

**SECURITY GUARDS MANAGEMENT SYSTEM  
FOR JASA PERKASA SECURITY SDN BHD**

**By  
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**Thesis submitted in partial fulfilment of the  
requirement for the award of the degree of  
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## **THESIS CONFIRMATION AND APPROVAL**

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## **DECLARATION**

I hereby declare that this thesis is the result of my own research except as cited in the references.



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## **SECURITY GUARDS MANAGEMENT SYSTEM FOR JASA PERKASA SECURITY SDN. BHD.**

### **ABSTRACT**

The Security Guard Management System (SeGuMaS) represents a transformative initiative aimed at modernizing security operations for Jasa Perkasa Security Sdn. Bhd. This thesis outlines the development and implementation of SeGuMaS, designed to digitalize and optimize security management through a robust, secure, and scalable platform. Key features include adherence to industry standards and data protection regulations, ensuring the confidentiality and integrity of sensitive information. The system's architecture facilitates seamless integration with existing systems and third-party services, enhancing operational efficiency and responsiveness. User acceptance testing and feedback played a pivotal role in refining SeGuMaS to meet user expectations and operational requirements effectively. Future directions include the development of a mobile application for enhanced accessibility and real-time data management, along with the implementation of advanced monitoring tools utilizing GPS and biometric technologies. Through continuous adaptation and innovation, SeGuMaS promises to elevate security management practices, ensuring Jasa Perkasa Security Sdn. Bhd. remains agile and effective in safeguarding assets and personnel. This thesis underscores SeGuMaS as a cornerstone in modern security solutions, prepared to meet evolving challenges in the security industry. recommendation.

## **SISTEM PENGURUSAN PENGAWAL KESELAMATAN UNTUK JASA PERKASA SECURITY SDN. BHD.**

### **ABSTRAK**

Sistem Pengurusan Pengawal Keselamatan (SeGuMaS) mewakili inisiatif pemodenan operasi keselamatan untuk Jasa Perkasa Security Sdn. Bhd. Tesis ini menggariskan pembangunan dan pelaksanaan SeGuMaS, yang direka untuk mengedarkan dan mengoptimumkan pengurusan keselamatan melalui platform yang kukuh, selamat, dan boleh dikembangkan. Ciri-ciri utama termasuk pematuhan kepada standard industri dan peraturan perlindungan data, memastikan kerahsiaan dan integriti maklumat yang sensitif. Senibina sistem memudahkan integrasi tanpa kesan dengan sistem sedia ada dan perkhidmatan pihak ketiga, meningkatkan kecekapan operasi dan responsif. Ujian penerimaan pengguna dan maklum balas memainkan peranan penting dalam menyempurnakan SeGuMaS untuk memenuhi harapan pengguna dan keperluan operasi secara berkesan. Arah masa depan termasuk pembangunan aplikasi mudah alih untuk aksesibiliti yang lebih baik dan pengurusan data secara masa nyata, serta pelaksanaan alat pemantauan canggih menggunakan teknologi GPS dan biometrik. Melalui adaptasi dan inovasi berterusan, SeGuMaS berjanji untuk meningkatkan amalan pengurusan keselamatan, memastikan Jasa Perkasa Security Sdn. Bhd. kekal cekap dalam melindungi aset dan personel. Tesis ini menggariskan SeGuMaS sebagai batu asas dalam penyelesaian keselamatan moden, bersedia untuk menangani cabaran evolusi dalam industri keselamatan.

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## **LIST OF ABBREVIATIONS**

HCM	Human Capital Management.
SeGuMaS	Security Guards Management System.
UMT	Universiti Malaysia Terengganu.

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# **CHAPTER 1**

## **INTRODUCTION**

The study undertaken is laid out in Chapter 1 of this thesis, which also offers an overview of the project background, problem statements, problem solution, project scope, coverage scope, and thesis outline. The goal of this chapter is to lay forth the background information and reasoning behind the study, preparing the reader for what comes next.

### **1.1 Project Background**

Chapter 1 of this document serves as an introduction to the Security Guards Management System, also known as 'SeGuMaS.' This innovative system has been conceptualized in response to a specific request from a prominent company based in Tok Jembal, Terengganu. The company seeks a sophisticated and efficient solution to streamline the management of their security guard workforce.

Jasa Perkasa Security Sdn. Bhd. is a prominent player in the security industry, boasting a sizable workforce spanning across several states in Malaysia. The company has identified a pressing need for a robust system that can effectively oversee and administer its staff. The aspiration is that 'SeGuMaS' will serve as the solution to alleviate their management challenges, drive operational improvements, and alleviate the workload for their HR department.

## **1.2 Problem Statements**

In the fast-paced IT environment of today, the technology sector is always evolving. Due to its propensity to cause data loss and overload HR workers, the conventional method of keeping staff records in physical books has been rendered obsolete. As a result, a lot of businesses have switched to contemporary staff management software, completely changing the way they handle employee management. These modern methods enable staff members to effectively gather comprehensive information on their peers while also removing the hazards connected with physical record-keeping. They also give HR departments powerful tools to improve organisational effectiveness and data management, which is a big step forward in workforce management.

A new system will be created to solve the following problem statements in order to overcome these obstacles and take use of technology advancements:

1. Staff still record data in book.

- The firm's continued use of outdated data recording techniques poses significant risks, including data loss and inefficiency. The reliance on paper documents for data storage makes tracking and retrieving important information challenging.

2. Data is not easy to be tracked.

- An updated and more efficient data management system is required, as the manual paper record keeping method has made it difficult to track and retrieve data effectively.

3. Lack of a data recording and management system impedes efficient data handling.

- The business doesn't currently have a data management system in place. Instead, every record is manually maintained in physical files, which increases the effort for HR staff and leads to inefficient data management.

### **1.3 Problem Solution**

This section presents the proposed resolution to the identified issues. It describes the approach, methodology, or inventive strategies used to address the challenges. The problem-solving solution should be in harmony with the research objectives and showcase the capacity to rectify the recognized gaps or shortcomings.

The system tackles the previously mentioned problems through the implementation of the following capabilities:

1. An organized system that effortlessly records all data.
  - The system will facilitate HR staff in effortless data recording while simultaneously reducing the need to purchase physical files and books for data entry. All data will be stored in a centralized database, streamlining management for HR personnel.
2. Using the search feature to track down the data easily.
  - By utilizing the management system for data recording, the process is simplified. The data can be easily located through the system's search feature, aiding HR in efficient data retrieval. The system stores data effectively in the database, streamlining the tracking process and saving significant time compared to the current data tracking methods.
3. System that help in managing staff data.
  - Utilizing the management system will enable the company to save costs and time in employee management. It will also assist HR staff in efficiently managing and tracking all data, making their work easier. Furthermore, it allows employers to independently monitor their staff.

## **1.4 Objectives**

This chapter explains the aim and objectives of the study and acts as an introduction to the research objectives. It seeks to provide readers a clear grasp of the primary goals and issues that the study is trying to solve. The following are the objectives of this study:

1. To analyze the efficacy of the data management strategy currently in use.
  - The first objective is to analyze and review the limitations and effectiveness of the current data management strategy, laying the groundwork for proposing an improved solution.
2. To design a platform that can manage the data of the security guards.
  - The second objective is to create a user-friendly platform that improves HR efficiency in managing security guard records. This platform will include an effective search and retrieval mechanism to streamline data tracking and enhance worker monitoring capabilities.
3. To test and evaluate the performance of the new system replacing the company's current procedure.
  - The third goal of this research is to develop and evaluate a user-friendly system aimed at reducing the time and expense associated with retrieving security guard records in businesses. This system will streamline HR efforts by implementing an efficient search and retrieval mechanism, ultimately enhancing employer monitoring of workers.

By resolving these issues with a more functional and user-friendly platform, the research aims to address the current system's shortcomings and enhance it. The following chapters will detail the analysis, design, and development processes toward achieving an improved system that meets the company's personnel and data management needs.

## **1.5 Project Scope**

This section intends to define the project's parameters and its extent. Security Guards Management System (SeGuMaS), is poised to assist HR staff and employers in effortlessly monitoring and documenting employee data. The primary objective of the project is to ensure the seamless development of the system, with its scope encompassing the facilitation of an efficient system development process.

### **1.5.1 Scope of the System**

#### **1. Employee Data Management:**

- SeGuMaS will provide a comprehensive database for HR staff and employers to store, update, and access employee information. This includes personal details, work history, certifications, and performance records.

#### **2. Scheduling and Assignment:**

- The system will enable the scheduling of security guards' shifts, assigning them to specific posts or tasks, and managing their rotations efficiently.

#### **3. Attendance Monitoring:**

- SeGuMaS will facilitate the monitoring of guards' attendance, absences, leaves, and overtime records.

#### **4. User Interface and Accessibility:**

- The Security Guards Management System (SeGuMaS), will provide a user-friendly interface that easy for the HR Staff to use and manage the data. This will enhance accessibility for HR personnel and provide guards with the necessary tools to perform their duties.

In essence, this system will replace the company's current methods, aiming to make data management more efficient and professional. By implementing this system, the company will present a more polished image and streamline operations. It will bring a systematic and organized approach to management, ultimately improving the company's business and operational efficiency.

## **1.6 Thesis Outline**

The thesis is organized into seven chapters that together tell the story of the research and its findings. Chapter One introduces the study by providing background information, outlining the problem, stating the research objectives, and defining the project's scope. It sets the scene for the rest of the thesis.

Chapter Two reviews the existing literature relevant to the project. This chapter builds a theoretical foundation, identifies gaps in current knowledge, and helps shape the research direction. In Chapter Three, the methodology used in the study is described, detailing the research approach, methods, and timeline, including key milestones.

Chapter Four outlines the system requirements, both functional and non-functional. This chapter uses requirement analysis techniques to ensure a clear understanding of what the system needs to do. Chapter Five covers system design, explaining the system's architecture, database structure, user interface, and design considerations.

Chapters Six and Seven wrap up the thesis. Chapter Six discusses system implementation, detailing the development process, testing methods, and system deployment. Finally, Chapter Seven concludes the thesis by summarizing the key findings, drawing conclusions, discussing the project's contributions and limitations, and suggesting areas for future research and development. Each chapter plays a crucial role in presenting a complete picture of the research project.

## **CHAPTER 2**

### **LITERATURE REVIEW**

In this chapter, the related work from the previous or existing project that was done by other researcher will be reviews. This section will discuss and make some reviews of the existing system which then will be useful reference in developing the new system. The literature reviews aim to study the function of an existing system that have the about the same function with the Security Guards Management System(SeGuMaS) to be developed. Comparison and discussion will be made among three existing system that studied and the idea obtained from the literature review will be a help in the new system to make it more efficient and the features of the system are more improve than the existing one.

#### **2.1 Introduction**

Chapter 2 of this thesis serves as the foundation for the research conducted and provides an overview of the Fundamental Theory and Concept, Related Works, discussion and summary. The chapter aims to establish the context and rationale for the study, setting the stage for the subsequent chapters.

#### **2.2 Fundamental Theory and Concept**

In this section, the fundamental theories and concepts that serve as the theoretical foundation of the research are discussed. It provides an overview of the key frameworks, models, or

perspectives that inform the understanding and analysis of the research topic. This section establishes the theoretical framework upon which the research is built.

### Fundamental Theory and Concept for Security Guard Managements System(SeGuMaS):

#### 1. Digital Transformation:

- Integrating digital technology into all business areas, like with SeGuMaS, transforms manual processes for managing security guards into automated and digital workflows, reducing human error and enhancing operational efficiency.

#### 2. Data Management:

- Collecting, storing, and utilizing data securely, efficiently, and cost-effectively, as seen with SeGuMaS, centralizes data storage for easy access and retrieval. This enhances the accuracy and reliability of information related to security operations.

#### 3. Automated Reporting:

- Using software tools to automatically generate reports based on collected data, as demonstrated with SeGuMaS, enables the creation of guard card staff, guard profile details, attendance logs, and other essential documentation without manual intervention.

#### 4. Guard Scheduling:

- Automating the scheduling of security guards through SeGuMaS ensures optimal coverage and compliance with labor laws, thereby effectively reducing scheduling conflicts and maintaining consistently adequate staffing levels. This implementation not only enhances overall operational efficiency but also streamlines resource allocation, improves workforce management, and fosters a more reliable and responsive security infrastructure within the organization.

## 5. Leave Management Request:

- Automating the leave request of security guards, as implemented in SeGuMaS, ensures optimal coverage and compliance with labor laws. This reduces leave conflicts, maintains adequate staffing levels, and enhances overall operational efficiency.

## 6. Communication and Alerts:

- Enabling instant communication between security personnel and management through messaging and alert systems, as integrated in SeGuMaS, enhances coordination during emergencies, facilitates rapid dissemination of critical information, and significantly improves response times.

## 7. Data Security:

- Protecting data from unauthorized access and data breaches involves ensuring that sensitive information related to security operations in SeGuMaS is safeguarded through encryption, access controls, and regular audits, thereby maintaining confidentiality and integrity.

## 8. Compliance:

- Adherence to laws, regulations, guidelines, and specifications relevant to the business ensures that SeGuMaS complies with industry standards and regulations, including data protection laws and labor regulations, to maintain legal and operational integrity.

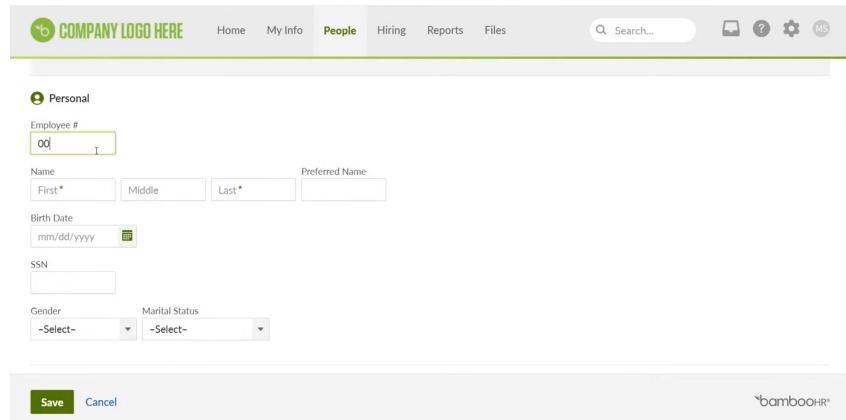
## **2.3 Related Works**

### **2.3.1 BambooHR**

BambooHR is a versatile and user-friendly HR management system hosted in the cloud, designed to streamline various human resources processes. Its array of features makes it an invaluable tool for HR professionals and companies of all sizes. BambooHR encompasses a wide range of functionalities, including employee onboarding, leave day monitoring, benefits administration, and performance evaluation. The software's success can be attributed to its intuitive design and user-friendly interface, enabling HR professionals to easily navigate and leverage its capabilities.

BambooHR stands out for its extensive customization and scalability, catering to businesses of all sizes. It streamlines HR processes, including employee data management, time tracking, and performance assessments, saving time and resources. The system's real-time data access and reporting support data-driven decision-making. Centralized HR data simplifies compliance management and audits, making BambooHR a valuable asset for HR departments.

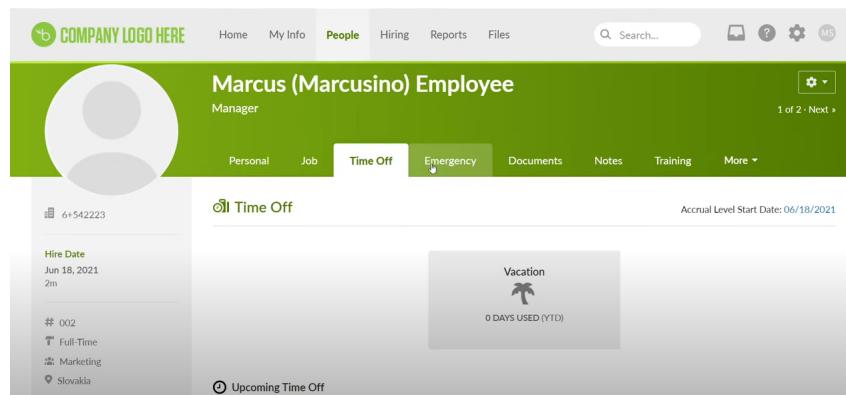
Figure 2.1 shows BambooHr profile creation page. On this page it will ask for the user to insert the information about the staff and then click save and a profile will be created.



The screenshot shows the 'Personal' tab of the BambooHr profile creation page. At the top, there's a placeholder 'COMPANY LOGO HERE'. The navigation bar includes 'Home', 'My Info', 'People' (which is highlighted in green), 'Hiring', 'Reports', and 'Files'. A search bar and various icons are also present. The main form area starts with 'Employee #' containing '00'. Below it are fields for 'Name' (First\*, Middle, Last\*) and 'Preferred Name'. There's a 'Birth Date' field with a calendar icon, an 'SSN' field, and dropdowns for 'Gender' and 'Marital Status', both set to '-Select-'. At the bottom are 'Save' and 'Cancel' buttons, and a 'bambooHR' logo.

Figure 2.1: BambooHr Create Profile Page

Figure 2.2 shows BambooHr profile page. On this page it shown the profile after is were created.



The screenshot shows the 'Time Off' tab of the BambooHr profile page for 'Marcus (Marcusino) Employee'. The header includes 'COMPANY LOGO HERE', 'Home', 'My Info', 'People', 'Hiring', 'Reports', 'Files', a search bar, and a dropdown menu. The main profile area shows a placeholder profile picture, the name 'Marcus (Marcusino)', title 'Manager', and a status indicator '1 of 2 - Next ». Below this are tabs for 'Personal', 'Job', 'Time Off' (which is selected and highlighted in green), 'Emergency', 'Documents', 'Notes', 'Training', and 'More ». On the left sidebar, there are sections for '6+542223' (phone number), 'Hire Date' (Jun 18, 2021, 2m), and 'Job Details' (# 002, Full-Time, Marketing, Slovakia). The 'Time Off' section displays a 'Vacation' card with a palm tree icon and '0 DAYS USED (YTD)'. At the bottom, there's a 'Upcoming Time Off' section.

Figure 2.2: BambooHr Profile Page

## 2.3.2 ADP Workforce Now

ADP Workforce Now is a revolutionary Human Capital Management (HCM) solution, reshaping how organizations handle HR and payroll functions. This comprehensive system simplifies critical processes such as payroll management, time tracking, benefits administration, and compliance with labor and tax regulations.

A standout feature of ADP Workforce Now is its user-friendly interface, accessible to both HR professionals and employees, with self-service options for payroll and benefits access. The system excels in integration, seamlessly connecting with other HR and accounting software to ensure data consistency and enhance workflow efficiency.

Beyond its software capabilities, ADP Workforce Now automates and streamlines HR and payroll processes, reducing administrative burdens and ensuring compliance with labor laws and tax regulations. In summary, ADP Workforce Now empowers organizations to operate more efficiently and support strategic growth initiatives.

Figure 2.3 shows the ADP profile page.

The screenshot displays the ADP Workforce Now interface. At the top, there's a navigation bar with links for HOME, RESOURCES, MYSELF, MY TEAM, PEOPLE, PROCESS, REPORTS, SETUP, and a search bar. Below the navigation is a header for 'Employment Profile' with employee details: Employee ID (12345), Position ID (BOQ999921), Hire Date (03/02/2018), and Status (Active). A progress bar indicates 1 of 616 employees. The main content area is divided into several sections:

- Position:** Shows details like Position Start Date (03/02/2018), Job Change Reason (New Hr), Pay Grade (Area Supervisor), and Job Class (Management).
- Status:** Displays hire and leave dates, reason codes, and supporting documents.
- Regular Pay:** Lists salary (\$8,766.00), pay frequency (Biweekly), and various deduction items (e.g., Johnson Salary, Premium Rate Factors).
- Employment:** Shows tenure category (Full Time), association ID (QANEP7U2), hire source, and service dates.
- Additional Earnings:** Shows no entries.
- Work Schedule:** Shows PTE, assigned shift, scheduled hours, and time off details.
- Corporate Groups:** Shows corporate group information (e.g., Alberta, Canada).

Figure 2.3: ADP Profile Page

### 2.3.3 Gusto

Gusto is an online platform that makes payroll and HR tasks super easy for small businesses and startups. It's designed to be really user-friendly, so even if you're not an HR expert, you can use it. The main focus of Gusto is to help with things like paying your employees, managing benefits, and handling HR stuff. It's great because it does the math for taxes and takes care of paperwork. Plus, your employees can use it to check their info, which means less work for your HR team. Gusto helps small businesses follow the rules when it comes to paying taxes and keeping employee info organized. This way, small businesses can concentrate on growing and not get bogged down with paperwork. It's a handy tool for businesses in this category.

Figure 2.4 shows Gusto profile creation page. On this page, it shows how the profile is created.

The screenshot shows the 'Create employee profile' form on the Gusto platform. The left sidebar has a 'Hiring' section selected. The main form fields include:

- First name:** Pm
- Middle initial:** Optional
- Last name:** Smith
- Start date:** 06/01/2021
- Department:** Create a new department...
- Department name:** Engineering

Figure 2.4: Gusto Profile Creation Page

Figure 2.5 shows Gusto profile page. On this page, it shows the profile that was created.

The screenshot shows the 'Hire & onboard' section on the Gusto platform. The left sidebar has a 'Hiring' section selected. The main area displays a table of 'New people' with the following data:

Name	Start	Status	Actions
Ella Fitzgerald	Mar 1	Complete All tasks complete	⋮
Louis Armstrong	Mar 1	Complete All tasks complete	⋮
Maya Angelou	Mar 8	Action needed Overdue tasks	⋮
John Lewis	Mar 15	On track Pending tasks	⋮
Pete Seeger	Mar 14	Incomplete	⋮

Figure 2.5: Gusto Profile Page

## **2.4 Discussion**

The approach taken in Chapter 2 to conduct a thorough literature review is commendable and aligns with best practices in academic research. By exploring both theoretical frameworks and practical implementations, the review lays a strong foundation for the development of SeGuMaS.

The identification of knowledge gaps and contradictions in existing literature is essential for advancing the understanding of security guide management. This process not only highlights areas for future research but also ensures that SeGuMaS is built upon a nuanced understanding of the field's challenges and opportunities.

Furthermore, the comparative analysis of existing systems provides valuable insights into design considerations and functionality requirements. By learning from the strengths and weaknesses of these systems, the development of SeGuMaS can be more targeted and innovative, aiming to address identified shortcomings and exceed current standards.

Overall, the literature review outlined in Chapter 2 is not only a critical component of the thesis but also a significant contribution to the advancement of knowledge in security guide management. It sets the stage for a focused and informed approach to developing SeGuMaS, with the potential to enhance existing solutions and pave the way for future advancements in the field.

Table 2.1: Security Guard Management System (SeGuMaS)

System	Inspired By	Key Features
	BambooHR	<ul style="list-style-type: none"> <li>• Efficiently organize and manage employee records</li> <li>• Streamline the process of tracking and managing employee time-off requests</li> <li>• Implement a system for assessing and improving employee performance</li> </ul>
Security Guard Management System (SeGuMaS)	ADP Workforce Now	<ul style="list-style-type: none"> <li>• Provide a scalable solution to accommodate organizational growth</li> <li>• Ensure accurate and timely payroll processing for all employees</li> </ul>
	Gusto	<ul style="list-style-type: none"> <li>• Simplify the payroll process, ensuring accuracy and compliance</li> <li>• Efficiently manage employee benefits, including insurance and retirement plans</li> <li>• Provide an easy-to-use platform suitable for users with varying levels of technical expertise</li> </ul>

## **2.5 Summary**

Chapter 2 of the thesis conducts an in-depth literature review to build a robust theoretical base for the research on Security Guide Management Systems (SeGuMaS). This review serves multiple crucial functions. It first uncovers existing knowledge voids and inconsistencies in the field, thereby indicating areas that are ripe for further exploration and progress. Next, it delves into the fundamental theories and concepts related to security guide management, offering a thorough theoretical framework that informs and directs the subsequent research. Moreover, the literature review carries out a detailed analysis of three systems similar to SeGuMaS, with the aim to gather insights into current practices, pinpoint deficiencies, and spotlight innovative features that can be incorporated into the development of SeGuMaS.

This extensive review of the literature is key in gaining a profound understanding of the current state of research in the field of security guide management. It not only enlightens the following chapters of the thesis but also plays a pivotal role in shaping the research methodology and design of SeGuMaS. By amalgamating existing knowledge, identifying gaps, and scrutinizing similar systems, the literature review lays the necessary groundwork for propelling the development of SeGuMaS and adds to the wider discussion on security guide management systems. The insights derived from this review are priceless in ensuring that SeGuMaS effectively addresses real-world challenges and makes a noteworthy contribution to the field.

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 Introduction**

The development of the Security Guard Management System (SeGuMaS) will follow a clear system development cycle, aligning with the Software Development Life Cycle (SDLC) phases.

Agile methodology will be central to SeGuMaS's development due to its flexibility and robustness. It allows for a dynamic approach to software development, breaking the project into manageable 'sprints' for continuous improvement. Regular stakeholder interactions ensure their feedback shapes SeGuMaS to meet their needs.

The Agile methodology ensures a dynamic, customer-focused approach to SeGuMaS's development. Its iterative nature allows quick response to changing priorities or feedback, exceeding stakeholder expectations and delivering a high-value system that aligns with user needs and standards.

By using Agile methodology within the SDLC framework, SeGuMaS's development will be transparent and collaborative, delivering a robust solution that effectively addresses security guard management challenges. This approach ensures SeGuMaS evolves iteratively, incorporating feedback and best practices to create a functional, innovative solution adaptable to evolving security management needs.

### 3.2 Project Methodology

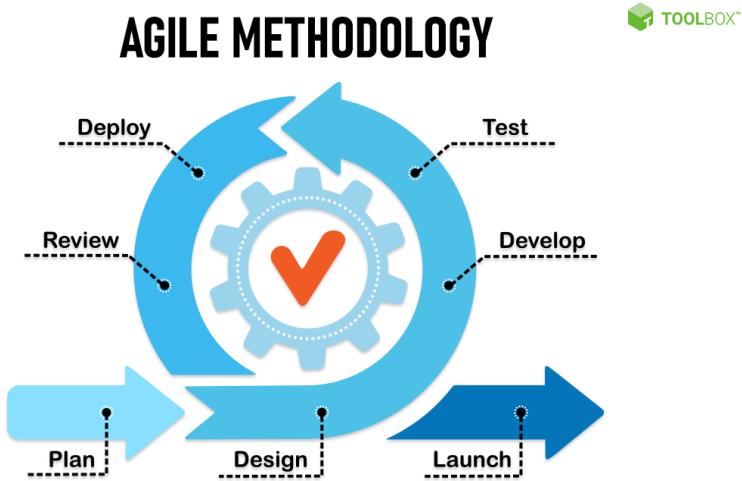


Figure 3.1: Agile Software Development Model For SeGuMaS

Based on Figure 3.1 shows that there are several planning in the agile methodology that were need to be follow. The first phase is the planning phase. In this stage, the project scope is defined, objectives are set, and priorities are identified. This involves creating a roadmap, outlining tasks, and estimating the resources required for the project. Then the second phase is design. During the design phase, the team focuses on creating a blueprint for the system. This involves architectural decisions, user interface (UI) design, database design, and other technical specifications. The goal is to create a detailed plan for how the system will function.

Next, Develop. In the development phase, the actual coding and implementation of the system take place based on the designs and plans created earlier. Developers write code, build features, and integrate various components to create the product. Then, test. Testing is a crucial phase where the developed system undergoes rigorous testing to ensure it meets quality standards. This includes functional testing, performance testing, security testing, and more. Bugs and issues are identified and resolved during this phase. After testing, the next phase is deploy. Deployment involves making the system available for use. This phase includes preparing the system for production, configuring servers, installing software, and ensuring everything is ready for users to access the system.

