

VILLA PERMATA INDAH RESIDENCE MANAGEMENT SYSTEM

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DECLARATION

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Last but not least, thank you to the person who was once part of this journey. I once believed you were where my story would end, but it turns out you were a meaningful chapter that helped me grow. For the time, the laughter, and the fleeting joy we once held, thank you. You may not have been meant to stay, but your presence was a soft chapter in my story. May we both bloom in separate gardens, becoming more of who we are meant to be.

ABSTRACT

As digital transformation becomes essential in daily operations, technology plays an important role in enhancing administrative activities, this project proposes the creation of a web-based Resident Management System tailored to Villa Permata Indah. The system overcomes significant concerns that arise from manual record-keeping, such as data retrieval delays, difficulty tracking residents, and possible mistaken entries. To address these issues, the system includes a centralized database and an interactive map interface that enables administrators to manage resident data visually by selecting specific residences. The Waterfall model was used to construct the system, with phases including requirement gathering, system design, implementation, testing, and deployment. The system was created with HTML, CSS, JavaScript, PHP, MySQL, and Leaflet.js for interactive mapping. According to the testing phase, the system had an overall success rate of 97%, meeting both functional and non-functional requirements. This shows better data accuracy, faster access to information, and increased security. Finally, the system improves Villa Permata Indah's administrative efficiency while also providing a scalable solution that can be applied to similar residential communities.

ABSTRAK

Seiring dengan keperluan transformasi digital dalam operasi harian, teknologi memainkan peranan penting dalam meningkatkan kecekapan aktiviti pentadbiran atau pengurusan. Projek ini merupakan pembangunan sistem pengurusan penduduk menggunakan web yang direka khusus untuk Villa Permata Indah. Sistem ini menyelesaikan pelbagai isu yang timbul akibat kaedah penyimpanan rekod secara manual, seperti kelewatan dalam mendapatkan data, kesukaran menjejak maklumat penduduk, serta risiko kesilapan maklumat. Bagi menangani masalah ini, sistem ini dibangunkan dengan pengkalan data berpusat dan muka peta yang interaktif yang membolehkan pihak pengurusan mengurus data penduduk secara visual dengan memilih kediaman tertentu. Model Pembangunan menggunakan kaedah Waterfall yang merangkumi fasa pengumpulan maklumat, reka bentuk sistem, pelaksanaan, pengujian, dan penggunaan. Teknologi yang digunakan termasuk HTML, CSS, JavaScript, PHP, MySQL dan Leaflet.js untuk pelaksanaan peta interaktif. Berdasarkan fasa pengujian, sistem ini mencapai kadar kejayaan keseluruhan sebanyak 97%, memenuhi keperluan fungsional dan bukan fungsional. Ini menunjukkan peningkatan dalam ketepatan data, akses maklumat yang lebih pantas, dan keselamatan yang dipertingkatkan. Kesimpulannya, sistem ini berjaya meningkatkan kecekapan pentadbiran di Villa Permata Indah serta menawarkan penyelesaian berskala yang sesuai digunakan untuk komuniti perumahan lain.

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CHAPTER 1

INTRODUCTION

1.1. Project Overview

The objective of this project is to create a web-based Resident Management System for Villa Permata Indah to overcome the challenges of manual data management. The existing lack of a centralized system makes tracking residents and their residences ineffective, resulting in time-consuming processes and an increased risk of errors. This initiative aims to improve resident data administration using a digital platform.

The suggested system utilizes an interactive map of the residential area, which allows administrators to quickly access, update, and manage resident information by selecting specific homes. With secure access, the system improves data retrieval speed, accuracy, and overall management efficiency. By using a Web-Based Management System for housing society, security can be provided to society members and records of visitors, maids, and others can be maintained in a MySQL database (Eddala, 2023). This project not only improves operating efficiency, but also provides the groundwork for a modern, organized, and easily accessible community information system.

1.2 Problem Statement

The management of resident data at Villa Permata Indah is now done manually, which has resulted in some operational inefficiencies. One of the most difficult issues is keeping track of residents and their residence details. The existing approach is inefficient and time-consuming, frequently causing delays when accessing or changing critical data. This not only slows down administrative work, but it also raises the possibility of errors, impacting on the quality and integrity of resident records.

In addition, the lack of a centralized information platform hinders the management process. Without a single system, resident data is dispersed and poorly organized, making it difficult for administrators to manage and retrieve information efficiently. It limits effective decision making

and increases the workload for management teams who are responsible for keeping records up to date.

1.3 Objectives

The objectives are as follows:

1. To design an online resident management system that facilitates occupant's information, maintenance requests, and payment records for both tenants and administrators.
2. To develop the online resident management system.
3. To evaluate the system's usability through testing and user feedback to ensure it meets the operational needs of apartment management.

1.4 Scope

This project aims to provide an efficient Residence Management System exclusively for Villa Permata Indah. The system was developed strictly for use by the management team to centralize and streamline the processing of resident information. By providing a digital platform with user-friendly features, the system would improve administrative efficiency and ensure secure access to sensitive data. The scope consists of the following major components:

- **Resident Data Management**

Admin can easily add, edit and delete resident information. This feature ensures that all data is accurate, up to date, and conveniently available for informed decision making and management.

- **Interactive Map Integration**

The system will include an interactive map of Villa Permata Indah that shows the residence's layout. Admin can view or change resident information by clicking on residences, allowing for a visual and location-based approach to resident data management.

- **User Friendly Interface.**

The platform will be developed with simplicity and usability in mind, allowing admins to do tasks without requiring important technical knowledge.

- **Web Based Platform**

The system will be accessible through a web interface, allowing admins to manage resident data from any device with internet connectivity.

1.5 Methodology

According to Suwita et al. (2023), the Waterfall model enables a clear, systematic, and linear development strategy that is ideal for web-based systems with well-defined requirements. Their research found that using Waterfall enabled the development team to maintain strong project control, avoid excessive scope modifications, and ensure that each phase from requirement collection to final deployment was meticulously planned and implemented. This strategy was shown to be effective in generating a system that was both functional and user-friendly, highlighting its relevance and applicability in projects such as the Resident Management System for Villa Permata Indah.

I. Phase 1 (Requirement Gathering)

In the initial phase, project requirements are defined by consultation with those involved, such as Villa Permata Indah's management team. This process includes gathering information about the intended system features, such as resident data management and interactive mapping. A thorough examination ensures that the system meets the specific demands of the management team and deals with current issues.

II. Phase 2 (System and Software Design)

The objective of this phase is to create a system design. Key tasks include building the database schema with MySQL, creating wireframes for the user interface, and establishing workflows for features such as map interactivity. The design document ensures a clear understanding of how the system will work and serves as the basis for the later implementation phase.

III. Phase 3 (Implementation)

The implementation phase involves coding and creating the system according to the design parameters. Backend development creates the database structure and

implements CRUD processes for managing resident data, whereas frontend development creates a user-friendly interface with HTML, CSS, and Php and others. Administrators includes OpenStreetMap to create an interactive map that administrators can use to view and update resident information. Security measures, such as secure login procedures, are used to limit access to authorized users. This phase provides a functional prototype with key features suitable for testing and development.

IV. Phase 4 (Testing)

The Testing process ensures that the system performs as expected by thoroughly evaluating its components and overall functioning. It starts with unit testing to ensure that individual elements like CRUD operations and the interactive map work properly, then moves on to integration testing to ensure that everything works together effectively. Next, system testing validates the system against the initial criteria, ensuring that it fulfills Villa Permata Indah management's expectations. Finally, user acceptability testing (UAT) enables administrators to test the system in a real-world environment, providing input to help identify and resolve any flaws. This thorough testing procedure guarantees that the system is dependable, user-friendly, and ready for deployment.

V. Phase 5 (Deployment and Maintenance)

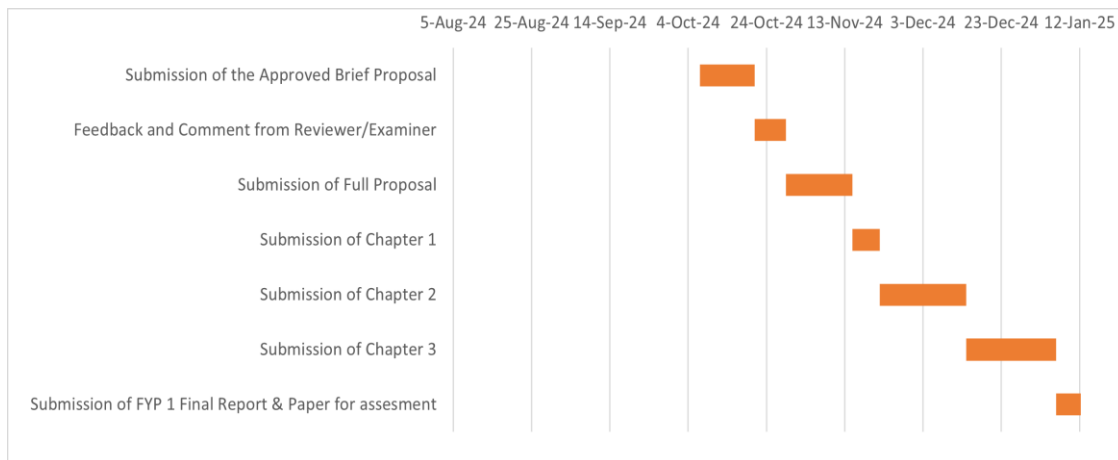
The Deployment and Maintenance phase ensures that the system is fully operational and continues to function properly throughout time. During deployment, the system is placed on a specific server and admins are trained to use its functions. Detailed documentation, including user guides, is available to assist users in navigating the system. Following deployment, the maintenance phase continues, with an emphasis on monitoring system performance, resolving any faults or issues, and implementing updates or additions as needed. This phase guarantees that the system remains reliable, secure, and in line with the management team's changing needs.

1.5 Significance of Project

- The user will have access to the most recent resident records.
- The user can add, delete, and edit resident records digitally, which reduces the need for paper or manual methods.
- Identifying a residence will be easier because to the system interactive map, which precisely displays locations.

1.6 Project Schedule

A project schedule is an established plan that aims to ensure that the project is completed on time and within the specified framework. Below is the project schedule:



1.7 Summary

This chapter provided an overview of the project, with a focus on the development of interactive maps for Villa Permata Indah. It covered the problem statement, objectives, methods, project scope, and project significance.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

As residential areas grow, effective digital systems particularly those with interactive maps, centralized databases, and intuitive user interfaces will become increasingly important. A comprehensive literature review serves as the strategy that supports such development. Hulland and Houston (2024) underline the importance of well-structured reviews in theory creation, policy formulation, and evidence-based design, as they assist developers and researchers in aligning system features with user demands and real-world difficulties.

2.2 Study of Existing and Related System

This section reviews three current practices from academic research that are applicable to the construction of a Resident Management System. The review focuses on the structure, features, strengths, weaknesses, and technologies employed. These systems bond to current trends in resident information platforms, particularly the usage of Geographic Information Systems (GIS), interactive mapping, and web-based architecture. Sections 2.2.1 through 2.2.3 provide details on the specific findings and comparisons.

2.2.1 Web-Based GIS Housing Marketing Information System in West Papua

Ahmad Safitri Saban et al. (2024) introduced a Web-Based GIS Housing Marketing Information System to help users locate and explore housing units in West Papua. The system included Google Maps as an important feature, allowing users to view residential plans on an interactive map. This method significantly improved the user experience by providing a clear geographic representation of available features. The study found that the system raised marketing efficiency by 45% and sales conversion rates by 30%, demonstrating how location-based interaction can improve decision-making and usability in housing-related platforms (Saban et al., 2024).

The authors highlighted the importance of geographic participation in systems that use residential data. Users could pick specific areas on the map to receive property information. This method consists of the design aim of the Villa Permata Indah Resident Management System, which includes an interactive map that allows administrators to access and manage resident data based

on their actual residence locations. The Saban et al. system demonstrates that visual tools not only improve clarity but also increase user participation, especially in systems with spatial relevance.

In addition to its features, the study identified multiple barriers, including infrastructure limits and the requirement for user training. In West Papua, inconsistent internet connectivity limits full utilization of the web-based system. This understanding is critical for the Villa Permata Indah project, as similar constraints may exist in local implementation. It underlines the importance of optimizing system performance for slower networks, as well as ensuring that end users, such as management, are appropriately taught to navigate and use the platform effectively (Saban et al., 2024).

