DIGITAL REAL ESTATE AGENT MANAGAEMENT SYSTEM (DREAMS)

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This report is submitted in partial fulfillment of the requirements for the
Bachelor of [Computer Science (Software Development)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I hereby declare that this project report entitled

[DIGITAL REAL ESTATE AGENT MANAGEMENT SYSTEM (DREAMS)]

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : ______________________ Date : 07/09/2021

(MOHD ASYRAF BIN MOHAMED HANIF)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of [Computer Science (Software Development)] with Honours.

SUPERVISOR : ______________________ Date : 07/09/2021

(ASSOC.PROF. DR SABRINA BINTI AHMAD)

DEDICATION

I would like to dedicate this project to my respectable Father and Mother for always support me in whatever I do and always stay behind me in whatever situation that I face. Besides that, I want to thank you to my Honorable supervisor who are always dear and near to me and without whose patience, care, understanding and support it would not have been possible to come up to this position.

ACKNOWLEDGEMENTS

Alhamdulillah, first and foremost thanks to Almighty Allah S.W.T for the endless blessing who gave me the opportunity, capability, spirit, and patience to complete this project.

It is my great pleasure to express my profound sense of gratitude to my Supervisor Assoc.Prof. Dr Sabrina Ahmad for the academic advice, guidance, and support that she gave to me towards the completion of this project. I am really benefiting from his excellent supervision.

Besides that, a big thank you to my beloved parents who have been giving me the encouragement and motivation throughout the course of this project. Without them it is quite impossible for me to get to this stage.

Finally, I would like to thank all my friends who helped me directly or indirectly to complete this project.

ABSTRACT

Today we are living in the world of internet and digital era. Most economic sectors, especially in Malaysia has implemented internet technology and digitize their business process. Today's real estate industry faces several challenges, including a scarcity of skilled labour, data loss and duplication, slow access to information, and the use of antiquated methods of data analysis and storage. Without a proper management tool, the real estate agent will be facing difficulty to access customers data and high potential of data loss. Besides that, in this era of pandemic Covid-19, the owner of the property having difficulties to market their property without appoint of a property agent. Furthermore, with the advent of digital systems in property management, it will facilitate the process of property owner to find and assign a qualified agent to market their property. As well as a property agent, the use of digital management system will provide comprehensive ways manage their active listing and customer data.

ABSTRAK

Hari ini kita hidup dalam dunia internet dan era digital. Sebilangan besar sektor ekonomi, terutamanya di Malaysia telah menerapkan teknologi internet dan mendigitalkan proses perniagaan mereka. Industri hartanah pada masa kini menghadapi beberapa cabaran, termasuk kekurangan tenaga mahir, kehilangan data dan penduaan, kelewatan mencapai maklumat, dan penggunaan kaedah analisis dan penyimpanan data yang lemah. Tanpa alat pengurusan yang betul, ejen hartanah akan menghadapi kesukaran untuk mengakses data pelanggan dan potensi kehilangan data adalah tinggi. Selain itu, dalam era pandemik Covid-19 ini, pemilik hartanah itu mengalami kesukaran untuk memasarkan hartanah mereka tanpa melantik ejen hartanah. Tambahan pula, dengan adanya sistem digital dalam pengurusan hartanah, ini akan memudahkan proses pemilik hartanah tersebut untuk mencari dan menetapkan ejen yang berkelayakan untuk memasarkan hartanah mereka. Begitu juga terhadap ejen hartanah, penggunaan sistem pengurusan digital akan menyediakan cara menyeluruh untuk menguruskan penyenaraian aktif dan data pelanggan mereka.

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DREAMS	**-**	**Digital Real Estate Agent Management System**
DB	**-**	**Database**
ERD	**-**	**Entity Relationship Diagram**
REA	**-**	**Real Estate Agent**
REN	**-**	**Real Estate Negotiator**
UI	**-**	**User Interface**

LIST OF ATTACHMENTS

CHAPTER 1: INTRODUCTION

1.1 Introduction

Digital Real Estate Agent Management System (DREAMS) is a digital platform that facilitates the Real Estate Agent (REA) agency to manage their clients and property information. DREAMS will act as an intermediate platform between the property owner and real estate agency. By using DREAMS, the Real Estate agency able to manage and store all the information regarding clients and property information in a centralized database system. With the increasing of clients, a company needs to have a systematic system to manage their client's data. The use of manual process is inappropriate to manage a huge data. DREAMS will also provide a dynamic report regarding property information to estate agent. Furthermore, DREAMS this system consists of three users, which are an Administrator, Real Estate Negotiator and Property Owner. With a centralized model of property management, Real Estate Agent agency can assure the clients that they are offering the most efficient management available.

1.2 Problem statements

There are many reasons this project was developed. This is because there are a few problems that happen to the user which are:

I. Lack of computerized system - Currently most of Real Estate Negotiator (REN) do not have a specific system for storing and recording their customer data.

II. Lack of data accessibility – Without a proper data management platform, Real Estate Negotiator (REN) facing difficulty to access customers data and high potential of data loss.

III. Lack of monitoring – Property owners have difficulty to monitoring and keep track assigned agent's progress.

1.3 Objectives

The objectives for this project are:

I. To develop a digital management tool for Real Estate Negotiator (REN) to manage their active listing and customers data.

II. To provide a centralized database system that can stored customer information and easily access by Real Estate Negotiator (REN).

III. To provide a digital monitoring tool for property owners to keep track the assigned agent's progress.

1.4 Project Scopes

1.4.1 Module Developed

I. Manage User Module

Manage user module including management of user authentication and user registration process.

II. Real Estate Negotiator Module

This module allows property owner to assign Real Estate Negotiator through the system. This module including the management of active listing record and potential client status.

III. Property Management Module

This module including property management that will be manage by property owner. In this module allows property owner to manage property owner and property information.

IV. Reporting Module

This module will provide a dynamic report according to the data obtained from the user.

1.4.2 Target users

The target users for this system are:

I. Estate Agent Agency
II. Real Estate Negotiator
III. Property Owner

1.5 Project Significance

The real estate industry is one of the slowest industries that transition into advance technological software. Most of the property management companies are still using spreadsheets, papers, email, and other manual recording software to compile important information. As a real estate negotiator that work at real estate agency, they might be working with multiple clients and need to manage a lot of data. DREAMS are developed for real estate negotiator to manage their active listing and customers data. Real estate negotiator can facilitate their work because of the dedicated design and key features that are needed for the property management business. DREAMS also provide two-way connection between a property owner and their assigned agent to keep track the progress about the status of their property.

1.6 Expected Output

The expected outputs for this system are:

I. Increase efficiency – Digital Real Estate Agent Management System be able to increase the efficiency of REN to manage all the data regarding to property in a centralized way.
II. Data accessibility – With the use of centralized database management system, the user can access the data easily at anywhere and anytime.
III. Report accuracy – The implementation of centralized database will help to the estate agent to store accurate information and generate an accurate report.

1.7 Conclusion

As a conclusion, from all the details in this chapter, the project developed follow as a planning. The system has four modules which are Managing user module, Real Estate Negotiator module, Property Management module and Reporting module. All the hardware and software mentioned were used to make sure the project meet the requirements.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The purpose of this chapter is to describe the implementation of digitalization systems in the real estate industry by gathering the information through the website and research that has been done. It has played an important role as the early phase in developing this project. The literature reviews phase were completed based on the observation of the current system regarding to Real Estate industry especially for property management.

This chapter contains all the surveys measured on existing systems on the internet, including reviews of the system's features, features and capabilities. In order for this project to overcome, any weaknesses of the current or existing system will be identified and the strengths of the existing system will be investigated so that they can be implemented in the proposed system.

A software development methodology is a procedure of how to build software. A methodology contains of various phases as recommendation and suggestion that needs to be followed in order to achieve the objectives of the project. Besides that, the system requirement and project milestone also will be briefly described in this chapter.

2.2 Fact and Findings

Fact-finding techniques is the procedure and operation of collecting the data and information based on the approach that been used before developing a system. The aim of this technique is to discover the accurate fact and information before starting to develop a system. All the gathered information will be supported by an analysis of the existing system and research on the internet and books.

2.2.1 Domain

DREAMS are developed to be used by real estate agency to improve their business process from day-today. DREAMS will act as management tools by focusing on Real Estate Negotiator to manage their customer information including property and property owner information in a centralized way.

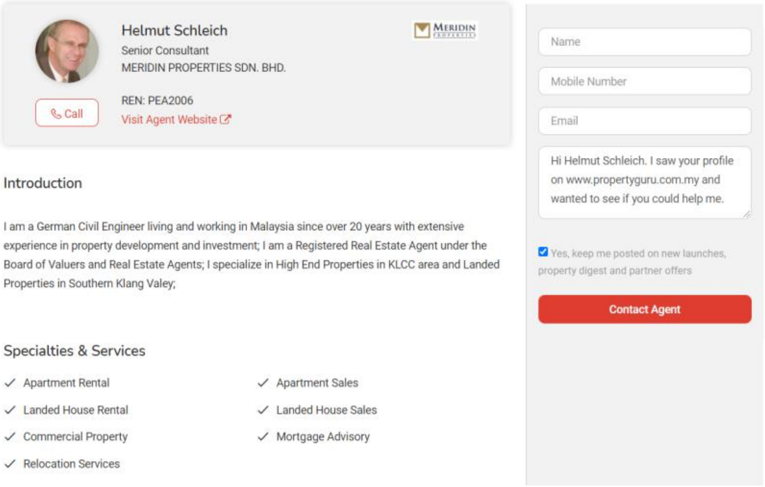
DREAMS offers a full authority to the Real Estate Agency to use and manage the system. By using this platform, property owner be able to review the registered agent profile before deciding to assign on specific agents. DREAMS provide an additional feature to owner which allow property owners to view potential client that listed by the assigned agent who are interested on their property.

By using this system, all the suitable information will be stored in a centralized database system that can easily access by the user of the system.

2.2.2 Existing System

This subchapter describes the existing system functionality, features and capabilities for my observation to determine the appropriate requirements and needs on my project.

2.2.2.1 Property Guru



Helmut Schleich
Senior Consultant
MERIDIN PROPERTIES SDN. BHD.

REN: PEA2006
Visit Agent Website

Introduction

I am a German Civil Engineer living and working in Malaysia since over 20 years with extensive experience in property development and investment; I am a Registered Real Estate Agent under the Board of Valuers and Real Estate Agents; I specialize in High End Properties in KLCC area and Landed Properties in Southern Klang Valey;

Specialties & Services

✓ Apartment Rental
✓ Landed House Rental
✓ Commercial Property
✓ Relocation Services
✓ Apartment Sales
✓ Landed House Sales
✓ Mortgage Advisory

Hi Helmut Schleich. I saw your profile on www.propertyguru.com.my and wanted to see if you could help me.

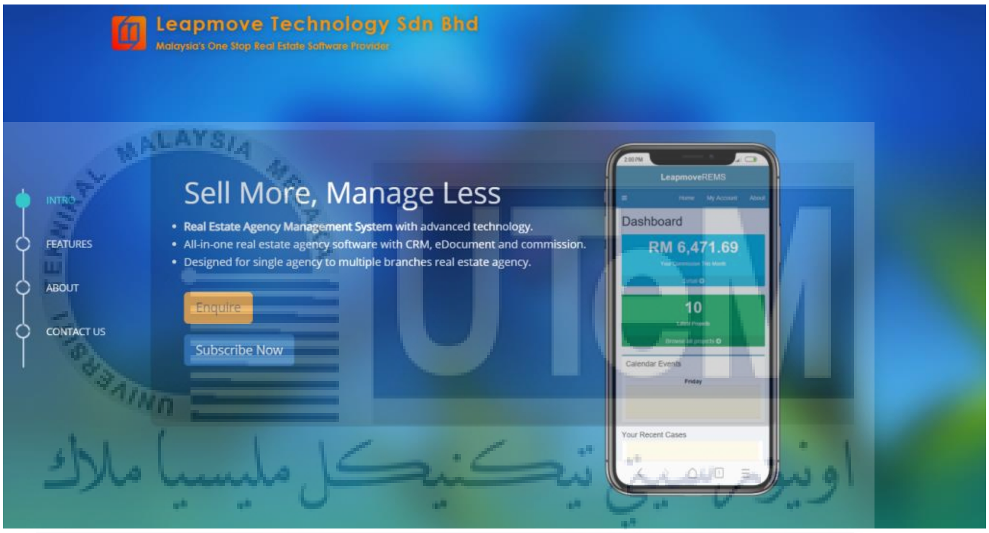
☑ Yes, keep me posted on new launches, property digest and partner offers

Figure 2.1:Find property agent on Property Guru

Property Guru is a well-known company that help people to find property and also property agent. Through a developed portal, they allow people to find and view property agent profile. For those who are interested to assign on selected agent, they need to fill in the required form and click "Contact Agent" button to notify the agent.

By using this method, property agent only gets the information about the property owner, but not the information about the property to be sale or rent. This method is difficult to identify whether the individual that contacted the agent actually owns the property or otherwise.

2.2.2.2 Leapmove



Sell More, Manage Less

- Real Estate Agency Management System with advanced technology.
- All-in-one real estate agency software with CRM, eDocument and commission.
- Designed for single agency to multiple branches real estate agency.

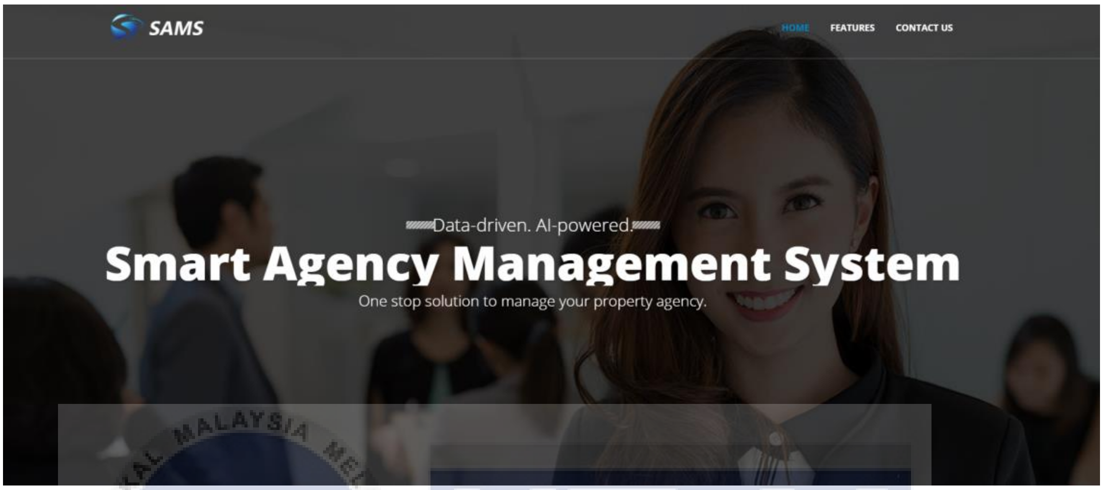
Figure 2.2:Leapmove Software

Leapmove is a mobile application that has been developed by Leapmove Technology Sdn Bhd. Leapmove provide Real Estate Agency Management System with advanced technology. This system was designed for single agency to multiple branches real estate agency.

There are some features available on the application are Auto-commission calculation, Subscale, rental and project sale and also Agent self-service portals. By using this system, the agent needs to fill in the property details, owner/tenant/buyer information and also price or deposit for closing details. Then, the system will automatically calculate the agent commission.

The feature of the system is more focused on the calculating agent commission regarding a specific property. It does not involve any interaction between the agent and the owner.

2.2.2.3 Smart Agency Management System (SAMS)



SAMS

HOME FEATURES CONTACT US

Data-driven. AI-powered.

Smart Agency Management System

One stop solution to manage your property agency.

Figure 2.3:Smart Agency Management System (SAMS)

The Smart Agency Management System (SAMS) is a computerized system that designed to suit the standard and common practice in Malaysian property Sales and Purchase protocol. With the growth of technology, SAMS has provided extremely simple, user-friendly, and fully responsive application.

There are some feature that available on SAMS. SAMS has provided a feature for agent management. User be able to manage agent's detail, ranking and related data. Besides that, the system provides a unit management module that can record and manage new development, Subscale and Rental units and track each case in stages from booking to completion.

Moreover, SAMS also comes out with Mobile Application that supports iOS and Android platform. With the implementation of mobile application, users can access data instantly anytime and everywhere.

2.3 Technique

This subchapter is referring to research technique that involve the investigation of problems previously solved by humans or other sources possibly either document. Analysts are created through databases, reference books, and the Internet to gather facts and information.

2.3.1 Real Estate Business Scenario during Pandemic COVID-19

The real estate industry is categorized as an international business because the business process is being locally and internationally. Juwai IQI (IQI, 2020a) has revealed that the global COVID 19 infectious disease has lowered its 2020 earnings forecast, according to a global coronavirus agent survey of realtors in more than 60 countries. According to the report, 82% of agents expect negative impacts on earnings this year, and 62% of agents expect infections to have a lasting impact on the real estate market for more than three months. The 10% of agents around the world believe that the consequences of the spread of the virus are limited to two months or less.

Moreover, 88% and 84% of agents in Singapore and Australia expect less in 2020, respectively. Malaysian and Philippine agents are the least pessimistic of the Juwai IQI respondents, with 74% expecting to benefit less, 38% expecting to gain slightly less, and 33% expecting to gain a little less in 2020. According to the survey, 22% of Malaysian real estate agents plan to upgrade their international buyers' marketing investment. During this pandemic COVID-19, the country like Greece, Thailand, the Philippines, Canada, and Malaysia have agents that are more disruptive than global sales patterns during the COVID19 crisis (IQI, 2020a).

The investigation also discovered that Malaysian agents and realtors were economically damaged, primarily because they were mostly contract agents without a base salary. Even though COVID-19 has had a broad impact on the markets, more realtors and developers are focusing on the market and launching their expansion plans. Approximately 18% of agents present new strategies with a focus on overseas buyers. About 22% of Malaysian and Thailand agents said they would increase overseas buyer marketing costs (IQI, 2020a). During the current crisis, many realtors have already analyzed their data internally to inform their business decisions, and some have begun to share the aggregated data with policy makers and researchers.

2.3.2 Service Digitalization for Real Estate Agency

The growth of digital technology information systems can play a big role in real estate's sector. Digital transformation driven by new technologies give an impact on the current processes, practices and roles. The task of real estate and facility management is undergoing significant transformation.

Digitalization has been recognized as one of the crucial trends changing society and business operation in the near- and long-term future (Tihinen et al.,2016). Digitization is obviously be relatively easily defined as "the process of converting information from a physical format into a digital one" or the process of "taking analog information and encoding it into zeroes and ones so that computers can store, process and transmit such information" (Vanessa Babington-Monegard,April 9, 2021). During the interval, Henriette et al. (2015) describes digitalization as the endorsement or gain in the use of digital or computer technology by an organization, sector and nation. Therefore, digitalization is the moments to switch the current products and services into digital versions, producing advantages over tangible products.

In the Real Estate Industry, computer and information technology are predicted to bring phenomenon of revolution in production and social interactions. Real estate is an information-intensive sector, enhancing the quality of data. Agents link buyers and sellers together by managing and distributing information. They are highly valued in the information technology they can bring to the table for listing and selling the properties. What agents do in real estate is focused on the connections between the agent, the buyer, and the seller.

2.4 Project Methodology

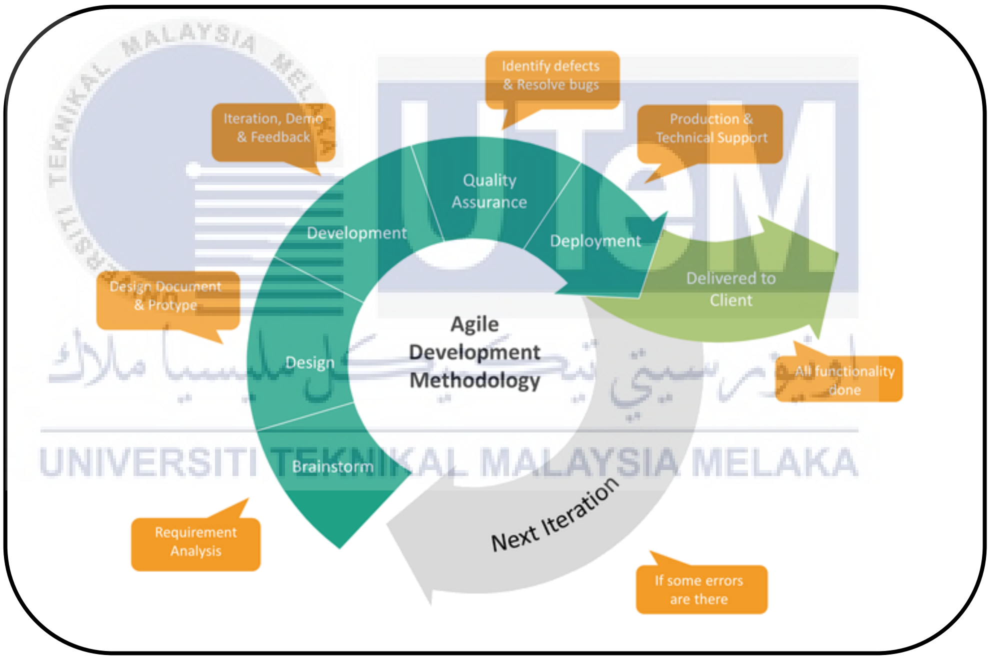


Figure 2.4:Agile Development Methodology

Figure 2.4 shows the software development methodology in agile method approach. Systems development methodology is implemented to standardize the development process by improving the software development process management and control process and defining what is to be done and how to apply the approach.

Furthermore, the implementing of agile methodology can enhance client experience. The development team can work closely with the client and gain a knowledge and client needs through understanding of the project's objective and vision. In the early phase of agile methodology also known as brainstorm phase that allow software development teams to communicate with clients to identify the system requirement and the project goal. This phase can be classified as a crucial phase to ensure the system is developed is meet what the user wants.

After that, once the software development team has identified the project requirements, we need to move on the next phase which are design phase. In this phase, the user flow diagram or high-level UML diagrams are designed to expose how the new feature should operate and how it will fit into the development system. Other than that, the design phase allows the designers to create a rough mock-up of the user interface. The user interface and user experience are paramount for the system to provide a user-friendly and responsive interface.

During the development phase, the software development process writes code and converts design documents into real software. This step in SDLC is usually the longest since it is the backbone of the whole process. After the development is completed, the system testing was made to identify defects and resolve the bugs. This phase ensures that the software is bug-free and compatible with everything else previously created by the developer.

Once the system being tested and the system is ready to deploy. The application is deployed on the dedicated servers that can be access by the customer. Agile Development Methodology is a structured iterative process. It helps ensure that related software is developed as a well-customized application to meet the business requirements and user needs.

2.5 Project Requirements

Software requirements are a description of the capabilities of the target system. Requirements communicate user expectations for a software product. Requirements may be known or unknown, expected or unanticipated, obvious or hidden from the client's point of view. This process allows the software development team to gather the software requirements from client, analyzed and documented the information.

2.5.1 Software Requirements

The hardware requirement for this system is:

I. Visual Studio Code

Visual Studio Code is a comprehensive source code editor which is able to run on the desktop and it can be used on Windows, macOS and Linux. Delivered with native support for JavaScript, TypeScript and Node.js, it has a rich ecosystem of extensions for other languages. This software suitable for developing this project because the language that use is PHP and HTML.

II. CodeIgniter 4 Web Framework

CodeIgniter is an Application Development Framework. It is a toolkit for people who build websites using PHP. CodeIgniter has been kept as flexible as possible and allowing developers to work in the way developer want.

III. MySQL

MySQL is used for a variety of purposes, including data warehousing, e-commerce, and logging applications. The development of this project uses MySQL and stores data for this project.

V. phpMyAdmin

The phpMyAdmin is an open-source software tool written in PHP, intended to handle and manage the administration of MySQL through the Web. Furthermore, phpMyAdmin provides a user-friendly interface that allows user with convenient query editing facility.