After the deployment phase, there is a review phase. The review phase is about evaluating the completed system against the initial objectives and requirements. Stakeholders and the development team review the system's functionality, performance, and alignment with the project goals. Feedback gathered here informs any necessary improvements. The last phase is launch. The launch phase involves the official release of the system to users or customers. It may involve marketing strategies, user training, and support systems to ensure a smooth transition and adoption of the newly released system.

These phases in Agile are iterative, allowing for continuous improvement and adaptation throughout the development process. The goal is to create a high-quality system that meets user needs and delivers value while accommodating changes and feedback along the way.

### **3.3 Project Planning Schedule**

After selecting the methodology, the planning schedule is established with the initial focus on defining milestones to gauge progress and ensure alignment with project goals. Milestones serve as benchmarks to track project advancement and maintain trajectory towards predefined objectives. Additionally, a Gantt chart is developed to streamline tasks into distinct phases corresponding to the chosen methodology. Tasks are segmented into several sprints within the project, facilitating efficient management and execution aligned with the agile approach.

### 3.3.1 Milestone

A project milestone is a management tool that is used to delineate a point in a project schedule. Milestones are pivotal occurrences or phases within a project that signify its advancement and contribute to its successful conclusion. They act as crucial checkpoints, establishing a distinct timeline and framework for the project's evolution. In the framework of the Security Management System (SeGuMaS), Table 4.1 delineates the primary milestones detailing significant objectives and deliverables to be achieved within designated time frames.

Through the delineation of these milestones, the project team gains the ability to monitor progress, distribute resources efficiently, and oversee the project's timeline. These milestones act as pivotal markers of project success, maintaining the project's trajectory toward completion.

In essence, the milestones outlined in Table 3.1 create a pathway for the establishment and finalization of the Security Management System (SeGuMaS), providing a systematic method for project management and directing the project team toward accomplishing its objectives.

Milestone No.	Description	Start Date	End Date
1	Project Title Approval	16 October 2023	27 October 2023
2	Submission of SPMP	27 October 2023	23 November 2023
3	Submission of SRS	22 October 2023	23 November 2023
4	Submission of SDD	3 November 2023	23 November 2023
5	Project Prototype	1 December 2023	6 July 2024
6	Submission of Thesis	9 October 2023	18 July 2024

Table 3.1: Milestone for SeGuMaS

Table 3.1 outlines the milestones necessary for the establishment and finalization of the Security Management System (SeGuMaS). Each milestone is designated with a unique number and accompanied by a description of the specific task or objective to be accomplished. Additionally, the table includes the commencement and conclusion dates for each milestone.

## 1. Project Title Approval:

- This milestone marks the approval of the project title, which typically occurs after initial discussions and agreement with the project stakeholders. The start date for this milestone is 16 October 2023, and the end date is 27 October 2023.

## 2. Submission of SPMP:

- The milestone involves the submission of the spmp, which outlines the project's management and development approach. The start date for this milestone is 27 October 2023, and the end date is 23 November 2023.

## 3. Submission of SRS:

- This milestone represents the submission of the Software Requirements Specification document. The SRS outlines the functional and non-functional requirements of the SeGuMaS. The start date for this milestone is 22 October 2023, and the end date is 23 November 2023.

## 4. Submission of SDD:

- The milestone involves the submission of the Software Design Document , which details the architectural and design aspects of the system. The start date for this milestone is 3 November 2023 and the end date is 23 November 2023.

## 5. Project Prototype:

- This milestone denotes the creation of the project prototype, entailing the development of an initial functional iteration of the SeGuMaS. It commences on December 1, 2023, and concludes on July 6, 2024.

## 6. Submission of Thesis:

- The ultimate milestone marks the submission of the thesis encompassing comprehensive documentation, analysis, and findings pertinent to the SeGuMaS.

It commences on October 9, 2023, and concludes on July 18, 2024.

These milestones provide a clear timeline and structure for the development and completion of the SeGuMaS. They help track progress, ensure timely completion of tasks, and provide a framework for project management and documentation.

### **3.3.2 Gantt Chart**

A Gantt chart, such as Gantt chart 3.2, functions as a visual portrayal of a project's timetable, displaying the commencement and conclusion dates of diverse tasks or activities. It offers a graphical overview of the project's timeline, pivotal milestones, and interconnections among tasks, enabling both project managers and team members to monitor progress and efficiently manage resources. Within the realm of the SeGuMaS, a Gantt chart holds significant importance by visualizing the project's schedule and facilitating effective project management.

The SeGuMaS Gantt chart provides an encompassing depiction of the project's timeline, tasks, and milestones, breaking down the project into manageable segments and illustrating the intricate relationships between different activities. Task representation through bars aids project managers in swiftly discerning task duration and their sequential or concurrent associations.

Efficient resource allocation and management are facilitated through the SeGuMaS Gantt chart. By visualizing the schedule, project managers can pinpoint potential bottlenecks or resource clashes, ensuring optimal resource utilization throughout the project's duration. This proactive approach mitigates delays and optimizes resource utilization.

Furthermore, the Gantt chart serves as a means of communication, imparting stakeholders with a lucid comprehension of the project's timeline and progress. It enables project managers to effectively convey project updates, deadlines, and milestones, fostering transparency and collaboration among stakeholders.

Equally significant, the Gantt Chart empowers project managers to monitor project progression and promptly adapt if necessary. By comparing actual progress to the planned schedule, project managers can detect deviations and implement corrective measures to realign the project trajectory.

To sum up, the SeGuMaS Gantt chart, much like its counterpart for the SeGuMaS, acts as a visual representation of the project schedule, aiding project managers and team members in

tracking progress, resource management, and transparent communication with stakeholders. Its role in organizing and coordinating project activities ensures efficient project execution, aiming to achieve objectives within the designated time frame.

Link For : Gantt Chart For Security Guards Management System (SeGuMaS)..

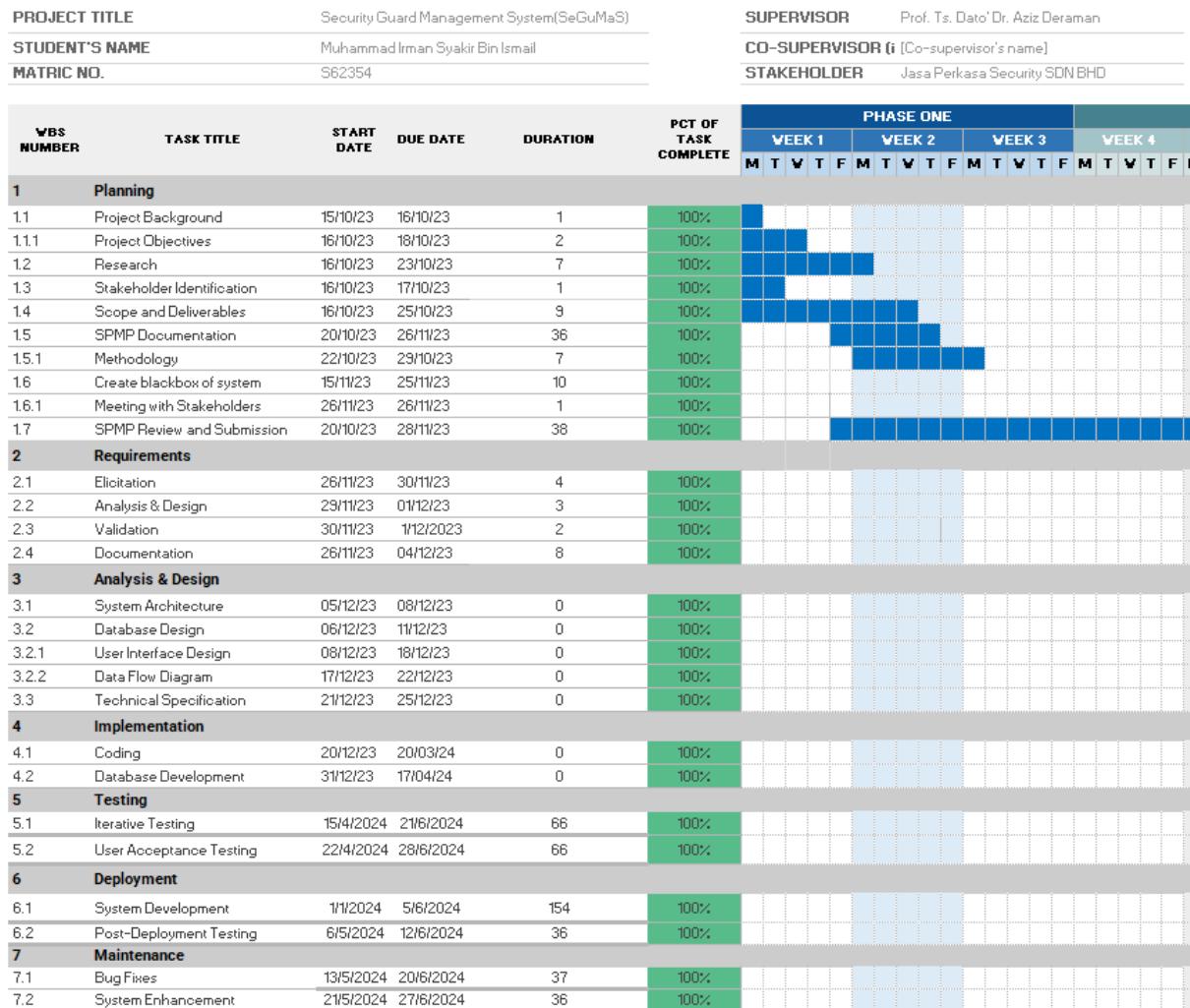


Figure 3.2: Gantt Chart for SeGuMaS

Based on Figure 3.2 show the gantt chart of the Security Guards Management System (SeGuMaS) development process phase for each of the development process timeline.

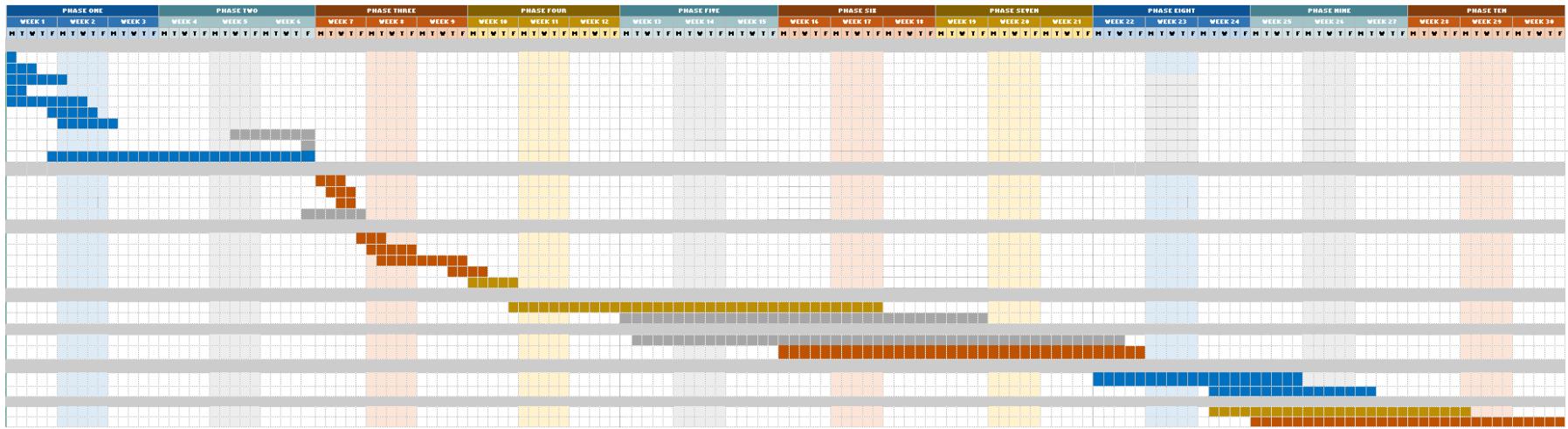


Figure 3.3: Gantt Chart Time Bar for SeGuMaS

25 Based on Figure 3.3 show the gantt chart of the Security Guards Management System (SeGuMaS) development process time bar, continuation of figure 3.2 that show the attribute of each phases of the development process.

### **3.4 Summary**

The Gantt chart used for the Security Guard Management System (SeGuMaS) serves as a critical visual tool that outlines the project's timeline, tasks, and milestones, offering a comprehensive overview for project managers and team members. This graphical representation facilitates effective project management by breaking down activities into manageable segments and illustrating the relationships between tasks. It enables efficient resource allocation and management, allowing project managers to identify potential bottlenecks and optimize resource utilization to prevent delays.

Moreover, the SeGuMaS Gantt chart acts as a communication tool, providing stakeholders with clear insights into project timelines and progress. It enhances transparency and collaboration by enabling project managers to convey updates, deadlines, and milestones effectively. Additionally, the chart allows for ongoing monitoring of project progression, enabling prompt adjustments if deviations from the planned schedule occur. Overall, the SeGuMaS Gantt chart plays a crucial role in organizing project activities, promoting efficient execution, and ensuring objectives are achieved within the designated timeframe.

## **CHAPTER 4**

### **SYSTEM REQUIREMENTS**

#### **4.1 Introduction**

The Security Guard Management System (SeGuMaS) is an essential software solution aimed at simplifying the management of security staff within organizations. This report offers an in-depth analysis of SeGuMaS, concentrating on its requirements, features, scope, and its effect on security operations. The Software Requirement Specification (SRS) for SeGuMaS serves as a development guide, outlining system goals and constraints based on stakeholder feedback. As the project progresses, the SRS adapts to meet changing needs, ensuring it aligns with stakeholder expectations and assists the development team in building a robust and user-focused security management solution. The SRS scope includes a comprehensive examination of SeGuMaS, emphasizing its features and application goals such as managing guard schedules, tracking leaves, maintaining guard profiles, and improving incident tracking and reporting. By providing accurate definitions of key terms and explaining acronyms and abbreviations, the SRS encourages effective communication and understanding across the document, ensuring consistent interpretation and aiding the successful implementation of SeGuMaS.

## **4.2 Requirement Elicitation Techniques**

Requirement elicitation stands as a pivotal stage in developing the Security Guards Management System (SeGuMaS), involving the search for specific functionalities and operational constraints crucial for optimal system performance. It embodies the thorough process of collecting vital data from stakeholders, forming the foundation for data analysts to comprehend their exact needs. This phase aims to meticulously identify the fundamental business requirements, potential risks, and critical assumptions pertinent to any SeGuMaS associated project. Through requirement elicitation techniques, the objective is to achieve a comprehensive grasp of SeGuMaS's functionalities, limitations, and the context in which it operates.

## **4.3 System Requirements**

System requirements are critical specifications that define how the SeGuMaS system should function and perform. These requirements outline the essential tasks and features that SeGuMaS needs to support, such as user authentication, managing guard details, scheduling shifts, leave requests and generating reports. These features are designed for different user roles like HR Staff, Managers, and Employers, ensuring SeGuMaS meets the needs of managing security personnel within organizations.

Besides these functional requirements, non-functional requirements ensure that SeGuMaS runs smoothly, reliably, and securely. Performance requirements make sure the system responds quickly to user actions and retrieves data efficiently. Scalability requirements ensure SeGuMaS can handle more users and data without slowing down. Security requirements protect sensitive information with encryption and access controls.

Clearly defined system requirements are essential for developing and implementing SeGuMaS. They ensure the system meets user needs, supports business operations well, and offers a secure and reliable way to manage security staff in organizations.

### **4.3.1 Functional Requirement**

Functional requirements in SeGuMaS, the System General Management Specification, serve as the essential building blocks defining the system's core operations. These requirements intricately outline specific behaviors and functionalities necessary for users to achieve their objectives. Crafted with precision, they prioritize clarity, simplicity, and a lack of ambiguity to ensure a clear understanding of system operations. These requirements emphasize completeness, coherence, and usability, ensuring that the system aligns with user expectations and business needs while being intuitive and accessible across various scenarios. Ultimately, they play a crucial role in guiding the system's development and functionality to meet user needs effectively.

### **4.3.2 HR Staff**

- **R1:** The system shall provide the HR Staff with the login page and the user authentication. Where it authenticate the user when they login.
- **R2:** The system shall provide the HR Staff with ability to manage the security guard info such as creating the new record for new recruit, updating and deleting the existing guards.
- **R3:** The system shall provide the HR Staff with ability to manage the security guard schedule such as create new schedule, updating and deleting the existing schedule.
- **R4:** The system shall provide the HR Staff with ability to manage the security guard leave process. This part will provide the security leave record so it easier to track it.
- **R5:** The system will provide HR Staff with features to printing the guard card and profile guard for the security guards.
- **R6:** The system should allow HR staff to create detailed reports that include guard information, schedules, leave records, and salary details. These reports will offer valuable insights and help in making decisions about managing security personnel.

#### **4.3.3 Manager**

- **R1:** The system shall provide the Manager with the login page and the user authentication. Where it authenticate the user when they login.
- **R2:** The Manager should be able to create, modify, and deactivate user accounts with different access levels.
- **R3:** The system shall provide the Manager with the access to comprehensive reports providing insights into system usage, user activity, and any anomalies.
- **R4:** The system shall provide Manager with the ability to manage the security guards and HR staff info.
- **R5:** The Manager shall access and manage security guard leave for approving and rejecting the leaves.
- **R6:** The Manager shall have access to managing the sites if there a new site contract.
- **R7:** The Manager should possess the capability to process and approve leave requests, thereby ensuring appropriate coverage during employee absences within SeGuMaS

#### **4.3.4 Admin**

- **R1:** The system shall provide the admin with a secure login page and authentication mechanism to access the admin dashboard upon login.
- **R2:** The system shall allow admins to manage details of security guard information, including adding, editing, and deleting records.
- **R3:** Admins should be able to create and modify schedules for security guards, ensuring efficient management of personnel deployment.
- **R4:** Admins will review and approve leave requests from security guards to maintain

adequate staffing levels during absences.

- **R5:** Managers will have access to manage site information, including adding new sites and updating existing site details.
- **R6:** The system shall enable admins to manage information for both security guards and HR staff.

#### **4.3.5 Non-functional Requirement**

In the realm of SeGuMaS, Non-Functional Requirements (NFRs) are pivotal in defining the system's operational landscape and performance standards. These specifications extend beyond basic functionalities, focusing on the system's efficiency, reliability, and security measures. SeGuMaS necessitates a spectrum of performance indicators, security protocols, scalability elements, and other essential dimensions. By setting rigorous yet vital benchmarks in reliability, usability, and security, SeguMaS aims to embody a holistic, robust, and secure system tailored to diverse security management needs.

Non-Functional Requirements for SeGuMaS:

1. Performance:

- SeGuMaS promises swift responses for HR Staff actions, aiming for interaction and data retrieval within 3 seconds. This ensures efficiency in navigating the system and accessing necessary information, enhancing the overall user experience.

2. Scalability:

- SeGuMaS must handle a growing number of security guards and HR Staff, accommodating a 30 percent increase in users annually without compromising performance.

3. Portability:

- The system should be accessible across major browsers (Chrome, Firefox, Safari) and devices (iOS and Android), ensuring seamless functionality across platforms.

4. Compatibility:

- SeGuMaS should integrate seamlessly with existing HR management tools and databases, enabling data exchange and system interoperability.

5. Reliability:

- SeGuMaS should maintain a 99.5 percent uptime, ensuring reliable access for HR Staff to manage guard-related activities.

6. Availability:

- The system should be accessible 24/7, except during scheduled maintenance windows, ensuring continuous access for HR Staff to perform necessary tasks.

7. Maintainability:

- SeGuMaS should facilitate easy updates and enhancements without service disruptions, allowing for efficient maintenance and future improvements.

8. Security:

- The system should employ robust encryption, access controls, and regular security updates to safeguard sensitive guard and HR-related information.

## **4.4 Requirement Analysis**

The use of Unified Modelling Language (UML) methodologies demonstrates the system's conformance to functional requirements. These methods, which each have a distinct function in the modelling process, include use case diagrams, activity diagrams, class diagrams, and sequence diagrams. Use case diagrams show how users (actors) interact with the features of the system, giving an overview of the functional requirements of the system. Activity diagrams provide a detailed overview of an operations' workflow by outlining the steps and requirements for completing tasks. Class diagrams define the classes, properties, and relationships within the system in order to show its structure. Sequence diagrams illustrate the order of operations while showing how objects interact across time.

### **4.4.1 Use Case Diagram**

A use case systematically describes how a system achieves specific objectives or performs tasks from a user's perspective. It outlines user interactions with the system and how the system responds. Use cases are crucial for developers to grasp customer needs, guide development, and design effective software, bridging user expectations with technological execution for functional and user-friendly products.

Based on the use case diagram for the Security Guard Management System (SeGuMaS) provided below, the system has three main types of users: Admin, HR Staff, and Manager. Each user has specific interactions with the system to perform their respective tasks. The main functional requirements of SeGuMaS include Manage Guard, Manage Guard Schedule, Manage Leave, Manage Sites, and Manage Staff.

Below Figure 4.1 show the module of the Security Guards Management System (SeGuMaS) and function that needed to be complete for each user based on their roles.

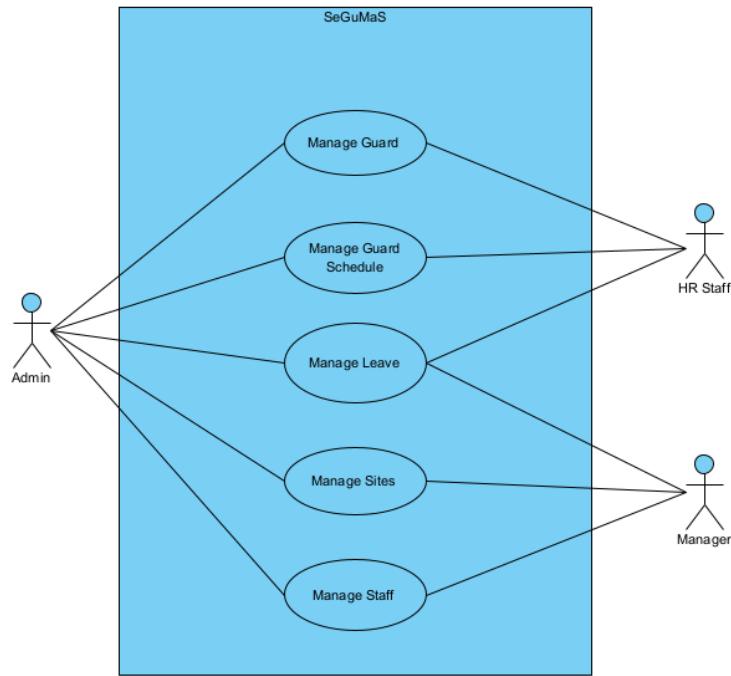


Figure 4.1: usecase for Security Guards Management System (SeGuMaS)

#### 4.4.2 Use Case Descriptions

A use case description Bertolino et al. (2002), provides a detailed account of interactions between a user and a system to achieve specific objectives. It outlines how users interact with the system to complete tasks, including system responses and any event sequence changes. In the Security Guard Management System (SeGuMaS), there are five primary use cases: Manage Guard, Manage Guard Schedule, Manage Leave, Manage Sites, and Manage Staff. These use cases define key functionalities of the system.

Table 4.1: Use Case 1: Manage Guard

<b>Use Case Name:</b> Manage Guard	<b>ID:</b> UC1	<b>Importance Level:</b> High
<b>Primary Actor:</b> Admin, HR Staff, Use Case Type: Primary, Essential Manager		
<b>Stakeholder and Interests:</b>		
<ul style="list-style-type: none"> <li>• Admin - Wants to create, update, view, and delete data of guards.</li> <li>• HR Staff - Wants to create, update, view, and delete data of guards.</li> <li>• Manager - Wants to view the guard information.</li> </ul>		
<b>Brief Description:</b> This use case describes how users manage the security guard data and how the Manager views the existing data.		
<b>Trigger:</b> <ul style="list-style-type: none"> <li>• HR Staff want to add new guard data, edit existing data, delete duplicate data, or view the data.</li> <li>• Admin want to add new guard data, edit existing data, delete duplicate data, or view the data.</li> <li>• Manager wants to view the security data.</li> </ul>		
<b>Type:</b> External		
<b>Relationship:</b>		
<b>Normal Flow of Events:</b> <ol style="list-style-type: none"> <li>1. User logs in by entering the username and password.</li> <li>2. User views the list of guards.</li> <li>3. User selects the existing guard data.</li> <li>4. User updates the data.</li> <li>5. User may choose to cancel the updates.</li> <li>6. User views the updated data.</li> <li>7. Staff or Admin can add new guard details.</li> <li>8. Staff or Admin fill out the form to add a new guard.</li> <li>9. Staff or Admin click on create and the new data is created and show on the list.</li> <li>10. User logs out of the system.</li> </ol>		
<b>Sub-Flows:</b>		
<b>Alternate/Exceptional Flows:</b>		
1a. The username and password are invalid; the user must log in again. 4a. The update data will be validate and if it were not valid the data is not saved. 7a. The form is validate before being saved. 7b. An alert will be show if the data is wrongly inserted.		

Table 4.2: Use Case 2: Manage Guard Schedule

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<b>Use Case Name:</b>	Manage Guard	<b>ID:</b> UC2	<b>Importance Level:</b> High
Schedule			
<b>Primary Actor:</b> Admin, HR Staff, <b>Use Case Type:</b> Primary, Essential Manager			
<b>Stakeholder and Interests:</b>			
<ul style="list-style-type: none"> <li>• Admin - Wants to create, update, view, and delete data of guard schedules.</li> <li>• HR Staff - Wants to create, update, view, and delete data of guard schedules.</li> <li>• Manager - Wants to view the guard schedule information.</li> </ul>			
<b>Brief Description:</b> This use case describes how users manage the security guard schedules and how the Manager views the existing data.			
<b>Trigger:</b>			
<ul style="list-style-type: none"> <li>• HR Staff want to add new guard schedule data, edit existing data, delete duplicate data, or view the data.</li> <li>• Admin want to add new guard schedule data, edit existing data, delete duplicate data, or view the data.</li> <li>• Manager wants to view the guard schedule data.</li> </ul>			
<b>Type:</b> External			
<b>Relationship:</b>			
<b>Normal Flow of Events:</b>			
<ol style="list-style-type: none"> <li>1. User logs in by entering the username and password.</li> <li>2. User views the list of guard schedules.</li> <li>3. User selects the existing guard schedule data.</li> <li>4. User updates the data.</li> <li>5. User may choose to cancel the updates.</li> <li>6. User views the updated data.</li> <li>7. Staff or Admin can add new guard schedule details.</li> <li>8. Staff or Admin fill out the form to add a new guard schedule.</li> <li>9. User logs out of the system.</li> </ol>			
<b>Sub-Flows:</b>			
<b>Alternate/Exceptional Flows:</b>			
<ol style="list-style-type: none"> <li>1a. The username and password are invalid; the user must log in again.</li> <li>4a. The update data will be validate and if it were not valid the data is not saved.</li> <li>7a. The form is validate before being saved.</li> <li>7b. An alert will be show if the data is wrongly inserted.</li> </ol>			

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Table 4.3: Use Case 3: Manage Leave

<b>Use Case Name:</b> Manage Leave	<b>ID:</b> UC3 <b>Importance Level:</b> High
<b>Primary Actor:</b> Admin, HR Staff, <b>Use Case Type:</b> Primary, Essential Manager	
<b>Stakeholder and Interests:</b>	
<ul style="list-style-type: none"> <li>• Admin - Wants to create, update, view, and delete data of guard leaves.</li> <li>• HR Staff - Wants to create, update, view data of guard leaves.</li> <li>• Manager - Wants to update and view the guard leaves.</li> </ul>	
<b>Brief Description:</b> This use case describes how users manage the security guard leaves.	
<b>Trigger:</b>	
<ul style="list-style-type: none"> <li>• HR Staff want to add new guard leaves data, edit existing data and viewing the data.</li> <li>• Admin want to add new guard leaves data, edit existing data, delete duplicate data, or view the data.</li> <li>• Manager wants to view the guard leaves data and accept or reject the leave request.</li> </ul>	
<b>Type:</b> External	
<b>Relationship:</b>	
<b>Normal Flow of Events:</b>	
<ol style="list-style-type: none"> <li>1. User logs in by entering the username and password.</li> <li>2. User views the list of guard application.</li> <li>3. Manager can choose to "APPROVE" or "REJECT" the leaves.</li> <li>4. HR Staff applying the leave for the guard.</li> <li>5. HR Staff may view the application leave and their leave status.</li> <li>6. User views the updated list of guard leaves.</li> <li>7. Staff or Admin can add new guard leave details.</li> <li>8. Staff or Admin fill out the form to add a new guard leaves.</li> <li>9. User logs out of the system.</li> </ol>	
<b>Sub-Flows:</b>	
<b>Alternate/Exceptional Flows:</b>	
1a. The username and password are invalid; the user must log in again. 4a. The update data will be validate and if it were not valid the data is not saved. 7a. The form is validate before being saved. 7b. An alert will be show if the data is wrongly inserted.	