Overall, this paper provides valuable information about how Web GIS systems can aid in residential system development through interactive mapping and centralized data access. Saban et al.'s approach demonstrates that using a visual, map-driven interface improves efficiency and user happiness. Drawing on these findings, the Villa Permata Indah Resident Management System intends to implement a similar GIS layout, providing both visual engagement and practical data management for administrative duties.

2.2.2 Web-Based Resident Information Management System

Uriel M. Melendres and Karlo M. Aranda (2024) proposed a Web-Based Resident Information Management System to improve administrative recordkeeping and data management in residential communities. The system was built utilizing the Rapid Application Development (RAD) paradigm, which stresses iterative development and frequent user feedback. Its design aims to make it easier for residents to submit, amend, and retrieve data via an accessible online interface. This system is relevant to the Villa Permata Indah project since both aim to replace inefficient, paper-based resident tracking with a more structured and responsive digital platform (Melendres & Aranda, 2024).

The Melendres and Aranda system was defined by its thorough assessment approach, which was based on the ISO/IEC 25010 software quality model. The system was evaluated on six dimensions which is functional suitability, usability, performance efficiency, reliability, security, and maintainability. It received an average score of 3.5 out of 5, suggesting that the system was reliable and ready to deploy. This structured evaluation establishes a clear standard that can be applied to

the Villa Permata Indah system to guarantee it meets both functional and non-functional objectives, particularly usability and data security (Melendres & Aranda, 2024).



Figure 2. Sample Mockup of the Developed System

Figure 1 Mockup for Web-Based Resident Information Management System

Another notable characteristic is the system's emphasis on administrative control, with staff members granted role-based access to manage resident records. This functionality is ideally suited to the needs of Villa Permata Indah, which will handle sensitive personal data and require restricted access via login authentication. The study demonstrates how implementing secure access and clearly defined user roles improves data integrity, accuracy, and accountability is a critical practice for residential systems that deal with real-time data updates.

In general, Melendres and Aranda's study provides a solid foundation for creating a well-organized, safe, and efficient resident information system. Its emphasis on user-centered design and ISO-based quality assurance assures that the system not only works well but also provides a dependable and secure environment for data processing. These approaches have a direct impact on the design strategy of the Villa Permata Indah Resident Management System, particularly its admin panel, login system, and overall user flow.

2.2.3 Design and Mapping of Off-Campus Student Residences Using Google Maps

Muhammad Ifwat Ismail et al. (2024) developed a system called Design and Mapping of Off-Campus Student Residences. Using Google Maps, which allows students to visually explore and identify housing options based on location and availability. This system uses Google Maps as a

visual platform, providing a spatial overview of off-campus housing alternatives. The implementation enabled users to engage with mapped zones and make informed decisions depending on their location, facilities, and local landmarks. While the primary users were students, the system's key concepts, such as interactive geographic layouts and location-based search, are directly applicable to the creation of Villa Permata Indah's Resident Management System (Ismail et al., 2024).



Fig. 4 – Map of Zone C



Fig. 8 – Map of Zone G



Fig. 5 – Map of Zone D



Fig. 9 – Map of Zone H

Figure 2 Example of map interface

One of the system's unique characteristics was its user-friendly map interface, which enabled students to locate specific housing units based on zones or clusters. Users may explore various home types visually, eliminating the need for extensive manual searches or text databases. This technique is similar to the capabilities planned in Villa Permata Indah's system, in which administrators can click on properties to manage data or get resident information. The findings confirm the notion that visual engagement considerably improves user experience, particularly when dealing with location-dependent information.

Ismail and colleagues additionally prioritized usability testing as a component of their system validation. They discovered that users preferred a map-driven approach over standard listing-based

formats because it provided better spatial awareness and faster access to information. For Villa Permata Indah, this reinforces the decision to favor visual data display via an interactive map, allowing administrators to explore housing clusters more intuitively. It also emphasizes the value of designing with clarity and responsiveness in mind.

Perhaps the work provides a feasible approach for incorporating mapping capabilities into residential online systems. While designed for students, the approach and design principles are easily transferable to gated community or neighborhood-level applications. The system's effectiveness in simplifying home selections via Google Maps highlights the importance of incorporating a comparable interactive structure into Villa Permata Indah's system where clear visuals, geographic accuracy, and user engagement are all essential goals.

2.3 Comparison of the existing system

The table below compares three reviewed systems with the proposed Resident Management System for Villa Permata Indah. The comparison focuses on important aspects such as map integration, database structure, login security, system purpose, and assessment techniques. This study assists in identifying each system's strengths and weaknesses, as well as justifying the features chosen for the proposed project.

Table 1 Comparison for the existing system

Features	Web-Based GIS Housing Marketing Information System (Saban et al., 2024)	Web-Based Resident Information Management System (Melendres & Aranda, 2024)	Design and Mapping of Off-Campus Student Residences Using Google Maps (Ismail et al., 2024)	Resident Management System for Villa Permata Indah (Proposed)
Purpose	Housing marketing system for property buyers	Digital system for managing resident records	Visual housing locator for student accommodations	Manage and visualize resident data in a

				gated community
Map	Google Maps API	None	Google Maps API	Leaflet.js for interactive map
Interactive Map	Yes (for location overview)	No	Yes (clickable zones)	Yes (clickable lots with popup resident details)
Centralized Database	Partial (limited to property info)	Yes (structured resident database)	Yes (housing listings and clusters)	Yes (full resident data management (MySQL))
Login & User Roles	Not specified	Yes (with admin access and ISO 25010 evaluation)	Not specified	Yes (secure login for admins and role-based access)
Target User	Public users and property seekers	Admins and staff	Students seeking rental housing	The management team
Technology Stack	Google Maps, Web GIS	PHP, MySQL, RAD methodology	Google Maps, web front-end	HTML, CSS, JavaScript, PHP, MySQL, Leaflet.js
Evaluation Method	Efficiency and conversion metrics (45% increase)	ISO/IEC 25010 criteria (avg. 3.5/5)	Usability feedback and user satisfaction	Functionality & usability test

Best Feature	Improved user engagement via map-based browsing	Emphasis on software quality and structured records	Simple map interface for location-based housing choices	Integrated map + admin tools with secure access
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2.4 Proposed System

Based on the reviewed systems, the proposed Resident Management System for Villa Permata Indah will include important qualities highlighted in the literature, including interactive mapping, organized data management, and secure login. The system intends to address existing problems created by manual record-keeping, such as data retrieval delays, tracking concerns, and a lack of centralized access.

A map interface will be developed with Leaflet.js, allowing administrators to view residents based on houses location and interact directly with each block. Login authentication will ensure that only authorized users can access or alter resident data, in accordance with the security principles established by Melendres and Aranda (2024). The system will also feature responsive and user-friendly design influenced by usability enhancements reported in Saban et al. (2024) and Ismail et al. (2024), resulting in smoother interaction for all users.

2.5 Summary

This chapter analyses three current academic systems that offer insight into good residential information management. Saban et al. (2024) highlighted the usefulness of GIS and maps for navigation; Melendres & Aranda (2024) stressed quality-based evaluation using ISO standards and Ismail et al. (2024) confirmed the advantages of interactive interfaces. Based on these results, the proposed system will provide an interactive, secure, and centralized platform adapted to the requirements of Villa Permata Indah's administration and residents. These references improve the design justification by demonstrating a clear link between research findings and actual system development.

CHAPTER 3

REQUIREMENTS ANALYSIS AND DESIGN

3.1 Introduction

This chapter explains the methodology used to create the Resident Management System at Villa Permata Indah. It begins with reviewing user requirements, both functional and non-functional, to ensure that the system effectively meets the demands of its users. The chapter also describes the design and development process, which provides a systematic approach to attaining project objectives.

This chapter also includes an overview of the system's design, including interface mockups which demonstrate its functioning and usability. interface mockups were built to ensure that the Resident Management System is intuitive and meets the needs of the users. These mockups serve as visual placeholders, allowing for early evaluation of layouts, navigation flows, and feature placement before production. A 2024 study on web-based open data applications reveals that wireframe modeling, using tools like Figma or Sketch, boosts stakeholder interaction, simplifies feedback, and significantly improves the quality of the final user interface (Milutinović, Milić, & Vučetić, 2024). These components are the basis for developing a user-friendly, efficient, and secure system for managing resident information effectively.

3.2 User Requirement Analysis

The requirements of users for the Resident Management System were discovered through interviews with Villa Permata Indah's management team. This approach gave important insights into their operating issues and expectations, ensuring the system meets their requirements. Key requirements highlighted include an interactive map for locating resident information, safe access restrictions for data security, and user-friendly tools for maintaining resident information. The list of interview questions used in this analysis is provided at the end part of this chapter for reference.

3.2.1 Functional Requirement Analysis

Interviews with Villa Permata Indah's management team highlighted the functional needs for the Resident Management System. These requirements are designed to ensure that the system

performs essential administrative functions while also providing effective administration of resident data. The following points highlight the essential functionalities required for the system:

- I. Villa Permata Indah's management team (Admin) has full access to the system.
- II. The system must have an interactive map element to help users find resident information based on property units.
- III. The system must store and update the most recent resident information.
- IV. The admin must be able to add, delete, and update resident information as needed.

3.2.2 Non-Functional Requirement Analysis

In addition to functional criteria, various non-functional factors were established to assure the system's overall efficacy, performance, and user experience. This includes:

- I. Usability
The system must have an easy-to-use interface, especially for the interactive map. Admins should be able to interact with the map to locate residents based on housing units without needing additional training. The design should be user-friendly, with clear labels and easy navigation.
- II. Security
Given the sensitive character of resident data, the system must have strong security features such as data encryption and secure user authentication systems for administrative access. Role-based access control should ensure that only authorized personnel can change resident information.
- III. Performance
The system must be responsive, with speedy page load times even when handling huge amounts of data. The interactive map should load smoothly and allow users to swiftly access resident information without any apparent delays.
- IV. Efficiency
Using this system, the admin should be able to efficiently solve difficulties associated with preserving their documentation, ensuring that it becomes more organized, structured, and effectively managed.

3.3 Project Outline

This Management System aims to improve the management of data at Villa Permata Indah by improving tasks such as updating, accessing, and organizing resident information. The system will have an interactive map that allows admin to easily browse and navigate properties while also providing up-to-date information. The project will be divided into phases, with requirement analysis coming first, followed by system design, development, and testing. The last step will include system deployment and training for admin. The system will be built to satisfy the management team's demands in an efficient and secure way, taking into consideration both functional and non-functional requirements.

3.4 System Design

The Resident Management System will be created with functionality and user experience in mind, with the goal of creating a simple, effective, and adaptable platform. This technology enables Villa Permata Indah's management team to manage resident information via a user-friendly interface with an interactive map for easy navigation. Key design concerns include assuring seamless system functioning, avoiding downtime, and allowing for rapid updates and maintenance as needed.

The interactive map is more than just a visual component it is fundamental to the system's design. It simplifies access to certain households, hence improving the overall administrative experience. As Unrau and Kray (2021) point out, good Web GIS systems successfully mix typical GUI components with map-specific heuristics such as explicit metadata, well-managed layers, and intuitive search tools. These observations influenced the design of our mapping interface, specifically the inclusion of zoom options, clickable popups for resident information, and a structured layout for improved usability. The following are the tools that will be used for this project.

- i. Mapping Library: The interactive map will be created and shown using Leaflet.js, which allows users to interact with it by clicking on blocks, analyzing property data, and using other map-based capabilities such as zooming and panning.
- ii. Web Development Framework: The system's front-end interface will be built using HTML, CSS, and JavaScript to ensure response and usability.

- iii. Backend Development: The system's backend will be controlled by Node.js or Django, allowing for data processing, user authentication, and interactions between the front end and database.
- iv. Database: MySQL will be applied to store resident information and related data, allowing for real-time changes, rapid data search, and safe storage

This architecture ensures that the system can handle huge databases efficiently while providing rapid, seamless user interactions. The system design will also incorporate search functionality, real-time data updates, and secure admin controls to ensure that the management team's operations run smoothly.