VI. Microsoft Office 365

To develop this system, Microsoft Word is used for the documentation such as proposal, report progress and final report. All the documentation shows the details of this project. Also, Microsoft Project was used to prepare the Gant Chart. It is used to plan the schedule of the project to ensure the flow of project development smoothly.

VII. Trello

Trello is used to make the team easy, flexible to manage the project. It also helps to organize the project. This platform allows the supervisor to supervise the progress of the project.

2.5.2 Hardware Requirement

The hardware requirement for this system is:

I. Personal Computer/ laptop

2.6 Project Schedule and Milestone

Week	Activity	Deliverable
Week 1 (15/3 – 21/3)	• Discussion with supervisor and develop proposals.	• Submission of Project Proposal
Week 2 (22/3 – 28/3)	• Proposal correction and improvement.	• Submission of updated Project proposal
Week 3 & 4 (29/3 – 11/4)	• Introduction, problem statement, objective, scope, project significance.	• Chapter 1
Week 5 & 6 (12/4 – 25/4)	• Fact finding, literature review, project requirements, project schedules. • System development (Module 1).	• Chapter 2 • Module 1 progress
Week 7 – Week 9 (26/4 – 16/5)	• Problem analysis, requirement analysis. • System development (Module 2 & 3).	• Chapter 3 • Module 2 & 3 progress
Week 10 – Week 12 (17/5 – 6/6)	• High-level design, detailed design. • System development • (Module 4).	• Chapter 4 • Module 4 progress
Week 13 & 14 (7/6 – 20/6)	• Final correction and improvement on report and project.	• Project demo • PSM 1 report
Week 15 (21/6 – 27/6)	• Final Presentation.	• Submission of the PSM 1 Report

Table 2.1:DREAMS Schedule and Milestone

2.7 Conclusion

In a conclusion, the review of literature begins with the fact-finding techniques. The implementation of this technique is to discover the accurate fact and information before starting to develop a system. The research and study on the existing system is to determine the system functionalities, capabilities and features that involve in the system before starting to develop the current system.

Furthermore, based on the other research has discovered the Real Estate business scenario during pandemic Covid-19 and determined the service digitization for Real Estate Agency. The attachment of project schedule and milestone on this chapter is to ensure the project can be completed within the allocated time.

CHAPTER 3: ANALYSIS

3.1 Introduction

The purpose of this chapter is to identify, clarify, and configure system requirements. In addition, this chapter provides step-by-step instructions on how actors can use the system to achieve planned results. Software analysis and design includes all activities that help transform requirements specifications into implementations.

3.2 Problem Analysis

3.2.1 Overview of As-Is System

This part is to describe the current business process of Real Estate Agency foe managing their customers.

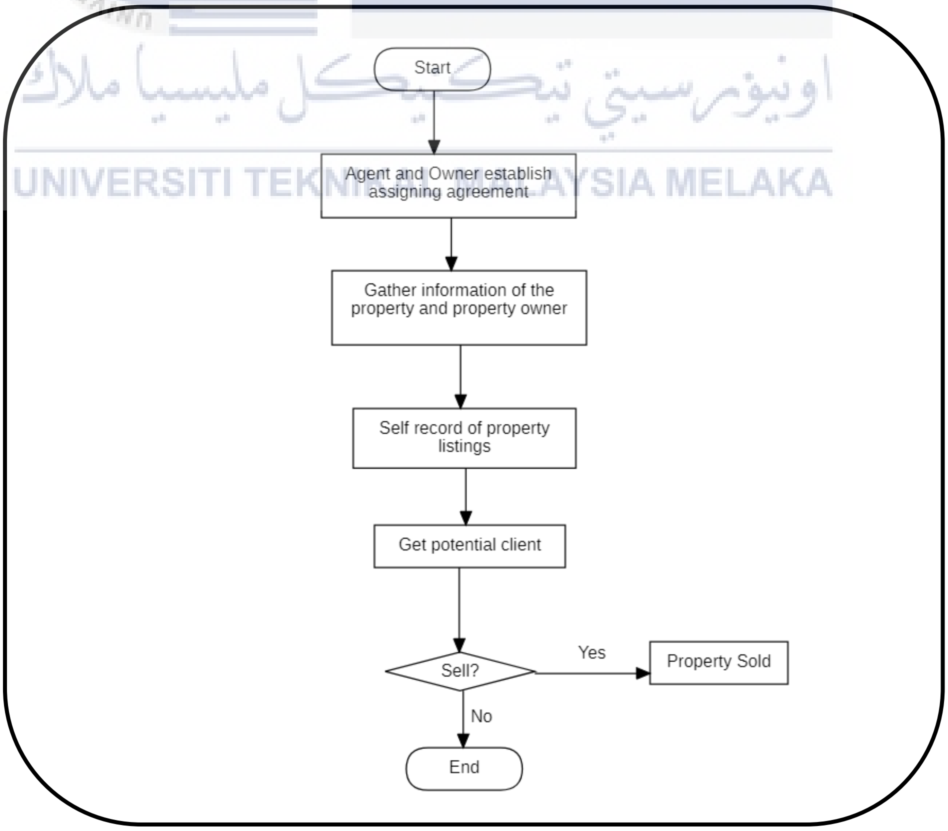

Start
Agent and Owner establish assigning agreement
Gather information of the property and property owner
Self record of property listings
Get potential client
Sell?
Yes
Property Sold
No
End

Figure 3.1:Flowchart of the current business process of Real Estate Agency

3.2.2 Overview of To-be System

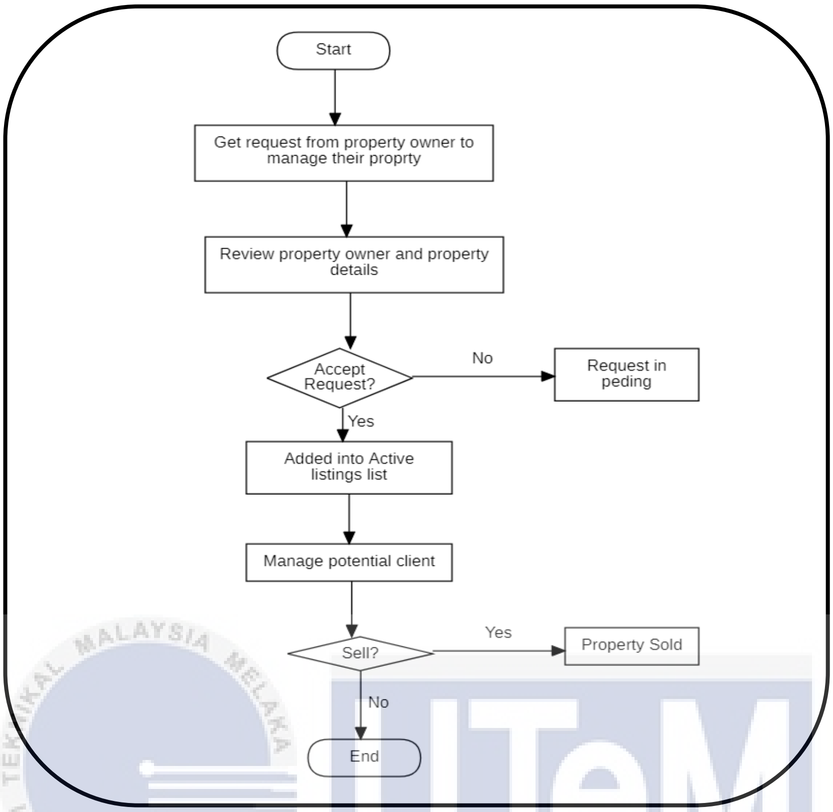

Start
Get request from property owner to manage their proprty
Review property owner and property details
Accept Request?
No
Request in peding
Yes
Added into Active listings list
Manage potential client
Sell?
Yes
Property Sold
No
End

Figure 3.2:Flowchart of the to-be system

3.2.3 System Decomposition Diagram

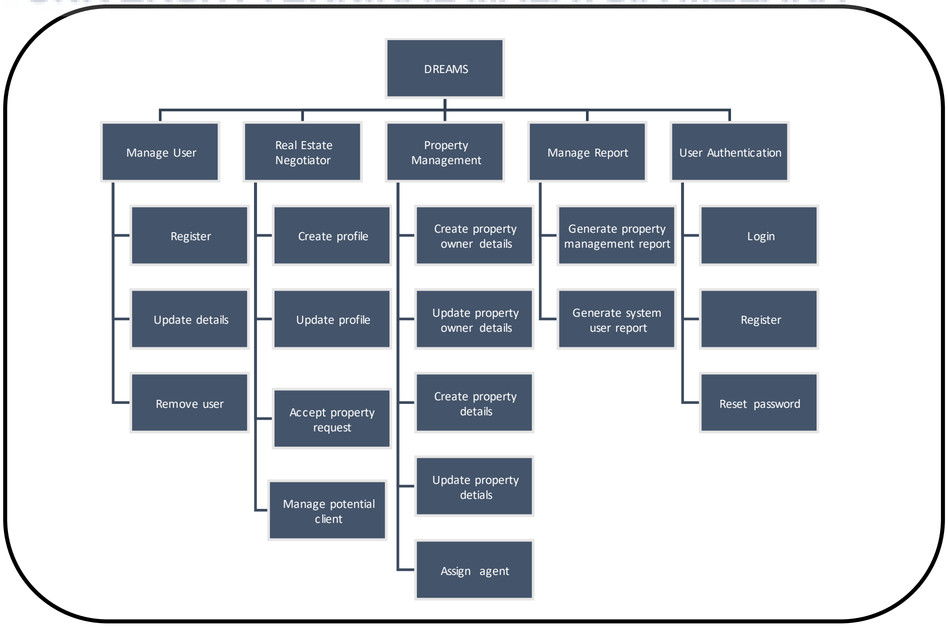


Figure 3.3:System decomposition diagram

3.3 Requirement Analysis

Requirement's analysis is a crucial operation that led to the success or failure of a software project. It helps software development team to determine the actual needs of stakeholders. Requirement specifications specify all functional and non-functional expectations of the software.

3.3.1 Data Requirement

Data requirements analysis is a top-down approach in which the process highlights business-driven needs, the analysis is execute to ensure that the specified requirements are relevant and feasible.

3.3.1.1 Initial Design of database

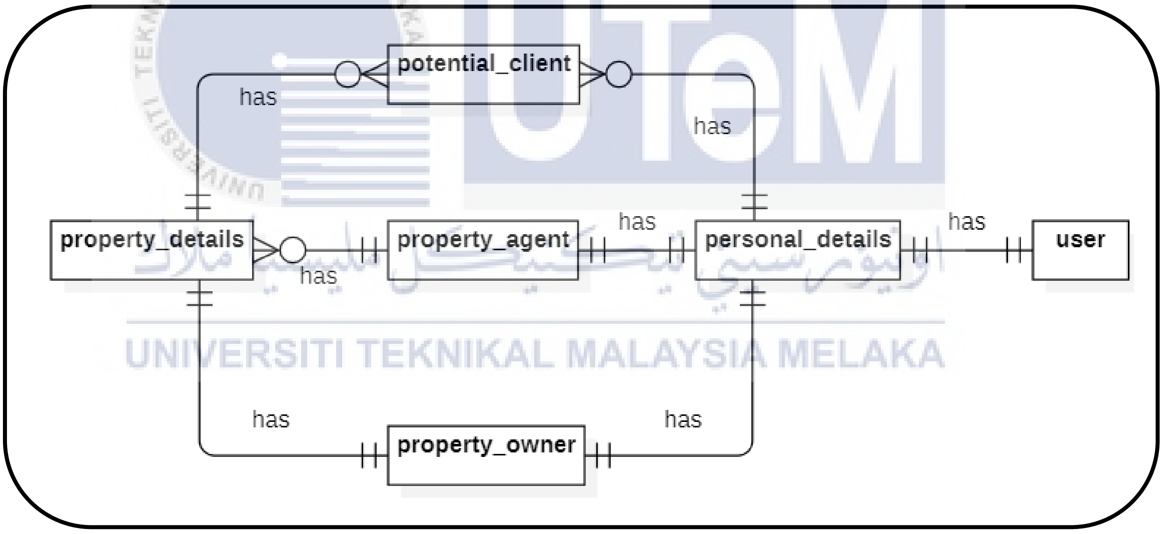


Figure 3.4:Initial Design of ERD

3.3.2 Entity Name

(a) *Property_details*

Field Name	Description
id	Unique ID for table property details
id_agent	Foreign key from table property agent
id_owner	Foreign key from table property agent
name	Property name
price	Property price
developer	Property developer
year_made	Property year made
description	Property description
property_status	Property status
address	Property address
type	Property type
status	Active and inactive property
created_at	Create date
updated_at	Update date

Table 3.1:Property_details table

(b) *Property_owner*

Field Name	Description
id	Unique ID for table property owner
id_property	Foreign key from table property details

id_person	Foreign key from table property personal details
status	Active and inactive owner
created_at	Create date
updated_at	Update date

Table 3.2:Property_owner table

(c) *Property_agent*

Field Name	Description
id	Unique ID for table property agent
id_person	Foreign key from table property personal details
status	Active and inactive owner
created_at	Create date
updated_at	Update date

Table 3.3:Property_agent table

(d) *Potential_client*

Field Name	Description
id	Unique ID for table potential client
id_property	Foreign key from table property details
id_person	Foreign key from table property personal details
nego_status	Negotiation status
status	Active and inactive owner
created_at	Create date
updated_at	Update date

Table 3.4:Property_client table

(e) *User*

Field Name	Description
id	Unique ID for table user
email	User email address
password	User Password
status	Active and inactive user
created_at	Create date
updated_at	Update date

Table 3.5:User table

(f) *Personal_details*

Field Name	Description
id	Unique ID for table personal details
id_user	Foreign key from table user
nric_no	Person Identity card number
agent_no	agent number
name	Person name
gender	Person gender
current_address	Person current address
tel_no	Person phone number
role	Person role
status	Active and inactive person
created_at	Create date
updated_at	Update date

Table 3.6:Personal_details table

3.3.3 Functional Requirement

Requirement Number	Use Case Name	Description	User Involve
SRA-100	Login	I. The system shall display the login page.	All user
SRA-101		II. The system shall be able to validate either the user id and password is correct or not.	
SRA-102		III. The system shall accept the combination of alphabetical, numerical and symbol for user password.	
SRA – 103		IV. User shall be able to log into the system if the username and password are valid.	
SRA-104		V. User shall not be able to login into the system if the username and password are invalid.	
SRA - 105	Logout	I. By clicking logout button, user shall be able to logout from the system.	All user
SRA-106		II. The system shall be able to display login page after successfully logout.	
SRA – 107	Manage User	I. The system administrator shall be able to register new user into the system.	Admin
SRA – 108		II. The system administration be able to update user details like user email and role.	

SRA – 109		III. The system administrator shall be able to remove from the system	
SRA - 110	Manage Real Estate Negotiator (REN).	I. The system shall be able to create profiles for REN.	REN
SRA – 111		II. The system shall be able to update REN profile.	
SRA – 112		III. The system shall be able to view REN profile.	
SRA – 113		IV. The system shall be able to receive requests from property owners.	
SRA – 114		V. The system shall be able to allow REN to add potential client.	
SRA – 115		VI. The system shall allow REN to update potential client negotiation status	
SRA – 116	Manage Property Information	I. The system shall be able to create property information.	Property Owner
SRA – 117		II. The system shall be able to update property information.	
SRA – 118		III. The system shall be able to view detail information regarding property.	
SRA – 119		IV. The system shall be able to assign a specific agent to manage the property.	
SRA – 120		V. The system shall be able to display agent progress with potential client information.	
SRA – 121	Manage Report	I. The system shall be able to generate a report of the total number of users according to their role.	Admin

SRA – 122		II. The system shall be able to generate a report of total number of new, pending, and accepted request status.	REN
SRA – 123		IV. The system shall be able to generate report of total number of current active listings.	

Table 3.7:Functional Requirement

3.3.3.1 Use case view

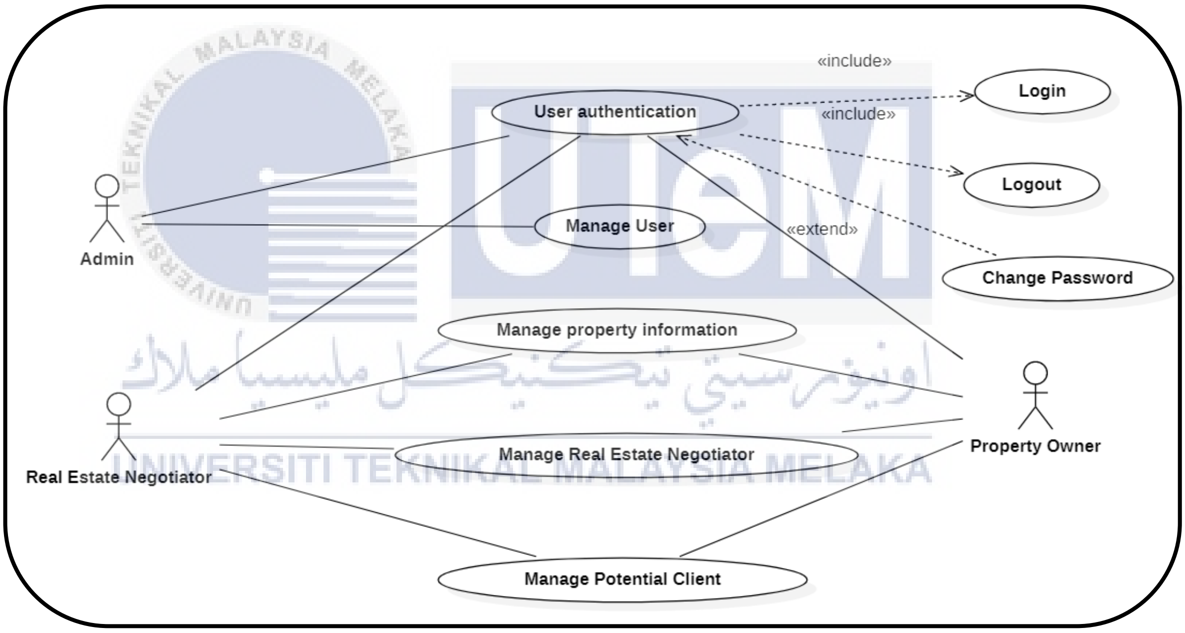


Figure 3.5: Use Case diagram

3.3.4 Non-functional Requirement

ID	Non-Functional Requirement
NFR – 101	a) The system should implement high security level for authenticate user before entering the system.
NFR – 102	b) The system should provide a consistent and standardize layout design for every page of the system.
NFR – 103	c) The system dashboard will load within 3 seconds after the user logins.
NFR – 104	d) The system should be able to run smoothly on multiple search engine such as google chrome, Safari, Mozilla Firefox etc.
NFR – 105	e) The system navigation from page-to-page load time should not more than 3 seconds.
NFR – 106	f) The user passwords should never be viewable at the point of entry or at any other time.

Table 3.8:Non-Funtional Requirements

3.4 Conclusion

At the conclusion, an analysis phase in software engineering was executed to determine and defined the overall informational needs of an organization both its current, and to some extent, future needs. The problem analysis was discussed to gather the knowledge and information between the current business process and the proposed system. The further discussion regarding to the system design will be discussed in the next chapter.

CHAPTER 4: DESIGN

4.1 Introduction

The design phase is crucial situation of the system to be enhance, and which may involve the overall design of the system. In term of software engineering, design phase involves the technique and method of preparing a plan, a blueprint for organizing the code of your software application. This chapter This part includes a high-level description of the system design and provides the conceptual view of the system and its functionality that contains detailed descriptions of the architecture and system components.

4.2 High-Level Design

The system overview interfaces with the System Administrator, Real Estate Negotiator (REN) and Property Owner actors which are described as below.

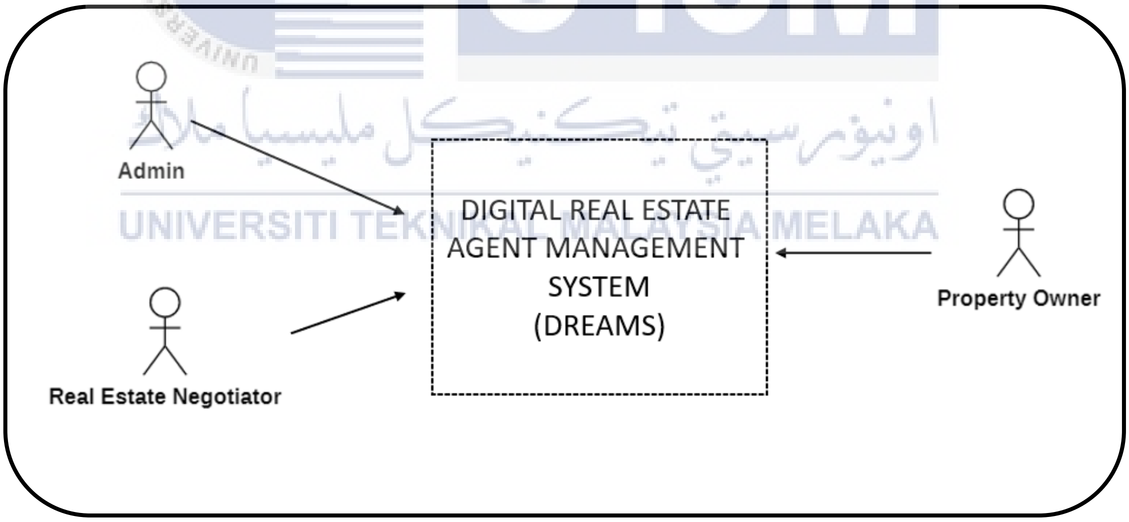


Figure 4.1:High level system context view

4.2.1 System Architecture

Digital estate agent was developed using Codeigniter 4 framework that implements the Model-View-Controller (MVC) architecture. The MVC is an architectural design divides an application into three main logical components: the model, the view, and the controller. The MVC component is stated as below.

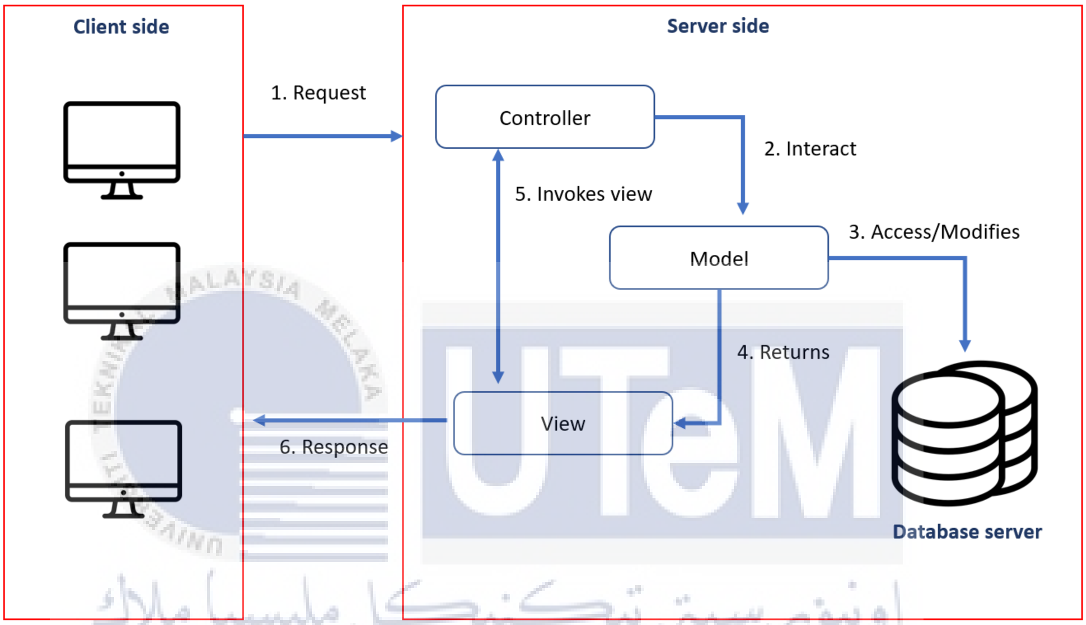


Figure 4.2:MVC System Architecture

Model	All data-related functionality that the user deals with is represented by the Model component. This might be the data being exchanged between the View and Controller components or any other data related to business logic.
View	All the application's UI functionality is handled by the View component.
Controller	Controllers serve as a link between the Model and View components, processing all business logic and incoming requests, manipulating data using the Model, and interacting with Views to display the final output.

