

# UNIVERSITI MALAYA

**FACULTY OF COMPUTER SCIENCE AND INFORMATION  
TECHNOLOGY**

**WIA3002 ACADEMIC PROJECT I  
SEMESTER 2 SESSION 2023/2024**

**LEGAL INFORMATION SYSTEM**

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# **LEGAL INFORMATION SYSTEM**

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KUALA LUMPUR**

**2024**

**LEGAL INFORMATION SYSTEM**

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**REPORT SUBMITTED IN FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF COMPUTER  
SCIENCE (INFORMATION SYSTEMS)**

**FACULTY OF COMPUTER SCIENCE  
AND INFORMATION TECHNOLOGY  
UNIVERSITY OF MALAYA  
KUALA LUMPUR**

**2024**

**UNIVERSITY OF MALAYA**  
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Title of Project Paper/Research Report/Dissertation/Thesis (“this Work”):

**Legal Information System**

Field of Study:

Case Management and Tracking System

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## **LEGAL INFORMATION SYSTEM**

### **ABSTRACT**

This project report presents the development of a Legal Information System for WONG & LOH Advocate & Solicitor, Kuala Lumpur. The project was initiated to address the challenges faced by the firm, such as document overload, deadline management, and manual case updates. The primary objective is to create a web-based system catering to individuals of all technical proficiency levels, track and remind on tasks and cases, and establish a centralised repository for case data and documents for remote access and retrieval. The methodology employed follows the Waterfall Model of the Software Development Life Cycle (SDLC), encompassing stages like requirements gathering, system analysis, design, implementation, and testing. Data was collected through stakeholder interviews and literature review. The system's architecture includes a frontend developed using ReactJS and Material UI for a modern, responsive user interface, and a backend built with ExpressJS for reliable API handling. MongoDB serves as the database, providing flexibility and scalability. Key features include modules for case creation, case details, and task management, all designed to enhance collaboration and efficiency within the firm. To summarise, this project is a critical step for WONG & LOH Advocate & Solicitor in improving operational efficiency, enhancing data management, and planning for future growth in the legal services sector. Ongoing developments and refinements to the Legal Information System aim to address current challenges while positioning the firm for success.

## **ACKNOWLEDGEMENTS**

First and foremost, I'd like to thank Dr. Hoo Wai Lam, who served as my supervisor and provided valuable advice in completing the first phase of the academic project. His feedback and ideas have been extremely helpful in helping me understand the project's details and clarifying any uncertainties I faced. Dr. Hoo has been very encouraging and thoughtful to me and the other students under his supervision, which has given me confidence that I will complete this project successfully.

Furthermore, I would like to thank Ms. Loh Fen Hui, my project's stakeholder, for collaborating with me. She provided me with critical information for better understanding the workflow as well as details about the challenges she faced at her legal firm. Furthermore, she provides feedback on the system I proposed, allowing me to modify and improve it. All of the information provided is extremely useful and important because it helped me understand her business workflow and ensure that the developed system aligns with her goals.

Furthermore, I would like to thank Dr. Tutut Herawan and Dr. Teh Ying Wah for being my academic project panel. Their constructive evaluation and insightful feedback during my presentation helped to significantly improve the quality of my project. Their expertise and guidance have been crucial in shaping the path of my academic project.

Last but not least, I'd like to express my heartfelt appreciation to my family for their constant support and encouragement not only throughout my academic project, but also in every aspect of my academic journey. Their love and understanding have been a constant source of strength, motivating me to excel academically and beyond.

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## **LIST OF SYMBOLS AND ABBREVIATIONS**

AI	:	Artificial Intelligence
API	:	Application Programming Interface
ERD	:	Entity Relationship Diagram
HDFS	:	Hadoop Distributed File System
IMC	:	Information Management Capability
IT	:	Information Technology
LIS	:	Legal Information System
NoSQL	:	Non-Structured Query Language
SDLC	:	Software Development Life Cycle
UI	:	User Interface

## **CHAPTER 1: INTRODUCTION TO THE PROJECT**

### **1.1 Project Background**

In today's fast-paced legal environment, the effective management of cases is critical for law firms looking to maintain a competitive advantage while offering excellent service to the clients. However, traditional manual workflows and outdated systems often present significant challenges, preventing the firm's ability to operate efficiently and deliver great service.

Recognising these problems, our project aims to improve how law firms handle their cases. By embracing current technology, we aim to optimise operations, create seamless communication among team members, and ensure strict compliance with crucial deadlines. Through this project, we hope to not only optimise internal procedures but also position the firm for long-term success in an increasingly competitive legal landscape.

The project background is further enriched by the exploration of various legal platforms and their limitations, as well as the identification of user needs and preferences through market research and user feedback. This study guided the development of the website, ensuring that it satisfies the interests of its intended users and serves as an effective and efficient tool for internal processes and collaboration.

In summary, the project's initiative represents an important step forward in the field of legal case management, providing an approach for law firms to take advantage of the opportunities provided by digital transformation. Through these efforts, legal practitioners will be able to thrive in a fast changing market while providing outstanding value to their clients.

