Appendix 4A

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

INDUSTRIAL TRAINING REPORT
HUMAN RESOURCES MANAGEMENT SYSTEM

By

NADIAH BINTI MOHD HANIM

2022/2023

COMPUTER SCIENCE (SOFTWARE ENGEINEERING)

TRAINING PLACE:	RN TECHNOLOGIES SDN. BHD. & 28 & 28A, JALAN HORIZON PERDANA 3, 79100, NUSAJAYA JOHOR
TRAINING PERIOD:	4 MONTHS 15 DAYS
SUPERVISORS:	MR. SHAHRUL AZHAN BIN ISHAK DR. ZURAINI BINTI ALI SHAH
REPORT DATE:	11/2/2023

ACKNOWLEDGEMENT

I would like to express my sincerest gratitude to RN Technologies Sdn. Bhd. for allowing me to undergo industrial training as partial fulfilment of the requirement for the degree of Bachelor of Computer Science (Software Engineering).

I would like to thank my supervisor, Mr. Shahrul Azhan Bin Ishak and also Mrs. Tengku Seri Wahyu who have helped me a lot during my training time in this company. In addition, I would also like to thank Dr. Zuraini Binti Ali Shah as my university supervisor for helping me in many ways in completing my industrial training documentation. Lastly, I would like to express my appreciation to all the staffs in RN Technologies Sdn. Bhd. Without their help and advice I would not have gained a lot of knowledge in this field. I have learned so much from them for the past 5 months and thank you to my family and friends for supporting me along this journey.

ABSTRACT

Besides providing students with guidance from professionals, internships can also assist them in developing practical skills in communication and technology that may prove useful later in their careers. Under the Software Development team at RN Technologies Sdn Bhd, this report contains the tasks that were assigned to me during the 20 weeks that I was there. In the course of my internship, I was supervised by Mr. Shahrul Azhan Bin Ishak. I was mainly involved with the development of the ongoing project, Human Resources Management (HRM) System, a system that can simplify the process of managing the data and employees for the Islamic religious council of the federal region. I developed seven new modules for the HRM System using the PHP Laravel framework. In addition, I was also responsible for fixing bugs found in the existing modules for the HRM System. Aside from this project, I was also assigned to be in the maintenance team to fix bugs in Muzium Diraja Abu Bakar (MDAB) Systems and Quarters Management System. Furthermore, several side tasks were also given to me such as updating the diagrams in the Software Requirements Specification (SRS) document for the Quarters Systems. All of the tasks were guided by my senior staff, Tengku Seri Wahyu, Azirah, Siti Mashitoh, and more. As a result of the given tasks, I have enhanced my programming skills, improved my multitasking skills as I have more than one daily task to accomplish and learned Visio Objects. Thus, my internship with RN Technologies Sdn Bhd has enabled me to gain a great deal of experience.

ABSTRAK

Selain daripada menyediakan pelajar bimbingan daripada profesional, latihan amali juga boleh membantu mereka dalam membangunkan kemahiran praktikal dalam komunikasi dan teknologi yang mungkin berguna dalam kerjaya mereka kelak. Di bawah pasukan Pembangunan Perisian di RN Technologies Sdn Bhd, laporan ini mengandungi tugasan yang diberikan kepada saya sepanjang 20 minggu saya berada di sana. Sepanjang menjalani latihan amali, saya telah diselia oleh En Shahrul Azhan Bin Ishak. Saya terlibat terutamanya dengan pembangunan projek yang sedang berjalan iaitu, Sistem Pengurusan Sumber Manusia (HRM), sistem yang boleh memudahkan proses pengurusan data dan pekerja untuk Majlis Agama Islam Wilayah Persekutuan. Saya membangunkan tujuh modul baharu untuk Sistem HRM menggunakan rangka kerja PHP Laravel. Selain itu, saya juga bertanggungjawab untuk membetulkan pepijat yang terdapat dalam modul sedia ada untuk Sistem HRM. Selain daripada projek ini, saya juga ditugaskan untuk berada dalam pasukan penyelenggaraan untuk membaiki pepijat dalam Sistem Muzium Diraja Abu Bakar (MDAB) dan Sistem Pengurusan Kuarters. Tambahan pula, beberapa tugas sampingan turut diberikan kepada saya seperti mengemas kini gambar rajah dalam dokumen Software Requirements Specification (SRS) untuk Sistem Kuarters. Semua tugas dibimbing oleh kakitangan senior saya, Tengku Seri Wahyu, Azirah, Siti Mashitah, dan ramai lagi. Hasil daripada tugasan yang diberikan, saya telah meningkatkan kemahiran pengaturcaraan saya, meningkatkan kemahiran pengurusan masa kerana saya mempunyai lebih daripada satu tugas harian untuk menyelesaikan dan mempelajari Visio Object. Oleh itu, latihan amali saya dengan RN Technologies Sdn Bhd telah membolehkan saya menimba banyak pengalaman.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

HRM	-	Human Resources Management
MDAB	-	Muzium Diraja Abu Bakar
POS	-	Point of Sale
UI	-	User Interface

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 About the Company

RN Technologies Sdn. Bhd. is a pioneer software development company in Nusajaya with more than 15 years of professional experience. It was founded in November 2011 and its main operation is in the main office, which is in Iskandar Puteri, Johor. RN Tech also has a new branch located in Sepang, Selangor.

Figure 1.1 RN Technologies Sdn. Bhd. Headquarters

RN Technologies' core business is in developing software and providing software services in order to cater for wider varieties of various markets such as accounting, human resource management, educational and more. This company strives to provide the best customization of software, data security, big data analytics and mobile applications for government and private sectors. This aligns with the company's vision, "strives to be leading one-stop business solution provider with focus on valuable and effective tailor-made software systems, thus growing together with the client" (RN Technologies, 2011). The company's mission is "the provision of high-quality business management products as well as affordable, effective cutting-edge software and hardware solutions to the government and private sectors" (RN Technologies, 2011). Several types of systems have been developed by this company, such as e-PRO Accounting System, e-PRO Human Resources Management System, e-PRO Attendance system and more. With over 50 products developed, this company is involved in many high-profile projects with clients ranging from the government and private sectors. Such clients are Senai Airport, Majlis Bandaraya Johor Bahru, Legoland and even Universiti Teknologi Malaysia. Figure 1.2, 1.3 and 1.4 shows three out of many systems that have been successfully developed by the company.

Figure 1.2 e-PRO Accounting System

Figure 1.3 e-PRO Human Resources Management System

Figure 1.4 e-PRO Assets Management System

This company is trusted by many government sectors especially in Johor and is certified by many institutions. This company is certified by SSM, myIPO, Kastam Diraja Malaysia, Malaysian Institute of Accountants and more. Currently, there are 55 staff members with Information Technology background have been contributing to the company in developing the systems using their expertise.

1.2 Organization Structure

The company is led by the board of directors whereby one of them is Dato' Suhaila Ahmad who is the Chief Executive Officer of the company. Under the board of directors, the company is operated by the legal department, secretary, and account department or internal auditor. The main department of the company, which is the software engineer department, has an information and maintenance department. These departments are the main engine of the company that work on developing the system to life. Figure 1.5 shows in detail the organization structure of RN Technologies Sdn. Bhd. main office.

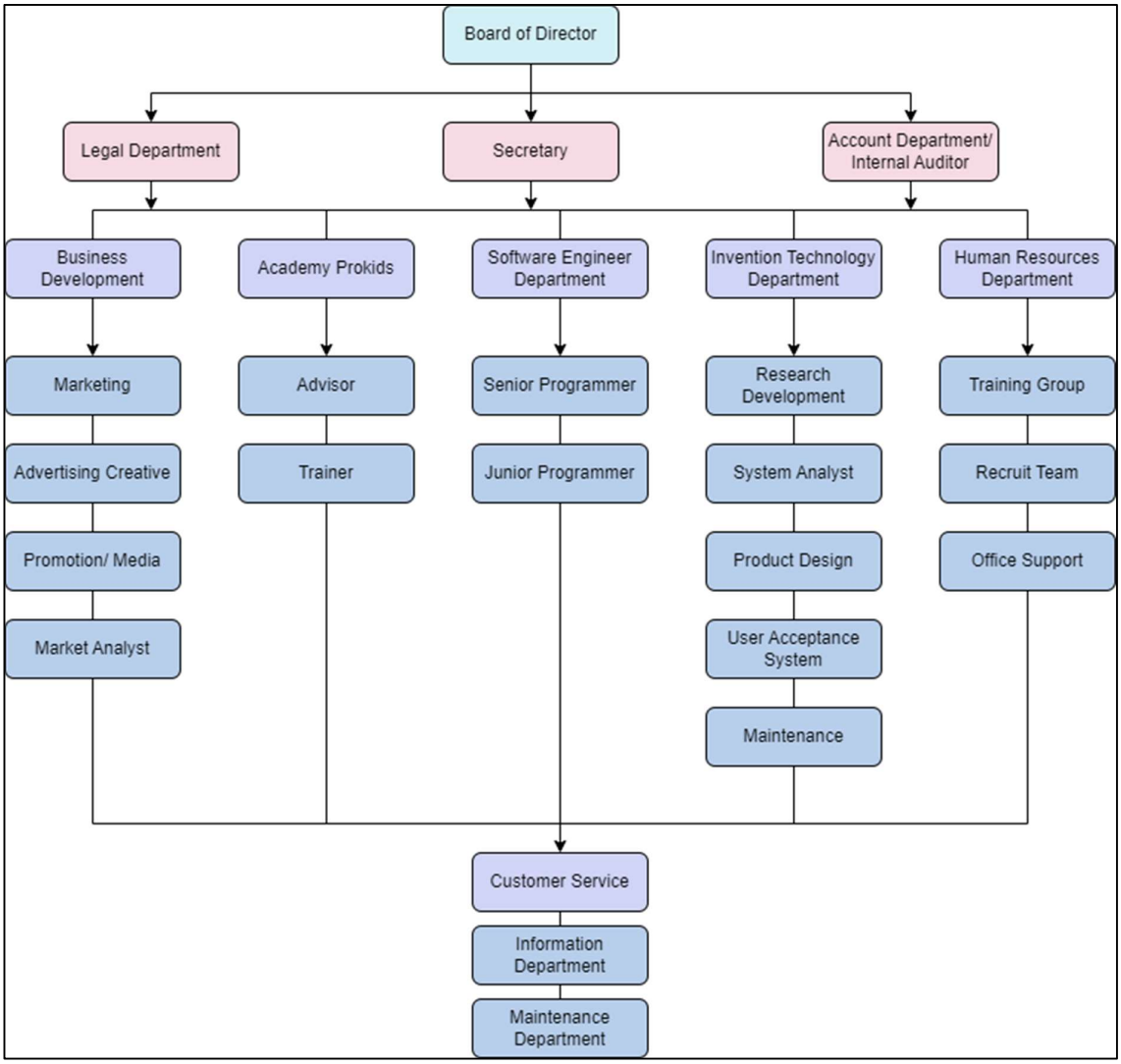


Figure 1.5 Organization Structure of RN Technologies Sdn. Bhd

1.3 Information of the Department

The department assigned during the industrial training is the software engineer department, more specifically in the information department and the maintenance department which are the development unit. The main leader of this department is the supervisor himself, Mr. Shahrul Azhan Bin Ishak who holds the position of an IT director. Currently, there are two senior programmers, one junior programmer and a system analyst in the software engineer department. In the development team, there are two separate teams working on different ongoing projects at the moment. The first team is working on the Human Resources Management System project for the Islamic religious council of the federal region while another team is working on the Quarters Management System project for the state's government. Currently, there are four programmers in the Human Resources Management System. However, it is the company's tradition to recruit several of the team members to be in the maintenance group for another system during crucial times.