Table 4.1:MVC description

4.2.2 User Interface Design (UI)

4.2.2.1 User Interface Navigation

(a) *Admin user*

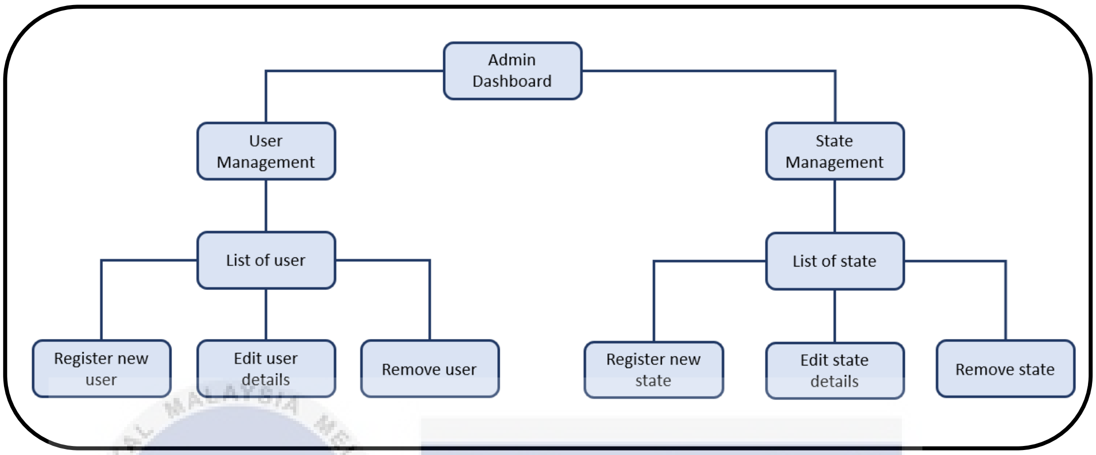


Figure 4.3:UI Navigation for Admin User

(b) *Property Agent User*

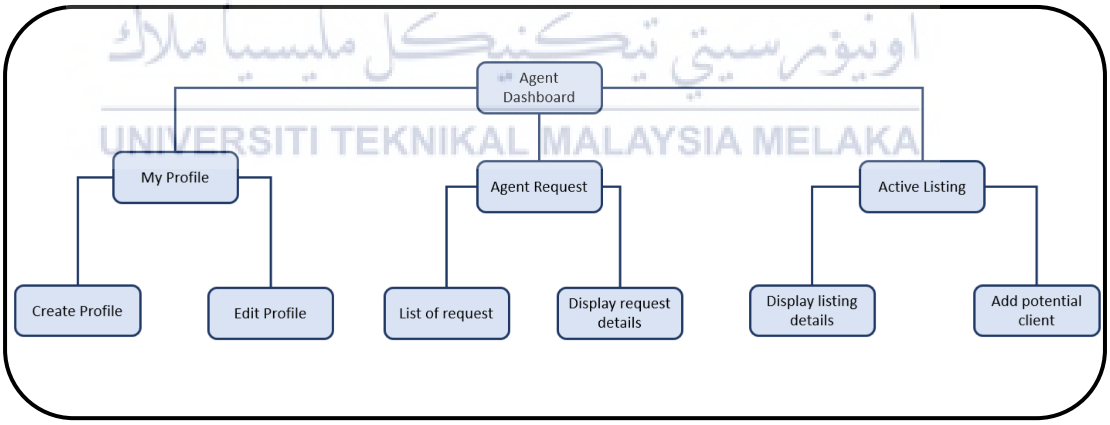


Figure 4.4:UI Navigation for Property Agent User

(c) *Property Owner User*

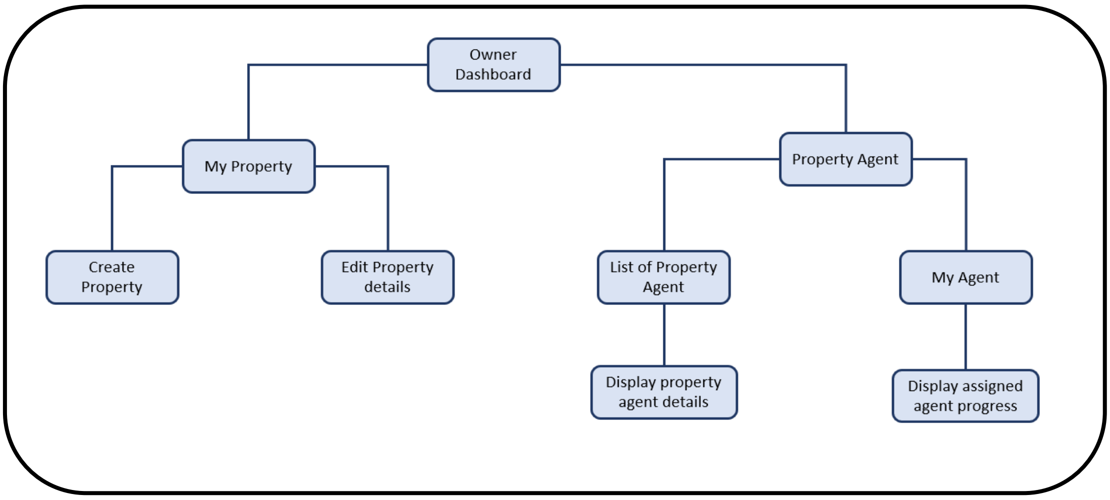
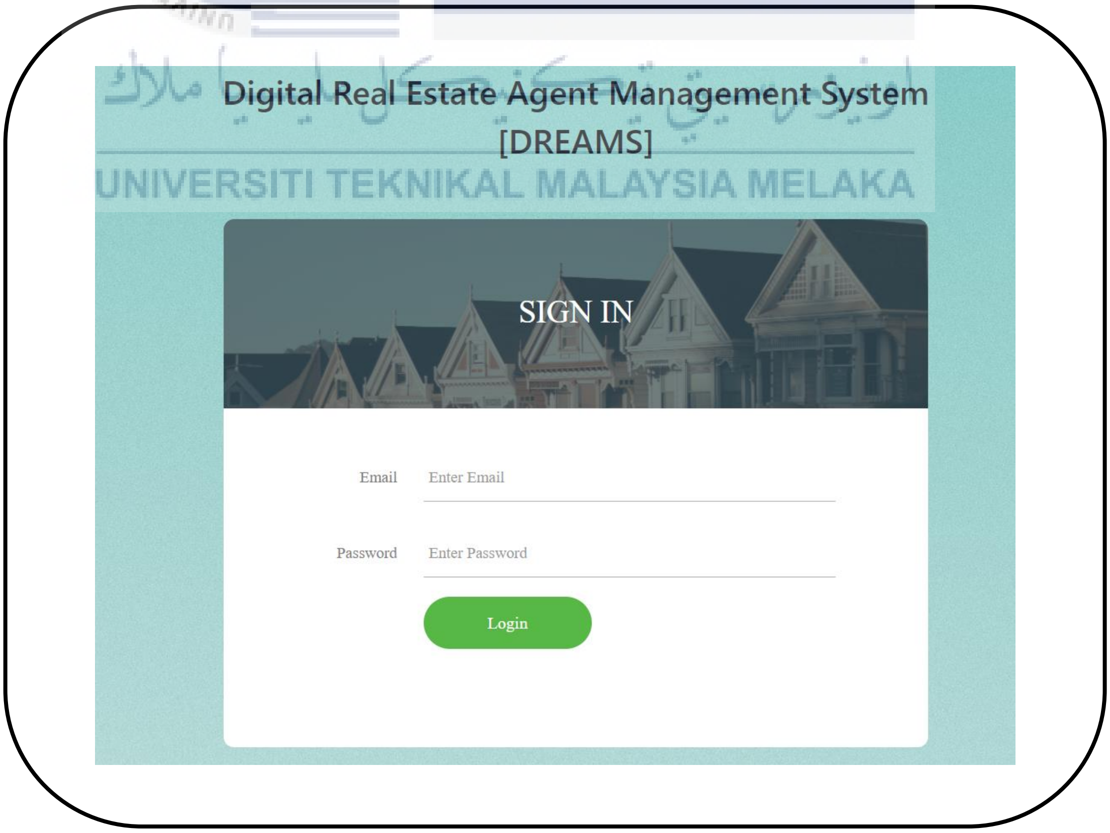


Figure 4.5:UI Navigation for Property Owner User

4.2.2.2 Input Design

(a) *Login page*



Digital Real Estate Agent Management System [DREAMS]

SIGN IN

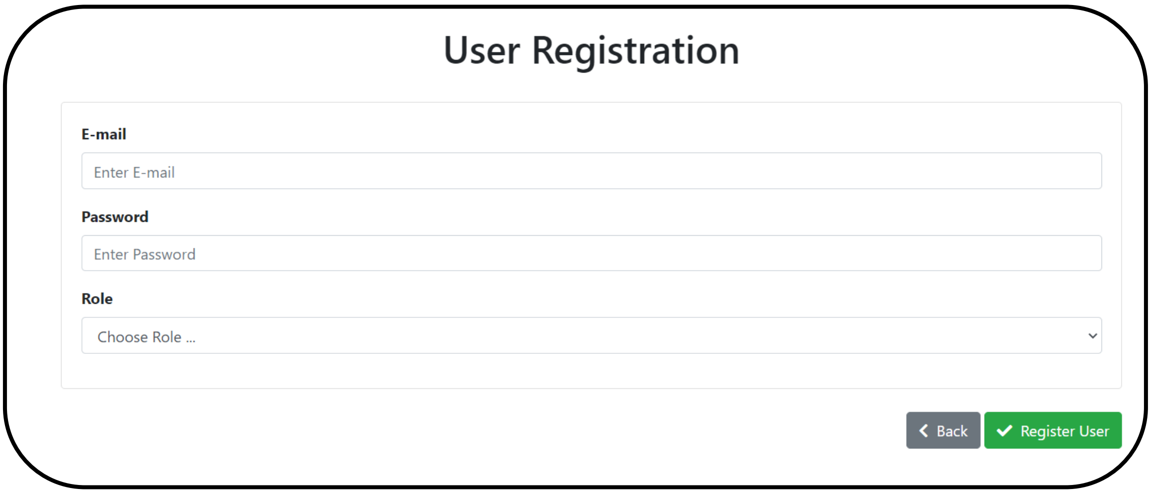
Email Enter Email

Password Enter Password

Login

Figure 4.6:Login Form

(b) *User Registration*



User Registration

E-mail

Enter E-mail

Password

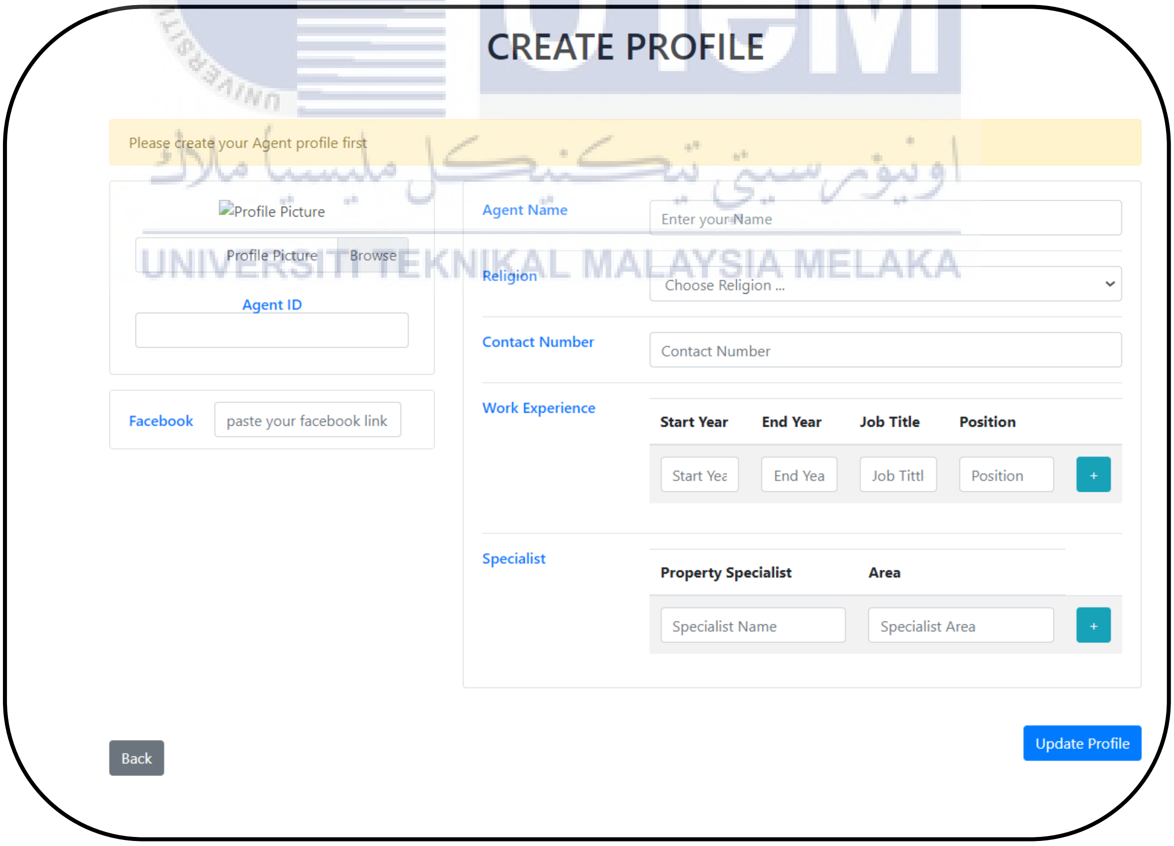
Enter Password

Role

Choose Role ...

Figure 4.7:User Registration Form

(c) *Create Agent Profile*



CREATE PROFILE

Please create your Agent profile first

Profile Picture

Profile Picture Browse

Agent ID

Facebook: paste your facebook link

Agent Name: Enter your Name

Religion: Choose Religion ...

Contact Number: Contact Number

Work Experience

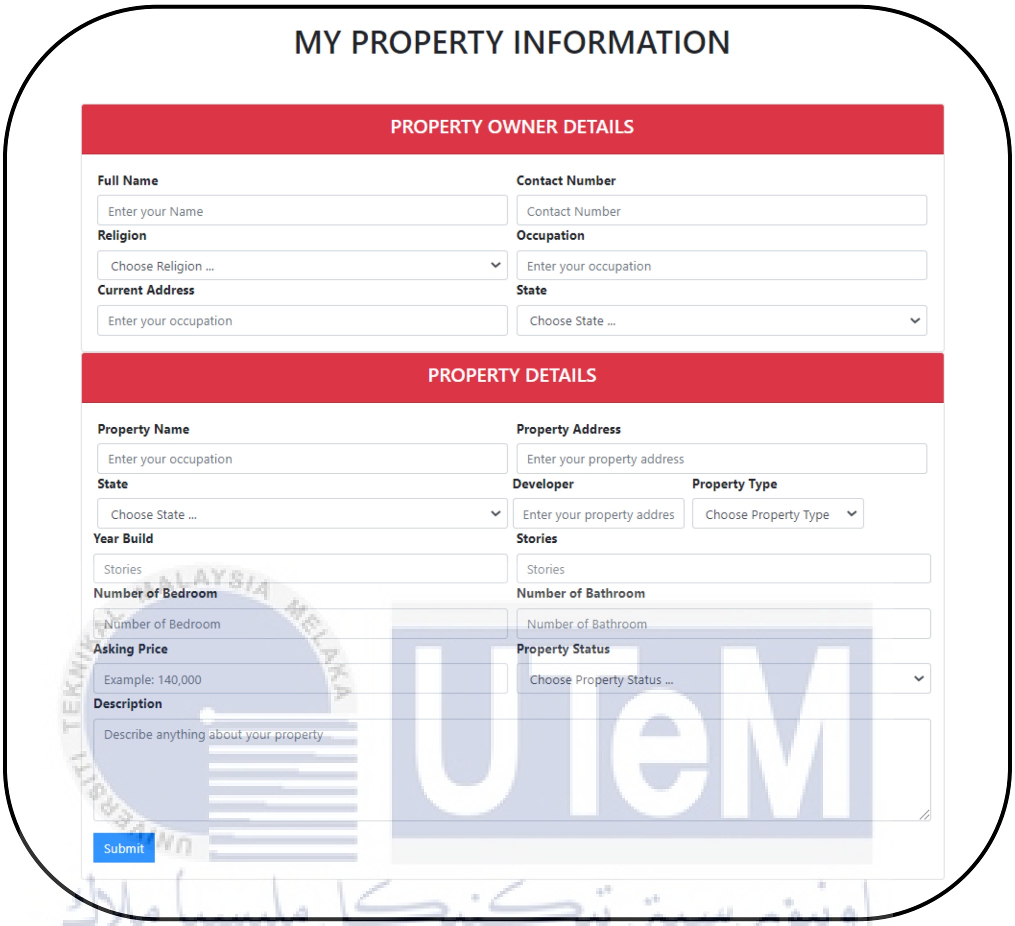
Start Year	End Year	Job Title	Position
Start Yea	End Yea	Job Tittl	Position

Specialist

Property Specialist	Area
Specialist Name	Specialist Area

Figure 4.8:Create Agent Profile Form

(d) *Create Property*



MY PROPERTY INFORMATION

PROPERTY OWNER DETAILS

Full Name Enter your Name	Contact Number Contact Number
Religion Choose Religion ...	Occupation Enter your occupation
Current Address Enter your occupation	State Choose State ...

PROPERTY DETAILS

Property Name Enter your occupation	Property Address Enter your property address	
State Choose State ...	Developer Enter your property addres	Property Type Choose Property Type
Year Build Stories	Stories Stories	
Number of Bedroom Number of Bedroom	Number of Bathroom Number of Bathroom	
Asking Price Example: 140,000	Property Status Choose Property Status ...	

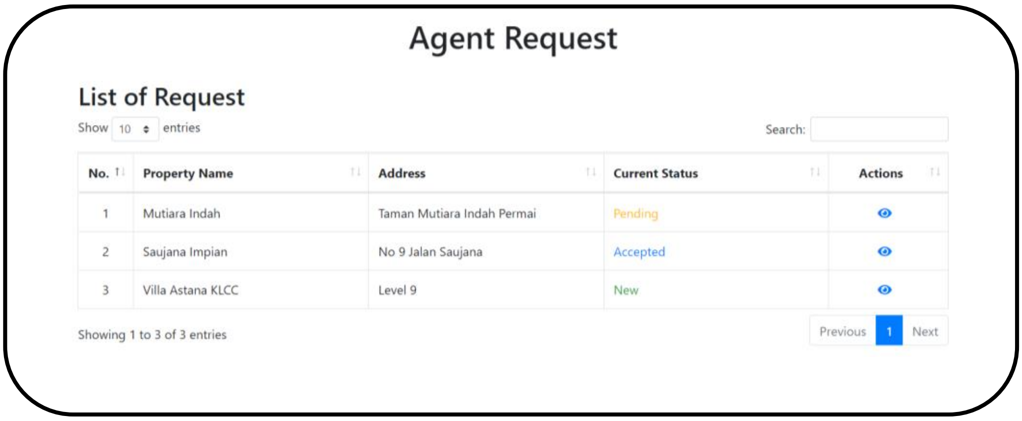
Description

Describe anything about your property

Figure 4.9:Create Property Form

4.2.2.3 output Design

(a) *List of requests*



Agent Request

List of Request

Show 10 entries

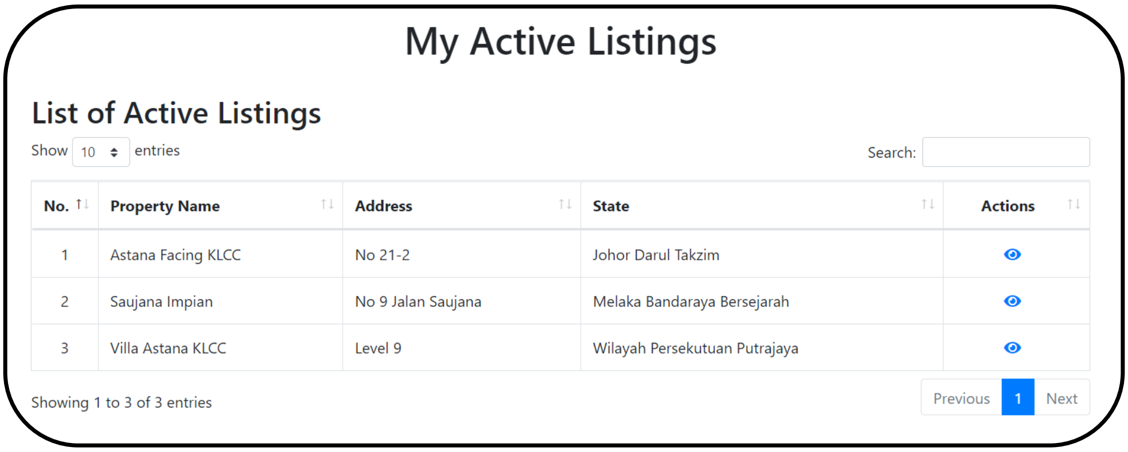
Search:

No.	Property Name	Address	Current Status	Actions
1	Mutiara Indah	Taman Mutiara Indah Permai	Pending	👁
2	Saujana Impian	No 9 Jalan Saujana	Accepted	👁
3	Villa Astana KLCC	Level 9	New	👁

Showing 1 to 3 of 3 entries

Figure 4.10: List of Request

(b) *Active listing*



My Active Listings

List of Active Listings

Show 10 entries

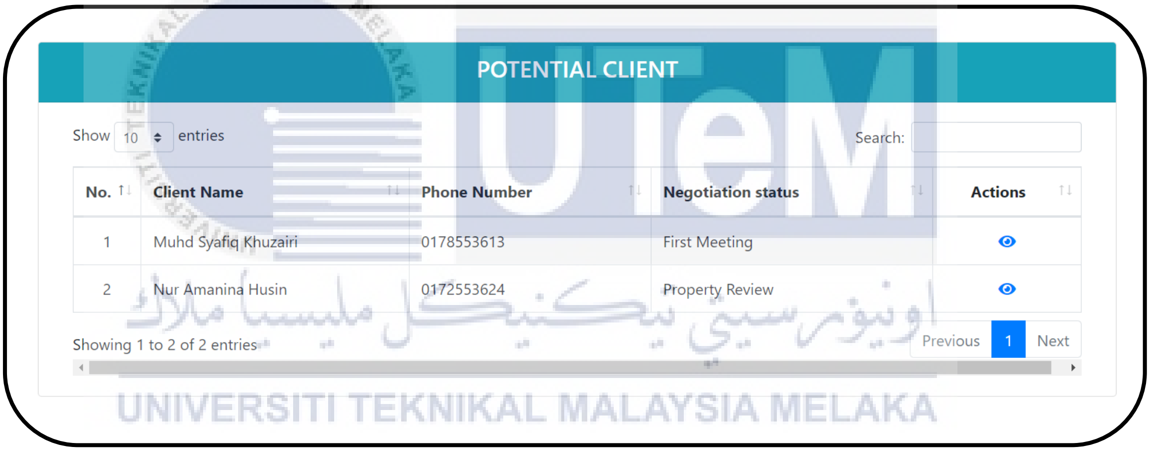
Search:

No.	Property Name	Address	State	Actions
1	Astana Facing KLCC	No 21-2	Johor Darul Takzim	👁
2	Saujana Impian	No 9 Jalan Saujana	Melaka Bandaraya Bersejarah	👁
3	Villa Astana KLCC	Level 9	Wilayah Persekutuan Putrajaya	👁

Showing 1 to 3 of 3 entries

Figure 4.11:List of Agent Active Listing

(c) *Potential client*



POTENTIAL CLIENT

Show 10 entries

Search:

No.	Client Name	Phone Number	Negotiation status	Actions
1	Muhd Syafiq Khuzairi	0178553613	First Meeting	👁
2	Nur Amanina Husin	0172553624	Property Review	👁

Showing 1 to 2 of 2 entries

Figure 4.12:List of Potential Clients

4.2.3 Database Design

4.2.3.1 Conceptual and Logical Database Design

(a) *Conceptual Database Design*

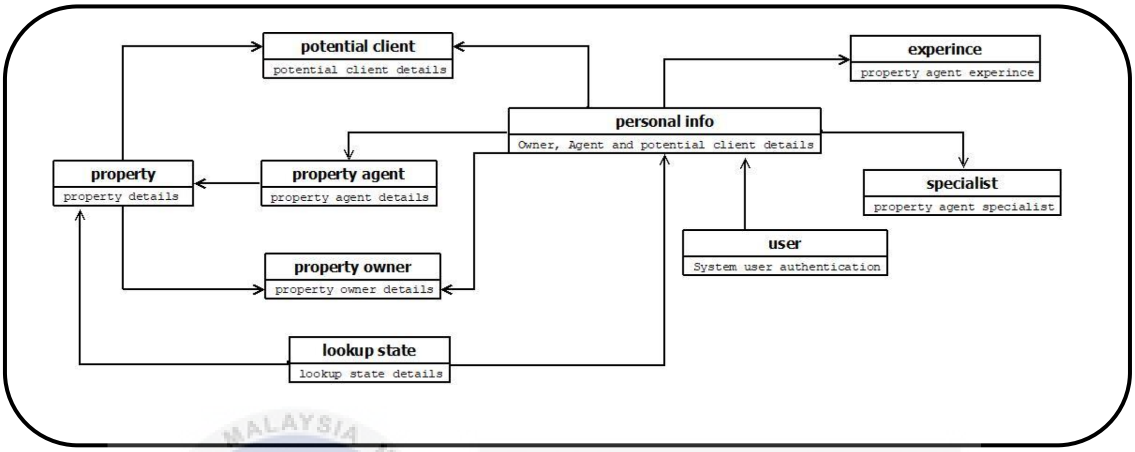


Figure 4.13:Overview of Conceptual DB Design

(b) *Logical Database Design*

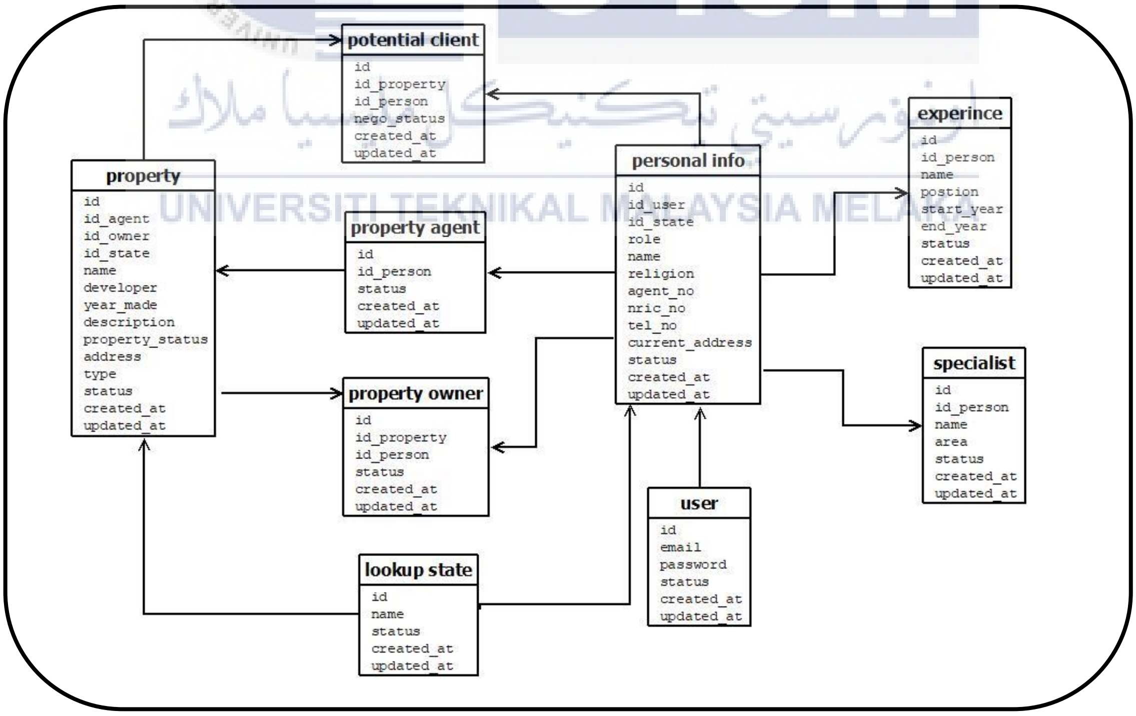


Figure 4.14: Overview of Logical DB Design

4.3 Detailed Design

Detailed design is a project implementation phase that cover all the necessary technical disciplines to form a set of deliverables. In this subchapter, all components, subsystems, and parts involved in the project are well documented, procured and implemented.

4.3.1 Software Design

The below figure shown the details class diagram for DREAMS.

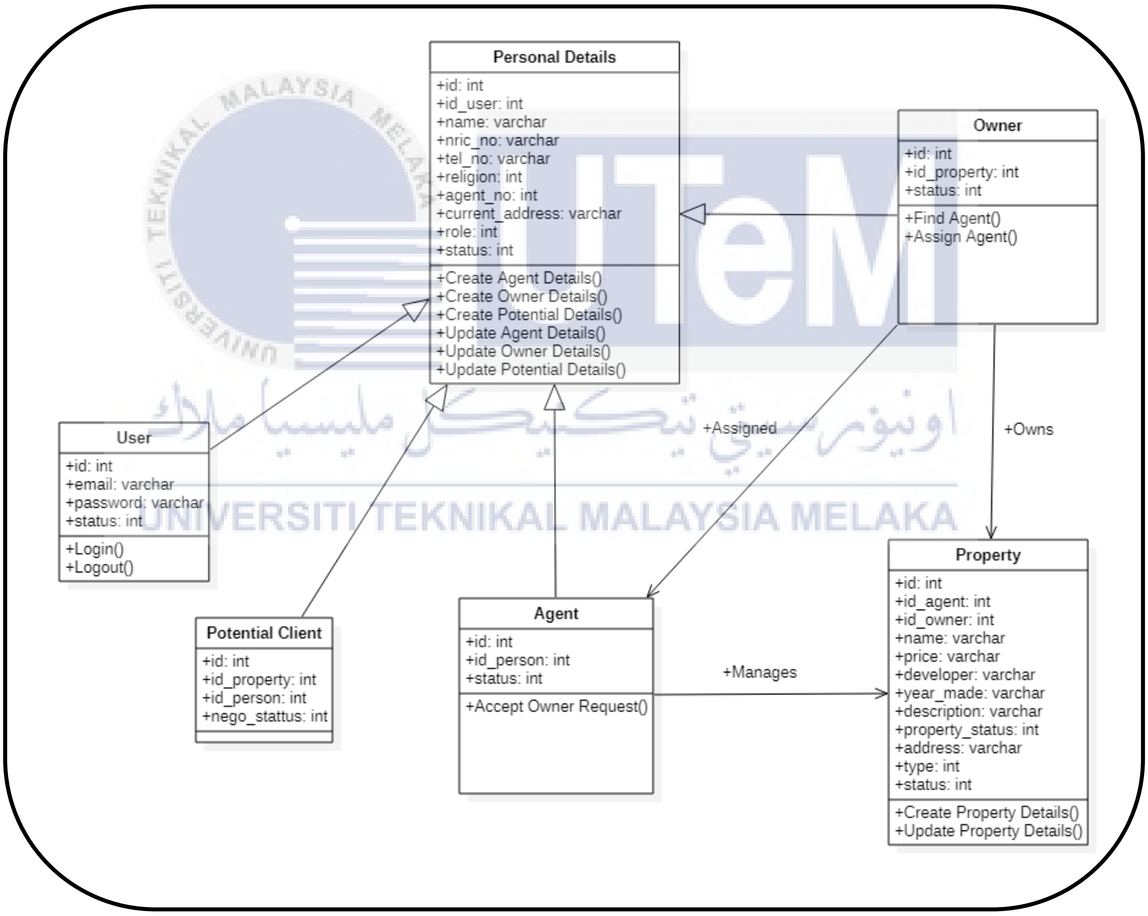


Figure 4.15:Overview of details class diagram

4.3.2 Physical Database Design

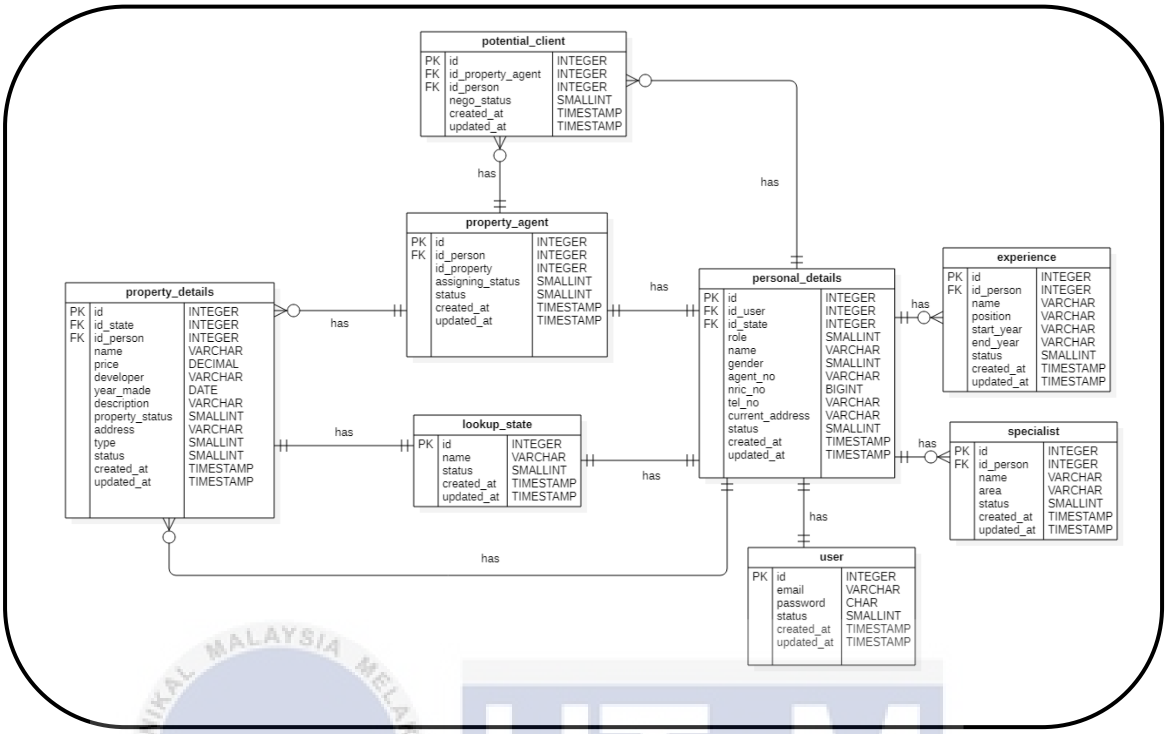


Figure 4.16:Entity Relationship Diagram (ERD)

4.3.2.1 Data Dictionary

(a) *Property_details*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
Id_state	Integer	11	Foreign Key	State ID
id_agent	Integer	11	Foreign Key	Agent ID
id_owner	Integer	11	Foreign key	Owner ID
name	Varchar	100	Not Null	Property name
price	Decimal	(10,2)	Not Null	Property price
developer	Varchar	100	Not Null	Property developer
year_made	Varchar	50	Not Null	Property year made
description	Varchar	255	Not Null	Property description

property_status	Smallint	5	Not Null	Property status
address	Varchar	255	Not Null	Property address
type	Smallint	2	Not Null	Property type
status	Smallint	2	Not Null	Active and inactive property
created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.2: Data Dictionary for property_details table

(b) *Property_agent*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
id_person	Integer	11	Foreign key	Person ID
status	smallint	2	Not Null	Active and inactive owner
created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.3: Data Dictionary for property_agent table

(c) *Potential_client*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
id_property_agent	Integer	11	Foreign Key	Property agent ID
id_person	Integer	11	Foreign key	Person ID
nego_status	Smallint	2	Not Null	Negotiation status
status	Smallint	2	Not Null	Active and inactive owner

created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.4:Data Dictionary for potential_client table

(d) *Lookup state*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
name	Varchar	50	Not Null	State name
status	Smallint	2	Not Null	Active and inactive lookup
crearted_at	Timestamp		Not Null	Create date
update_at	Timestamp		Null	Update date

Table 4.5: Data Dictionary for lookup state table

(e) *Personal_details*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
id_user	Integer	11	Foreign Key	User ID
id_state	Integer	11	Foreign key	State ID
nric_no	bigint	12	Unique	Person Identity card number
agent_no	Varchar	20	Unique	agent number
name	Varchar	100	Not Null	Person name
gender	smallint	2	Not Null	Person gender
current_address	Varchar	255	Not Null	Person current address
tel_no	Varchar	20	Not Null	Person phone number
role	Smallint	2	Not Null	Person role

status	smallint	2	Not Null	Active and inactive person
created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.6: Data Dictionary for personal_details table

(f) *user*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
email	Varchar	255	Not Null	User email address
password	Varchar	255	Not Null	User Password
status	Smallint	2	Not Null	Active and inactive user
created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.7: Data Dictionary for user table

(g) *Experience*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
id_person	Integer	11	Foreign key	Person ID
name	Varchar	255	Not Null	Experience name
position	Varchar	255	Not Null	Position name
start_year	Varchar	255	Not Null	Experience start year
end_year	Varchar	255	Not Null	Experience end year
status	Smallint	2	Not Null	Active and inactive experience
created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.8: Data Dictionary for experience table

(h) *Specialist*

Field Name	Data type	Field Length	Constraint	Description
id	Integer	11	Primary key	Table ID
id_person	Integer	11	Foreign key	Person ID
name	Varchar	255	Not Null	Specialist name
area	Varchar	255	Not Null	Specialist area
status	Smallint	2	Not Null	Active and inactive specialist
created_at	Timestamp		Not Null	Create date
updated_at	Timestamp		Null	Update date

Table 4.9: Data Dictionary for specialist table

4.4 Conclusion

This chapter has discussed on the project design which includes Entity Relationship Diagram for Conceptual and Logical Design. High-level Design also has been discussed for the system architecture, Graphic User Interface (GUI) and Database design. The outcome of this phase can absolutely be used in implementing programming languages.

The design phase is important before starting to develop the system. It helps a software developer to determine the suitable technique and method before the jump to implementation phase. Software design can be completed in a few ways. It can be done by utilizing some software tools with modeling language, such as UML.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

The implementation phase begin after the design phase is completed. This chapter discusses the implementation of DREAMS system. This chapter consists of several section. Section 5.2 provides the step of the software development environment setup that describes about the software environment architecture. Section 5.3 outlines the software configuration management that consist of two parts which are configuration environment setup and version control procedure. In section 5.4 provides the information regarding the software implementation status such as list of module name, description and the time taken to complete for each module.

5.2 Software Development Environment setup

A software development environment setup that automates the procedure involved in a software development cycle. Codeigniter 4 Framework is used to develop this system. Codeigniter 4 framework consists of three (3) architecture which are Model-View-Controller (MVC) architecture. Some components of the Codeigniter 4 are discussed in the figure below.

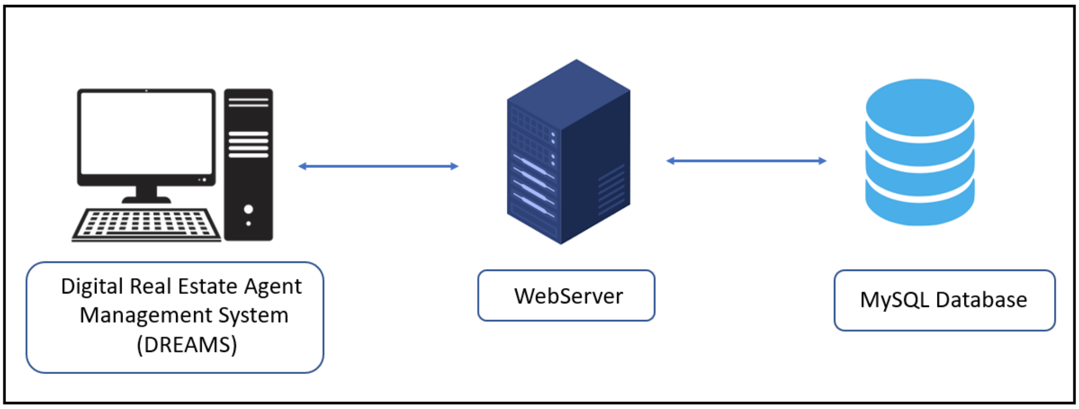


Figure 5.1: Software Development Environment Setup for DREAMS

In order to develop and run PHP Web pages, the components need to be installed in computer system are shown in the table below:

No	Component	Description
1	Codeigniter 4 Framework	To develop Web Application using Application Development Framework
2	PHP Version 7.3 and above	Programming language used to develop the system
3	Bootstrap 4 Framework	CSS Framework for developing responsive Web Application
4	AMPPS	Localhost web server that executables along with Apache, MySQL and PHP.

Table 5.1: SDE Component

5.3 Software Configuration Management

5.3.1 Configuration environment setup

The configuration files are used by every framework to establish a variety of parameters and basic settings. CodeIgniter configuration files create basic classes with public properties that describe the needed parameters. In Codeigniter 4 Framework, the environment variables are used to facilitates the change made between deploys without changing any code. Configuration can change a lot across deploys, but code does not. For example, multiple environments, such as the developer's local machine and production server, generally require different configuration values for each setting.

CodeIgniter makes it simple and easier to set Environment Variables by using a “dot(.)env” file. The term comes from the file name, which starts with a dot (.) before the text “env”. CodeIgniter expects (.env) to be at the root of your project alongside the system and app directories. There is a template file distributed with CodeIgniter that’s located at the project root named env.

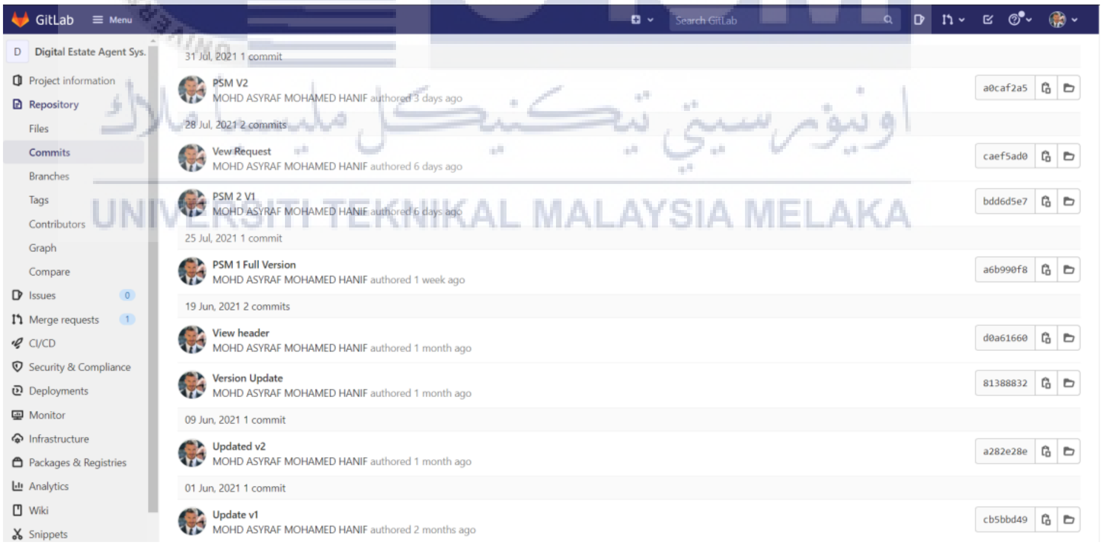
5.3.2 Version Control Procedure

The version control allows to track the changes of the software code. The implementation of version control enables to reduce and fix the conflicts and act as a centralized location for managing the source code. DREAMS is used GitLab software as source code management. Git is an open-source distributed system that is suitable for software projects of any size provide a comprehensive and user-friendly interface. By using GitLab, version control is much smoother and easier to implement. The source code will be stored and managed in repository. The GitLab workflow can be summarized by the "commit-pull-push" command. Below is the step involved on how version control works in GitLab:

a) Commit – The changes that have been made to the files in repository will be saved as a version for the repository and ready to be upload on GitLab.

b) Pull – Before the changes is send to the GitLab, pull command should be made to make sure the files are completely up to date with the latest version.

c) Push – Once the files are up to date, push command should be made to send the file into GitLab.



31 Jul, 2021 1 commit

PSM V2
MOHD ASYRAF MOHAMED HANIF authored 3 days ago — a0caf2a5

28 Jul, 2021 2 commits

Vew Request
MOHD ASYRAF MOHAMED HANIF authored 6 days ago — caef5ad0

PSM 2 V1
MOHD ASYRAF MOHAMED HANIF authored 6 days ago — bdd6d5e7

25 Jul, 2021 1 commit

PSM 1 Full Version
MOHD ASYRAF MOHAMED HANIF authored 1 week ago — a6b990f8

19 Jun, 2021 2 commits

View header
MOHD ASYRAF MOHAMED HANIF authored 1 month ago — d0a61660

Version Update
MOHD ASYRAF MOHAMED HANIF authored 1 month ago — 81388832

09 Jun, 2021 1 commit

Updated v2
MOHD ASYRAF MOHAMED HANIF authored 1 month ago — a282e28e

01 Jun, 2021 1 commit

Update v1
MOHD ASYRAF MOHAMED HANIF authored 2 months ago — cb5bbd49

Table 5.2: GitLab Repository

5.4 Implementation Status

Module	User Authentication Module
Description	Allow only authorized and registered user can access into the system
Duration to Complete	1 week

Table 5.3 : User Authentication Module Implementation Status

Module	Manage User Module
Description	Allow the System Administration to register user into the system
Duration to Complete	1 week

Table 5.4:Manage User Module Implementation Status

Module	Real Estate Negotiator Module
Description	Allow Real Estate Negotiator to manage profile, active listings and potential client.
Duration to Complete	2 weeks

Table 5.5: Real Estate Negotiator Module Implementation Status

Module	Property Management Module
Description	Allow Property Owner to manage property information, assign REN and keep track assigned agent progress.
Duration to Complete	2 weeks

Table 5.6:Property Management Module Implementation Status

Module	Manage Report Module
Description	Provide a dynamic report according to the data obtain from the user
Duration to Complete	2 weeks

Table 5.7: Manage Report Module Implementation Status

5.5 Conclusion

In conclusion, this chapter describes the procedure involves for implementing DREAMS (Digital Real Estate Management System). Details of the software environment and configuration management were described in Sections 5.2 and 5.3. The implementation state is described in Section 5.4. Testing activities are briefly described in the next chapter.

CHAPTER 6: TESTING

6.1 Introduction

This chapter is briefly described the relevant scheme, procedure, workflows, and methodologies used to arrange, and execute testing of DREAMS systems. In section 6.2 provides the Test Plan including Test Organization, Environment and Schedule. Section 6.3 outlines the Test Strategy to execute the testing. Section 6.4 provides Test Design including Test Description and Test Data. Section 6.5 outlines the Test Result and Analysis.

6.2 Test Plan

A test plan is a documented element that describes the test organization, environment, and schedule of intended testing activities. Determine the test items, the functions to be tested, the test tasks, who will perform each task, and any possibility risks that require contingency plans.

6.2.1 Test Organization

The testing organization explains and describes the person who are responsible for all activities in the testing process. Testing of the DREAMS project consists of unit and system testing phases. The test organizations required to run the tests are shown in the following table.