## **1.2 Problem Statement**

- Legal firms face significant challenges as a result of document overload, with employees spending excessive amounts of time managing unnecessary documents and searching for information in hard copy. This issue not only reduces productivity but also has a negative impact on business margins. According to Letlape (2016), inefficiency caused by handling large amounts of paperwork can harm a company's overall performance. Dependence on physical documents results in time-consuming searches and difficulty in organisation, making it difficult for employees to quickly access the information they require. As a result, a significant amount of time is spent on administrative tasks rather than primary legal work, lowering the firm's profitability.
- In addition to document management issues, legal professionals frequently struggle to keep track of deadlines and tasks as they handle multiple cases at the same time. The challenge of managing multiple cases can result in important information being overlooked, causing delays and errors. These errors can have serious consequences, affecting client service quality and case outcomes. The lack of a centralised system for tracking deadlines and tasks worsens the issue, as lawyers may miss critical deadlines or fail to complete important tasks on time. This inefficiency impacts the firm's reputation while also increasing the risk of legal consequences for failing to meet client expectations and legal requirements.
- The problem with manual methods for managing case updates and client communication, which are time-consuming and prone to delays as stated by the collaborator. Without an organised system in place, important updates can be delayed, causing client frustration as they expect timely and accurate information about their cases. This inefficiency in client

communication could damage the client-lawyer relationship because clients might view the firm as unresponsive or disorganised. Implementing automated systems for case management and client communication can help eliminate these issues by ensuring that updates are delivered on time and accurately, thus improving overall client satisfaction.

As such, building a proper system that addresses the issues would allow legal professionals to concentrate on core legal work, increase overall productivity, and strengthen the firm's competitive advantage in the industry.

### **1.3 Project Objectives**

The main objectives of this project are as follows:

- To establish a centralised repository for case data and documents for remote access and retrieval.
- To track and remind on tasks and cases, to minimise the risk of missed deadlines.
- To develop a web-based application catering to individuals of all technical proficiency levels.

## **1.4 Project Scope**

### **1.4.1 Target User**

There are 3 target users for the Legal Information System. The target users are as follows:

- System Administrator: Managing users and their roles within the Legal Information System, managing category creation and update, as well as handling announcements for internal communication.
- Legal Practitioners: Creating and accessing case information, uploading and managing documents, setting tasks and deadlines, and collaborating with other team members.
- Legal Clients: Viewing case status and documents shared by legal practitioners, communicating with the legal team, and accessing important information related to their legal matters.

### **1.4.2 System Scope**

The final deliverable is a web-based legal information system. There are a total of 9 modules in the system as stated below:

- General (Administrator, Legal Practitioners, Clients)
- Dashboard (Administrator, Legal Practitioners)
- Notifications (Administrator, Legal Practitioners)
- Announcements (Administrator, Legal Practitioners)
- Case Creation (Administrator, Legal Practitioners)
- Cases (Administrator, Legal Practitioners)
- Case Details (Administrator, Legal Practitioners, Clients)
- Documents (Administrator, Legal Practitioners, Clients)
- Tasks Management (Administrator, Legal Practitioners)

## 1.5 Project Timeline

Task	Week														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Title Selection															
Preliminary discussion															
Problem statement															
Project Objectives															
Literature review															
Methodology															
Requirement analysis															
Analysis and design															
Identify tools for implementation															
Monitoring session															
Technical implementation															
Viva session															
Report Submission															

Table 1.1: Project Timeline for Academic Project I

## **1.6 Project Repository**

The source code of the project is stored within a Github Repository for version control, and efficient code management. The links to the project are as follows [LIS: Legal Information System - Frontend](#) and [LIS: Legal Information System - Backend](#). Please reach out to me if you need access to review the system's source code as the repositories are in private.

## **CHAPTER 2: LITERATURE REVIEW**

In this chapter, we will review relevant literature related to legal assistance and processes. Moreover, we will also review existing systems with similar functionalities and purposes. By understanding the existing research and systems in this field, we will be able to create a foundation for our project and determine the problems that we can tackle.

### **2.1 Existing Literature**

This literature review examines the challenges and solutions addressed by previous studies related to legal information systems. It explores the systems proposed in previous research, their methodologies for system development, and the solutions they offer.

#### **2.1.1 Lawyers' Work Management Through Digitization**

This paper explores the importance for digitalisation in law firms, focusing on increasing work efficiency through improved file management systems. Traditional methods of managing legal documents have proven ineffective due to the huge number of files and manual processes involved. Lawyers face serious problems in keeping case files organised, which is required for legal proceedings. The absence of a structured system leads to inefficiencies, time waste, and difficulty accessing critical information quickly.

To address these issues, this study proposes an automated system specifically designed for Sri Lankan lawyers. The proposed system focuses on using cloud storage to provide remote access to case files from any location. Key features include creating separate client folders based on case categories, setting up time reminders and alerts, integrating chatbots for client

communication, storing templates for repetitive tasks, and providing access to soft copies of reference materials.

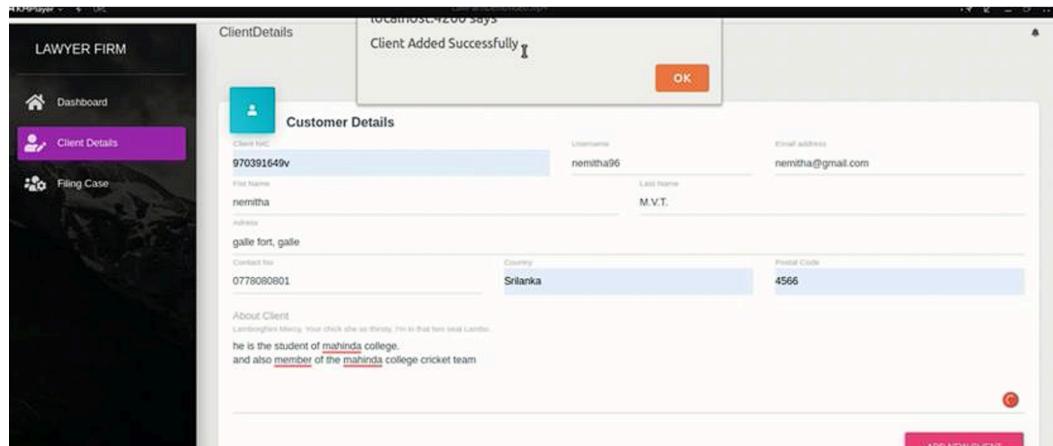


Figure 2.1: Proposed File Management System Design

In contrast with existing software solutions such as "Clio" and "MyCase," often used in foreign law firms, which mainly focus on billing and invoicing, the suggested system prioritises document management and efficiency in operation through a digital shift. Moreover, this study shows an increasing need for technology improvement in the legal field. Clients seek faster and more efficient services, forcing law firms to implement digital solutions that improve workflow while maintaining data protection and privacy.

