option selected by the users will be resubmitted and redirected back to the list all item. Next, if users would like to create a new item, users will be prompted to input the information required, then the system validates the input if it is an invalid return to ask users to input again, else redirect to the list of all items. If the users have selected an item to delete and it is the author of the item, it will be allowed to delete the item, and redirect back to list all items, or else the activity end. If the users select to upvote or downvote an item, the system will process it and redirect it to list all items. The last activity is if users select an item and view the item, the details of the item will be displayed, in this step the users may edit if he is the author, when the input submit for editing is invalid will ask the user to input again, else return to display item details step.



*Figure 4.2.3. 2 Evaluation Form Component Suggestion Management Activity Diagram (Admin)*

The system will list all evaluation form components suggested by all users. If the administrator sorts the list with the option the query will be resubmitted and list all sorted results. If the administrator approves or rejects an item in the list, the system records it and display again all evaluation form component. If the administrator selects to view an item, he will be redirected to the show page of the item.

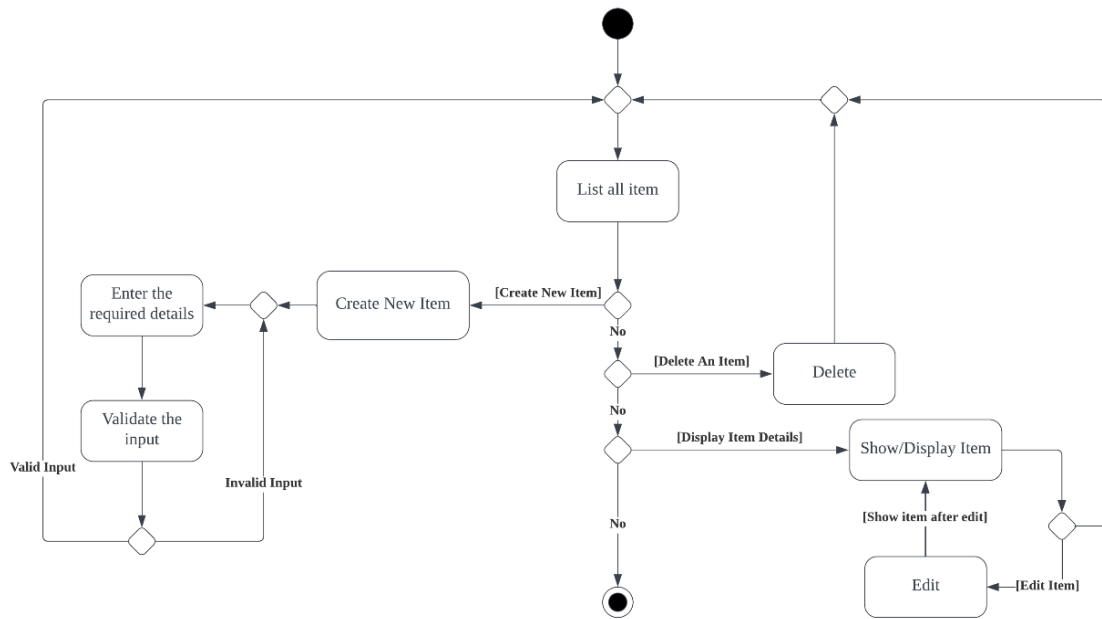


Figure 4.2.3. 3 Professional Category Suggestion Activity Diagram (User)

First, the users will be shown a list of all professional category suggestions submitted but, if the users select to create a new professional category suggestion, the system will prompt them to input the required information details, then the system validates the submitted input if it is invalid ask the user input again else record it and return to list all item. If the users select an item and delete it, the system will delete it and return to list all items. If the users select to view an item, the system will show the item full details, if the users select to edit the item, the users will ask to modify the item, and the system save it and return it to show the item.

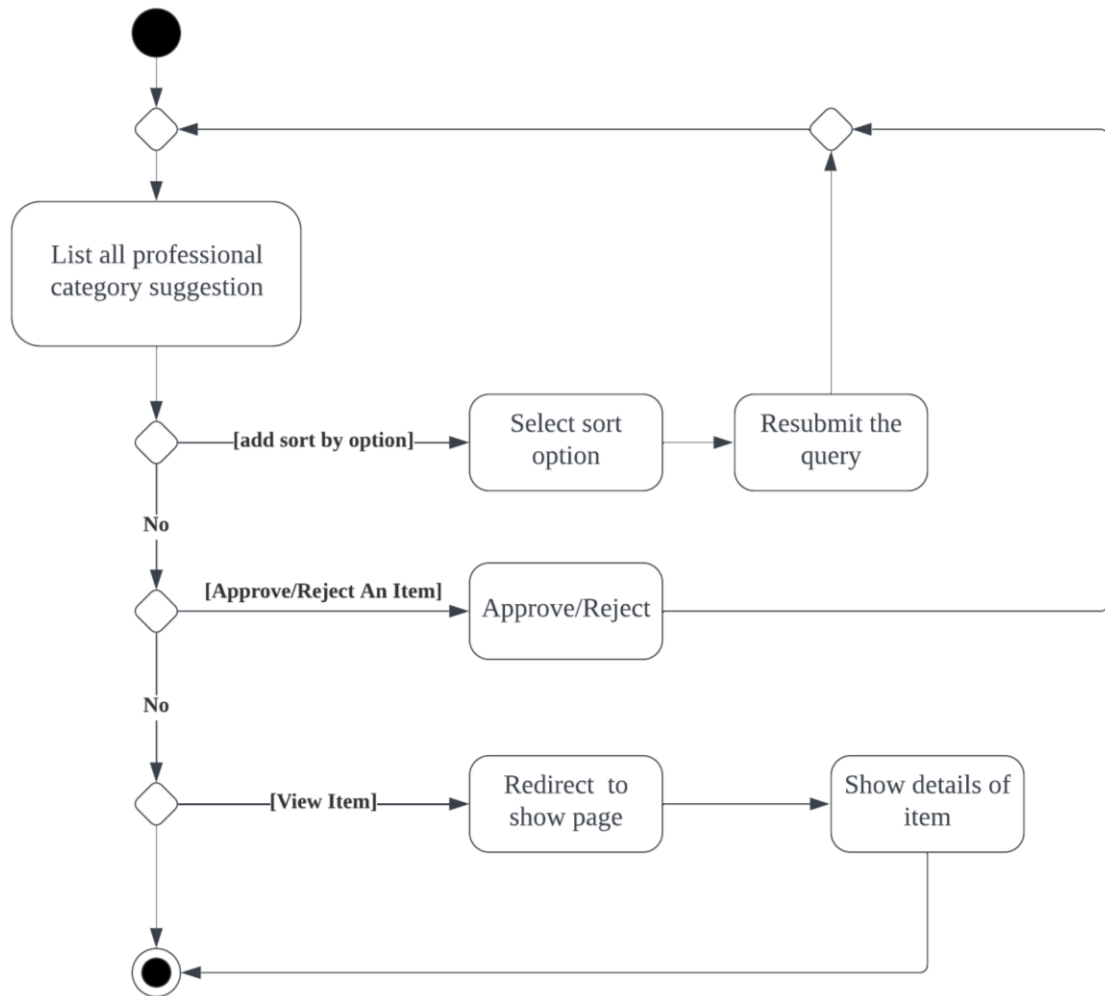
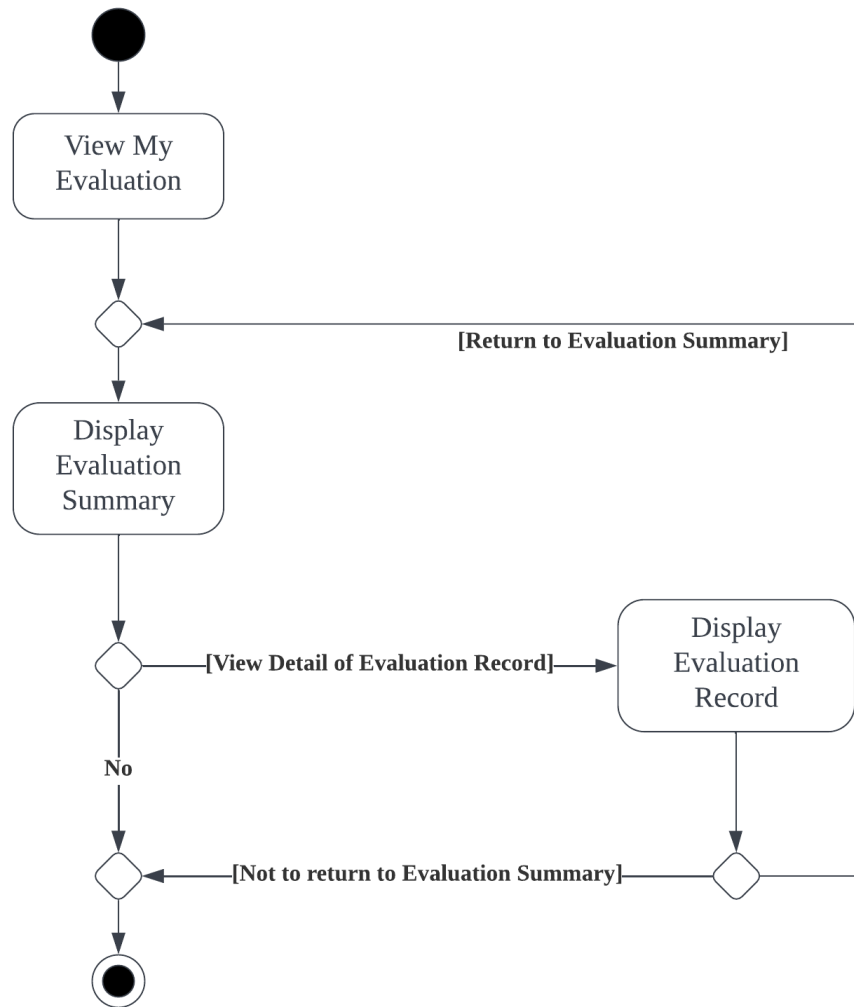


Figure 4.2.3. 4 Professional Category Suggestion Management Activity Diagram (Admin)

The system will list all professional category suggestions from users, if the administrator selects to sort the list, it will resubmit the query and show the list with sorted results. If the administrator selects an item to approve or reject, the system will update it and return to list all professional category suggestions. If the administrator selects an item to view, it will redirect the administrator to the show item details page.



*Figure 4.2.3. 5 Peer Evaluation Summary Activity Diagram (Owner of Evaluation Summary)  
(User)*

The user visits the page to view his evaluation summary, the system displays the evaluation summary. If the user selects to view the detail of an evaluation record, the system output the evaluation record and displays it.



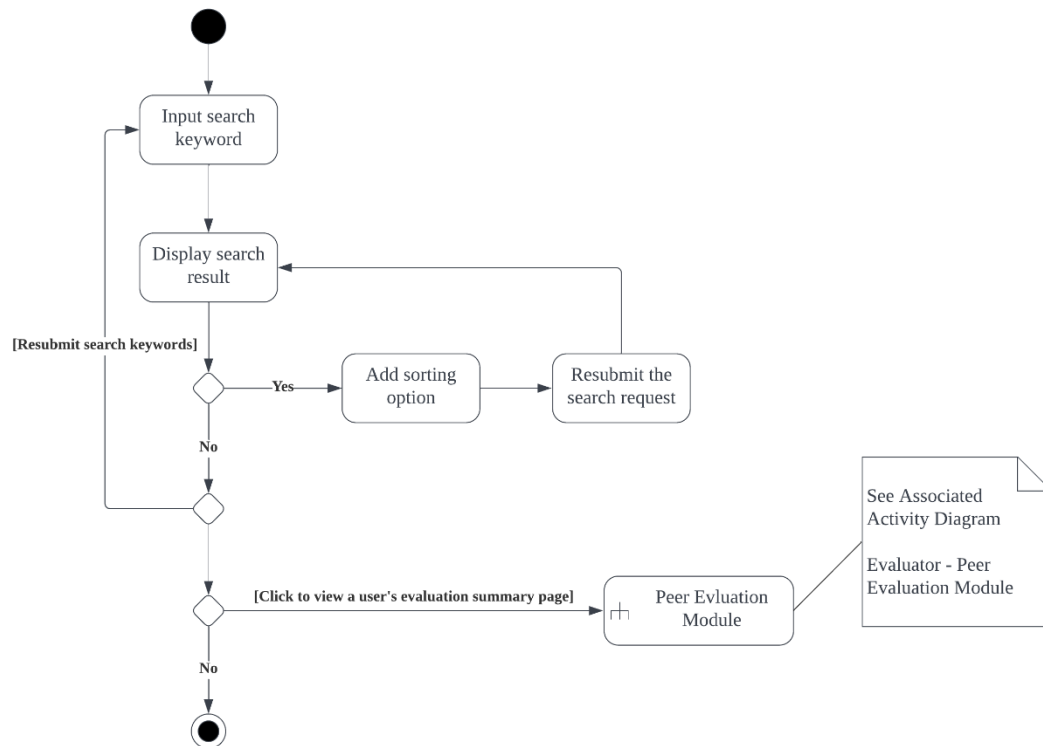


Figure 4.2.3. 7 Search & Sort Activity Diagram (User)

The user will input the search keyword and the system fetch the result and display the search result to users. If the users select the sort option, then it will be resubmitted and returned to display the search result. If the users select a search result item to view, they will be redirected to the evaluation summary page from the peer evaluation module.

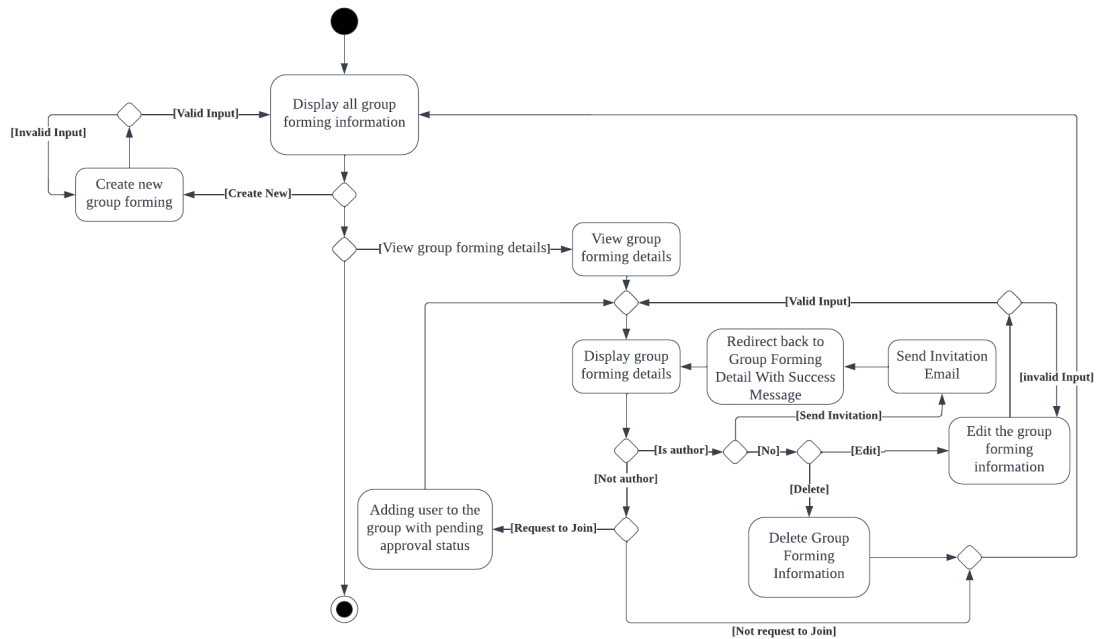


Figure 4.2.3. 8 Group Forming Activity Diagram (User)

The system will display all group forming information to the users. If the users select to create new group forming information, they will ask to input the details, if the input is invalid upon submission, they will be asked to input the correct input, or else the system saves and publishes it. Once the input is valid and submitted, the system returns the users to display all group information, and display all group information. If the users select a group to view the details, the system will show the details of the group. If the user is the author, he will be able to delete or edit and send invitation. If the author click on send invitation the system will send an email to the target user and display a success message. If the users delete it, the system will delete and return them to the display all group information page. Else if the user selects to edit the group information, the user will ask to modify the group information, if the input is invalid, he will be asked to input the correct value, else the system saves it and return it to display the group information details page. If the users are not the author, and they wish to join the group and clicked to join the group, the system will add the user to the group with pending approval status.



### 4.3 Functional Module in the System

There are 4 modules to be developed in this project, and they are organized as below:

1. Evaluation Form Component Suggestion Module
  - The peer evaluation item suggestion module is designed to allow users in the community to design and develop the standard component to be evaluated for each profession. The voting period will be restricted to a suitable time frame to make the process easy and the component with majority supported will be added to the evaluation form once the administrator approved the suggestion.
  
2. Peer Evaluation Module
  - The peer evaluation module which will contain the functionality of evaluation, display the evaluation result to the users, the module will allow the users or evaluator to evaluate the other person with the evaluation form component that is approved in the first module peer evaluation form component vote and allow the users to upload the evidence as to the supporting to the evaluation record if users could provide it. This module will also be using the following algorithm to calculate the average rating score of the person who has been evaluated to be added to the evaluation record page when the users view the evaluation record. The algorithm below first will convert the rating score to make all rating scores have the same unit to be further calculated by dividing the rating score of an evaluation record with the maximum score of the evaluation record and times with one hundred. The converted rating score will later to calculated with the average rating score which is the sum of all converted rating scores divided by the number of the rating score times one hundred and later times one hundred again to get the final result of the average rating score.

$$\text{Converted Rating Score} = \frac{\text{Rating Score of an Evaluation Record}}{\text{Maximum Score of the Evaluation Record}} \times 100$$

$$\text{Average Rating Score} = \frac{\sum_{i=0}^n \text{Converted Rating Score}}{n} \times 100$$

### 3. Search and Sort Module

- The third module to be developed is the search and sorting module, this module will help the users to search the users or person and check their evaluation records that are available in the system and allow the users to sort the search result according to their average rating score or school, professions. The average rating score will also rely on the calculation algorithm introduced in the peer evaluation module.

### 4. Study and Research Group Forming Module

- The fourth module is the study and research group forming module, this module will help the users in the community to announce their request to look for new members of their research or study group, the other users will be able to request to join the group when the author of the group request posted to the system. This module will also help the author to restrict those unqualified users to send the request when the author of the group forming information that has been published set the group forming with minimum average rating score, hide from user who does not have the required profession. This study and research group forming module will allow the author to find his members easily when he or she is allowed to view the evaluation record of the users who have requested to join.

## 4.4 System Flow

### 4.4.1 Login System Flow

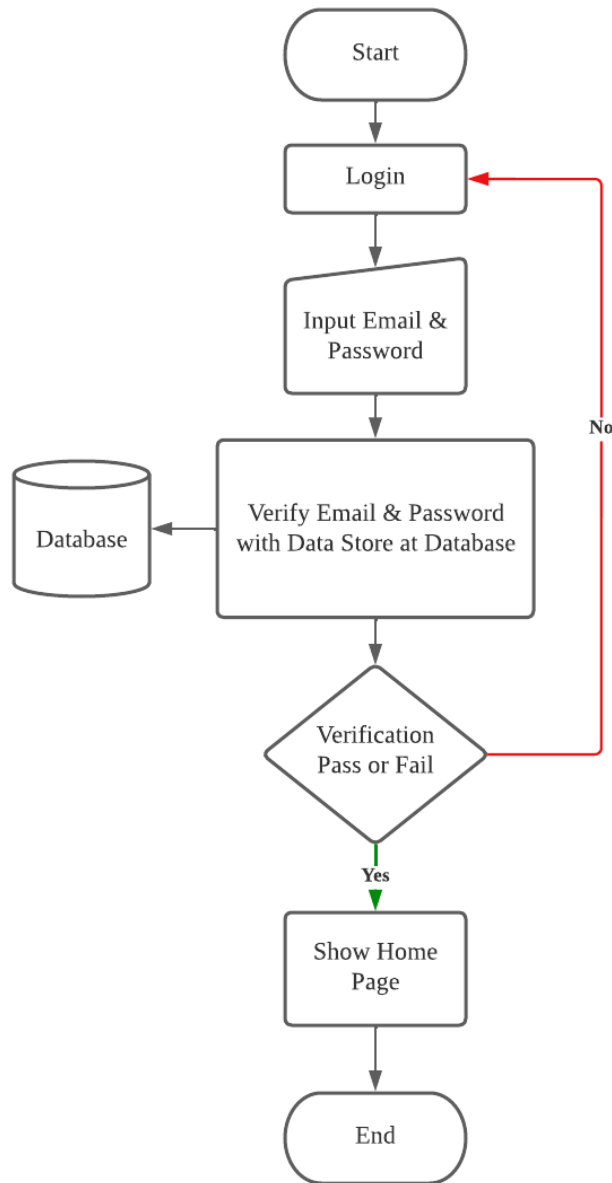


Figure 4.4.1. 1 Login System Flow

At the beginning, the users will be required to login to the system with a valid pair of email and password, if the verification is failed the users will stay at the login page until he or she had provided a valid pair of email and password, else the users is succeeded to pass, he or she will be allowed to access the home page, and continue with others module in the system.