3.4.1 Context Diagram

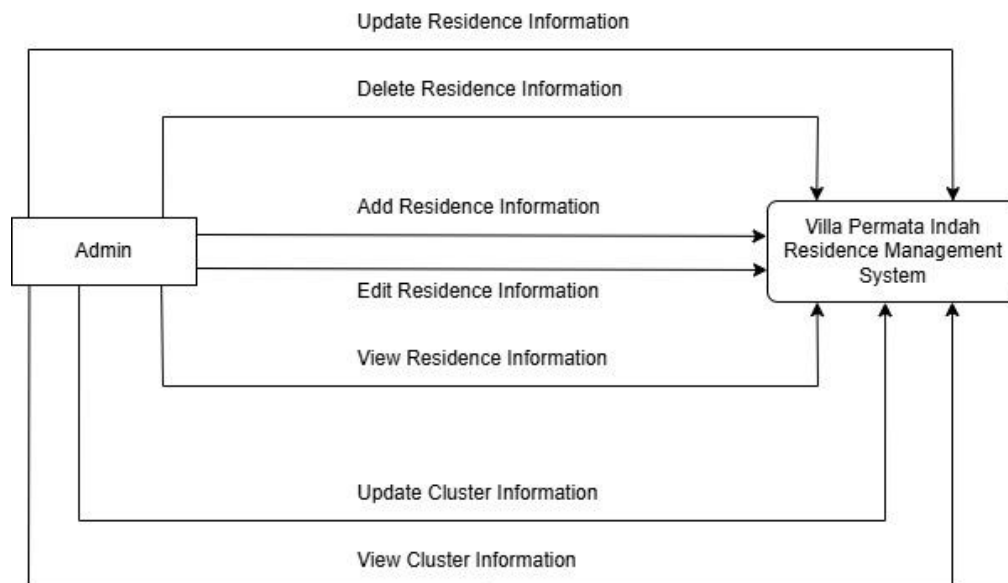


Figure 3 Context Diagram

The system connects with a single external entity which is Admin. The Administrator controls resident data using a variety of essential operations, including adding, editing, updating, and deleting residence information. The admin can also access residential and cluster details, which allows for more effective data tracking and organization. Through these interactions, the system ensures that all residence and cluster information is correct and up to date. Administrators gain access to the system via a secure process that allows them to authenticate and conduct administrative activities, ensuring that resident data is properly controlled and managed.

3.4.2 Data Flow Diagram

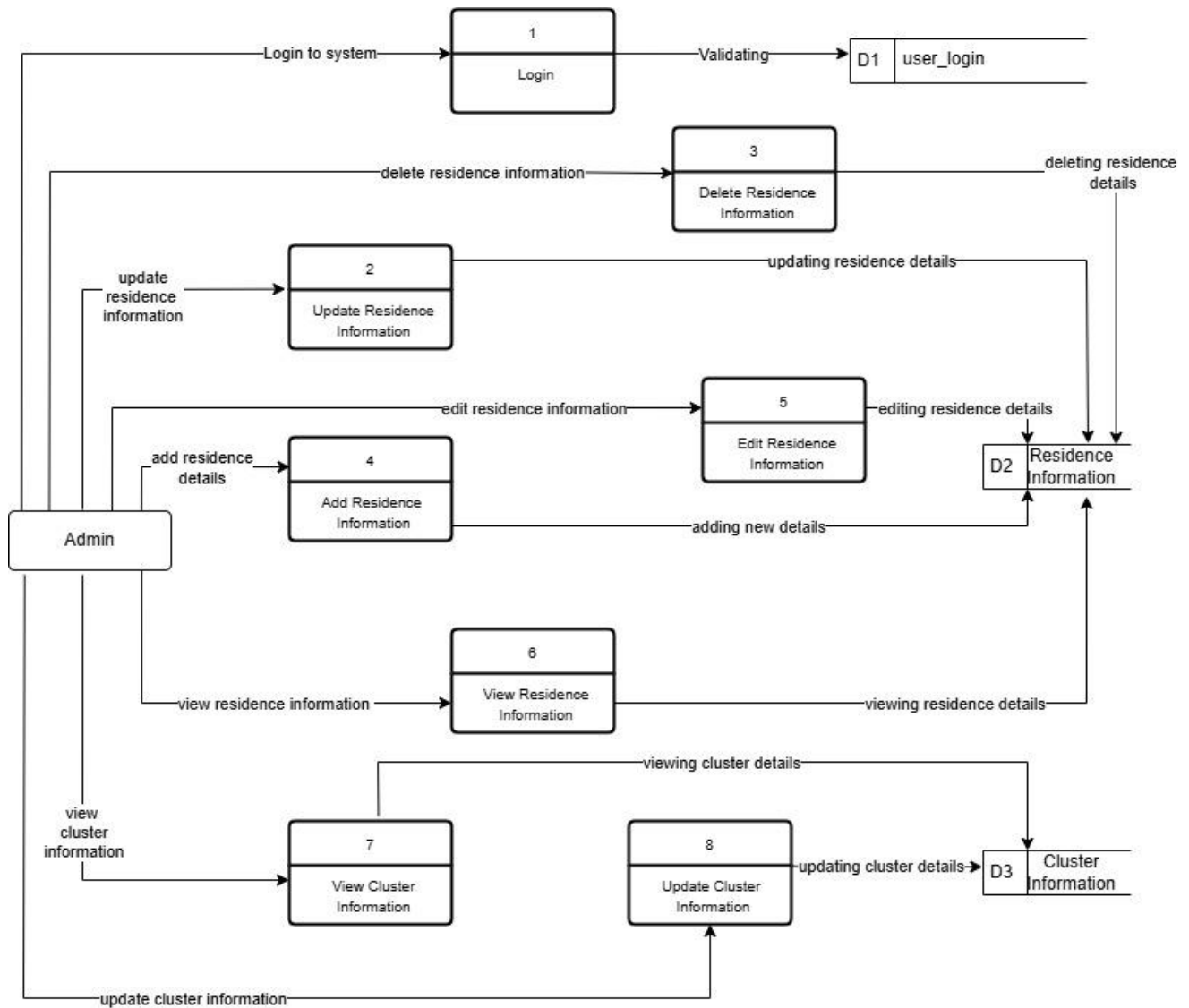


Figure 4 DFD level 0

Figure 8 represents the overall data flow between the admin and the residence management system. It covers the important processes, such as login, adding, editing, removing, and viewing resident information, as well as updating and viewing cluster data. These operations are the primary interfaces with the system, allowing administrators to effectively handle residence and cluster data.

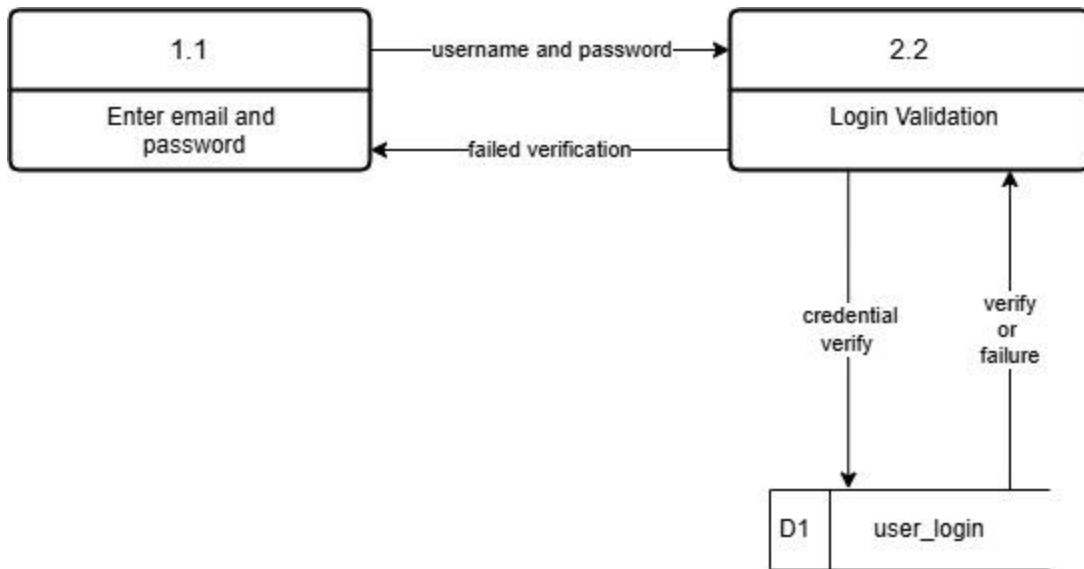


Figure 5 DFD level 1

Figure 9 shows the login procedure within the system, including the user's interaction with the login validation mechanism. The process begins with the admin providing their email address and password, which are then verified against stored credentials. Following verification, the system either authorizes access by saving the session in the admin login data store or delivers a failure message, ensuring safe authentication.

3.5 User Interface Design



Figure 6 Home page

The homepage wireframe for the Villa Permata Indah Resident Management System is designed to be clean and easy to use by the management team. The interface is built around an interactive map, which is the primary tool for exploring and managing residential clusters inside the community. The map is intended to create a dynamic and engaging user experience, allowing administrators to easily obtain extensive information about certain areas or assets.

The top navigation bar provides direct links to the main, second, third, and fourth clusters, allowing for easy and orderly access to different areas of the residential area. A login button is prominently placed on the right side of the header, stressing that secure access is only available to authorized users. The general structure promotes utility and simplicity, with the goal of streamlining the management of resident and property information while retaining a professional appearance.

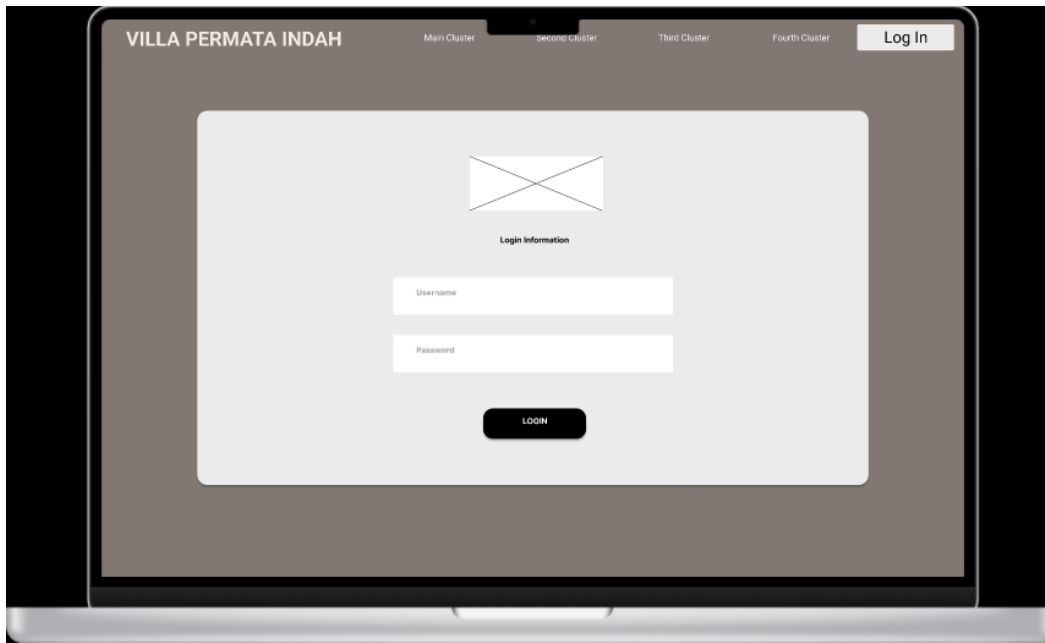


Figure 7 Login page

This website is the login interface for the "Villa Permata Indah" system, where users can safely access the platform by providing their username and password. The design has a clean and straightforward structure, with a central login form and navigation links to various clusters (Main Cluster, Second Cluster, Third Cluster, and Fourth Cluster) at the top, allowing users to easily visit other parts once logged in.