In conclusion, this study highlights the importance of digitisation in transforming legal services. By embracing modern technology, Sri Lankan lawyers can raise productivity, improve client satisfaction, and adapt better to the changing demands of the legal profession.

### 2.1.2 Legal Files Management System Using Big Data

This paper explores the role of Hadoop in managing and analysing large datasets, specifically in the context of legal case files. As data grows exponentially, managing extremely large datasets has become an issue. The paper describes how Hadoop uses its distributed file

system (HDFS) to process and store large amounts of data. HDFS allows data to be distributed across multiple nodes, which improves the system's ability to handle large datasets efficiently.

However, the exponential growth of data results in limitations that have to be addressed. One of the primary challenges is the complexity of data analysis, especially in big data contexts. Traditional data processing tools are usually insufficient to handle the massive amounts of data generated today. Hence, the paper suggests utilising advanced tools like Apache Pig and Apache Spark to simplify MapReduce program writing and improve data processing speed.

The paper highlights the significance of using scalable storage solutions, specifically Hadoop's HDFS, for managing big data. HDFS efficiently handles distributed data storage and processing by partitioning data into large blocks and distributing them across nodes in a cluster, ensuring fault tolerance and parallel processing. The paper also emphasises the importance of integrating advanced analytics tools like Apache Spark in big data management. Spark's real-time processing capabilities and handling complex tasks make it an effective tool for extracting valuable insights from large datasets, especially in legal case files, which allows quick access and analysis.

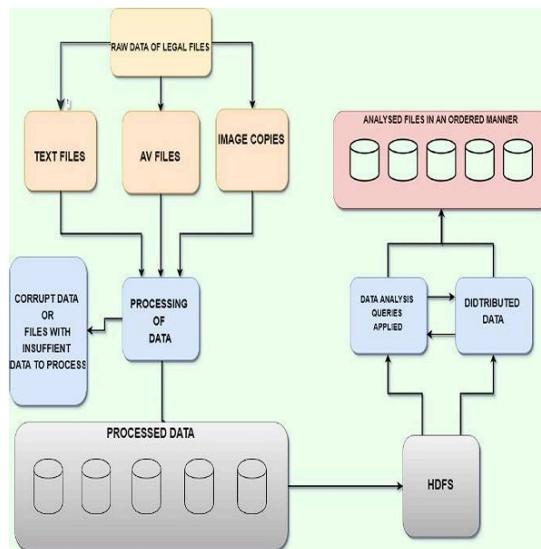


Figure 2.2: System Architecture by integrating HDFS

In conclusion, the paper provides an in-depth discussion of how Hadoop and its tools can help with the challenges of managing and analysing large datasets. Hadoop provides a solid framework for overcoming the limitations of big data by using scalable storage solutions, implementing data partitioning techniques, and integrating advanced analytics tools.

### **2.1.3 Managing information in law firms: changes and challenges**

The legal industry is changing significantly due to increased competition, technological advancements, and changes in client expectations. These changes require law firms to implement efficient information management practices in order to remain competitive and operationally effective.

Managing information assets within legal firms presents challenges such as maintaining client confidentiality during the transition from hard copy to digital records. This includes managing data security concerns and regulatory compliance, which are important in protecting sensitive client information. Another challenge is overcoming cultural barriers that discourage lawyers from sharing information, which comes from the traditional norms of individuality within firms.

Addressing these challenges requires the development of a collaborative environment that promotes knowledge sharing and collective decision making. Despite these challenges, effective information management provides significant benefits. It can give law firms a competitive advantage by improving the delivery of services, strengthening client relationships, and differentiating what they offer in the market. Furthermore, it reduces costs by streamlining processes, reducing operational inefficiencies, and reducing the risks related to inaccurate or inaccessible information.

## 2.1.4 How Information Management Capability Influences Firm Perform

Information Management Capability (IMC) has become known as a key indicator of organisational capabilities and firm performance in today's business environments. The article provides recent research to investigate the impact of IMC on organisational capabilities, its relationship with leadership and strategic planning, and the strategic needs for management.

Recent research, stated by Mithas et al. (2011), highlights IMC's critical role in improving organisational capabilities such as customer management, process management, and performance management. IMC serves as a fundamental capability, allowing businesses to effectively manage customer relationships, streamline business processes, and optimise overall performance results. This fundamental role promotes the development of higher-level organisational capabilities required for long-term competitive advantage.