Testing Type	Description	Responsibility
Unit Testing	- A testing that involves an individual units or components of the software been tested. - The aim is to ensure that each unit of software code is valid and working as expected.	- Software Developer

System Testing	- To guarantee that the total build fulfils the business specifications.	- Software Developer

Table 6.1: Test Organization for DREAMS

6.2.2 Test Environment

The test environment is the proper configuration and arrangement of software and hardware for the tester to perform the test cases. The test environment is configured according to the needs of the application under test. The following is a list of test environment setup to test the application:

No	Test Environment Setup	Description
1.	Setup of Test Server	● Installing Web Server and configure PHP in Apache Server.
2.	Setup of Test Personal Computer	● Installing Microsoft visual Studio 2019
3.	Setup of Test Network	● Internet setup ● Wifi setup

Table 6.2: Test Environment Setup

6.2.3 Test Schedule

No.	Task Name	Duration	Start Date	End Date
1.	Test Planning	3 days	19/07/2021	21/07/2021
2.	Test Plan and QA Schedule Preparation	1 day	22/07/2021	23/07/2021
3.	Test Case Design a) Blackbox b) Whitebox	5 days	26/07/2021	30/07/2021

4.	Test Development a) Develop test scripts b) Review and approve test scripts	5 days	02/08/2021	06/08/2021
5.	Test Execution a) Setup and testing b) Evaluation	5 days	09/08/2021	13/08/2021
6.	Conduct System Testing a) Complete system Test Plan b) Complete system Test Cases c) Execute the System Tests	5 days	16/08/2021	20/08/2021
7.	Prepare Final Test Report	5 days	23/08/2021	27/08/2021
8.	Review and approve Final Test Report	5 days	30/08/2021	03/09/2021

Table 6.3: Test Schedule

6.3 Test Strategy

The test strategy is defined as software testing approach to achieve the testing objective. This chapter helps the test manages the clear state of the project at any point. It helps to reduce the chances of missing any test activity. The Testing Strategy plan were discussed with the whole team to ensure the consistency with the approach and responsibilities. The testing approach are described as below:

i. Bottom – Up

Bottom-Up approach testing is carried out from sub modules to main modules. This procedure was performed to analyse the risks of the software. The main advantage of this method is that it is user-friendly and provides high scalability in the early stages of software development.

ii. Top – Down

Top-down approach testing is executed from top to bottom through the system structure. A test method used to identify the actions of the submodules that have not yet been integrated. The top-down testing approach also known as incremental testing in which the testing is executed by combining the modules from main modules to submodules.

6.3.1 Classes of test

i. Unit Testing

Unit testing are performed by the software developer. The unit testing will test the software by individual's unit or components. The importance of unit testing is to ensure that each component and behaviour in software source code are perform as expected.

For unit testing, the techniques and methods used in this system is a white box testing that involves statement coverage and decision coverage. The statement coverage is a testing that will execute all statements in the source code at least one while the decision coverage is a testing that produce a result from true and false statement executed.

ii. System Testing

System Testing will be executed by the software developers and the testers. The system testing is crucial phase to validate that the overall development fulfills the business and user requirements. The system testing is categorized as a black box testing. For this system, functionality testing is executed by providing the input data to verify the output of the system and does not require any programming knowledge.

6.4 Test Design

The Test Design was documented to describes how the execution of testing should be done. It describes a list of inputs for the system that need to be test and will provide a set of expected outputs. It involves the operation and procedure for determining the test conditions, test cases and test data.

6.4.1 Test Description

The table below describes the test descriptions for the DREAMS system:

Module	User Authentication Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021
Test Case ID	**Test Cases**	**Test Step**	**Expected Result**
TC_01_01	Admin login with valid email and password	1. Open the login page 2. Enter valid email address 3. Enter valid password 4. Click login button.	Admin user be able to login into the system
TC_01_02	Agent login with valid email and password	1. Open the login page 2. Enter valid email address 3. Enter valid password 4. Click login button.	Agent user be able to login into the system
TC_01_03	Property owner login with valid email and password	1. Open the login page 2. Enter valid email address 3. Enter valid password 4. Click login button.	Property owner user be able to login into the system
TC_01_04	Admin login with invalid email and	1. Open the login page	The system will display invalid

	password	2. Enter invalid email address 3. Enter invalid password 4. Click login button.	email and password message.
TC_01_05	Agent login with invalid email and password	1. Open the login page 2. Enter invalid email address 3. Enter invalid password 4. Click login button.	The system will display invalid email and password message.
TC_01_06	Property owner login with invalid email and password	1. Open the login page 2. Enter invalid email address 3. Enter invalid password 4. Click login button.	The system will display invalid email and password message.
TC_01_07	Admin login without email	1. Open the login page 2. Blank the email section 3. Enter valid password 4. Click login button.	The system will display invalid email and password message.
TC_01_08	Agent login without email	1. Open the login page 2. Blank the email section 3. Enter valid password 4. Click login button.	The system will display invalid email and password message.
TC_01_09	Property owner login without email	1. Open the login page 2. Blank the email section 3. Enter valid password 4. Click login button.	The system will display invalid email and password message.
TC_01_10	Admin login without password	1. Open the login page 2. Enter valid email	The system will display invalid email and password

		address 3. Blank the password section 4. Click login button.	message.
TC_01_11	Agent login without password	1. Open the login page 2. Enter valid email address 3. Blank the password section 4. Click login button.	The system will display invalid email and password message.
TC_01_12	Property owner login without password	1. Open the login page 2. Enter valid email address 3. Blank the password section 4. Click login button.	The system will display invalid email and password message.
TC_01_13	Change Password	1. Login into the system with valid email and password. 2. Click Account Management menu. 3. Enter new password. 4. Click save button to submit.	The system will password successfully updated message.

Table 6.4: Test Description for User Authentication Module

Module	Manage User Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021

Test Case ID	**Test Cases**	**Test Step**	**Expected Result**
TC_02_01	Register user without email	1. Login into the system as admin 2. Click management menu and select user management 3. Open registration form by clicking register user button 4. Blank the email section 5. Enter default password 6. Click register button to submit	The system displays error message and unable to register user.
TC_02_02	Register user with invalid email format	1. Login into the system as admin 2. Click management menu and select user management 3. Open registration form by clicking register user button 4. Enter email with invalid format 5. Enter default password 6. Click register button to submit	The system displays error message and unable to register user.
TC_02_03	Register user without role	1. Login into the system as admin. 2. Click management menu and select user management. 3. Open registration form by clicking register user button. 4. Enter email address	The system displays error message and unable to register user.

		5. Enter default password. 6. Blank the role section 7. Click register button to submit.	
TC_02_04	Register User with valid email, password and role.	1. Login into the system as admin. 2. Click management menu and select user management. 3. Open registration form by clicking register user button. 4. Enter email address 5. Enter default password. 6. Select user role. 7. Click register button to submit.	The system will display user successfully registered message.
TC_03_05	Remove user	1. Login into the system as admin. 2. Click management menu and select user management. 3. Remove user by clicking trash icon on action column 4. Click yes on the confirmation box.	The user successfully removed from the system

Table 6.5: Test Description for Manage User Module

Module	Real Estate Negotiator Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021
Test Case ID	**Test Cases**	**Test Step**	**Expected Result**
TC_03_01	New agent user with incomplete profile	1. Login into the system as new agent user.	The system display creates profile form along with a message to ask the user to complete the

			profile before proceeding further action.
TC_03_02	Create Profile	1. Login into the system as new agent user. 2. Enter all the required information 3. Click create profile button to submit	The system display profile successfully created message.
TC_03_03	Update Profile	1. Login into the system as agent. 2. Click Profile menu and select My Profile. 3. Edit the selected data. 4. Click save button to submit.	The system display profile successfully updated message.
TC_03_04	Agent user with complete profile	5. Login into the system as agent.	The system displays dashboard page for agent user.
TC_03_05	Display list of property request	1. Login into the system as agent. 2. Click Agent Request Menu.	The system will display list of property request.
TC_03_06	Request status change from New to Pending	1. Login into the system as agent. 2. Click Agent Request Menu. 3. Open request with new status by clicking action button. 4. Click back button to hold the request.	The request status will change from New to Pending.
TC_03_07	Accept Request	1. Login into the system as agent. 2. Click Agent Request Menu 3. Click action button to view request details. 4. Click Accept	The request status change to Accepted and successfully added into active listings list.

		button to accept the request.	
TC_03_08	Display list of Active Listings	1. Login into the system as agent. 2. Click Active Listings menu.	The system displays the list of active listings currently manage by REN.
TC_03_09	Register Potential Client	1. Login into the system as agent. 2. Click Active Listings menu. 3. Click action button to view active listings details. 4. Click add client button. 5. Enter potential client details. 6. Click add client button to submit.	The system displays potential client successfully registered message.
TC_03_10	Update potential client details	1. Login into the system as agent. 2. Click Active Listings menu. 3. Click action button to view active listings details. 4. Select potential client from list of potential clients by clicking edit button on action column 5. Edit potential client details. 6. Click update client button to submit.	The system displays potential client successfully updated message

Table 6.6: Test Description for Real Estate Negotiator Module

Module	Property Management Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021
Test Case ID	**Test Cases**	**Test Step**	**Expected Result**
TC_04_01	New property owner user with incomplete information	1. Login into the system as property owner.	The system displays property information form along with a message to ask the user to complete the information before proceeding further action.
TC_04_02	Create Property	1. Login into the system as property owner. 2. Enter all the required information. 3. Click submit button to submit.	The system displays property information successfully created message.
TC_04_03	Add Property	1. Login into the system as property owner. 2. Click Property Management menu 3. Click add property button 4. Enter all the required information. 5. Click submit button to submit.	The system displays property information successfully created message.
TC_04_04	Update Property information	1. Login into the system as property owner. 2. Select any property from the property list by clicking icon on actions column.	The system displays property information successfully updated message.

		3. Click edit information button. 4. Edit property information details. 5. Click submit button to submit.	
TC_04_05	Property owner user with complete information	1. Login into the system as property owner.	The system displays the property information.
TC_04_06	Display list of property Agents	1. Login into the system as property owner. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button.	The system will display list of property agent.
TC_04_07	View Property Agent Details	1. Login into the system as property owner. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button. 5. View property agent details by clicking view button on action column in property agent list.	The system will display property agent details.
TC_04_08	Assign Property Agent	1. Login into the system as property owner.	The assigned agent successfully added in My Real Estate

		2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button. 5. View property agent details by clicking view icon on action column in property agent list. 6. Click Assign Agent button to assign selected property agent. 7. Click yes button on the confirmation box to proceed.	Negotiator section.
TC_04_09	Change to another property agent	1. Login into the system as property owner. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button. 5. View property agent details by clicking view icon on action column in property agent list. 6. Click Assign Agent button to assign selected property agent.	The new assigned agent successfully added in My Real Estate Negotiator section and the previous agent status will change from active to inactive.

		7. Click yes button on the confirmation box to proceed	
TC_04_10	Unable to assign current active agent	1. Login into the system as property owner. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button.	The view icon on active property agent is disabled.

Table 6.7: Test Description for Property Management Module

Module	Report Generator Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021
Test Case ID	**Test Cases**	**Test Step**	**Expected Result**
TC_05_01	Number of user statistics report	1. Login into the system as admin 2. Open Dashboard page.	The system displays dynamic statistics report about the number of system users by role.
TC_05_02	Number of request status statistics report	1. Login into the system as property agent. 2. Open Dashboard page.	The system displays dynamic statistics report about the number of requests by status either New, Pending and Accepted.
TC_05_03	Number of active listings statistics report	1. Login into the system as property owner. 2. Open Dashboard page	The system displays dynamic statistics report about the number of active listings manage by property agent.

Table 6.8: Test Description for Report Generator Module

6.4.2 Test Data

The Test Data is the input data given to a software program during test execution of the system. The table below shows the given test data to execute DREAMS system testing.

Project Name	Digital Real Estate Management System					
Module	User Authentication Module					
Prepared By	Mohd Asyraf		**Date**	06/08/2021		
Test Case ID	**Test Cases**	**Test Step**	**Test Data**	**Expected Result**	**Actual Result**	**Status**
TC_01_01	Admin login with valid email and password	1. Open the login page. 2. Enter valid email address. 3. Enter valid password. 4. Click login button.	Email: user_admin@gmail.com Password: admin123	Admin user be able to login into the system.	As expected	Pass
TC_01_02	Agent login with valid email and password	1. Open the login page. 2. Enter valid email address.	Email: agent_aaron@gmail.com	Agent user be able to login into the system.	As expected	Pass

		3. Enter valid password. 4. Click login button.	Password: 12345			
TC_01_03	Property owner login with valid email and password	1. Open the login page. 2. Enter valid email address. 3. Enter valid password. 4. Click login button.	Email: amirul_owner@gmail.com Password: 12345	Property owner user be able to login into the system	As expected	Pass
TC_01_04	Admin login with invalid email and password	1. Open the login page. 2. Enter invalid email address. 3. Enter invalid password. 4. Click login button.	Email: administration@gmail.com Password: admin001	The system will display invalid email and password message.	As expected	Pass
TC_01_05	Agent login with invalid email and password	1. Open the login page. 2. Enter invalid email address. 3. Enter invalid	Email: john_agent@gmail.com Password: john001	The system will display invalid email and password message.	As expected	Pass

		password. 4. Click login button.				
TC_01_06	Property owner login with invalid email and password	1. Open the login page. 2. Enter invalid email address. 3. Enter invalid password. 4. Click login button.	Email: amirul@gmail.com Password: amirul001	The system will display invalid email and password message.	As expected	Pass
TC_01_07	Admin login without email	1. Open the login page. 2. Blank the email section. 3. Enter valid password. 4. Click login button.	Email: - Password: admin123	The system will display invalid email and password message.	As expected	Pass
TC_01_08	Agent login without email	1. Open the login page. 2. Blank the email section. 3. Enter valid password	Email: - Password: 12345	The system will display invalid email and password message.	As expected	Pass

		4. Click login button.				
TC_01_09	Property owner login without email	1. Open the login page. 2. Blank the email section. 3. Enter valid password. 4. Click login button.	Email: - Password: 12345	The system will display invalid email and password message.	As expected	Pass
TC_01_10	Admin login without password	1. Open the login page. 2. Enter valid email address. 3. Blank the password section 4. Click login button.	Email: user_admin@gmail.com Password: -	The system will display invalid email and password message.	As expected	Pass
TC_01_11	Agent login without password	1. Open the login page. 2. Enter valid email address. 3. Blank the password section. 4. Click login	Email: agent_john@gmail.com Password: -	The system will display invalid email and password message.	As expected	Pass

		button.				
TC_01_12	Property owner login without password	1. Open the login page. 2. Enter valid email address. 3. Blank the password section. 4. Click login button.	Email: amirul_owner@gmail.com Password: -	The system will display invalid email and password message.	As expected	Pass
TC_01_13	Change Password	1. Login into the system with valid email and password. 2. Click Account Management menu. 3. Enter new password. 4. Click save button to submit.	Email: owner_kamal@gmail.com Password: 12345 New Password: kamal123	The system will display password successfully updated message.	As expected	Pass

Table 6.9: Test Data for User Authentication Module

Project Name	Digital Real Estate Management System		
Module	Manage User Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021

Test Case ID	Test Cases	Test Step	Test Data	Expected Result	Actual Result	Status
TC_02_01	Register user without email	1. Login into the system as admin user. 2. Click management menu and select user management. 3. Open registration form by clicking register user button. 4. Blank the email section. 5. Enter default password. 6. Click register button to submit.	**Login (Admin)** Email: user_admin@gmail.com Password: admin123 **Registration form** Email: - Password: abc123 Role: Property Agent	The system displays error message and unable to register user.	As expected	Pass
TC_02_02	Register user with invalid email	1. Login into the	**Login (Admin)** Email:	The system displays error message and unable to	As expected	Pass

	format	system as admin user. 2. Click management menu and select user management. 3. Open registration form by clicking register user button. 4. Enter email with invalid format. 5. Enter default password. 6. Click register button to submit.	administration@gmail.com Password: admin123 **Registration form** Email: rizal_12.com Password: abc123 Role: Property Agent	register user.		
TC_02_03	Register user without role	1. Login into the system as admin user. 2. Click management menu and select user management. 3. Open registration form by clicking register user	**Login (Admin)** Email: administration@gmail.com Password: admin123 **Registration form** Email: rizal_12@gmail.com	The system displays error message and unable to register user.	As expected	Pass

		button. 4. Enter email address 5. Enter default password. 6. Blank the role section 7. Click register button to submit.	Password: abc123 Role: -			
TC_02_04	Register user with valid email, password and role.	1. Login into the system as admin user. 2. Click management menu and select user management. 3. Open registration form by clicking register user button. 4. Enter email address 5. Enter default password. 6. Select user role. 7. Click register	**Login (Admin)** Email: user_admin@gmail.com Password: admin123 **Registration form** **1. Property Agent** Email: agent_husin@gmail.com Password: 12345 Role: Property Agent	The system will display user successfully registered message.	As expected	Pass

		button to submit.	**2.Property Owner** Email: owner_kamal@gmail.com Password: 12345 Role: Property Owner			
TC_02_05	Remove user	1. Login into the system as admin user. 2. Click management menu and select user management. 3. Remove user by clicking trash icon on action column. 4. Click yes on the confirmation box.	**Login (Admin)** Email: user_admin@gmail.com Password: admin123 **User** Email: owner_test@gmail.com	The user successfully removes from the system.	As expected	Pass

Table 6.10: Test Data for Manage User Module

Project Name	Digital Real Estate Management System					
Module	Real Estate Negotiator Module					
Prepared By	Mohd Asyraf		**Date**	06/08/2021		
Test Case ID	**Test Cases**	**Test Step**	**Test Data**	**Expected Result**	**Actual Result**	**Status**
TC_03_01	New agent user with incomplete profile	1. Login into the system as new agent user.	**Login (Agent)** Email: agent_husin@gmail.com Password: 12345	The system display creates profile form along with a message to ask the user to complete the profile before proceeding further action.	As expected	Pass
TC_03_02	Create Profile	1. Login into the system as agent user. 2. Enter all the required information 3. Click create profile button to submit	**Create Profile form** REN ID: REN 2901 Agent Name: Husin Akhlaken Religion: Muslim Contact Number: 0187736001 Work Experience Start year: 2010 End Year: 2021 Job Title: Agent Position: REN Specialties	The system display profile successfully created message.	As expected	Pass

			Property Specialist: Semi-D Sales Area: JOHOR			
TC_03_03	Update Profile	1. Login into the system as agent user. 2. Click Profile menu and select My Profile. 3. Edit the selected data. 4. Click save button to submit.	Contact Number: 0187736212	The system display profile successfully updated message.	As expected	Pass
TC_03_04	Agent user with complete profile	1. Login into the system as agent user.	**Login (Agent)** Email: agent_husin@gmail.com Password: 12345	The system displays property agent dashboard as main page.	As expected	Pass
TC_03_05	Display list of property request	1. Login into the system as agent user. 2. Click Agent Request Menu.	**Login (Agent)** Email: agent_husin@gmail.com Password: 12345	The system will display list of property request.	As expected	Pass
TC_03_06	Request status change from New to Pending	1. Login into the system as agent	Select: No: 1 Property Name:	The request status will change from New to Pending.	As expected	Pass

		user. 2. Click Agent Request Menu. 3. Open request with new status by clicking action button. 4. Click back button to hold the request.	Luxury Condo Address: Blok A Section 3 Current Status: New			
TC_03_07	Accept Request	1. Login into the system as agent user. 2. Click Agent Request Menu. 3. Click action button to view request details. 4. Click Accept button to accept the request.	Select: No: 1 Property Name: Luxury Condo Address: Blok A Section 3 Current Status: Pending	The request status change to Accepted and successfully added into active listings list.	As expected	Pass
TC_03_08	Display list of Active Listings	1. Login into the system as agent user. 2. Open Active Listings page by	No: 1 Property Name: Luxury Condo Address: Blok A Section 3	The system displays the list of active listings currently manage by REN.	As expected	Pass

		clicking My Listings menu.				
TC_03_09	Register Potential Client	1. Login into the system as agent user. 2. Click Active Listings menu. 3. Click action button to view active listings details. 4. Click add client button. 5. Enter potential client details. 6. Click add client button to submit.	Name: Azri Mohamed Phone Number: 012998120 Religion: Muslim Occupation: Lecturer Negotiation status: First Meeting Description: Serious Buyer.	The system displays potential client successfully registered message.	As expected	Pass
TC_03_10	Update potential client details	1. Login into the system as agent user. 2. Click Active Listings menu. 3. Click action button to view active listings details.	<u>Select</u> No: 2 Client Name: Azri Mohamed <u>Update</u> Negotiation Status: Loan Submitted	The system displays potential client successfully updated message.	As expected	Pass

		4. Select potential client from list of potential clients by clicking edit button on action column 5. Edit potential client details. 6. Click update client button to submit.				

Table 6.11: Test Data for Real Estate Negotiator Module

Project Name	Digital Real Estate Management System					
Module	Property Management Module					
Prepared By	Mohd Asyraf		**Date**	06/08/2021		
Test Case ID	**Test Cases**	**Test Step**	**Test Data**	**Expected Result**	**Actual Result**	**Status**
TC_04_01	New property owner user with	1. Login into the system as a new	**Login (Owner)** Email:	The system displays property information	As expected	Pass

	incomplete information	property owner user.	owner_kamal@gmail.com Password: 12345	form along with a message to ask the user to complete the information before proceeding further action.		
TC_04_02	Create Property	1. Login into the system as property owner user. 2. Enter all the required information. 3. Click submit button to submit.	**Create Property form** Property Owner Details Full Name : Kamal Adly Contact Number: 0187726553 Religion: Muslim Occupation: Musician Current Address: No 76 Jalan Selasih State: Wilayah Persekutuan Kuala Lumpur Property Details Property Name: Damansara Height Property Address: No 9 Jalan Damansara 1 State: Wilayah Persekutuan Kuala Lumpur	The system displays property information successfully created message.	As expected	Pass

			Developer: KSL Property Property Type: Semi-D Type of Land: Bumiputera Lot Stories: 2 Number of bedrooms:3 Number of bathrooms:7 Property Status: Property For SALE Asking Price: 467000 Description: Please Find A buyer ASAP			
TC_04_03	Add Property	1. Login into the system as property owner user. 2. Click Property Management menu 3. Click add property button 4. Enter all the required information.	Property Name: Modern House Property Address: 321-2 Jalan Anggerik State: Wilayah Persekutuan Kuala Lumpur Developer: KSL Property SDN BHD Property Type: Bungalow Type of Land: Freehold Stories: 3	The system displays property information successfully created message	As expected	Pass

		5. Click submit button to submit.	Number of bedrooms:5 Number of bathrooms:7 Property Status: Property For SALE Asking Price: 1200000 Description: Fully Furnished			
TC_04_04	Update Property Information	1. Login into the system as property owner user. 2. Select any property from the property list by clicking icon on actions column. 3. Click edit information button. 4. Edit property information details. 5. Click submit button to submit.	Select No: 1 Property Name: Damansara Height Update Data Occupation: Doctor	The system displays property details successfully updated message.	As expected	Pass

TC_04_05	Property owner user with complete information	1. Login into the system as property owner user.	**Login (Owner)** Email: amirul_owner@gmail.com Password: 12345	The system displays My Property page as a main page.	As expected	Pass
TC_04_06	Display list of property Agent	1. Login into the system as property owner user. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button.	Select Property No: 1 Property Name: Pangsapuri Taman Tasek Utama	The system will display list of property agents.	As expected	Pass
TC_04_07	View Property Agent Details	1. Login into the system as property owner user. 2. Select any property from the	Select: No: 1 Agent ID: REN 2901 Name: Husin Akhlaken Phone Number: 0187736212	The system will display property agent details.	As expected	Pass

		property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button. 5. View property agent details by clicking view icon on actions column in property agent list.				
TC_04_08	Assign Property Agent	1. Login into the system as property owner user. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real	Select: No: 1 Agent ID: REN 2901 Name: Husin Akhlaken Phone Number: 0187736212	The assigned agent successfully added in My Real Estate Negotiator section.	As expected	Pass

		Estate Negotiator section. 4. Click Assign Your Agent button. 5. View property agent details by clicking view button on action column in property agent list. 6. Click Assign Agent button to assign selected property agent. 7. Click yes button on the confirmation box to proceed.				
TC_04_09	Change property agent	1. Login into the system as property owner user. 2. Select any property from the	Select: No: 4 Agent ID: REN 7788 Name: Aaron Azizi Phone Number: 018826266	The new assigned agent successfully added in My Real Estate Negotiator section and the previous agent status will change from active to inactive.	As expected	Pass

		property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button. 5. View property agent details by clicking view button on action column in property agent list. 6. Click Assign Agent button to assign selected property agent. 7. Click yes button on the confirmation box to proceed.				
TC_04_10	Unable to assign current active agent	1. Login into the system as	<u>Select:</u> No: 4 Agent ID: REN 7788	The view icon on an action column for active agent is disabled.	As expected	Pass

		property owner user. 2. Select any property from the property list by clicking icon on actions column. 3. Go to My Real Estate Negotiator section. 4. Click Assign Your Agent button.	Name: Aaron Azizi Phone Number: 018826266			

Table 6.12: Test Data for Property Management Module

Project Name	Digital Real Estate Management System		
Module	Report Generator Module		
Prepared By	Mohd Asyraf	**Date**	06/08/2021

Test Case ID	Test Cases	Test Step	Test Data	Expected Result	Actual Result	Status
TC_05_01	Number of user statistics report	1. Login into the system as admin user. 2. Open Dashboard page.	**Admin** Email: user_admin@gmail.com Password: admin123	The system displays dynamic statistics report about the number of system users by role.	As expected	Pass
TC_05_02	Number of request status statistics report	1. Login into the system as agent user. 2. Open Dashboard page.	**Admin** Email: agent_husin@gmail.com Password: 12345	The system displays dynamic statistics report about the number of requests by status either New, Pending and Accepted.	As expected	Pass
TC_05_03	Number of active listings statistics report	1. Login into the system as property owner user. 2. Open Dashboard page	**Admin** Email: agent_husin@gmail.com Password: 12345	The system displays dynamic statistics report about the number of active listings manage by property agent	As expected	Pass

Table 6.13: Test Data for Report Generator Module

6.5 Test Results and Analysis

The test results are the end result of the overall activity of software testing life cycle. The test results should be documented that allows developer to keep track the success and failure result during software testing execution.