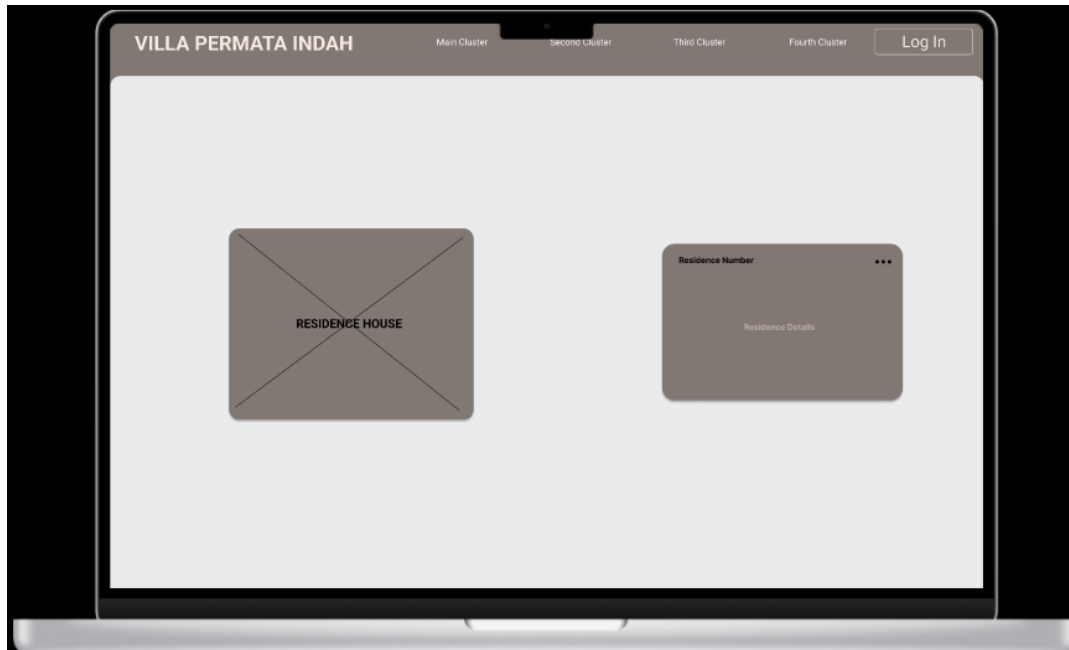


Figure 8 Pop up box view residence details

The Resident Information pop-up box in the "Villa Permata Indah" system is meant to display detailed information about a residence and its residents. When viewed, the box prominently displays the residence image. Resident details, which appear beside this section, contain important information about the resident. The pop-up window contains user-friendly action buttons such as "Edit," "Delete," and "Close," which allow administrators to control the information directly. To improve usability, the design has a clean structure with clear labels, allowing administrators to rapidly access and change resident information while maintaining a smooth workflow.

3.6 Summary

This chapter explains the technique for creating the Resident Management System for Villa Permata Indah, with emphasis on user requirements, system design, and tools. It focuses on functional requirements such as administrative access, an interactive map, and data management, as well as non-functional requirements such as usability, security, and performance. The system will be created with technologies such as Leaflet.js for the map, HTML, CSS, JavaScript for the front end, and MySQL for the database. The project will be performed in stages, from analysis to implementation, to ensure the system is secure, efficient, and simple to use for maintaining resident information.

CHAPTER 4

DEVELOPMENT AND TESTING

4.1 Introduction

This chapter focuses on the implementation of the interactive map feature into the Resident Management System for Villa Permata Indah. It explains the main components, including the source code and algorithms for each system function. The major goal is to show and manage resident profiles using a map-based interface that connects to the system's database and online framework. This chapter additionally illustrates the system's implementation flow, focusing on how users interact with the interface to efficiently view, retrieve, and store resident information.

4.2 System Configuration

Proper system configuration is crucial for the seamless development and implementation of Villa Permata Indah's Resident Management System. The development environment was configured using the WAMP server bundle, which contains Windows, Apache, MySQL, and PHP. WAMP is a local development platform that enables error-free internal testing and system execution. WAMP's web server is Apache, while MySQL and PHP are the essential technologies for database management and server-side scripting. MySQL offers a dependable and fast database solution, while PHP allows for efficient interaction between the system and the database. Furthermore, the system was built with HTML, CSS, PHP, JavaScript, SQL, and MySQL to offer a dynamic and user-friendly web interface.

4.2.1 Main Page

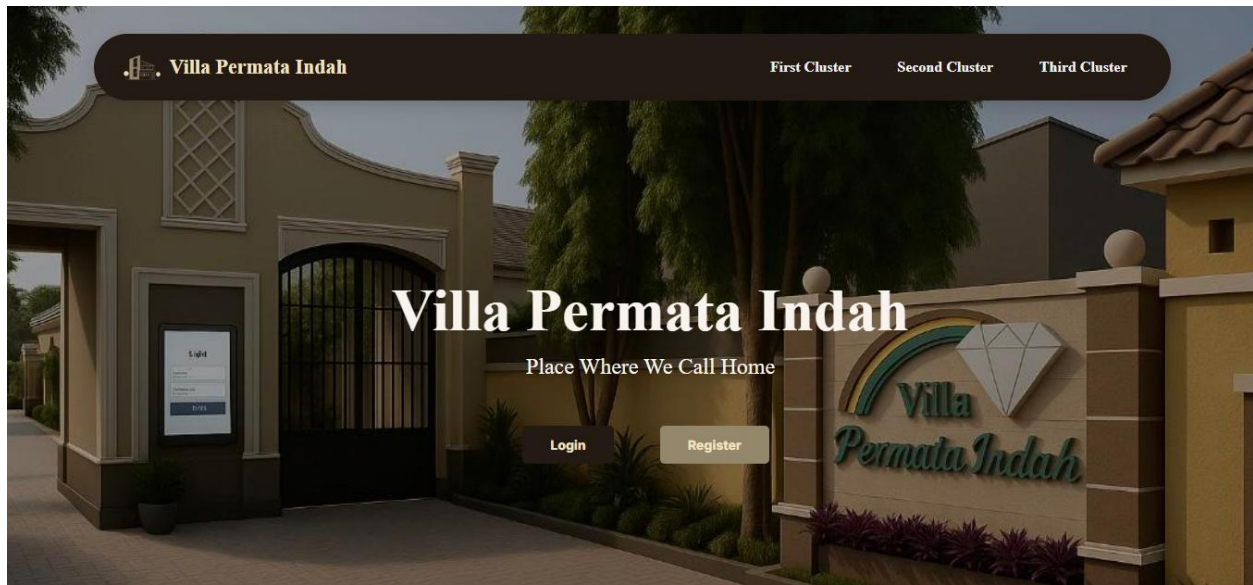


Figure 9 Main Page

The figure shows the main page of Villa Permata Indah's Resident Management System. The Villa Permata Indah online interface has a clean and attractive look that welcomes users while allowing easy navigation. The navigation bar at the top of the page features the site's logo and the title "Villa Permata Indah," which acts as the system's identity. To the right of the navigation bar are three clickable links labeled First Cluster, Second Cluster, and Third Cluster. When a user selects one of these alternatives, it will display the area of that cluster, allowing them to quickly browse different areas of the residential area. The dark brown "Login" button takes users to the login page, where they can gain system access. The beige "Register" button allows users to create a new admin user and enable system management access.

I. First Cluster

The figure below shows the focus area of the first cluster. The "First Cluster" was designed to take users directly to the selected area representing the first cluster, allowing them to focus on observing or interacting with that specific residential section.

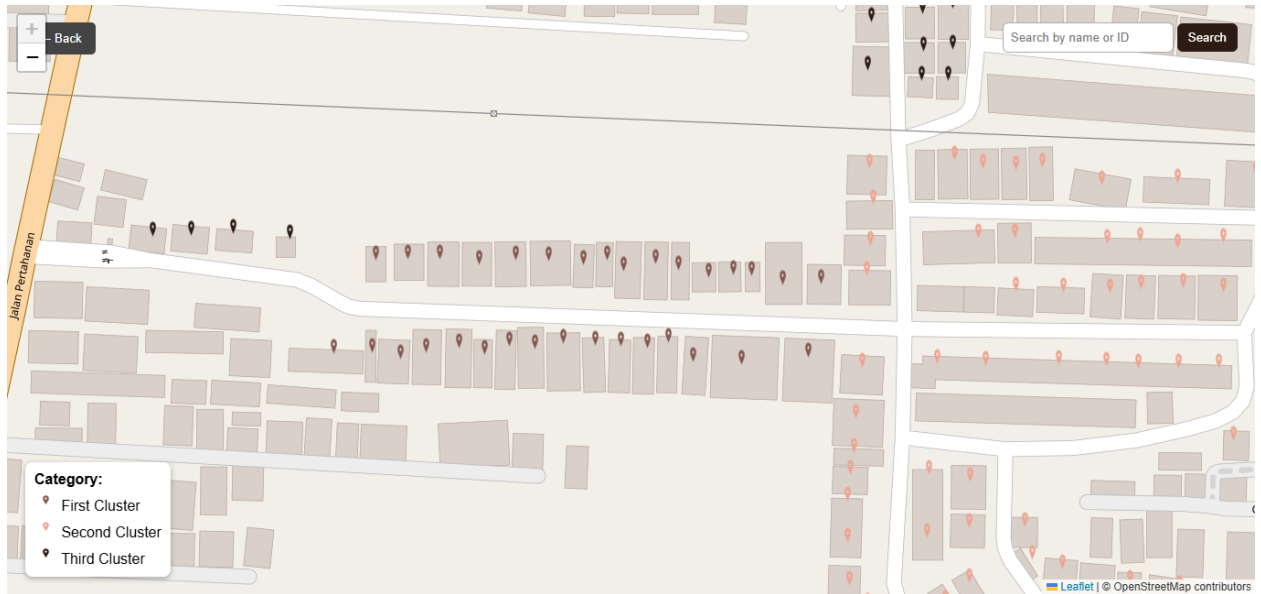


Figure 10 First Cluster

II. Second Cluster

The "Second Cluster" was designed to take users directly to the selected area representing the first cluster, allowing them to focus on observing or interacting with that specific residential section. The figure below shows the focus area of the second cluster.

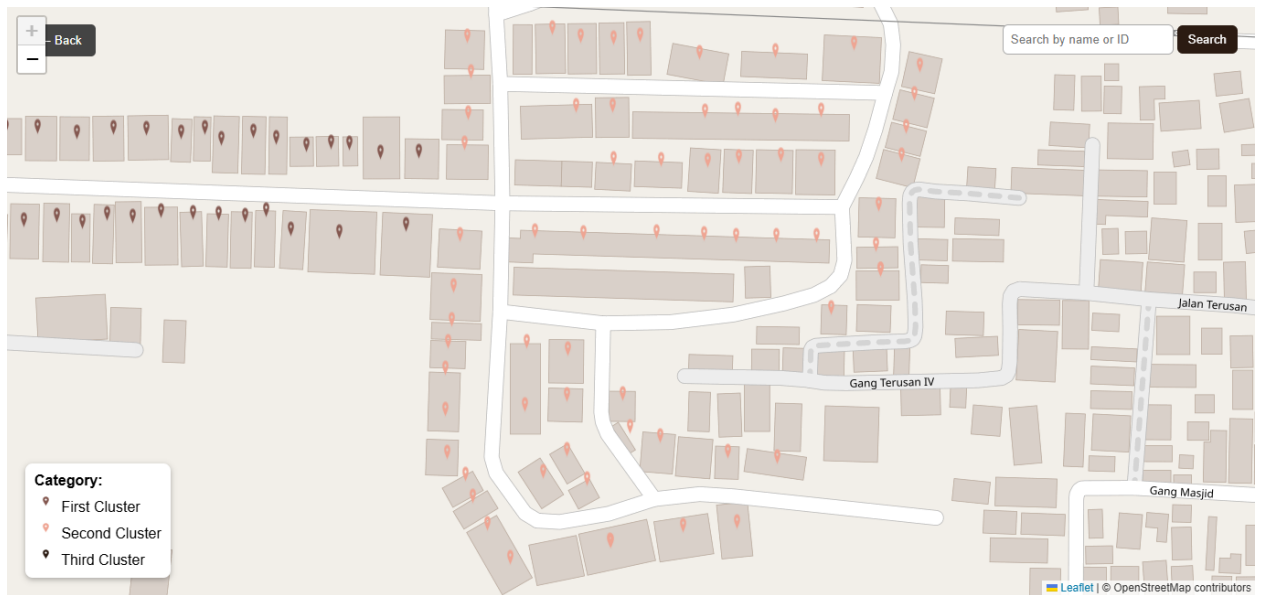


Figure 11 Second Cluster

III. Third Cluster

The figure below shows the focus area of third cluster. The "Third Cluster" was designed to take users directly to the selected area representing the first cluster, allowing them to focus on observing or interacting with that specific residential section.