1.4 Training Program

The training program provided by the company mainly revolves around programming. The main objective of the company in recruiting the internship students is to find more talent for the company's benefit. This means that if the student is doing an excellent job in every task assigned, the student will have a higher chance of being absorbed into the company as a full-time developer. The initial tasks provided to the interns would be easy and will get more complex overtime. The complete tasks assigned during the industrial training displayed in a Gantt chart form can be referred in Appendix A.

Such tasks that are assigned to the interns while training is:

1) Developing a simple module or submodule for an ongoing project's system.
2) Resolving bugs found by the system analyst during the maintenance session.
3) Perform the user acceptance testing on the system after maintenance.

CHAPTER 2

SPECIFIC DETAILS ON PROJECTS / TRAINING

2.1 Introduction

This chapter elaborates on the specific details of the project and training given during the whole 20 weeks of industrial training. This chapter will also describe the side tasks assigned for several other projects during the industrial training.

2.2 Human Resources Management System

One of the high-profile ongoing projects that RN Technologies is involved in is a Human Resources Management (HRM) System for the Islamic religious council of the federal region. On the first day of industrial training, the student was assigned to be in the development team for the HRM System. The scope of the HRM System is very big and has started its development since early 2022. The HRM System is divided into three phases. The first phase contains 14 modules, the second phase contains 22 modules and the third phase contains 11 modules. Currently, the development work is still in the first phase.

The programming language used in this system is PHP with Laravel framework. Laravel is an elegant and expressive framework for developing web applications (Laravel, 2011). The Laravel PHP framework is a free and open-source PHP framework that provides tools and resources for building modern PHP applications (Digital Ocean, 2021). In terms of backend, MySQL is used with HeidiSQL as its administration tool. The HeidiSQL administration tool is free, open-source, and allows to manage MariaDB, MySQL, Microsoft SQL Server, PostgreSQL, and SQLite databases (HeidiSQL, 2006).

2.2.1 Project Goal

The goal of the Human Resources Management System is to create a system that can simplify the process of managing the data and employees for the Islamic religious council of the federal region.

2.2.2 Project Objectives

1. To develop the Human Resources Management System.
2. To maintain the Human Resources Management System.

2.2.3 Discipline Module

The first module assigned during the industrial training is called the Discipline module. This module is a simple module with only two submodules that have clear and direct business processes. The submodules are called Discipline Transaction and Discipline Report.

2.2.3.1 Discipline Transaction Module

Figure 2.1 shows a general overview on the flow of the Discipline Transaction module.

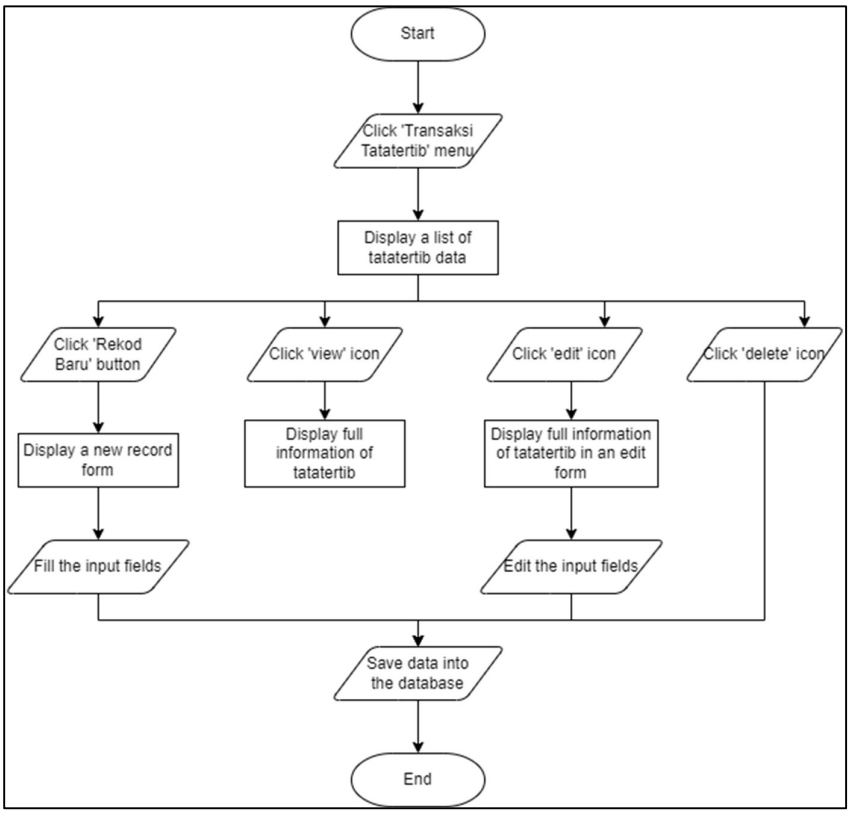


Figure 2.1 Flowchart of Discipline Transaction Module

Discipline Transaction comprises all the four CRUD functions, which are to create a new record, read the detailed data based on its primary key, update the data and delete the data. In almost every module, the system displays all the data in that module in a list inside a table which is called the index page. The table design uses a Bootstrap DataTable plugin which enables paging and search bar on the table. At the right most column there are three icons which are to view, update or delete the data on that row. At the right corner, there is a button named 'Rekod baru' which navigates to a new record page for the user to key in new data and eventually to store the new data into the database. Figure 2.2 shows the user interface of the index page of the Discipline Transaction module.

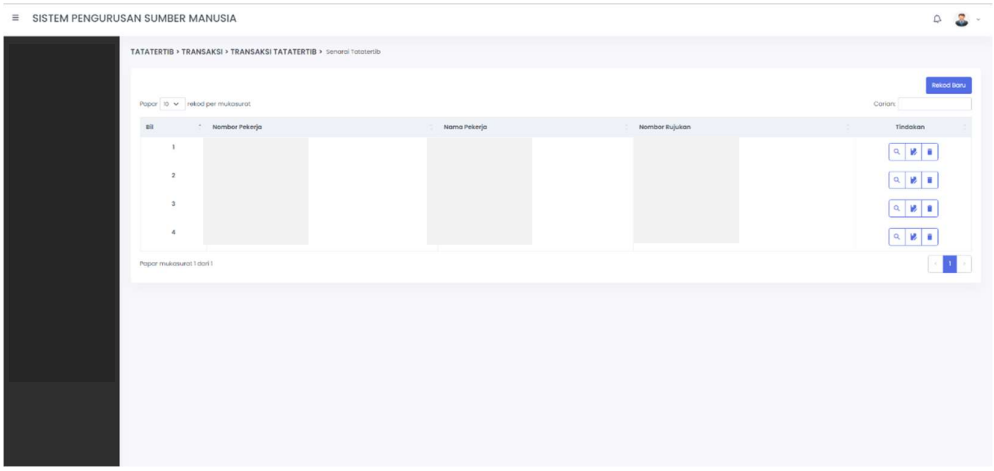


Figure 2.2 UI Index Page Discipline Transaction

In the new record page of the Discipline Transaction module, there are several cards that display input fields of each category. In the first card, there is a dropdown select input type that enables the user to choose an officer's name. When an officer's name is chosen, a JavaScript function is called onchange event with the officer's id passed in the parameter. In the JavaScript function, an AJAX function is used to get the full information of the chosen officer from the database. The AJAX function will call the function in the controller in order to get the data selected in the query. Figure 2.3 displays the user interface of the new record form page for the Discipline Transaction module.

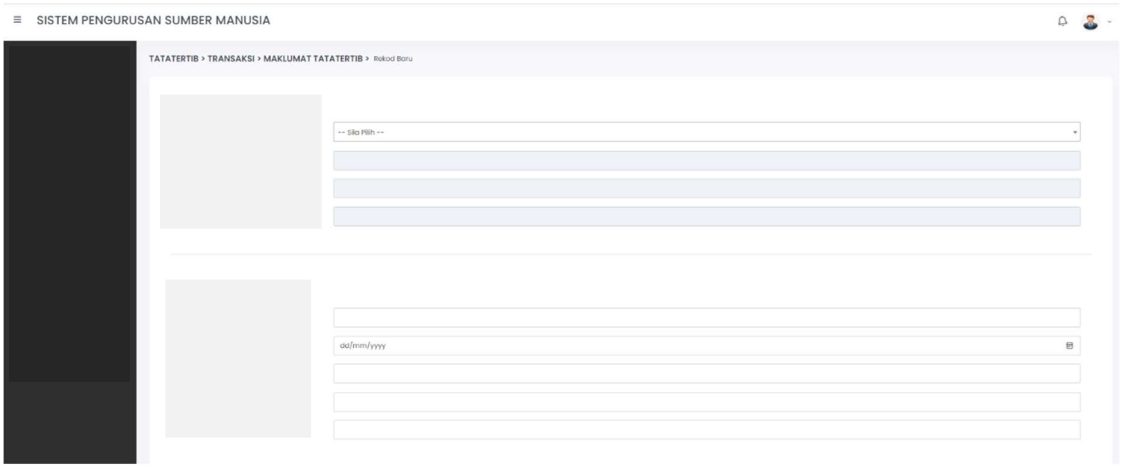


Figure 2.3 UI New Record Page Discipline Transaction

In the fourth card, there are two date type input fields which are called Chronological Start Date and Chronological End Date. Chronological Start Date is a start date while Chronological End Date is the end date. By logic, the end date should be greater than the start date. In order to validate that the chosen end date is greater than the start date, two JavaScript functions are used which are validateStartDate and validateEndDate. For validateStartDate, the function is called onchange event in the start date input. When a date is chosen in the start date input, the JavaScript function will be called. In the function, it will compare if the start date is smaller than the end date. If the start date is greater, the value of input end date will be cleared. For validateEndDate, the function is called onchange event in the end date input. When a date is chosen in the end date input, the JavaScript function will be called. In the function, it will compare if the start date is smaller than the end date. If the start date is greater, the value of both input end date and start date will be cleared. At the bottom right corner of the new record page, there is a button called ‘Simpan’ which submits the form to the controller. When the button is clicked, there will be a pop-up message as a confirmation message to the user. The message uses SweetAlert which makes the system more interactive and responsive.

When an update button is clicked, the system will redirect to an edit page. In the edit page, a form very similar to the new record page will be displayed with values from the database assigned to the input field. However, not all input fields can be edited. For instance, the officer's details input fields are set to readonly as they should not be enabled to be edited. Figure 2.4 displays the user interface of the edit form page for the Discipline Transaction module.