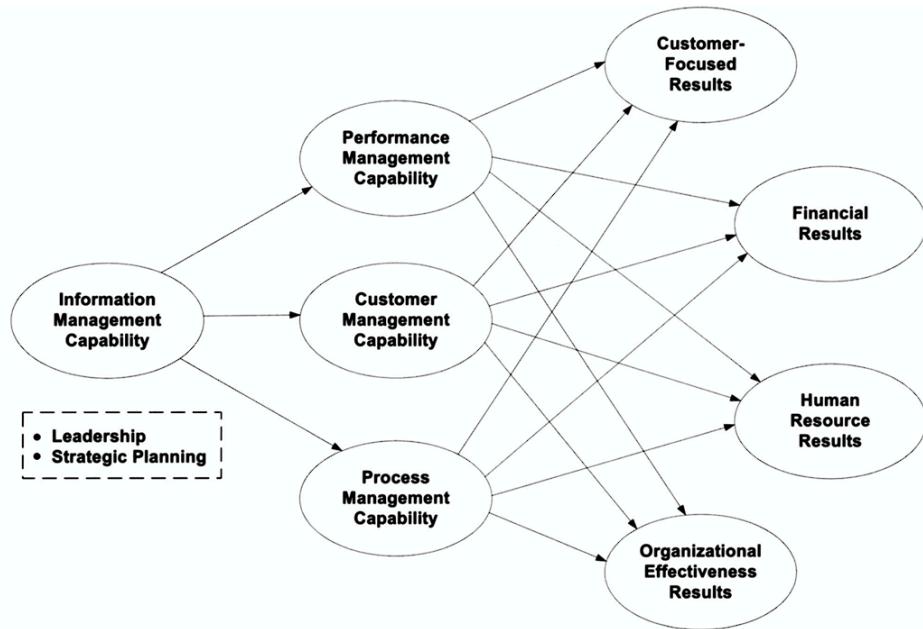


Figure 2.3: Conceptual Model of Information Management Capability

Mithas et al. (2011) provide empirical evidence demonstrating a positive relationship between IMC and various dimensions of firm performance. Customer management capability is

particularly important, as it influences customer satisfaction and financial metrics. Furthermore, process management and performance management capabilities significantly improve financial performance, human resource effectiveness, and overall organisational effectiveness. These findings highlight the importance of developing different organisational capabilities in order to achieve overall performance improvements.

While effective leadership and strategic planning are crucial for applying organisational capabilities, IMC is still important for developing flexible and adaptable organisational structures. Integrating IMC into strategic planning frameworks enables businesses to effectively use information assets, match company's goals with strategic objectives, and achieve long-term growth and competitive advantage.

Management must invest in and develop IMC as an essential driver of organisational shifts and improved business performance. Proactive IT governance and resource management are critical for applying IMC, as they enable smoother operational processes, proactive decision-making, and innovative service delivery in dynamic market environments.

The integration of IT infrastructure and organisational skills improves operational efficiencies and enables organisations to take advantage of digital opportunities. This integration emphasises IMC's role in promoting organisational flexibility and maintaining its competitive edge.

## **2.1.5 The Future of Law Firms (and Lawyers) in the Age of Artificial Intelligence**

This paper provides a thorough examination of the revolutionary effect of artificial intelligence (AI) on the legal field, focusing on both the benefits and the providers of AI-powered legal services. This paper highlights several key benefits of integrating AI into the legal field.

AI tools can improve efficiency by automating routine tasks like document review, legal research, and contract analysis, allowing lawyers to focus on more complex work. AI-driven analytics can improve decision-making by providing insights from massive amounts of data that humans are unable to handle manually. Predictive analytics can help forecast case outcomes based on historical data, hence advising strategy and decision-making. Another significant benefit is cost savings. By automating repetitive tasks, AI can reduce the costs of legal services, making them more affordable to a wider range of clients. Furthermore, AI tools can improve access to legal services by providing self-help options for people who cannot afford traditional lawyers.

Moreover, this paper specifies three major groups controlling the development and delivery of AI-powered legal services. First, legal publishers such as Thomson Reuters and Wolters Kluwer are actively involved in developing AI tools for the legal industry. These organisations use their huge legal databases and expertise to create advanced AI solutions. Second, major accounting firms, which were previously viewed as a threat by the legal profession, are now important figures in the AI legal services market. These firms benefit from a corporate structure that allows for major investment in capital as well as an international presence, letting them to effectively enter the legal services market. Third, high-tech entrepreneurs supported by venture capital are promoting innovation in AI legal solutions. These

startups have made the most significant advances in AI applications in the legal field, with significant venture capital investment.

Finally, This paper also highlights the importance of regulation of non-lawyer-provided legal services, especially as alternative legal service providers become increasingly common. The ability of these organisations to innovate and invest in AI solutions places them as key players in the future of legal services.

## 2.2 Existing Systems Analysis

### 2.2.1 Jarvis

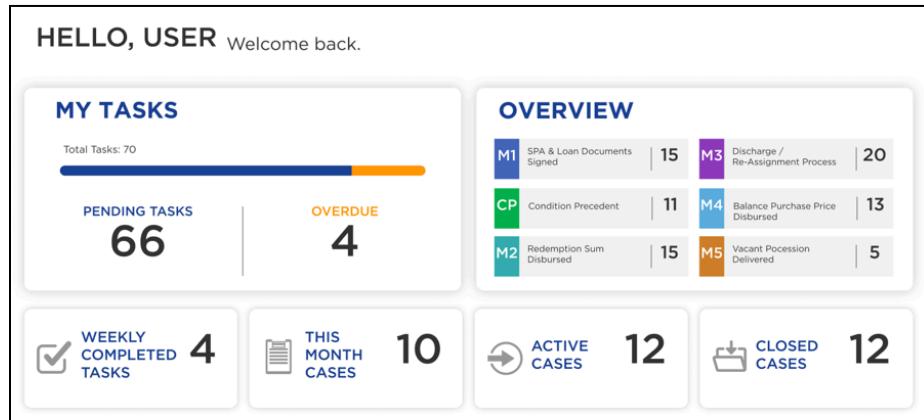


Figure 2.4: Jarvis Web-based Conveyancing Software

Jarvis is a web-based conveyancing software specifically designed for Malaysia's property transfer process which aims to enhance efficiency and accuracy for conveyancing practitioners. The software features a comprehensive dashboard that centralises all activities to ensure that practitioners can effectively manage their tasks.

A key feature of Jarvis is its reminders and notifications system, which ensures that tasks are completed on time by providing alerts as deadlines approach. This feature helps users stay organised and avoid missing important deadlines. Additionally, Jarvis's automation capabilities

significantly reduce the manual workload by prioritising tasks and guiding users through their daily tasks.