Figure 12 Third Cluster

IV. Register

The registration form is used to create new admin users in the system. All registered email addresses need to use the domain @vpi.com to ensure that only authorized Villa Permata Indah admin have access to the administrative services.

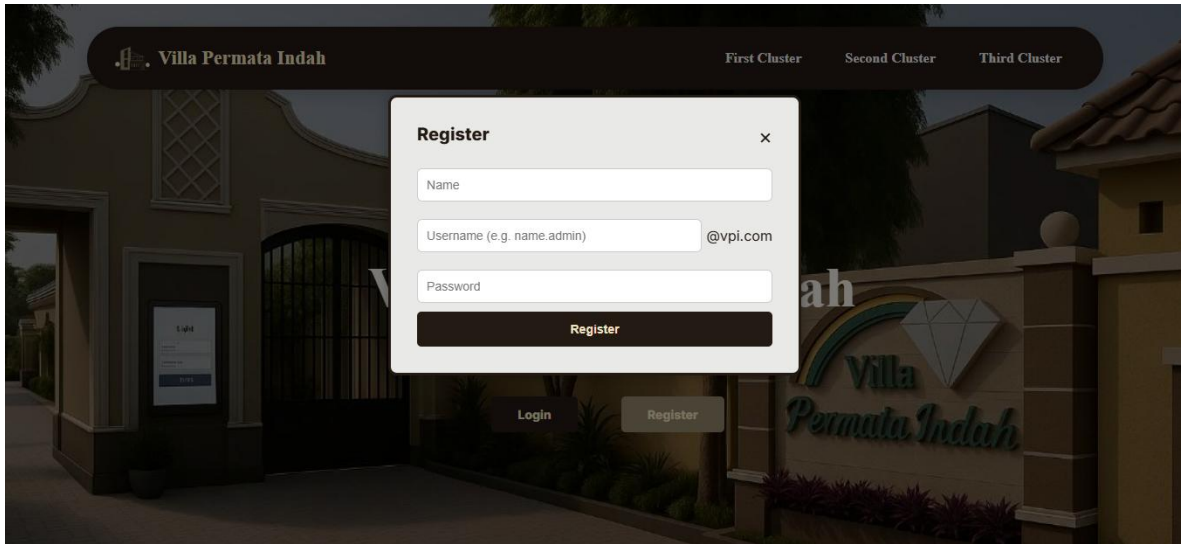


Figure 13 Register Page

V. Login

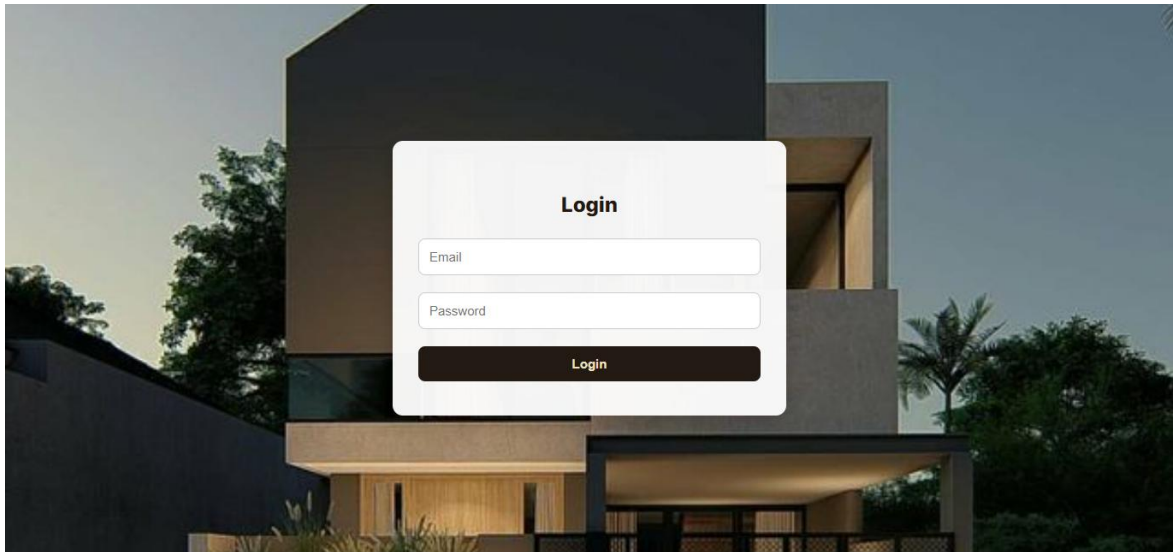


Figure 14 Login page

The figure above shows the login page. Users need to log in to obtain access to the system. This security precaution is in place to protect all confidential and important data about residents, ensuring that only authorized people have access to or handle the information.

4.2.2 Dashboard

The Dashboard page gives a summary of important information from the Villa Permata Indah Resident Management System. The pie chart in the center of this page illustrates the total number of residents categorized by cluster first, second, and third and provides an instant overview of resident distribution. Overview cards appear below or alongside the chart, displaying key statistics and insights for each cluster, providing viewers with a quick snapshot of residential data. This hierarchical layout allows administrators to properly monitor and evaluate the neighborhood.



Figure 15 User dashboard (name of user login)

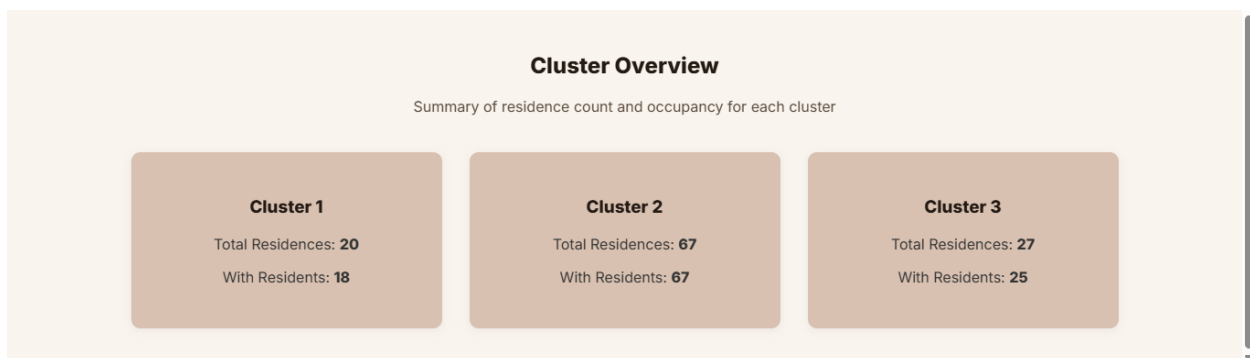


Figure 16 Cluster Overview

4.2.3 Resident

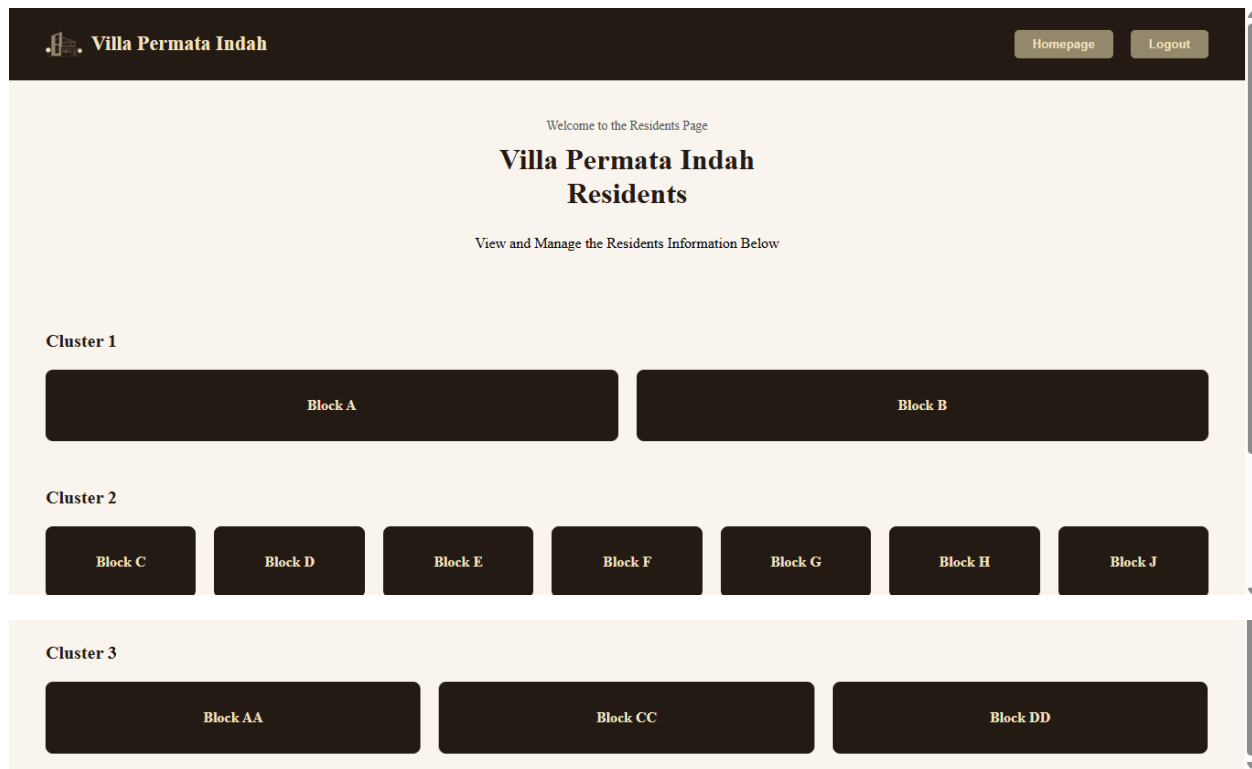


Figure 17 Resident page

Figure above shows The Resident page combines resident information by cluster, allowing users to manage data more efficiently. Within each cluster, residents are further classified by block. When a user clicks on a particular block button, they are taken to a detailed resident list for that block. This list includes all residents of the selected location.

Each resident entry has a "View" button, which, when pressed, displays the resident's complete information as well as their monthly payment history. This structure provides quick access to individual and group resident data. Admin can also click the "Edit" button. This feature allows the administrator to change the resident's information as needed. If a resident has moved out, the administrator can utilize the Edit button to mark the unit as "Vacant." This helps to keep the occupancy status in the system up to current and accurate.

I. Block

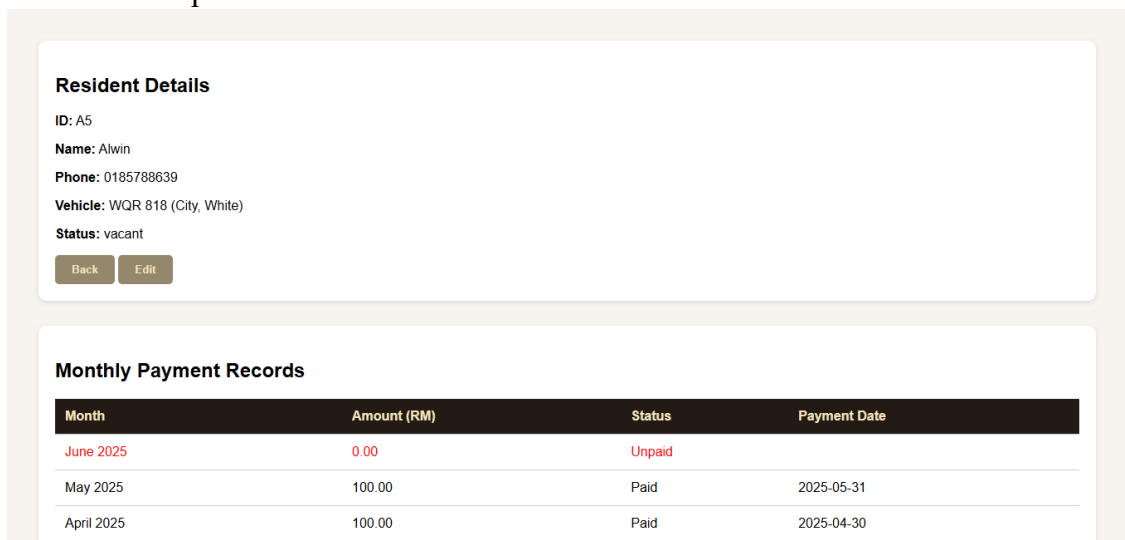


Resident ID	Name	Phone	Vehicle	Action
A1	Baskara	011332321	SSQ 123 (Camry, Black) - Harley Davidson (Plate: HD123)	View
A3	Nia	0128452312	BNS 229 (Porsche, Silver)	View
A5	Alwin	0185788639	WQR 818 (City, White)	View
A7	Rizky	0187421123	JKL 998 (Civic, Red)	View

Figure 18 Residents list based on block

When a user clicks on a certain block, the system displays a list of all the residents related with it. The list includes basic information like the Resident ID, name, phone number, and car data. To get additional information about a certain resident, simply click the "View" button next to the related entry.