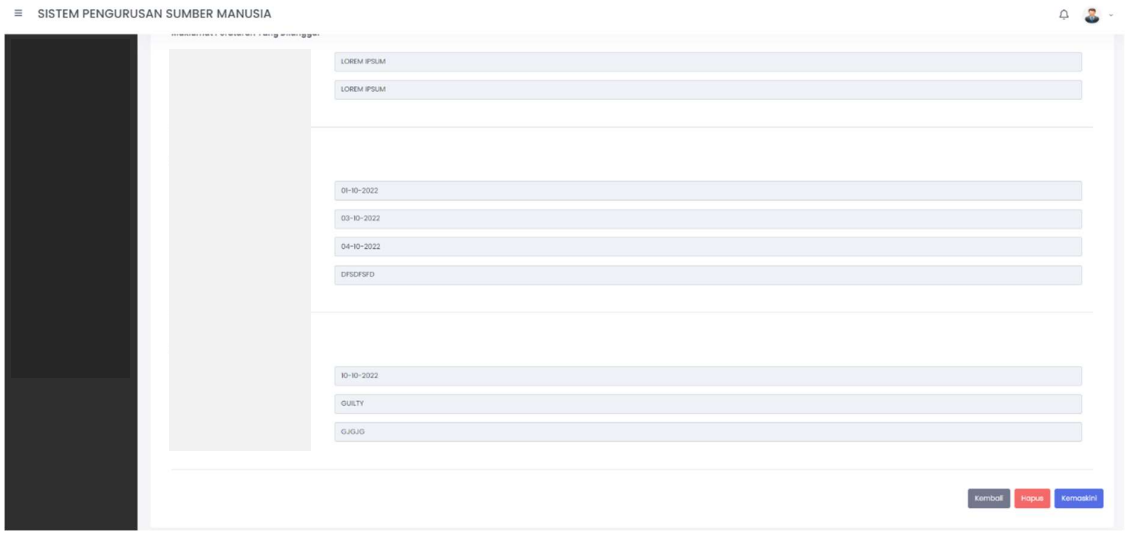


Figure 2.4 UI Edit Page Discipline Transaction

The data can be deleted directly from the list page and edit page. When the delete button is clicked, a SweetAlert message will pop up to give the user the opportunity to confirm. When clicked, the system will redirect to the list page and a message 'Data is successfully deleted!' will be displayed at the top of the page. In all modules, when a data is deleted, it is not actually deleted from the database. All tables in the database have an attribute named status_data which represents the status of the data. When retrieving data to display, a condition where the status_data is equals to 1 is required in the query. If the data is deleted, the status_data will be changed from 1 to 0.

2.2.3.2 Discipline Report Module

The Discipline Report module has only one purpose, which is to generate a report in a PDF format based on the chosen Discipline record. Figure 2.5 shows a general overview on the flow of the Discipline Report module.

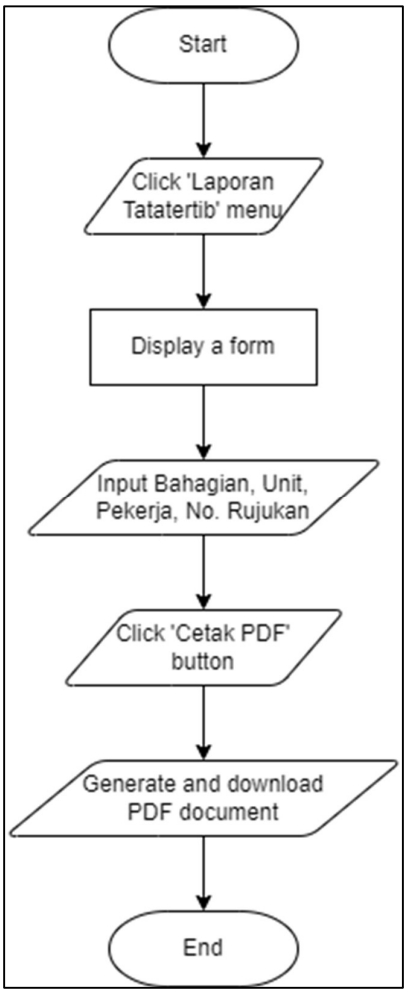


Figure 2.5 Flowchart of Discipline Report Module

In the index page of Discipline Report, there is a form with four input fields. The first input, Department displays a list of departments that exists inside the agency. When a department is chosen, a JavaScript function is called onchange event. Depending on the department chosen, a list of units exists inside the department are displayed as the options in the Unit input field. Then, when a unit is chosen, a list of officers inside that department and unit will be displayed using the same method which is by calling a JavaScript function and ajax. Then, when an officer is chosen, a list of Discipline records that are registered for that officer are displayed in a checkbox input type. When the user chooses two Reference No. for instance, a two-page pdf report will be generated. After clicking the button 'CETAK PDF', the report in a PDF format will be downloaded. Figure 2.6 displays the user interface of the index page for the Discipline Report module.

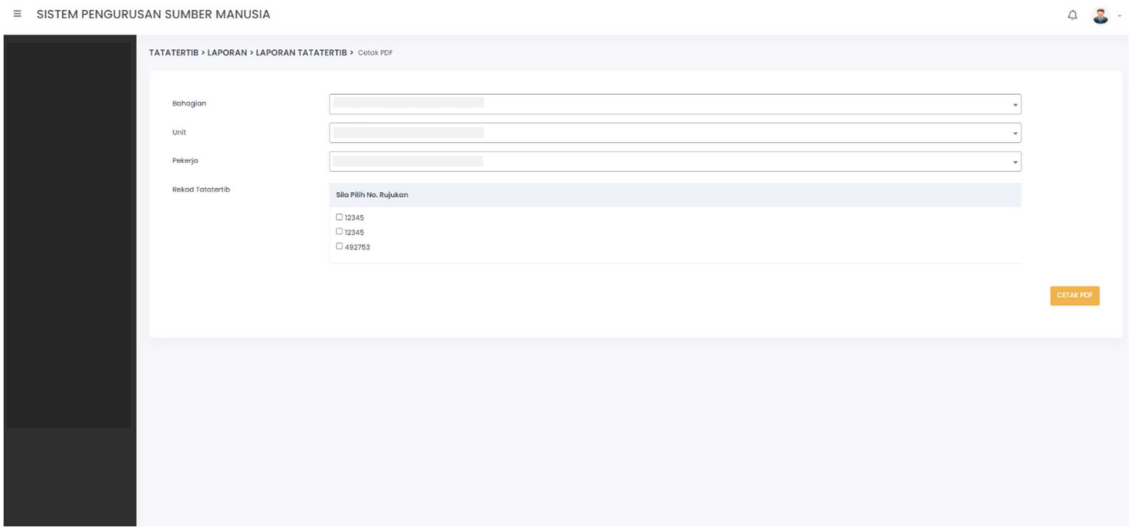


Figure 2.6 UI Index Page Discipline Report

2.2.4 MyPortfolio Module

The second module assigned during the industrial training is called MyPortfolio module. This module is a bit complex and has five submodules and only three submodules were assigned. The submodules are called MyPortfolio Officer Settings, MyPortfolio Settings and MyPortfolio Transaction. The general business process of MyPortfolio is that every officer working in the agency has to produce a report that records every work they have done while working in the agency and this report is called MyPortfolio. For instance, if an officer is under department A, Unit B with position C, he or she will have to record every work done during her or his service in that department, unit and position. If the officer quits, another officer who will be taking her or his place will have to continue the work and record them in another MyPortfolio. When MyPortfolio is done, there are officers who will be in charge of validating and approving the content of MyPorfolio.

2.2.4.1 MyPortfolio Officer Settings Module

In this module, all the CRUD functions are implemented. Figure 2.7 shows a general overview on the flow of MyPortfolio Officer Settings module.

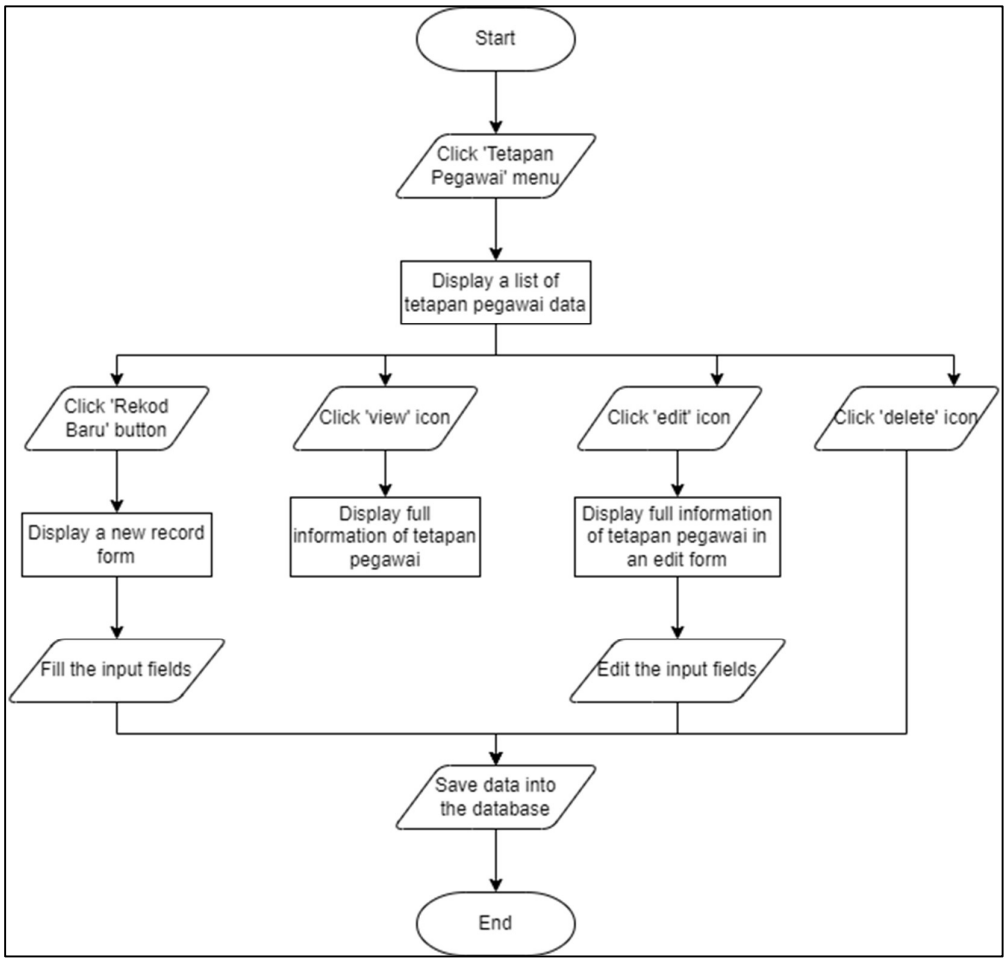


Figure 2.7 Flowchart of MyPortfolio Officer Settings Module

This module is to enable the user to assign the officer who will be in charge of validating and approving whose MyPortfolio. For instance, Officer A is in charge of validating 10 officers' MyPortfolio and approving 5 officers' MyPortfolio. Therefore, Officer A has to register the 10 officers to be under his or her validation and 5 officers to be under his or her approval.

The process of updating data in MyPortfolio Officer Settings is more complicated than usual as a new row of data can be added or a row of data can be deleted in the same edit page. In order to differentiate whether a new data is added, a data is deleted or a data is updated, a variable called flag is used. This variable is used to differentiate the process done on each row of data. Flag 1 is used to update data, Flag 2 is used to add new data and Flag 3 is used to delete data. Figure 2.8 shows the user interface of the edit page of MyPortfolio Officer Settings.