4.4.2 Evaluation Form Component Suggestion Module Flow

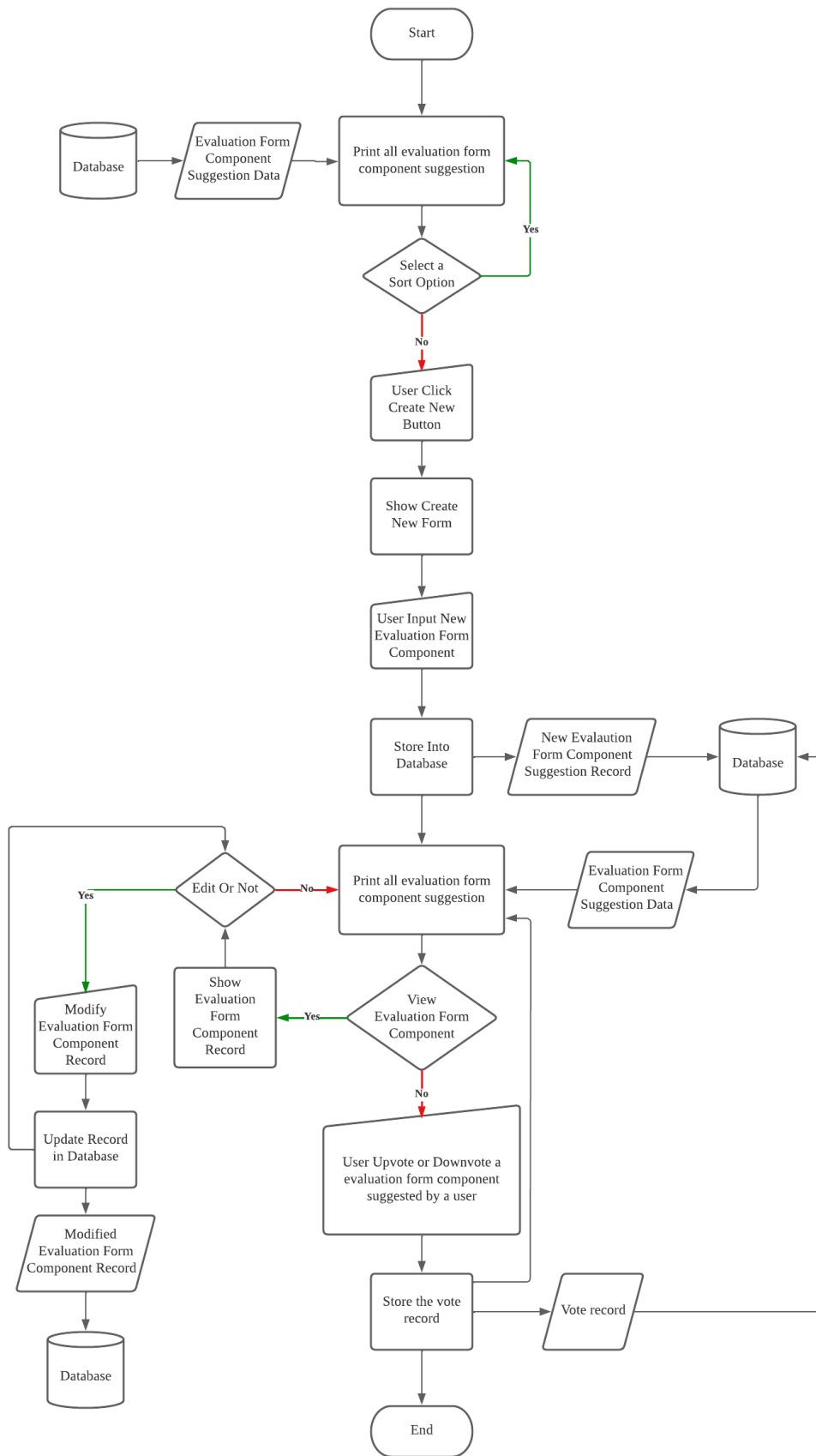


Figure 4.4.2. 1 Evaluation Form Component Suggestion Module Flow

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In the evaluation form component suggestion module, the system will print out all the suggestion by every user that are available in the database, if user have sort condition, the listed evaluation form component will be sorted with the condition. Later, the user will create the create new button and get shown with a create new form. Then the user will be able to fill in the detail of the evaluation form component to be suggested and click save and the system will store into the database and redirect the user to the main page of this module. The user can click an item in the list to view the detail. In the detail page, if the user is the author, he may have the right to edit. If user clicked edit will redirect to the edit page and user may modify the content and click save to update the content and go back to the show page, and user may return to main page of the module when clicked the return button. In the main page the user can click upvote or downvote on an item in the list and the system record the vote.

4.4.3 Search Module & Evaluation Module Flow

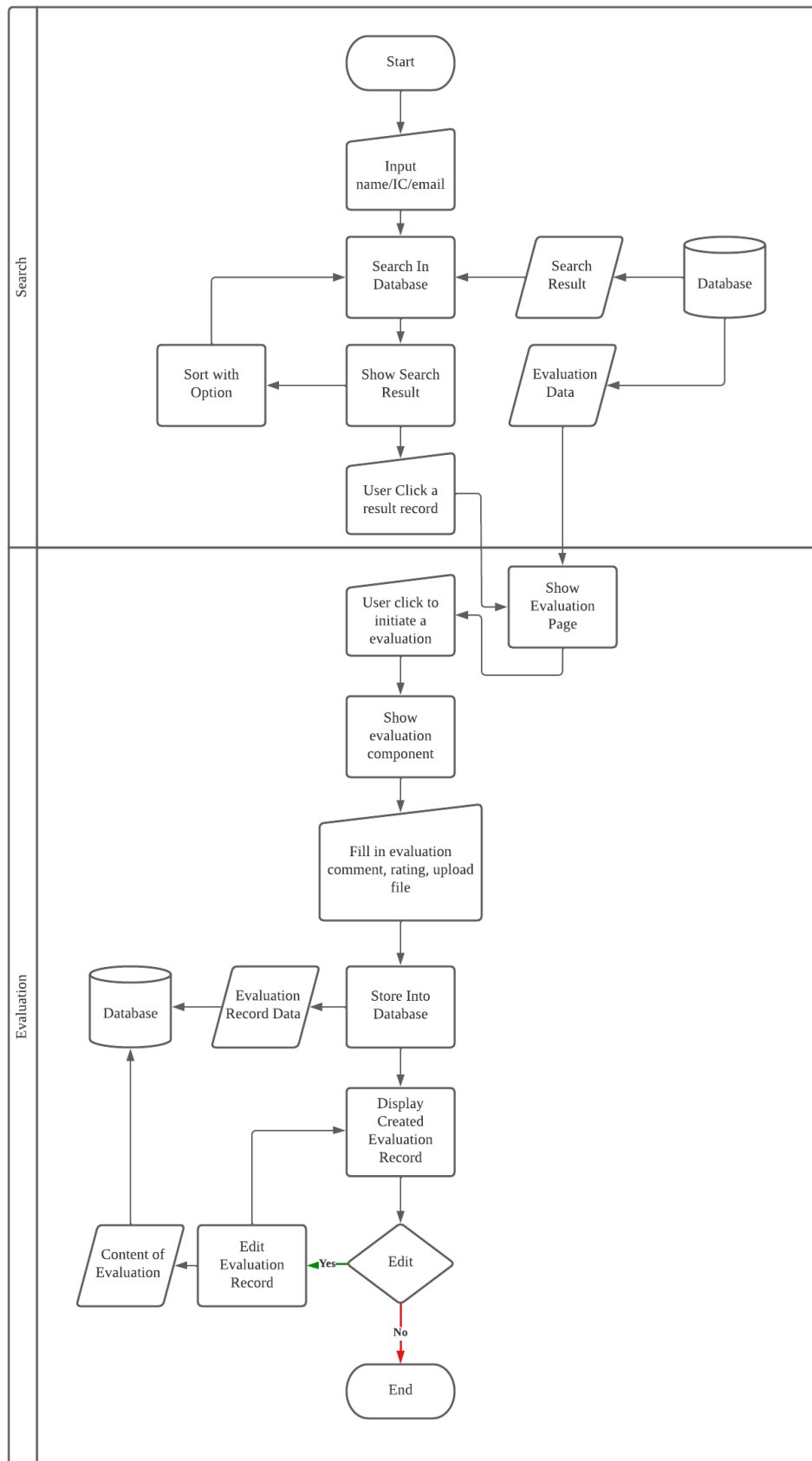


Figure 4.4.3. 1 Search Module & Evaluation Module Flow

## CHAPTER 4

In the search module the user may key in name, email or IC number of a user registered in the system and search. The search results can be applied with the sort condition and the system will search with the applied condition and print all result to the user. The user may click the result in the list to view the summary page of evaluation record of a peer, and user will be redirect to the summary page at evaluation module.

In the summary page of evaluation module, the system shows all evaluation record associated with the peer. In the summary page user can initiate an evaluation to the peer and user will be ask for fill in the content such as rating, comment and optional attachment file in the evaluation form and submit it. The system will save into database and redirect user to the detail page of evaluation record created by the user, in this page the user can edit the content or return to summary page. If user proceed to edit the content, user will give a page prefilled with the content created by the user and user may modify and click save to update it, and return to detail page of evaluation record.



4.4.4 Group Forming Module Flow

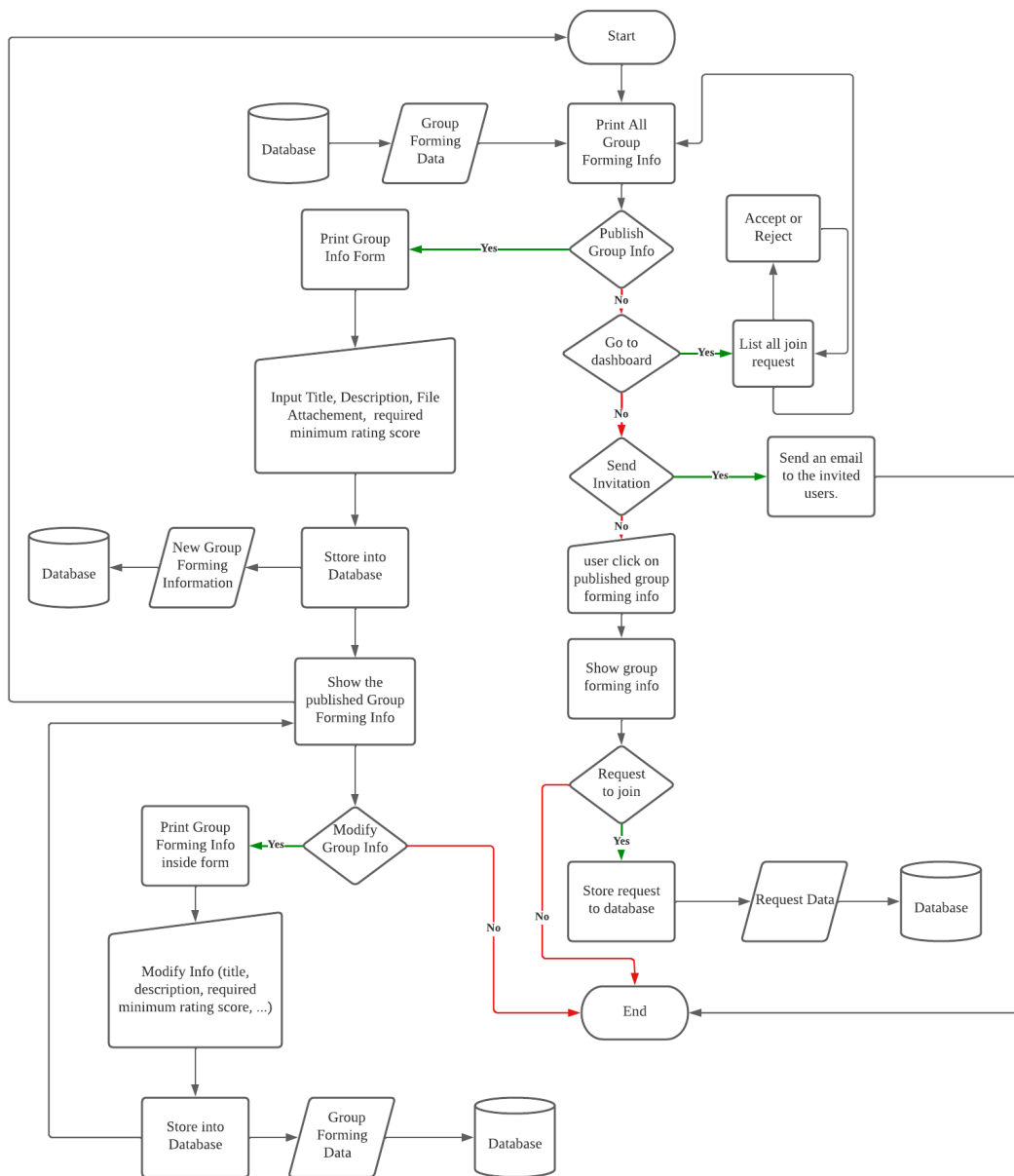


Figure 4.4.4. 1 Group Forming Module Flow

In group forming module, the user will first show with a main page that list all the group forming information. The user can click publish group information button to publish a group information to find for new member for his team. The user will be asked to fill in the required detail in the create new page, and the system will store and redirect to the detail page after the user click submit button. In detail page the user may click edit button to modify the content, the system will provide the content in a page for user to modify and update to the database once user modified and click save button, and return user back to the detail page. If user is not interest with publishing a new group forming information, he may click item listed in main page to view the group forming

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information published by others user. In the detail page of the group forming information allow user to click request to join button to join the group, and the action will be record by system to the database, if the author click on send invitation the system will send an email to the target user. In the main page, the user may also visit the dashboard through clicking the dashboard button. In dashboard page, user is able to accept or reject on every request to join from other user to the group forming published by him.

## 4.5 Database Design

### 4.5.1 Entity Relationship Diagram

PF = Primary Key

FK = Foreign Key

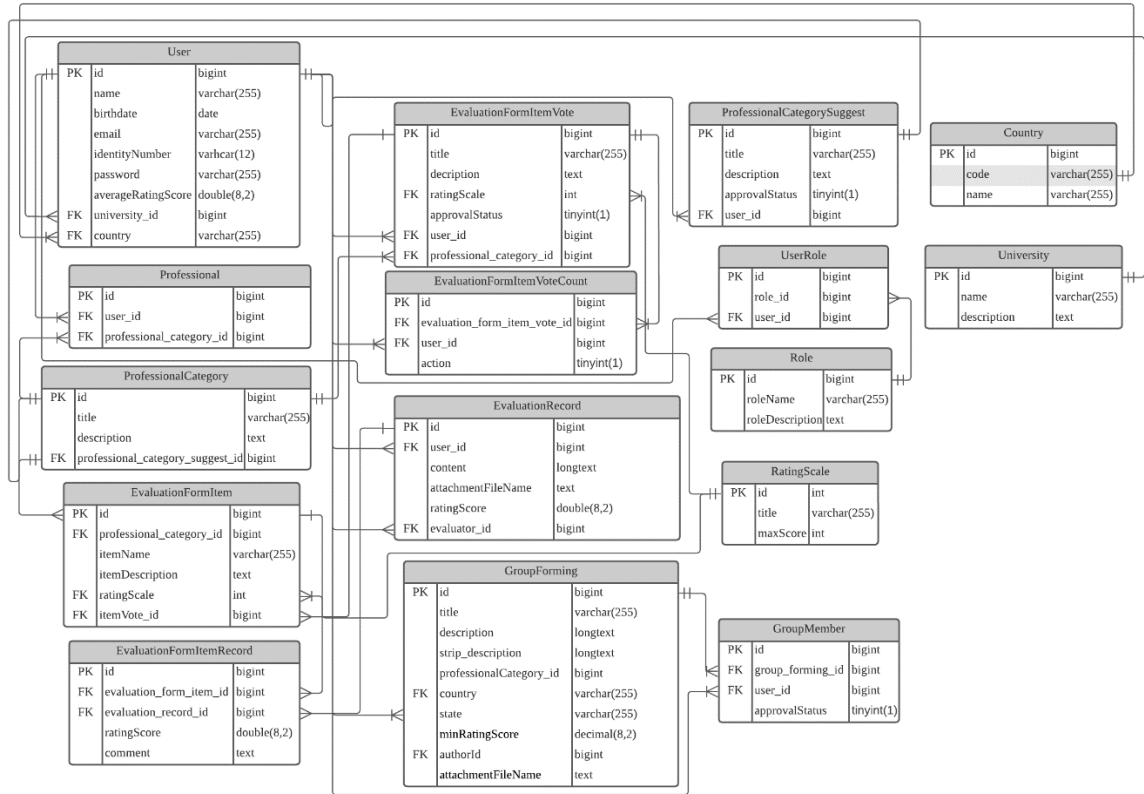


Figure 4.5.1. 1 Entity Relationship Diagram

**4.5.2 Data Dictionary**

P = Primary Key

F = Foreign Key

N = Nullable

*Table 4.5.2. 1 Role Table*

Field Name	P/F/N	Data Type	Field Size	Description
id	P	bigint	N/A	Unique number for role
roleName		varchar	255	Name for the role
roleDescription		text	N/A	Description of the role

*Table 4.5.2. 2 User Role Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	N/A	Unique number for user role
role_id	F	bigint	N/A	Reference to role table.
user_id	F	bigint	N/A	Reference to the user table.

*Table 4.5.2. 3 User Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for user table.
name		varchar	255	Name of user
birthdate		date	N/A	Birthdate of user
email		varchar	255	Email registered
averageRatingScore		double	8,2	Average rating score of evaluation record.
identityNumber		varchar	12	The identity number of the user
password		varchar	255	The password of the user account
university_id	N	bigint		University studies by user
country		varchar	255	Country of the user.

*Table 4.5.2. 4 Professional Category Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for professional category

title		varchar	255	Title for the professional category
description		text	N/A	Description of the professional category
professional_category_suggest_id	F/N	bigint	20	Foreign key from professional category suggest table to tracing the user who suggests it.

*Table 4.5.2. 5 Professional Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for professional table.
user_id	F	bigint	20	Reference to the user table.
professional_category_id	F	bigint	20	Reference to professional category table.

*Table 4.5.2. 6 Professional Category Suggest Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for professional category suggest table.
title		varchar	255	Title of the professional category to suggest.
description		text	N/A	Description of the professional category to suggest.
approvalStatus	N	boolean	N/A	Approved by admin or not.
user_id	F	bigint	20	Reference to the user table.

*Table 4.5.2. 7 Evaluation Form Item Vote Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	N/A	Unique number for evaluation form component vote table.
title		varchar	255	Title of evaluation form component vote.

description		text	N/A	Description of evaluation form component vote.
ratingScale	F	int	10	Reference to rating scale table.
approvalStatus	N	boolean	N/A	Approved by admin or not.
user_id	F	bigint	20	Reference to the user table.
professional_category_id	F	bigint	20	Reference to professional category table.

*Table 4.5.2. 8 Evaluation Form Item Vote Count Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	N/A	Unique number for evaluation form component vote count table.
user_id	F	bigint	20	Reference to the user table.
evaluation_form_item_vote_id	F	bigint	20	Reference to evaluation form component vote table.



action		boolean	N/A	Describe the user is upvoted or downvoted the item.
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*Table 4.5.2. 9 Evaluation Form Item Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for evaluation form component table.
professional_category_id	F	bigint	20	Reference to professional category table.
itemName		text	N/A	Name of the form component.
itemDescription		varchar	255	Type of the form component.
ratingScale	F	int	10	Reference to rating scale table.
itemVote_id	F	bigint	20	Reference to evaluation form component vote table for tracing the suggested by which

				suggestion record.
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*Table 4.5.2. 10 Evaluation Record Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for evaluation record table.
user_id	F	bigint	20	Reference to the user table.
content		longtext	N/A	Content that describes the evaluation record.
attachmentFileName	N	text	N/A	The file name that uploads with the evaluation record if applicable.
ratingScore		int	10	The total score of the current record.
evaluator_id	F	bigint	20	Reference to users table for evaluator's user id.

*Table 4.5.2. 11 Evaluation Form Item Record*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for evaluation form component record table.
ratingScore		double	8, 2 decimal places	The score gives to the evaluation form component.
comment		text	N/A	Comment of the evaluator to the evaluation form component.
evaluation_form_item_id	F	bigint	20	Reference to evaluation form component table.
evaluation_record_id	F	bigint	20	Reference to evaluation record table.

*Table 4.5.2. 12 Rating Scale Table*

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for rating scale table.

title		varchar	255	Title of the rating scale.
maxScore		int	11	The maximum score of the rating scale has.

Table 4.5.2. 13 Group Forming Table

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for group forming table.
title		varchar	255	Title of the group forming request.
description		longtext	N/A	Description of the group forming request.
strip_description		longtext		HTML stripped description.
professionalCategory_id		bigint	N/A	Required profession category to join.
country		varchar	255	The country of this group is located.
state		varchar	255	The state of this group located
minRatingScore		decimal	(8,2)	Minimum rating score to join this group.
authorId	F	bigint	20	Reference to the user table to trace who is the author to

				publish the group forming request.
attachmentFileName	N	text	N/A	The file is attached to this request for clarification purposes.

Table 4.5.2. 14 Group Member Table

Field Name	P/F/NN	Data Type	Field Size	Description
id	P	bigint	20	Unique number for group member table.
group_forming_id	F	bigint	20	Reference to group forming table.
user_id	F	bigint	20	Reference to user table as a member to join the team.
approvalStatus	N	boolean	N/A	The status of the join request is approved or rejected.

Table 4.5.2. 15 Country Table

Field Name	P/F/N	Data Type	Field Size	Description
id	P	bigint	N/A	Unique number for country.

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code		varchar	255	Country code
name		varchar	255	Name for the country.

## 4.6 Wireframe Diagram

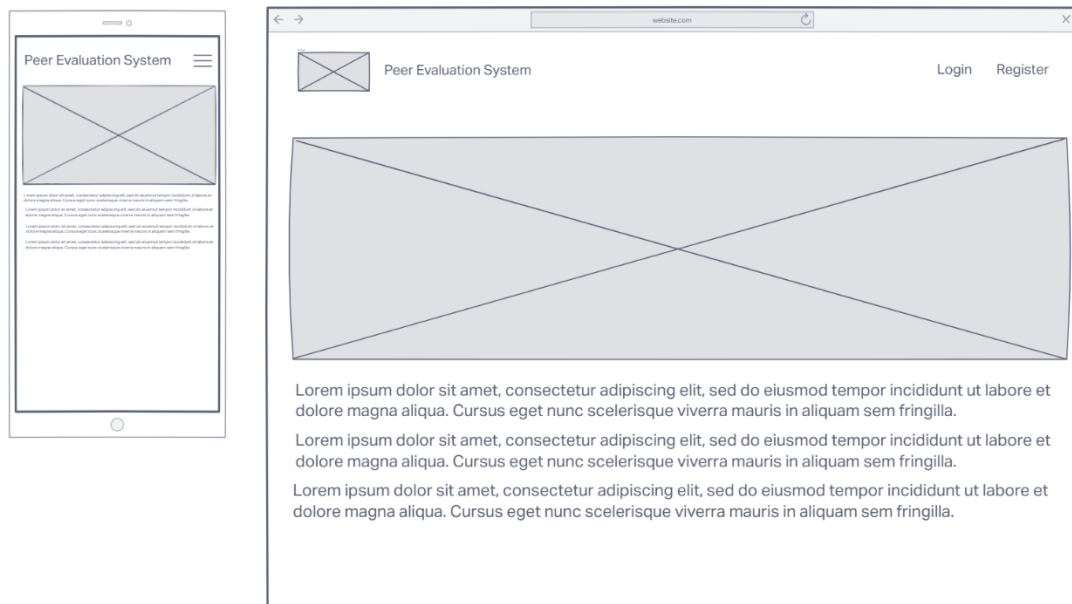


Figure 4.6. 1 Home Page Wireframe (Not Signed In)