II. View resident profile



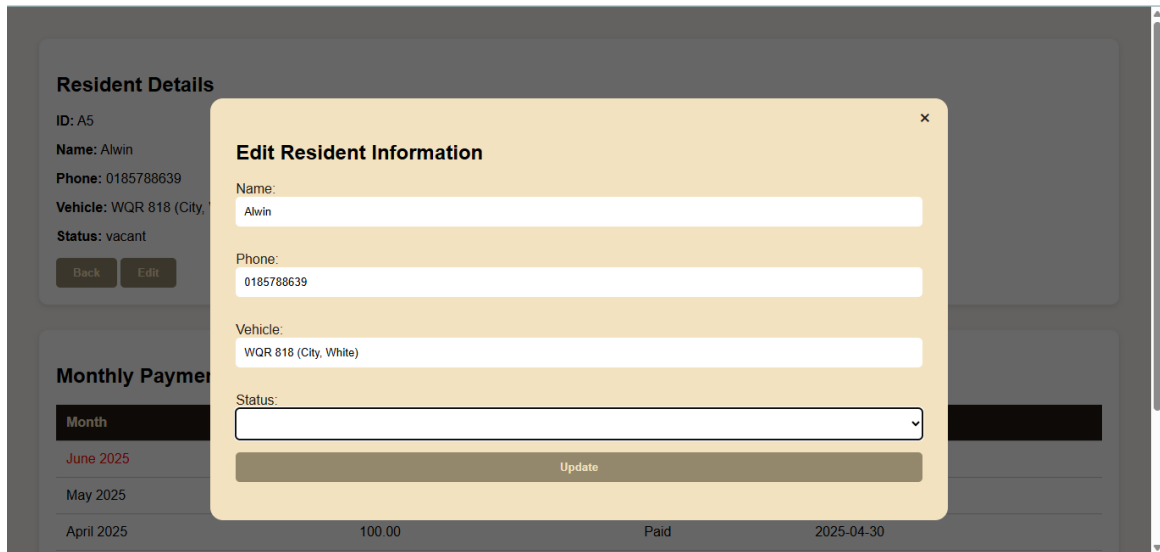
Resident Details			
ID:	A5		
Name:	Alwin		
Phone:	0185788639		
Vehicle:	WQR 818 (City, White)		
Status:	vacant		
Back Edit			

Monthly Payment Records			
Month	Amount (RM)	Status	Payment Date
June 2025	0.00	Unpaid	
May 2025	100.00	Paid	2025-05-31
April 2025	100.00	Paid	2025-04-30

Figure 19 Resident profile and their monthly record

On the resident profile page, users can check the monthly data for that specific residence and change the resident's profile information as needed. The "Status" section indicates whether a resident has moved out or the house has been assigned to a new resident.

III. Edit resident details



The screenshot shows a web interface with a 'Resident Details' section on the left and a 'Monthly Payment' table below it. An 'Edit Resident Information' modal form is open in the center. The modal contains input fields for Name, Phone, and Vehicle, and a dropdown menu for Status. An 'Update' button is at the bottom of the modal. The background shows the resident's details: ID: A5, Name: Alwin, Phone: 0185788639, Vehicle: WQR 818 (City, White), and Status: vacant. The 'Monthly Payment' table has columns for Month, Amount, and Date, with rows for June 2025, May 2025, and April 2025.

Month	Amount	Date
June 2025	100.00	Paid
May 2025		
April 2025		

Figure 20 Edit resident form.

The Edit Residents Form enables administrators to edit existing resident information in the system. This comprises elements such as the resident's name, phone number, car information, and address. The form ensures that any changes such as new contact information or an updated vehicle registration are properly reported in the database. It is also used to reassign a house to a new resident once the former occupant has moved out, so ensuring that records are up to date and accurate.

4.2.4 Residence

The Residence page includes an interactive map of the Villa Permata Indah residential area. Each clickable point on the map represents a residential unit. When a user clicks on a unit, a popup card opens with the resident's basic information, including name and block. The popup also includes a "View" option, which takes the user to the full resident profile, where detailed personal information and payment history are accessible.

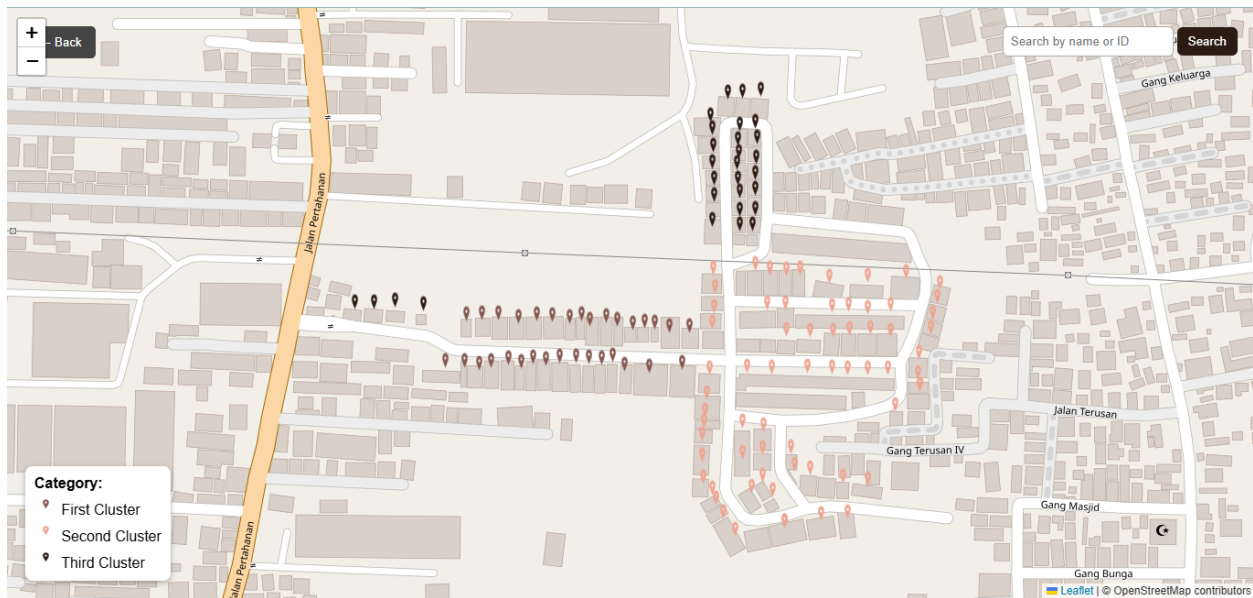


Figure 21 Residence focus location

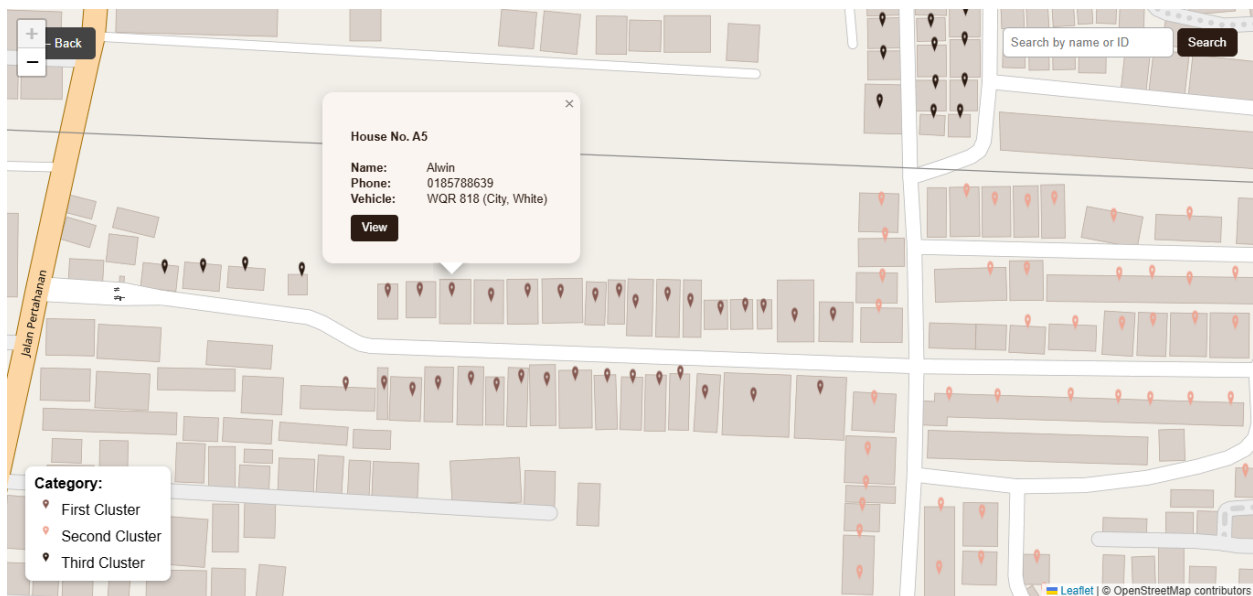


Figure 22 Pop up card for resident information

When a specific residence is clicked on the interactive map, a popup card appears with essential resident information about that unit. This allows users to rapidly access important details without leaving the map interface.

4.2.5 Monthly Payment Record

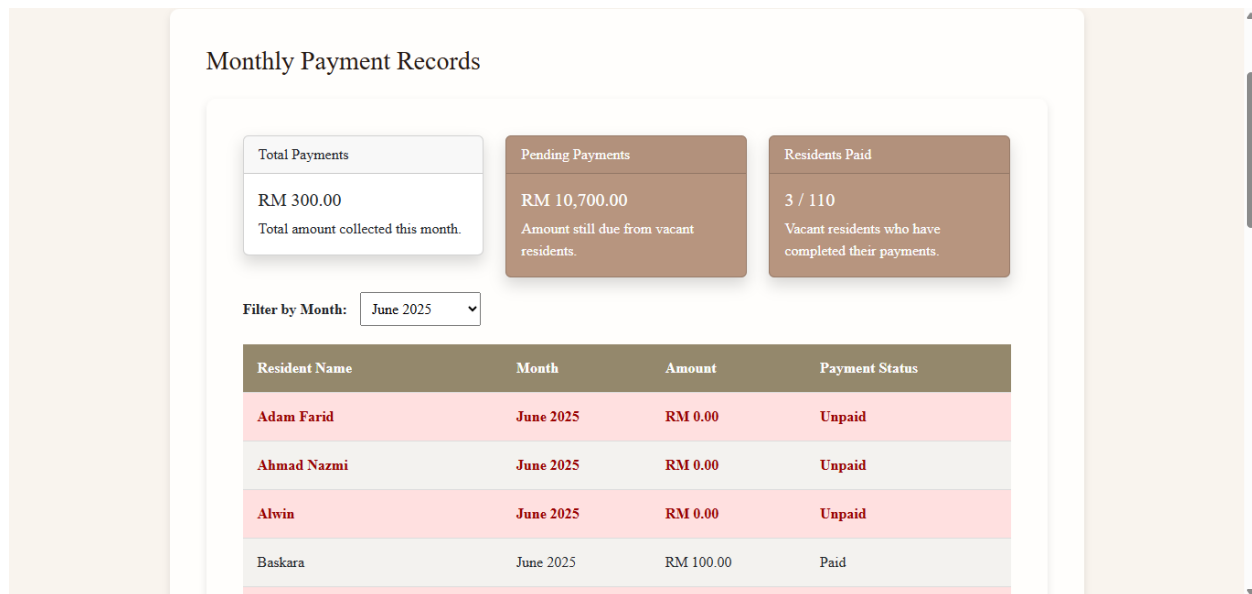


Figure 23 Red highlight for unpaid residents

The Monthly Payment Record page presents a detailed list of all residents and their payment statuses. A month filter is available at the top, allowing users to view payment statistics for a certain month. Residents who have not made a payment for the specified month are displayed in red, making it simple to locate pending payments. Summary cards are displayed at the top of the page.