Module	Test Case ID	Total Number of Test Case Executed	Number of Pass Test Cases	Number of Fail Test Cases	Result
User Authentication Module	TC_01_01 – TC_01_13	13	13	0	Success
Manager User Module	TC_02_01 – TC_02_05	5	5	0	Success
Real Estate Negotiator Module	TC_03_01 – TC_03_10	10	10	0	Success
Property Management Module	TC_04_01 – TC_04_10	10	10	0	Success
Report Generator Module	TC_05_01 – TC_05_03	3	3	0	Success

Table 6.14: Test Result

6.6 Conclusion

In a conclusion, the objective of this chapter is to gain confidence in the DREAMS system. Section 6.2 briefly describes the test plan before executing the testing. The testing technique and approach was detailed describe in section 6.3. In addition, the test design and description were documented in section 6.4. For the testing results and analysis, it was recorded in section 6.5. Therefore, the entire test activities were detailed describes and documented in this chapter. The next chapter is the last chapter that conclude and identify the proposition on how to improve this system to a better level.

CHAPTER 7: CONCLUSION

7.1 Observation on Weaknesses and Strengths

The DREAMS System is a web application system that was developed based on the requirements obtained through observation and investigation related to the property management process. Every product developed has its own strengths and weaknesses. This subchapter is to observe and identify the strengths and weaknesses of DREAMS System.

Nowadays, the digital platform become the crucial elements in economic industry including property industry. Pandemic Covid-19 has forced every daily process to run digitally. Hence, DREAMS provides the management tools for property agency to manage their client's information digitally. At the same time, DREAMS offers property owners to assign preferred property agent to manage their property. Property agent able to manage the information digitally while reduce the risk of data loss and data redundancy.

From the observation that have been made, there some issue which leads to system weaknesses. DREAMS do not allow the property owner to self-registered into the system. To use the system, property owner will be registered by the property agency administration only. Furthermore, the system should provide the page for the citizen to browse the available property managed by that property agency.

7.2 Propositions for Improvement

The improvement is one of the major factors to ensure the quality of developed system and make the system more inclusive. Through the observations made, there are several propositions for improvements to this system.

First, to produce an inclusive system in the real estate sector, DREAMS should provide a page for real estate agent to market and promote their active listing through this system. This feature can facilitate the process for real estate agent to get a buyer for the listing’s property.

Next, the process in property management involves many documents that need to be signed. This system needs to be improved by provides features that allow users to sign documents digitally. By implement this feature, the process of signing documents can be done through the system.

Lastly, in this digital era is more focused on mobile applications. This system should be improving by providing the mobile application version to user to use the system. The mobile application is one of the well-known platforms that can improve and facilitate the business process and provide customer satisfaction.

The propositions for improvements stated in this section need to be considered as well as possible to ensure the system can be operating comprehensively and provide a complete satisfaction to the users of the system.

7.3 Project Contribution

Digital Real Estate Agent Management System (DREAMS) is a software project that was developed to facilitate the entire management process that focused on real estate sector. Real estate sector is the sector that involving extensive data management. Hence, the systematic and centralized data management is essential to streamline the property management process.

Furthermore, the Real Estate Agent Management System (DREAMS) provides a convenience feature for property owners to find and assign Real Estate Negotiator (REN) to manage their property. This system also provides a centralized data management for property agent to manage their client's information.

Therefore, this system can contribute a comprehensive management solution and method for individuals involved in property management either by directly or indirectly. In other words, this system will help property agency to increase their business efficiency and help to grow their business.

7.4 Conclusion

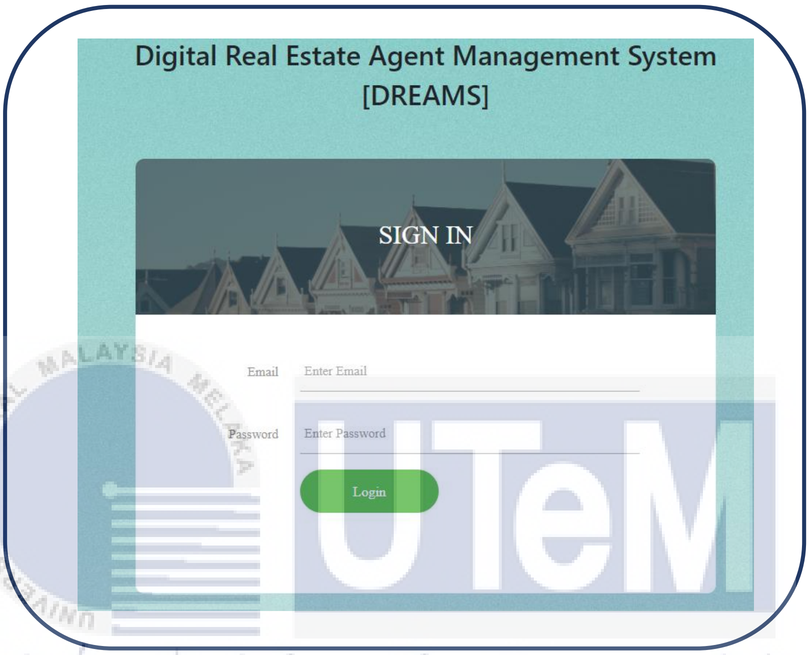
As a conclusion, by going through all the software development process, the project has achieved its objectives. The project was successfully developed by using Codeigniter 4 framework and was provided a comprehensive web application for property agency to manage their client's information digitally. This system provides a solution for individuals involved in property management to execute the management process in a digital way. Lastly, by implementing digital technology in real estate business, it can help to improve the entire process of property management including communication, data management and customer experience.

APPENDIX A

User Manual

1. System Login

a) Enter email address.
b) Enter password.
c) Click login button.



Digital Real Estate Agent Management System [DREAMS]

SIGN IN

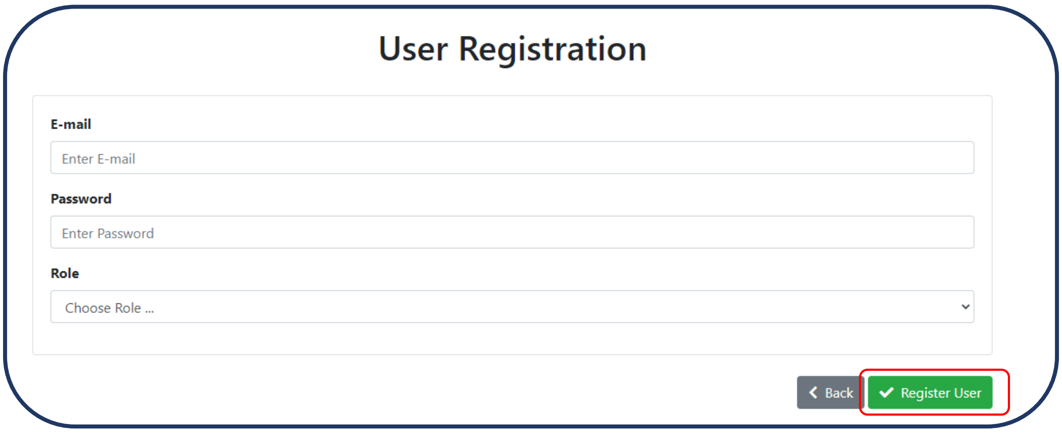
Email: Enter Email

Password: Enter Password

Login Page

2. Register user

a) Enter email address.
b) Enter password.
c) Select role.
d) Click register user button to submit.



User Registration

E-mail: Enter E-mail

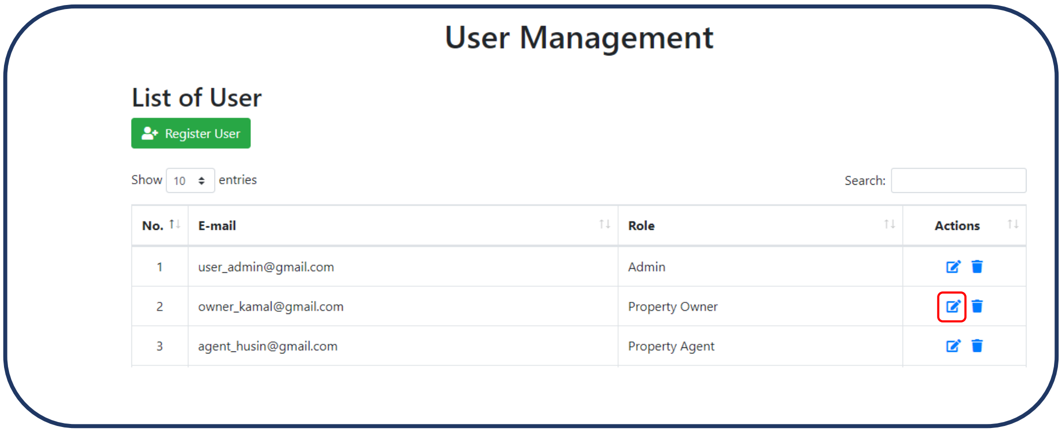
Password: Enter Password

Role: Choose Role ...

User Registration form

3. Edit user

a) Select user by clicking edit icon on action column.
b) Click update user button to submit.



User Management

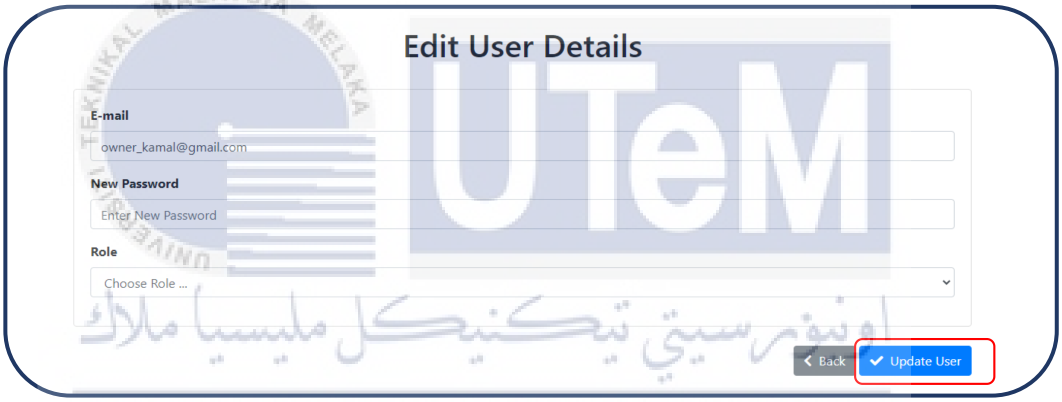
List of User

Show 10 entries

Search:

No.	E-mail	Role	Actions
1	user_admin@gmail.com	Admin	✎ 🗑
2	owner_kamal@gmail.com	Property Owner	✎ 🗑
3	agent_husin@gmail.com	Property Agent	✎ 🗑

Edit user icon



Edit User Details

E-mail: owner_kamal@gmail.com

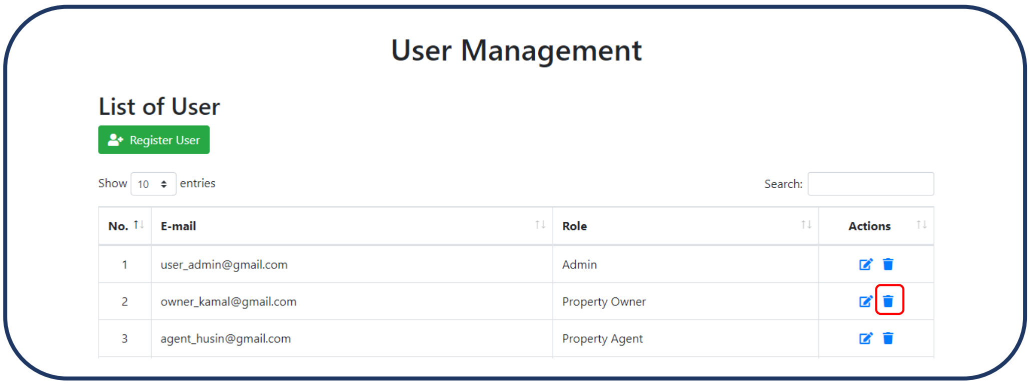
New Password: Enter New Password

Role: Choose Role ...

Edit user form

4. Remove user

a) Select user by clicking trash icon on action column.
b) Click update user button to submit.



User Management

List of User

Show 10 entries

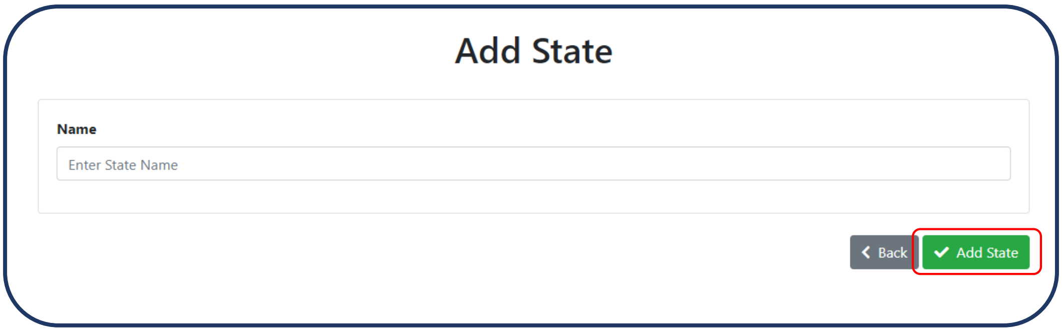
Search:

No.	E-mail	Role	Actions
1	user_admin@gmail.com	Admin	✎ 🗑
2	owner_kamal@gmail.com	Property Owner	✎ 🗑
3	agent_husin@gmail.com	Property Agent	✎ 🗑

Remove user icon

5. Add State

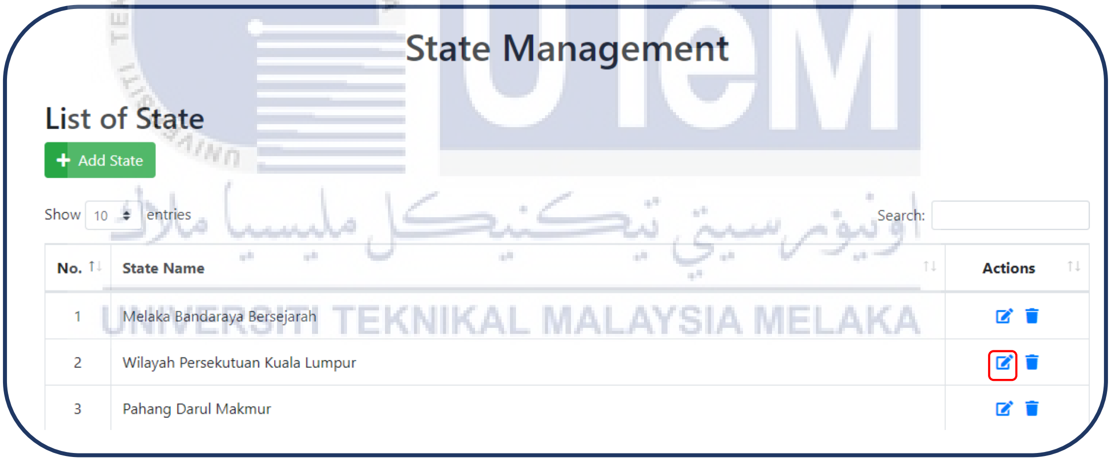
a) Open add state form by clicking Add State button
b) Click Add State button to submit.



Add State form

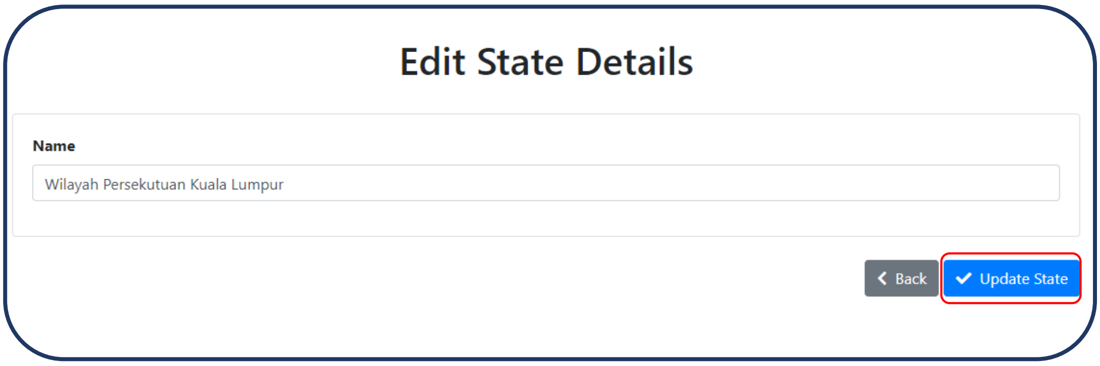
6. Edit State

a) Select state by clicking edit icon on action column.
b) Click Update state to submit



No.	State Name	Actions
1	Melaka Bandaraya Bersejarah	
2	Wilayah Persekutuan Kuala Lumpur	
3	Pahang Darul Makmur	

Edit State icon

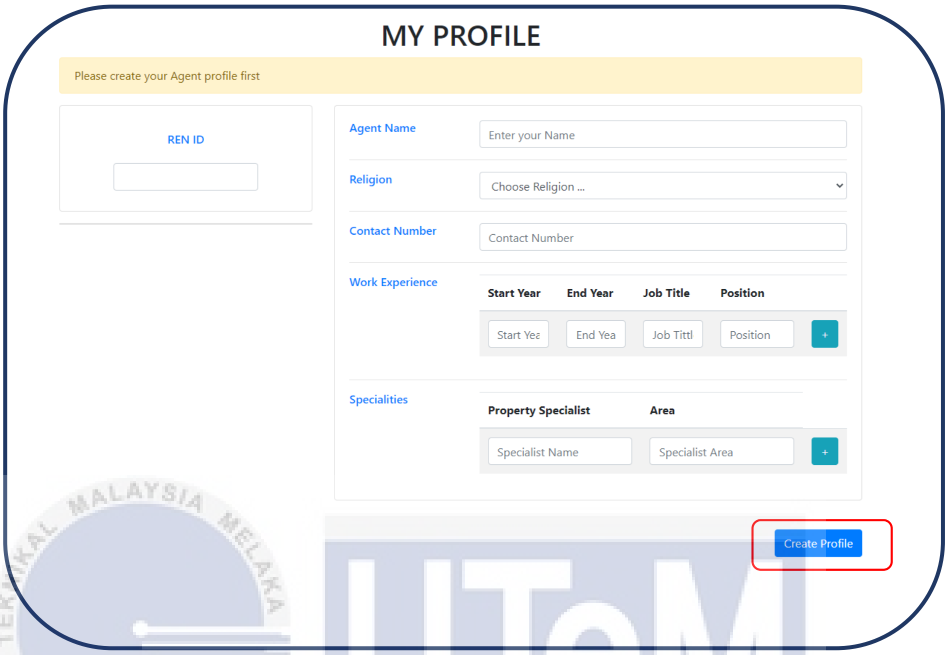


Name
Wilayah Persekutuan Kuala Lumpur

Edit State form

7. Create Agent Profile

a) Login as new agent.
b) Fill in all required information.
c) Click create profile button to submit.



MY PROFILE

Please create your Agent profile first

REN ID	
Agent Name	Enter your Name
Religion	Choose Religion ...
Contact Number	Contact Number

Work Experience

Start Year	End Year	Job Title	Position	
Start Yea	End Yea	Job Tittl	Position	+

Specialities

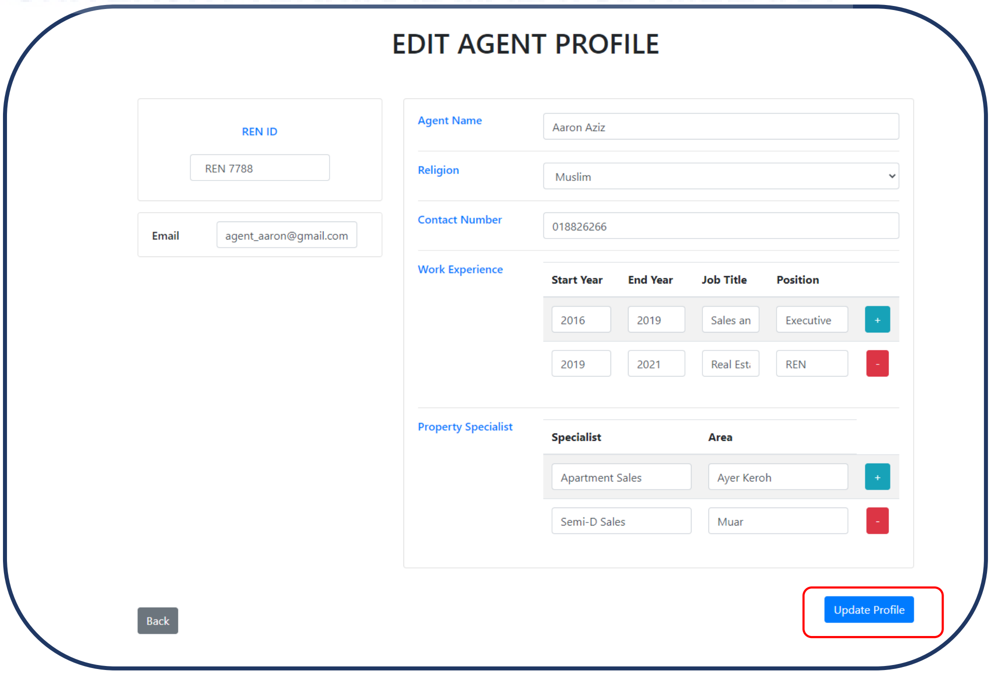
Property Specialist	Area	
Specialist Name	Specialist Area	+

Create Profile

Create profile form

8. Edit Agent Profile

a) Open edit profile form.
b) Update selected information
c) Click update profile button to submit.