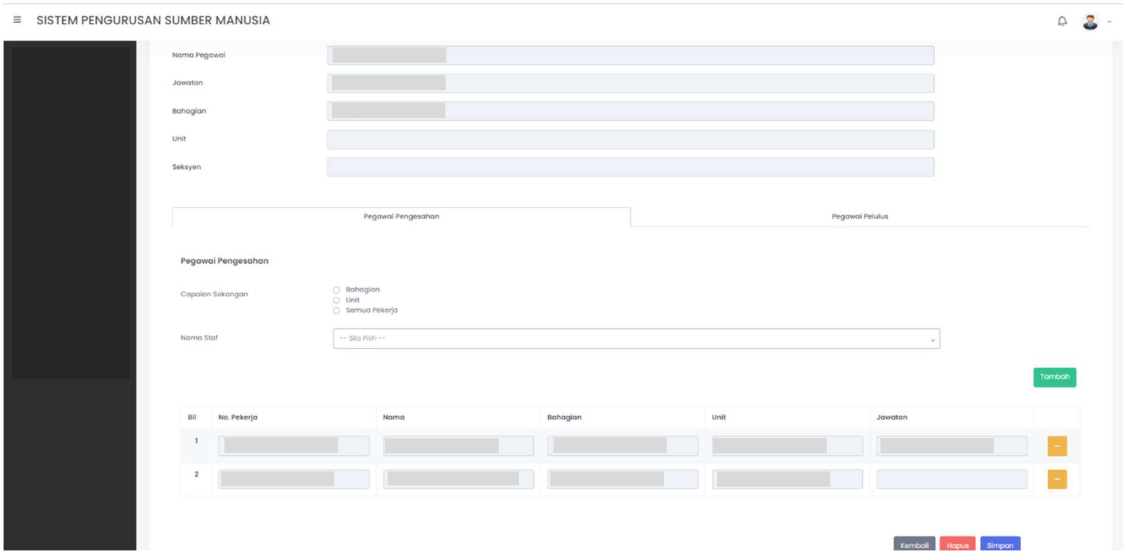


Figure 2.8 UI Edit Page MyPortfolio Officer Settings

2.2.4.2 MyPortfolio Settings Module

Myportfolio Settings is basically a setting that can be done to register MyPortfolio. Figure 2.9 shows a general overview on the flow of Myportfolio Settings module.

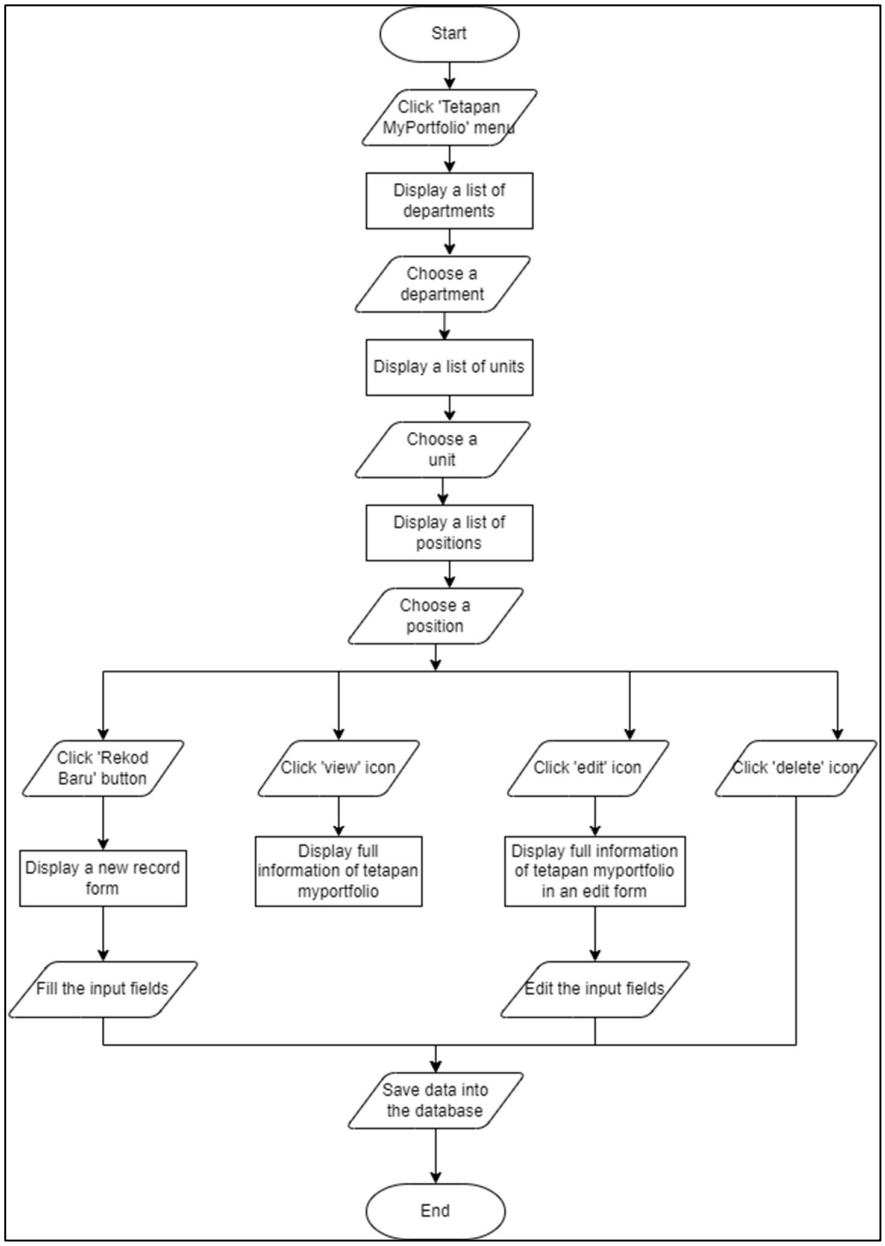


Figure 2.9 Flowchart of Myportfolio Settings Module

MyPortfolio has to be registered according to department, unit and position. Before the user is able to view a list of MyPortfolio registered in the system, three list pages will be displayed. The first page displays a list of departments that exist inside the agency. Figure 2.10 shows the user interface of the list page for departments in Myportfolio Settings.

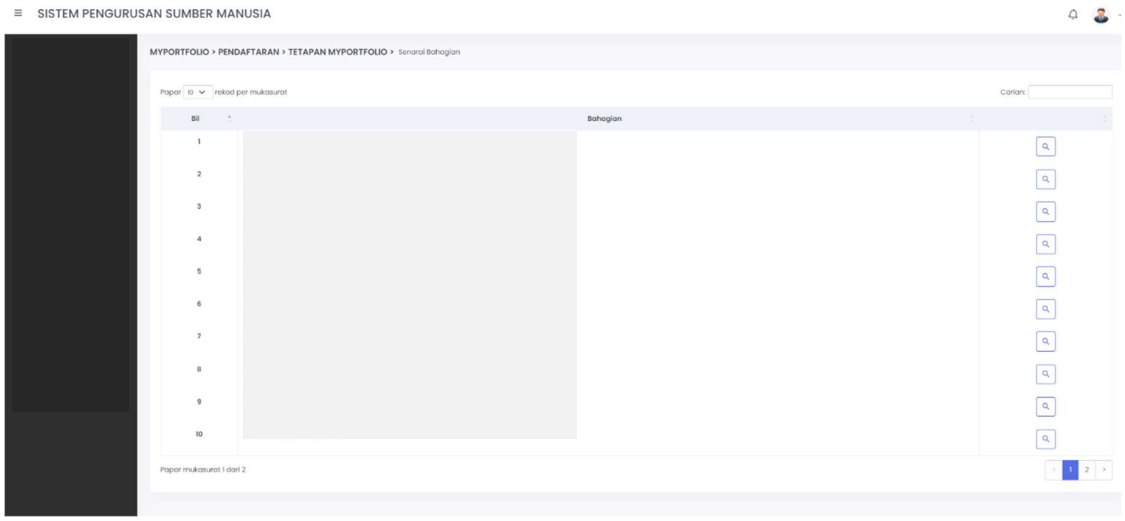


Figure 2.10 UI Department List Page Myportfolio Settings

After clicking the magnifier icon, the second page displays a list of units that exist inside the chosen department. After clicking the magnifier icon, the third page which displays a list of positions that exist inside the chosen unit will be displayed. After clicking the magnifier icon, the page that displays a list of MyPortfolio registered for that department, unit and position will be displayed.

When the 'Rekod Baru' button is clicked, a new record form page will be displayed. Figure 2.11 shows the user interface of the new record form page for Myportfolio Settings. The name of department, unit and position are displayed in readonly input fields. There are only two input fields which are for the name of MyPortfolio and the name of officer. To produce the query that displays the name of the officers that belong under the chosen department, unit and position was very complicated and long. This is because one officer can be in many departments, units and positions while working in the agency.

In order to get the latest department and unit the officer belongs to; an attribute date needs to be considered in the where condition. In order to get the position, it was much more complicated as the table that keeps the position information of the officer has no relation. Therefore, the tables cannot be simply joined. To solve the problem, the supervisor's assistance was needed. The query designed by the supervisor requires an inner join of three tables and left join with three tables. There are multiple where conditions that compare with a complete select query that has other multiple where conditions.

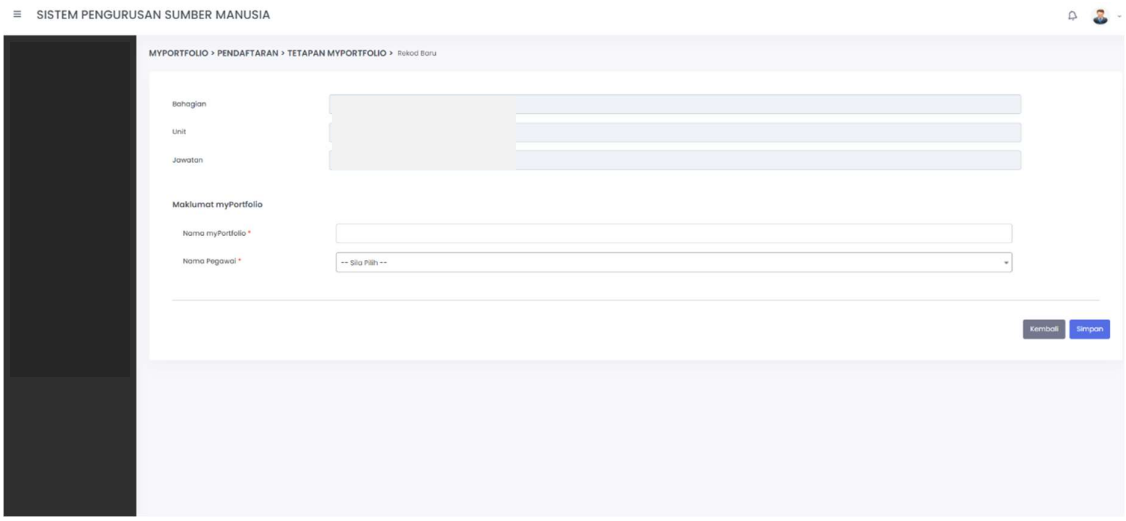


Figure 2.11 UI New Record Form Page Myportfolio Settings

2.2.4.3 MyPortfolio Transaction Module

The MyPortfolio Transaction module was one of the most complex modules assigned. Since in the middle of completing this task, another project was assigned, it took more than a month to complete. This module is where the officer can fill in all of the information about their work during their service in the agency. Figure 2.12 shows a general overview on the flow of MyPortfolio Transaction module.