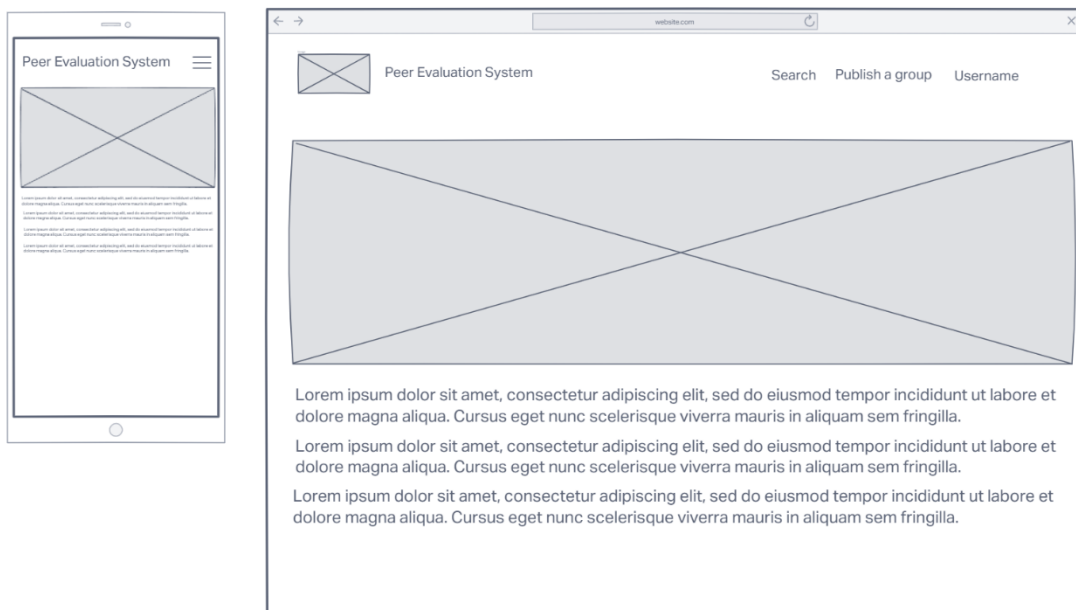
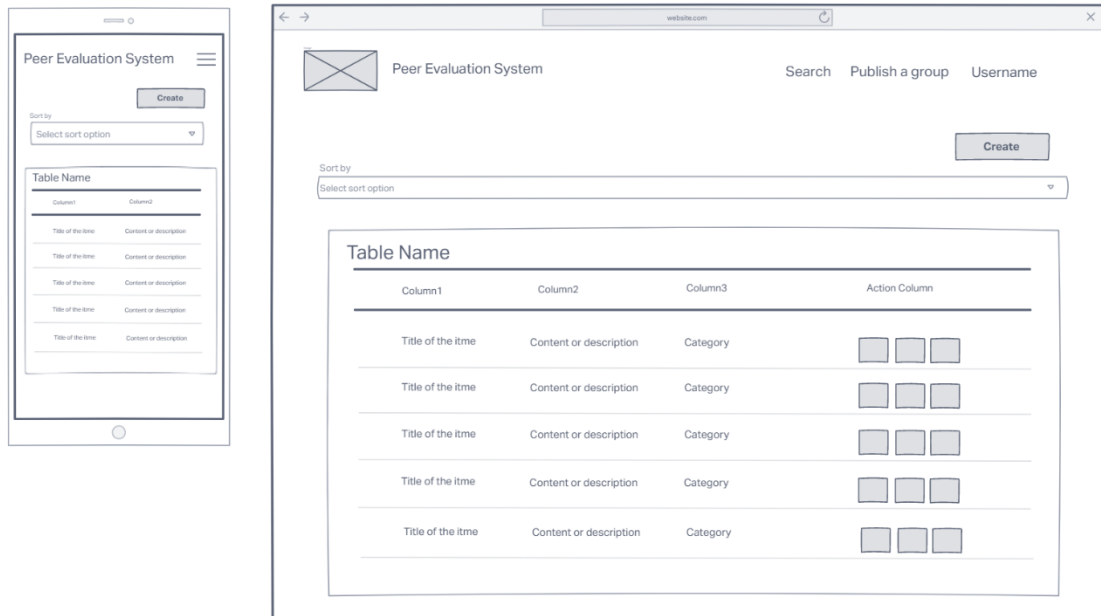


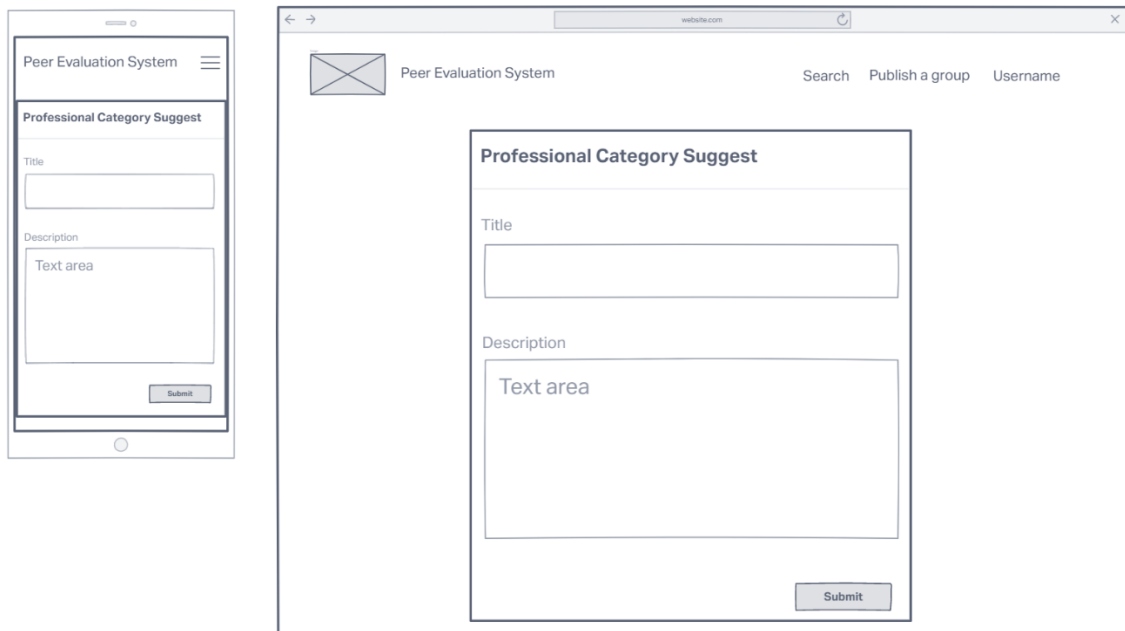
Figure 4.6. 2 Home Page Wireframe (Signed In)

## CHAPTER 4



*Figure 4.6. 3 Index / List Page Wireframe*

For each module's list page such as Evaluation Form Component Suggestion, professional category suggestion will design according to the standardised format as shown in figure 3.34 with the table format and last column as the action button for each printed row of record.



*Figure 4.6. 4 Create Page Wireframe*



## CHAPTER 4

The create page design as the standardised design as shown in figure 3.35 for pages such as create professional category suggest, evaluation form component suggest, and inside the form, the design had a different amount of input form according to the needs.

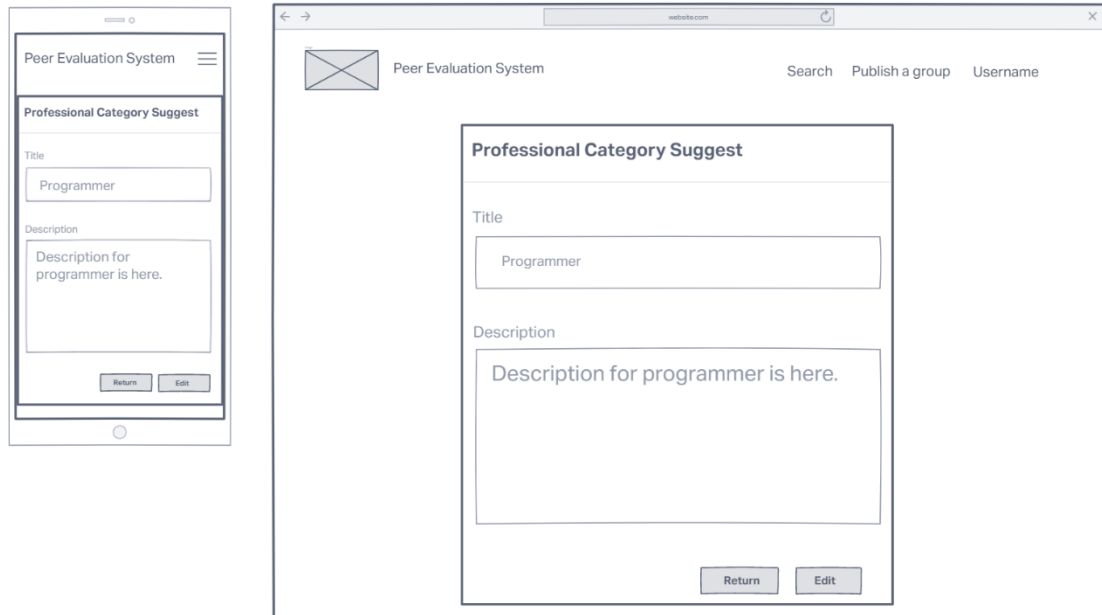
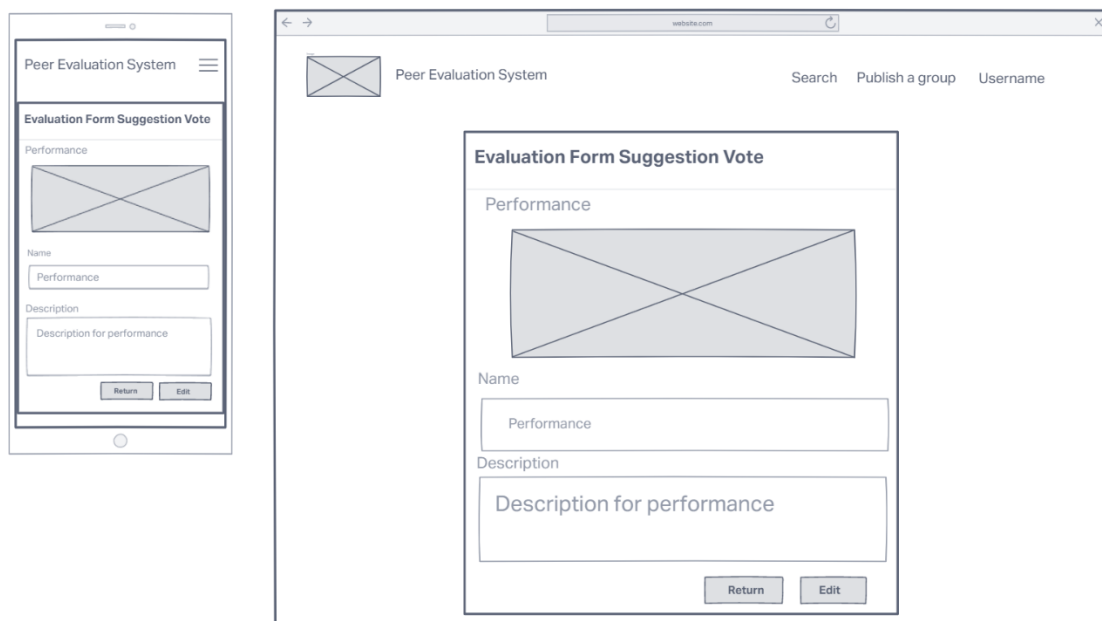


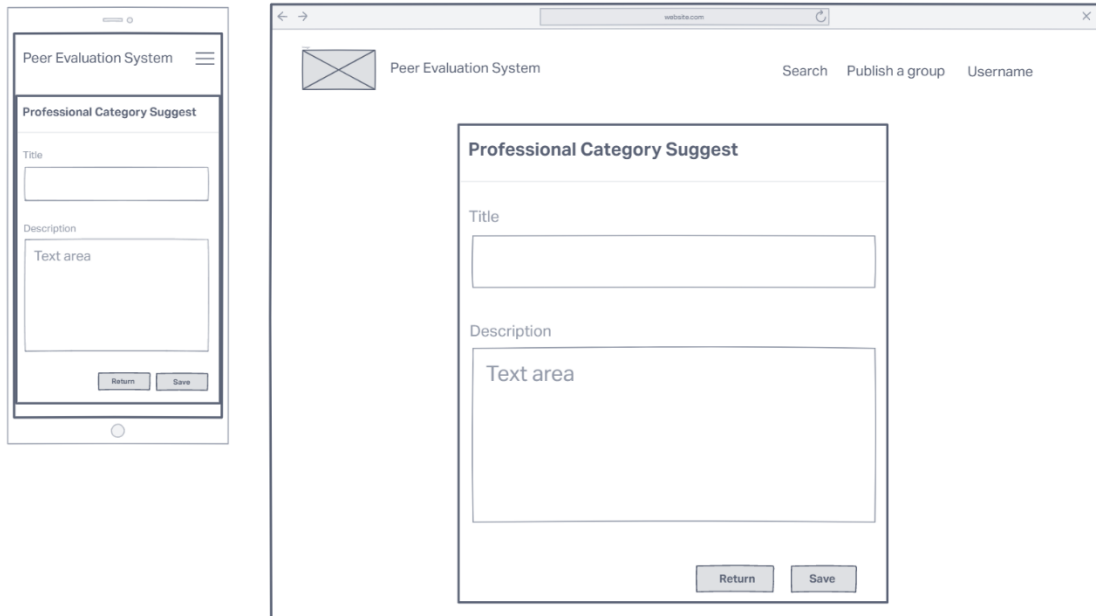
Figure 4.6. 5 Show Page Wireframe

The show page as figure 3.36 will be used to implement in the professional category suggest page.

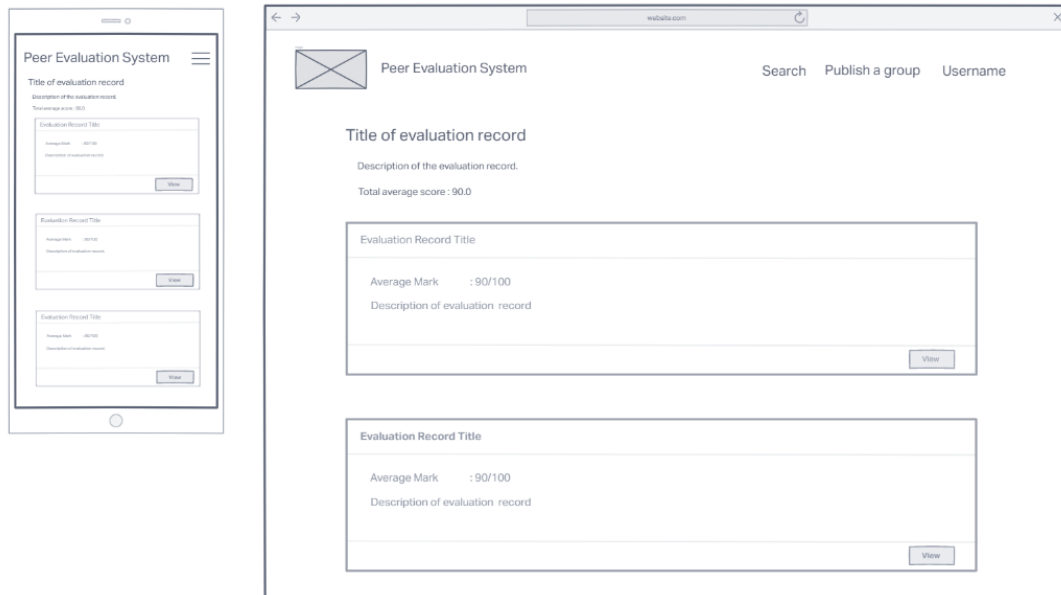


*Figure 4.6. 6 Show Page Wireframe (With Chart)*

The show page with the chart included in figure 3.37 will be used in the Evaluation Form Component Suggestion page as there are an upvote and downvote functions and the chart will be used to display the statistical data of the upvote and downvote.



*Figure 4.6. 7 Edit Page Wireframe*



*Figure 4.6. 8 Evaluation Summary Page Wireframe*

# CHAPTER 4

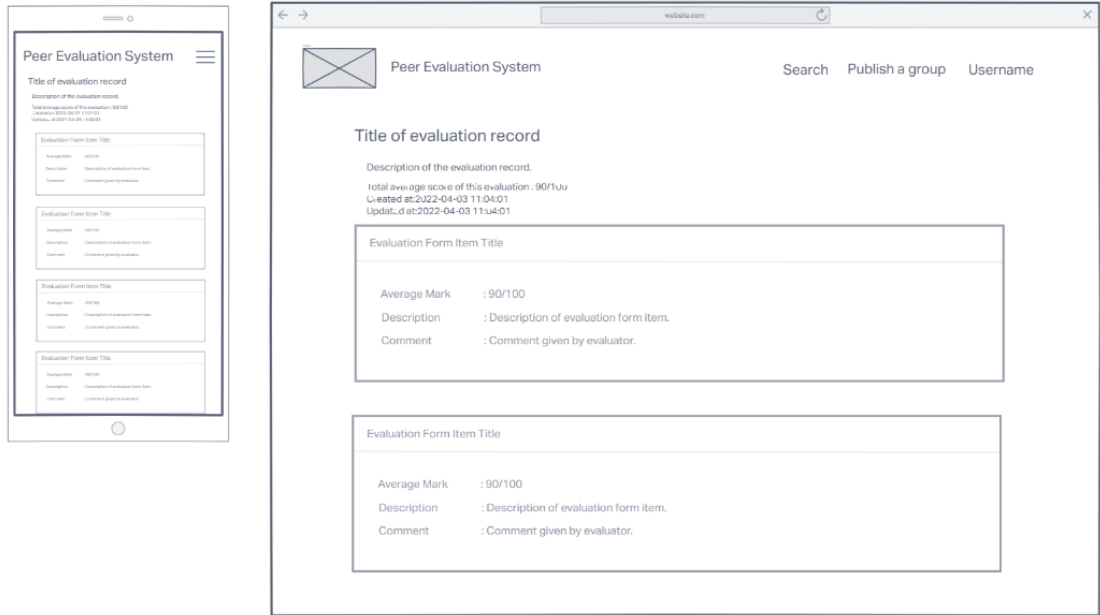


Figure 4.6. 9 Evaluation Record Details Page Wireframe

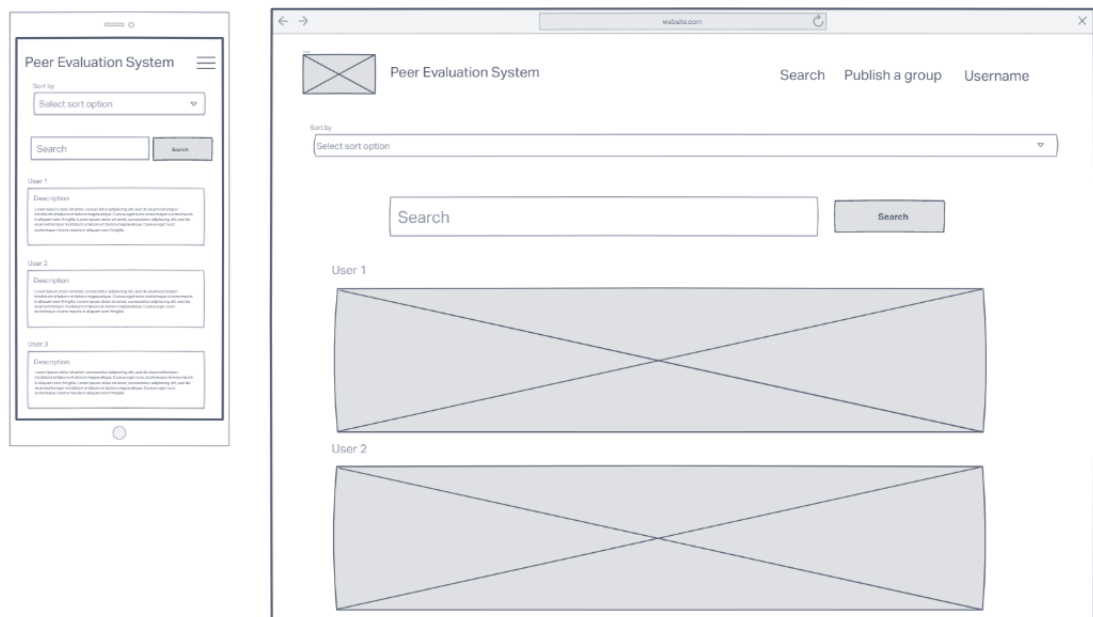
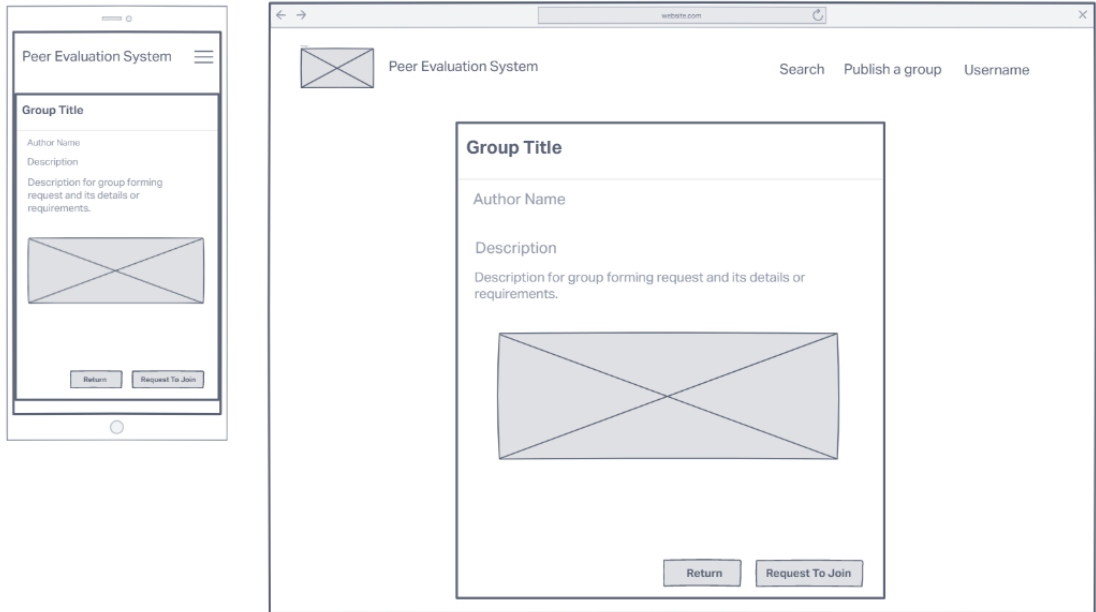


Figure 4.6. 10 Search Page Wireframe



*Figure 4.6. 11 Group Forming Description Page Wireframe*

## **4.7 Concluding Remark**

MVC architecture was chosen as the system architecture for the development of the project since it enables faster development and reuse of some design components. The functional modules in the system include the evaluation form component suggestion Module for helping to design the evaluation form, peer evaluation module for peer evaluation, search & sort module for helping users to find their peers for evaluation and link to the peer evaluation module, and study and research group forming will help to form their group. The ERD depicts the database and its relationships with other tables in section 4.4, while section 4.5 depicts the system's layout architecture.

# Chapter 5

## System Implementation

### 5.1 Software Setup

This section consists of server configuration to hosting the web app system developed in this project with using of Nginx, PHP, and MySQL/MariaDB server.

1. Execute the command below in Ubuntu to get the required software installed.  
“sudo apt-get update && sudo apt-get install nginx php8.1-{fpm,common,mysql,mbstring,opcache,xl,gd} mariadb-server”
2. Run the “sudo mysql\_secure\_installation” to finish the setup for mysql/mariadb.

### 5.2 Setting and Configuration

#### 5.2.1 Nginx Configuration Setup

The following configuration file path is /etc/nginx/sites-enabled/default and move the project file to “/home/tjt/www/PeerEvaluationSystem/”;

```
server {
    listen 80;

    server_name peerevaluation.jt-cloud.me;

    client_max_body_size 256M;

    autoindex on;

    location /.well-known/acme-challenge/ {
        alias /home/tjt/www/PeerEvaluationSystem/public/.well-known/acme-
challenge/;
        try_files $uri $uri/ =404;
    }

    return 301 https://$server_name$request_uri;
}
```

## CHAPTER 5

```
server {  
    listen 443 http2 ssl;  
    server_name peerevaluation.jt-cloud.me;  
    autoindex off;  
    client_max_body_size 256M;  
    server_tokens off;  
    ssl_certificate /home/tjt/.acme.sh/peerevaluation.jt-cloud.me/fullchain.cer;  
    ssl_certificate_key /home/tjt/.acme.sh/peerevaluation.jt-  
cloud.me/peerevaluation.jt-cloud.me.key;  
  
    root /home/tjt/www/PeerEvaluationSystem/public/;  
    index index.php;  
  
    location / {  
        try_files $uri $uri/ /index.php?$query_string;  
    }  
  
    # pass PHP scripts to FastCGI server  
  
    location ~ \.php$ {  
        include snippets/fastcgi-php.conf;  
        #  
        # With php-fpm (or other unix sockets):  
        fastcgi_pass unix:/var/run/php/php8.1-fpm.sock;  
        # With php-cgi (or other tcp sockets):  
        # fastcgi_pass 127.0.0.1:9000;  
    }  
}
```

### 5.2.2 PHP Configuration

Change the following line of configuration at `php.ini` located at `/etc/php/8.1/fpm/php.ini` as shown at below to enable the file upload larger than 2MB. The other configuration remain default and modify as per required.

```
post_max_size = 128m
```

```
upload_max_filesize = 128m
```

### 5.2.3 MySQL/MariaDB Database User Setup

The following command should be run inside “`sudo mysql -u root -p`”, replace the password with a strong password.