Table 4.4: Use Case 4: Manage Site

<b>Use Case Name:</b> Manage Site	<b>ID:</b> UC4 <b>Importance Level:</b> High
<b>Primary Actor:</b> Admin, Manager <b>Stakeholder and Interests:</b>	<b>Use Case Type:</b> Primary, Essential
<ul style="list-style-type: none"> <li>• Admin - Wants to create, update, view, and delete data of sites.</li> <li>• Manager - Wants to create, update, view, and delete data of sites.</li> </ul>	
<b>Brief Description:</b> This use case describes how users manage the security guard sites. <b>Trigger:</b> <ul style="list-style-type: none"> <li>• Admin want to add new site data when get a tender, edit existing data, delete duplicate data, or view the data.</li> <li>• Manager want to add new site data when get a tender, edit existing data, delete duplicate data, or view the data.</li> </ul>	
<b>Type:</b> External <b>Relationship:</b> <b>Normal Flow of Events:</b> <ol style="list-style-type: none"> <li>1. User logs in by entering the username and password.</li> <li>2. User views the list of sites.</li> <li>3. User select existing data for updating the details.</li> <li>4. User can add new sites.</li> <li>5. User fill out the form to add a new site.</li> <li>6. User save the data.</li> <li>7. User logs out of the system.</li> </ol>	
<b>Sub-Flows:</b> <b>Alternate/Exceptional Flows:</b> <ol style="list-style-type: none"> <li>1a. The username and password are invalid; the user must log in again.</li> <li>3a. The update data will be validate and if it were not valid the data is not saved.</li> <li>5a. The form is validate before being saved.</li> <li>5b. An alert will be show if the data is wrongly inserted.</li> </ol>	

Table 4.5: Use Case 5: Manage Staff

<b>Use Case Name:</b> Manage Staff	<b>ID:</b> UC4 <b>Importance Level:</b> High
<b>Primary Actor:</b> Admin, Manager	<b>Use Case Type:</b> Primary, Essential
<b>Stakeholder and Interests:</b>	
<ul style="list-style-type: none"> <li>• Admin - Wants to create, update, view, and delete data of staff.</li> <li>• Manager - Wants to create, update, view, and delete data of staff.</li> </ul>	
<b>Brief Description:</b> This use case describes how users manage the HR Staff data.	
<b>Trigger:</b>	
<ul style="list-style-type: none"> <li>• Admin want to add new staff into system, edit existing data, delete duplicate data, or view the data.</li> <li>• Manager want to add new staff into system, edit existing data, delete duplicate data, or view the data.</li> </ul>	
<b>Type:</b> External	
<b>Relationship:</b>	
<b>Normal Flow of Events:</b>	
<ol style="list-style-type: none"> <li>1. User logs in by entering the username and password.</li> <li>2. User views the list of Staff.</li> <li>3. User select existing data for updating the details.</li> <li>4. User can add new staff into system.</li> <li>5. The Admin will add data for the Manager, and the Manager will add data only for HR Staff.</li> <li>6. User save the data.</li> <li>7. User logs out of the system.</li> </ol>	
<b>Sub-Flows:</b>	
<b>Alternate/Exceptional Flows:</b>	
1a. The username and password are invalid; the user must log in again. 3a. The update data will be validate and if it were not valid the data is not saved. 5a. The form is validate before being saved. 5b. An alert will be show if the data is wrongly inserted. 5c. The data is clasify into roles, admin only add for manager and manager only add for staff.	

#### 4.4.3 Activity Diagrams

By offering a thorough graphical representation of the underlying activities, activity diagrams unlock the mystery of every business process Linzhang et al. (2004). These diagrams are essential in SeGuMaS for elucidating intricate operational operations. They function as vital instruments, exposing the basic operations that underlie the processes of SeGuMaS. SeGuMaS provides stakeholders with a thorough visual framework that explains and connects the key tasks promoting operational efficiency through the use of these diagrams.

#### 4.4.4 Login Activity Diagram

Figure below shows the process of the user to login into the system. User and admin must enter the username, password and also roles.

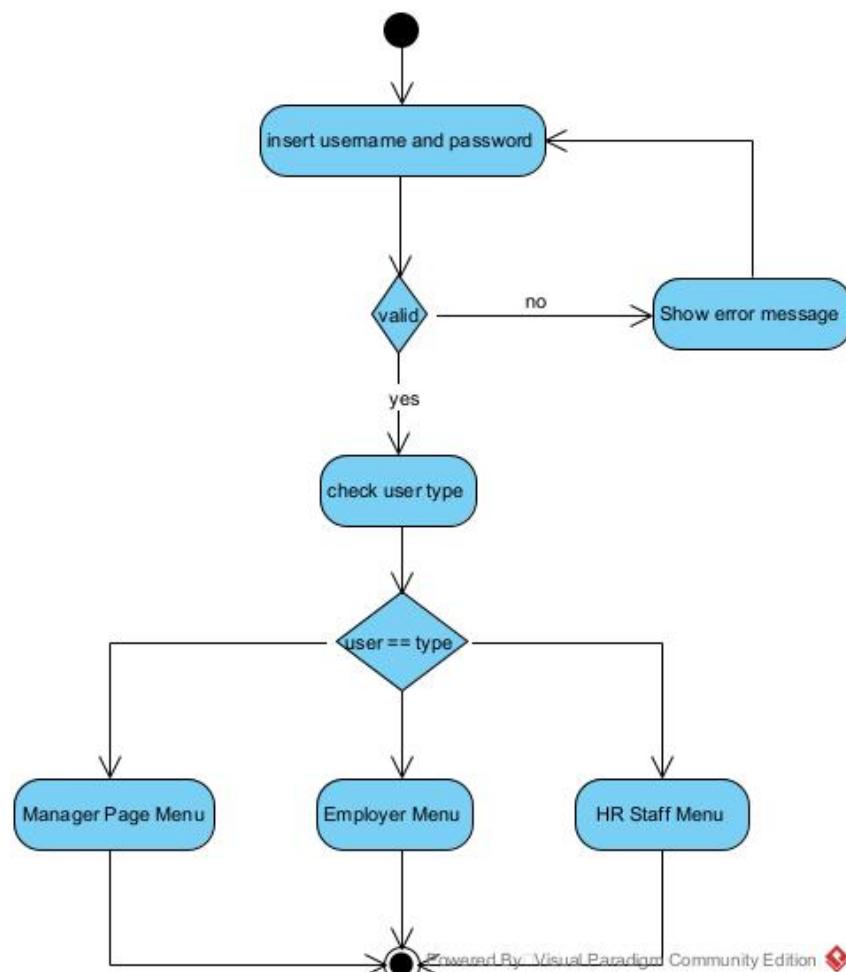


Figure 4.2: Login Activity Diagram for the SeGuMaS

#### 4.4.5 Manage Staff Activity Diagram

Figure below show the process of user to manage the staff data.

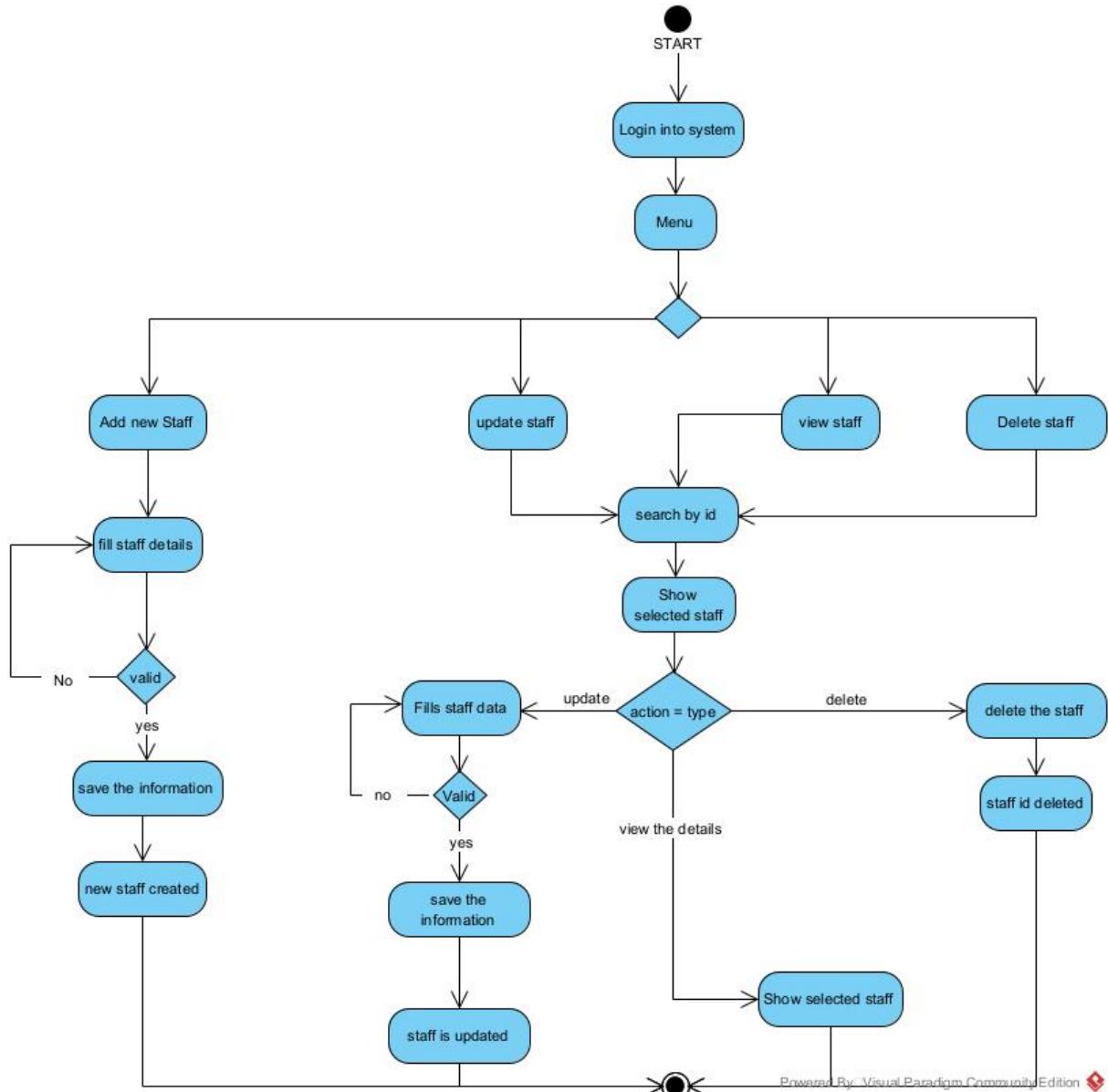


Figure 4.3: Manage Staff Activity Diagram for the SeGuMaS

#### 4.4.6 Manage Guard Activity Diagram

Figure below show the process of user to manage the guard data.

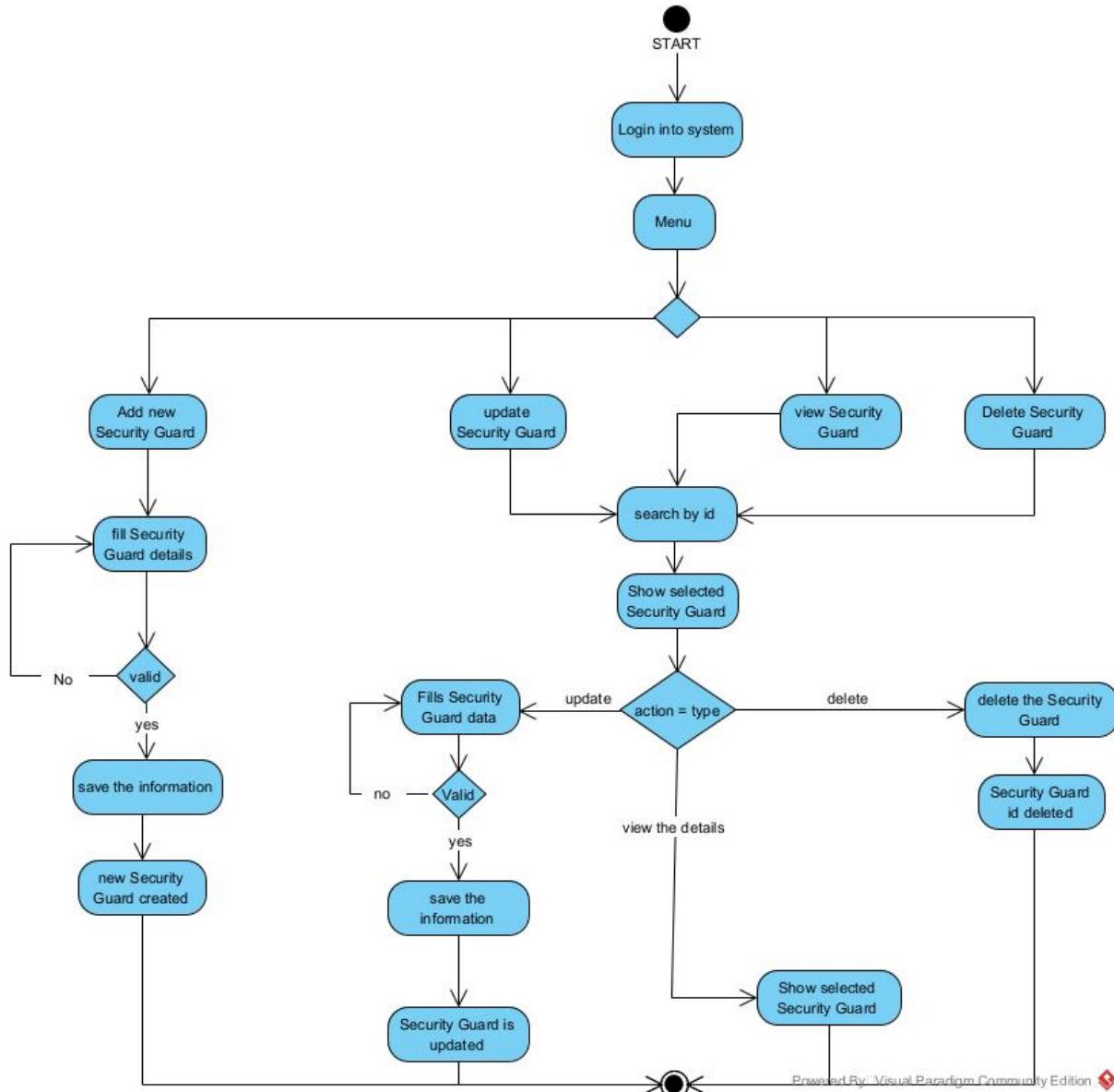


Figure 4.4: Manage Guard Activity Diagram for the SeGuMaS

#### 4.4.7 Manage Guard Schedule Activity Diagram

Figure below show the process of user to manage the guard schedule data.

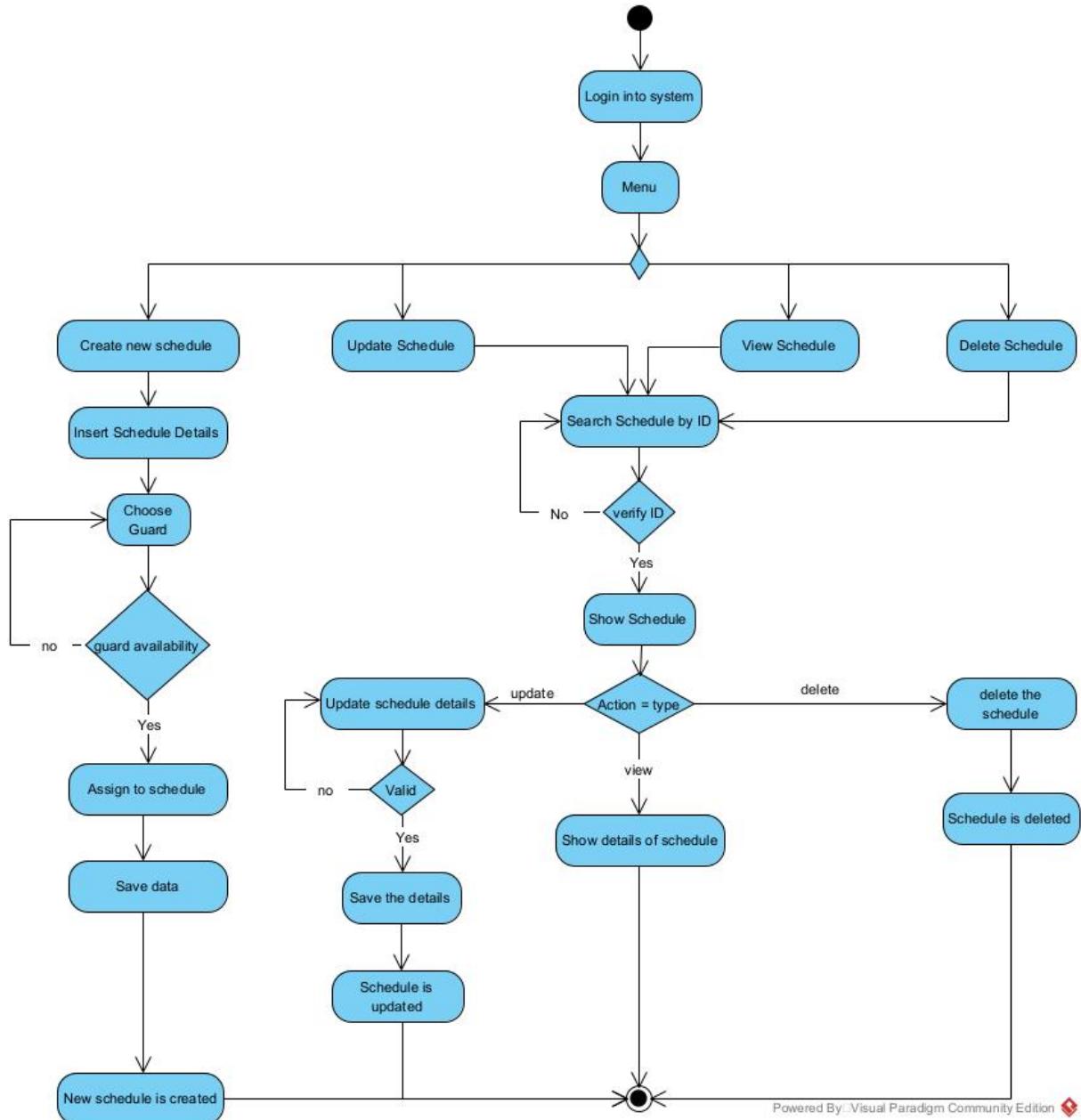


Figure 4.5: Manage Guard Schedule Activity Diagram for the SeGuMaS

#### 4.4.8 Manage Guard Leave Application Activity Diagram

Figure below show the process of user to manage the guard leave application.

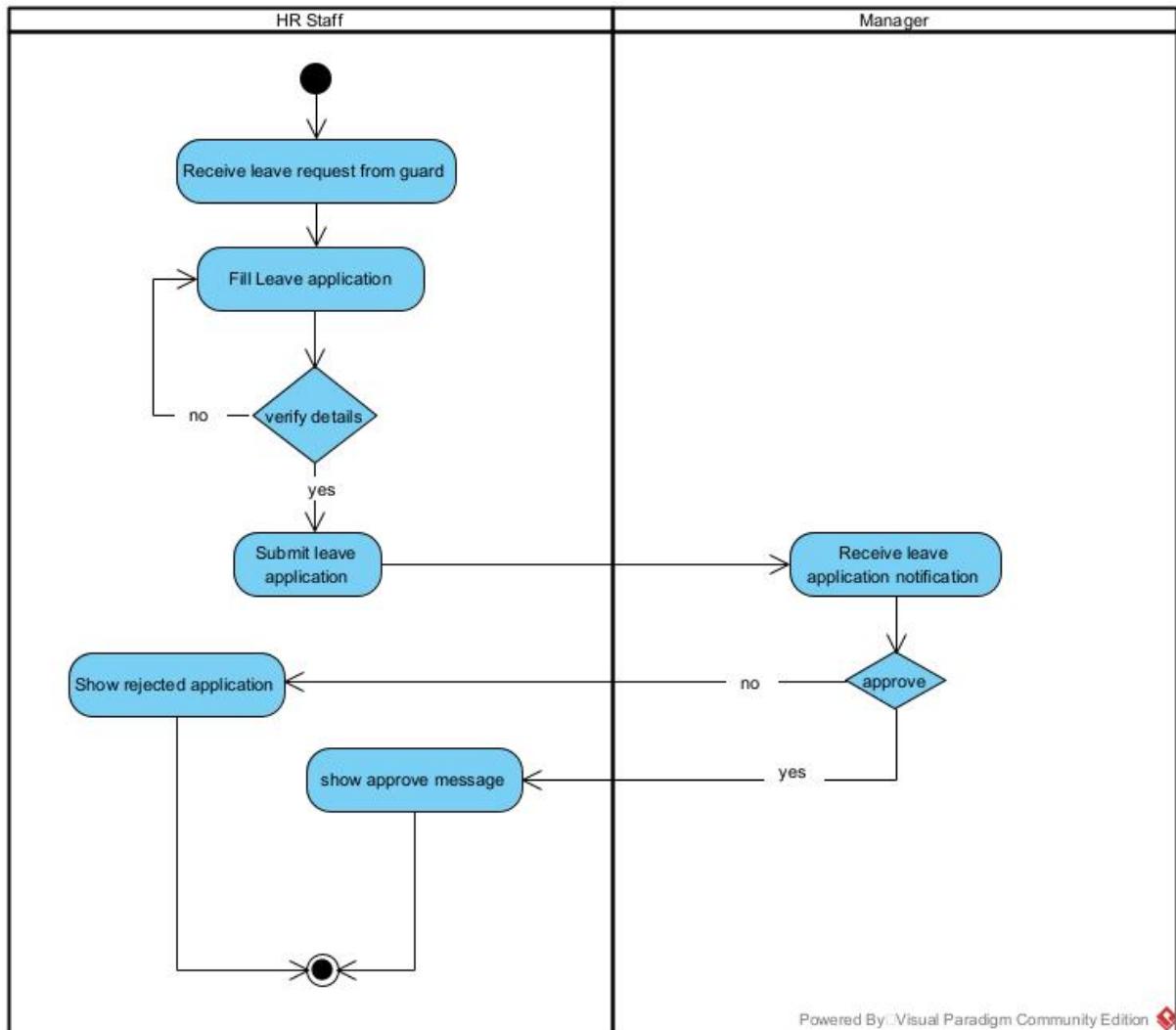


Figure 4.6: Manage Guard Leave Application Activity Diagram for the SeGuMaS

#### 4.4.9 Manage Site Activity Diagram

Figure below show the process of user to manage the site.

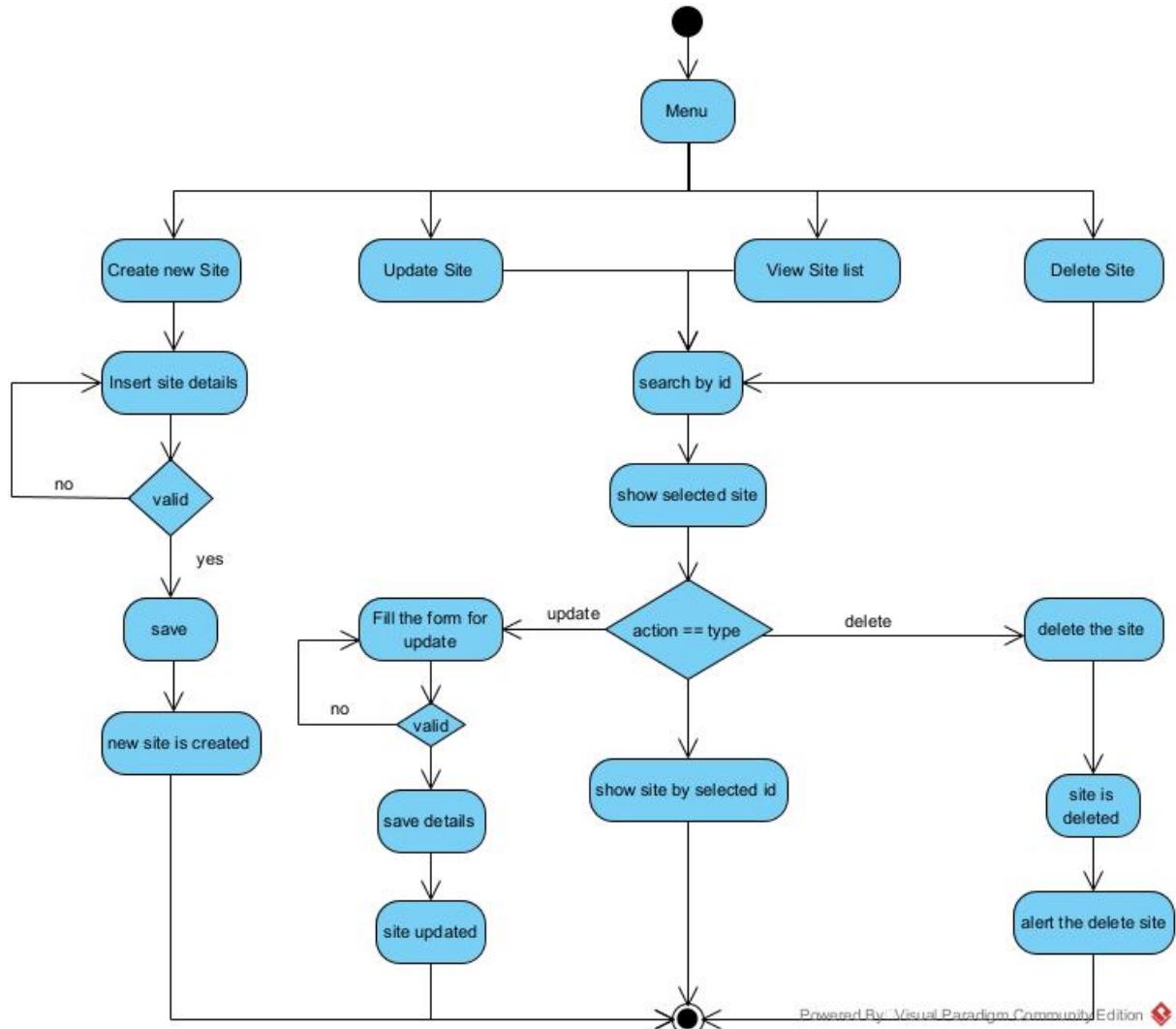


Figure 4.7: Manage Site Activity Diagram for the SeGuMaS

#### 4.4.10 Generate Guard Card and Profile Activity Diagram

Figure below show the process of user to generate Guard Card and guard profile for printing.