EDIT AGENT PROFILE

REN ID	REN 7788
Email	agent_aaron@gmail.com
Agent Name	Aaron Aziz
Religion	Muslim
Contact Number	018826266

Work Experience

Start Year	End Year	Job Title	Position	
2016	2019	Sales an	Executive	+
2019	2021	Real Est.	REN	-

Property Specialist

Specialist	Area	
Apartment Sales	Ayer Keroh	+
Semi-D Sales	Muar	-

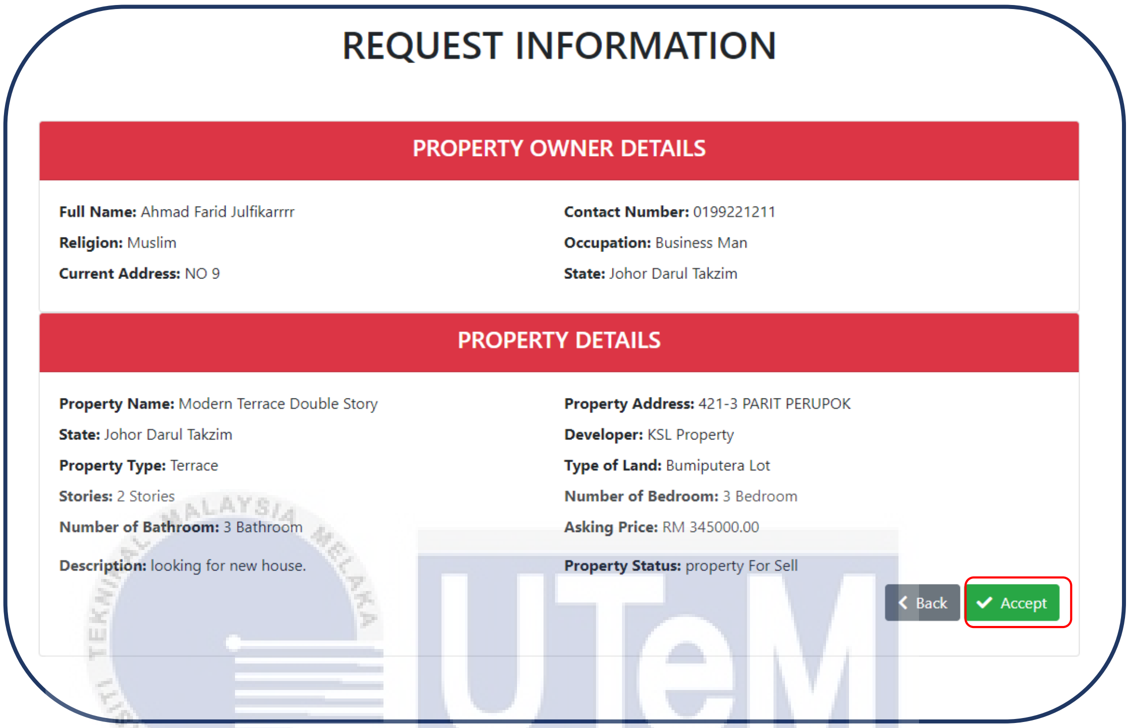
Back

Update Profile

Edit profile form

9. Accept property owner request

a) Open property owner request.
b) Click Accept button to accept request.



REQUEST INFORMATION

PROPERTY OWNER DETAILS

Full Name: Ahmad Farid Julfikarrrr
Religion: Muslim
Current Address: NO 9
Contact Number: 0199221211
Occupation: Business Man
State: Johor Darul Takzim

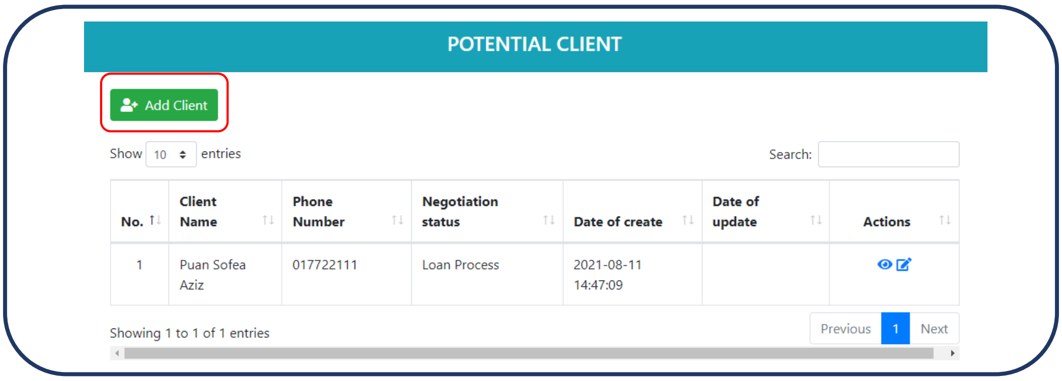
PROPERTY DETAILS

Property Name: Modern Terrace Double Story
State: Johor Darul Takzim
Property Type: Terrace
Stories: 2 Stories
Number of Bathroom: 3 Bathroom
Description: looking for new house.
Property Address: 421-3 PARIT PERUPOK
Developer: KSL Property
Type of Land: Bumiputera Lot
Number of Bedroom: 3 Bedroom
Asking Price: RM 345000.00
Property Status: property For Sell

Request Information

10. Add potential client

a) Click Add client button.
b) Fill in all required information.
c) Click Add client button to submit.

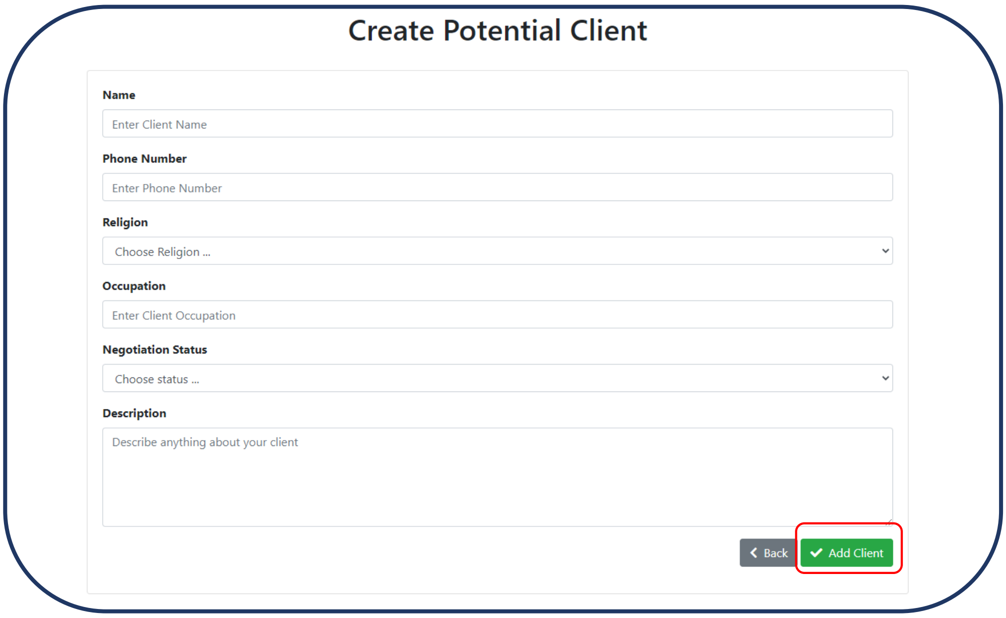


POTENTIAL CLIENT

No.	Client Name	Phone Number	Negotiation status	Date of create	Date of update	Actions
1	Puan Sofea Aziz	017722111	Loan Process	2021-08-11 14:47:09		

Showing 1 to 1 of 1 entries

List of potential clients



Create Potential Client

Name

Enter Client Name

Phone Number

Enter Phone Number

Religion

Choose Religion ...

Occupation

Enter Client Occupation

Negotiation Status

Choose status ...

Description

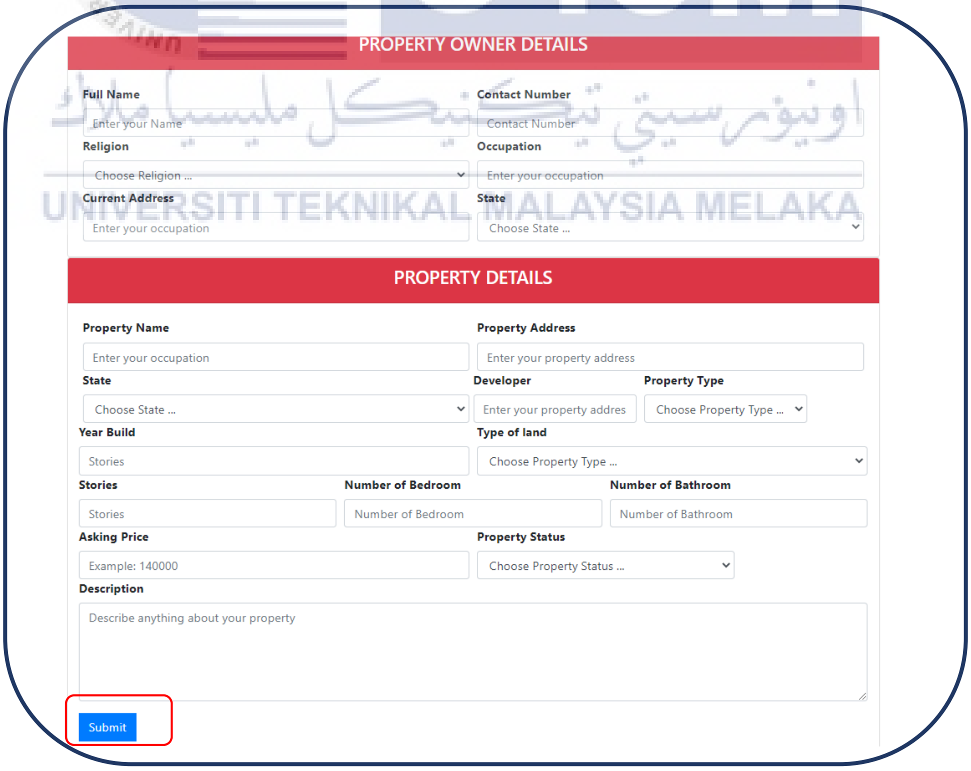
Describe anything about your client

< Back ✓ Add Client

Add potential client form

10. Create property

a) Login as new property owner.
b) Fill in all required information.
c) Click submit button.



PROPERTY OWNER DETAILS

Full Name: Enter your Name
Contact Number: Contact Number
Religion: Choose Religion ...
Occupation: Enter your occupation
Current Address: Enter your occupation
State: Choose State ...

PROPERTY DETAILS

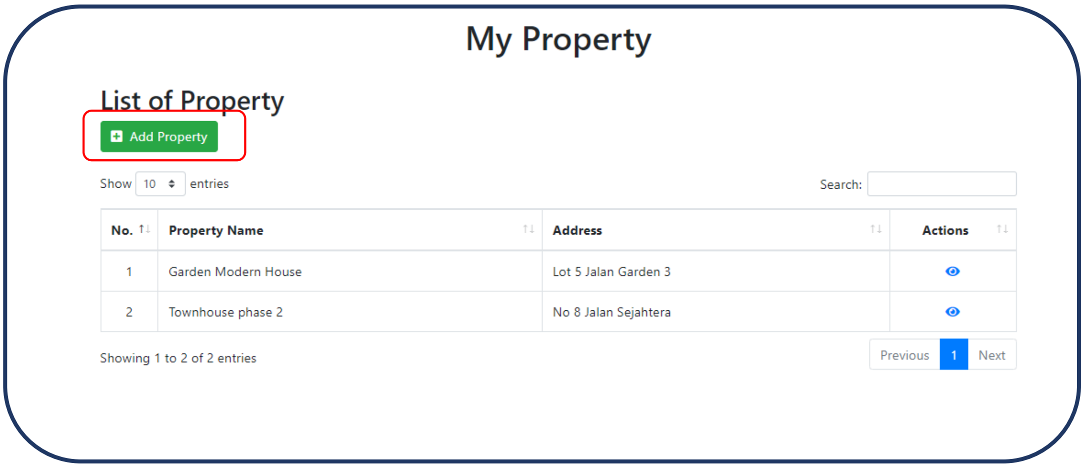
Property Name: Enter your occupation
Property Address: Enter your property address
State: Choose State ...
Developer: Enter your property addres
Property Type: Choose Property Type ...
Year Build: Stories
Type of land: Choose Property Type ...
Stories: Stories
Number of Bedroom: Number of Bedroom
Number of Bathroom: Number of Bathroom
Asking Price: Example: 140000
Property Status: Choose Property Status ...
Description: Describe anything about your property

Submit

Create property form

11. Add property

a) Click Add property button
b) Fill in all required information.
c) Click submit button.



My Property

List of Property

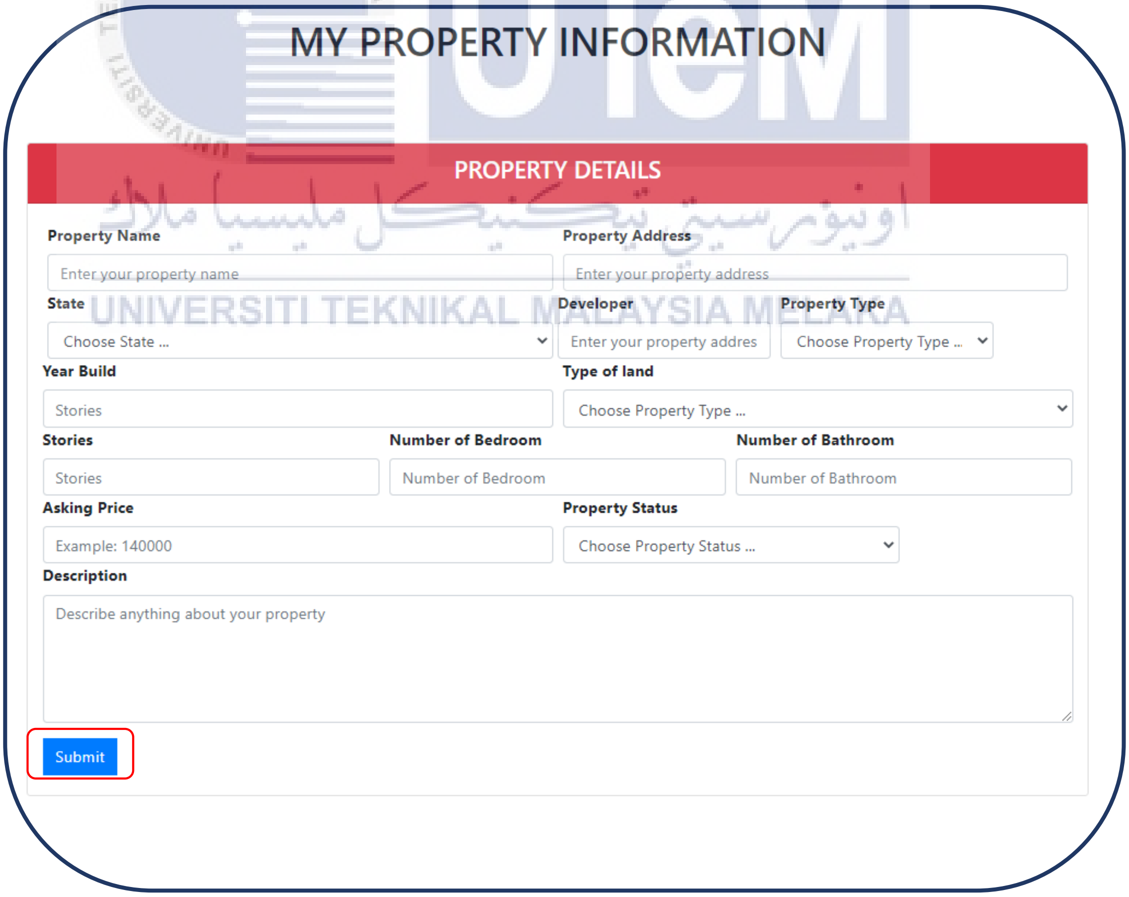
Show 10 entries

Search:

No.	Property Name	Address	Actions
1	Garden Modern House	Lot 5 Jalan Garden 3	👁
2	Townhouse phase 2	No 8 Jalan Sejahtera	👁

Showing 1 to 2 of 2 entries

List of property



MY PROPERTY INFORMATION

PROPERTY DETAILS

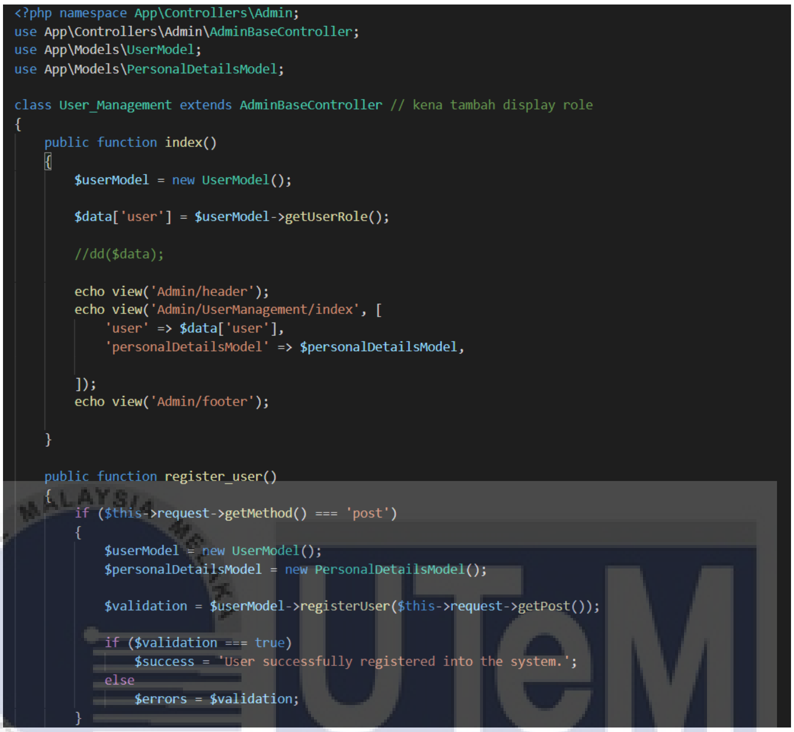
Property Name: Enter your property name
Property Address: Enter your property address
State: Choose State ...
Developer: Enter your property addres
Property Type: Choose Property Type ...
Year Build: Stories
Type of land: Choose Property Type ...
Stories: Stories
Number of Bedroom: Number of Bedroom
Number of Bathroom: Number of Bathroom
Asking Price: Example: 140000
Property Status: Choose Property Status ...
Description: Describe anything about your property

Property details form

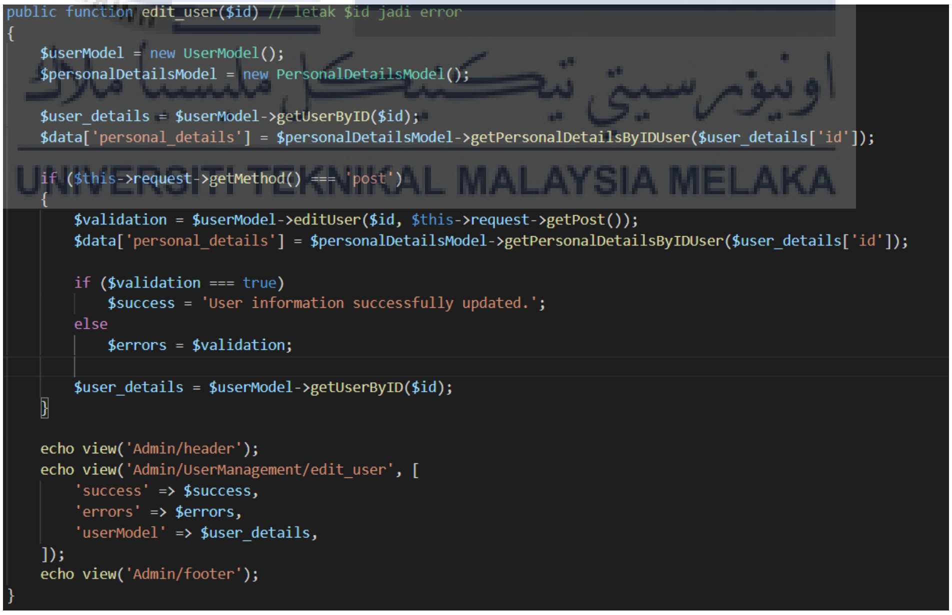
APPENDIX B

System source code

1. User Management Controller

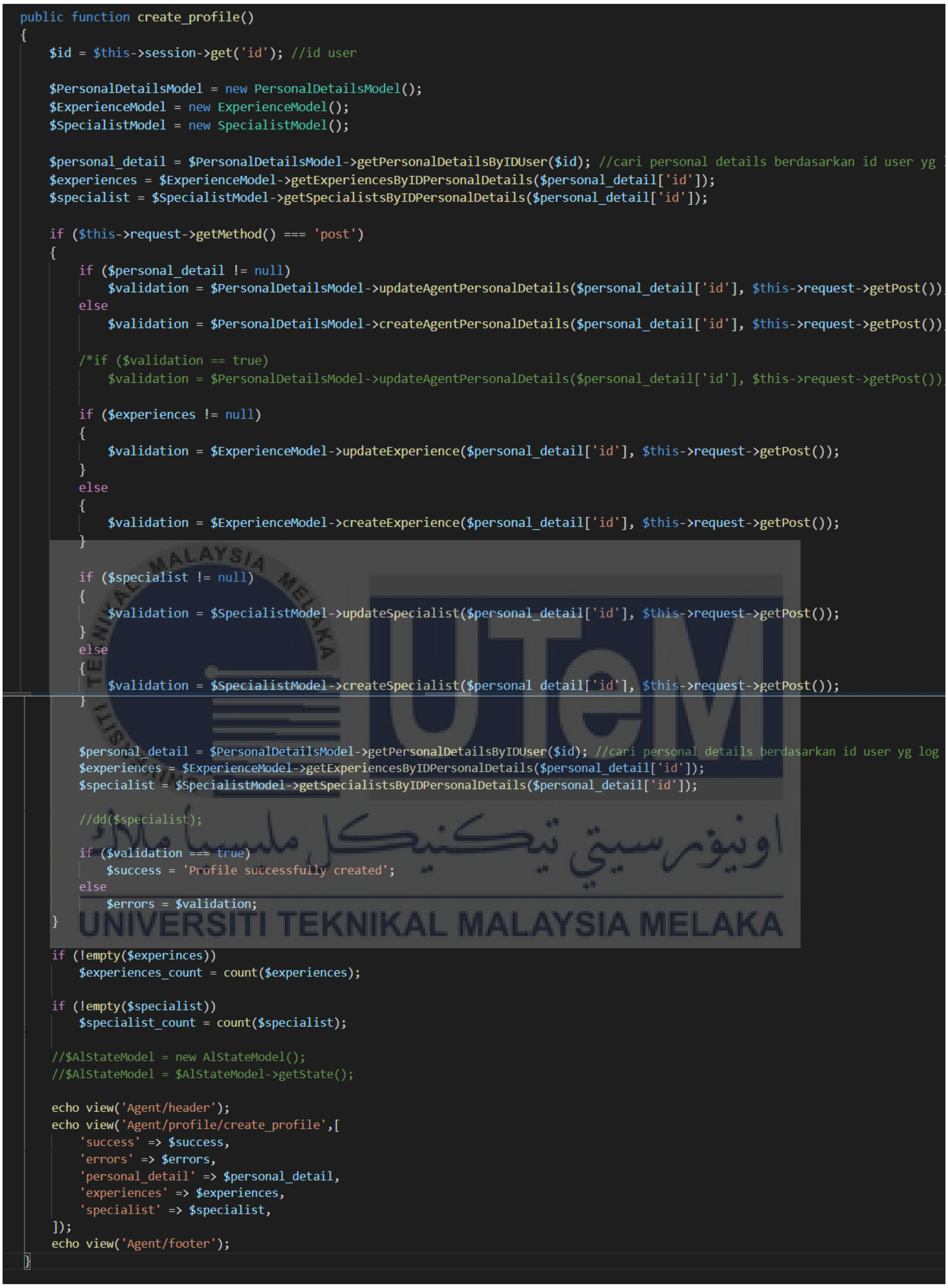


```php
<?php namespace App\Controllers\Admin;
use App\Controllers\Admin\AdminBaseController;
use App\Models\UserModel;
use App\Models\PersonalDetailsModel;

class User_Management extends AdminBaseController // kena tambah display role
{
    public function index()
    {
        $userModel = new UserModel();

        $data['user'] = $userModel->getUserRole();

        //dd($data);

        echo view('Admin/header');
        echo view('Admin/UserManagement/index', [
            'user' => $data['user'],
            'personalDetailsModel' => $personalDetailsModel,

        ]);
        echo view('Admin/footer');

    }

    public function register_user()
    {
        if ($this->request->getMethod() === 'post')
        {
            $userModel = new UserModel();
            $personalDetailsModel = new PersonalDetailsModel();

            $validation = $userModel->registerUser($this->request->getPost());

            if ($validation === true)
                $success = 'User successfully registered into the system.';
            else
                $errors = $validation;
        }
```