1. `CREATE USER IF NOT EXISTS 'peerevaluation'@'localhost' IDENTIFIED BY 'password';`
2. `GRANT ALL PRIVILEGES ON *.* TO 'peerevaluation'@'localhost' WITH GRANT OPTION;`
3. `GRANT PROXY ON "" TO 'peerevaluation'@'localhost' WITH GRANT OPTION;`
4. `FLUSH PRIVILEGES;`

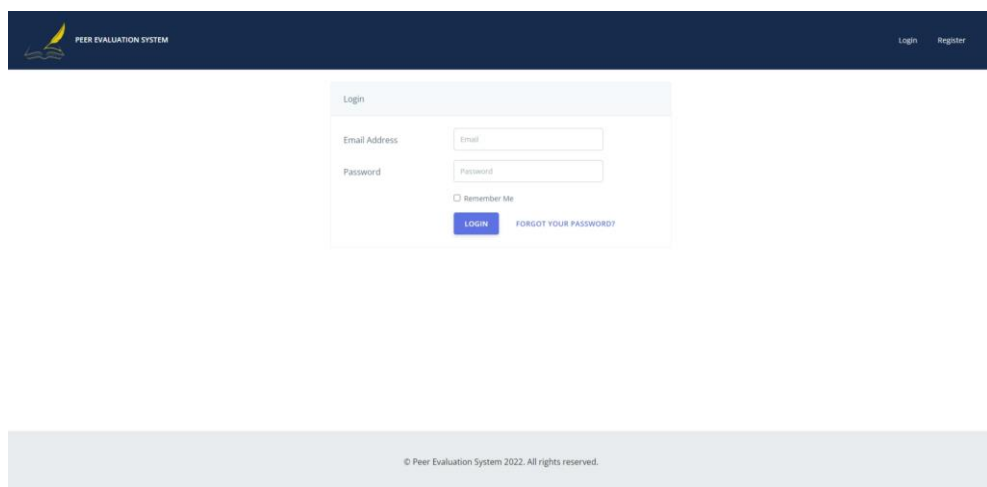


### 5.3 System Operation

To operate or use the system developed in this project, the user will be required to have a device such as desktop pc or mobile smart phone and have internet access on the devices. The software required to access the system is any types of web browser that support of HTML 5, CSS and JavaScript to ensure the system developed able to work.

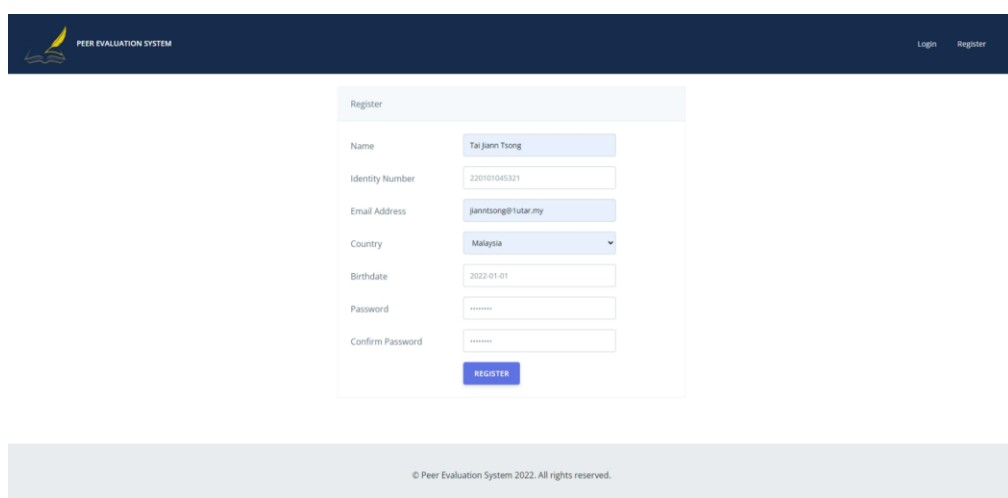
#### 5.3.1 Access the system

1. To start using the system, the users is required to use their browser in their devices to browse <https://peerevaluation.jt-cloud.me/> and he or she will get redirected to ask for login.



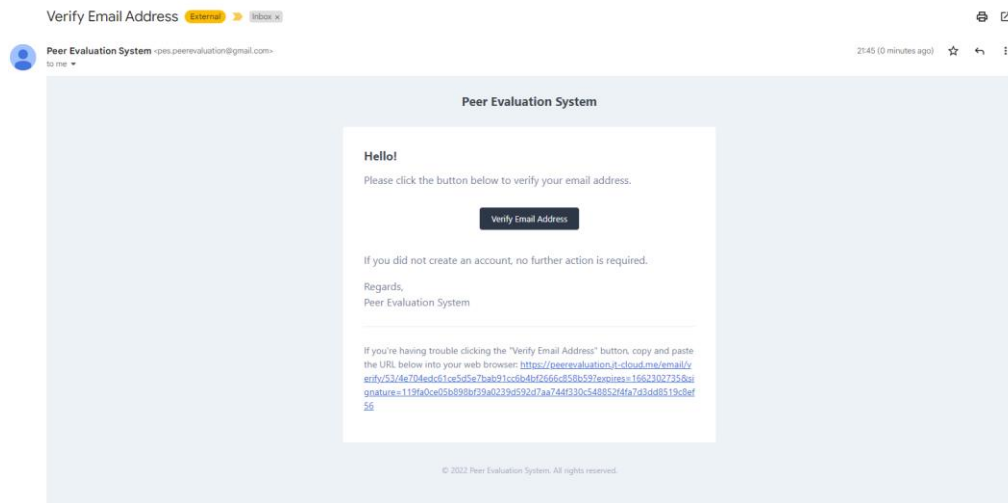
*Figure 5.3.1. 1 Login to the system*

2. If user does not have an account, he will be required to sign up for an account and fill up the details in the format shown as image below.



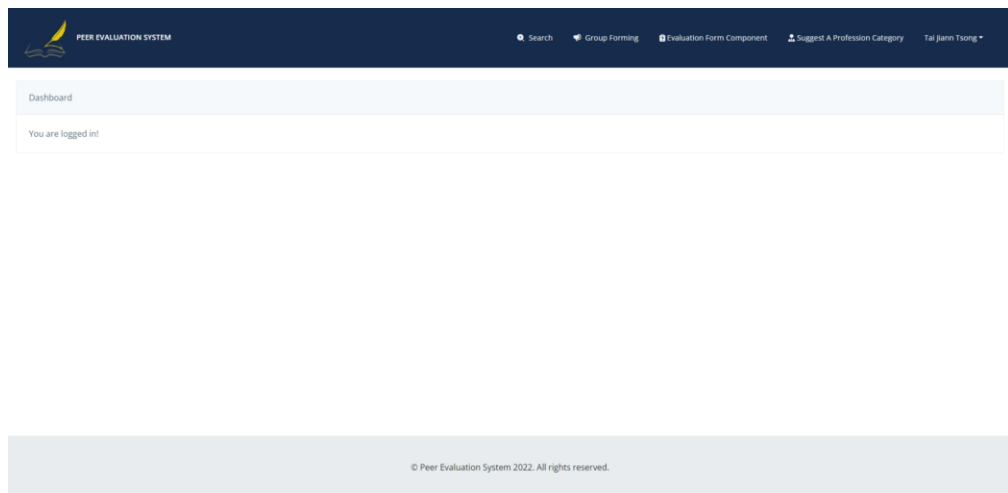
*Figure 5.3.1. 2 Register an account*

Once the register button was clicked the system will send an email to the registered email address for verification purpose. User are required to verify the email before they could proceed to the next step.



*Figure 5.3.1. 3 Verify the email address*

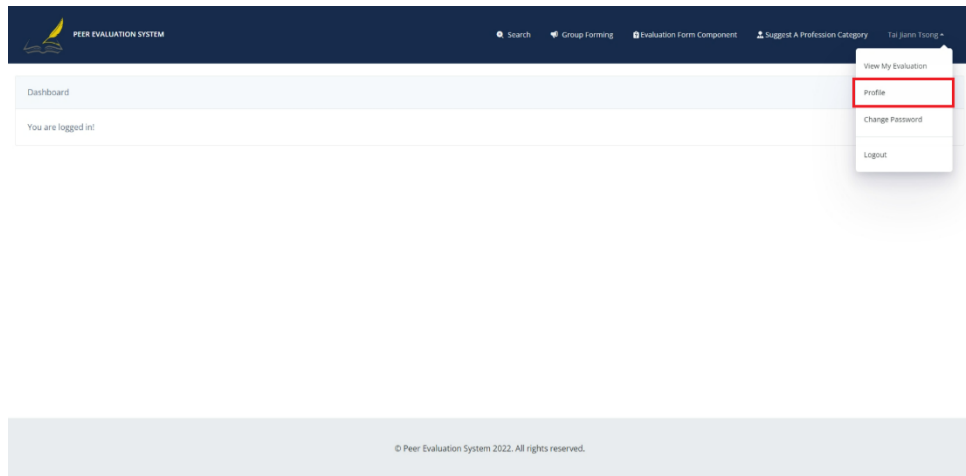
Once the verification is done user will be able to access the system.



*Figure 5.3.1. 4 Home Page*

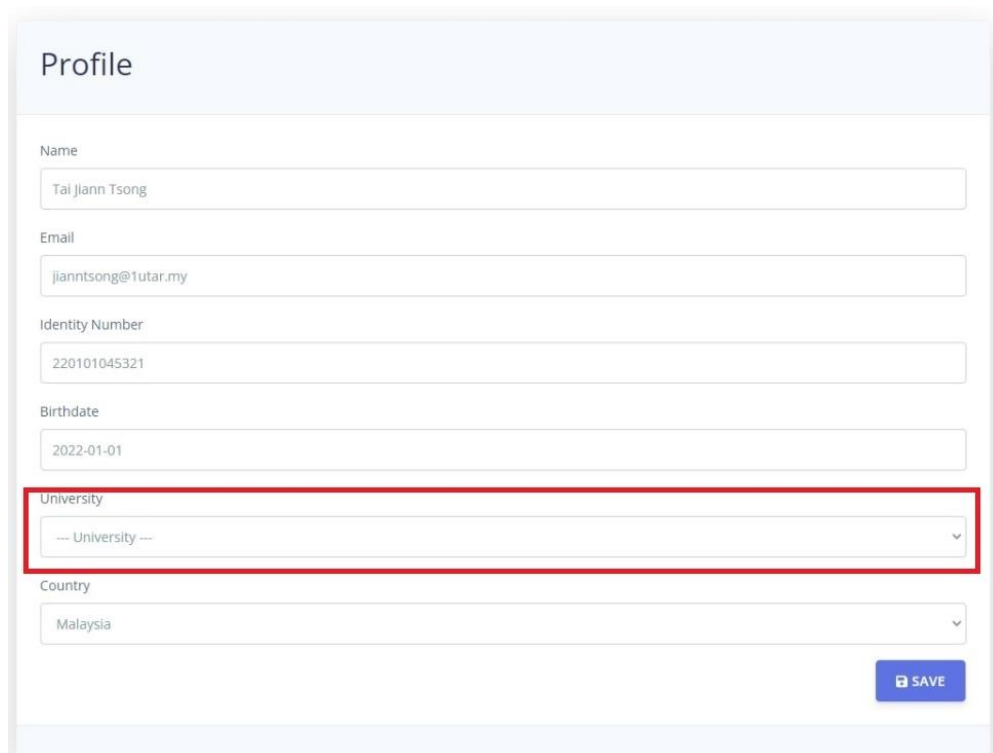
### 5.3.2 Setup Profile

1. Go to profile to set the profession and university.



*Figure 5.3.2. 1 Navigate to profile*

2. Set university in the profile and click save



*Figure 5.3.2. 2 Set university in profile*

3. Select a profession to add into the profile.

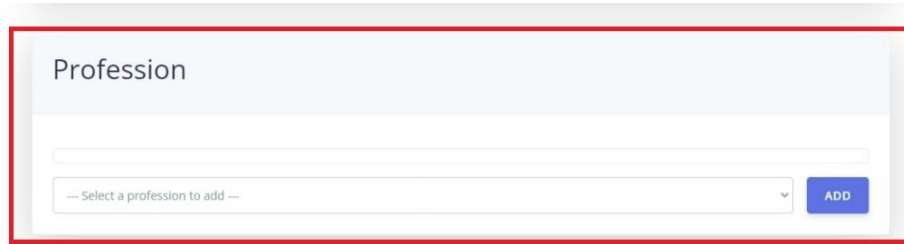


Figure 5.3.2. 3 Add a profession

### 5.3.3 Search A User in The System

1. Navigate to the search module to search a user for evaluation.

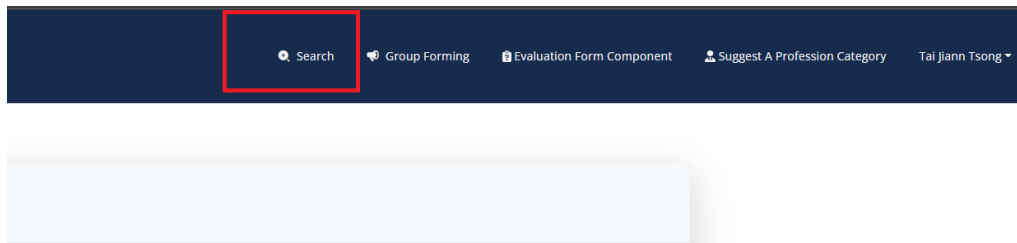


Figure 5.3.3. 1 Navigate to search module

2. In the search page, user will able to apply the search keyword such as name, email or identity number in the search box and or apply the sort option for rating score, university and country in step 1. The result will be shown in step 2 below the search.

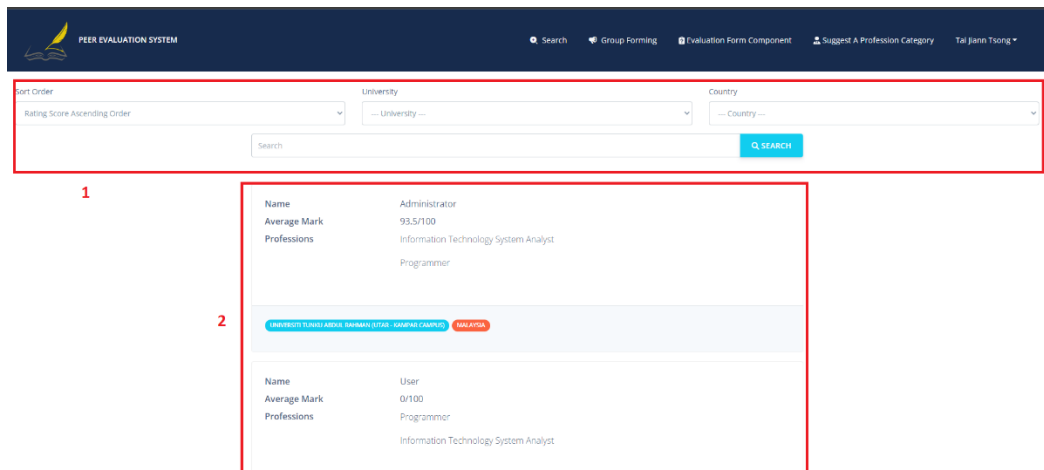


Figure 5.3.3. 2 Search User

3. User may click the search result to view the evaluation summary of a user.

### 5.3.4 Evaluation

The algorithm of the source code to calculate the total evaluation rating score in this module is shown as below. The code as below will find out all the evaluation record related to the user and get the evaluation rating score for each of the evaluation record and calculate the total average score and save it to the user's profile.

```
public function TotalAverageRatingScore(): float
{
    $total = 0.00;

    $cumulativeMark = 0.00;

    $count = 0;

    foreach($this->EvaluationRecord as $item)
    {
        $cumulativeMark += $item->ratingScore;
        $count++;
    }

    if($count > 0)
    {
        $total = ($cumulativeMark/$count);
    }

    $score = round($total, 2);

    $this->averageRatingScore = $score;

    $this->save();

    return $score;
}
```

While the rating score of the evaluation record will be calculated by the function inside the evaluation record model, and the code is shown as below. The function will get all the rating score for each of the component in the evaluation form component, and calculate the rating score based on 100% and get the average of the rating score and assign it to the evaluation record.

```
public function GetAverageScore(): float
{
    $total = 0.00;

    $count = 0;

    $totalCumulativeMark = 0.00;

    $EvaluationFormItemRecord = $this->EvaluationFormItemRecord;

    foreach($EvaluationFormItemRecord as $item)
```

```

        {
            $calculatedResult =
DB::table('evaluation_form_item_records')->select(DB::raw('((evaluation_form_item_records.ratingScore / rating_scales.maxScore)*100) AS avgScore'))
                ->join('evaluation_form_items',
'evaluation_form_items.id',
'evaluation_form_item_records.evaluation_form_item_id')
                ->join('rating_scales', 'rating_scales.id',
'evaluation_form_items.ratingScale')
                ->where('evaluation_form_item_records.id', $item->id)
                ->first();

            $totalCumulativeMark += $calculatedResult->avgScore;

            $count++;
        }

//dd($EvaluationFormItemRecord);

if($count > 0){
    $total = ($totalCumulativeMark/$count);
}

$this->ratingScore = round($total, 2);
$this->save();

return round($total, 2);
}

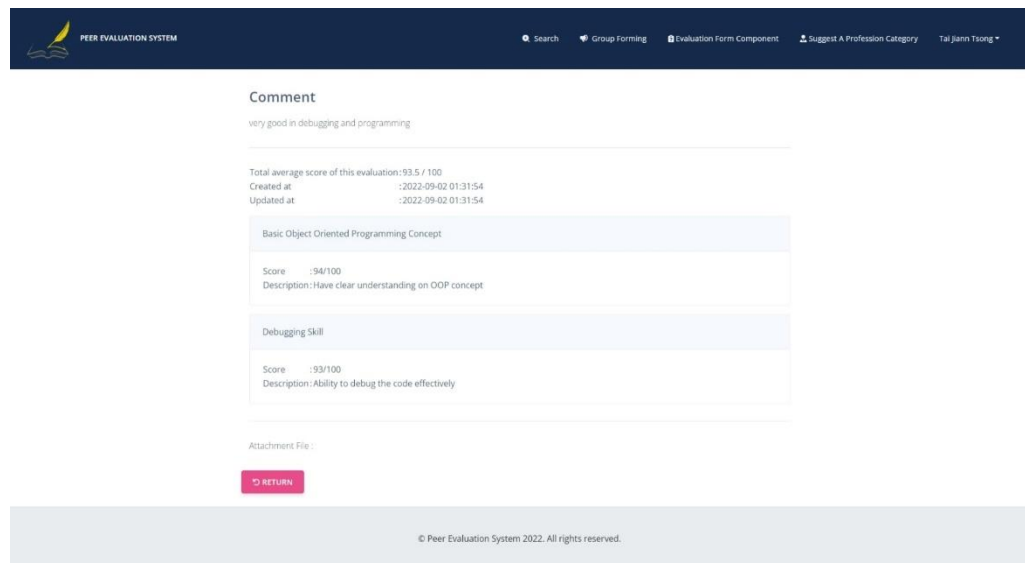
```

1. After the user clicked a result record from the search page, the system will show the target evaluation summary. The user may click on view detail of any of the evaluation record for the target too check the full rating information of the evaluation record.

The screenshot displays the 'PEER EVALUATION SYSTEM' header with navigation links: Search, Group Forming, Evaluation Form Component, Suggest A Profession Category, and Tai Jann Tsong. The main content area is titled 'Evaluation Summary of Administrator' and shows a 'Total Average Score : 93.5' with an 'ADD EVALUATION RECORD' button. Below this is a card containing 'Average Mark : 93.5', the comment 'very good in debugging and programming', and 'Created At : 2022-09-02 01:31:54' with a 'VIEW DETAIL' button. The footer contains the copyright notice: '© Peer Evaluation System 2022. All rights reserved.'

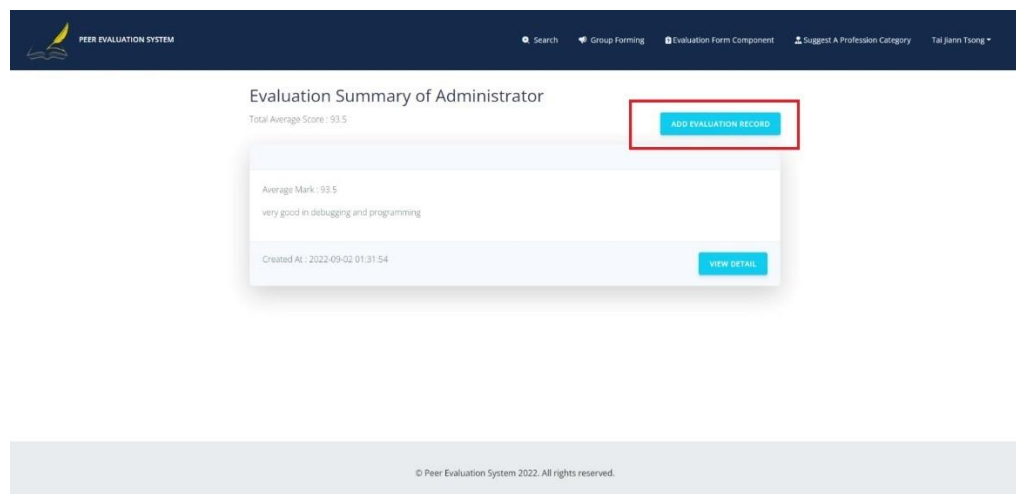
Figure 5.3.4. 1 Evaluation Summary

- Once the user clicked an evaluation record, the system will display the full detail of the evaluation record such as comment, each of the rating for each component in the evaluation form.