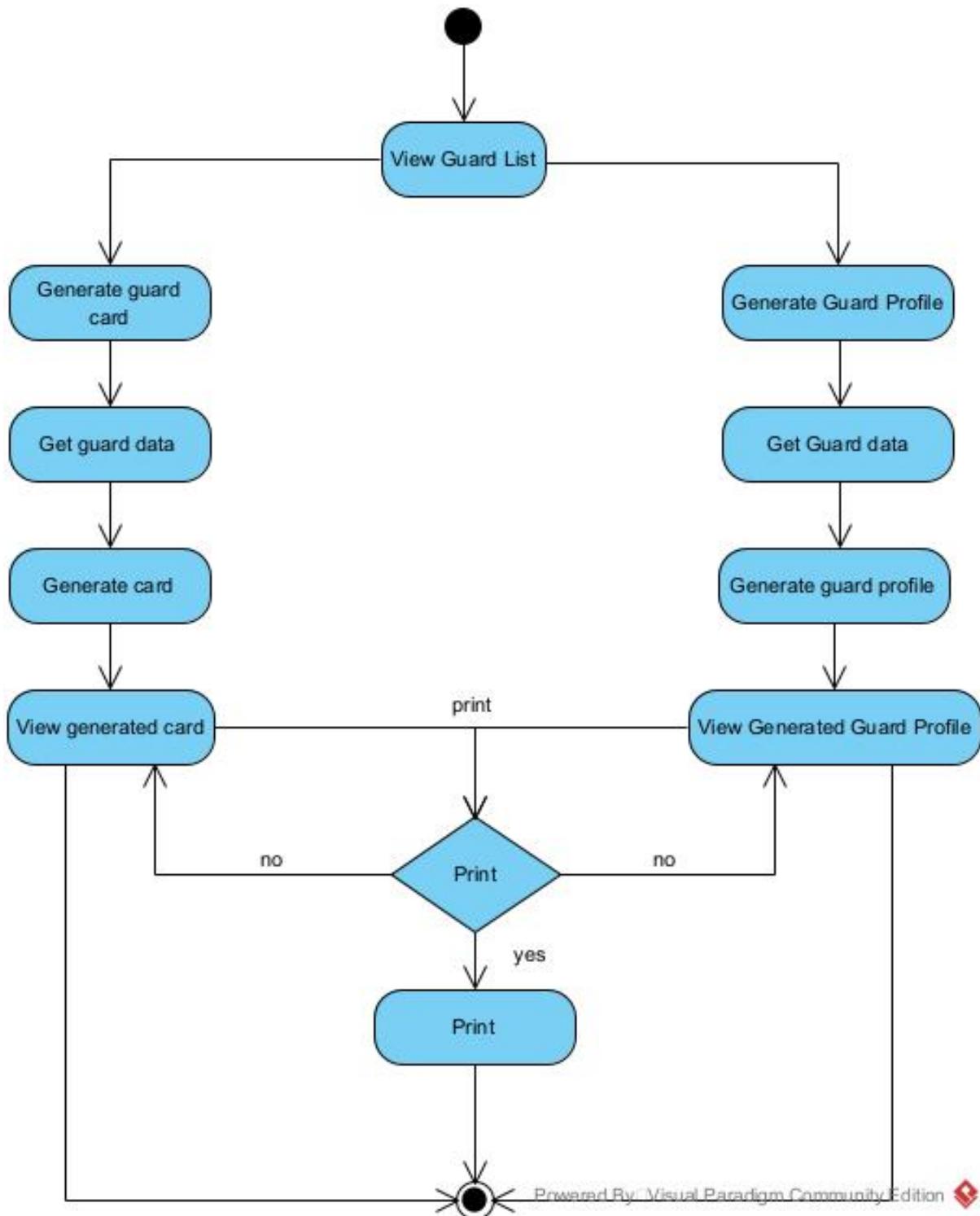


Figure 4.8: Generate Guard Card and Profile Activity Diagram for the SeGuMaS

#### 4.4.11 Class Diagram

The class diagram, which shows the many entities and their relationships, is essential to visualising the architecture of the Security Guards Management System (SeGuMaS). The class diagram, being a static model, presents the classes and their interrelationships that are constant throughout the system Nurbasirah bt Ibrahim (2012). Every class in the diagram represents a unique entity and captures behaviours (methods) and states (attributes), offering a thorough understanding of how various system components interact and work as a whole. The interactions that are shown between the classes—such as dependencies, inheritances, and associations—help to clarify how SeGuMaS is structured and how data and responsibilities move through it. This visualisation makes the system's complexity easier for developers and stakeholders to understand, resulting in a more reliable design that complies with the requirements.

Figure 4.9 show the relationship and visualizing the architecture of the Security Guards Management System (SeGuMaS).

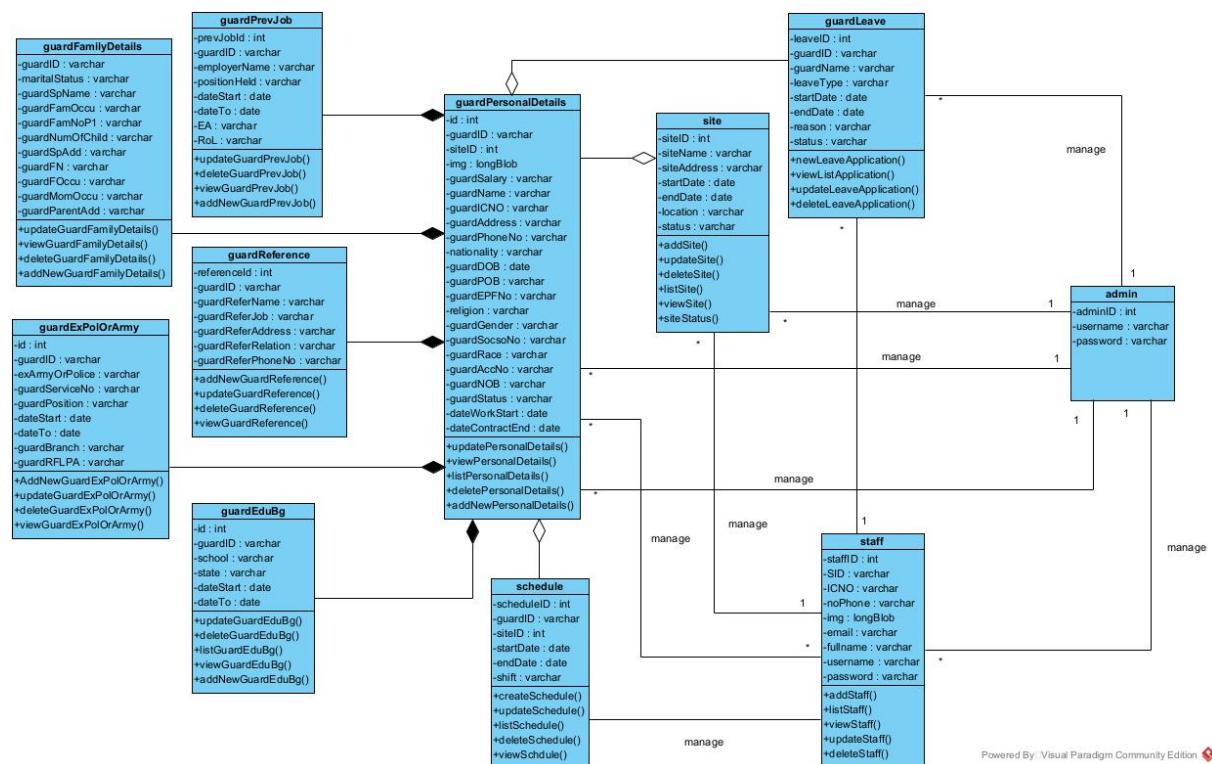


Figure 4.9: Security Guards Management System (SeGuMaS) Class Diagram

#### 4.4.12 Sequence Diagrams

Sequence diagrams [Jagajodhy Mr and Rahim Mr (2015)], are one of two types of interaction diagrams. They illustrate the objects that participate in a use case and the messages that pass between them over time for one use case. A sequence diagram is a dynamic model that shows the explicit sequence of messages that are passed between objects in a defined interaction. Because sequence diagrams emphasize the time-based ordering of the activity that takes place among a set of objects, they are very helpful for understanding real-time specifications and complex use cases.

#### 4.4.13 Login Sequence Diagrams

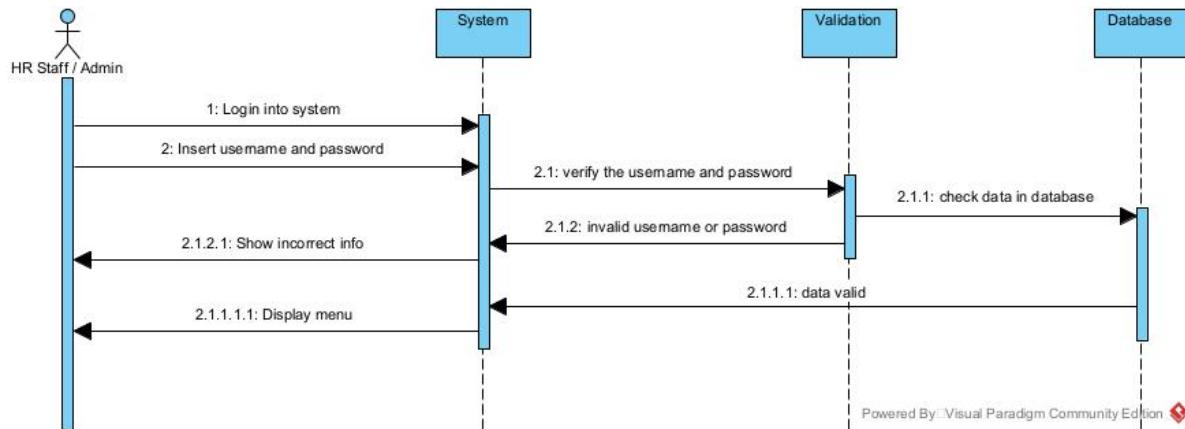


Figure 4.10: Login Sequence Diagrams for the SeGuMaS

#### 4.4.14 Manage Staff Sequence Diagrams

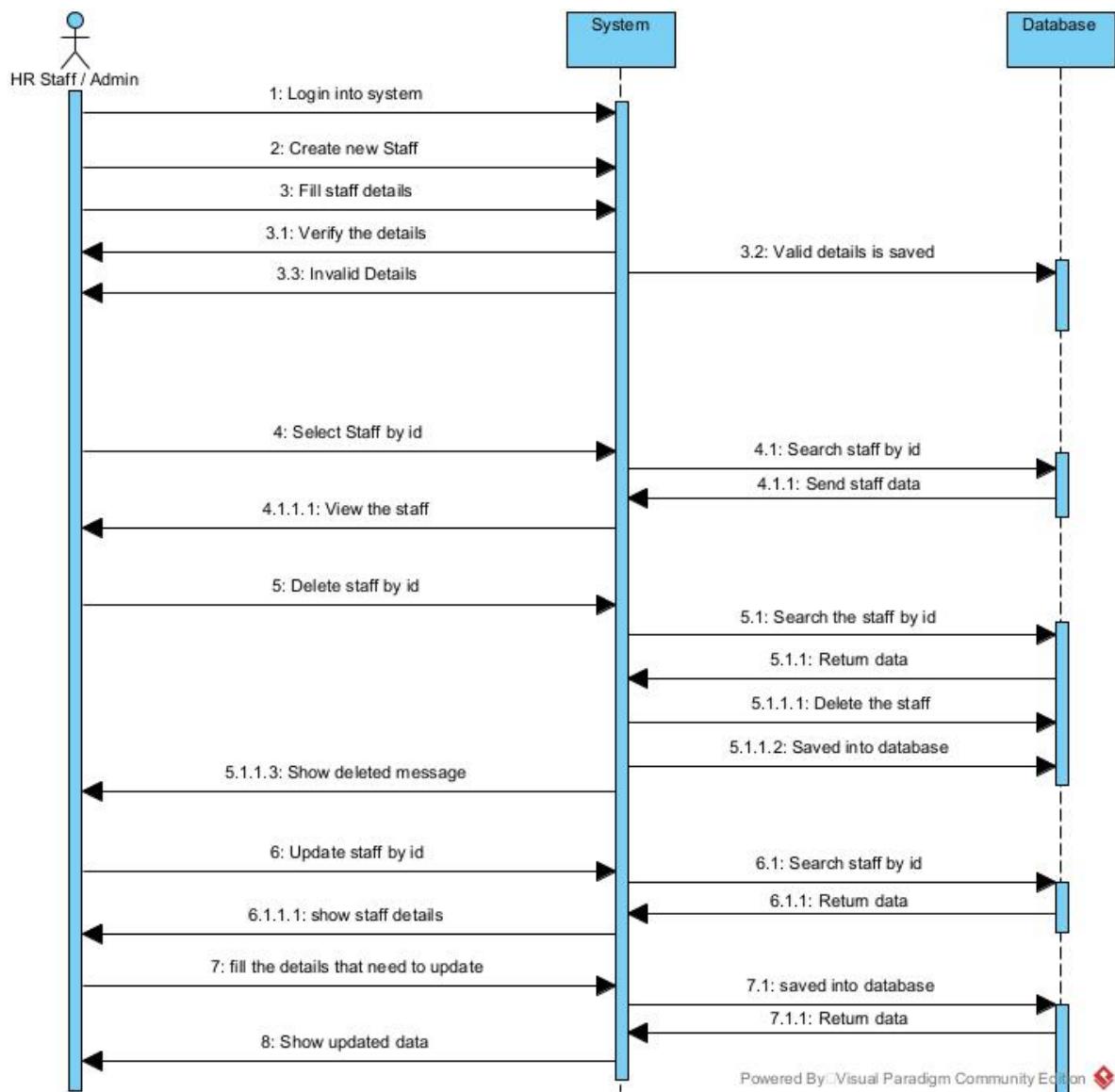


Figure 4.11: Manage Staff Sequence Diagram for the SeGuMaS

#### 4.4.15 Manage Guard Sequence Diagram

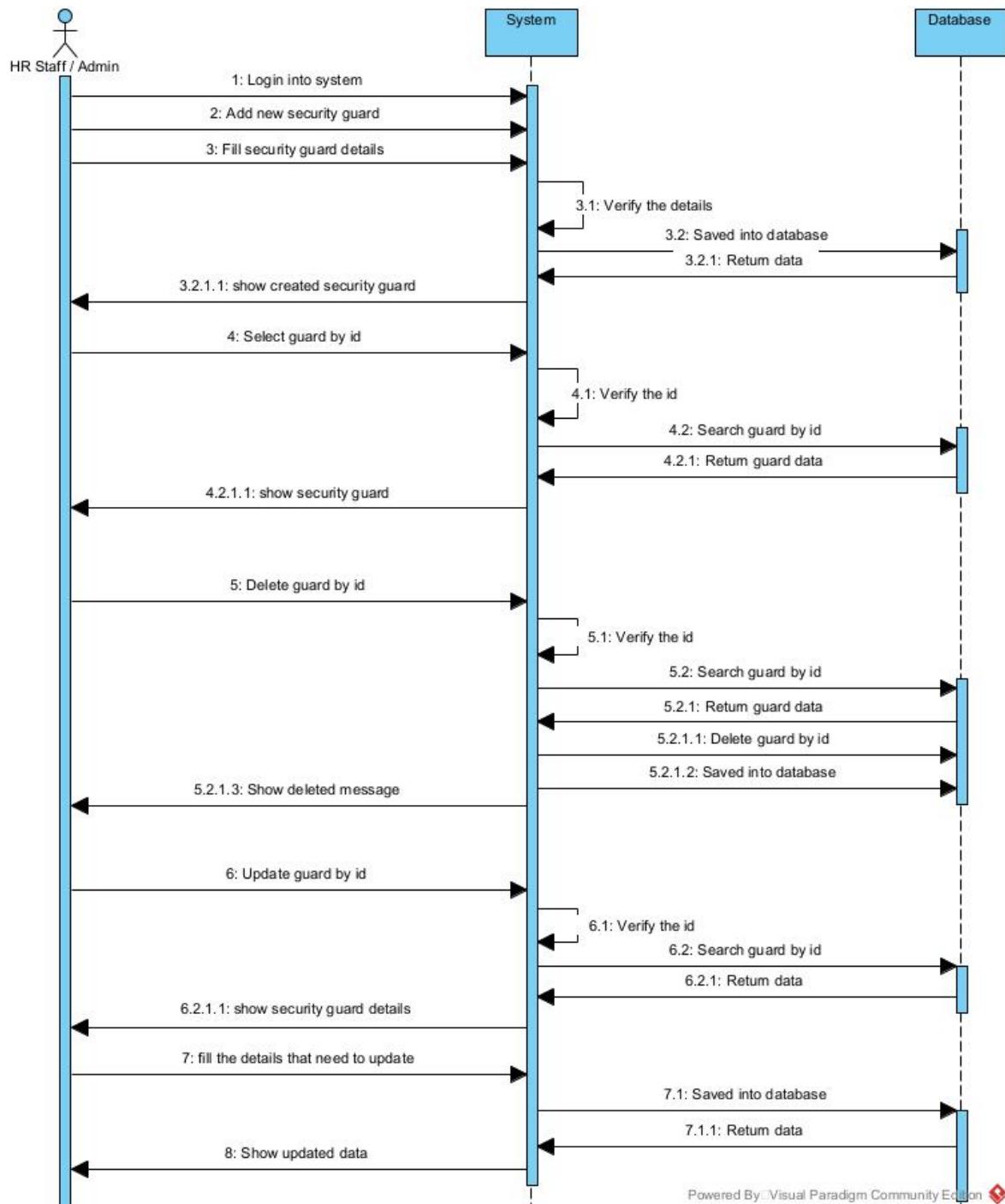


Figure 4.12: Manage Guard Sequence Diagram for the SeGuMaS

#### 4.4.16 Manage Guard Schedule Sequence Diagrams

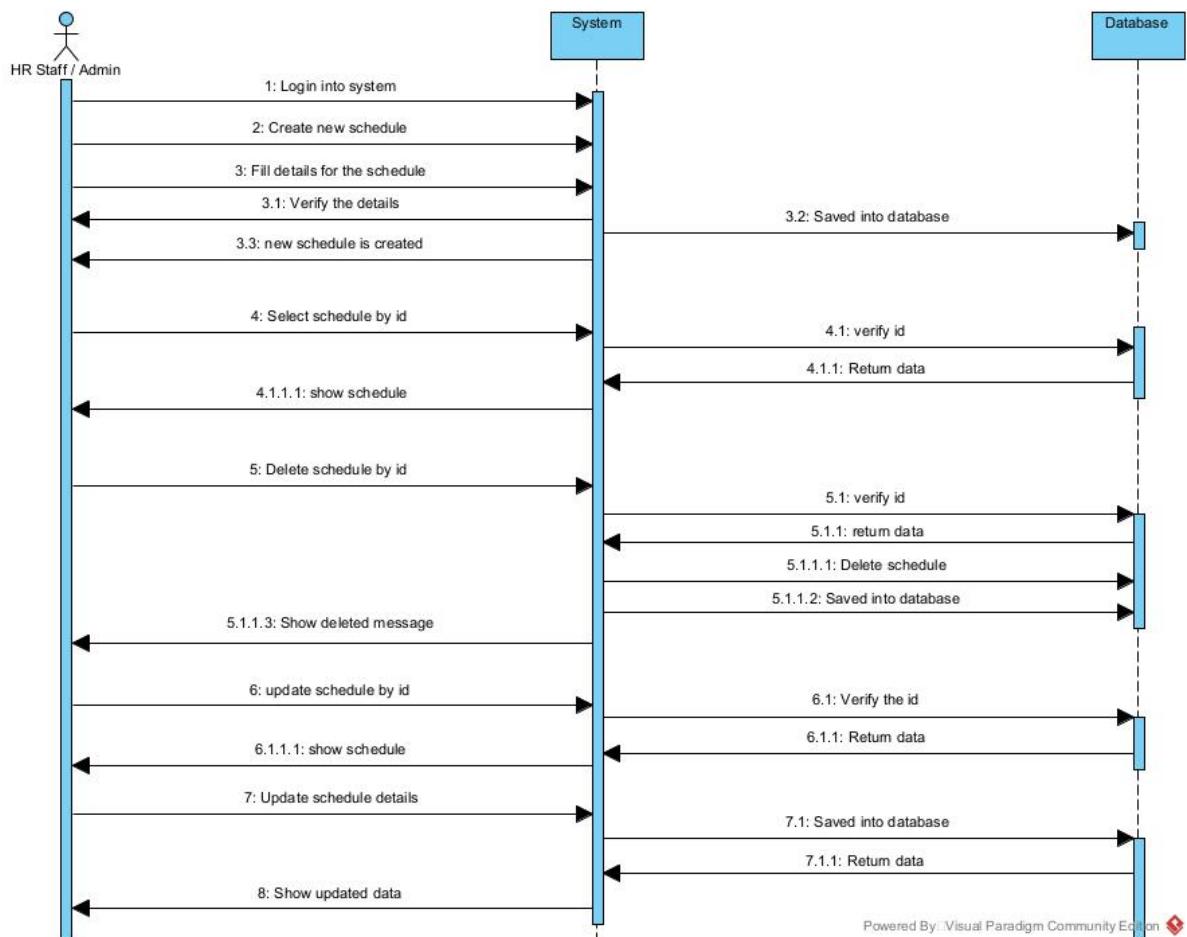


Figure 4.13: Manage Guard Schedule Sequence Diagram for the SeGuMaS

#### 4.4.17 Manage Guard Leave Application Sequence Diagrams

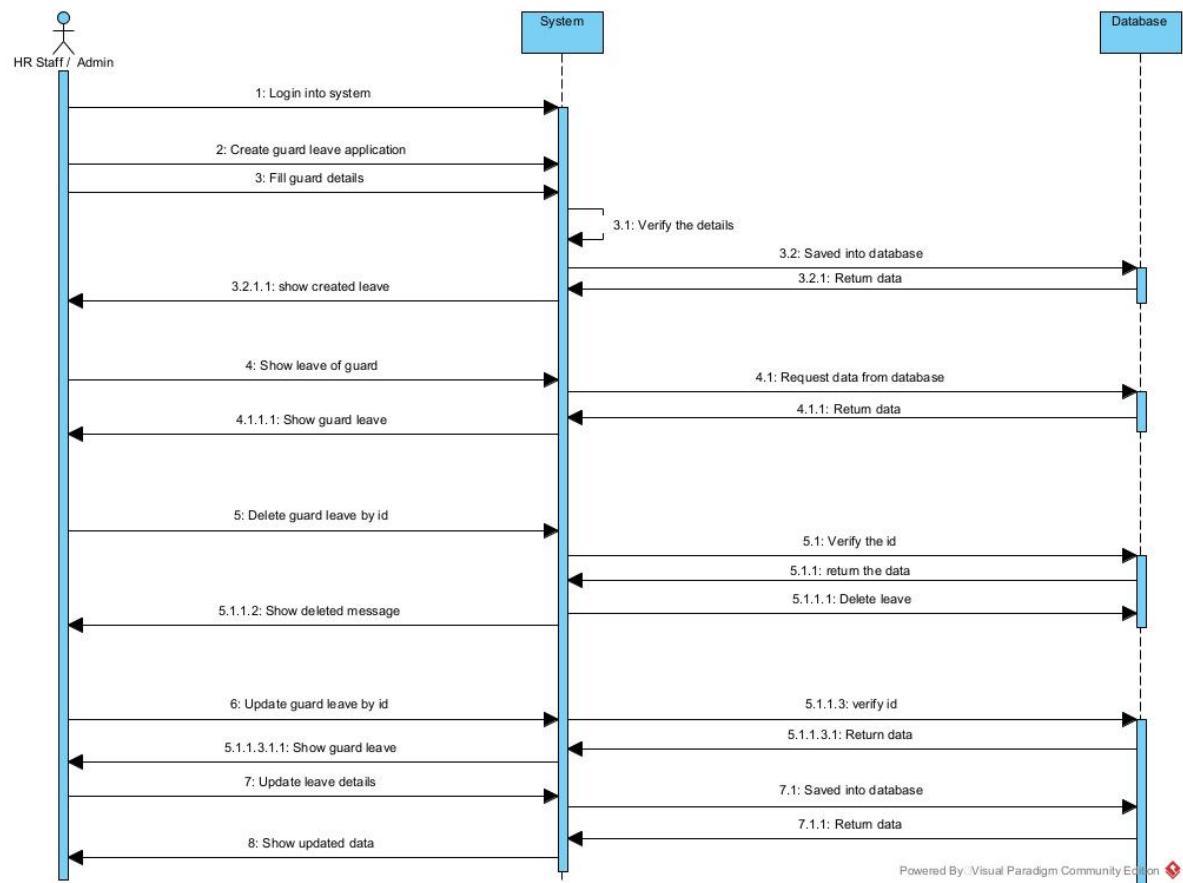


Figure 4.14: Manage Guard Leave Application Sequence Diagram for the SeGuMaS

#### 4.4.18 Manage Site Sequence Diagrams

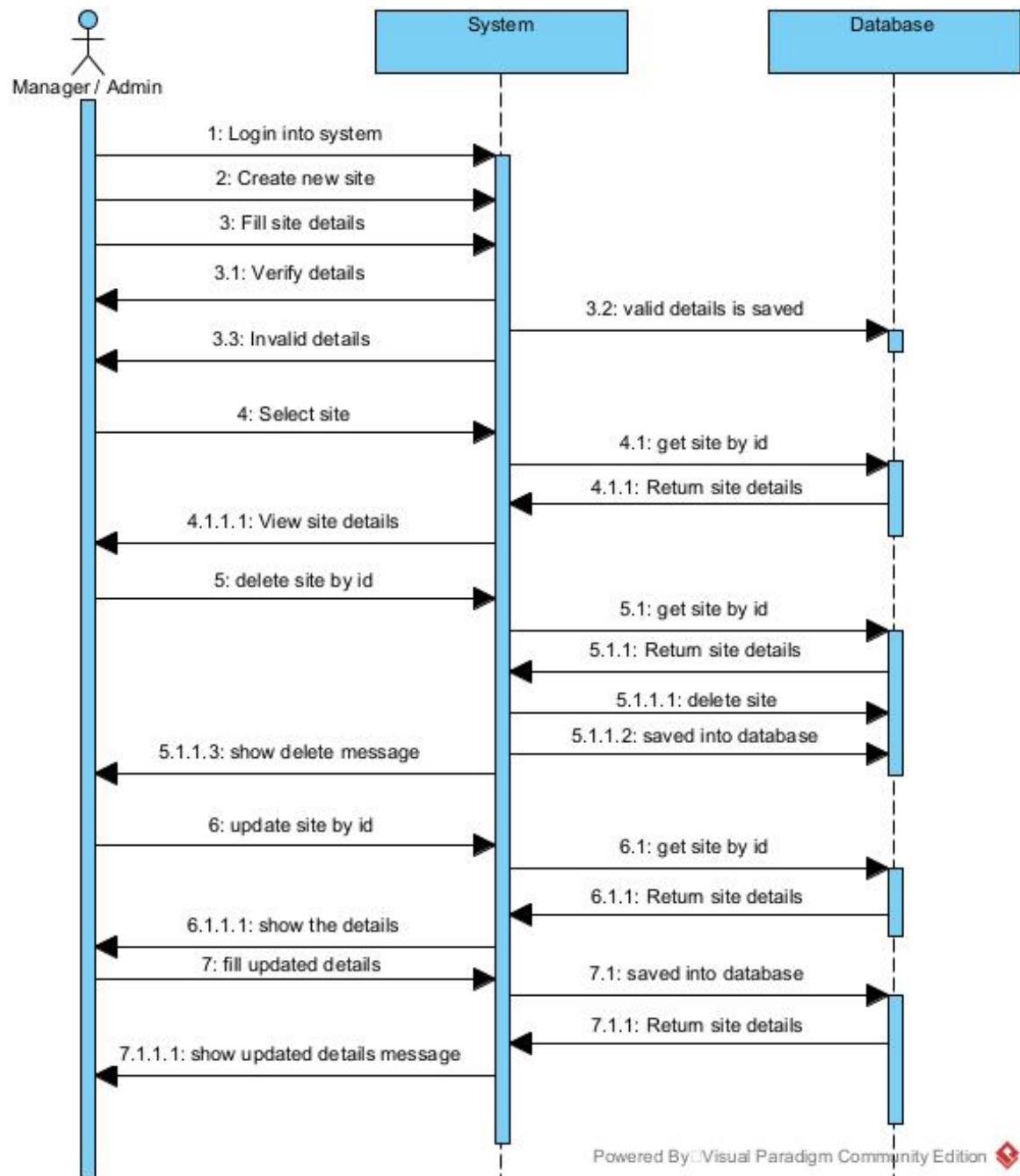


Figure 4.15: Manage Site Sequence Diagram for the SeGuMaS

#### 4.4.19 CRUD Matrix

Within the context of system analysis and design, the CRUD (Create, Read, Update, Delete) analysis method [Torim (2012)], embodied in the form of a matrix as illustrated in Table 4.6, serves as a structured approach to unveil the nuanced interplay between user roles like HR Staff, Manager, and Admin and their corresponding permissions and interactions (create, read, update, delete) with diverse system functionalities or use cases. This systematic breakdown elucidates the granular details of user access, empowering the precise configuration of user permissions while intricately aligning system functionalities with the specific needs and capabilities of each user role within the operational landscape.