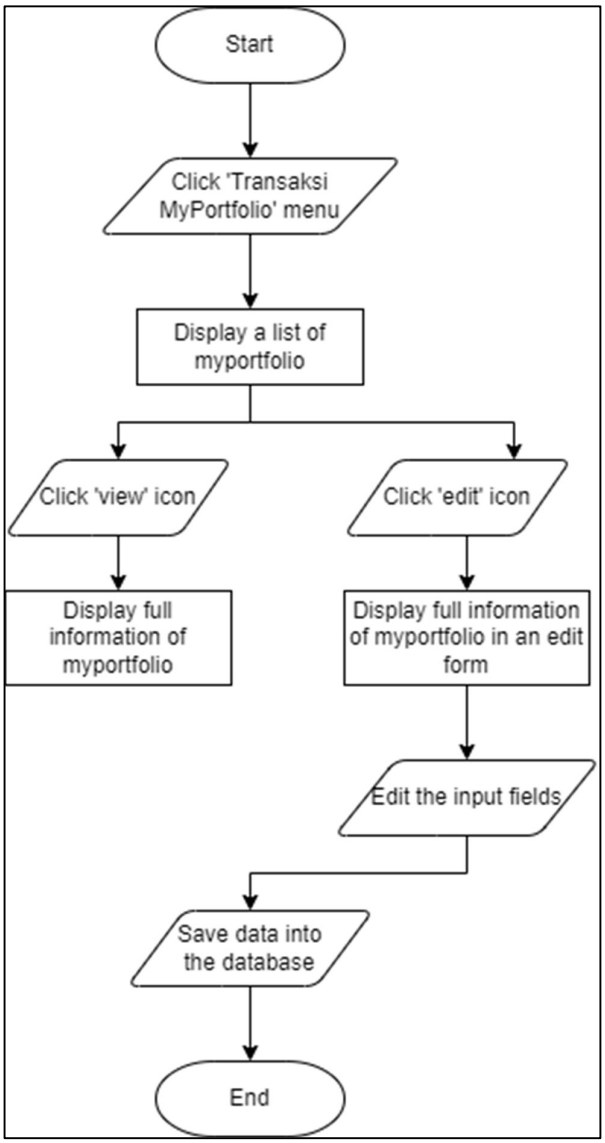


Figure 2.12 Flowchart of MyPortfolio Transaction Module

This module only has two main functions, which are to view and edit the data. In the previous module the user can assign one officer to be in charge of the registered MyPortfolio. Then, the officer can see a list of MyPortfolio assigned to him or her in the list page of MyPortfolio Transaction.

There are a total of nine tabs in the edit page of MyPortfolio Transaction. Each of these tabs hold data from different tables. Most of the tabs contain a table with a list of data. However, there are three tabs with special cases such as tab Work Process. For this tab, the data is related to the data registered in tab Functional Activity. Therefore, in order to view a list of Work

Processes for one Functional Activity, JavaScript onclick event function is used to get the data using AJAX. Figure 2.13 shows the user interface of tab Work Process in the view page of MyPortfolio Transaction.

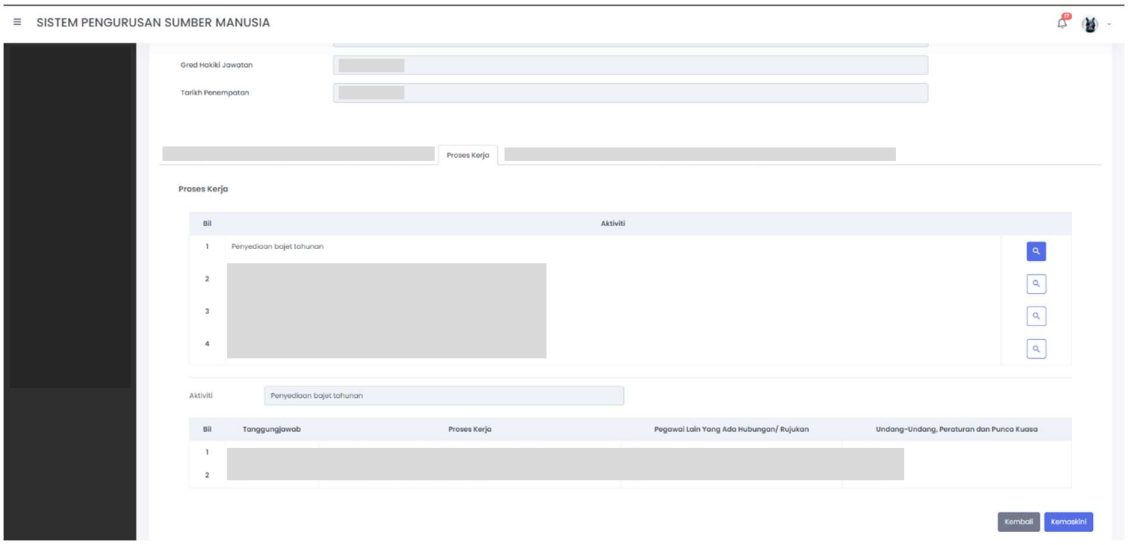


Figure 2.13 UI Tab Proses Kerja in View Page MyPortfolio Transaction

2.2.5 Replacement Leave Officer Settings Module

The next task assigned was a submodule named Replacement Leave Officer Settings. This submodule is under the Replacement Leave module. In this module, all the CRUD functions are implemented. This module is to enable the user to assign the officer who will be in charge of validating and approving whose replacement leave application. For instance, Officer A is in charge of validating 10 officers' applications and approving 5 officers' applications. Therefore, Officer A has to register the 10 officers to be under his or her validation and 5 officers to be under his or her approval.

The process of updating data in Replacement Leave Officer Settings is more complicated than usual as a new row of data can be added or a row of data can be deleted in the same edit page. However, since this module works the same way as the other officer settings module, it has become easier to be implemented. Figure 2.14 shows the user interface of the new record page of Replacement Leave Officer Settings.

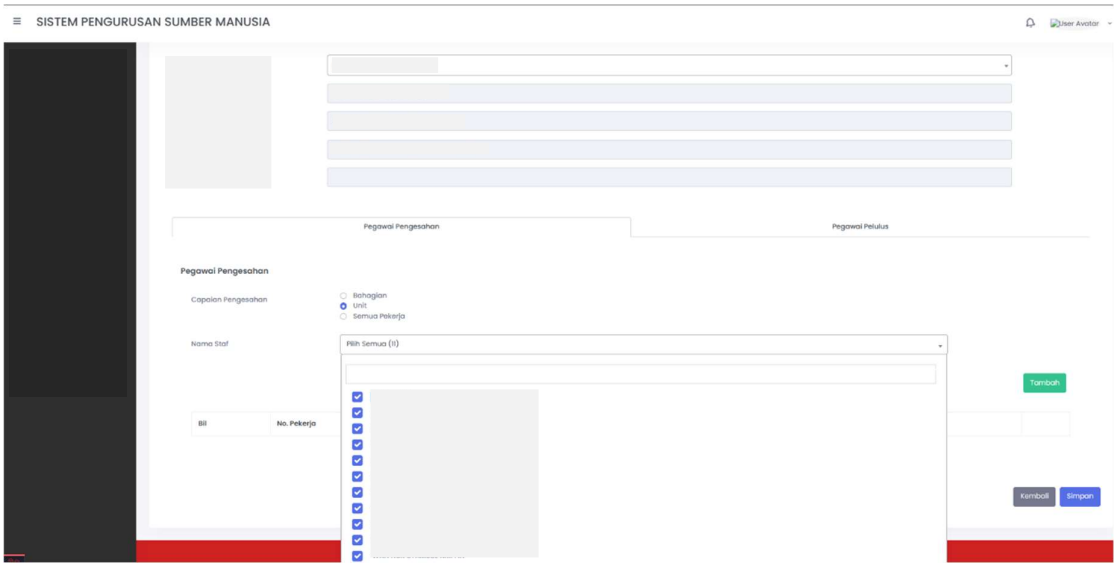


Figure 2.14 UI New Record Page Replacement Leave Officer Settings

2.2.6 Interview Module

The next module assigned during the industrial training was an Interview module and only three submodules were assigned. They were Interview Panel Settings, Scoring Criteria, Interview Candidates List and Scoring Interview Admin. In general, an Interview module is a module that processes a job application made by an applicant from the portal that passes for an interview session.

2.2.6.1 Interview Panel Settings Module

The first submodule of the Interview module assigned was an Interview Panel Settings module. This module comprises all the CRUD functions. This module's purpose is just like any other officer settings module. This module enables the user to assign an officer who will be in charge of interviewing the candidates as a panel. The difference is that the number of officers to be assigned as a panel is fixed. Other than that, this module is to create an interview session whereby the user can also select the position, venue, date, time and group.

Each interview will have two types of panels and each type of panel will have several numbers of panels. Referring to the wireframes, the panel needs to be registered in a table that

can be added to a new row with the click of a + button. However, since the number of panels is fixed, there is no need in using the table that can add a new row. After selecting the officers to be on the panels, the user will have to select which applicants to be in that interview group by checking the checkbox.

In order to display the list of applicants to be chosen by the user, as usual JavaScript and AJAX functions are used. This is because the list of applicants to be displayed depends on the position selected by the user when creating the interview session. Figure 2.15 shows the user interface of the new record page of Interview Panel Settings.

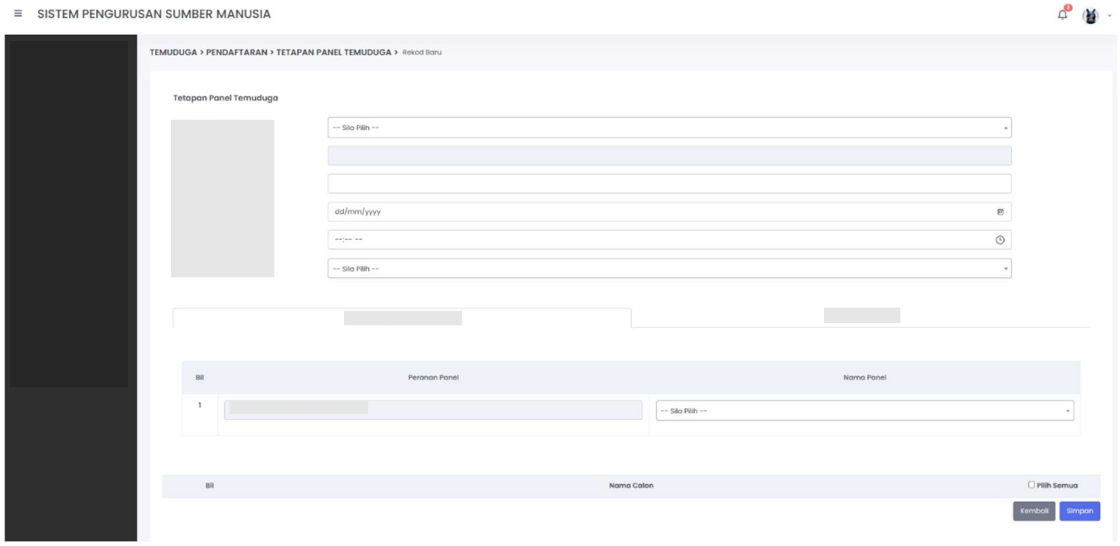


Figure 2.15 UI New Record Page Interview Panel Settings

After several weeks, there was an additional feature to be added in this module. The feature is to send an invitation to attend the interview as a panel. The invitation needs to be sent to the four panels' formal emails when the user clicks on 'Hantar' button. However, the invitations to be sent must contain a reference number. Therefore, after the user click on 'Hantar' button, a page for the user to preview the invitation and input the reference number will be displayed. After inserting the reference number, the user has to click on 'Hantar' button again. Figure 2.16 shows the user interface of the invitation preview page of the Interview Panel Settings.