- **Total Payments:** Displays the total amount collected for the given month.
- **Pending Payments:** Shows the amount remaining owed from unoccupied units.
- **Residents Paid:** The number of unoccupied apartments that have completed their payments.

The "Add Payment" button opens a popup card where the admin may enter new payment information for a resident. The form has fields for Resident ID, Payment Amount (RM100 per residence), Payment Month, Payment Date, and Payment Status (either "Unpaid" or "Paid"). To ensure data accuracy, the system contains a validation component that prevents duplicate entries the same resident cannot be associated with the same payment month several times. This ensures that the payment records are clear, consistent, and reliable.

Figure 24 Add payment form

4.2.6 Profile

The Admin Profile Page contains the logged-in admin's name, username, and email address. Admins can update their personal information by clicking the "Edit Profile" button, which opens a form for changing. A "Change Password" option is also provided, which allows for safe updates to login credentials. After any successful update or change, the system will display a popup message confirming the update was successful. Below this section, there is a view-only list of all registered admin users, with their information and last access times. This feature improves transparency and enables more effective monitoring and administration of administrative accounts.

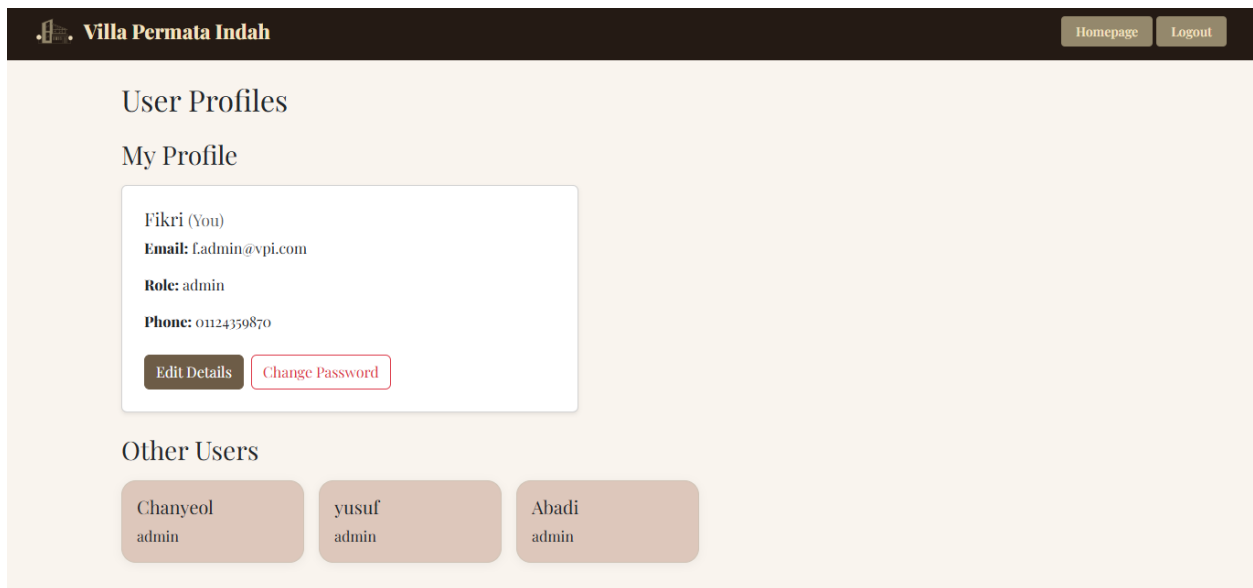


Figure 25 User profile

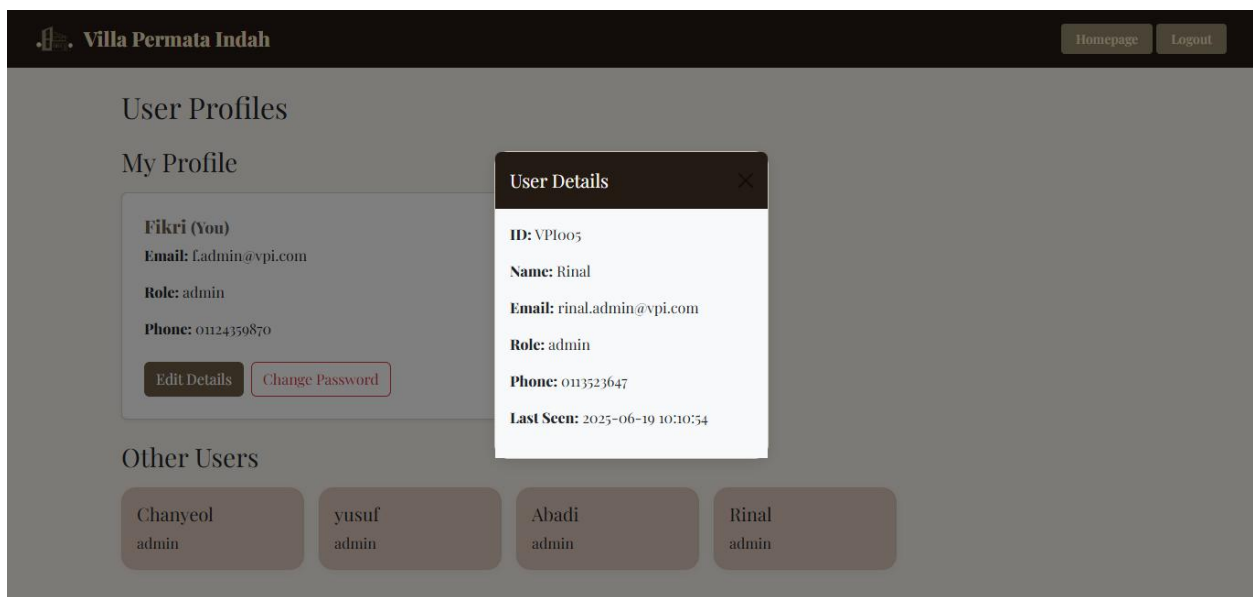


Figure 26 Others user details

When Other Users are selected, a popup card appears with important data such as the user's name, email, role, phone number, and the last time they accessed the system. This card is set to view-only mode, which means that the information can be reviewed but not changed from this interface, ensuring data visibility while minimizing the risk of unintentional modifications.

4.3 Functionality Testing

Functionality testing ensures that the Villa Permata Indah Resident Management System's essential features, such as resident management, the interactive map, monthly payments, and admin profile management function as planned. This testing validates system inputs, predicted outputs, and behavior under multiple scenarios, such as failure routes and limit conditions. The table below lists each test case and its real result.

i. Homepage and Admin profile

Table 2 Homepage and Admin profile test

ID	Test Case	Expected Result	Actual Result	Test Result (Pass, Fail)	Comments
H1	Login with a. invalid email (fikri@gmail.com) b. incorrect password	User cannot login and error message appear	User cannot login and error message appear that need user to re enter the email and password	pass	
H2	Login with c. invalid email (fikri@gmail.com) d. correct password	User cannot login and error message appear	User cannot login and error message appear that need user to re enter the email and password	pass	-
H3	Login with e. valid email (f.admin@vpi.com) f. incorrect password	User cannot login and error message appear	User cannot login and error message appear that need user to re enter the email and password	pass	
H4	Login with g. valid email (rinal@vpi.com) h. correct password	User able to login and directing to admin dashboard	user able to login to system and the system directing to admin dashboard	pass	

ID	Test Case	Expected Result	Actual Result	Test Result (Pass, Fail)	Comments
H5	Register new admin (user)	Success register and user can access the system	Register success new user can use the system	pass	The system has fixed (@vpi.com) as one the security system
H6	Update user information on "admin.profile"	A pop up saying "success" appear and the information updated	A pop up saying "success" appear and the information updated	pass	-
H7	User click on others registered user that use the system	A pop up card display the information in "view-only" version	A pop up card display the information in "view-only" version	pass	-

ii. Residents

Table 3 Residents test case

ID	Test Case	Expected Result	Actual Result	Test Result (Pass, Fail)	Comments
Rd1	View residents list based on “cluster” and “block”	Resident list appear according based on the “cluster” and “block”	Resident list appear according based on the “cluster” and “block”	Pass	
Rd2	View residents details	Click button view and it will directing to residents detail	A complete resident details page appear	pass	-
Rd3	Edit residents details	Updated data is reflected in resident view	Changes reflected instantly	pass	

iii. Residence

Table 4 Residence test case

ID	Test Case	Expected Result	Actual Result	Test Result (Pass, Fail)	Comments
Rc1	Search based on resident id a. user enter phone num on search bar	Pop up show “No resident found”	Pop up show “No resident found”	pass	
Rc2	Search based on resident id b. user enter unregistered name	Pop up show “No resident found”	Pop up show “No resident found”	pass	-
Rc3	Search based on resident id c. user enter invalid resident_id	Pop up show “No resident found”	Pop up show “No resident found”	pass	
Rc4	Search based on resident id d. user enter registered name	User can see a point marker of location	User can see a point maker of location	pass	
Rc5	Search based on resident id e. user enter valid resident_id	User can see a point marker of location	User can see a point maker of location	pass	
Rc6	Access map from the “residence” page and click on the maker location	A pop up card show residents details	A pop card show resident details	pass	

Rc7	Access map from the “cluster” link at homepage and click on the maker location	A pop up card show residents details	A pop card show resident details	pass	
Rc8	Access map from the “residence” page and click on the maker location and access full details of residents	Residents detail page appear	Residents detail page appear	pass	Residence page is after login, user no need to login to access the details
Rc9	Access map from the “cluster” link at homepage and click on the maker location and access full details of residents	User need to login first	A login page appear to the user. User need login first	pass	Cluster link is a link before login page, user need to login

iv. Monthly payments

Table 5 Monthly payment test

ID	Test Case	Expected Result	Actual Result	Test Result (Pass, Fail)	Comments
M1	Click “monthly payments” link from dashboard	Directing to the monthly payment record page	Directing to the monthly payment record page	pass	
M2	Filter payment list based on month	List name selected based month appear	User can see list name of payment based on month that been choose	Pass	-
M3	Add payment button being click	A pop up card to add payment appear	A pop up card to add payment appear	Pass	
M4	Add details on “add payment”	System notify and the list is updated	A notification shows the data has been get and list of payments directly update	pass	
M5	Add same payment details twice	System will reject the data and error message appear	Failed to store update and error message appear	pass	

v. Logout

Table 6 User Logout

ID	Test Case	Expected Result	Actual Result	Test Result (Pass, Fail)	Comments
L1	Logout from the system -user click “logout “ button	User able to logout from the system	User able to logout from the system and back to homepage	pass	

4.4 Usability Testing

Ten respondents participated in usability testing to evaluate the Villa Permata Indah Residence Management System's functionality, interface, and user-friendliness. Respondents were initially gathered to test the system by carrying out important administrative operations such as accessing resident data, using the interactive map, managing payments, and changing admin profiles. After completing the tasks, a series of structured questionnaires were issued to gather feedback and measure their satisfaction with the system.

Age Range
10 jawaban

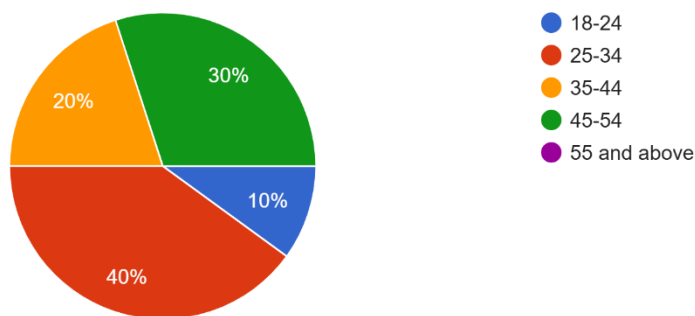


Figure 27 Age Range

Participants in the usability testing consisted of various ages. This distribution implies that the system was mainly tested by people of working age, particularly those who are likely to hold administrative positions. The high proportion of respondents aged 25 to 54 indicates that the

feedback mirrors the experiences and expectations of actual system users, particularly administrative staff. It also reveals that the system is usable across several adult age groups.