Table 4.6: CRUD Matrix

No.	Use Case	HR Staff	Manager	Admin
1	Manage Security Guard	C,R,U,D	R	C,R,U,D
2	Manage Staff	-	C,R,U,D	C,R,U,D
3	Manage Guard Schedule	C,R,U,D	R	C,R,U,D
4	Manage Guard Leave	C,R,U	R,U	C,R,U,D
5	Manage Site	-	C,R,U,D	C,R,U,D

## **CHAPTER 5**

### **SYSTEM DESIGN**

#### **5.1 Introduction**

The System Design for the SeGuMaS serves as a comprehensive guide detailing the plan and specifications necessary for building and implementing SeGuMaS effectively. This document is instrumental in providing a clear vision of what SeGuMaS aims to achieve and how it will operate. Targeted towards the design and development team, the system design document (System Design) acts as a roadmap outlining every aspect of SeGuMaS to ensure its smooth functioning and successful deployment within organizational settings.

The primary objective of this System Design is to define the architectural structure, components, and interactions of SeGuMaS required for its development, implementation, and maintenance. It serves as a technical blueprint guiding developers in implementing the system's functionalities and providing a reference for software architects, developers, testers, project managers, and stakeholders involved in the design and deployment of SeGuMaS. Each section of the System Design contributes to forming a complete blueprint, ensuring that SeGuMaS emerges as a robust, efficient, and transformative system tailored to meet the specific needs of human resources management within organizations. The System Design document is pivotal in facilitating a comprehensive understanding of SeGuMaS and ensuring alignment in execution throughout the software development lifecycle.

## 5.2 System Architecture

The architectural design of SeGuMaS lays the groundwork for its operations, delineating how system responsibilities are divided among distinct subsystems. This section provides an overview of these subsystems, highlighting their roles and collaborative relationships. By exploring this modular structure, we aim to understand how SeGuMaS efficiently partitions its functionalities among various components to achieve a cohesive and effective security management system.

Here is system architecture for Security Guards Management System (SeGuMaS):

### 1. Presentation Layer(View)

- The User Interface (UI) in Security Guards Management System (SeGuMaS) is where users interact visually with the system. Here, you can input data, view security reports, manage settings, and crucially, oversee and manage the track record of security guard details. This user-friendly layer empowers security administrators to easily navigate and control security protocols while efficiently handling and maintaining records of security guard information.

### 2. Application Layer(Controller)

- Manage Security Guards:

Administrators or HR Staff oversee and handle the comprehensive details of security personnel. This includes inputting, updating, and maintaining data related to security guards' personal information, schedules, certifications, and performance metrics. The application layer facilitates seamless interaction, ensuring efficient management of security personnel within the system's framework.

- Manage Security Guards Schedule:

Administrators, HR Staff or Manager have access to the application layer for managing security guard schedules. This access enables them to efficiently coordinate and update guard shifts, ensuring effective scheduling for security personnel. The system provides a user-friendly interface for both admin and HR roles to input, adjust, and maintain schedules based on security needs and personnel availability.

- Manage Security Guards Leave:

Administrators, HR Staff or Manager efficiently handle and oversee leave requests submitted by security personnel. The system provides a dedicated interface for managing and approving leave requests, ensuring seamless coordination of guard schedules while considering absences due to leave. This feature allows for effective workforce management and scheduling adjustments in response to approved leaves.

- Manage Site:

The "Manage Site" feature in SeGuMaS is designed for administrators or managers to efficiently handle new tender sites. This tool allows them to create, track, and manage new sites with accuracy and transparency.

- Manage Staff:

Administrator and Manager have the ability to create accounts for HR staff, granting them access to the system. This functionality allows admins to set up accounts with specific roles and permissions tailored for HR-related tasks. By providing access, HR staff can utilize the system to manage security personnel, schedules, leave, and other HR functions within their designated scope of responsibilities.

### 3. Data Layer(Model)

- the data layer is like a storage room for important information. It keeps details about security guards, their schedules, salaries, leaves, and other necessary info. This layer uses strong systems to keep this data safe and organized. It helps the system quickly find and use the information needed by users. Also, it makes sure that sensitive data, like personal details, stays secure and protected.

### 4. External Services

- SeGuMaS offers the potential for integration with external APIs, expanding its functionality and capabilities. This integration could include accessing external services for additional security threat intelligence, regulatory compliance databases, or authentication services. Furthermore, SeGuMaS may integrate with industry-standard security protocols or threat intelligence platforms to bolster its incident response mechanisms and enhance its ability to detect emerging threats in real-time.

## 5.3 Integrating MVC Architecture

The Model, View, and Controller (MVC) architecture further partitions the functionality of SeGuMaS into three interdependent components.

- View (Presentation Layer):

The View component corresponds to the Presentation Layer in SeGuMaS. It is responsible for displaying data to the users and capturing their inputs. This layer includes the User Interface (UI), where security administrators, HR staff and Manager interact with the system to manage security protocols, view reports, and oversee security guard details.

- Controller (Application Layer):

The Controller component corresponds to the Application Layer in SeGuMaS. It acts

as an intermediary between the View and the Model, processing user inputs, managing security guard details, schedules, leaves, and site information. The Controller ensures efficient management and coordination of tasks, updating the Model and refreshing the View accordingly.

- **Model (Data Layer):**

The Model component corresponds to the Data Layer in SeGuMaS. It handles the data-related aspects, including storing, retrieving, and updating information about security guards, schedules, salaries, and leaves. The Model interacts with the database to ensure data integrity and security, providing necessary data to the Controller as needed.

## 5.4 Design Rationale

The SeGuMaS architecture was carefully selected after considering various crucial factors and trade-offs to meet SeGuMaS's unique needs. The decision to use a modular design stemmed from its complexity and scalability demands, allowing clear responsibility division among subsystems for efficient management of security guard details, scheduling, and HR functions.

During the selection process, several architectures were evaluated, including monolithic and microservices-based designs. The monolithic approach, while initially simple, limited scalability and adaptability. Conversely, the microservices architecture offered promising scalability but added integration complexities and operational overhead.

Ultimately, the modular architecture was chosen for its balanced scalability and manageability. It allows easy integration of new features, enhances system maintainability, and efficiently allocates development resources, aligning well with SeGuMaS's current needs and future growth.

## 5.5 Package Diagram

The Security Guards Management System (SeGuMaS) package diagram separates the high-level system components into distinct packages to improve manageability and clarity. The Presentation Layer allows users to engage with the system, and the User Package represents various user roles including HR Staff, Managers, and Admins. Users may see security reports, adjust settings, and enter data thanks to the user interface and presentation logic included in the Presentation Layer Package. The main application logic, including scheduling, leave requests, staff management, sites, and security guards, is handled by the Controller Package. The Model (System Data) Package is in charge of managing the data that is stored and retrieved from the Database, including information about security guards, schedules, leaves, sites, and staff. The Cross Cutting Package handles cross-cutting issues including security and login screening. To improve functionality, the system also integrates with external services. This structure makes it easier to comprehend how users, data, and system components relate to one another, which enhances system development and administration.

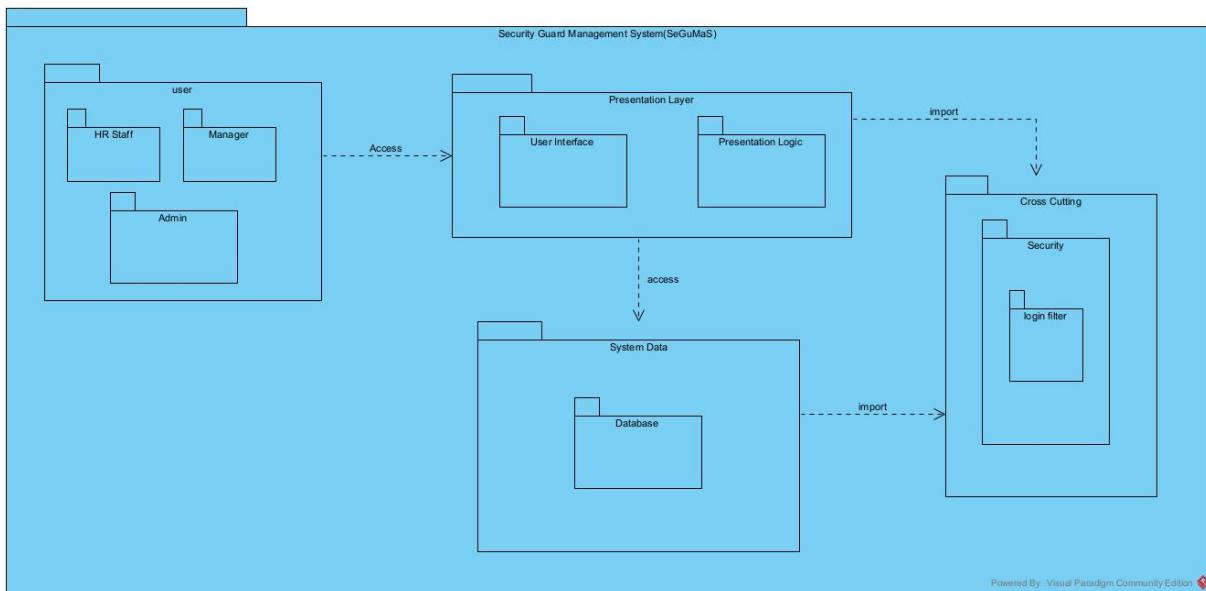


Figure 5.1: Security Guards Management System (SeGuMaS) Package Diagram

Above Figure 5.1 show the Security Guards Management System (SeGuMaS) package diagram that separates the high-level system components into distinct packages to improve manageability and clarity.

## **5.6 Database Design**

### **5.6.1 Normalization**

Normalization is a process used to minimize redundancy in database relations, addressing potential issues such as insertion, deletion, and update anomalies. By following a series of guidelines known as normal forms, we can design an efficient, organized, and anomaly-free database. In the context of the Security Guard Management System (SeGuMaS), applying these normalization principles ensures that the system's database is optimized for reliability and performance. Each level of normalization introduces specific guidelines to further refine the database structure, contributing to a robust and well-organized data management solution for Jasa Perkasa Security Sdn. Bhd.

## Zero Normal Form: 0NF

username	adminID	password	staffID	SID	ICNO	noPhone	img	email	fullname	username	password
siteID	siteName	siteAddress	startDate	endDate	location	status	scheduleID	guardID	siteID	startDate	endDate
shift	id	guardID	img	guardSalary	guardName	guardICNO	guardAddress	guardPhoneNo	nationality	guardDOB	guardPOB
guardEPFNo	religion	guardGender	guardSocsoNo	guardRace	guardAccNo	guardNOB	guardStatus	dateWorkStart	dateContractEnd		
guardID	maritalStatus	guardSpName	guardFamOccu	guardFamNoP1	guardNumOfChild	guardSpAdd	guardFN	guardFOccu	guardMomName	guardMomOccu	guardParentAdd
idEdu	guardID	school	state	dateStart	dateTo	prevlobid	guardID	employerName	positionHeld	dateStart	dateTo
idEx	guardID	exArmyOrPolice	guardServiceNo	guardPosition	dateStart	dateTo	guardBranch	guardRFLPA			
referenceID	guardID	guardReferName	guardReferJob	guardReferAddress	guardReferRelation	guardReferPhoneNo	leaveID	guardID	guardName	leaveType	startDate
endDate	reason	status									

Figure 5.2: Zero Normal Form

Above Figure 5.2 shows 0NF of the Security Guards Management System (SeGuMaS) attribute.

## One Normal Form: 1NF

username	adminID	password
admin	1	1234

Figure 5.3: admin table

staffID	SID	ICNO	noPhone	img	email	fullname	username	password
24	stJPS_24	990423-09-5239	115331750	blob	<a href="mailto:irumankun@gmail.com">irumankun@gmail.com</a>	Muhammad irman	eman	<a href="mailto:eman@08">eman@08</a>
25	stJPS_25	020705-06-5056	145227569	blob	<a href="mailto:fanaChan@gmail.com">fanaChan@gmail.com</a>	Nursyarahfana	nana	<a href="mailto:nana@09">nana@09</a>

Figure 5.4: staff table

scheduleID	guardID	siteID	startDate	endDate	shift
1	JPS52	1	11/6/2024	13/6/2024	Morning
2	JPS53	1	11/6/2024	13/6/2024	Morning

Figure 5.5: schedule table

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siteID	siteName	siteAddress	startDate	endDate	location	status
1	Kuala Nerus 1	Sk Mengabang telipot	15/2/2022	31/5/2024	Terengganu	Active
2	Kuala Nerus 2	Sk Tok Jembal	15/2/2022	31/5/2024	Terengganu	Not Active

Figure 5.6: site table

leaveID	guardID	guardName	leaveType	startDate	endDate	reason	status
19	JPS53	Nursyarahfana Binti Mohd Syahrizan	vacation	11/6/2024	13/6/2024	Tukar	Approved
20	JPS60	Muhammad Nizam Bin Ismail	sick	28/6/2024	29/6/2024	sakit la boss	In Process

Figure 5.7: leave table

Above Figure 5.3,Figure 5.4,Figure 5.5,Figure 5.6,Figure 5.7 shows the 1NF of the Security Guards Management System (SeGuMaS) attribute for each table that have been identified the dependency of each table.

id	guardID	siteID	img	guardSalary	guardName	guardICNO	guardAddress	guardPhoneNo	nationality	guardDOB	guardPOB
52	JPS52	1	[BLOB - 46.7 KB]	900	Irman Syakir	990423-09-5239	No 12, Taman Wai Permai	1114416950	Citizen	11/6/2024	kangar
53	JPS53	2	[BLOB - 46.7 KB]	2500	Nursyarfana Binti Mohd Syahrizan	020705-06-7890	Besut Terengganu	1114416950	Citizen	5/7/2002	pahang
guardEPFNo	religion	guardGender	guardSocsoNo	guardRace	guardAccNo	guardNOB	guardStatus	dateWorkStart	dateContractEnd		
456789	ISLAM	MALE	49034	MALAY	48753245	RHB	Active	11/6/2024	28/6/2024		
456789	ISLAM	FEMALE	49034	MALAY	48753245	RHB	Active	11/6/2024	28/6/2024		
guardID	maritalStatus	guardSpName	guardFamOccu	guardFamNoP1	guardNumOfChild	guardSpAdd	guardFN	guardFOccu	guardMomName	guardMomOccu	guardParentAdd
JPS52	SINGLE	NO	NO	NO	NO	No 12, Taman Wai Permai	Ismail Saad	Not Work	Noraini Jaya	Not Work	No 12, Taman Wai Permai
JPS53	MARRIED	Tidak Tahu	Cikgu	011-124578952	2	Terengganu, gong badok	Ismail Bin Saad	Not Work	Noraini Binti Jaya	Not Work	Terengganu, gong badok
idEdu	guardID	school	state	dateStart	dateTo	guardID	guardReferName	guardReferJob	guardReferAddress	guardReferRelation	guardReferPhoneNo
32	JPS52	skkps	PERLIS	26/8/2021	26/9/2021	JPS52	faner	Guard	No 12, Taman Wai Permai	siblings	1114416950
34	JPS53	SMS Sultan Mahmud Gong Badak	Terengganu	10/6/2024	12/6/2024	JPS53	Syarafana	Guard	Terengganu, gong badok	siblings	1114416950
prevJobID	guardID	employerName	positionHeld	dateStart	dateTo						
18	JPS52	Iman garage	co supervisor	26/8/2021	26/9/2021						
19	JPS53	Alia Farhana	Manager	10/6/2024	12/6/2024						
idEx	guardID	exArmyOrPolice	guardServiceNo	guardPosition	dateStart	dateTo	guardBranch	guardRFLPA			
13	JPS52	YES	12345678910	Lieutenant	25/6/2021	28/8/2022	Gong Badak	Retired			
14	JPS53	YES	45678	Sargeant	11/6/2024	13/6/2024	Perlis	Retired			

Figure 5.8: Guard table attribute

Above Figure 5.8 shows 1NF of the Security Guards Management System (SeGuMaS) attribute for guard table and the dependency have been identified and it can be break into several part.

## Second Normal Form: 2NF

admin table

username	adminID	password
admin	1	1234

staff table

staffID	SID	ICNO	noPhone	img	email	fullname	username	password
24	stIPS_24	990423-09-5239	115331750	blob	irumankun@gmail.com	Muhammad irman	eman	eman@08
25	stIPS_25	020705-06-5056	145227569	blob	fanaChan@gmail.com	Nursyarafana	nana	nana@09

site table

siteID	siteName	siteAddress	startDate	endDate	location	status
1	Kuala Nerus 1	Sk Mengabang telipot	15/2/2022	31/5/2024	Terengganu	Active
2	Kuala Nerus 2	Sk Tok Jembal	15/2/2022	31/5/2024	Terengganu	Not Active

schedule table

scheduleID	guardID	siteID	startDate	endDate	shift
1	JPS52	1	11/6/2024	13/6/2024	Morning
2	JPS53	1	11/6/2024	13/6/2024	Morning

leave table

leaveID	guardID	guardName	leaveType	startDate	endDate	reason	status
19	JPS53	Nursyarafana Binti Mohd Syahrizan	vacation	11/6/2024	13/6/2024	Tukar	Approved
20	JPS60	Muhammad Nizam Bin Ismail	sick	28/6/2024	29/6/2024	sakit la boss	In Process

Figure 5.9: Second Normal Form

5

Above Figure 5.9 shows the 2NF of the Security Guards Management System (SeGuMaS) attribute for each table that have been identified the dependency of each table.

<b>id</b>	<b>guardID</b>	<b>siteID</b>	<b>img</b>	<b>guardSalary</b>	<b>guardName</b>	<b>guardICNO</b>	<b>guardAddress</b>	<b>guardPhoneNo</b>	<b>nationality</b>	<b>guardDOB</b>	<b>guardPOB</b>
52	JPS52	1	[BLOB - 46.7 KB]	900	Irman Syakir	990423-09-5239	No 12, Taman Wai Permai	1114416950	Citizen	11/6/2024	kangar
53	JPS53	2	[BLOB - 46.7 KB]	2500	Nursyarahana Binti Mohd Syahrizan	020705-06-7890	Besut Terengganu	1114416950	Citizen	5/7/2002	pahang
<b>guardEPFNo</b>	<b>religion</b>	<b>guardGender</b>	<b>guardSocsoNo</b>	<b>guardRace</b>	<b>guardAccNo</b>	<b>guardNOB</b>	<b>guardStatus</b>	<b>dateWorkStart</b>	<b>dateContractEnd</b>		
456789	ISLAM	MALE	49034	MALAY	48753245	RHB	Active	11/6/2024	28/6/2024		
456789	ISLAM	FEMALE	49034	MALAY	48753245	RHB	Active	11/6/2024	28/6/2024		

Figure 5.10: Personal Details Table

<b>guardID</b>	<b>maritalStatus</b>	<b>guardSpName</b>	<b>guardFamOccu</b>	<b>guardFamNoP1</b>	<b>guardNumOfChild</b>	<b>guardSpAdd</b>	<b>guardFN</b>	<b>guardFOccu</b>	<b>guardMomName</b>	<b>guardMomOccu</b>	<b>guardParentAdd</b>
JPS52	SINGLE	NO	NO	NO	NO	No 12, Taman Wai Permai	Ismail Saad	Not Work	Noraini Jaya	Not Work	No 12, Taman Wai Permai
JPS53	MARRIED	Tidak Tahu	Cikgu	011-124578952	2	Terengganu, gong badok	Ismail Bin Saad	Not Work	Noraini Binti Jaya	Not Work	Terengganu, gong badok

Figure 5.11: Family Details Table

<b>idEdu</b>	<b>guardID</b>	<b>school</b>	<b>state</b>	<b>dateStart</b>	<b>dateTo</b>
32	JPS52	skkps	PERLIS	26/8/2021	26/9/2021
34	JPS53	SMS Sultam Mahmud Gong Badak	Terengganu	10/6/2024	12/6/2024

Figure 5.12: Education Background Details Table

99

Above Figure 5.10, Figure 5.11, and Figure 5.12 shows the 2NF of the Security Guards Management System (SeGuMaS) for guard table after the dependency be identified.

prevJobID	guardID	employerName	positionHeld	dateStart	dateTo
18	JPS52	iman garage	co supervisor	26/8/2021	26/9/2021
19	JPS53	Alia Farhana	Manager	10/6/2024	12/6/2024

Figure 5.13: Previous Job Table

idEx	guardID	exArmyOrPolice	guardServiceNo	guardPosition	dateStart	dateTo	guardBranch	guardRFLPA
13	JPS52	YES	12345678910	Lieutenant	25/8/2021	28/8/2022	Gong Badak	Retired
14	JPS53	YES	45678	Sargeant	11/6/2024	13/6/2024	Perlis	Retired

Figure 5.14: Ex-Army or Police Table

referenceID	guardID	guardReferName	guardReferJob	guardReferAddress	guardReferRelation	guardReferPhoneNo
3	JPS52	faner	Guard	No 12, Taman Wai Permai	siblings	1114416950
4	JPS53	Syarafana	Guard	Terengganu, gong badok	siblings	1114416950

Figure 5.15: Reference Table

67 Above Figure 5.13, Figure 5.14, and Figure 5.15 shows the 2NF of the Security Guards Management System (SeGuMaS) for guard table after the dependency be identified.

## Third Normal Form: 3NF

Third Normal Form (3NF) aims to remove transitive dependencies, ensuring that non-key attributes do not depend on other non-key attributes. After normalizing our database to 1NF and 2NF, we have the following tables:

- Personal Details Table:

All non-key attributes are fully dependent on the primary key, guardID.

- Family Details Table:

All non-key attributes are fully dependent on the primary key, guardID.

- Education Background Details Table:

All non-key attributes are fully dependent on the primary key, idEdu.

- Previous Job Table:

All non-key attributes are fully dependent on the primary key, prevJobId.

- Ex-Army or Police Table:

All non-key attributes are fully dependent on the primary key, idEx.

- Reference Table:

All non-key attributes are fully dependent on the primary key, referenceId.

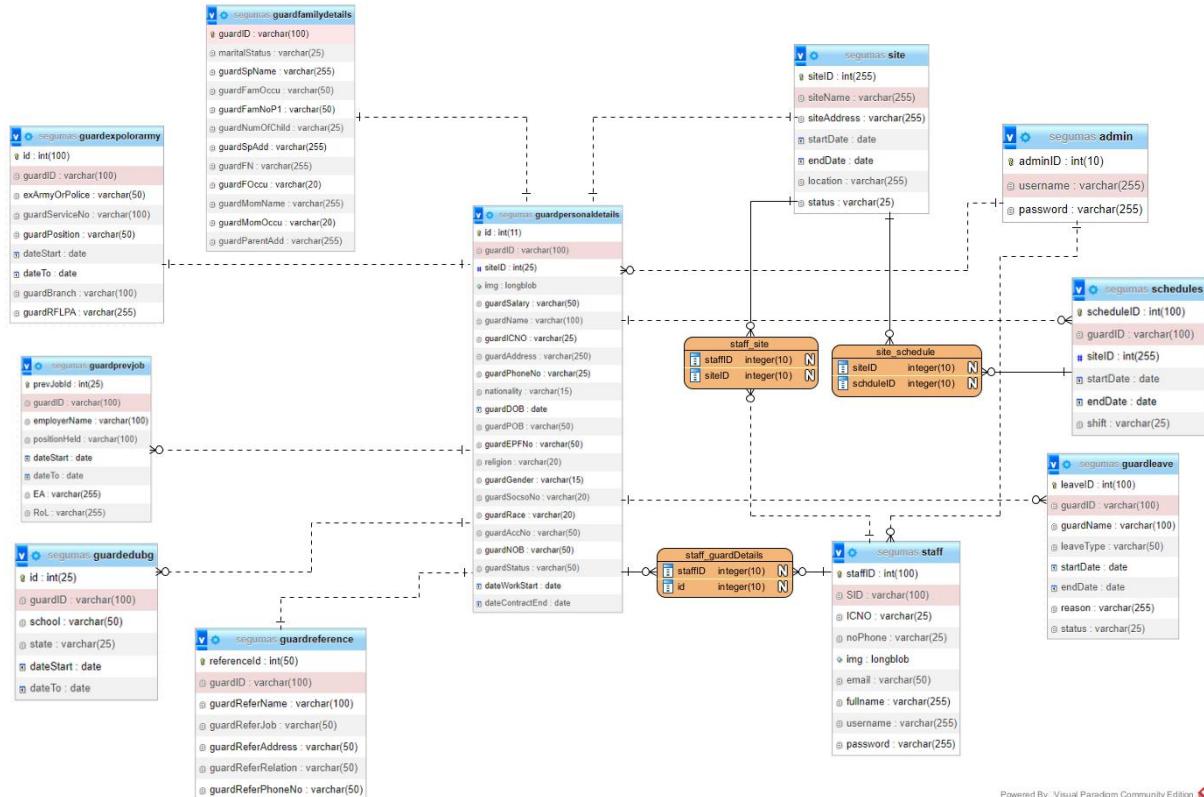
- Leaves Table:

All non-key attributes are fully dependent on the primary key, leaveID.

We eliminated transitive dependencies by ensuring that the non-key properties of each table are entirely dependent on the primary key. Thus, the tables are now in Third Normal Form (3NF), which improves data integrity and reduces redundancy. This normalisation method has helped to structure the database in a way that allows for efficient data administration while reducing the possibility of anomalies, hence improving the system's overall robustness.

## 5.6.2 Entity Relationship Diagram

An Entity-Relationship Diagram (ERD) is a visual representation of the entities (objects or concepts) within a system and the relationships between those entities. ERDs are commonly used in database design and modeling to illustrate the structure of a database and how different entities interact with each other, Lubis and Zamzami (2020).



Powered By: Visual Paradigm Community Edition

Figure 5.16: Entity Relationship Diagram

### 5.6.3 Data Dictionary

The SeGuMaS Data Dictionary serves as a comprehensive guide outlining the essential elements and their attributes within the SeGuMaS system. It provides clear descriptions and relationships between various data components, ensuring a unified understanding across users.