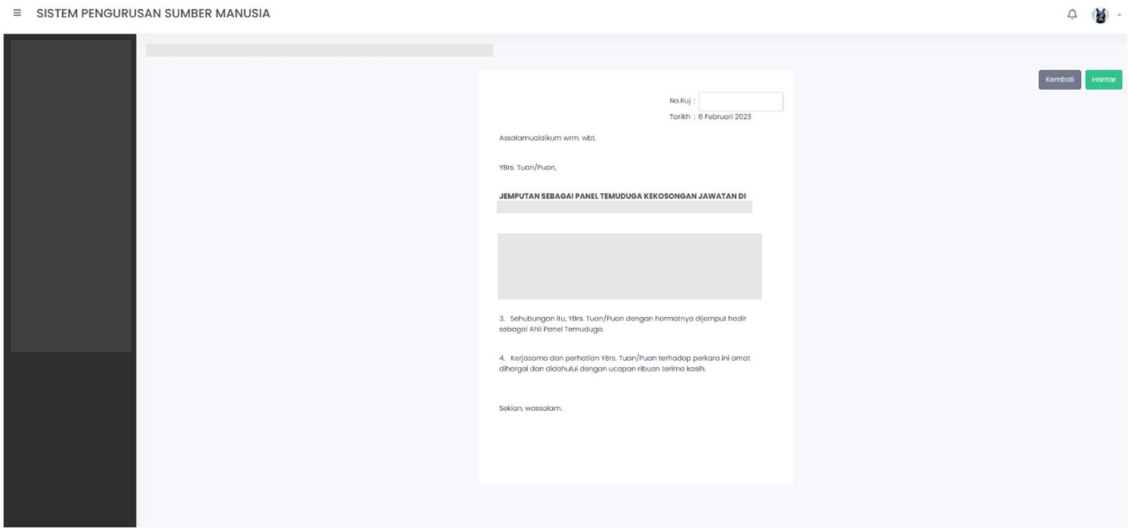


Figure 2.16 UI Invitation Preview Page Interview Panel Settings

2.2.6.2 Scoring Criteria Module

The second submodule of the Interview module assigned was Scoring Criteria module. This module's purpose is to register the score rubric for a job interview. The user can register the score for each criterion to be evaluated in an interview. This module was one of the hardest modules to be developed as the process of creating the new record page was very complicated. The reason for this was that in a table that can be added a new row with inputs inside each column, one column can also be added a new row. This means that in one row, there can be a column that contains many rows of data.

Unlike in many previous modules that only append new row to the table, the implementation of this module is not easy as the row to be added needs to clone the previous row and clear the values. Basically, the first row in the table were created in the blade.php file and it was set as hidden in the JavaScript function. When the user clicks on the '+' button, the first row will change to visible. If the '+' button is clicked again, the entire row will be cloned in the JavaScript function. Every element, tags and attributes exist in that row will be duplicated and the values of the inputs will be cleared. Figure 2.17 shows the new record page of the Scoring Criteria module.

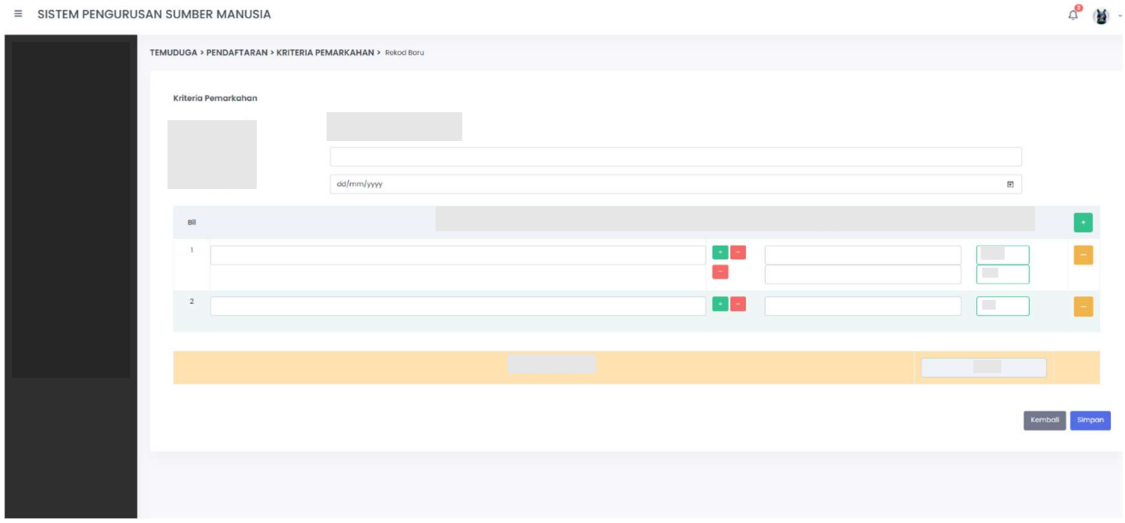


Figure 2.17 UI New Record Page Scoring Criteria

2.2.6.3 Interview Candidates List Module

The third submodule of the Interview module assigned was an Interview Candidates List module. The purpose of this module is to display all applicants that qualify for an interview. This module contains two functions which are to view the candidate's profile and download the candidate's resume. The information to be displayed in the candidate's profile page and resume is exactly the same. Since the candidates can update their information from the Job Application System, as known as HRM Portal System, the data needs to be retrieved from the tables that are specified for processing the job application.

For instance, when an applicant wants to update their personal information, the data will be retrieved from table A and saved into table A. However, in this module, the data needs to be retrieved from table AA. There is a module called Filter that specifically saves the data from table A to table AA. This is to ensure that the data sent by the applicants are the ones they sent when applying for the position. The formatting and styling of the resume were exactly the same as the one done in the HRM Portal System. Basically, almost all type of information is displayed in a table. Figure 2.18 shows the candidate's PDF resume of the Interview Candidates List module.

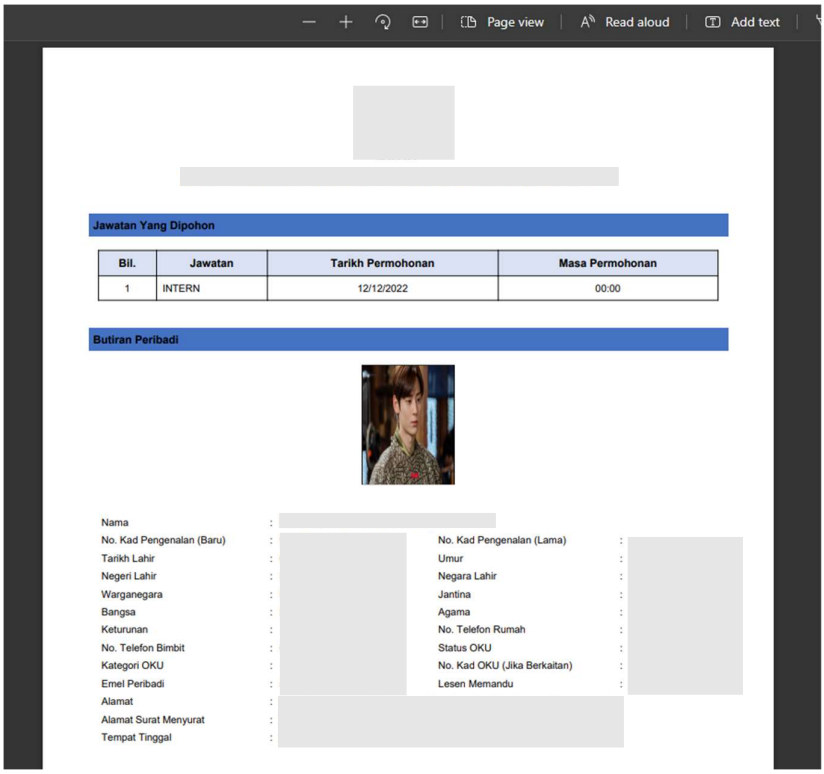


Figure 2.18 Candidate's PDF Resume

In the profile page, there are several information that cannot be displayed in a table. If displayed in a table, the table will be overflowed due to many columns. Therefore, in order to display the information, a JavaScript modal popup box is used. Figure 2.19 shows the modal popup box in the candidate's profile page of the Interview Candidates List module.

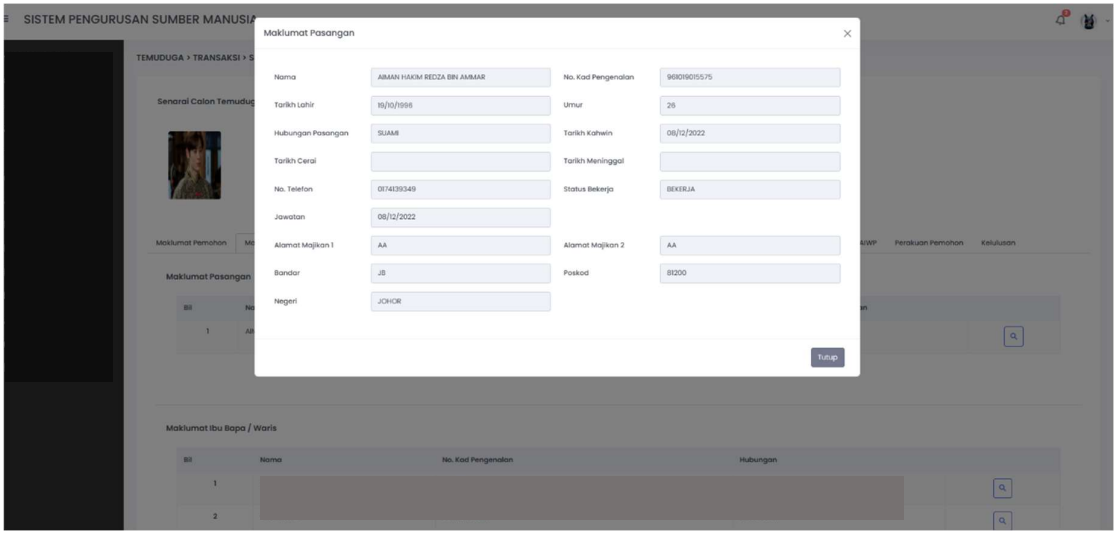


Figure 2.19 Modal Popup Box Candidate's Profile

2.2.6.4 Scoring Interview Admin Module

The last submodule of the Interview module assigned was a Scoring Interview Admin Module. This module's purpose is to display the scores given by the panels for the candidates' job applications and to enable the user give the finalised result of the job application whether the candidates pass or fail. Since there are four panels registered for an interview evaluation, this module displays all the scores given by each panel, and the total score. When the user chooses whether the candidates pass or fail, the application status will be updated. Figure 2.20 shows the user interface of the edit page of Scoring Interview Admin Module.