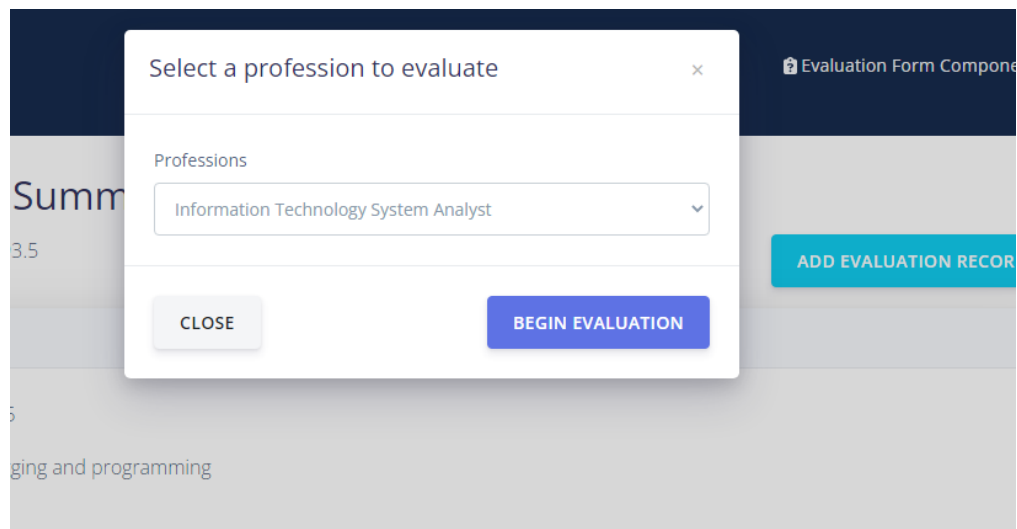


*Figure 5.3.4. 2 Evaluation Record Detail*

- In the evaluation summary page, if user would like to evaluate the target, user may able to click on the add evaluation record button to start evaluate the target and select a profession when the system prompt for which profession's evaluation form.

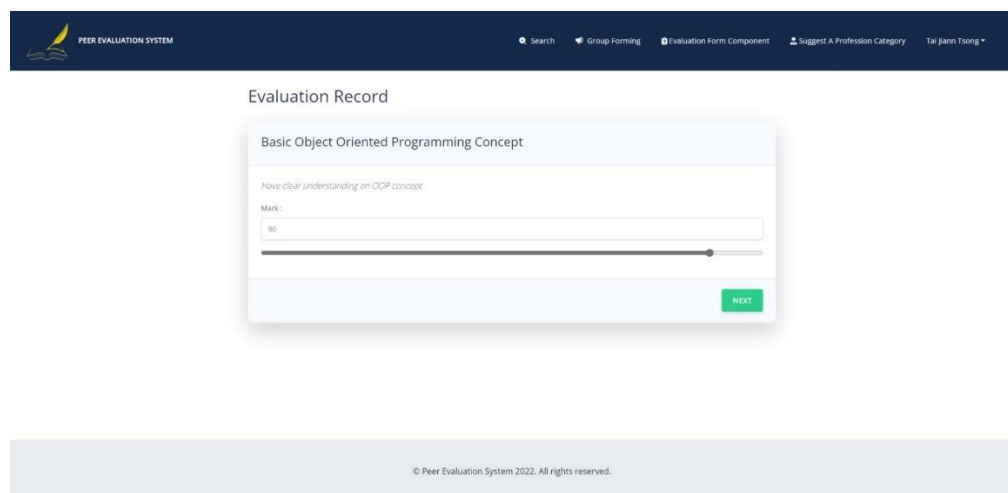


*Figure 5.3.4. 3 Start an Evaluation*



*Figure 5.3.4. 4 Select A Profession's Evaluation Form*

4. In the evaluation process, the user will be able to rate each of the evaluation form component as shown in the figure below.



*Figure 5.3.4. 5 Rate Evaluation Form Component*

5. After user have given the rate for all form component, the user will proceed to give a comment for the evaluation, and optional to upload the file that contain the evidence to support his/her comment and evaluation. Once the user has finished to fill in the comment and selected file to upload, he or she may click submit to complete the evaluation.

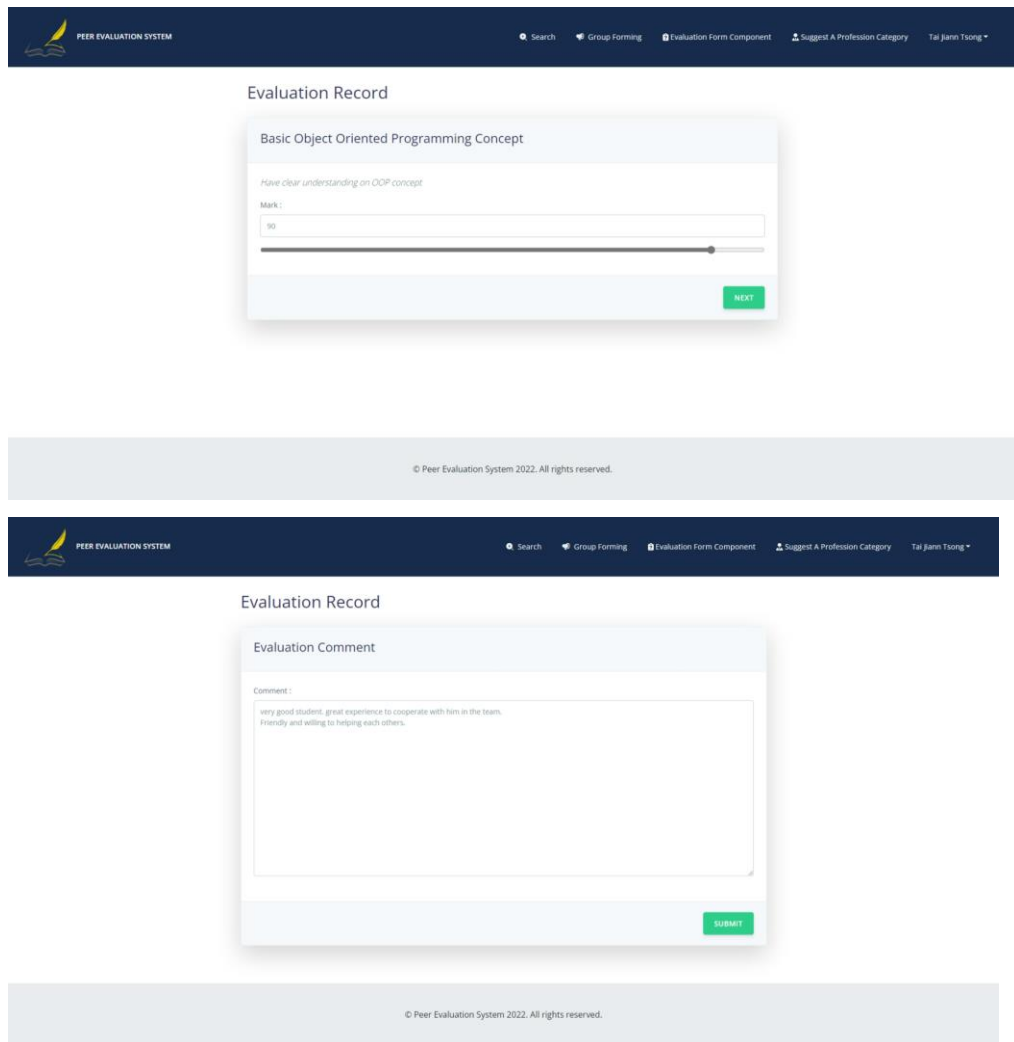


*Figure 5.3.4. 6 Submit an Evaluation*

6. After the user submitted the evaluation, the system will display the submitted evaluation record.

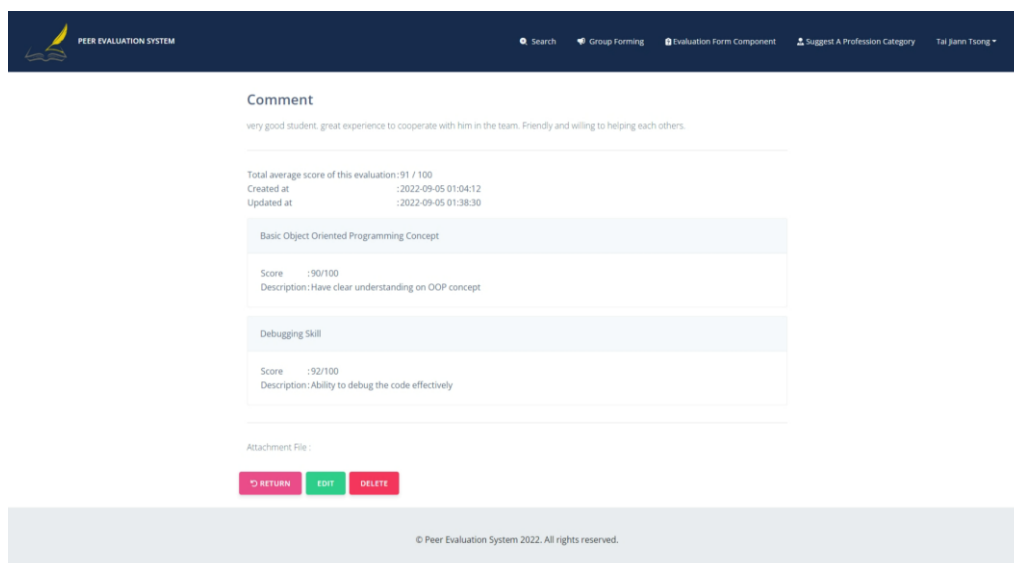
*Figure 5.3.4. 7 Submitted Evaluation Record*

7. The user may click edit button in the evaluation record detail page if the user would like to make changes to the submitted evaluation record and the system will redirect the user to the edit page for evaluation record. The user will same as the process to create the evaluation record as before but all the existing field was field with data, and user may modify it.



*Figure 5.3.4. 8 Edit Evaluation Record.*

8. The updated evaluation record will be shown after submit.



*Figure 5.3.4. 9 Updated Evaluation Record*

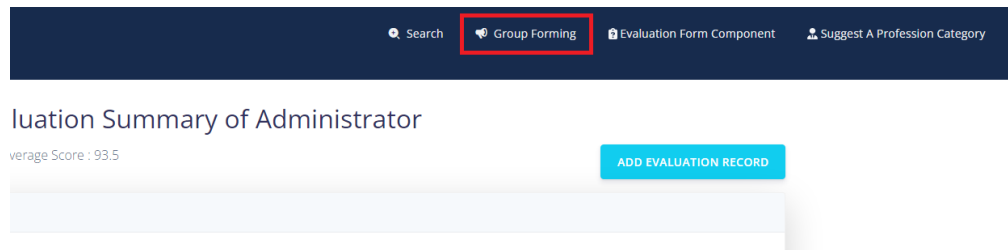
## CHAPTER 5

9. To delete the evaluation, record the user may click on the delete button to delete the evaluation record and the deleted evaluation record will be disappeared from the evaluation summary page.

### 5.3.5 Group Forming

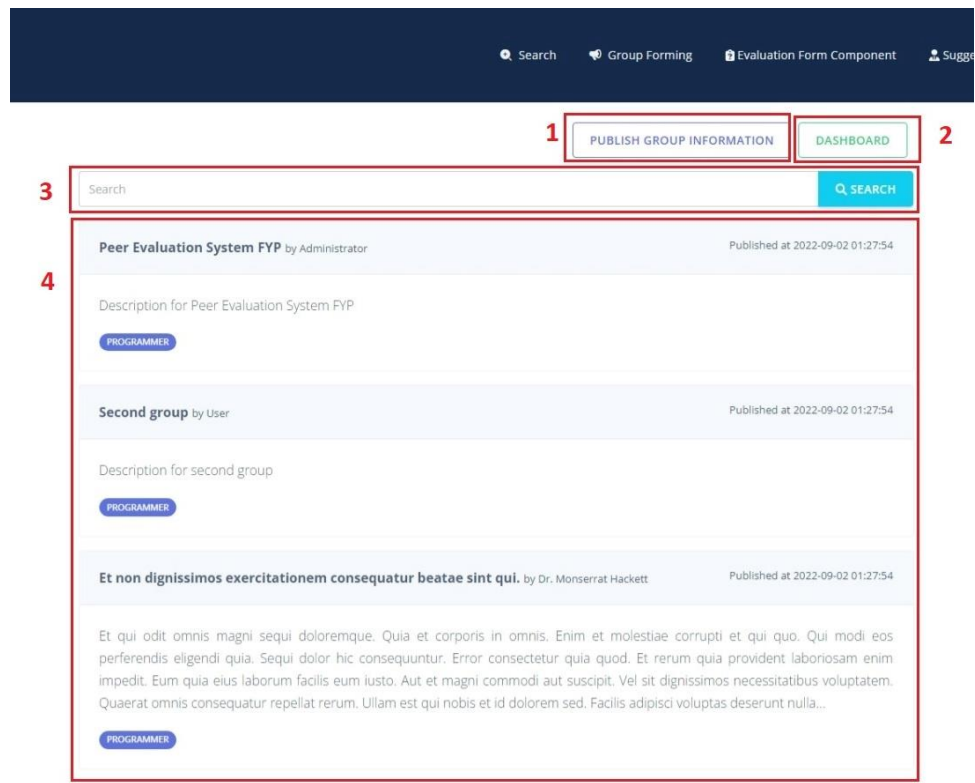
To find group member for his or her assignment group or research team, the user may publish a group forming information on this module. The user may accept the person who make a request on the posted group forming information and the others user who fulfil the minimum rating score requirement may send a request to join.

1. Click group forming from the navigation bar.



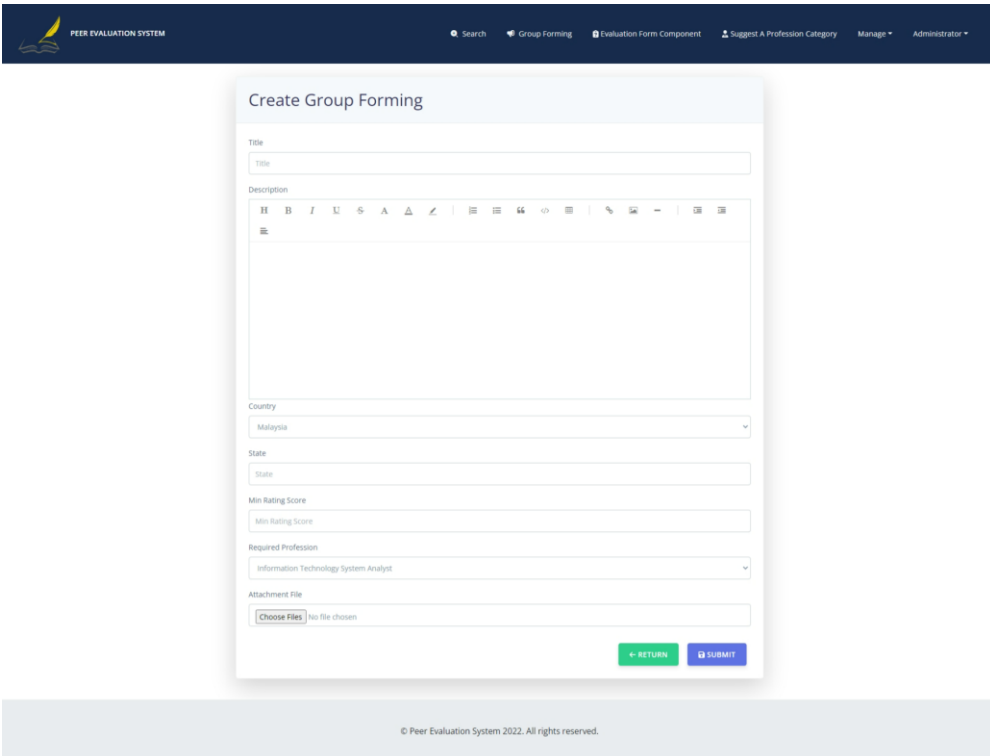
*Figure 5.3.5. 1 Navigate to Group Forming*

2. The group forming page shown as figure below. The box 1 show the button linked to the publish new group information, box 2 was the dashboard to manage the join request of group, box 3 show the search box for user to search for a posted group forming information, and box 4 is the result or list of posted group information.



*Figure 5.3.5. 2 Group Forming Index Page*

- To publish a group forming information, click the publish group information button as shown in the Figure 65 and user will be redirect to the page to create and publish the group forming information as shows in figure at below.



The screenshot displays a web application interface for creating a group. At the top, a dark blue navigation bar contains the logo and name 'PEER EVALUATION SYSTEM' on the left, and a search bar and several menu items ('Group Forming', 'Evaluation Form Component', 'Suggest A Profession Category', 'Manage', 'Administrator') on the right. The main content area is a white form titled 'Create Group Forming'. The form includes a 'Title' text input field, a 'Description' rich text editor with a toolbar, a 'Country' dropdown menu (set to 'Malaysia'), a 'State' text input field, a 'Min Rating Score' text input field, a 'Required Profession' dropdown menu (set to 'Information Technology System Analyst'), and an 'Attachment File' section with a 'Choose Files' button and the text 'No file chosen'. At the bottom right of the form are two buttons: a green '+ RETURN' button and a blue 'SUBMIT' button. Below the form, a light gray footer bar contains the copyright notice: '© Peer Evaluation System 2022. All rights reserved.'

*Figure 5.3.5. 3 Create & Publish Group Forming*

- The user may fill in all the detail of the group and the attachment of file is an optional option for the user. He will be required to provide the title, description, country, state, minimum rating score to join the group, required profession and click submit button the submit the content to the server. After the submission he will get redirected to the group forming details page that contain all the information he submitted just now.

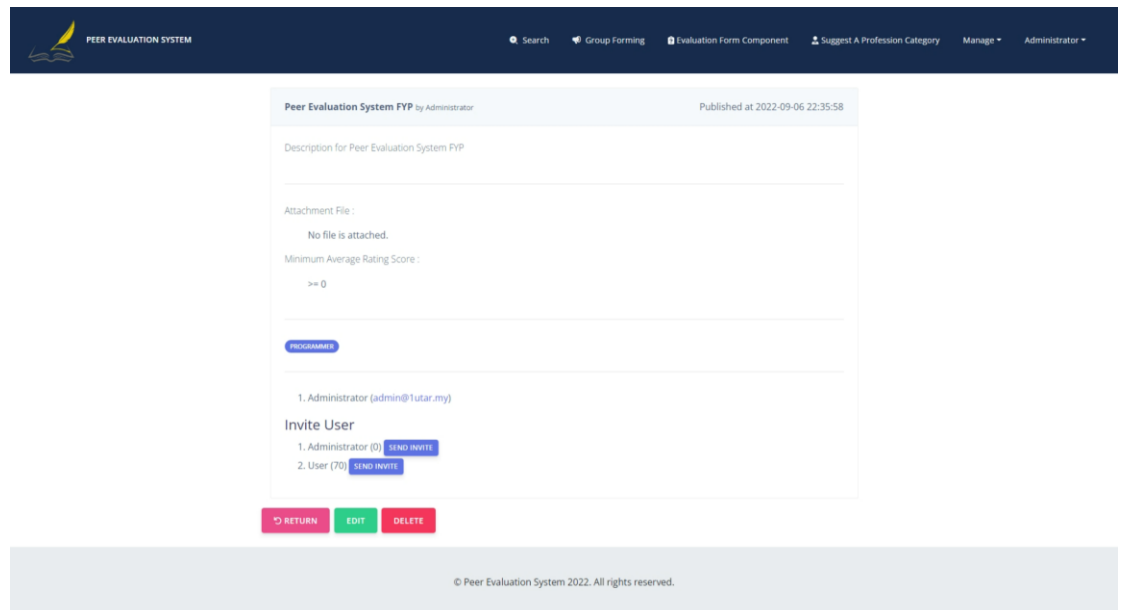


Figure 5.3.5. 4 Posted Group Forming Details

5. To edit the posted group forming information, the user may click the edit button at the details page to enter the edit page and make modification.

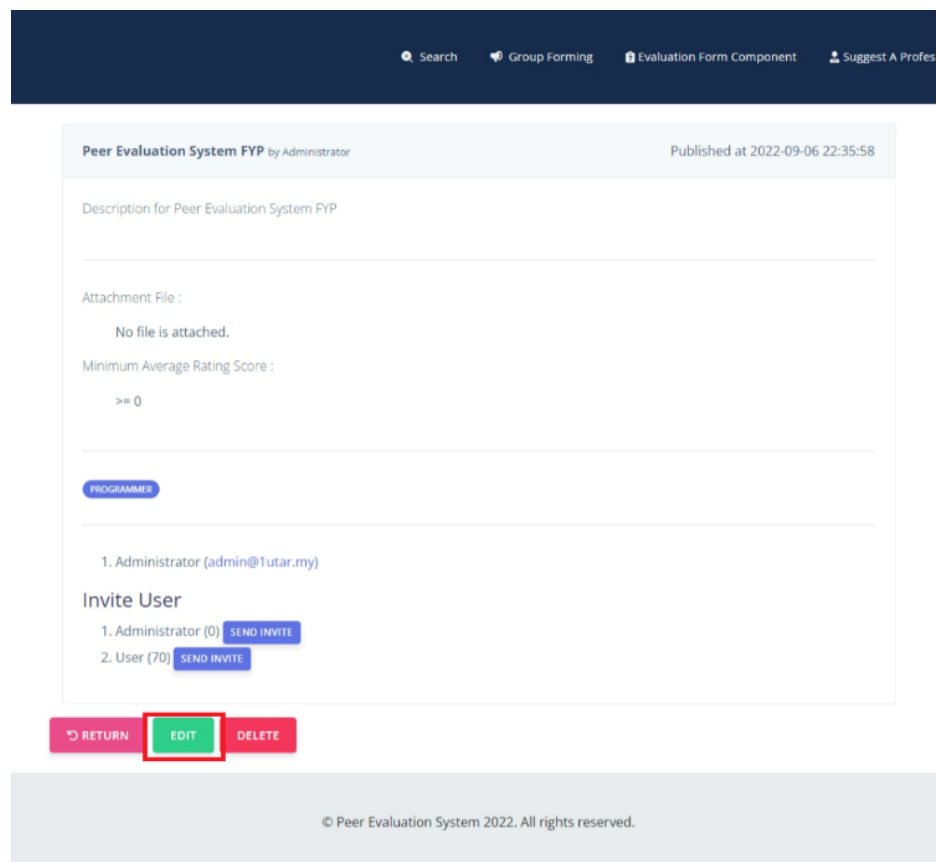


Figure 5.3.5. 5 Edit Button at Posted Group Forming Detail

- Once user enter the edit page, he may make changes to the content as shown in the step 1 in figure below, and click the submit button in step 2 to save the changes and return back to the detail page.