Table 5.1: Data Dictionary for table guardpersonaldetails

Field	Description	Data Type	Field Size
id	Primary Key	INT	11
guardID	Guard Identifier	VARCHAR	100
siteID	Site Identifier	INT	25
img	Guard Image	LONGBLOB	N/A
guardSalary	Guard Salary	VARCHAR	50
guardName	Guard Full Name	VARCHAR	100
guardICNO	Guard Identification Number	VARCHAR	25
guardAddress	Guard Address	VARCHAR	250
guardPhoneNo	Guard Phone Number	VARCHAR	25
nationality	Nationality	VARCHAR	15
guardDOB	Date of Birth	DATE	N/A
guardPOB	Place of Birth	VARCHAR	50
guardEPFNo	EPF Number	VARCHAR	25
religion	Religion	VARCHAR	20
guardGender	Gender	VARCHAR	15
guardSocsoNo	SOCSO Number	VARCHAR	20
guardRace	Race	VARCHAR	20
guardAccNo	Account Number	VARCHAR	50
guardNOB	Number of Bank Accounts	VARCHAR	50
guardStatus	Status	VARCHAR	50
dateWorkStart	Work Start Date	DATE	N/A
dateContractEnd	Contract End Date	DATE	N/A

Table 5.2: Data Dictionary for table guardfamilydetails

Field	Description	Data Type	Field Size
guardID	Primary Key	VARCHAR	100
maritalStatus	Marital Status	VARCHAR	25
guardSpName	Spouse Name	VARCHAR	255
guardFamOccu	Family Occupation	VARCHAR	20
guardFamNoP1	Number of Family Members	VARCHAR	50
guardNumOfChild	Number of Children	VARCHAR	50
guardSpAdd	Spouse Address	VARCHAR	255
guardFN	Father's Name	VARCHAR	255
guardFOccu	Father's Occupation	VARCHAR	20
guardMomName	Mother's Name	VARCHAR	255
guardMomOccu	Mother's Occupation	VARCHAR	20
guardParentAdd	Parent Address	VARCHAR	255

Table 5.3: Data Dictionary for table guardedubg

Field	Description	Data Type	Field Size
id	Primary Key	INT	25
guardID	Guard Identifier	VARCHAR	100
school	School Name	VARCHAR	50
state	School State	VARCHAR	25
dateStart	Start Date	DATE	N/A
dateTo	End Date	DATE	N/A

Table 5.4: Data Dictionary for table guardprevjob

Field	Description	Data Type	Field Size
prevJobId	Primary Key	INT	25
guardID	Guard Identifier	VARCHAR	100
employerName	Employer Name	VARCHAR	100
positionHeld	Position Held	VARCHAR	100
dateStart	Start Date	DATE	N/A
dateTo	End Date	DATE	N/A
EA	Employment Agreement	VARCHAR	255
RoL	Reason of Leaving	VARCHAR	255

Table 5.5: Data Dictionary for table guardexpolarmary

Field	Description	Data Type	Field Size
id	Primary Key	INT	100
guardID	Guard Identifier	VARCHAR	100
exArmyOrPolice	Ex-Army or Police	VARCHAR	50
guardServiceNo	Service Number	VARCHAR	50
guardPosition	Guard Position	VARCHAR	50
dateStart	Start Date	DATE	N/A
dateTo	End Date	DATE	N/A
guardBranch	Guard Branch	VARCHAR	100
guardRFLPA	Relevant Field or Law Protection Act	VARCHAR	255

Table 5.6: Data Dictionary for table guardreference

Field	Description	Data Type	Field Size
referenceID	Primary Key	INT	50
guardID	Guard Identifier	VARCHAR	100
guardReferName	Reference Name	VARCHAR	100
guardReferJob	Reference Job	VARCHAR	50
guardReferAddress	Reference Address	VARCHAR	50
guardReferRelation	Reference Relation	VARCHAR	50
guardReferPhoneNo	Reference Phone Number	VARCHAR	50

Table 5.7: Data Dictionary for table admin

Field	Description	Data Type	Field Size
adminID	Primary Key	INT	10
username	Username	VARCHAR	255
password	Password	VARCHAR	255

Table 5.8: Data Dictionary for table staff

Field	Description	Data Type	Field Size
staffID	Primary Key	INT	100
SID	Staff Identifier	VARCHAR	100
ICNO	Identification Number	VARCHAR	25
noPhone	Phone Number	VARCHAR	25
img	Staff Image	LONGBLOB	N/A
email	Staff Email	VARCHAR	50
fullname	Full Name	VARCHAR	255
username	Username	VARCHAR	255
password	Password	VARCHAR	255

Table 5.9: Data Dictionary for table schedules

Field	Description	Data Type	Field Size
scheduleID	Primary Key	INT	100
guardID	Guard Identifier	VARCHAR	100
siteID	Foreign Key	INT	255
startDate	Start Date	DATE	N/A
endDate	End Date	DATE	N/A
shift	Shift Timing	VARCHAR	25

Table 5.10: Data Dictionary for table site

Field	Description	Data Type	Field Size
siteID	Primary Key	INT	255
siteName	Site Name	VARCHAR	255
siteAddress	Site Address	VARCHAR	255
startDate	Start Date	DATE	N/A
endDate	End Date	DATE	N/A
location	Location	VARCHAR	25
status	Status	VARCHAR	25

Table 5.11: Data Dictionary for table guardleave

Field	Description	Data Type	Field Size
leaveID	Primary Key	INT	100
guardID	Guard Identifier	VARCHAR	100
guardName	Guard Name	VARCHAR	100
leaveType	Leave Type	VARCHAR	50
startDate	Start Date	DATE	N/A
endDate	End Date	DATE	N/A
reason	Reason for Leave	VARCHAR	255
status	Status	VARCHAR	25

## 5.7 Interface Design

This section, Screen Images, presents a visual representation of SeGuMaS in this study. These photos capture the user interface's various functional components, including the Dashboard, Task Management, Collaboration Tools, and Reports. The user interface, which encompasses all of the parts and functions that users interact with when using the programme, is intended to make interactions as easy, efficient, and intuitive as feasible. Each graphic depicts SeGuMaS' operational aspects, providing insight into its wide toolkit designed for effective project management and collaborative endeavours.

### 1. Login Page

Figure 6.4 is the first interface of the system where the user will firstly see. This page serve as the first interface for the user.

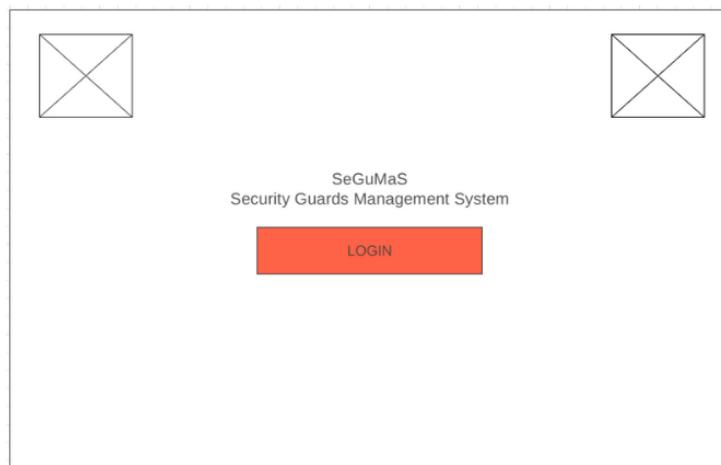


Figure 5.17: Login Page

Figure 5.18 show that user need to insert their password and username before using the system. This page is for the authenticating the user and make sure the system is access by authorize people only.

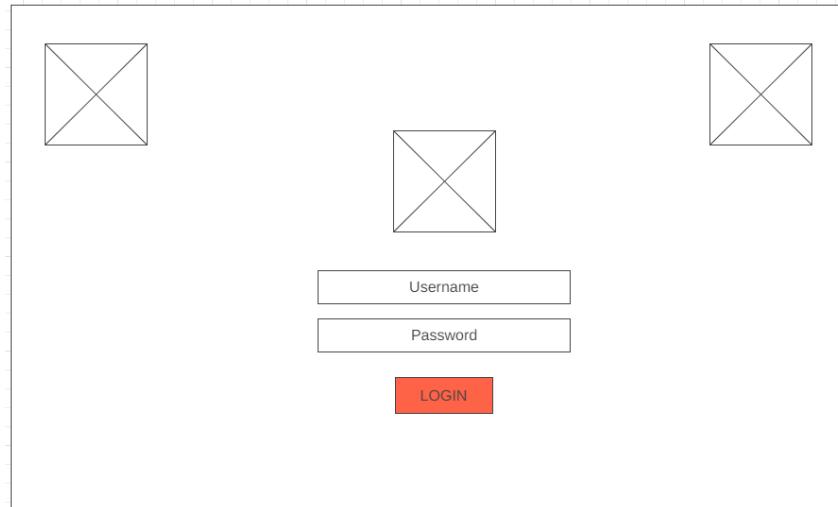


Figure 5.18: Login Page

## 2. Menu Page

Figure 5.19 show Menu which is the main page of the SeGuMaS where it have all the functionality placed and the user can choose what they want to access.

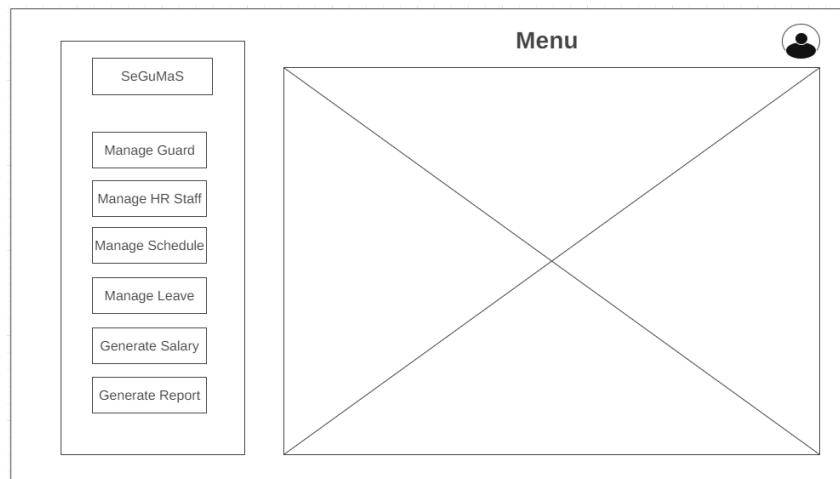


Figure 5.19: Menu

### 3. Dropdown list

Below Figure 5.20, show the dropdown for the Manage Guard.

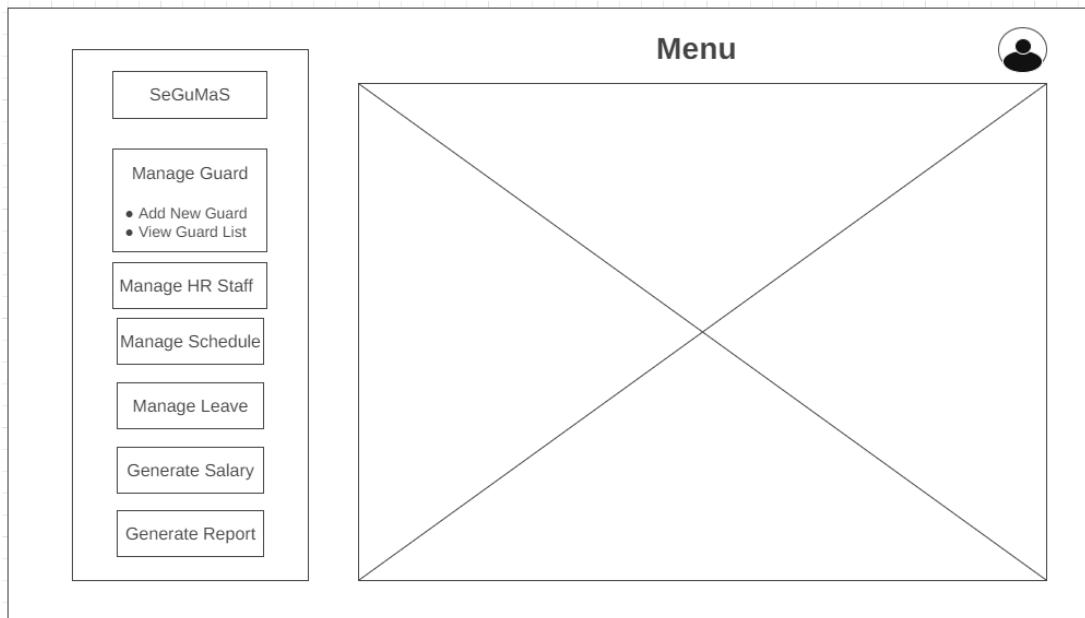


Figure 5.20: Drop Down List For Manage Guard

Below Figure 5.21, show the dropdown for the Manage HR Staff.

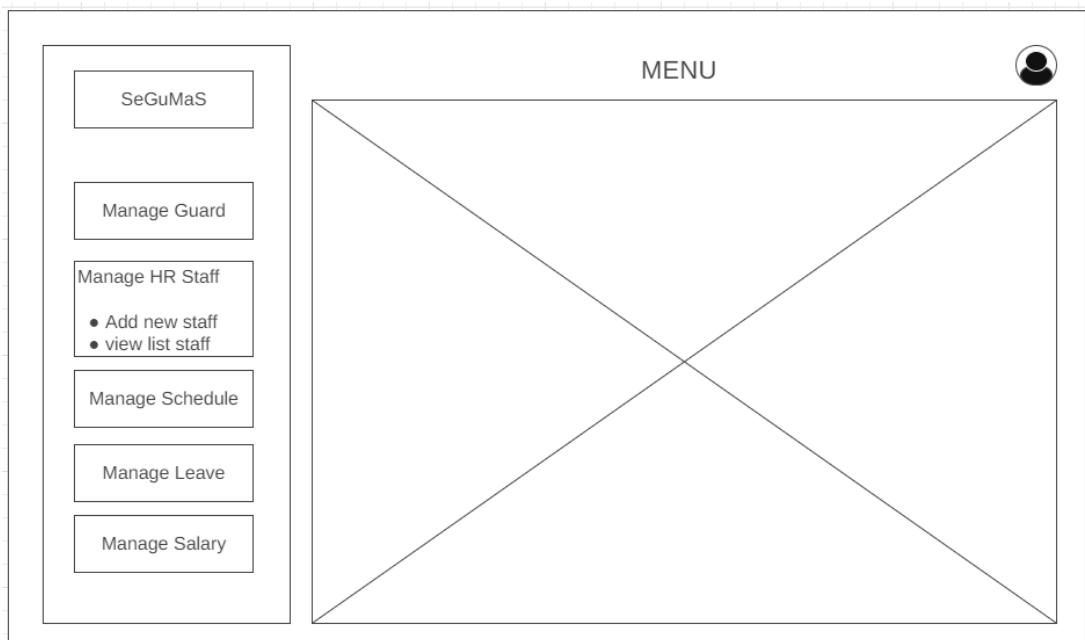


Figure 5.21: Drop Down List For Manage HR Staff

Below Figure 5.22, show the dropdown for the Manage Leave.

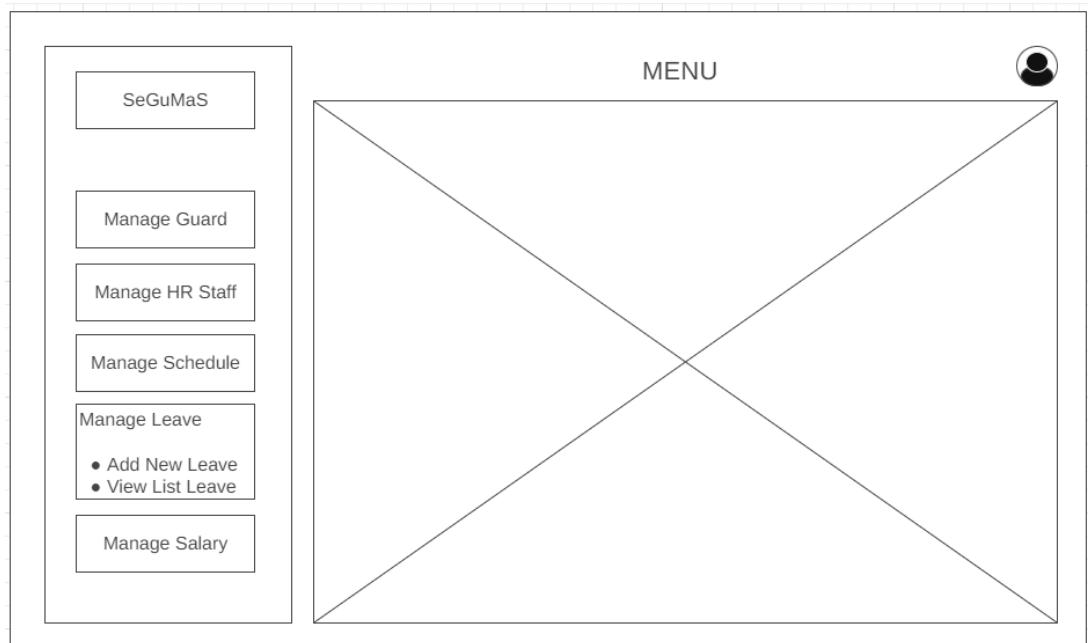


Figure 5.22: Drop Down List For Manage Leave

Below Figure 5.23, show the dropdown for the Manage Schedule.

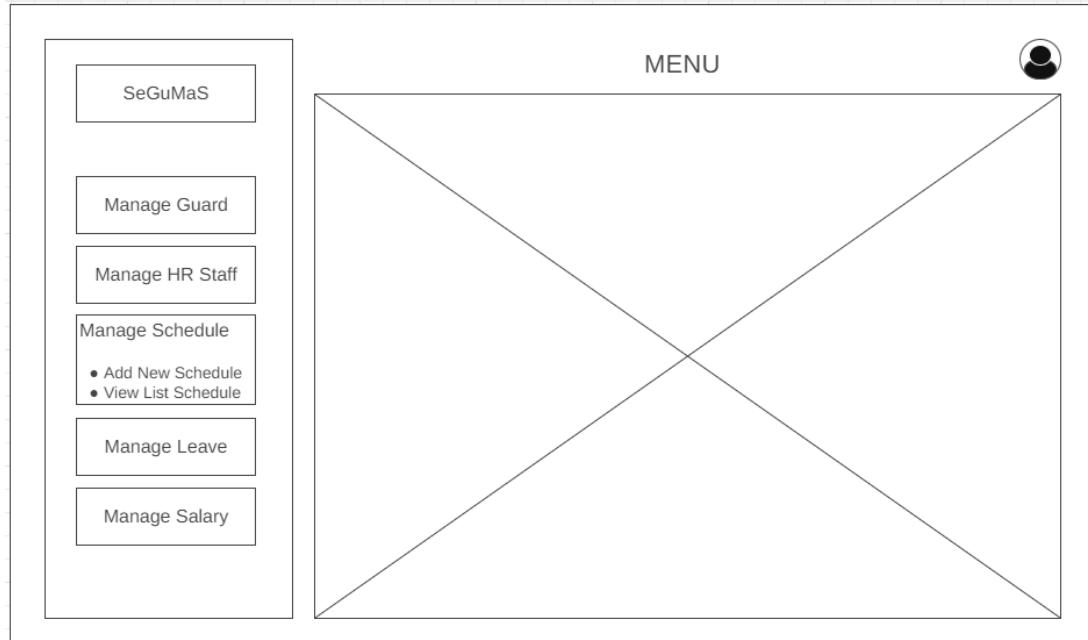


Figure 5.23: Drop Down List For Manage Schedule

#### 4. Add New Guard

Below Figure 5.24, show the add new guard.

Add New Guard

SeGuMaS

Manage Guard

- Add New Guard
- View Guard List

Manage HR Staff

Manage Schedule

Manage Leave

Manage Salary

Name

Gender

Email

Race

Age

Phone No

Nationality

Date Of Birth

Address

Figure 5.24: Add New Guard

#### 5. List of Guard

Below Figure 5.25, show the list of the guard.

View Guard List

SeGuMaS

Manage Guard

- Add New Guard
- View Guard List

Manage Staff

Manage Schedule

Manage Leave

Manage Salary

Generate Report

View Data Of Guard

Figure 5.25: List of Guard

## 6. Create New Leave

Below Figure 5.26, show the page to create new leave.

The screenshot shows the 'Add New Leave' page. On the left, there is a vertical sidebar with the following menu items:

- SeGuMaS
- Manage Guard
- Manage Staff
- Manage Schedule
- Manage Leave
  - Add new Leave
  - View Leave
- Manage Salary
- Generate Report

The main content area is titled 'Add New Leave' and contains the following fields:

- Applicant name
- Branch
- Start date
- End Date
- Time
- Duration
- Reason Leave (a large text input field)

At the bottom right are two buttons: 'SAVE' and 'RESET'.

Figure 5.26: create leave

## 7. List of leave

Below Figure 5.27, show page to view leave.

The screenshot shows the 'View Leave' page. On the left, there is a vertical sidebar with the following menu items:

- SeGuMaS
- Manage Guard
- Manage Staff
- Manage Schedule
- Manage Leave
  - Add new Leave
  - View Leave
- Manage Salary
- Generate Report

The main content area is titled 'View Leave' and contains a large rectangular frame with a diagonal 'X' drawn through it, indicating that no leave records are currently displayed.

Figure 5.27: View leave

## 8. Create new schedule

Below Figure 5.28, show the page to create new schedule.

The screenshot shows the 'New Schedule' page. On the left, there is a vertical sidebar with the following menu items:

- SeGuMaS
- Manage Guard
- Manage Staff
- Manage Schedule
  - Add New Schedule
  - View schedule
- Manage Leave
- Manage Salary
- Generate Report

The main content area is titled 'New Schedule' and contains the following form fields:

Schedule name	Time
Start Date	End Date
Description	Branch
Site Name	

At the bottom of the page are two buttons: 'SAVE' and 'RESET'.

Figure 5.28: Adding new schedule

## 9. List of schedule

Below Figure 5.29, show the page to view list of schedule.

The screenshot shows the 'View Schedule' page. On the left, there is a vertical sidebar with the following menu items:

- SeGuMaS
- Manage Guard
- Manage Staff
- Manage Schedule
  - Add New Schedule
  - View schedule
- Manage Leave
- Manage Salary
- Generate Report

The main content area is titled 'View Schedule' and contains a large rectangular box with a diagonal 'X' drawn through it, indicating that no data is currently displayed.

Figure 5.29: View schedule

## 10. Report page

Below Figure 5.30, show the report page.

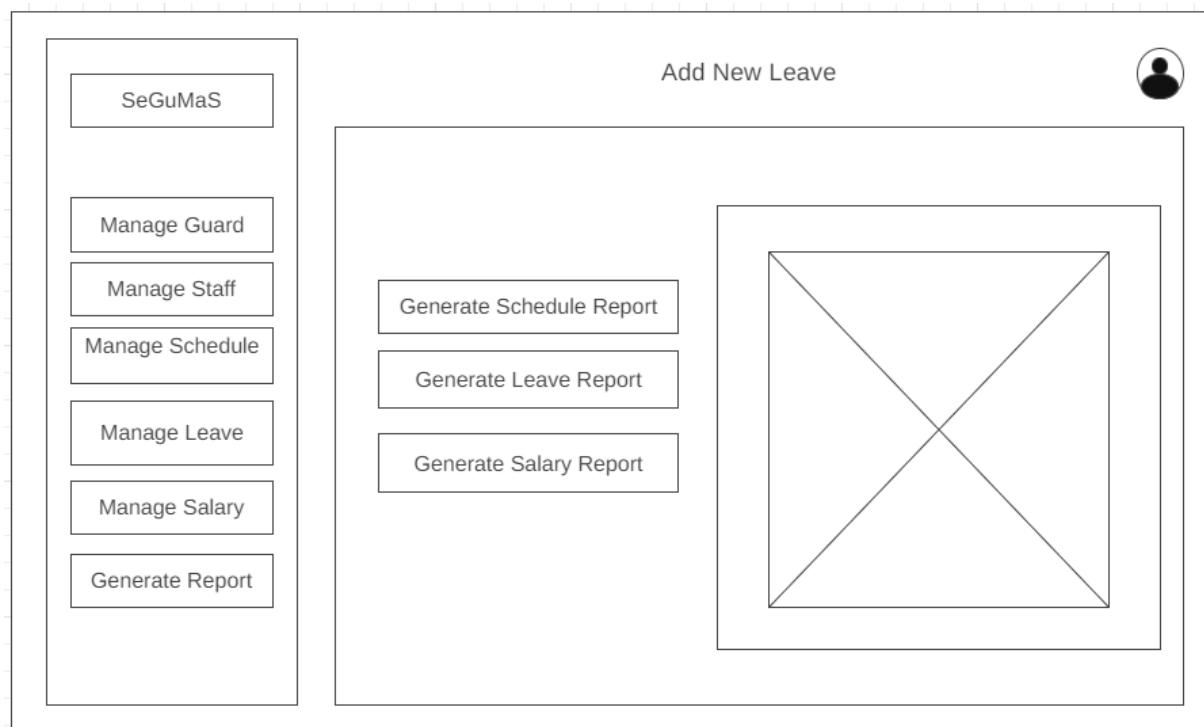


Figure 5.30: Report Page

On this page in the Figure 5.31, the warning message will be show when the system facing the error then user will be redirect back to the login page and being asked to fill the right information.

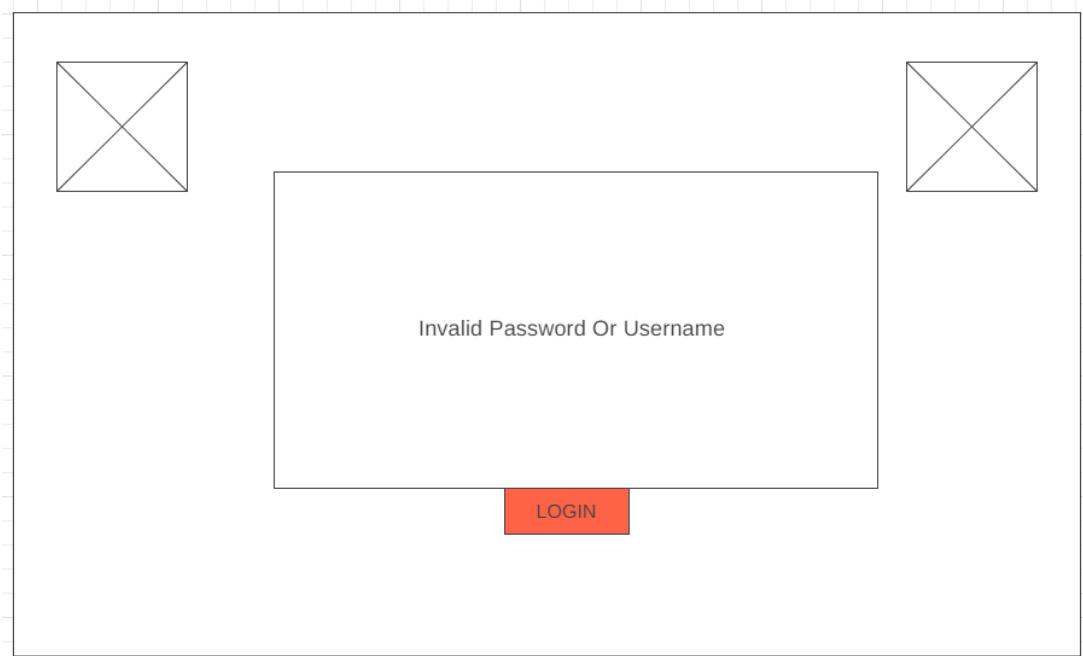


Figure 5.31: Invalid Input

For this page in Figure 5.32 the user will be creating the new data for the guard and the user will be asked to insert the information correctly.