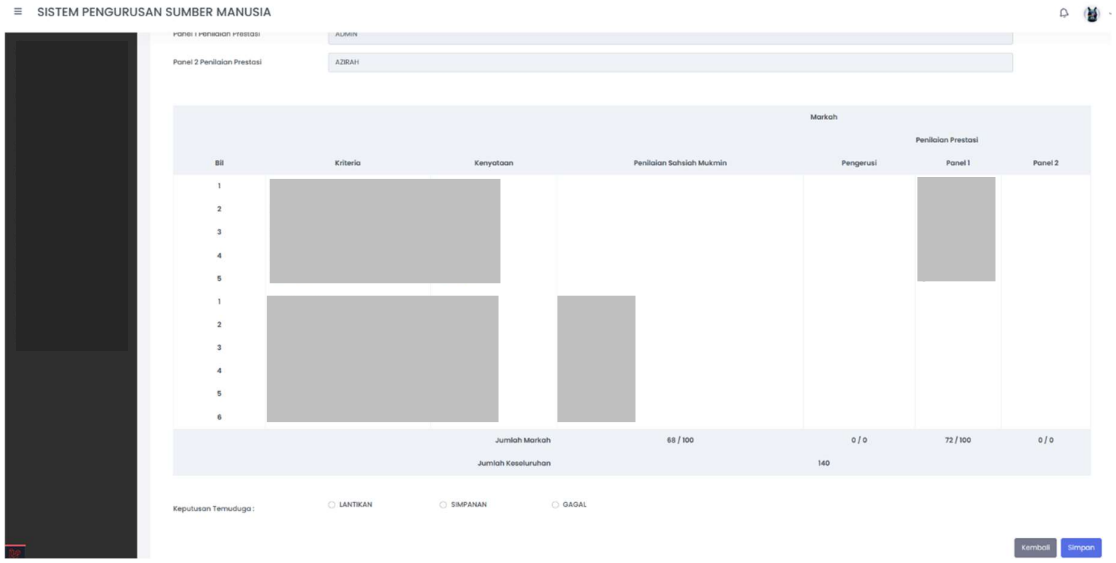


Figure 2.20 UI Edit Page Scoring Interview Admin

2.2.7 Maintenance For Other Modules

After completing the MyPortfolio Transaction module, several bugs that require immediate fixing were assigned as the sprint review session was almost near. Majority of the bugs assigned were minor whereby only the user interface design needed to be fixed. For instance, many similar bugs were assigned such as moving the validation message that appears above the dropdown input field by moving it to be below the input field. The solution to this was shared by a fellow staff who was assigned the same kind of bug before. The solution was to include data-parsley-errors-container="#errorContainer" in the input field and then define the div that is placed under the option in the input field with id errorContainer. Other than that, the minor bugs were mostly on placement of buttons, width of input field, addition of title in all pages of every module, renaming validation messages and more.

One of the major bugs assigned requires a lot of time in trying to understand the detailed business process of the Leave Entitlement Settings module. This was because the fixing requires a major modification done to the whole functions of that module.

One of the bugs assigned was a minor bug, but one of the hardest ones. The bug was to make the official email input so that the domain is fixed. For instance, make sure the email domain is only @gmail.com. Then, the user will only have to input the left side of the email.

The strategy is to display @gmail.com in the input field, then make sure the input cursor always stays before _@gmail.com. Since no other programmers have done this, no example can be referred to. After searching the internet, the solution to resolve the problem was found. In short, the solution is to create a function that creates a specific regular expression format. Then, use setSelectionRange to make sure the input cursor always stays before @gmail.com. There was a slight problem where the setSelectionRange cannot be used as the input type is email. Therefore, the attribute type is changed to text before the setSelectionRange function, and then change back to email type after the setSelectionRange function.

Many bugs require modification to the select query that displays selected data. For instance, in the 4 Hours Application Approval module. For every application, there will be an officer assigned to approve the application. The bug was the application is not displayed on the officer's side even though there are 2 applications made. After inspecting, it was found that the data is retrieved where the officer id is equals to the logged in user id. This is wrong as the officer id is a foreign key that refers to another table. In order to solve this bug, three tables have to be joined. The only data had was the logged in user id which comes from Table C. Therefore, Table A has to join with Table B and left join with Table C.

2.3 Other Tasks during Industrial Training

2.3.1 Muzium Diraja Abu Bakar POS Systems Maintenance

The second project assigned was on fixing bugs in Muzium Diraja Abu Bakar (MDAB) Systems. There are five systems in this project and three systems were assigned for fixing which are the Point of Sale (POS) Systems. One of the major bugs was found by the system analyst whereby the user for POS Ticket 1, which is for counter 1 cannot log out of the system even after submitting the closing cash amount. It is a procedure to be followed whereby the user of the system must input the closing cash amount before logging out. After a discussion with the colleague, it was found that the system allows another user to login in the same POS Ticket counter after the previous user has input the closing cash amount. Therefore, in order to fix that, another condition is added whereby another user can only login when the previous user has both input the closing cash amount and logged out.

A bug from the same module, POS Food and Beverage was assigned. The bug to be confirmed and resolved is on the sidebar menu. Each type of user has a different type of policy or access. When the system analyst logged in as a staff admin, it was found that several menus such as Food and Beverage and Reports were missing. The bug was confirmed and resolved by adding the if else condition for the sidebar menu.

A bug from another module, which is POS Souvenir, was assigned. The bug to be confirmed and resolved is on the problem with the quantity of item and total price. The bugs found were when three items are added into cart and displayed in a table, the total price is correct. Then, the second item in the table is deleted and removed from the table row, the total price updated is correct. The last item in the table is then deleted but cannot be removed from the table row. However, the total price updated is correct. Lastly, the last item in the table can still be deleted but still cannot be removed from the table row and the total price updated is incorrect. After inspecting and tracing the code using alert messages, it was found that the row index of the table is not updated after a row is deleted. For instance, when the second item in the listing with index 2 is deleted, the third item still holds index 3. This is the reason why the third item cannot be deleted as the third item now actually hold index 2. Therefore, in order to resolve the bug, an object is passed as one of the parameters to the function to delete the row.

2.3.2 Quarters Management System Maintenance

The third project assigned was on fixing bugs for the Quarters Management System. The Quarters Management System uses the same PHP version as the HRM System. Therefore, there were no environment changes that needed to be done. However, the code in the Quarters Management System was quite different as opposed to the HRM System. Majority of the bugs assigned for the system's maintenance were minor bugs. For instance, the first minor bug assigned was on the position of the horizontal line. Upon client's request, the horizontal line needs to be swapped so that it will be below the title of the page. Other than that, change the tooltip name for the icon, change the position of the buttons, rename the validation messages and more. Another bug was on the different data display on the list and view page. On the list page, the data displayed with the first letter of the word in uppercase, while the rest in lowercase. For instance, "Copy Of Identification Card". However, in the view page which displays the full information of the data, it displays "COPY OF IDENTIFICATION CARD".

To resolve the bug, the function strtolower() which changes the characters to lowercases and ucwords() which changes the first character in every word to uppercase is removed. So, the data is displayed as the one stored in the database. Other than bugs, a task was assigned to create the index and view pages for Agency and Department submodules in the System Configuration module. The task was only to create the page to view a list of agencies and departments in the system and the view page which displays the full information about the agency and the department.

2.3.3 Quarters System Documentation

Documentation was assigned for only one week after the maintenance of Quarters Systems. For the documentation, the task assigned was to amend the Software Requirements Specification (SRS) document for the second version. After the maintenance was done, a lot of procedures were changed. This requires amendment in the use case diagram, use case description, sequence diagram and user interface design. The amendment for these diagrams were done using Visio. Several modules were assigned which are Log In, Placement Confirmation and Monitoring for the Quarters Management System while Log In, Quarters Application and Complaint for the Quarters Application System.

2.4 Hardware and Software used

Table 2.1 Hardware Used for Task Completion

Hardware	Specifications
Processor	12th Gen Intel(R) Core (TM)
RAM	8.00 GB
Input medium	Logitech Mouse, Logitech Keyboard
Output Medium	Acer Monitor

Table 2.2 Software Used for Task Completion

Software	Specifications
Operating System	Windows 11 Professional
Programming Language	PHP Laravel

Development Tools	Visual Studio Code, Composer, XAMPP, TortoiseSVN
Database	HeidiSQL
Design	Visio

2.5 Task Completion Period

The tasks assigned varied from task to task depending on the complexity of them. Appendix A depicts the completion period of the tasks assigned in a Gantt Chart for better illustration.

2.6 Theoretical and Practical Knowledge

A lot of knowledge is gained during the industrial training, especially practical knowledge in programming. Firstly, the way to use ajax in the JavaScript function in order to make the system more interactive is finally clear. For instance, a lot of ajax and JavaScript functions were implemented in order to display a list of data in a dropdown select input based on data chosen from the previous dropdown select input.

Secondly, getting to practice the knowledge of joining tables from the Database course and understanding it more clearly now. Previously, only the basic knowledge on how two tables can be joined was understood while taking the Database course in the second year. During the industrial training, skills in using join and left join for more than four tables were given the chance to be polished.

Next, the knowledge gained from the Software Engineering course was used in order to update the Software Requirements Specification (SRS) document for the Quarters System. The use case diagrams, use case descriptions, and sequence diagrams are all constructed based on the knowledge gained in the previous courses.

Other than that, technical knowledge is gained when another project is assigned. For instance, when the MDAB System project was assigned, the technical knowledge on how to downgrade the PHP version and Composer version in order to fix the system was gained. New knowledge was gained as changing the environment of the computer has never been done

before. As another project that has a different PHP and Composer version was assigned again, like Quarters Systems, changing the environment had become easier.

2.7 Problems Faced

For sure there are problems. The first problem faced was actually a simple problem that seemed to be major as the usage of AJAX and JavaScript functions were still very unclear and unfamiliar. When implementing the Discipline Report module, specifically on the JavaScript function to display a list of Discipline records for a certain officer, a lot of errors happened. The errors happened mainly due to the wrong usage of the AJAX function.

One of the major problems faced during the industrial training was to display a list of officers based on the chosen department, unit and position in the MyPortfolio Settings module. The problem was an officer can be in multiple departments, units and hold many positions. To get the latest department, unit and position multiple tables need to be joined and the where conditions are complicated. A junior programmer's assistance was needed for this problem and she also asked the supervisor's assistance as it was more complicated than expected and the supervisor has a deeper understanding on the database design. The query designed by the supervisor was very long and the correct data finally can be displayed.

When doing programming, there would always be the time when there is an error without any explanation on which line the error happened. When inspected, the code should be working well as the function and the syntax were all correct. When another programmer's assistance was asked, the fault was always something minor such as a spelling mistake. In the future, it is very important to make sure there is no carelessness in the code before giving up on fixing the error.

2.8 Conclusion

In this chapter, the details regarding the tasks given were discussed in depth with screenshots. This industrial training has provided the internship student with a lot of opportunity to enhance their programming skills to be a good full-stack developer. The training

also makes the student to be more creative in solving problems in order to create the system modules or fix bugs. In return, the student can be more confident to further their career in this industry in the future.

CHAPTER 3

OVERALL INFORMATION OF THE INDUSTRIAL TRAINING

3.1 Introduction

This chapter explains the knowledge gained after undergoing the industrial training at RN Technologies Sdn. Bhd. This chapter also elaborates on constructive comments given about the overall task performance.

3.2 Things Learned When Conducting a Task

3.2.1 Importance of Communication

Communication is the key to success. In almost every work done, communication is very important in order to make sure that the system meets user requirements. Initially when a development needs to be done, the developer only has to follow the wireframe provided. However, the wireframe cannot be relied on 100% as the wireframe is done by humans, who are known to be imperfect. Therefore, before starting any development it is important to discuss with the supervisor or the system analyst on the detailed business process. When discussing with the supervisor, an extra explanation on the technical aspects of the system will be given. For instance, the supervisor would explain how to join tables needed to display the data, how to use AJAX and more.

3.2.2 Programming Skills

The programmers in RN Technologies Sdn. Bhd. shared a lot of useful tips and tricks that help in making the programming work easier and faster. Firstly, the staff taught how to

display data with complex conditions by testing the query first in HeidiSQL. When there is a task that requires to display data with complex conditions in the query, it is easier if the query is designed in HeidiSQL first to test whether the correct data is retrieved. Other than that, it saves a lot of time as there is no time spent to run the code over and over.