The usability testing findings demonstrate that all respondents (100%) were able to successfully perform each of the activities offered, such as creating a new user, logging in, traversing clusters, seeing and editing resident profiles, handling payments, and accessing admin profile capabilities. Additionally, no respondents reported any misunderstanding or difficulty when completing any of the tasks.

This clearly shows that the Villa Permata Indah Resident Management System is highly user-friendly, efficient, and intuitive for administrative users. The constant success of all tasks shows that the system interface, layout, and workflows are well-designed and satisfy user expectations. Administrators were able to do their tasks without assistance, demonstrating that the system takes little learning effort. The system has proven to be functional and accessible for administrative duties, with no major usability difficulties identified. These findings confirm the system's dependability and usefulness for managing residential data in the real world.

The system is easy to use

10 jawaban

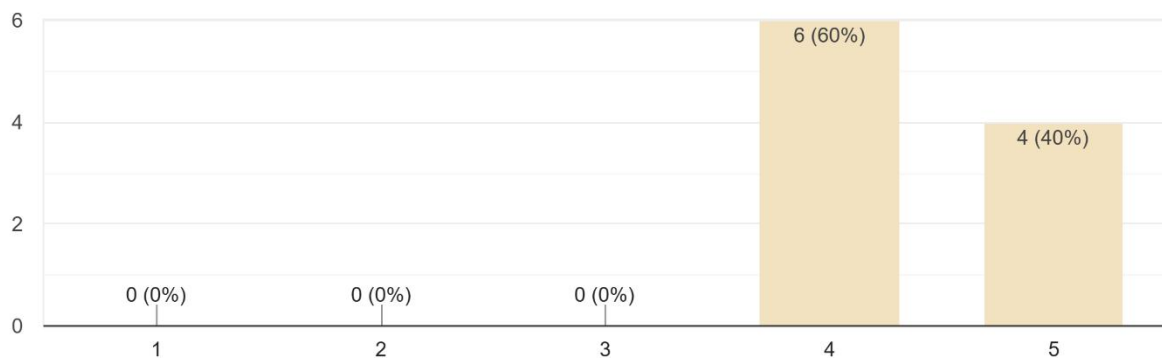


Figure 28 Bar Chart indicates the system is easy to use

The layout is clear and well-organized

10 jawaban

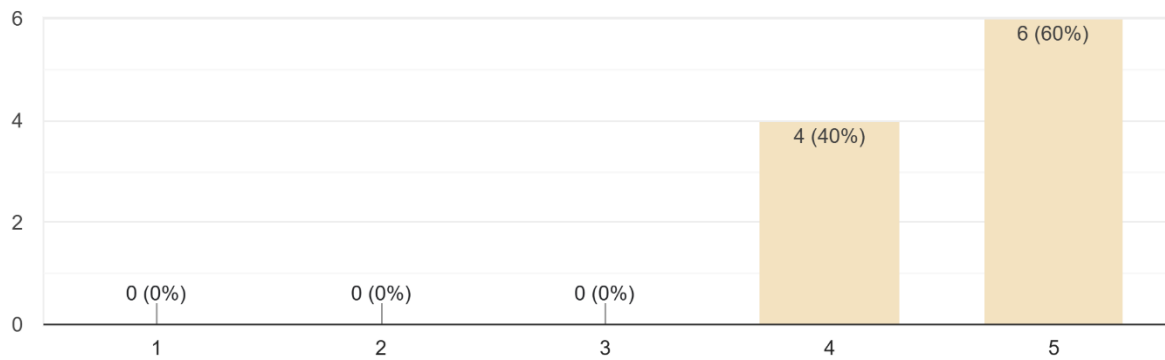


Figure 29 Bar chart showing the layout is clear and well organized

I was able to find what I needed quickly

10 jawaban

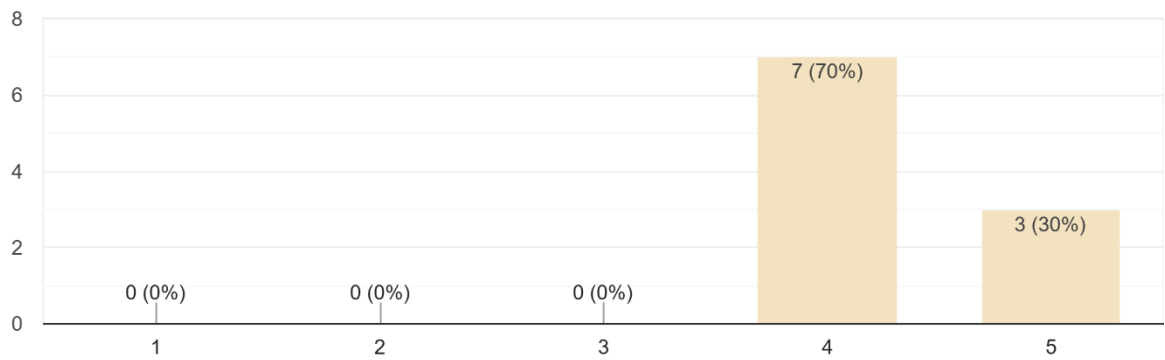


Figure 30 Bar chart of find what user needs

The features work as expected

10 jawaban

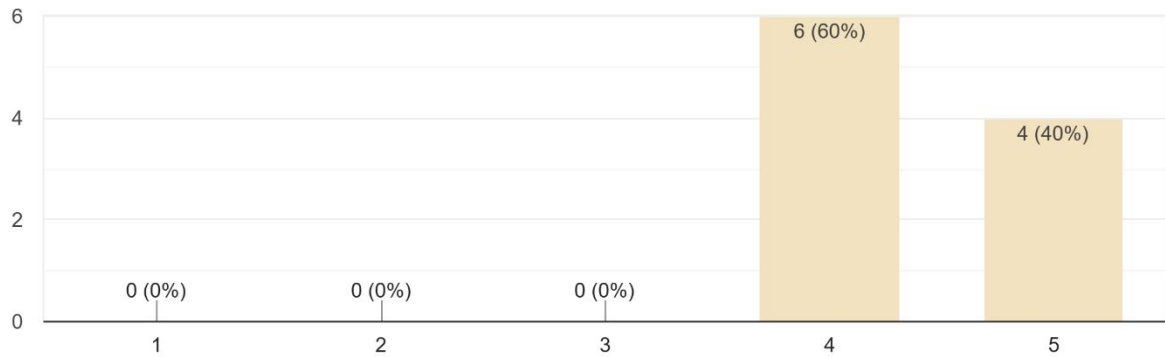


Figure 31 Bar chart of user expectation

I would feel confident using this system regularly

10 jawaban

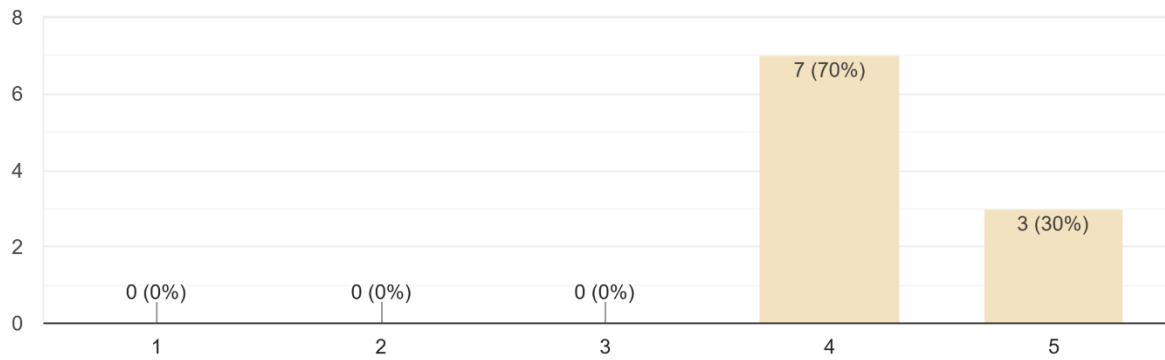


Figure 32 Bar chart of confidence level using system

4.5 Summary

The Villa Permata Indah Resident Management System was developed with PHP, MySQL, HTML, CSS, and JavaScript to assist administrators in efficiently managing resident information, payments, and profiles. Key features like an interactive map, cluster-specific resident lists, monthly payment tracking, and admin profile administration were successfully completed. Testing was performed throughout the development process to ensure that all functions worked properly and that data was handled correctly. Usability testing with ten admin users revealed that all tasks were accomplished successfully and without any confusion, demonstrating that the system is simple to use and performs as intended.

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 Introduction

Chapter 5 outlines the overall outcome of the Villa Permata Indah Resident Management System project. It describes the system's achievements, outlines the limitations and obstacles faced during development, and suggests future improvements. This system was designed with the goal of establishing an interactive platform for storing and managing residential profiles in a gated community. By providing a centralized and visual interface, it greatly aids management, particularly the residential area manager in successfully overseeing resident information, monitoring occupancy, and handling monthly payments.

5.2 Achievement

The system successfully achieves its main objective of improving resident information management in the Villa Permata Indah. Major accomplishments include:

Table 7 Achievement

Objective	Achievement
To design an online resident management system that facilitates occupant information, maintenance requests, and payment records for both tenants and administrators	The system was successfully developed to include modules that enable administrators to manage resident profiles, track payments, and update dwelling statuses. While the maintenance request function is intended for future development, the present version concentrates on essential resident data and payment processing, which are connected with an interactive map for clarity.
To develop the online resident management system	The system was built with HTML, CSS, JavaScript, PHP, MySQL, and Leaflet.js. Secure login, CRUD operations for resident data, payment tracking, and an interactive map

	interface with links to each housing unit are among the key features.
To evaluate the system's usability through testing and user feedback to ensure it meets the operational needs of team management	The system went through units, integration, and user acceptance testing. The results demonstrated an overall success rate of 97% based on functional and non-functional requirements, showing that it fits the needs of Villa Permata Indah's administrative workflow.

5.3 Limitations

Villa Permata Indah Resident Management System performs its primary functions correctly, numerous shortcomings were discovered. The system is entirely web-based and has not yet been optimized for mobile devices, potentially limiting its usability on smartphones and tablets. The interactive map, while functional, is confined to visual display and does not currently allow dynamic filtering or analytics tools. Furthermore, the system still lacks advanced functionality such as data export (PDF/Excel) and automatic reminders for late payments.

5.4 Future Enhancement

In the future, the system can be improved by making it mobile-friendly, allowing administrators to manage data more easily from any device. Adding features like PDF or Excel export will also improve report generation and record storage efficiency. Usability can be improved further by adding filtering options and real-time data graphics to the interactive map. Furthermore, the system could contain automatic warnings or reminders for outstanding payments to aid in prompt collection.

5.5 Summary

The project's objectives were met effectively, resulting in a functional Resident Management System for Villa Permata Indah. While the system achieves its intended aims, there are some

constraints that might be addressed to increase usability and efficiency. With future improvements, the system can become even more effective and user-friendly. Overall, the system is a useful tool for the top management of Villa Permata Indah to handle resident data digitally, reducing manual work and paper waste.

Appendix A

1. Currently, how do you find a specific house here?

Management team: We remember it but sometimes we also forget about it since here we have 266 houses.

2. Let's say if there is government or any authorized party request for information for people who live here, how will you provide it?

Management team: We keep all data manually and organized. Usually Pak Abadi (Head of Villa Permata Indah) keeps the data. To be honest, sometimes it needs sometimes to find it since we have a lot of data especially when we need the data as soon as possible.

3. As you mention before that Pak Abadi that keeps the data, what if he not around how you guys access the data?

Management team: Usually when he is going out for a certain time, he will pass the document to Pak Yusuf (Secretary of Villa Permata Indah) or Pak Novanda (Assistance of Secretary of Villa Permata Indah).

4. Is it acceptable to have a management system with an interactive map of the resident layout?

Management team: Yes, since right now we do everything manually, to handle 266 houses quite challenging for use to use this paper method. Not only that, we also sometimes lack the latest update data of residential since we have done it manually and write it on paper. A management system for us in this situation is helpful.

5. Who will have the access to this system

Management team: Only for management team since we must keep the residence information private and confidential

References

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