A screenshot of a web application titled "Add New Guard". On the left, there is a sidebar with a logo and several menu options: "SeGuMaS", "Manage Guard" (with sub-options "Add New Guard" and "View Guard List"), "Manage HR Staff", "Manage Schedule", "Manage Leave", and "Manage Salary". The main area has a title "Add New Guard" and a profile icon. It contains several input fields: "Name", "Gender", "Email", "Race", "Age", "Phone No", "Nationality", and "Salary". Below these is a "Date Of Birth" field and a large "Address" input field. There are also two empty input fields below the address.

Figure 5.32: Add New Guard

Figure 5.33 shows that invalid input will be displayed if the user key in the wrong information in the form then the warning message is shown then it will redirect back to the add new guard form.

The screenshot displays a web-based application interface titled "Add New Leave". In the top right corner, there is a user icon. On the left side, a vertical sidebar contains several menu items, with "Gener" partially visible at the bottom. The main content area has a large text input field containing the placeholder text "Invalid Data".

Figure 5.33: Invalid input

## **5.8 Discussion**

There are multiple main layers in the SeGuMaS System Design: Presentation, Application, Data, and External Services. The User Interface (UI), where users interact, the application logic (Controller), which oversees activities, and the data management (Model), which stores and retrieves data, are the three main components of an MVC system. This architecture follows these ideas. This strategy guarantees that the system can grow and be maintained with ease throughout time. A modular architecture was selected because it can scale efficiently without becoming unmanageable, in contrast to monolithic or microservices approaches. The package diagram makes clear how these components function together, and the interface design prioritises user-friendliness. SeGuMaS is made with the purpose of effectively handling activities such as scheduling, managing security guard details, and HR operations while maintaining the security of data.

## **5.9 Summary**

The System Design for SeGuMaS is organized around four main layers: Presentation, Application, Data, and External Services. This architectural framework follows MVC principles, dividing the system into distinct roles: the Presentation layer manages the user interface (UI), the Application layer handles business logic (Controller), and the Data layer manages data storage and retrieval (Model). This structure ensures scalability and simplifies maintenance. The decision to adopt a modular architecture, rather than a monolithic or microservices approach, was driven by the need for efficient expansion and ease of management. A detailed package diagram illustrates the interactions between these layers and additional services, providing a clear visualization of the system's components. The interface design prioritizes intuitive usability, ensuring that users, including security administrators and HR personnel, can navigate and operate SeGuMaS effectively. Overall, SeGuMaS is designed to proficiently manage tasks such as security guard details, scheduling, and HR operations, while maintaining high standards of data security and integrity throughout its operation.

## **CHAPTER 6**

### **SYSTEM IMPLEMENTATION**

#### **6.1 Introduction**

The Security Guard Management System's (SeGuMaS) actualization is the main topic of this chapter. It offers a thorough rundown of the steps used to put the system design into practice. The chapter starts with a description of the hierarchical menu structure, organisation, and navigation of the system. Every element in the implementation is constructed and smoothly integrated according to a modular architecture. The application of particular programming languages, frameworks, and technologies demonstrates the efficacy of the system. Strict testing and quality assurance protocols are used during the installation phase to guarantee the system performs as planned. The chapter closes with a discussion of the difficulties found during implementation and the strategies employed to get beyond them in order to successfully deploy SeGuMaS.

#### **6.2 System Hierarchical Menu**

Figure 6.1 show system features a hierarchical menu designed for administrators. At the top layer, the Security Guards Management System (SeGuMaS) login page serves as the starting point. From there, admin need to login first. Upon successful login, administrators are directed to the admin dashboard. On the dashboard, administrators have the ability to access features such as manage staff, manage site, manage guard, manage guard schedule, manage leave.

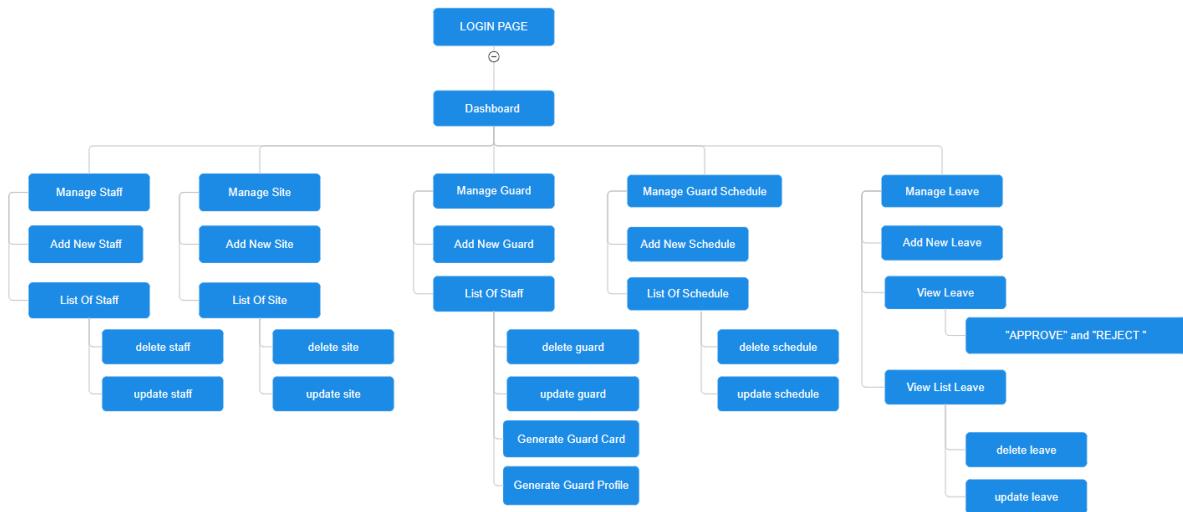


Figure 6.1: System Hierarchical Menu for Admin.

As we can see on Figure 6.1 it show the fives main module for admin. Which is manage staff, manage site, manage guard, manage guard schedule, manage leave.

## 1. Manage Staff

- Add New Staff

For this, admin will create an account for the user of the system and granted the access based on their roles. Role will be given by admin. Mainly, admin will create an account for manager.

- List of Staff

- a. For this part, admin can view all list of the user account that were created by the admin and manager.
- b. On this page also admin can delete or update the staff details.

## 2. Manage Site

- Add New Site

Admin can add new site based on the tender that the company receive, this site will be assign to guard when inserting the guard details.

- List of Site
  - a. Admin can use this page for viewing the list of current existing site, admin can check the status of the site whether it still active or not.
  - b. Admin also can delete or update the current existing site details.

### 3. Manage Guard

- Add New Guard

For this, admin can add new data of guard into the system.

- List of Guard

- a. Admin can use this page for viewing the list of current existing guard, admin can check the status of the guard whether it still active or not.
- b. Admin also can delete or update the current existing guard details.
- c. Admin also can generate the guard id card.
- d. Admin also can generate the guard profile that will be use at the guard post.

Guard need to stick guard profile at their post.

### 4. Manage Guard Schedule

- Add New Guard Schedule

Admin can add new schedule of guard.

- List of Guard Schedule

- a. Admin can use this page for viewing the list of guard schedule.
- b. Admin also can delete or update the current existing guard schedule.

### 5. Manage leave

- Add New Leave

Admin can create the guard leave application for record log of leaves.

- View Leave

This page use for "APPROVE" and "REJECT" the leave application, this page specifically use for manager.

- View List Leave
  - a. Admin can use this page for viewing the list of leave.
  - b. Admin also can delete or update the current existing guard leave.
  - c. Admin can view the status of leave application.

Figure 6.2 show system features a hierarchical menu designed for HR Staff. At the top layer, the Security Guards Management System (SeGuMaS) login page serves as the starting point. From there, HR Staff need to login first. Upon successful login, HR Staff are directed to the HR Staff dashboard. On the HR Staff dashboard, HR Staff have the ability to access features such as manage guard, manage guard schedule, manage leave.

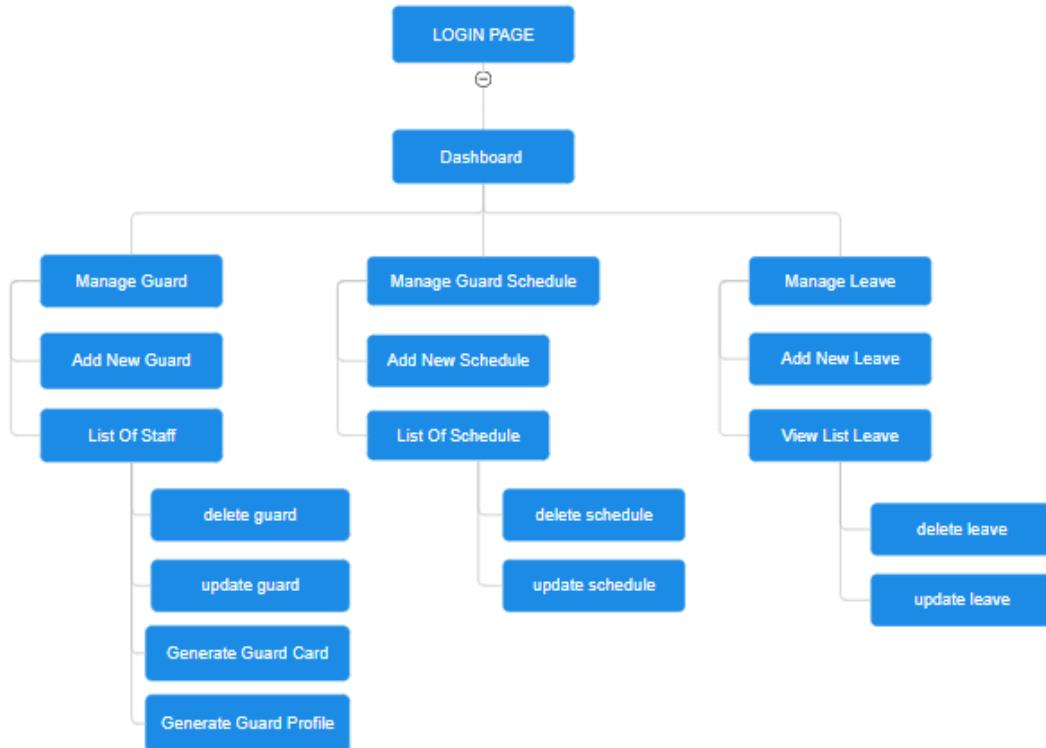


Figure 6.2: System Hierarchical Menu for Staff.

As we can see on Figure 6.2 it show the three main module for HR Staff. Which is manage guard, manage guard schedule, manage leave.

### 1. Manage Guard

- Add New Guard

For this, HR Staff can add new data of guard into the system.

- List of Guard

- a. HR Staff can use this page for viewing the list of current existing guard, HR Staff can check the status of the guard whether it still active or not.
- b. HR Staff also can delete or update the current existing guard details.
- c. HR Staff also can generate the guard id card.
- d. HR Staff can generate the guard profile that need to be show at the guard post.

### 2. Manage Guard Schedule

- Add New Guard Schedule

HR Staff can add new schedule of guard.

- List of Guard Schedule

- a. HR Staff can use this page for viewing the list of guard schedule.
- b. HR Staff also can delete or update the current existing guard schedule.

### 3. Manage leave

- Add New Leave

HR Staff can create the guard leave application for record log of leaves.

- View List Leave

- a. HR Staff can use this page for viewing the list of leave.
- b. HR Staff also can delete or update the current existing guard leave.
- c. HR Staff can view the status of leave application.

Figure 6.3 show system features a hierarchical menu designed for manager. At the top layer, the Security Guards Management System (SeGuMaS) login page serves as the starting point. From there, manager need to login first. Upon successful login, manager are directed to the manager dashboard. On the manager dashboard, manager have the ability to access features such as manage staff, manage site, manage leave.

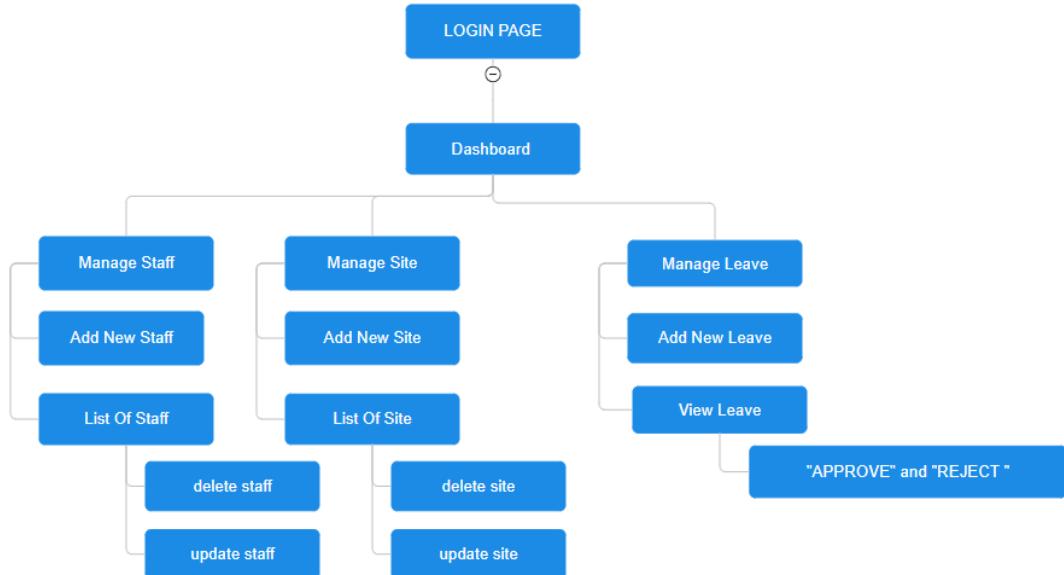


Figure 6.3: System Hierarchical Menu for Manager.

As we can see on Figure 6.3 it show the three main module for manager. Which is manage staff, manage site, manage leave.

## 1. Manage Staff

- Add New Staff
  - For this, Manager will create an account for the user of the system.
- List of Staff
  - For this part, Manager can view all list of the user account that were created by the Manager.
  - On this page also Manager can delete or update the staff details.

- Manage Site
  - Add New Site Manager can add new site based on the tender that the company receive, this site will be assign to guard when inserting the guard details.
  - View Leave This page use for "APPROVE" and "REJECT" the leave application, this page specifically use for manager.

### **6.3 System Development**

The Security Guard Management System (SeGuMaS) is designed to streamline security operations for Jasa Perkasa Security Sdn. Bhd. by transitioning from physical log files to a digital platform. The system requires users to log in first. Users can access and update their personal information using the user profile icon.

The “Manage Guard” feature allows users to manage guard information. They can add new guards, update existing guard details, or remove guards from the system. This ensures that all guard data is current and accurate.

The “Manage Guard Schedule” feature enables the scheduling of guards for various shifts and locations. Users can create and update schedules, ensuring that all shifts are covered and that guards are assigned to their respective posts efficiently.

The “Manage Leave” feature allows for the management of leave requests. Guards can submit leave requests, which can be reviewed and approved or denied by administrators. This helps in maintaining a proper record of guard availability and ensuring that all shifts are adequately staffed.

The “Manage Sites” feature is used to manage the details of different sites where guards are deployed. Users can add new sites, update information about existing sites, or remove sites from the system. This ensures that all site data is up to date and accessible.

The “Manage Staff” feature enables the management of other staff members apart from guards. This includes adding new staff, updating existing staff details, or removing staff from the system. This feature ensures that all staff data is accurate and current.

Based on this roles, each actor have their own module.

- Admin

Responsible for overall management, including managing guards, schedules, leave, sites, and staff.

- Admin

Responsible for overall management, including managing guards, schedules, leave, sites, and staff.

- Admin

Responsible for overall management, including managing guards, schedules, leave, sites, and staff.

The system’s development goals include providing a comprehensive digital platform that improves the efficiency and efficacy of security operations. By including capabilities for managing guards, schedules, leave, sites, and staff, SeGuMaS guarantees that all areas of security management are managed efficiently. The system is intended to be user-friendly, with intuitive interfaces that make it simple for administrators, HR personnel, and managers to complete their duties. Furthermore, implementing real-time updates and notifications helps to maintain high levels of responsiveness and accountability throughout the organisation.

### 6.3.1 Overview Interfaces

This section provides an overview of the user interfaces for the Security Guard Management System (SeGuMaS). These interfaces, which are designed to be straightforward and user-friendly. Each interface facilitates easy navigation and streamlines workflows, hence increasing efficiency.

For this page in Figure 6.4 is the first page of the system which is the login of Security Guards Management System (SeGuMaS).



Figure 6.4: Security Guards Management System (SeGuMaS) login page

For this page in Figure 6.5 is the main menu after login into the system, the user will got to the homepage or the dashboard which show the user the graph and leave request information.

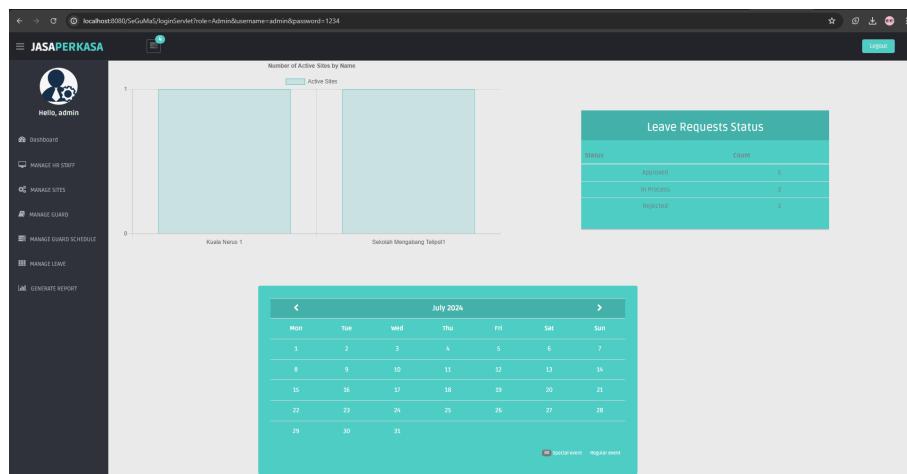


Figure 6.5: Dashboard Page

For this page in Figure 6.6, the user can add a new security guard to the system by entering the relevant details.

Figure 6.6: Add Guard Page

For this page in Figure 6.7, the user can view a list of all security guards registered in the system. This page allows for managing and updating guard information. User also can click on update the guard site,printing the guard card and guard profile.

GUARD ID	GUARD NAME	GUARD PHOTO	GUARD IC NO	GUARD ADDRESS	GUARD SITE	PHONE NO	STATUS	GENERATE PROFILE	ACTIONS
IPS58	Nursu Dinegmat Son Of Iqbal		950423095239	NO 12, JALAN WAI PERMAI 02000 KUALA PERLIS, PERLIS	Kuala Nerus 1 : Sekolah Kebangsaan Mengabang T	01135458950	ACTIVE	<button>PRINT CARD</button> <button>PRINT PROFILE</button>	<button>Edit</button> <button>Delete</button>
IPS59	Gray Fullbuster		020705067890	Fiore, magnolia	Kuala Nerus 1 : Sekolah Kebangsaan Mengabang T	01135458950	ACTIVE	<button>PRINT CARD</button> <button>PRINT PROFILE</button>	<button>Edit</button> <button>Delete</button>
IPS60	Muhammad Nizam Bin Ismail		02042215239	Kampung Gong Pakjin	Kuala Nerus 1 : Sekolah Kebangsaan Mengabang T	01293276	INACTIVE	<button>PRINT CARD</button> <button>PRINT PROFILE</button>	<button>Edit</button> <button>Delete</button>
IPS61	Muhammad Irfan Hakimi Bin Ismail		050705095054	No 12, Taman wal	Kuala Nerus 1 : Sekolah Kebangsaan Mengabang T	01213337439	ACTIVE	<button>PRINT CARD</button> <button>PRINT PROFILE</button>	<button>Edit</button> <button>Delete</button>
IPS62	Ismail Bin Saad		950423095239	NO 12, KAMPUNG SEBERANG RAMAI, KUALA PERLIS	Kuala Nerus 1 : Sekolah Kebangsaan Mengabang T	01136505798	ACTIVE	<button>PRINT CARD</button> <button>PRINT PROFILE</button>	<button>Edit</button> <button>Delete</button>

Figure 6.7: List of Guards Page

For this page in Figure 6.8, after user click on the print card button it will show the printing setting like in this figure.

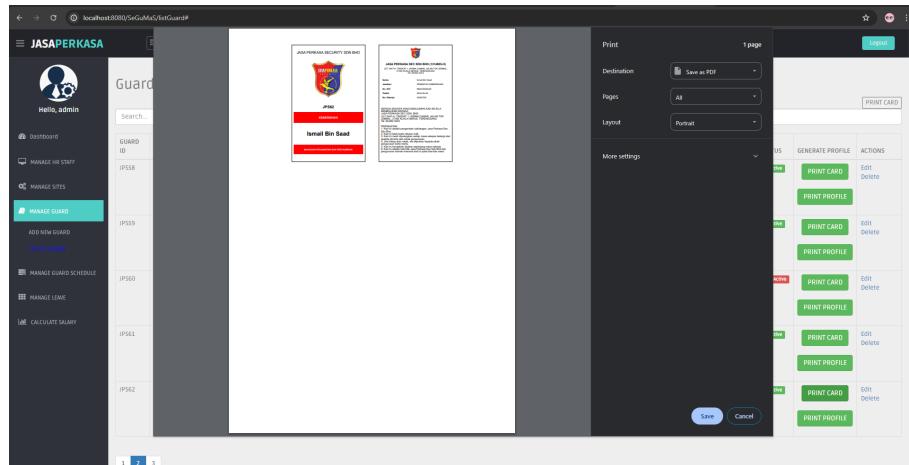


Figure 6.8: Print ID Card Page

For this page in Figure 6.9, the user can print a detailed profile of a security guard, including all relevant personal and professional information.

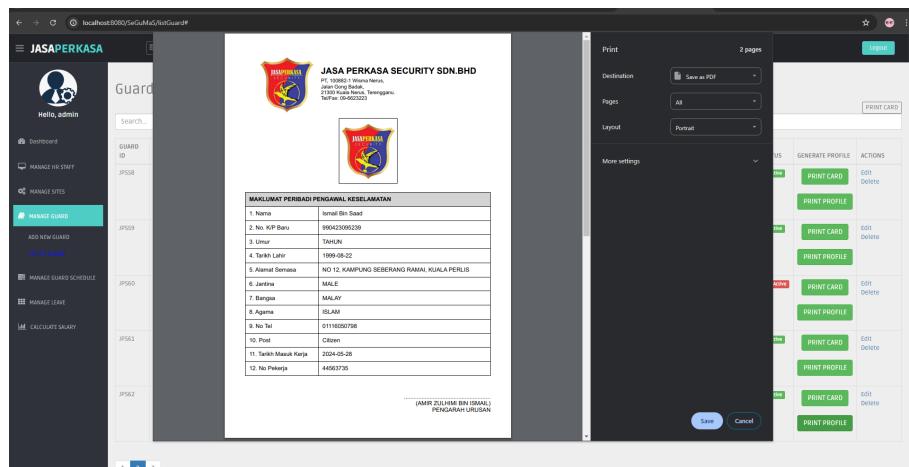


Figure 6.9: Print Guard Profile Page

For this page in Figure 6.10, the user can edit a security guard's personal details, ensuring the information is accurate and up-to-date.

Figure 6.10: Edit Guard Personal Details Page

For this page in Figure 6.11, the user can edit a security guard's family details, including information about dependents and emergency contacts.

Figure 6.11: Edit Guard Family Details Page

For this page in Figure 6.12, the user can update a security guard's educational background, ensuring all qualifications are recorded accurately.

The screenshot shows a web-based application interface for managing security guards. On the left is a sidebar with a user profile icon and the text 'Hello, admin'. Below it are several menu items: Dashboard, MANAGE HR STAFF (which is highlighted in blue), ADD NEW STAFF, LIST OF STAFF, MANAGE GUARD SCHEDULE, MANAGE LEAVE, and CALCULATE SALARY. The main content area has a header with tabs: PERSONAL DETAILS, FAMILY DETAILS, EDU BACKGROUND (which is highlighted in green), PREVIOUS EMPLOYMENT, EX POLICE OR ARMY DETAILS, and REFERENCES. Below the tabs, the section title is 'Educational Background'. A blue button labeled 'Add Educational Background' is visible. There are input fields for 'SCHOOL/UNIVERSITY' (containing 'skips') and 'STATE' (containing 'PERJIS'). To the right of these are two date pickers: 'DATE FROM' (set to 20/07/2004) and 'DATE TO' (set to 31/10/2011). A green 'UPDATE' button is at the bottom. The browser address bar shows the URL as `localhost:8080/SeGuMa/editGuard/guardID-JP58`.

Figure 6.12: Edit Guard Education Background Page

For this page in Figure 6.13, the user can update the employment history of a security guard, documenting all previous job experiences.

This screenshot shows the 'Edit Guard Previous Job' page. The sidebar and tabs are identical to Figure 6.12. The main content area has a header with tabs: PERSONAL DETAILS, FAMILY DETAILS, EDU BACKGROUND, PREVIOUS EMPLOYMENT (highlighted in green), EX POLICE OR ARMY DETAILS, and REFERENCES. Below the tabs, the section title is 'Previous Employment Position'. A blue button labeled 'Add Previous Employee' is present. There are input fields for 'EMPLOYER'S NAME' (containing 'fana') and 'POSITION HELD' (containing 'manager'). To the right of these are two date pickers: 'DATE FROM' (20/07/2004) and 'DATE TO' (31/10/2011). Below these fields is a text input field containing 'NO 12, JALAN WAI PERMAI 8 TAMAN WAI PERMAI'. A green 'UPDATE' button is at the bottom. The footer of the page contains the text '© Specialty Made For Berlara Cemer Security SDN BHD' and 'Created with Love by Human'.

Figure 6.13: Edit Guard Previous Job Page

For this page in Figure 6.14, the user can update the guard information whether they are ex army or police in this pages.

The screenshot shows a web application interface for managing staff. On the left is a sidebar with various management options like Dashboard, Manage HR Staff, Manage Sites, Manage Guard, Manage Leave, and Calculate Salary. The main content area has a header 'JASAPERKASA' and a sub-header 'Hello, admin'. Below the sub-header is a navigation bar with tabs: PERSONAL DETAILS, FAMILY DETAILS, EDU BACKGROUND, PREVIOUS EMPLOYMENT, EX-POLICE OR ARMY DETAILS, and REFERENCES. The 'EX-POLICE OR ARMY DETAILS' tab is currently selected. It contains a question 'Ex Army Or Police:' followed by two radio buttons: 'YES' and 'NO'. At the bottom right of this section is a green 'UPDATE' button.

Figure 6.14: Edit Guard Ex-Army or Police Page

For this page in Figure 6.15, the user can edit the references for a security guard, ensuring that all referees' contact information is up to date.

The screenshot shows the 'Edit Guard Reference Page'. The left sidebar is identical to Figure 6.14. The main content area has a header 'JASAPERKASA' and a sub-header 'Hello, admin'. Below the sub-header is a navigation bar with tabs: PERSONAL DETAILS, FAMILY DETAILS, EDU BACKGROUND, PREVIOUS EMPLOYMENT, EX-POLICE OR ARMY DETAILS, and REFERENCES. The 'REFERENCES' tab is currently selected. The form is titled 'Personal References' and contains fields for 'REFERENCE NAME:' (Syratana), 'REFERENCE JOB:' (Guard), 'ADDRESS:' (NO 12, JALAN WAI PERMAI 8 TAMAN WAI PERMAI), 'REFERENCE RELATION:' (NOT RELATED), and 'REFERENCE TELEPHONE NO.' (01114416900). At the bottom right of the form is a green 'UPDATE' button. The footer of the page contains the text: '© Specially Made For Bintara Carter Security SDN BHD' and 'Created with Love by Human'.

Figure 6.15: Edit Guard Reference Page

For this page in Figure 6.16, the user can add a new staff member to the system by entering the relevant details.