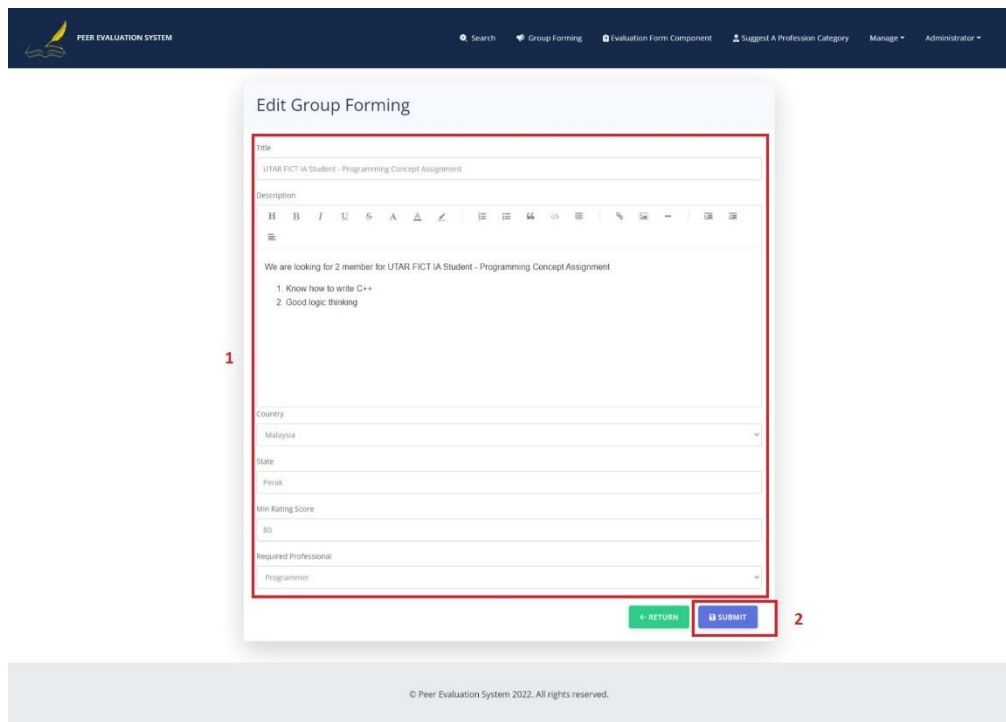


Figure 5.3.5. 6 Edit Group Forming Information

- Click the delete button shows in figure below to delete the posted group forming information.

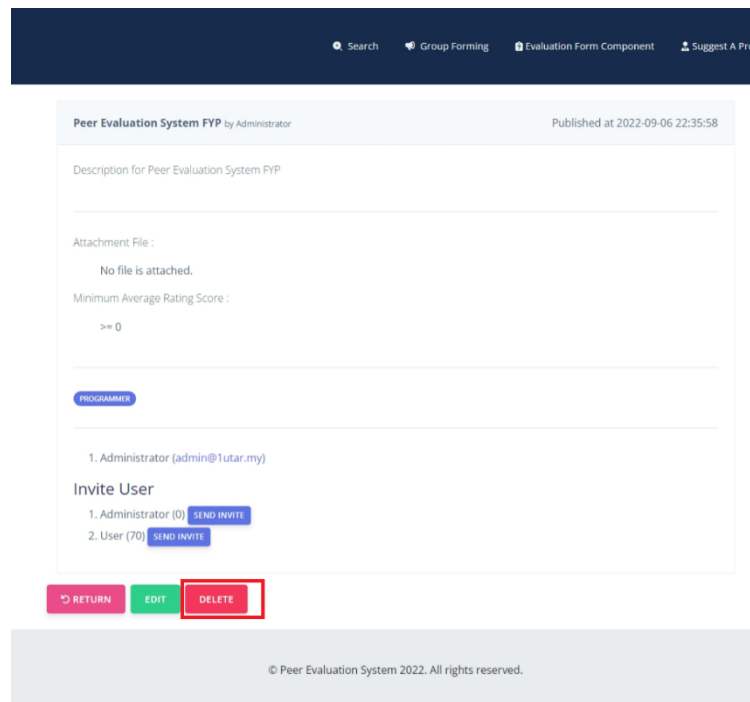
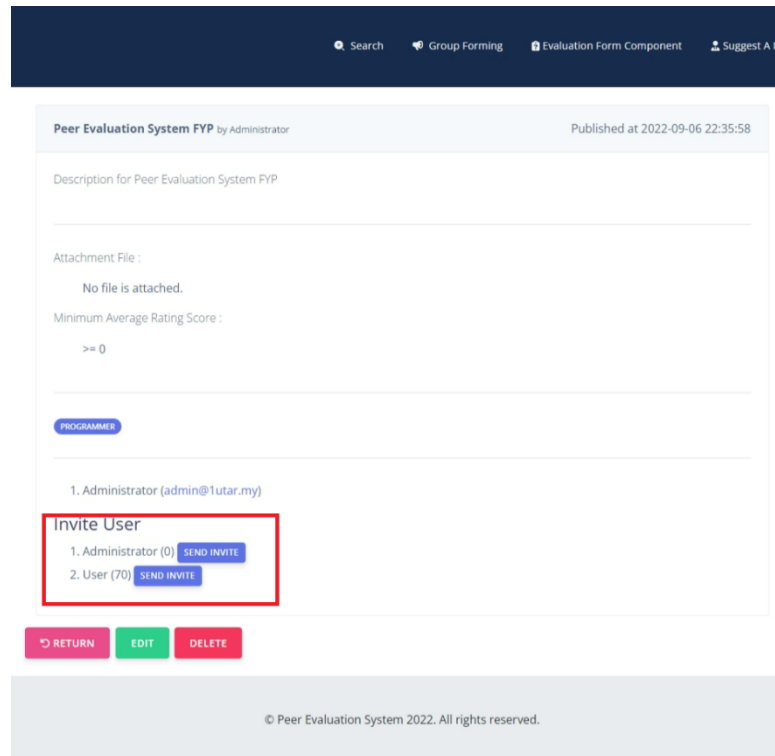


Figure 5.3.5. 7 Delete Group Forming Information

8. Invite a user to join his group, the user may click on send invite button in the red box highlight as shown in figure below to send an invitation to the user's email.



*Figure 5.3.5. 8 Send Group Forming Invitation*

9. To join a group, the user will be required to have the minimum rating score specified in the posted group forming details, and click request to join button to send the request and wait for the author to accept.



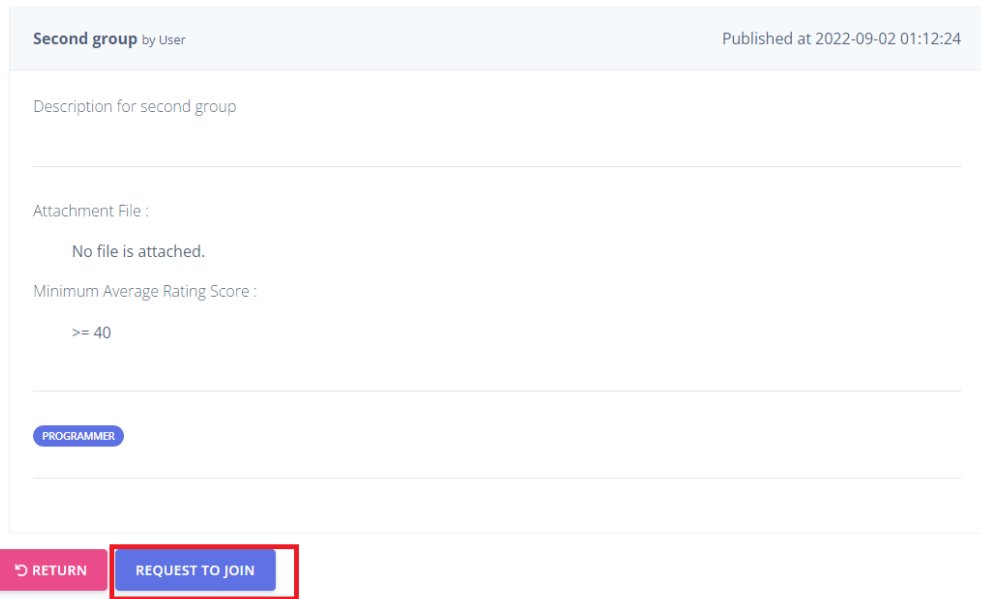


Figure 5.3.5. 9 Request to Join Group

10. If the user does not have the enough rating score specified, he will get the message said that he does not have enough rating score to join the group.
11. As a author of posted group forming information, he can accept the user request from the dashboard, visit the dashboard by clicking the dashboard button in main page of group forming module shown at the figure below.

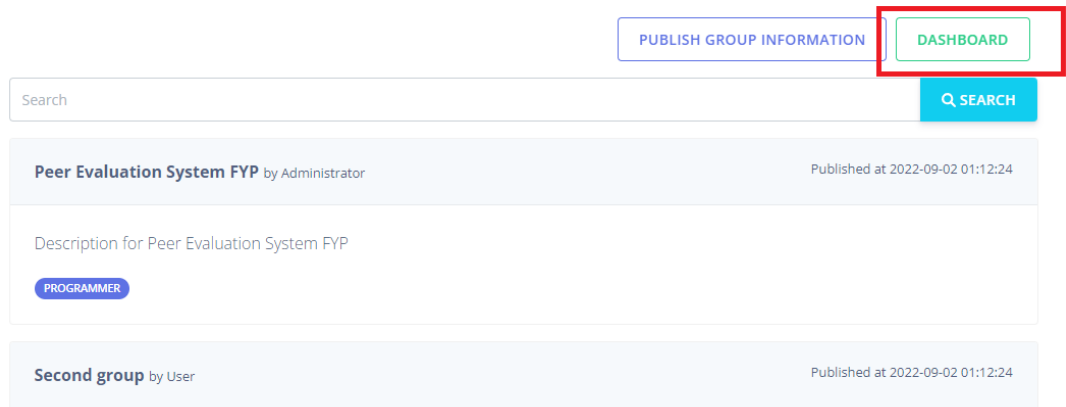


Figure 5.3.5. 10 Navigate to Group Forming Dashboard

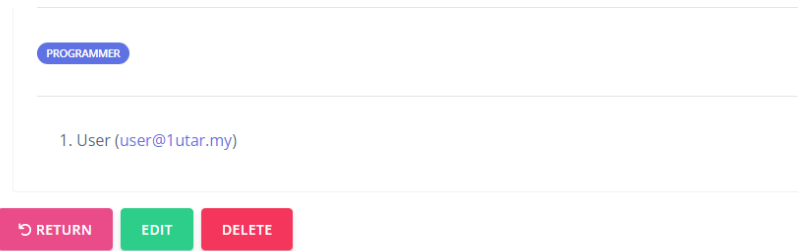
12. In the dashboard of group forming, the user may click accept or reject the request to join to the group forming he published.

Group Forming Request

User	Requested Group	Request On	Approval Status	Professions	Action
User	Peer Evaluation System FYP	2022-09-02 01:12:24	New	1. Programmer	<div style="display: flex; gap: 5px;"> <span style="border: 1px solid red; padding: 2px;">Accept</span> <span style="border: 1px solid red; padding: 2px;">Reject</span> <span style="border: 1px solid red; padding: 2px;">More</span> </div>

Figure 5.3.5. 11 Group Forming Dashboard

13. After the author has been accepted the request, the accepted member will be shown in the detail page of the group forming.

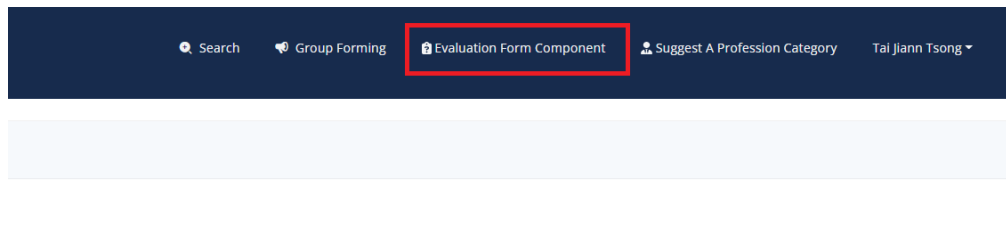


*Figure 5.3.5. 12 Group Member at Group Forming Detail Page*

### 5.3.6 Evaluation Form Component Suggestion

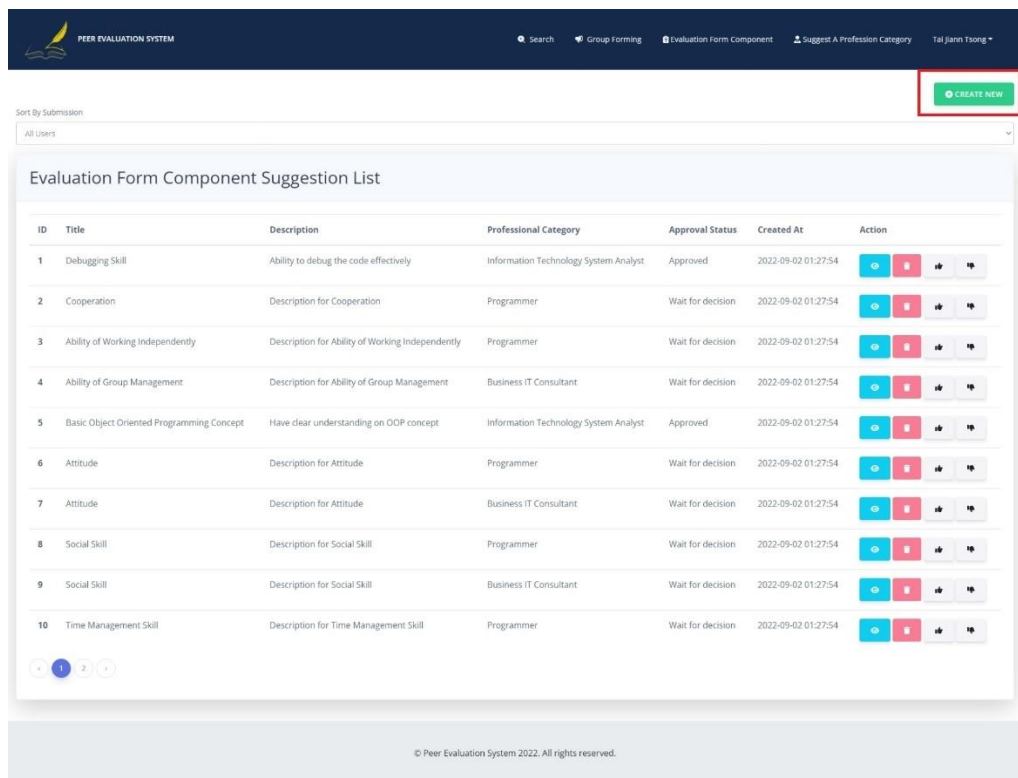
When the user thinks that the evaluation component in the evaluation form is not enough and would like to proposed a new evaluation item, he may navigate to the evaluation form component suggestion module.

1. Click “Evaluation Form Component” from the navigation bar to enter the evaluation form component suggestion page.



*Figure 5.3.6. 1 Navigate to Evaluation Form Component*

2. On the evaluation form component suggestion page click create new button to proposed a new evaluation form component.



*Figure 5.3.6. 2 Evaluation Form Component Suggestion Page*

3. In the suggest new evaluation form component page, the user may fill in the content such as title, description, rating scale and what profession’s evaluation form would like to propose. In the profession category of the suggestion form,

the user will only able to select the profession related to himself as shown in the red box in Figure below.

The screenshot shows a web interface for suggesting new evaluation form components. The header includes the logo for 'PEER EVALUATION SYSTEM' and navigation links for Search, Group Forming, Evaluation Form Component, Suggest A Profession Category, Manage, and Administrator. The main form is titled 'Suggest New Evaluation Form Component' and contains the following fields:

- Title:** A text input field containing 'Communication Skill'.
- Description:** A text area containing 'Have a good communication skill to communicate with client effectively.'
- Rating Scale:** A dropdown menu set to '10 Mark Rating'.
- Profession Category:** A dropdown menu with 'Information Technology System Analyst' selected. This field is highlighted with a red rectangular box.

At the bottom right of the form are two buttons: a green 'RETURN' button and a blue 'SUBMIT' button. The footer of the page contains the copyright notice: '© Peer Evaluation System 2022. All rights reserved.'

*Figure 5.3.6. 3 Suggest New Evaluation Form Component*

4. After the user submitted it, he will be redirected to the detail page of the submitted suggestion and he may click edit button to edit the content.

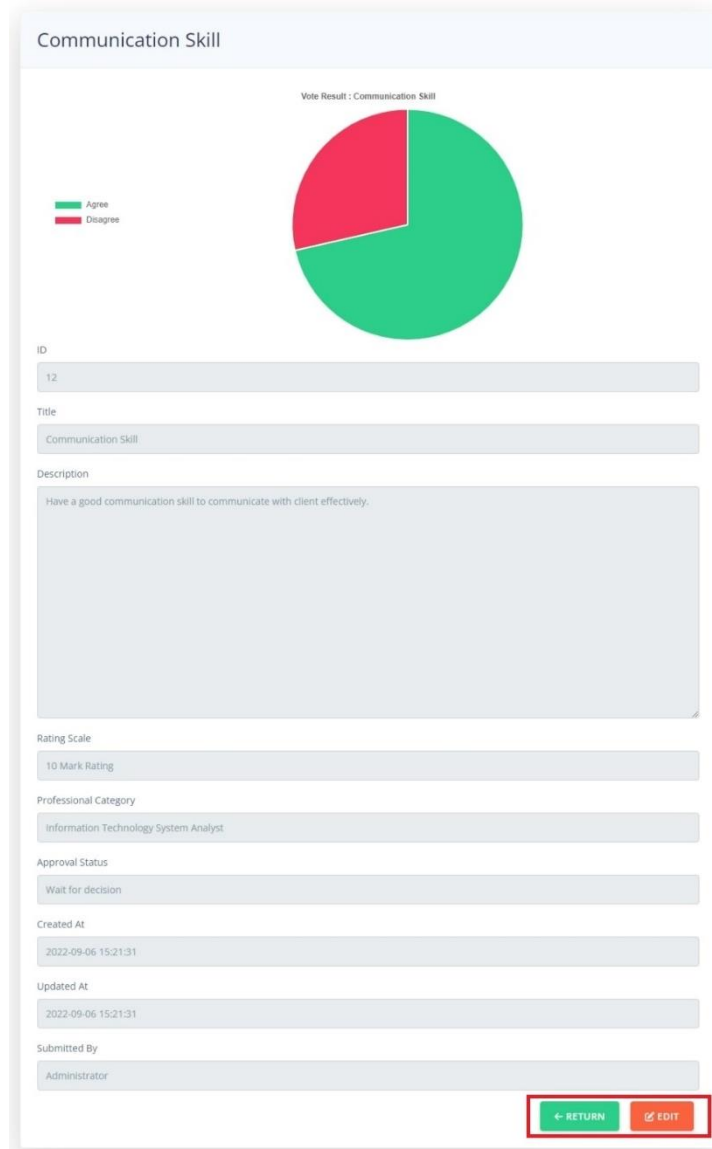


Figure 5.3.6. 4 Suggested Evaluation Form Component Details

5. In the edit page, the user may edit the content and click save to take effect for the changes.

PEER EVALUATION SYSTEM

Search Group Forming Evaluation Form Component Suggest A Profession Category Manage Administrator

### Communication Skill

ID: 12

Title: Communication Skill

Description: Have a good communication skill to communicate with client effectively.

Rating Scale: 10 Mark Rating

Professional Category: Information Technology System Analyst

RETURN SAVE

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*Figure 5.3.6. 5 Edit Suggested Evaluation Form Component*

- Return back to the main page of suggest evaluation form component page, the user may click the delete button in the list and delete the suggested item, user able only able to delete the item suggested by himself.

Sort by Submission

All Users

























CREATE NEW

### Evaluation Form Component Suggestion List

ID	Title	Description	Professional Category	Approval Status	Created At	Action
12	Communication Skill	Have a good communication skill to communicate wit...	Information Technology System Analyst	Wait for decision	2022-09-06 15:21:31	Upvote Downvote Delete
1	Debugging Skill	Ability to debug the code effectively	Information Technology System Analyst	Approved	2022-09-02 01:12:24	Upvote Downvote Delete
2	Cooperation	Description for Cooperation	Programmer	Wait for decision	2022-09-02 01:12:24	Upvote Downvote Delete
3	Ability of Working Independently	Description for Ability of Working Independently	Programmer	Wait for decision	2022-09-02 01:12:24	Upvote Downvote Delete
4	Ability of Group Management	Description for Ability of Group Management	Business IT Consultant	Wait for decision	2022-09-02 01:12:24	Upvote Downvote Delete

*Figure 5.3.6. 6 Delete Suggested Evaluation Form Component*

- Besides that, user may also click upvote or downvote an item in the suggested evaluation form component list, upvote and downvote will reflected to the statistic in the detail page of the suggested evaluation form component detail page. If there is majority to agree on the adding of the suggestion, the administrator will add it to the related evaluation form.

Evaluation Form Component Suggestion List						
ID	Title	Description	Professional Category	Approval Status	Created At	Action
12	Communication Skill	Have a good communication skill to communicate wit...	Information Technology System Analyst	Wait for decision	2022-09-06 15:21:31	   
1	Debugging Skill	Ability to debug the code effectively	Information Technology System Analyst	Approved	2022-09-02 01:12:24	   
2	Cooperation	Description for Cooperation	Programmer	Wait for decision	2022-09-02 01:12:24	   
3	Ability of Working Independently	Description for Ability of Working Independently	Programmer	Wait for decision	2022-09-02 01:12:24	   
4	Ability of Group Management	Description for Ability of Group Management	Business IT Consultant	Wait for decision	2022-09-02 01:12:24	   
5	Basic Object Oriented Programming Concept	Have clear understanding on OOP concept	Information Technology System Analyst	Approved	2022-09-02 01:12:24	   

*Figure 5.3.6. 7 Vote A Suggested Evaluation Form Component*

### 5.3.7 Administrator Management

1. The admin may approve a suggested evaluation form component from the evaluation form component suggestion management dashboard as show in figure at below. To visit the management dashboard for evaluation form component the admin may click evaluation form component suggestion from the drop-down list named “manage”. The red box highlighted in the horizontal will allow admin to filter the list item according to the approval status, while the vertical red box highlighted show the approve and reject button for the suggested evaluation form component.

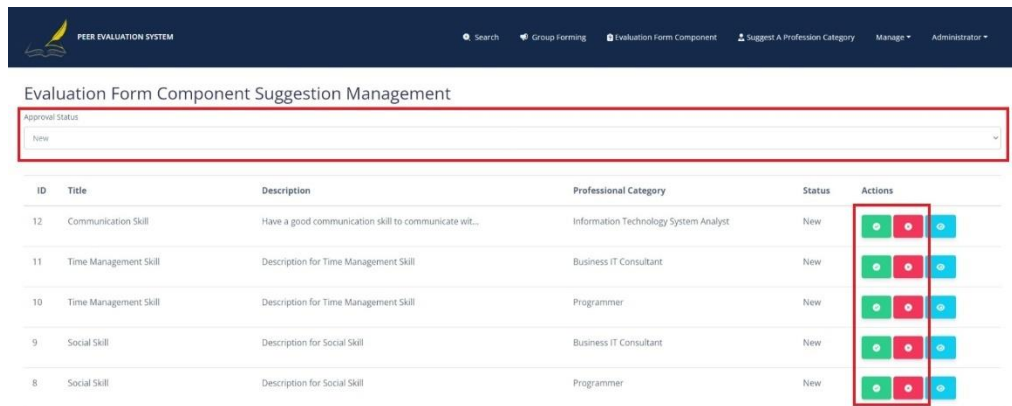


Figure 5.3.7. 1 Evaluation Form Component Suggestion Management

2. To approve a suggested profession category from the user the admin may visit the management dashboard for profession category suggestion from the drop-down list named “manage”. In the profession category suggest management dashboard, the admin may sort the list with approval status in red box step 1 and click approve or reject button in the step 2 from the figure at below.