Secondly, the staff taught a lot on how to trace the coding for the purpose of finding the root cause of error. Finding the cause of error has become much easier when using functions like dd() and alert(). The staff also shared that the dd() function can be used to test the query. For instance, sometimes the query that is converted into PHP Laravel may not work due to wrong syntax, so we can fix it by including the dd() function at the end of the query to see where the problem is.

3.2.3 Thinking Skills

Sometimes, the tasks given by the supervisor or the system analyst require a lot of searching on the Internet especially if the task had never been done by the other programmers in the company. Many useful websites taught a lot on how to solve the problem with many alternatives. However, not everything on the Internet can solve the problem as the code shared by the Internet cannot be fully utilized in the HRM System's code. Thus, thinking outside the box is very essential in solving programming problems.

3.3 Constructive Comments of Overall Task Performance

Overall, the experience and knowledge gained from this industrial training is priceless. The tasks given helps a lot in improving one of the most essential skills as a software engineering student, which is programming skill. It gives a clear view and confidence in developing the system for the second part of final year project. It can be confidently be said that the overall task performance was excellent. All tasks managed to be done within the time given and most of the time, it can be done faster. A lot of contributions were made to develop the system. However, there are several things that are not exposed to very well. For instance, the documentation part of the system. It is still a wonder on what kind of documentation is

done after a system is released. In general, how the entire business works. How detailed testing is actually done in order to test all kinds of data.

3.4 Chapter Summary

In short, this chapter elucidated the knowledge gained after undergoing the industrial training at RN Technologies Sdn. Bhd. In addition, explanation on the constructive comments given about the overall task performance are also included.

CHAPTER 4

CONCLUSION

4.1 Introduction

This chapter explains the overall achievement after undergoing the industrial training at RN Technologies Sdn. Bhd. This chapter also elaborates on issues and challenges faced during the industrial training and several opinions and suggestions that can improve the training in the future.

4.2 Overall Achievement

In a nutshell, the main objectives of industrial training are achieved successfully. Firstly, adapting oneself in a new work environment where everything works progressively. As a student, it is common to be multitasking for different courses. Multitasking was practiced even more during the industrial training where a task is assigned along with several bugs in one time.

Communication wise, improved successfully especially when communicating about the technical aspects of the system. For instance, before asking or explaining the problem to the staffs, sentence arrangements are done first hand. This is to ensure that the points and message to be sent is understood by the second party successfully.

As 95% of the tasks assigned are on programming, it can be said with confidence that the programming skill is enhanced successfully. It is definitely the biggest achievement as this programming skill will come in handy during the second part of final year project and future career.

4.3 Issue and Challenges

One of the challenges while conducting a task during the industrial training was when there is no clear understanding on the detailed business process of a certain module. Sometimes, the task assigned was to fix bugs and these bugs usually requires modification done to the function in the controller. The bugs sometimes were assigned with no explanation on how the actual business process is. Thus, a lot of time was spent in trying to understand someone else's code to figure out why it was done that way before the actual correction can be done.

Another challenge was when the bugs assigned cannot be confirmed immediately due to lack of information. For instance, there was a major bug assigned found by the system analyst and when tested in the development side, no bug found as every function worked perfectly. However, when the system analyst tested the function again in the staging side, the same bug was found again. Confusion arose from both parties as it was puzzling how the bug exists. After further discussion, the bug was finally found. The reason why there was no bug found in the first place was the steps taken to perform the test were different than the steps taken by the system analyst.

4.4 Opinion and Suggestion

It is highly suggested to normalize the usage of comments for every function or complex statement in the code. With comments, the person in charge of fixing the bugs for that module will be able to understand instantly on why the code is done that way and able to find the root cause of problem. To make the work easier, it is better if the initial programmer in charge of that module can explain the code so that the person in charge of fixing the bugs is more aware on what function can or cannot modify in order to avoid further complications to other modules.

When creating bugs to be assigned to the programmer, it is suggested to rewrite the exact steps taken while testing the system so the programmer can follow the steps and find the bugs. This can avoid confusion and reduce the time spent in trying to find the bugs using multiple different steps.

4.5 Conclusion

RN Technologies Sdn. Bhd. is definitely the best place to go for industrial training. The interns are definitely exposed to a real working environment, and given the huge honor to for real high-profile projects. The company is very professional in everything they do and treated the interns like a full-time working staff treated like a working staff. In addition, the company has a very healthy work environment which makes the company to be more successful and has a good name among the clients.

REFERENCES

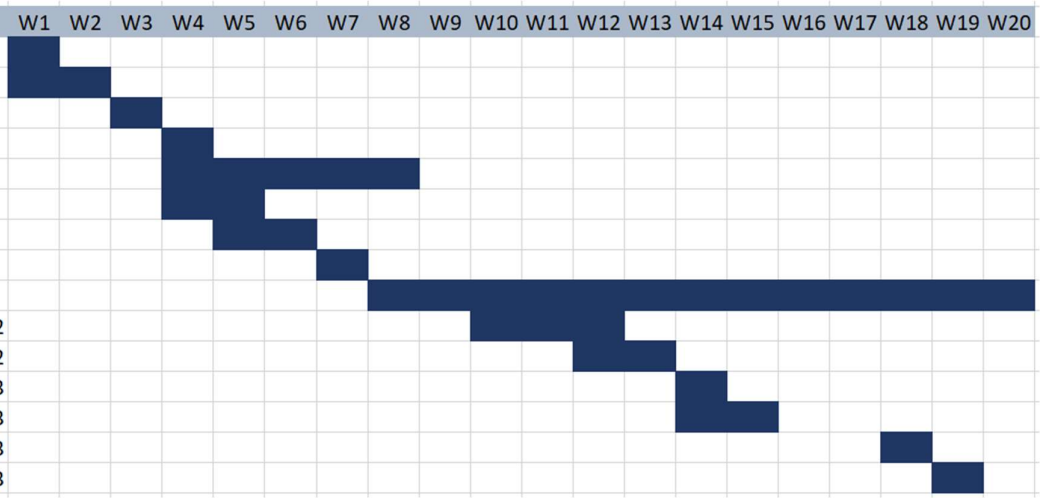
Meet Laravel. (2011). Laravel. Retrieved December 30, 2022, from https://laravel.com/

What is Laravel? (2021). Digital Oceans. Retrieved December 30, 2022, from https://www.digitalocean.com/community/tutorials/what-is-laravel

What's This? (2006). HeidiSQL. Retrieved December 30, 2022, from https://www.heidisql.com/

Appendix A Industrial Training Gantt Chart

TASK	START	FINISH
Discipline Transaction Module	6/10/2022	8/10/2022
Discipline Report Module	8/10/2022	11/10/2022
MyPortfolio Officer Settings Module	18/10/2022	19/10/2022
MyPortfolio Settings Module	23/10/2022	25/10/2022
MyPortfolio Transaction Module	25/10/2022	29/11/2022
Maintenance Museum's POS Systems	28/10/2022	3/11/2022
Maintenance Quarters Management System	4/11/2022	11/11/2022
Amendment SRS Quarters Systems	14/11/2022	17/11/2022
Maintenance HRM Systems	29/11/2022	16/2/2023
Replacement Leave Officer Settings Module	5/12/2022	18/12/2022
Interview Candidates List Module	20/12/2022	29/12/2022
Interview Panel Settings Module	9/1/2023	11/1/2023
Scoring Criteria Module	12/1/2023	16/1/2023
Job Application Module	31/1/2023	31/1/2023
Scoring Interview Admin Module	6/2/2023	8/2/2023



Appendix B Industrial Training Achievements

Sekretariat Latihan Industri
Sekolah Komputeran,
Universiti Teknologi Malaysia,81310 SKUDAI, JOHOR
Fax: 07-5565044 Tel: 07-5532008

INDUSTRIAL TRAINING ACHIEVEMENTS

(This form must be filled by student and must be attached in the Industrial Training report)

Student's Name : Nadiah Binti Mohd Hanim

Organisation : RN Technologies Sdn. Bhd.

No.	Task (List all tasks have been completed)	Month of Task Achieved				
		Month 1	Month 2	Month 3	Month 4	Month 5
1	Discipline Transaction Module	✓				
2	Discipline Report Module	✓				
3	MyPortfolio Officer Settings Module	✓				
4	MyPortfolio Settings Module	✓				
5	MyPortfolio Transaction Module	✓	✓			
6	Maintenance MDAB POS Systems	✓	✓			
7	Maintenance Quarters Management System		✓			
8	Maintenance HRM Systems		✓	✓	✓	✓
9	Replacement Leave Officer Settings Module			✓		
10	Interview Candidates List Module			✓	✓	
11	Interview Panel Settings Module				✓	
12	Scoring Criteria Module				✓	
13	Interview Scoring Admin Module					✓

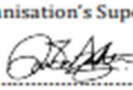
Deliverable/Training reflection
(Outcomes that have been achieved)

The outcomes that have been achieved from the industrial training are enhanced programming skills especially in using PHP Laravel Framework. The experience of developing several modules and fixing bugs for several high-profile systems projects was a golden opportunity that taught a lot in sharpening the problem-solving skills. Other than programming, knowledge in system design and system testing which are other essential parts of software development were also acquired when given the chance to update the System Requirements Specification (SRS) document.

Student Signature:  Date: 30/01/2023

Approval

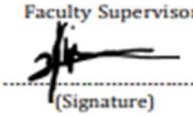
Organisation's Supervisor:



(Signature)

Name: SHAHRUL AZHAN BIN ISHAK
Date: 31/01/2023

Faculty Supervisor:



(Signature)

Name: ZURAINI BINTI ALI SHAH
Date: 11.2.2023

Appendix C Industrial Training Checklist

INDUSTRIAL TRAINING CHECKLISTS (PLACEMENT)

No.	Activities/Tasks	Tick (√)	Endorse by and date
1.	Report Duty to The Organization Approved by faculty	√	2/10/2022
2.	E-mail Report Duty Verification (BLI-1D) to faculty supervisor.	√	7/10/2022
3.	Upload Report Duty Verification (BLI-1D) in e-learning for course code SCS*4114.	√	6/11/2022
4.	Contact faculty supervisor to inform the job scope and organization information	√	7/10/2022
5.	Fill in organization supervisor information survey in ITS	√	6/11/2022
6.	*Update of Industrial Training site (address). Inform faculty supervisor and JKL, if any changes.*	-	-
7.	Updating Industrial Training Logbook online – daily basis	√	Daily
8.	Ensure that organization supervisor able to login to ITS successfully (Organization supervisor get ITS userid and password).	-	-
9.	Faculty Supervisor Visit. Date:	√	2/2/2023
10.	Industrial Training Presentation.	√	2/2/2023
11.	Performance evaluation by organisation supervisor. Online or *submission BLI-2B during supervisor visit.*	√	11/2/2023
12.	Submission of Industrial Training Logbook.	√	11/2/2023
13.	Submission of Industrial Training Report with checklist and achievement form as Appendix.	√	11/2/2023
14.	Fill in Industrial Training Performance Evaluation by student (BLI-1E) in ITS.	√	12/2/2023
15.	End Industrial Training	√	16/2/2023

Note:
1. Italic activities are optional depending on student situation.

IIMPORTANT: This checklist must be put as attachment in the industrial training report.

Prepared by Industrial Training Committee, Faculty of Computing, UTM 16 August 2016