Another main feature of Jarvis is "My Tasks" which centralises task management and offers different views such as list, board, and calendar. This flexibility helps users organise and prioritise their work effectively, ensuring that no task is overlooked. Additionally, team collaboration is enhanced by the ability to add tasks to multiple projects to reduce duplicate efforts and improve visibility across teams.

Nevertheless, Jarvis lacks essential document management capabilities necessary for organising case documents effectively, which will impact workflow efficiency and document retrieval. The absence of analysis and announcement features will also limit its ability to provide insights into business performance and improve internal communication within legal teams. Additionally, Jarvis does not provide client access to the system, which could impact collaboration between firms and clients.

## 2.2.2 CoreMatter

MATTER	MATTER DESCRIPTION	CLIENT	PARTNER IN CHARGE	FILE REF NO	PRACTICE AREA	OPEN DATE
<a href="#">000116</a>	Intellectual property dispute on the trademark for Potasco	Potasco Ltd	SF	KP/Dec12/123/116	Commercial Litigation	29/12/15
<a href="#">17000241</a>	Breach of Contract	BIBD BERHAD	SF	11BOC/9/a	Commercial Litigation	04/09/17
<a href="#">17000240</a>	Defamation suit against Tan Sri Ali Bakar	Kamaruddin & Partners	SF	32525/123/cc	Defamation	04/09/17
<a href="#">17000248</a>	Suit against Prudential Holdings Compensation claims	Abdullah Chen & Co	SF	88C11/1	Contract	08/09/17
<a href="#">17000250</a>	Suit against Gamuda	Potasco Ltd	SF	123/994g	Commercial Litigation	11/09/17
<a href="#">17000249</a>	Suit against Abdul Kareen for Defamation	Hassan Merican	SF	141/41	Defamation	11/09/17
<a href="#">17000246</a>	Suit against Hartamas holdings for IP infringement	Tiruan Holdings	SF	IP/001	Intellectual Property	04/09/17
<a href="#">17000244</a>	Debt Recovery Agreement	Theed Cor Yong Lim Siew Lee, Mdm Chia Huey Ching	SF	DCqq/551	Conveyancing	04/09/17
<a href="#">17000247</a>	Suit 34 of 2016 for Darren vs Yen	Ali Kassim	SF	44.100c	Criminal	04/09/17
<a href="#">17000235</a>	Corporate Restructuring	Hassan Alias	SF	123/515	Company Law	22/08/17

DATE	MATTER	DESCRIPTION	UNITS	RATE	COST	DISC(%)	AMOUNT
19/09/17		Meeting: 1st meeting client meet notes	1	1,000.00	100.00	0.00	100 <input checked="" type="checkbox"/> <input type="checkbox"/>
01/09/17		Conference Call:	1	1,000.00	100.00	0.00	100 <input checked="" type="checkbox"/> <input type="checkbox"/>

Figure 2.5: CoreMatter Legal Practice Management and Accounting & Billing System

CoreMatter is a comprehensive legal practice management software designed to streamline operations and enhance efficiency for law firms. One of CoreMatter's strengths is its robust case management capabilities. The software allows law firms to efficiently manage cases from start to finish. It allows users to easily organise case details and monitor progress. CoreMatter allows efficient document gathering and management. It includes tools for creating document templates, version control, and secure storage to help reduce errors and ensure compliance with legal standards. CoreMatter also performs well at time tracking and billing functions. The software allows lawyers to accurately track billable hours and expenses, which is crucial for client billing and internal financial management. However, CoreMatter lacks a crucial task tracking feature necessary for adhering to deadlines, which could impact workflow management and timely task completion. Additionally, it does not provide clients with direct access to the system, limiting transparency and collaboration between firms and their clients.

### 2.2.3 Maxift

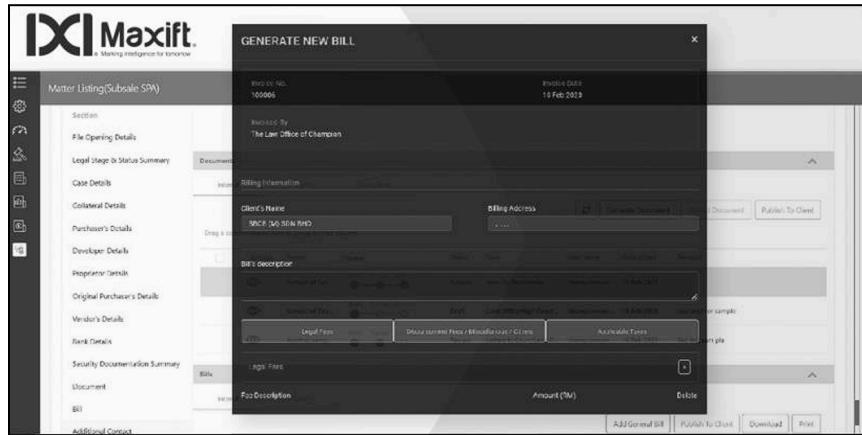


Figure 2.6: Maxift Web-based Legal Practice Operation Management Software

Maxift is a web-based legal practice management software that aims to modernise and optimise Malaysian law firms. It includes essential modules to streamline operations and increase efficiency, transforming traditional practices into high-performing businesses. A file opening registry for efficient case initiation, built-in escalation processes to ensure accuracy and compliance, and automated templates to make document creation easier. Maxift enables real-time task scheduling and personalised document management, which reduces manual workload and increases organisational efficiency. It provides remote access and client interaction via secure portals, allowing for remote work flexibility and real-time case status updates. Maxift's robust security protocols and reporting capabilities ensure data integrity and support accurate decision-making. However, it lacks features such as temporary access for client interaction and an announcement feature which is crucial for internal communications.

### 2.2.3 Comparisons Between Existing Systems and Proposed System

Below is a table of comparisons between the similar existing systems together with the proposed system. The features listed are the features that are suitable and can be integrated into the proposed system.