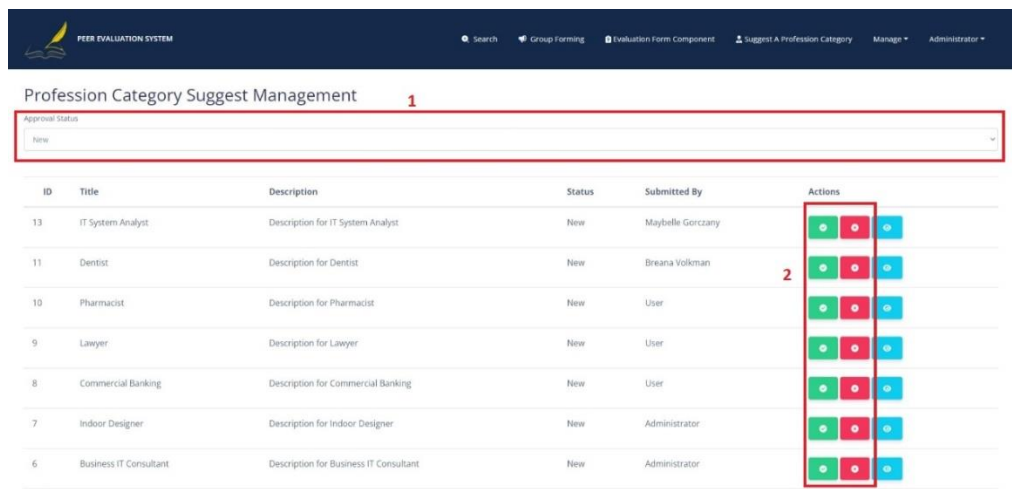
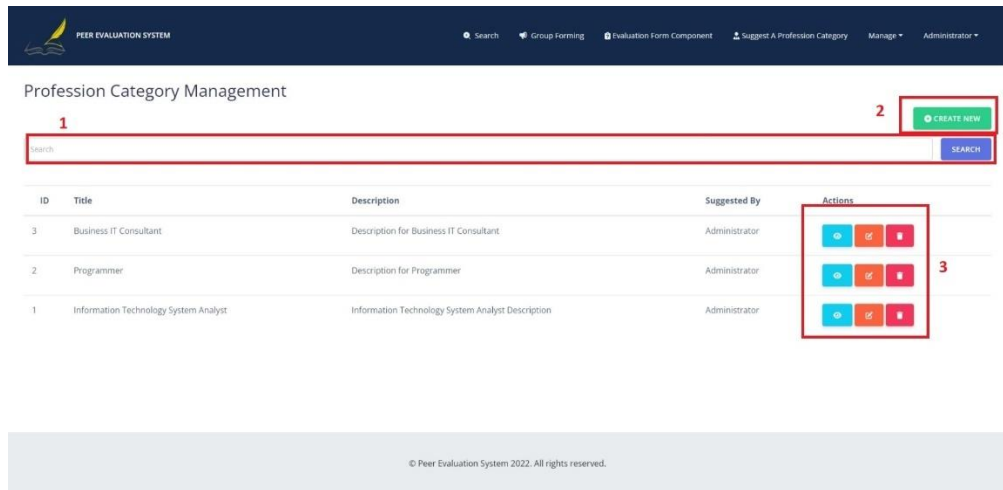


Figure 5.3.7. 2 Profession Category Suggest Management



## CHAPTER 5

- To manage the existing profession category, the admin can click the profession category management from the drop-down list named “manage” from the navigation bar.
- In the profession category management dashboard, the admin may input a keyword to search the profession category in step 1, click create new button to add new profession category in step 2, delete, edit and view an profession in the step 3 box.



*Figure 5.3.7. 3 Profession Category Management*

- If the user click create new button in the main page, he will get a page with title and description box to ask for the details. The admin will need to fill in the details can click save to add the profession.

Create New Profession Category

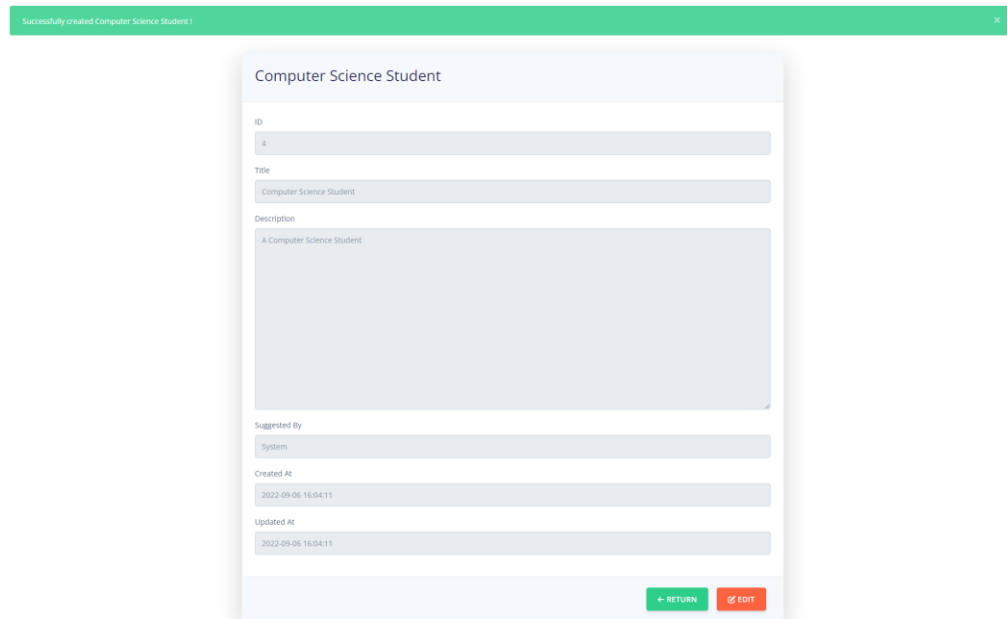
Title

Description

RETURN SAVE

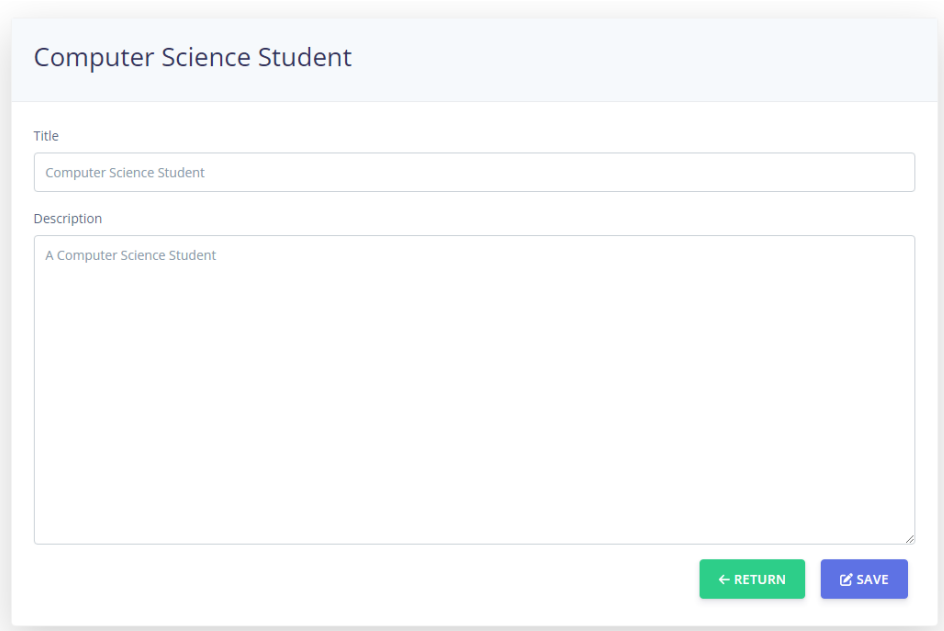
*Figure 5.3.7. 4 Create New Profession Category*

6. After created the system will show the created profession as shown in figure at below.



*Figure 5.3.7. 5 Detail Page of Profession*

7. The admin may further edit the profession by clicking edit button, and system will bring he to the edit page.



*Figure 5.3.7. 6 Edit Page of Profession*

## **5.4 Implementation Issues and Challenges**

The main challenge was facing in this project was selecting the right technology stack, it is because those technologies were new to someone, a new technology always brings challenges when the developer first tries to learn and practice. Besides learning and practising the new technology planned in this project, there will be challenging to keep the code structure and code in optimal performance, failing to do so will result in a bad performance system. Secondly, the evolution of the peer evaluation system was still in a very early stage and not many advanced features could be found in the existing system, so developing the peer evaluation system to have full features and functionalities that are innovative could be a challenge if there are not many sources that could be compared or references. Next, the new software for the development process such as the Laravel framework was a challenge to develop as the Laravel framework was getting updated from time to time, newer versions of Laravel might have a different library get replaced with another library. Each version of functions and library available might be different and it brings errors or failures while debugging the application developed.

## **5.5 Concluding Remark**

The foundation to get the project running was using the nginx, php server, and mysql setup and running on the cloud VPS server. The users will need to create an account and setup their profile to utilize the full function of the system. The users able to search their peers in the system to check their peers' evaluation summary and give their peer an evaluation. Besides that, the users are able to publish the group forming information to finding new member and set the entry requirement such as minimum rating score of evaluation. The administrator will able to manage the suggested evaluation form component, suggested profession category to approve or reject, and manage the profession category in the system.

## Chapter 6

# System Evaluation and Discussion

### 6.1 System Testing and Performance Metrics

The testing plan to be carry out for this project will be black box testing. The test will be applied to all the module developed in this project. Each of the module will be designed with suitable test case scenario to test the function. Each of the test case will test the functionality and the requirement to pass the testing should be at least the function with workable and does not output any errors on the result.

Test cases designed in the test plan for the black box testing will contain the testing of correct value only produce the result else the system should warn the user about the improper input value. The test also contains the situation of only authorized user able to access and perform the action, else the test case should fail. The result generated by the system should be immediately responses after the user submitted an action.

Besides that, the tool of using clockwork to observe the N+1 issues of SQL query should be observed by the developer to ensure there is no N+1 issues of SQL query for the Eloquent lazy loading that will affect the performance of the system.

## 6.2 Testing Setup and Result

### 6.2.1 Testing Setup

Table 6.2.1. 1 Evaluation Form Component Suggestion Module

No.	Summary	Pre-requisite	Test Case	Expected Result	Result
1	Create new evaluation form component suggestion.	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. Access suggest new evaluation form component page.</li> <li>2. Input title and description.</li> <li>3. Select appropriate rating scale and professional category.</li> <li>4. Click submit button to suggest new evaluation form component.</li> </ol>	<ol style="list-style-type: none"> <li>1. Able to visit suggest new evaluation form component page.</li> <li>2. Able to input title, description, select a rating scale, and professional category.</li> <li>3. Able to click submit button and redirect to the details page of the created item.</li> </ol>	
2	View details of new evaluation form component suggestion	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. Click view button from list at suggest new evaluation form component page.</li> <li>2. Get redirected to details page.</li> </ol>	<ol style="list-style-type: none"> <li>1. Able to click view button to view new evaluation form component suggestion.</li> <li>2. Get redirected to details page.</li> <li>3. Able to display the details of new evaluation form component suggestion.</li> </ol>	

3	Edit the new evaluation form component suggestion.	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. Is the owner who created it.</li> </ol>	<ol style="list-style-type: none"> <li>1. On details page click the edit button.</li> <li>2. Redirected to edit page.</li> <li>3. Modify the details.</li> <li>4. Click save button to make changes or return to return.</li> <li>5. The item makes changes if submit is clicked or nothing if return is clicked and redirect back to details page.</li> </ol>	<ol style="list-style-type: none"> <li>1. Able to click edit button on detail page.</li> <li>2. Redirected to edit page.</li> <li>3. Able to modify the content.</li> <li>4. Able to click save button to save the changes or return button to do nothing and redirected back to detail page.</li> </ol>	
4	Delete a new evaluation form component suggestion record.	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. Is the owner who created it.</li> </ol>	<ol style="list-style-type: none"> <li>1. On list page of new evaluation item suggestion click delete button.</li> <li>2. The page reload and show message indicate it is deleted.</li> </ol>	<ol style="list-style-type: none"> <li>1. The users click the delete button.</li> <li>2. The system redirected back to list page.</li> <li>3. The item selected just now is deleted.</li> <li>4. System show a message said the item is deleted.</li> </ol>	
5	List all new evaluation form component suggestion	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> </ol>	<ol style="list-style-type: none"> <li>1. On list page, optional to select sort by submission.</li> <li>2. If sort condition is selected the result filtered with the sort option else list the items as usual.</li> </ol>	<ol style="list-style-type: none"> <li>1. Able to access list page of new evaluation form component suggestion.</li> <li>2. The system should list all the items.</li> <li>3. Optional to sort the list item with submitted by user himself or all users.</li> <li>4. If sort condition available, and is my record only, it</li> </ol>	

				should list only item created by the user himself, else list all.	
6	Vote a new evaluation form component suggestion	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. On list page, choose one of the items and click thumb up button to up vote or click thumbs down to down vote.</li> <li>2. The vote is reflected with clicked down vote or up vote button is highlighted.</li> </ol>	<ol style="list-style-type: none"> <li>1. On list page of new evaluation form component suggestion, choose one items and able to click up vote or down vote button.</li> <li>2. The page refreshed, and shown the clicked button is highlighted.</li> <li>3. The data in the item's vote count in behind should be reflected and can check on detail page.</li> </ol>	



Table 6.2.1. 2 Search Module

No.	Summary	Pre-requisite	Test Case	Expected Result	Result
1	Search with name or email, or identity number	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. Input name or, email, or identity number of a person to the text field.</li> <li>2. Click search button or hit enter.</li> <li>3. Apply the sort condition as needed such as sort by country, rating score, or universities.</li> <li>4. System print result on the page according to the most closed to the keywords input by user.</li> </ol>	<ol style="list-style-type: none"> <li>1. User able to input keyword such as name, email, identity number to search.</li> <li>2. User is optional to apply sort condition such as country, university, score ranking order.</li> <li>3. The system list the result according to the most closed to the keyword and if the score ranking is applied the list will sort in order with average rating score.</li> </ol>	

Table 6.2.1. 3 Group Forming Module

No.	Summary	Pre-requisite	Test Case	Expected Result	Result
1	Search or view all group forming info	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. Visit the list page of group forming.</li> <li>2. System print a list of group forming information with the latest updated group forming information.</li> <li>3. If the search was applied the result print only with matched result and order as step 2.</li> </ol>	<ol style="list-style-type: none"> <li>1. User able to access the list page of group forming.</li> <li>2. User is optional and able to input keyword to search in search text field.</li> <li>3. User able to hit enter or click search button to search.</li> <li>4. Result is listed in the page that matched the search keyword or list all with order from latest updated.</li> </ol>	
2	View details page	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. Visit the details page.</li> <li>2. System print the details of the published group information.</li> <li>3. Button at bottom may vary if it was the owner or author, it show the edit and delete button, else show the request to join or unsend join request button.</li> </ol>	<ol style="list-style-type: none"> <li>1. User able to access the details page.</li> <li>2. The details page shown the details such as title, description and etc.</li> <li>3. Control button such as edit and delete button shown for author, else show the request to join or unsend join request button.</li> </ol>	
3.	Send request to join or unsend request to join	1. Is a registered user.	<ol style="list-style-type: none"> <li>1. Visit the details page.</li> <li>2. Click request to join button or unsend join request button.</li> </ol>	<ol style="list-style-type: none"> <li>1. User able to access the details page.</li> <li>2. Able to see and click request to join button if not</li> </ol>	

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		<ol style="list-style-type: none"> <li>2. User is not the owner or author who publish the group forming information.</li> </ol>	<ol style="list-style-type: none"> <li>3. The page refresh and change the button according to the join request status.</li> </ol>	<p>yet send join request. Else show a unsend join request to cancel the request.</p> <ol style="list-style-type: none"> <li>3. Immediately refresh and update the status after clicked.</li> </ol>	
4	Publish new group forming information	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> </ol>	<ol style="list-style-type: none"> <li>1. Click publish group information button on list group forming page.</li> <li>2. Redirected to create group forming page.</li> <li>3. Input title, description, upload file, country, state, and select required profession.</li> </ol>	<ol style="list-style-type: none"> <li>1. User can click the publish group information button and access the create group forming page.</li> <li>2. User able to input the title, description, country, state, required profession, and file attachment.</li> <li>3. User able to click submit button.</li> <li>4. The system save the information after user is clicked the submit button and redirected to the detail page of created group information.</li> </ol>	
5	Edit published group forming information	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. Must be the author or owner of the</li> </ol>	<ol style="list-style-type: none"> <li>1. Click edit button at detail page.</li> <li>2. Redirected to edit page.</li> <li>3. Modify the content.</li> </ol>	<ol style="list-style-type: none"> <li>1. User able to click edit button at detail page.</li> <li>2. User will be redirected to the edit page.</li> </ol>	

		published group forming information.	<ol style="list-style-type: none"> <li>4. Click submit button to make changes.</li> <li>5. System redirects back to detail page of the item.</li> </ol>	<ol style="list-style-type: none"> <li>3. User modify the content at the edit page.</li> <li>4. User clicked submit button to take effect the changes has been made.</li> <li>5. System is saved the changes and redirects back to detail page with changed content.</li> </ol>	
6	Delete published group forming information	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. Must be the author or owner of the published group forming information.</li> </ol>	<ol style="list-style-type: none"> <li>1. Click the delete button on the detail page of the group forming information item.</li> <li>2. System asks for confirmation to delete.</li> <li>3. If user is cancelled then do nothing.</li> <li>4. If confirmed to delete, send request to system and system delete item.</li> <li>5. Redirects back to list page of group forming.</li> </ol>	<ol style="list-style-type: none"> <li>1. User able to access delete button on detail page of group forming information.</li> <li>2. Users can confirm to delete the item when ask by system.</li> <li>3. Request send to system and system delete the item and redirects back to the list page.</li> <li>4. Item is deleted.</li> </ol>	

Table 6.2.1. 4 Evaluation Module

No.	Summary	Pre-requisite	Test Case	Expected Result	Result
1	Create a new evaluation record for a peer.	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. The target to evaluate is not the user himself.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visit the evaluation page (route from the search page), and click add evaluation record button to create a new evaluation record.</li> <li>2. Select the profession to evaluate, and click begin evaluation button to evaluate.</li> <li>3. Redirected to create evaluation record page.</li> <li>4. Input all evaluation information.</li> <li>5. Optional to upload attachment file.</li> <li>6. Click submit button.</li> <li>7. Redirect to the created evaluation record detail page.</li> </ol>	<ol style="list-style-type: none"> <li>1. User can access the add evaluation record button at evaluation page of others users.</li> <li>2. Select a profession to evaluate, and click begin evaluation.</li> <li>3. Redirected to the create evaluation record page.</li> <li>4. User can rate the evaluation form component, input comment, and optional to upload file.</li> <li>5. User can click the submit button at the end of the evaluation form.</li> <li>6. System is saved the evaluation form content submitted by user and redirect to detail page of created evaluation record.</li> </ol>	
2	Edit an evaluation record	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visit the detail page of evaluation record would like to edit.</li> </ol>	<ol style="list-style-type: none"> <li>1. User can click the edit button at detail page of an evaluation record.</li> </ol>	

		<ol style="list-style-type: none"> <li>The target to edit is not belong to the user himself.</li> <li>User must be the author who create the evaluation record.</li> </ol>	<ol style="list-style-type: none"> <li>Redirected to edit evaluation record page.</li> <li>Change the evaluation record information.</li> <li>Click submit button.</li> <li>Redirect to the evaluation record detail page.</li> </ol>	<ol style="list-style-type: none"> <li>User get redirected to the evaluation record edit page.</li> <li>User can modify the content of the evaluation record and click submit button.</li> <li>System store the changes content and recalculate the evaluation record mark, and redirect back to the detail page.</li> </ol>	
3	Delete an evaluation record	<ol style="list-style-type: none"> <li>Is a registered user.</li> <li>The target to delete is not belong to the user himself.</li> <li>User must be the author who create the evaluation record.</li> </ol>	<ol style="list-style-type: none"> <li>Visit the detail page of evaluation record would like to edit.</li> <li>Click delete button.</li> <li>System show evaluation record has been deleted, and redirect back to the evaluation page of the target peer.</li> </ol>	<ol style="list-style-type: none"> <li>User can access the detail page of an evaluation record.</li> <li>User can click the delete button at detail page of an evaluation record.</li> <li>System show evaluation record has been deleted message and redirects back to evaluation page of the target peer.</li> </ol>	
4	View evaluation record	<ol style="list-style-type: none"> <li>Is a registered user.</li> </ol>	<ol style="list-style-type: none"> <li>Using search function to search any peer.</li> <li>Click to browse into evaluation page.</li> </ol>	<ol style="list-style-type: none"> <li>User can click any peer in search page result to browse the evaluation page of the peers.</li> </ol>	

			<p>3. Click an evaluation record item to browse the evaluation record detail.</p>	<p>2. User can see the evaluation records and the total average mark at evaluation page.</p> <p>3. User can click any of the evaluation record item to browse the detail of the evaluation record item.</p> <p>4. User able to see the detail such as evaluation record mark and each mark for evaluation form component, comment given by evaluator, date created and updated, file attachment if available in the detail page of evaluation record.</p>	
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*Table 6.2.1. 5 Profession Category Suggestion*

No.	Summary	Pre-requisite	Test Case	Expected Result	Result
1	Suggest a new profession category.	1. Is a registered user.	<p>1. Visit the profession category suggest page.</p> <p>2. Click create new button.</p> <p>3. Fill in the details.</p> <p>4. Click submit button once fill in all the details.</p>	<p>1. Able to access profession category suggest page.</p> <p>2. Able to visit the create new profession category suggestion page.</p> <p>3. Able to fill in the details.</p>	

				4. Able to submit the suggestion.	
2	Edit submitted profession category suggestion.	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. Must be the author who created the profession category suggestion.</li> </ol>	<ol style="list-style-type: none"> <li>1. On details page of profession category suggestion.</li> <li>2. Click the edit button to make modification.</li> <li>3. System redirect toe edit page.</li> <li>4. User able to modify the content.</li> <li>5. User able to click save button to save the modification.</li> <li>6. The content is updated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Able to access the details page.</li> <li>2. Able to enter the edit page.</li> <li>3. Able to modify the content in the edit page.</li> <li>4. Able to click save button.</li> <li>5. The content able to updated.</li> </ol>	
3	Delete a submitted profession category suggestion.	<ol style="list-style-type: none"> <li>1. Is a registered user.</li> <li>2. Must be the author who created the profession category suggestion.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visit the index page of the profession category suggestion.</li> <li>2. Click delete button on the submitted profession category suggestion.</li> <li>3. The page reloads and the record is removed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Able to visit the index page of profession category suggestion.</li> <li>2. Able to click delete button.</li> <li>3. The item clicked delete get deleted.</li> </ol>	



## 6.2.2 Testing Result

### Testing Sample 1

*Table 6.2.2. 1 Evaluation Form Component Suggestion Module*

Test Case Number	Summary	Result
1	Create new evaluation form component suggestion.	All passed
2	View details of new evaluation form component suggestion	All passed
3	Edit the new evaluation form component suggestion.	All passed
4	Delete a new evaluation form component suggestion record.	All passed
5	List all new evaluation form component suggestion	All passed
6	Vote a new evaluation form component suggestion	All passed

*Table 6.2.2. 2 Search Module*

Test Case Number	Summary	Result
1	Search with name or email, or identity number	All passed