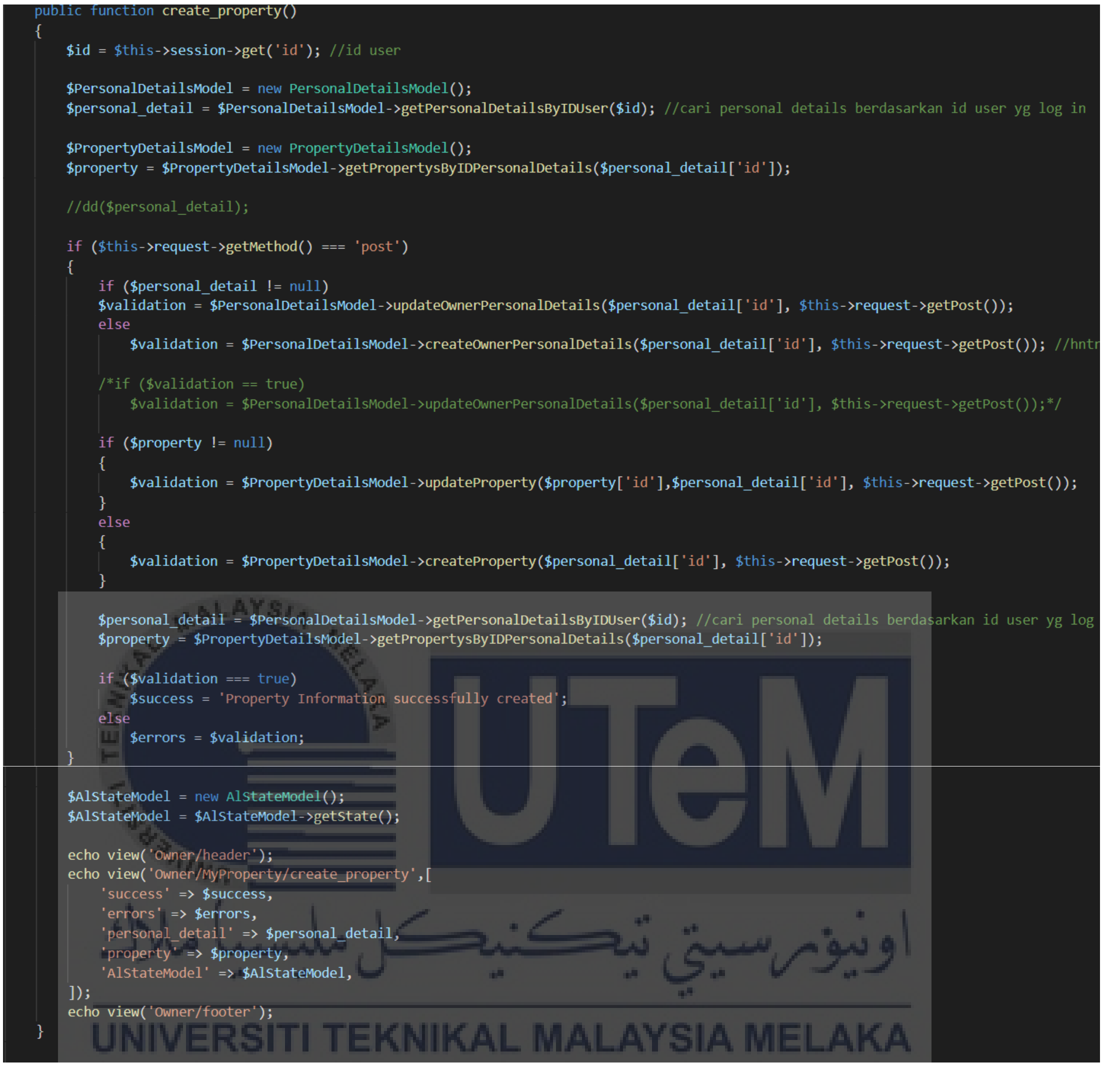
```php
public function edit_user($id) // letak $id jadi error
{
    $userModel = new UserModel();
    $personalDetailsModel = new PersonalDetailsModel();

    $user_details = $userModel->getUserByID($id);
    $data['personal_details'] = $personalDetailsModel->getPersonalDetailsByIDUser($user_details['id']);

    if ($this->request->getMethod() === 'post')
    {
        $validation = $userModel->editUser($id, $this->request->getPost());
        $data['personal_details'] = $personalDetailsModel->getPersonalDetailsByIDUser($user_details['id']);

        if ($validation === true)
            $success = 'User information successfully updated.';
        else
            $errors = $validation;

        $user_details = $userModel->getUserByID($id);
    }

    echo view('Admin/header');
    echo view('Admin/UserManagement/edit_user', [
        'success' => $success,
        'errors' => $errors,
        'userModel' => $user_details,
    ]);
    echo view('Admin/footer');
}
```

2. Agent Profile Controller



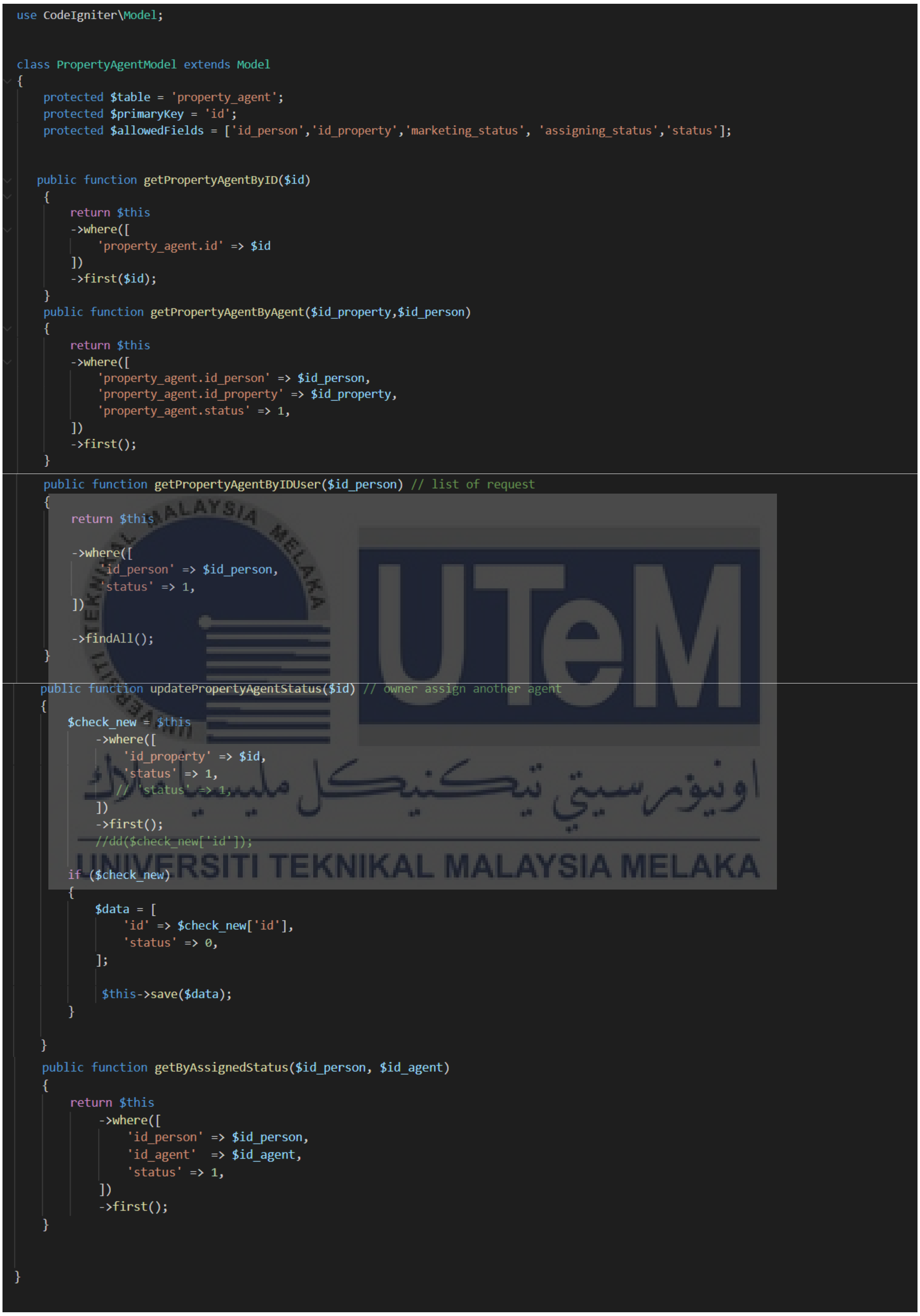
```
public function create_profile()
{
    $id = $this->session->get('id'); //id user

    $PersonalDetailsModel = new PersonalDetailsModel();
    $ExperienceModel = new ExperienceModel();
    $SpecialistModel = new SpecialistModel();

    $personal_detail = $PersonalDetailsModel->getPersonalDetailsByIDUser($id); //cari personal details berdasarkan id user yg
    $experiences = $ExperienceModel->getExperiencesByIDPersonalDetails($personal_detail['id']);
    $specialist = $SpecialistModel->getSpecialistsByIDPersonalDetails($personal_detail['id']);

    if ($this->request->getMethod() === 'post')
    {
        if ($personal_detail != null)
            $validation = $PersonalDetailsModel->updateAgentPersonalDetails($personal_detail['id'], $this->request->getPost())
        else
            $validation = $PersonalDetailsModel->createAgentPersonalDetails($personal_detail['id'], $this->request->getPost())

        /*if ($validation == true)
            $validation = $PersonalDetailsModel->updateAgentPersonalDetails($personal_detail['id'], $this->request->getPost())

        if ($experiences != null)
        {
            $validation = $ExperienceModel->updateExperience($personal_detail['id'], $this->request->getPost());
        }
        else
        {
            $validation = $ExperienceModel->createExperience($personal_detail['id'], $this->request->getPost());
        }

        if ($specialist != null)
        {
            $validation = $SpecialistModel->updateSpecialist($personal_detail['id'], $this->request->getPost());
        }
        else
        {
            $validation = $SpecialistModel->createSpecialist($personal_detail['id'], $this->request->getPost());
        }


        $personal_detail = $PersonalDetailsModel->getPersonalDetailsByIDUser($id); //cari personal details berdasarkan id user yg log
        $experiences = $ExperienceModel->getExperiencesByIDPersonalDetails($personal_detail['id']);
        $specialist = $SpecialistModel->getSpecialistsByIDPersonalDetails($personal_detail['id']);

        //dd($specialist);

        if ($validation === true)
            $success = 'Profile successfully created';
        else
            $errors = $validation;
    }
    if (!empty($experinces))
        $experiences_count = count($experiences);

    if (!empty($specialist))
        $specialist_count = count($specialist);

    //$AlStateModel = new AlStateModel();
    //$AlStateModel = $AlStateModel->getState();

    echo view('Agent/header');
    echo view('Agent/profile/create_profile',[
        'success' => $success,
        'errors' => $errors,
        'personal_detail' => $personal_detail,
        'experiences' => $experiences,
        'specialist' => $specialist,
    ]);
    echo view('Agent/footer');
}
```

3. My Property Controller



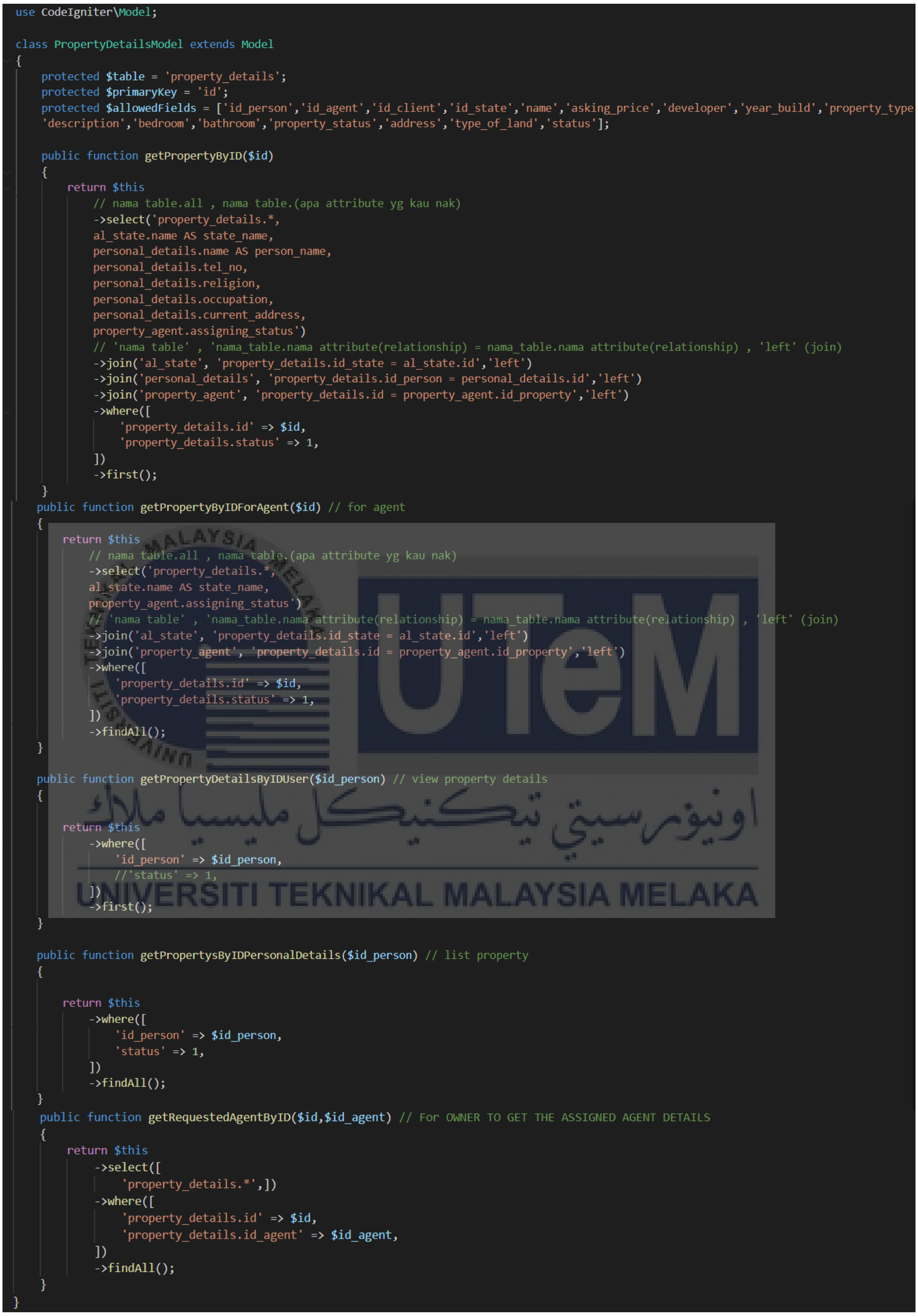
```
public function create_property()
{
    $id = $this->session->get('id'); //id user

    $PersonalDetailsModel = new PersonalDetailsModel();
    $personal_detail = $PersonalDetailsModel->getPersonalDetailsByIDUser($id); //cari personal details berdasarkan id user yg log in

    $PropertyDetailsModel = new PropertyDetailsModel();
    $property = $PropertyDetailsModel->getPropertysByIDPersonalDetails($personal_detail['id']);

    //dd($personal_detail);

    if ($this->request->getMethod() === 'post')
    {
        if ($personal_detail != null)
        $validation = $PersonalDetailsModel->updateOwnerPersonalDetails($personal_detail['id'], $this->request->getPost());
        else
            $validation = $PersonalDetailsModel->createOwnerPersonalDetails($personal_detail['id'], $this->request->getPost()); //hntr

        /*if ($validation == true)
            $validation = $PersonalDetailsModel->updateOwnerPersonalDetails($personal_detail['id'], $this->request->getPost());*/

        if ($property != null)
        {
            $validation = $PropertyDetailsModel->updateProperty($property['id'],$personal_detail['id'], $this->request->getPost());
        }
        else
        {
            $validation = $PropertyDetailsModel->createProperty($personal_detail['id'], $this->request->getPost());
        }

        $personal_detail = $PersonalDetailsModel->getPersonalDetailsByIDUser($id); //cari personal details berdasarkan id user yg log
        $property = $PropertyDetailsModel->getPropertysByIDPersonalDetails($personal_detail['id']);

        if ($validation === true)
            $success = 'Property Information successfully created';
        else
            $errors = $validation;
    }

    $AlStateModel = new AlStateModel();
    $AlStateModel = $AlStateModel->getState();

    echo view('Owner/header');
    echo view('Owner/MyProperty/create_property',[
        'success' => $success,
        'errors' => $errors,
        'personal_detail' => $personal_detail,
        'property' => $property,
        'AlStateModel' => $AlStateModel,
    ]);
    echo view('Owner/footer');
}
```

4. Property Agent Model



```php
use CodeIgniter\Model;


class PropertyAgentModel extends Model
{
    protected $table = 'property_agent';
    protected $primaryKey = 'id';
    protected $allowedFields = ['id_person','id_property','marketing_status', 'assigning_status','status'];


   public function getPropertyAgentByID($id)
    {
        return $this
        ->where([
            'property_agent.id' => $id
        ])
        ->first($id);
    }
    public function getPropertyAgentByAgent($id_property,$id_person)
    {
        return $this
        ->where([
            'property_agent.id_person' => $id_person,
            'property_agent.id_property' => $id_property,
            'property_agent.status' => 1,
        ])
        ->first();
    }
    public function getPropertyAgentByIDUser($id_person) // list of request
    {
        return $this

        ->where([
            'id_person' => $id_person,
            'status' => 1,
        ])

        ->findAll();
    }
    public function updatePropertyAgentStatus($id) // owner assign another agent
    {
        $check_new = $this
            ->where([
                'id_property' => $id,
                'status' => 1,
              // 'status' => 1,
            ])
            ->first();
            //dd($check_new['id']);

        if ($check_new)
        {
            $data = [
                'id' => $check_new['id'],
                'status' => 0,
            ];

             $this->save($data);
        }

    }
    public function getByAssignedStatus($id_person, $id_agent)
    {
        return $this
            ->where([
                'id_person' => $id_person,
                'id_agent'  => $id_agent,
                'status' => 1,
            ])
            ->first();
    }


}
```

5. Property Details Model



```
use CodeIgniter\Model;

class PropertyDetailsModel extends Model
{
    protected $table = 'property_details';
    protected $primaryKey = 'id';
    protected $allowedFields = ['id_person','id_agent','id_client','id_state','name','asking_price','developer','year_build','property_type
    'description','bedroom','bathroom','property_status','address','type_of_land','status'];

    public function getPropertyByID($id)
    {
        return $this
            // nama table.all , nama table.(apa attribute yg kau nak)
            ->select('property_details.*,
            al_state.name AS state_name,
            personal_details.name AS person_name,
            personal_details.tel_no,
            personal_details.religion,
            personal_details.occupation,
            personal_details.current_address,
            property_agent.assigning_status')
            // 'nama table' , 'nama_table.nama attribute(relationship) = nama_table.nama attribute(relationship) , 'left' (join)
            ->join('al_state', 'property_details.id_state = al_state.id','left')
            ->join('personal_details', 'property_details.id_person = personal_details.id','left')
            ->join('property_agent', 'property_details.id = property_agent.id_property','left')
            ->where([
                'property_details.id' => $id,
                'property_details.status' => 1,
            ])
            ->first();
    }
   public function getPropertyByIDForAgent($id) // for agent
   {
       return $this
           // nama table.all , nama table.(apa attribute yg kau nak)
           ->select('property_details.*,
           al_state.name AS state_name,
           property_agent.assigning_status')
           // 'nama table' , 'nama_table.nama attribute(relationship) = nama_table.nama attribute(relationship) , 'left' (join)
           ->join('al_state', 'property_details.id_state = al_state.id','left')
           ->join('property_agent', 'property_details.id = property_agent.id_property','left')
           ->where([
               'property_details.id' => $id,
               'property_details.status' => 1,
           ])
           ->findAll();
   }

   public function getPropertyDetailsByIDUser($id_person) // view property details
   {

       return $this
           ->where([
               'id_person' => $id_person,
               //'status' => 1,
           ])
           ->first();
   }

   public function getPropertysByIDPersonalDetails($id_person) // list property
   {

       return $this
           ->where([
               'id_person' => $id_person,
               'status' => 1,
           ])
           ->findAll();
   }
    public function getRequestedAgentByID($id,$id_agent) // For OWNER TO GET THE ASSIGNED AGENT DETAILS
    {
        return $this
            ->select([
                'property_details.*',])
            ->where([
                'property_details.id' => $id,
                'property_details.id_agent' => $id_agent,
            ])
            ->findAll();
    }
}
```

REFERENCES

Coronavirus driving agents earnings down worldwide; Juwai IQI Market Intelligence 2020 survey. Urban. (2020, December 8). https://www.urban.com.au/news/112145-coronavirus-driving-agents-earnings-down-worldwide-juwai-iqi-market-intelligence-2020-survey.

Digital Transformation of the Real Estate Industry. Adfenix. (n.d.). https://www.adfenix.com/post/real-estate-digital-transformation.

Dinnie Muslihat,?, S. in S. G., says:, Z., says:, D. M., says:, L. C., says:, R. A. J. E. S. H. K. U. M. A. R., says:, A., says:, S. O. R., Says:, J., says:, V. D., & Says:, S. (2021, January 14). *Agile Methodology: An Overview*. Zenkit. https://zenkit.com/en/blog/agile-methodology-an-overview/.

Kumar, N. (2021, March 8). *How the Model View Controller Architecture Works – MVC Explained*. freeCodeCamp.org. https://www.freecodecamp.org/news/model-view-architecture/.

MVC Framework - Introduction. Tutorialspoint. (n.d.). https://www.tutorialspoint.com/mvc_framework/mvc_framework_introduction.htm#:~:text=The%20Model%2DView%2DController%20(,development%20aspects%20of%20an%20application.

Noida, N. (n.d.). *DIGITALIZATION IN THE HOSPITALITY INDUSTRY: TRENDS THAT MIGHT SHAPE THE NEXT STAY OF GUESTS*. Academia.edu. https://www.academia.edu/39844875/DIGITALIZATION_IN_THE_HOSPITALITY_INDUSTRY_TRENDS_THAT_MIGHT_SHAPE_THE_NEXT_STAY_OF_GUESTS.

Real Estate, COVID-19 and What 2021 Holds for the Industry. Adfenix. (n.d.). https://www.adfenix.com/post/real-estate-covid-2021.

Sacolick, I. (2020, February 25). *What is agile methodology? Modern software development explained*. InfoWorld. https://www.infoworld.com/article/3237508/what-is-agile-methodology-modern-software-development-explained.html.

Tackling the digitalization challenge: how to benefit from ... (n.d.). http://www.sciencesphere.org/ijispm/archive/ijispm-050104.pdf.

Welcome to CodeIgniter4. Welcome to CodeIgniter4 - CodeIgniter 4.1.3 documentation. (2021, June 5). https://codeigniter.com/user_guide/intro/index.html.