The screenshot shows the 'ADD NEW STAFF' form. The fields are as follows:

- Name (required):
- IC NO (required):
- No Phone (required):
- Staff Image (required):  (placeholder: Upload image)
- E-mail (required):
- Username (required):
- Password (required):

At the bottom are 'Save' and 'Cancel' buttons.

Figure 6.16: Add Staff Page

For this page in Figure 6.17, the user can view a list of all staff members registered in the system. This page allows for managing and updating staff information.

The screenshot shows the 'LIST OF STAFFS' page. The table data is as follows:

No	Staff ID	Fullname	username	Password	Actions
1	1	Nur Husna Muzani	husnaru	husn@888	Edit Delete
2	2	halakai	halo8	halakai09	Edit Delete
3	3	irman syaikir	iruma	1234	Edit Delete
4	4	wan shafra	wanwan99	wanShafra09	Edit Delete
5	5	Nursyafarina	nana	nana123	Edit Delete
6	6	raian binqiran	luq	luq111	Edit Delete
7	7	irumekan syaikir	iruma	12312	Edit Delete
8	8	Nursyafarina	syafarina	99123	Edit Delete
9	9	adam	qamion	12313	Edit Delete
10	10	syafarina nana	nana	132	Edit Delete
11	11	irman syaikir bin ismail	man	3214	Edit Delete
12	13	ghnj	hbjn	hbjm	Edit Delete
13	14	ryui	ghjk	hn	Edit Delete
14	15	rhyui	rvb	gbhmj	Edit Delete
15	16	alita farahana	alita	23456	Edit Delete

At the bottom left are page navigation buttons [1] [2]. The footer notes: '© Specially Made For Bintara Camar Security SDN BHD' and 'Created with love by iruman'.

Figure 6.17: List Of Staff Page

For this page in Figure 6.18, the user can edit the details of an existing staff member, ensuring that their information is accurate and up-to-date.

The screenshot shows the 'Edit Staff' page of the BINTARACAMAR application. The left sidebar has a dark theme with white icons and text. The main content area has a light gray background. The form fields are as follows:

- Staff ID: SIPK\_25
- Name (required): Natsu Dragneel
- IC NO (required): 990705096056
- No Phone (required): 0543299483
- Staff Image (required): no+image (with a 'Select image' button)
- E-mail (required): edragneel78@gmail.com
- Username (required): Natsu
- Password (required): ed08

At the bottom right of the form are 'Update' and 'Cancel' buttons.

Figure 6.18: Edit Staff Details Page

For this page in Figure 6.19, the user can add a new site to the system by entering the necessary site details.

The screenshot shows the 'Add New Site' page of the JASAPERKASA application. The left sidebar has a dark theme with white icons and text. The main content area has a light gray background. The form fields are as follows:

- SITE NAME (ZONO): (empty input field)
- SITE ADDRESS: (empty input field)
- START DATE: dd/mm/yyyy (empty input field)
- END DATE: dd/mm/yyyy (empty input field)
- LOCATION: (empty input field)
- Status: Choose (dropdown menu)

At the bottom right of the form is a green 'SUBMIT' button.

Figure 6.19: Add Site Page

For this page in Figure 6.20, the user can view a list of all sites registered in the system. This page allows for managing and updating site information.

No	Site ID	Site Name	Address	Start Date	End Date	Location	Status	Actions
1	3	Sekolah Mengabang Telipot	Sekolah Mengabang Telipot, dekat dengan rumah lama	2022-02-15	2024-05-31	TERENGGANU	Active	<button>Edit</button> <button>Delete</button>
2	4	Sekolah Menengah Mengabang Telipot mil boss	Sekolah Menengah Mengabang Telipot, dekat mana mana jela takken tattau	2023-11-22	2024-05-26	TERENGGANU	Inactive	<button>Edit</button> <button>Delete</button>
3	7	Kuala Nerus 1	SMS Sultan Mahmud	2024-06-01	2024-06-29	TERENGGANU	Active	<button>Edit</button> <button>Delete</button>

Figure 6.20: List Of Site Page

For this page in Figure 6.21, the user can edit the details of an existing site, ensuring that the information is accurate and up-to-date.

Site ID	1
SITE NAME (ZON)	Sekolah Mengabang Telipot
SITE ADDRESS	Sekolah Mengabang Telipot, dekat dengan rumah lama
START DATE	15/02/2022
END DATE	31/05/2024
LOCATION	TERENGGANU
Status	Active

Figure 6.21: Edit Site Details Page

For this page in Figure 6.22, the user can create a new schedule by entering the relevant scheduling details for security personnel.

The screenshot shows the 'Manage Schedule' section of the JASAPERKASA application. On the left sidebar, under 'MANAGE GUARD SCHEDULE', there is a link 'CREATE NEW SCHEDULE'. The main form has fields for 'Staff Name' (dropdown), 'Site Name' (dropdown), 'Start Date' and 'End Date' (date pickers), and 'Shift' (dropdown). A green 'INSERT' button is at the bottom. Below the form is a 'Schedule List' table with columns: Staff Name, Site Name, Start Date, End Date, and Shift.

Figure 6.22: Add Schedule Page

For this page in Figure 6.23, the user can request leave by entering the necessary leave details.

The screenshot shows the 'ADD NEW LEAVE' section of the JASAPERKASA application. On the left sidebar, under 'MANAGE LEAVE', there is a link 'CREATE NEW LEAVE'. The main form has fields for 'Employee Name' (dropdown), 'Leave Type' (dropdown), 'Start Date' and 'End Date' (date pickers), and a large 'Reason' text area. A blue 'Submit' button is at the bottom. The footer contains the text '© Specialty Made For Bimara Cemerlang Security SDN BHD' and 'Created with love by Human'.

Figure 6.23: Add Leave Page

For this page in Figure 6.24, the user can view and manage leave requests from a managerial perspective, allowing approval or rejection of requests.

Leave ID	Guard ID	Guard Name	Leave Type	Start Date	End Date	Reason	Status	Action
1	IPS49	Irman Syakir	sick	2024-05-31	2024-06-01	sakit sampai	Approved	COMPLETED
2	IPS50	Irman Syakir	personal	2024-05-31	2024-06-08	hehe	Approved	COMPLETED
9	IPS50	Irman Syakir	personal	2024-04-20	2024-05-06	joke	Approved	COMPLETED
10	IPS50	Irman Syakir	sick	2024-05-10	2024-05-13	hhty	Approved	COMPLETED
11	IPS49	Irman Syakir	SICK	2024-04-19	2024-04-13	uu	Approved	COMPLETED
12	IPS50	Irman Syakir	SICK	2024-06-13	2024-06-07	hmm	Approved	COMPLETED
15	IPS50	Irman Syakir	SICK	2024-06-19	2024-06-20	yayayeu	Approved	COMPLETED
17	IPS50	Irman Syakir	SICK	2024-06-06	2024-06-07	gh	In Process	Approve Reject
18	IPS49	Irman Syakir	SICK	2024-06-08	2024-06-09	irman sakit	In Process	Approve Reject
19	IPS53	Nursyafana Binti Mohd Syahirzan	vacation	2024-06-11	2024-06-13	Tukar	Approved	COMPLETED

Figure 6.24: View Leave Requests (Manager) Page

For this page in Figure 6.25, the user can view their own leave requests and the status of those requests.

Leave ID	Guard ID	Guard Name	Leave Type	Start Date	End Date	Reason	Status	Action
1	IPS49	Irman Syakir	sick	2024-05-31	2024-06-01	sakit sampai	Approved	EDIT DELETE
2	IPS50	Irman Syakir	personal	2024-05-31	2024-06-08	hehe	Approved	EDIT DELETE
9	IPS50	Irman Syakir	personal	2024-04-20	2024-05-06	joke	Approved	EDIT DELETE
10	IPS50	Irman Syakir	sick	2024-05-10	2024-05-13	hhty	Approved	EDIT DELETE
11	IPS49	Irman Syakir	SICK	2024-04-19	2024-04-13	uu	Approved	EDIT DELETE
12	IPS50	Irman Syakir	SICK	2024-06-13	2024-06-07	hmm	Approved	EDIT DELETE
15	IPS50	Irman Syakir	SICK	2024-06-19	2024-06-20	yayayeu	Approved	EDIT DELETE
17	IPS50	Irman Syakir	SICK	2024-06-06	2024-06-07	gh	In Process	EDIT DELETE
18	IPS49	Irman Syakir	SICK	2024-06-08	2024-06-09	irman sakit	In Process	EDIT DELETE
19	IPS53	Nursyafana Binti Mohd Syahirzan	vacation	2024-06-11	2024-06-13	Tukar	Approved	EDIT DELETE

Figure 6.25: View Leave Requests (Staff) Page

For this page in Figure 6.26, the user can view their profile, which contains personal and professional information.

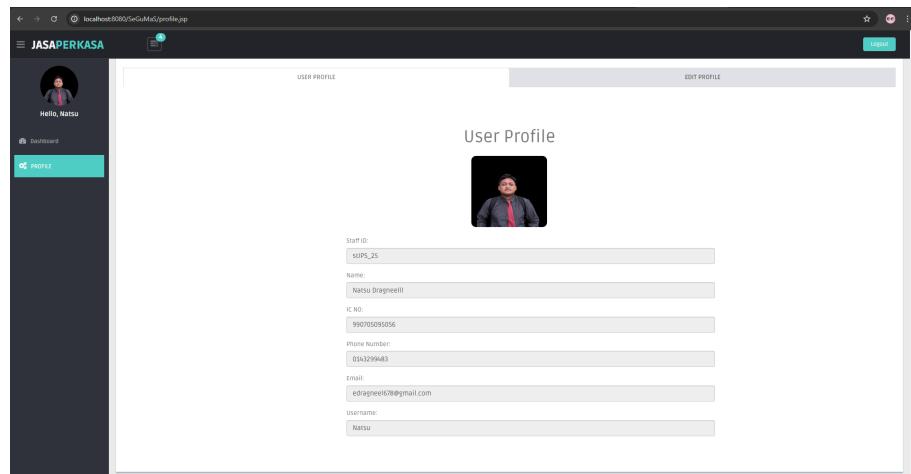


Figure 6.26: Profile Page

For this page in Figure 6.27, the user can edit their profile information to ensure it is accurate and up-to-date.

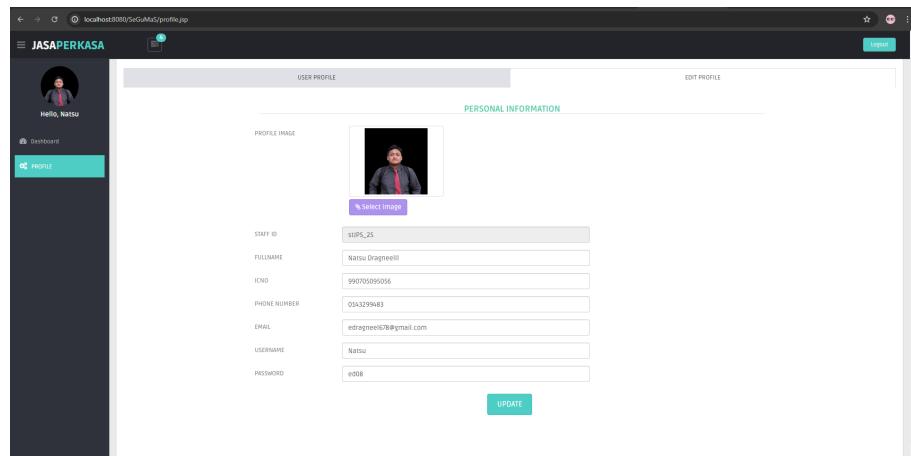


Figure 6.27: Edit Profile Page

## **6.4 Discussion**

In order to ensure effective operation and improve user interaction, the Security Guards Management System (SeGuMaS) is painstakingly built to integrate many technologies. Java powers the backend functions, which include managing security guards and user authentication. To design user interfaces that are both visually beautiful and responsive, frontend technologies like HTML, CSS, and Bootstrap are used. Furthermore, to enable dynamic content and offer a seamless user experience, jQuery, AJAX, and JavaScript are utilised. An Entity Relationship Diagram is used to organise and manage the SQL database that powers the system's data storage and retrieval processes. XAMPP is used in this process. The MVC architecture, which guarantees a distinct division of responsibilities and facilitates system scalability, is handled by Java Servlets for server-side operations. Throughout the development phase, obstacles including the smooth integration of different modules were faced. Future improvements could focus on making the user interfaces more efficient and adding more features to the system to meet more needs.

## **6.5 Summary**

The Security Guard Management System (SeGuMaS) integrates various technologies to ensure operational efficiency and enhance user experience. Backend operations, such as user authentication and security guard data management, are powered by Java. Frontend development focuses on creating responsive and visually appealing interfaces using HTML, CSS, and Bootstrap. Dynamic content and improved user interaction are facilitated through JavaScript, jQuery, and AJAX. Data is managed in an SQL database configured with XAMPP, following an Entity Relationship Diagram. Server-side processes are handled by Java Servlets, adhering to the MVC architecture for scalability and maintaining a clear separation of concerns. The integration of these modules poses challenges, addressed in the chapter, which also outlines future enhancements aimed at optimizing the user interface and expanding system functionality.

## **CHAPTER 7**

### **CONCLUSION**

#### **7.1 Introduction**

Well-defined requirements are the foundation of the Security Guard Management System (SeGuMaS) and are important to its development. This clarity guarantees a shared knowledge of the architecture, features, and how these requirements will be transformed into functional capabilities amongst developers and stakeholders. Precise and unambiguous specifications are essential for directing upcoming system adjustments. Since stakeholder needs form the basis of the system's design, it is imperative to accurately capture user expectations through the use of effective elicitation methodologies. Ineffective systems put users at risk of low adoption rates and higher maintenance costs when they fail to meet their needs.

To help stakeholders understand the system's functionality, structure, and behavior, various diagrams and models are created. These include use case diagrams, activity diagrams, and entity-relationship diagrams, which ensure a clear and comprehensive understanding of the project's goals and implementation.

In conclusion, the rigorous specification of criteria for SeGuMaS ensures that the system is built to match user needs while minimising future adjustment costs. This systematic method establishes a solid foundation for the system's successful development and deployment, ultimately improving the efficiency and effectiveness of the organization's security operations.

## 7.2 Project Contributions

By digitising and optimising several processes, it significantly advances the field of security management. Important inputs consist of:

- Improved Data Management: SeGuMaS transitions from physical log files to a digital format, allowing for more efficient data storage, retrieval, and management. This ensures that all records are easily accessible and organized.
- User-friendly Interface: The system features an intuitive and responsive user interface designed with HTML, CSS, Bootstrap, and JavaScript. This simplifies navigation for users such as HR staff, managers, and security administrators, making it easier to manage security operations.
- Streamlined Operations: By unifying diverse capabilities like schedule management, leave management, and site tracking into a single platform, SeGuMaS eliminates the need for several tools and manual processes, saving administrative staff time and effort.
- Cost Efficiency: SeGuMaS reduces the need for physical logbooks and several software tools, which saves money. Organisations may rely on this single solution for comprehensive security management, saving money on extra software or manual record-keeping.
- Enhanced Security and Data Integrity: The system ensures secure management of sensitive data, such as security guards' personal information, using strong data protection methods and secure storage techniques. This aids in preserving data integrity and confidentiality.

With its user-friendly interface, real-time monitoring, and systematic data handling, SeGuMaS improves the overall performance, efficiency of security management operations and overall improved security operations within organisations are all benefited by this.

### **7.3 Project Constraints**

The Security Guard Management System (SeGuMaS) development is subject to a number of constraints that must be properly handled to ensure that the project stays on track and achieves its goals. Budget limits limit the available resources for development, testing, and deployment, forcing cost-effective alternatives. To reach established deadlines, project schedules must be strictly followed. Resource restrictions, such as a scarcity of skilled workers, have an impact on project progress, necessitating efficient human resource allocation and utilisation. Technical restrictions include assuring compatibility with current infrastructure and complying to technical standards set by technologies such as Java, HTML, CSS, Bootstrap, and SQL databases.

Given the sensitive nature of the data managed by SeGuMaS, it is critical to follow industry standards and applicable data protection laws while adopting strict security measures to avoid data breaches and unauthorised access. Furthermore, the system's architecture must be carefully planned to allow future increases in user numbers and data volume. Integration problems include assuring compatibility and interoperability, as the system must work seamlessly with third-party services and current systems.

User acceptance restrictions emphasise the significance of meeting user wants and expectations, making user acceptance testing and feedback critical. To prevent legal ramifications, follow labour legislation, data protection laws, and industry-specific requirements. Furthermore, environmental constraints take into account the physical and operational conditions under which the system will operate, ensuring its robustness and dependability in a variety of scenarios. By identifying and addressing these restrictions, the SeGuMaS project can avoid potential stumbling blocks and assure successful development and implementation, ultimately improving the efficiency and efficacy of the organization's security operations.

## 7.4 Future Work

The future development of the Security Guard Management System (SeGuMaS) will focus on enhancing functionality and efficiency to better meet organizational needs. This section outlines key areas for expansion and improvement.

### 1. Integration with Payroll System:

Integrating SeGuMaS with a payroll system will streamline administrative processes and improve accuracy in payroll management. This integration aims to automate payroll calculations based on guard activity data captured by SeGuMaS, ensuring timely and error-free compensation.

### 2. Mobile Application Development:

Developing a dedicated mobile application for SeGuMaS will enable real-time access to guard data and operational insights. Guards and administrators can efficiently manage schedules, report incidents, and access critical information from any location, enhancing responsiveness and operational agility.

### 3. Implementation of Real-Time Monitoring Tools:

Real-time monitoring tools utilizing GPS, biometric devices, and incident reporting systems will enhance operational oversight and security. These tools will enable supervisors to track guard movements, verify attendance through biometric authentication, and respond promptly to incidents, thereby improving overall security management effectiveness.

These planned innovations aim to improve SeGuMaS' functionality, efficiency, and efficacy. Integrating with a payroll system, creating a mobile app, and deploying real-time monitoring tools would not only simplify operations but also improve data accuracy, responsiveness, and security management skills. These enhancements are critical steps towards fulfilling changing organisational needs and industry standards for security management.

## **7.5 Summary**

In summary, the Security Guard Management System (SeGuMaS) marks a substantial leap forward in digitalizing and optimizing security operations for Jasa Perkasa Security Sdn. Bhd.,[Začs and Rendenieks (2018)]. Its implementation has proven effective in transitioning from traditional paper-based data management to a robust, secure, and scalable digital solution.

The architecture of SeGuMaS ensures compliance with industry standards and data protection regulations, protecting sensitive information while allowing seamless integration with existing systems and third-party services,[Bass et al. (2013)]. User acceptance testing and feedback have been crucial in refining SeGuMaS to meet user expectations and operational needs.

Looking ahead, future enhancements include integrating SeGuMaS with a payroll system for streamlined administration, developing a mobile application for improved accessibility and real-time data management, and implementing advanced monitoring tools for increased security and operational efficiency,[Alur et al. (2003)]. These advancements aim to further enhance the efficiency, effectiveness, and resilience of security management operations at Jasa Perkasa Security Sdn. Bhd.

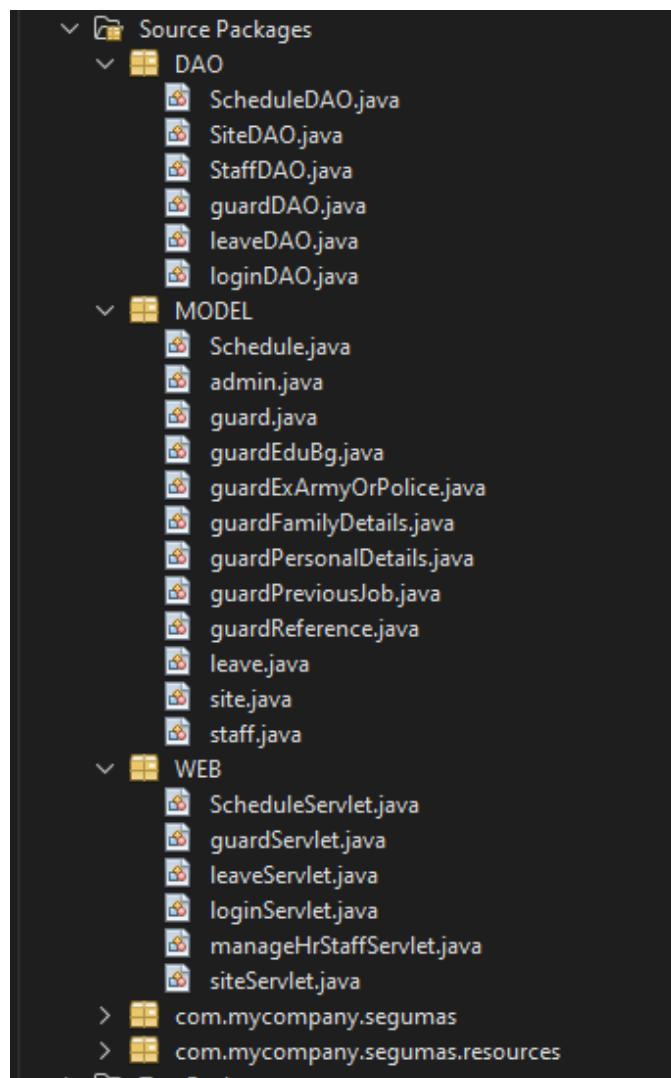
Through continuous adaptation and innovation, SeGuMaS is set to be a cornerstone in modernizing security management practices, ensuring the organization remains agile, responsive, and proactive in addressing evolving security challenges and operational demands.

## REFERENCES

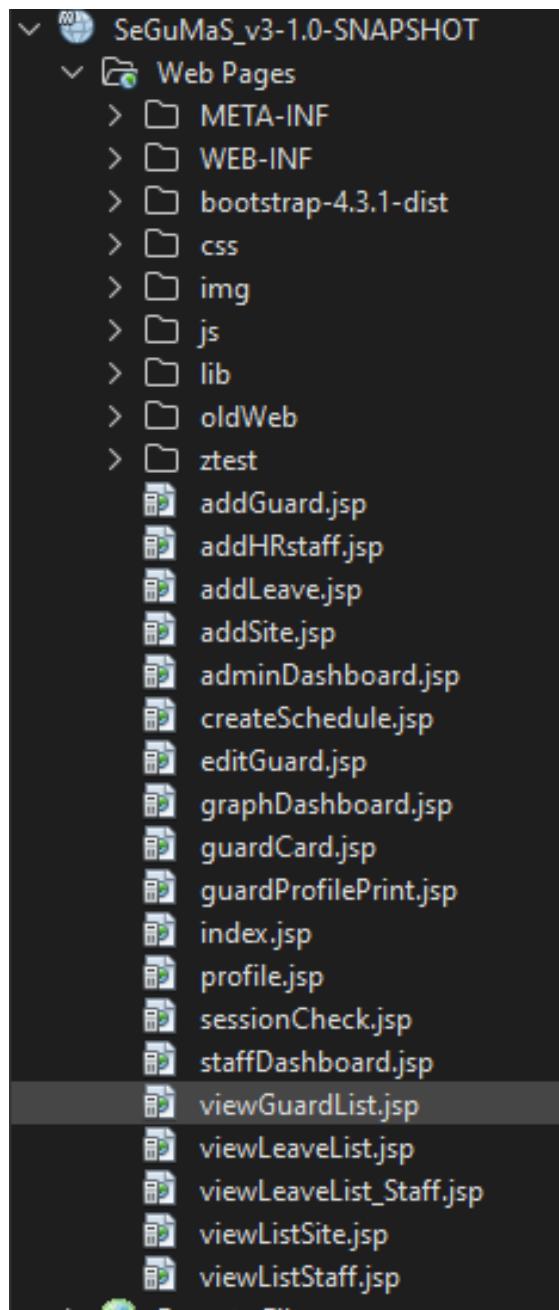
- Alur, D., Crupi, J., and Malks, D. (2003). *Core J2EE Patterns: Best Practices and Design Strategies*. Prentice Hall PTR.
- Bass, L., Clements, P., and Kazman, R. (2013). *Software Architecture in Practice*. Addison-Wesley Professional, 3rd edition.
- Bertolino, A., Fantechi, A., Gnesi, S., Lami, G., Maccari, A., et al. (2002). Use case description of requirements for product lines. In *Proceedings of the international workshop on requirements engineering for product lines*, pages 12–19.
- Jagajodhy Mr, S. and Rahim Mr, A. (2015). Staff management of a call center using system analysis and design.
- Linzhang, W., Jiesong, Y., Xiaofeng, Y., Jun, H., Xuandong, L., and Guoliang, Z. (2004). Generating test cases from uml activity diagram based on gray-box method. In *11th Asia-Pacific software engineering conference*, pages 284–291. IEEE.
- Lubis, J. H. and Zamzami, E. M. (2020). Relational database reconstruction from sql to entity relational diagrams. In *Journal of Physics: Conference Series*, volume 1566, page 012072. IOP Publishing.
- Nurbasirah bt Ibrahim, N. (2012). Staff development program (sdp) management system.
- Torim, A. (2012). A visual model of the crud matrix. *Information Modelling and Knowledge Bases*, 23:313–320.
- Začs, U. and Rendenieks, D. (2018). Security guard management centre. *Collective Monograph Edited by Ivita Kīsnica*, page 511.

## APPENDICES

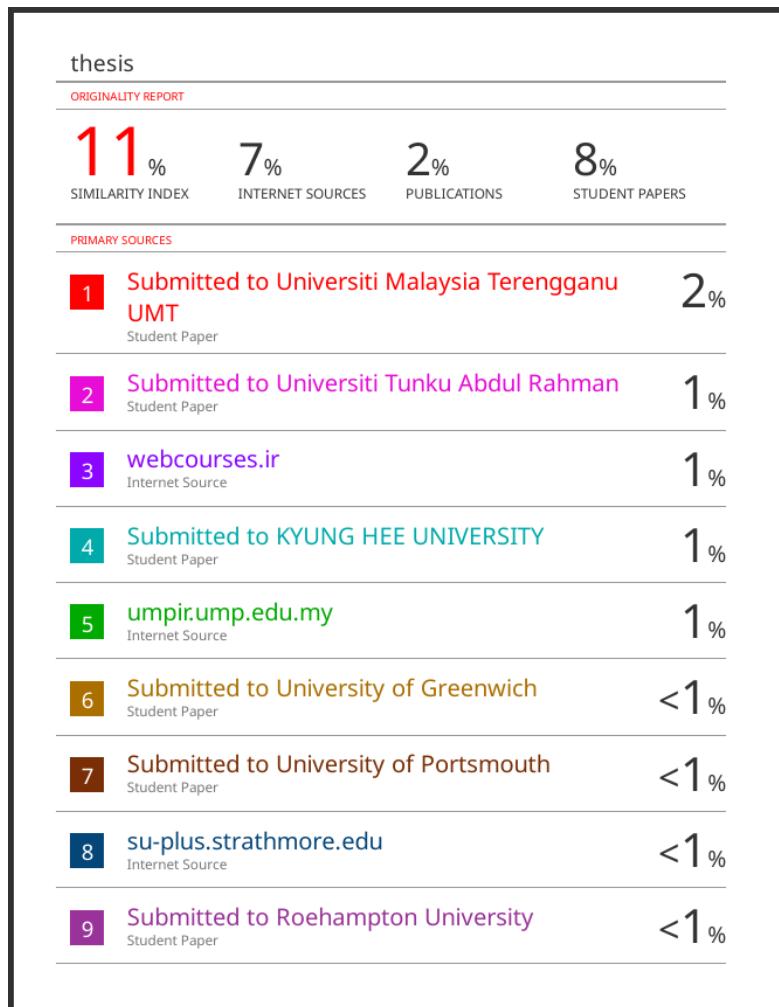
### Appendix A: SeGuMaS MVC Architecture Overview



## Appendix B: The Web Structure For SeGuMaS



## Appendix C: Turnitin Report



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