*Table 6.2.2. 3 Group Forming Module*

Test Case Number	Summary	Result
1	Search or view all group forming info	All passed
2	View details page	All passed
3.	Send request to join or unsend request to join	All passed
4	Publish new group forming information	All passed
5	Edit published group forming information	All passed
6	Delete published group forming information	All passed

*Table 6.2.2. 4 Evaluation Module*

Test Case Number	Summary	Result
1	Create a new evaluation record for a peer.	All passed
2	Edit an evaluation record	All passed
3	Delete an evaluation record	All passed
4	View evaluation record	All passed

*Table 6.2.2. 5 Profession Category Suggestion*

Test Case Number	Summary	Result
1	Suggest a new profession category.	All passed

2	Edit submitted profession category suggestion.	All passed
3	Delete a submitted profession category suggestion.	All passed (SQL Foreign Key Integrity Problems - Solved)

**Testing Sample 2***Table 6.2.2. 6 Evaluation Form Component Suggestion Module*

Test Case Number	Summary	Result
1	Create new evaluation form component suggestion.	All passed
2	View details of new evaluation form component suggestion	All passed
3	Edit the new evaluation form component suggestion.	All passed
4	Delete a new evaluation form component suggestion record.	All passed (SQL Foreign Key Delete Problem Solved)
5	List all new evaluation form component suggestion	All passed
6	Vote a new evaluation form component suggestion	All passed

*Table 6.2.2. 7 Search Module*

Test Case Number	Summary	Result
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1	Search with name or email, or identity number	All passed
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*Table 6.2.2. 8 Group Forming Module*

Test Case Number	Summary	Result
1	Search or view all group forming info	All passed
2	View details page	All passed
3.	Send request to join or unsent request to join	All passed
4	Publish new group forming information	All passed
5	Edit published group forming information	All passed
6	Delete published group forming information	All passed

*Table 6.2.2. 9 Evaluation Module*

Test Case Number	Summary	Result
1	Create a new evaluation record for a peer.	All passed
2	Edit an evaluation record	All passed
3	Delete an evaluation record	All passed
4	View evaluation record	All passed

*Table 6.2.2. 10 Profession Category Suggestion*

Test Case Number	Summary	Result
1	Suggest a new profession category.	All passed
2	Edit submitted profession category suggestion.	All passed
3	Delete a submitted profession category suggestion.	All passed

**Testing Sample 3***Table 6.2.2. 11 Evaluation Form Component Suggestion Module*

Test Case Number	Summary	Result
1	Create new evaluation form component suggestion.	All passed
2	View details of new evaluation form component suggestion	All passed
3	Edit the new evaluation form component suggestion.	All passed
4	Delete a new evaluation form component suggestion record.	All passed
5	List all new evaluation form component suggestion	All passed
6	Vote a new evaluation form component suggestion	All passed

*Table 6.2.2. 12 Search Module*

Test Case Number	Summary	Result
1	Search with name or email, or identity number	All passed

*Table 6.2.2. 13 Group Forming Module*

Test Case Number	Summary	Result
1	Search or view all group forming info	All passed
2	View details page	All passed
3.	Send request to join or unsend request to join	All passed (user feedback to send an email when author accepted)
4	Publish new group forming information	All passed
5	Edit published group forming information	All passed
6	Delete published group forming information	All passed

*Table 6.2.2. 14 Evaluation Module*

Test Case Number	Summary	Result
1	Create a new evaluation record for a peer.	All passed
2	Edit an evaluation record	All passed
3	Delete an evaluation record	All passed

4	View evaluation record	All passed
---	------------------------	------------

*Table 6.2.2. 15 Profession Category Suggestion*

Test Case Number	Summary	Result
1	Suggest a new profession category.	All passed
2	Edit submitted profession category suggestion.	All passed
3	Delete a submitted profession category suggestion.	All passed

#### Testing Sample 4

*Table 6.2.2. 16 Evaluation Form Component Suggestion Module*

Test Case Number	Summary	Result
1	Create new evaluation form component suggestion.	All passed
2	View details of new evaluation form component suggestion	All passed
3	Edit the new evaluation form component suggestion.	All passed
4	Delete a new evaluation form component suggestion record.	All passed
5	List all new evaluation form component suggestion	All passed

CHAPTER 6

6	Vote a new evaluation form component suggestion	All passed
---	---	------------

*Table 6.2.2. 17 Search Module*

Test Case Number	Summary	Result
1	Search with name or email, or identity number	All passed

*Table 6.2.2. 18 Group Forming Module*

Test Case Number	Summary	Result
1	Search or view all group forming info	All passed
2	View details page	All passed
3.	Send request to join or unsend request to join	All passed
4	Publish new group forming information	All passed
5	Edit published group forming information	All passed
6	Delete published group forming information	All passed

*Table 6.2.2. 19 Evaluation Module*

Test Case Number	Summary	Result
1	Create a new evaluation record for a peer.	All passed



2	Edit an evaluation record	All passed
3	Delete an evaluation record	All passed
4	View evaluation record	All passed

*Table 6.2.2. 20 Profession Category Suggestion*

Test Case Number	Summary	Result
1	Suggest a new profession category.	All passed
2	Edit submitted profession category suggestion.	All passed
3	Delete a submitted profession category suggestion.	All passed

### Testing Sample 5

*Table 6.2.2. 21 Evaluation Form Component Suggestion Module*

Test Case Number	Summary	Result
1	Create new evaluation form component suggestion.	All passed
2	View details of new evaluation form component suggestion	All passed
3	Edit the new evaluation form component suggestion.	All passed
4	Delete a new evaluation form component suggestion record.	All passed

5	List all new evaluation form component suggestion	All passed
6	Vote a new evaluation form component suggestion	All passed

*Table 6.2.2. 22 Search Module*

Test Case Number	Summary	Result
1	Search with name or email, or identity number	All passed

*Table 6.2.2. 23 Group Forming Module*

Test Case Number	Summary	Result
1	Search or view all group forming info	All passed
2	View details page	All passed
3.	Send request to join or unsend request to join	All passed
4	Publish new group forming information	All passed
5	Edit published group forming information	All passed
6	Delete published group forming information	All passed

*Table 6.2.2. 24 Evaluation Module*

Test Case Number	Summary	Result
------------------	---------	--------

1	Create a new evaluation record for a peer.	All passed (Get an email notification when receive an evaluation)
2	Edit an evaluation record	All passed
3	Delete an evaluation record	All passed
4	View evaluation record	All passed

*Table 6.2.2. 25 Profession Category Suggestion*

Test Case Number	Summary	Result
1	Suggest a new profession category.	All passed
2	Edit submitted profession category suggestion.	All passed
3	Delete a submitted profession category suggestion.	All passed

### **6.3 Project Challenges**

The most challenging aspect of this endeavour was determining how legitimate test cases should be constructed for each system function. It is absolutely necessary to take into account every conceivable circumstance while building the test case for each function and feature. The fact that the test case has been finished in its whole will make it less likely that the defective system component and the misaligned objective will be ignored in this project. During the process of fixing the system, there were also problems with communication barrier between the user and the developer. The developer needed to have strong critical thinking abilities in order to interpret ambiguous user inquiries and feedback. There were also the challenge to build the suggestion list in the group forming function which are facing the technical issues to provide a high precise of random list of good rated users to the other users, this was one of the difficulty to provide a randomly list.

### **6.4 Objectives Evaluation**

1. To develop a peer evaluation function that can provide peer evaluation records as a reference for the public.
  - Successfully implemented the peer evaluation and works as the designed and available as reference to the public.
  
2. To develop an evaluation aspect or component design function from the vote and propose results from all users that have the same professional.
  - Successfully developed the evaluation form component suggestion module to allow the users to proposed evaluation form component and allow only users have the same profession to propose it.
  
3. To develop a study or research group forming function that can suggest a student or employees list with a good rating of peer evaluation.

- Successfully to develop the group forming or team building function that help users to publish their group forming or team building details and assist to form their group and allow send invitation to the good rated users.
4. To develop a peer evaluation-based search and sorting function for students to know their self and their peers' ranking.
    - Successfully completed the developed search function that allow users to search their peer and as the ranking list of a list of users.

### **6.5 Concluding Remark**

For this project, the black box testing technique was chosen to be utilised. The test case that was developed to evaluate each of the module's capabilities and features included scenarios for reading, creating, updating, and deleting. The test case was conducted by observing and interrogating the user as the user attempted to use the developed system. This allowed the developer to determine whether or not the user was capable of performing the task outlined in the stated test case. The communication barrier issue arose during the user and developer testing session when the user attempted to provide feedback to the developer.

## Chapter 7

# Conclusion and Recommendation

### 7.1 Conclusion

Every student, researcher, or human resource staff might face the issues of lack of background information of the person who would like to join them for forming an assignment group, research team or company for working together, and it was hard or complex to verify the information given by the person, and failure to do so would cause there is a large risk to spoil their whole team's effort in the future. Therefore, verifying and checking the information given by the person is required and it should be resolved to lower the risk of spoiling the effort they had put into the work.

Therefore, this project proposed a peer evaluation system that includes the peer evaluation module, Evaluation Form Component Suggestion module, search & sorting module and group forming module. The peer evaluation module which will contain the functionality of evaluation, display the evaluation result to the users, the module will allow the users or evaluator to evaluate the other person with the evaluation item, the overall rating score gained by the users will be calculated using the algorithm formula stated in Chapter 3. The Evaluation Form Component Suggestion module was designed for purpose of letting the users in the community design and develop the standard item to be evaluated for each of the professionals, and later it will require the administrator to approve the proposed item to be added to the evaluation form component as the aspect to be evaluated. The proposed solution was decided to implement using the Laravel MVC framework and using agile development methodology. The system was developed to store all the data in MySQL and run a PHP server to run the Laravel MVC framework. Each of the modules will have its simple create, read, update, delete function, and the implementation was fully following the resource controller by Laravel framework. The layout user interface of the system was designed using the argon design system which is fully compliant with the bootstrap syntax. The search and sorting module was designed to help the users to search and check a user's evaluation records that are available in the system and allow the users to sort the search result according to their average rating score or school, or professional. The fourth module is the group forming module, this module will help the users in the community to announce their

request to look for new members for their research or study group, the other users will be able to request to join the group when the author of the group request posted to the system.

The system was installed and deployed to a virtual private server (VPS) in the Azure cloud, and it is now possible for users to access it by using web browsers on any device they choose. This makes it more convenient for users to utilise the system. On the other hand, the system has been put through its paces with black box testing. The purpose of this testing was to identify any problems with the modules that were produced and to confirm that the objectives outlined in the plan had been saved. The outcome of the testing revealed that there is a malfunctioning component during the first three samples, and the issue was resolved as soon as the users provided their input at the conclusion of the testing session. In the course of this project, all four objectives were accomplished, and the necessary steps were taken to incorporate them into the system that was constructed.

The challenges faced in the project are providing the high precise of search result generated and recommendation list of users in the group forming module. The challenges bring to the developer when designing the way how the system react to the users when user perform the task that required the system to provide such as search result of the users.

The proposed project was expected to provide the benefit of a speedier way to assist students in identifying their weaknesses, as well as reducing the likelihood of receiving a terrible team member and to assist human resource departments in identifying the experience of new employees.

### **7.2 Recommendation**

The first suggestion made is to add function such as machine learning to the group forming module, in order to provide a forecast for the list of users who would be the best candidates to suggest to the author of a group-forming post. This would improve the overall user experience of the module.

In the project's search module, an algorithm that will improve the related search results to the user should also be implemented. This algorithm will look for user records that have the same university as the user who is performing the search, as well as user

records that are located in the same area or nearby. This will ensure that irrelevant search results do not become mixed together in the results of the search, which would make it more difficult to search for users within the system.

In addition, the peer evaluation module ought to advocate for the inclusion of a file upload and file attachment management feature on the edit page, which would enable users to change the file that is associated with the evaluation record. The peer evaluation module also suggests restricting modifications after a certain period of time to prevent the evaluator from adding biased comments and ratings to the existing evaluation record if their opinions change after that period.

In order to expedite the process of creating a new evaluation form for a new profession whenever a new profession category is added to the system, the self-monitoring and auto approval function should be implemented in the evaluation form component suggestions. This will allow a large number of evaluation form component suggestions to be approved. Additionally, this will speed up the process of creating a new evaluation form for a new profession.

The final recommendation that was given to the project was to add an anti-spam function to the peer evaluation module. This would prevent malicious users or robots from trying to create spam or improper evaluation records in the system, which would then cause harm to other users. It would also increase the safety or reliability of evaluation results for users.



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## APPENDIX

### User Requirements Collection Questionnaires

1. Do you hear peer evaluation before?
  - A. Yes
  - B. No
  - C. Maybe
2. Based on your understanding, what is the peer evaluation system use for?
  - A. Evaluate peer's performance
  - B. Evaluate peer's attitude
  - C. Judging the appearance of others
  - D. I Don't Know
3. If you are the user of peer evaluation system, what kind of the function or features you wish to have in the system? (Multiple Selection)
  - ✓ Customized peer evaluation form component
  - ✓ Evaluate a person not recorded or registered in the system
  - ✓ Vote function for evaluation form component for better evaluation (Let community decide for each professional standard for evaluation)
  - ✓ Search & sorting person in the peer evaluation system
  - ✓ Study & research group forming to finding group or member from the community
4. Do you think that peer evaluation should be done in anonymously? (Evaluator)
  - A. Yes
  - B. No
  - C. Maybe
5. Besides the functions or features listed in the previous questions, do you have any suggestions regarding the function to be added to the system?

**FINAL YEAR PROJECT WEEKLY REPORT***(Project II)*

<b>Trimester, Year: June, 2022</b>	<b>Study week no.: 2</b>
<b>Student Name &amp; ID: Tai Jiann Tsong 20ACB00146</b>	
<b>Supervisor: Dr Suthashini a/p Subramaniam</b>	
<b>Project Title: Peer Evaluation System</b>	

**1. WORK DONE**

Added search and sorting function, create peer evaluation record.

**2. WORK TO BE DONE**

- Peer evaluation record attachment file upload.
- Beautify the UI of search page and group forming page.
- Delete evaluation record and attachment file to save storage.

**3. PROBLEMS ENCOUNTERED****4. SELF EVALUATION OF THE PROGRESS**

Progress is under schedule and use case was able to complete in the expected time.

  
\_\_\_\_\_  
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# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: June, 2022</b>	<b>Study week no.: 4</b>
<b>Student Name &amp; ID: Tai Jiann Tsong 20ACB00146</b>	
<b>Supervisor: Dr Suthashini a/p Subramaniam</b>	
<b>Project Title: Peer Evaluation System</b>	

## 1. WORK DONE

- Peer evaluation record attachment file upload.
- Beautify the UI of search page and group forming page.
- Delete evaluation record and attachment file to save storage.

## 2. WORK TO BE DONE

- Create group forming post function
- Modify function for group forming information
- Display group forming information

## 3. PROBLEMS ENCOUNTERED

## 4. SELF EVALUATION OF THE PROGRESS

Progress is under schedule and use case was able to complete in the expected time.



## FINAL YEAR PROJECT WEEKLY REPORT

*(Project II)*

<b>Trimester, Year: June, 2022</b>	<b>Study week no.: 6</b>
<b>Student Name &amp; ID: Tai Jiann Tsong 20ACB00146</b>	
<b>Supervisor: Dr Suthashini a/p Subramaniam</b>	
<b>Project Title: Peer Evaluation System</b>	

### 1. WORK DONE

- Create group forming post function
- Modify function for group forming information
- Display group forming information

### 2. WORK TO BE DONE

- Publish Project to Server
- Define the Black Box Testing Test Case

### 3. PROBLEMS ENCOUNTERED

### 4. SELF EVALUATION OF THE PROGRESS

Progress is under schedule and test case define was able to complete in the expected time.



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Supervisor's signature



\_\_\_\_\_  
Student's signature

## FINAL YEAR PROJECT WEEKLY REPORT

*(Project II)*

<b>Trimester, Year: June, 2022</b>	<b>Study week no.: 8</b>
<b>Student Name &amp; ID: Tai Jiann Tsong 20ACB00146</b>	
<b>Supervisor: Dr Suthashini a/p Subramaniam</b>	
<b>Project Title: Peer Evaluation System</b>	

### 1. WORK DONE

- Report documentation
- Navigation bar adjustment

### 2. WORK TO BE DONE

- Draft Report

### 3. PROBLEMS ENCOUNTERED

-

### 4. SELF EVALUATION OF THE PROGRESS

Progress is under schedule and test case define was able to complete in the expected time.



Supervisor's signature



Student's signature



## FINAL YEAR PROJECT WEEKLY REPORT

*(Project II)*

<b>Trimester, Year: June, 2022</b>	<b>Study week no.: 10</b>
<b>Student Name &amp; ID: Tai Jiann Tsong 20ACB00146</b>	
<b>Supervisor: Dr Suthashini a/p Subramaniam</b>	
<b>Project Title: Peer Evaluation System</b>	

### 1. WORK DONE

- Navigation bar adjustment

### 2. WORK TO BE DONE

- Draft report documentation

### 3. PROBLEMS ENCOUNTERED

-

### 4. SELF EVALUATION OF THE PROGRESS

Progress is under schedule and test case define was able to complete in the expected time.



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Supervisor's signature



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Student's signature

## FINAL YEAR PROJECT WEEKLY REPORT

*(Project II)*

<b>Trimester, Year: June, 2022</b>	<b>Study week no.: 12</b>
<b>Student Name &amp; ID: Tai Jiann Tsong 20ACB00146</b>	
<b>Supervisor: Dr Suthashini a/p Subramaniam</b>	
<b>Project Title: Peer Evaluation System</b>	

### 1. WORK DONE

- Draft report documentation

### 2. WORK TO BE DONE

- Finalize and Check Report Completeness

### 3. PROBLEMS ENCOUNTERED

-

### 4. SELF EVALUATION OF THE PROGRESS

Progress is under schedule and test case define was able to complete in the expected time.



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Supervisor's signature



\_\_\_\_\_  
Student's signature

POSTER

# PEER EVALUATION SYSTEM

**AUTHORS**  
Tai Jiann Tsong

**SUPERVISOR**  
Dr Suthashini a/p Subramaniam

**INTRODUCTION**

The peer evaluation system in this project refers to a web-based peer evaluation system for the students or employees to evaluate each other from the aspect of performance, work quality, etc done by the target peer to be evaluated in the peer evaluation system. The peer evaluation system will be able to record or save the evaluation written by a peer to the targeted evaluated students or employees and provide the overall rating from all of the evaluations. The peer evaluation system should be able to help the users to identify the performance through peer evaluation records and rating of the new member of their teammate. The peer evaluation system also allows defining the valuation standard of evaluation form through gathering idea among users.

**OBJECTIVE**

- To develop a peer evaluation function that can provide peer evaluation records as a reference for the public.
- To develop an evaluation aspect or component design function from vote and propose results from all users that have the same professional.
- To develop a study or research group forming function that can suggest student or employees list with a good rating of peer evaluation.
- To develop a peer evaluation-based search and sorting function for students to know theirs and their peers' ranking.

Agile Methodology

**METHODOLOGY**

**Agile Methodology**

- Incremental development
- Allowed to make changes at any time.
- Clients are involved in the project and provide feedback on every phase.
- The budget is more flexible as agile methodology encourages experimental and changes of direction.
- Focus on accomplishing the project.

**RESULTS**

A full function of peer evaluation system allow user to evaluate their peers and forming their assignment or research group with the assist of the system. Result in users are able to evaluate someone and check the evaluation score of someone in the system that benefit user when they find for their new group member in the team.

- Evaluation Form Component Suggestion Module
  - Evaluation Form Component - List, Show, Delete, Create, Edit, Vote, Management
  - Profession Category Suggestion - Create, List, Delete, Edit, Management
- Peer Evaluation Module
  - Evaluation Summary Page
  - Evaluation Record Details Page
- Evaluation Module
  - Evaluation Summary Page
  - Evaluation Record Details Page
  - Evaluate a User Page, Edit and Delete Evaluation Record
- Group Forming
  - Publish, Edit and Delete Group Forming Information
  - Accept & Reject User to join the group
  - Request to join a group

Group Forming Module

Evaluation Form Item Suggestion - Module Index Page

Evaluation Form Component Suggestion Module - Show Page

Peer Evaluation Module - Evaluation Summary

Search Module

Evaluation Module - evaluation Page

**DISCUSSION**

- It is a peer evaluation system that allow peers to evaluate each other without paid and built the evaluation standard since there are limited function and availability in the market. It attract the users to form or built the standard for the evaluation for each profession, and make it fair to evaluate. In future, the peer evaluation system will be added with more functions and improvement to make it effective and provide reliable evaluation summary to the users.

**CONCLUSION**

The Peer Evaluation System is a PHP-developed system that allows users to evaluate their peers and check their peers' evaluation records. Besides that, it also helps to define the evaluation standard for each profession through the evaluation form component suggestion module while the search and sorting module as the module help to find or list the users and bring them to the evaluation summary. It was also created with a group-forming feature to make it easier to organise groups and allow only good evaluation score students to join.

A-8

Bachelor of Information Systems (Honours) Information Systems Engineering  
Faculty of Information and Communication Technology (Kampar Campus), UTAR

## PLAGIARISM CHECK RESULT

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### Peer Evaluation System

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TECHNOLOGY**

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<b>ID Number(s)</b>	20ACB00146
<b>Programme / Course</b>	Information Systems Engineering
<b>Title of Final Year Project</b>	Peer Evaluation System

Similarity	Supervisor's Comments (Compulsory if parameters of originality exceed the limits approved by UTAR)
<b>Overall similarity index: <u>2</u> % Similarity by source</b>  Internet Sources: <u>2</u> % Publications: <u>0</u> % Student Papers: <u>1</u> %	
<b>Number of individual sources listed of more than 3% similarity: <u>0</u></b>	
<b>Parameters of originality required, and limits approved by UTAR are as Follows:</b> (i) Overall similarity index is 20% and below, and (ii) Matching of individual sources listed must be less than 3% each, and (iii) Matching texts in continuous block must not exceed 8 words <i>Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.</i>	

**Note:** Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

**Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.**

\_\_\_\_\_  
Signature of Supervisor

Name: Dr Suthashini a/p Subramaniam

Date: 8 September 2022

\_\_\_\_\_  
Signature of Co-Supervisor

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## UNIVERSITI TUNKU ABDUL RAHMAN

### FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY (KAMPAR CAMPUS)

#### CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	20ACB00146
Student Name	Tai Jiann Tsong
Supervisor Name	Dr Suthashini a/p Subramaniam

TICK (✓)	DOCUMENT ITEMS
	Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
✓	Front Plastic Cover (for hardcopy)
✓	Title Page
✓	Signed Report Status Declaration Form
✓	Signed FYP Thesis Submission Form
✓	Signed form of the Declaration of Originality
✓	Acknowledgement
✓	Abstract
✓	Table of Contents
✓	List of Figures (if applicable)
✓	List of Tables (if applicable)
✓	List of Symbols (if applicable)
✓	List of Abbreviations (if applicable)
✓	Chapters / Content
✓	Bibliography (or References)
✓	All references in bibliography are cited in the thesis, especially in the chapter of literature review
✓	Appendices (if applicable)
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✓	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)
✓	I agree 5 marks will be deducted due to incorrect format, declare wrongly the ticked of these items, and/or any dispute happening for these items in this report.

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I, the author, have checked and confirmed all the items listed in the table are included in my report.



(Signature of Student)

Date: 8<sup>th</sup> September 2022