Features	Jarvis	CoreMatter	Maxift	LIS
Create Case	✓	✓	✓	✓
Tasks Tracking	✓	✗	✓	✓
Document Management	✗	✓	✓	✓
Analysis	✗	✓	✓	✓
Client Access	✗	✗	✓	✓
Notifications	✓	✗	✓	✓
Announcements	✗	✗	✗	✓

Table 2.1: Comparisons Between Existing Systems and Proposed System

### 2.3 Summary

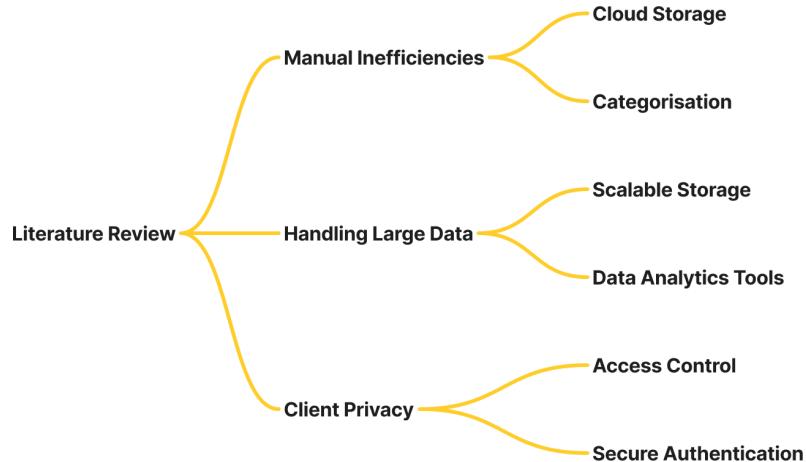


Figure 2.7: Literature Review Summary

According to the literature reviewed, three major challenges faced by the legal industry have been identified: manual inefficiencies, managing large amounts of data, and ensuring strong client privacy. To effectively address these challenges, a thorough legal information system is proposed.

To address manual inefficiencies, the system will utilise cloud storage, which will allow for remote access and document categorisation. This approach not only simplifies document management, but also improves operational efficiency by reducing time spent on repetitive tasks.

Second, to address the issue of managing large amounts of data within legal firms, scalable storage solutions and advanced data analytics tools will be used. These tools are essential for extracting valuable insights from large datasets, enabling more informed decision-making and strategic planning in legal practices.

Finally, protecting clients' privacy is important. The legal information system will include access control to help manage user permissions effectively. Furthermore, secure authentication protocols will be implemented to prevent unauthorised access to sensitive information while ensuring compliance with strict data protection regulations.

To summarise, the implementation of an advanced legal information system presents promising solutions to the challenges posed by manual processes, data management difficulties and privacy concerns in the legal field.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Software Development Life Cycle (SDLC)**

Software development requires careful planning to ensure that the final product meets the needs of the users. To achieve this goal, the Waterfall model methodology is implemented throughout the SDLC phases to ensure high-quality deliverables that effectively meet end-user requirements.

#### **3.1.1 Overview of Waterfall Model**

The waterfall model is the chosen SDLC methodology for this project. In adopting the waterfall model, we embrace a structured and systematic approach that ensures clear progression and thorough planning throughout the development process. With a strong emphasis on requirement clarity and detailed documentation, we aim to develop a solution that aligns with the organisation's needs and objectives. By following the sequential progression and thorough testing, we seek to deliver a high-quality product that meets the specified requirements and functions upon deployment. While there are limitations in flexibility, the waterfall model has a robust framework that provides a solid foundation for the successful development and implementation of the project, paving the way for improved efficiency and collaboration within the organisation.

### 3.1.2 Stages Involved in the Waterfall Model

Figure 3.1 shows the stages involved in the Waterfall Model. This methodology involves five stages, which are requirements, analysis and design, implementation, testing and deployment.

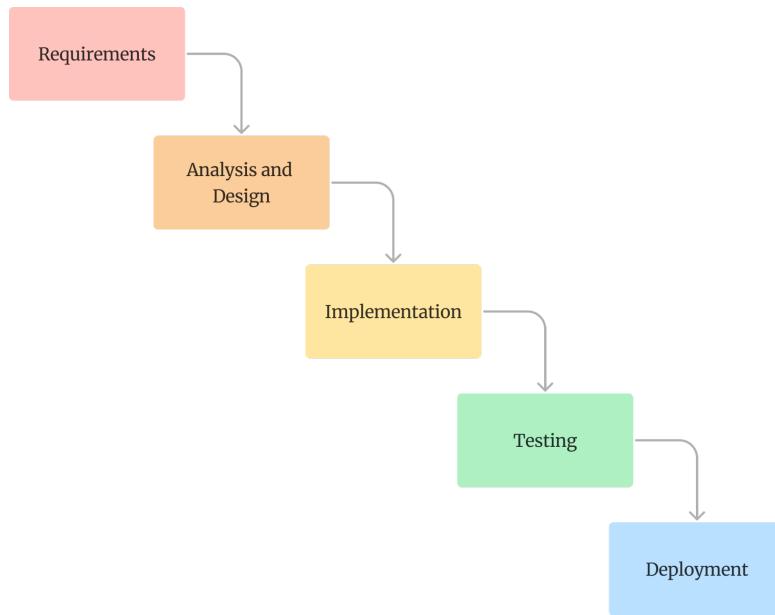


Figure 3.1 The Waterfall Model

#### 3.1.2.1 Requirements

During the requirement phase, the focus is on defining the objectives and scope of the project, understanding the needs of the collaborator through interviews, and conducting research on existing platforms to identify potential gaps in the market. This phase involves a thorough analysis of the project's purpose and goals, ensuring a clear understanding of what needs to be achieved. Through interviews with the collaborator, insights are gathered to understand their preferences, expectations, as well as the functional and non-functional requirements for the project. Additionally, research is conducted to analyse existing platforms and solutions in the market, identifying areas where the proposed project can offer unique value or solve gaps in the market. By defining the objectives and scope, and gaining a deep understanding of the

collaborator's needs and the market landscape, the requirement phase establishes a foundation for the development of the project.

### **3.1.2.3 Analysis and Design**

During the Analysis and Design phase, the focus is on defining the overall architecture of the web application, designing the database schema to store and manage information and documents, and developing wireframes and prototypes to visualise the layout and user flow of the app. This phase involves converting the requirements gathered in the previous phase into concrete design specifications. The overall architecture of the web application is defined, showing the various modules and technologies that will be used to build the platform. At the same time, the database schema is designed, defining the structure of the database and how data will be organised, stored, and retrieved. Wireframes and prototypes are developed to visualise the user interface, layout, and navigation of the application, providing a concrete visualisation of the user experience.

### **3.1.2.4 Implementation**

During the Implementation phase, we begin by determining the most suitable programming languages, frameworks, and tools to use while developing the web application. Once the decisions are made, the system features will be coded and implemented based on the chosen design standards and the technology stack. This involves writing the code that will make the system's function, from the backend logic to the frontend user interface. As the implementation is ongoing, the work will be reviewed continually to ensure that everything is in

line with the initial concept. Unit testing is critical during this phase, as the individual code components will be tested to verify they perform properly on their own.

### **3.1.2.5 Testing**

During the Testing phase, the focus shifts to ensuring the quality and reliability of our web application. We start by performing various types of testing to validate its functionality, usability, and performance. This includes conducting functional testing to ensure that all features and functionalities work as intended, usability testing to evaluate the user experience and interface design, and performance testing to assess the application's speed, responsiveness, and scalability under different conditions. Throughout the testing process, we thoroughly identify and document any defects or issues found, whether they are related to functionality, usability, or performance. The issues will then be addressed and fixed to ensure that the application meets our quality standards.

### **3.1.2.6 Deployment**

In the Deployment phase, the culmination of our efforts is the launch of the web application, making it accessible to our intended users. This involves deploying the application to the appropriate servers or platforms, ensuring that it is available and ready for use. Additionally, we provide training and support materials to users to help them navigate and utilise the platform effectively. These materials may include user guides, tutorials, or interactive training sessions, designed to familiarise users with the features and functionalities of the application and empower them to make the most of its capabilities.

## **3.2 Data Gathering Methodology**

During the project's requirement phase, data is gathered to better understand the problem and the solution that will be implemented in the system. Throughout this phase, two methodologies were used: interviews with stakeholders as part of collaboration initiatives and literature review.

### **3.2.1 Stakeholder Interview**

As part of the data gathering process, several interview sessions are conducted with Ms. Loh Fen Hui, an associate at Wong & Loh Advocates & Solicitors. The firm is currently using CoreMatter primarily which is a legal practice management software. The objective of these interviews was to understand the current challenges and requirements for their legal information system.

Ms. Loh mentioned that the firm is currently using CoreMatter, although she did not provide specific feedback on its pros and cons. The primary challenge with the current system is the manual effort required by staff to update clients on their case status. This process is time-consuming and inefficient, leading to delays and potential miscommunication.

Ms. Loh highlighted several key features that the new system should include:

1. File Management: Efficient organisation and retrieval of case documents.
2. Case & Client Information: Centralised storage of all case-related and client information.
3. Case Status: The ability to view the current status of each case.
4. Task Notifications: Automated reminders and notifications for tasks and deadlines.
5. Categorisation: Support for multiple case categories such as housing projects, subsales, and completed properties.

A prototype of the proposed system was also presented to Ms. Loh and her team for review. They provided constructive feedback based on their interactions with the prototype. Furthermore, she provided example documents for each case category that detailed the tasks associated with the various types of cases. She also provided sample data to show the types of information that must be handled within the system. This additional information is crucial for creating a system that can effectively handle various document types and task flows.

Ms. Loh provided detailed feedback on the firm's requirements and challenges across multiple interview sessions. These sessions helped shape my understanding of the new legal information system's necessary functionalities.

### **3.2.2 Literature Review**

A literature review is carried out to determine related topics that have previously been studied, providing valuable insights into the project's problems and requirements. The results highlight the advantages of such a system for lawyers, clients, and administrators. Existing systems are analysed and compared to better understand their features and identify new, creative ideas that can be utilised in the proposed system. Furthermore, the development processes, tools, and frameworks implemented in these systems are analysed to determine the most effective methods for building the legal information system.

## CHAPTER 4: SYSTEM ANALYSIS AND DESIGN

### 4.1 Requirements Analysis

During the requirements analysis phase, the system's functional and non-functional needs are determined to ensure that all required features and characteristics are met.

#### 4.1.1 Functional Requirements

The system should contain the following features:

Req. ID	Use Case ID	Module	Feature	Description
FR-1	UC-1	General	Register	To allow users with different roles to register an account in the system.
FR-2	UC-2		Login	To provide users with a way to access the system by entering their credentials.
FR-3	UC-3	Dashboard	Overview	To display an overview regarding active cases and tasks to be completed.
FR-4	UC-4		Analysis	To provide an overview of various metrics and insights related to case management and performance.
FR-5	UC-5	Notifications	Notifications	To receive notifications on case updates, deadlines and reminders on tasks.
FR-6	UC-6	Announcements	Announcements	To receive announcements created by the admin.

FR-7	UC-7		Create Announcement	To allow admin to create announcements.
FR-8	UC-8		Update Announcement	To allow admin to edit and delete announcement details.
FR-9	UC-9	Case Creation	Create Case	To allow users to create a case by choosing predefined categories.
FR-10	UC-10		Create Categories	To allow users to create predefined categories which can be used to generate new cases with consistent information and details.
FR-11	UC-11		Update Categories	To allow users to view, edit, and delete existing categories.
FR-12	UC-12	Cases	Case Listing	To list out all the cases handled by the legal firm.
FR-13	UC-13		Case Searching	To allow users to search for a specific case.
FR-14	UC-14		Case Filtering	To allow users to filter out cases based on time and categories.
FR-15	UC-15	Case Details	Details	To allow users to view details, edit details, and change the status of a case.
FR-16	UC-16		Link Generator	To allow lawyers to generate links and QR code for clients to temporarily access their case details.
FR-17	UC-17		Case Log	To allow users to add important

				updates or messages regarding the case.
FR-18	UC-18		Tasks	To allow users to view, edit, add, delete tasks for each phase.
FR-19	UC-19		Tasks Reminder	To allow users to add reminders to the tasks.
FR-20	UC-20	Documents	Document Listing	To list out and access all the documents by case.
FR-21	UC-21		Document Searching	To allow users to search for a specific document.
FR-22	UC-22		Documents Filtering	To allow users to filter out documents based on time, categories, and file types.
FR-23	UC-23		File Management	To allow users to create folders, upload, remove, and download documents.
FR-24	UC-24	Tasks Management	Tasks Tracking	To allow users to view all the tasks and their current status in a single page.
FR-25	UC-25		Tasks Filtering	To allow users to filter tasks based on their status.

Table 4.1: Functional Requirements

#### **4.1.2 Non-functional Requirements**

There are two non-functional requirements that will be focused on during the system development. This is to ensure that the system quality is guaranteed and improve the user experience. The requirements are stated below:

Req. ID	Feature	Description
NFR-01	User-friendly	To develop a web application that suits different kind of users
NFR-02	Role-based access	To allow users of different roles to access the system with different functionalities

Table 4.2: Non-functional Requirements

## 4.2 Project Breakdown Structure

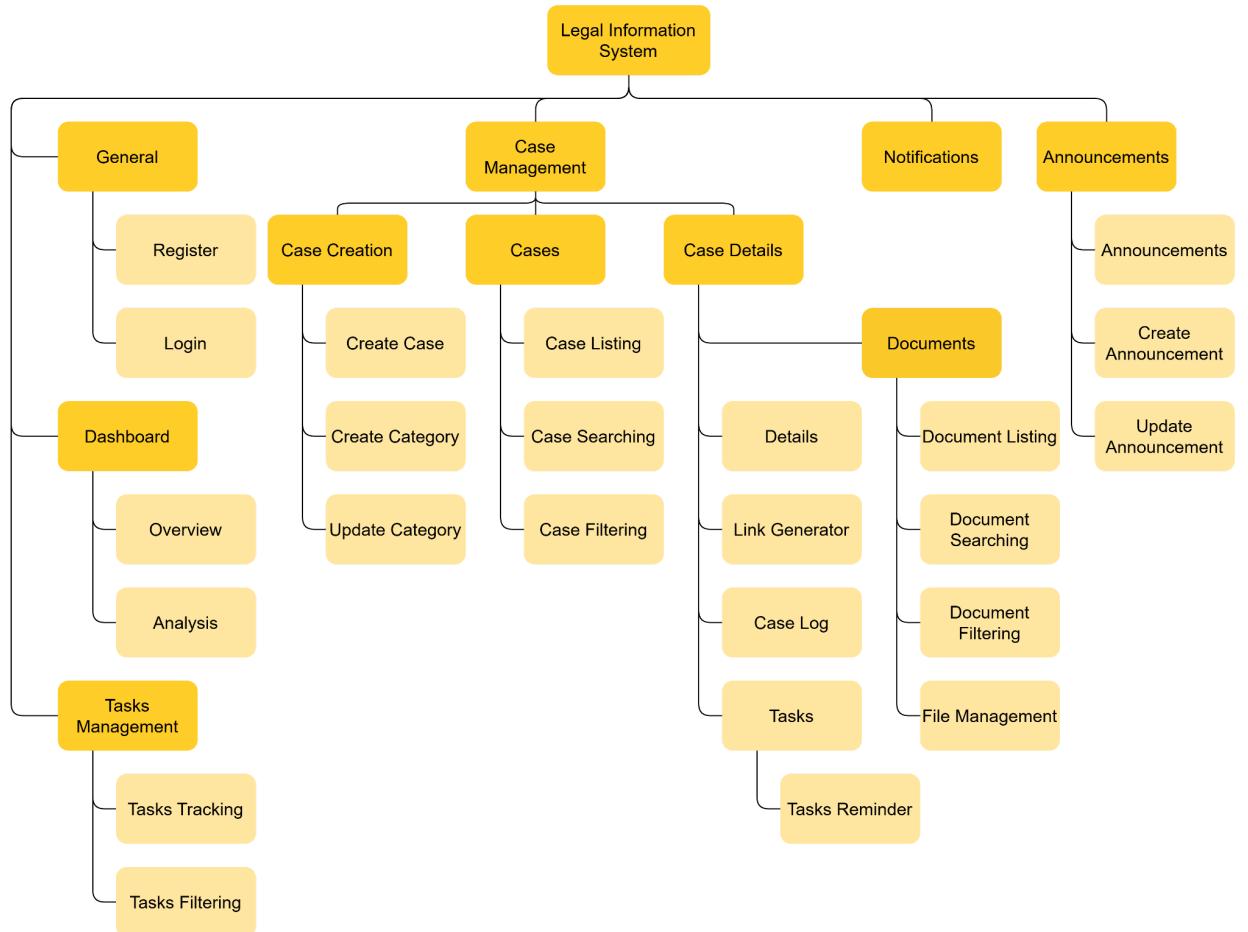


Figure 4.1: Project Breakdown Structure

### 4.3 Use Case Diagram

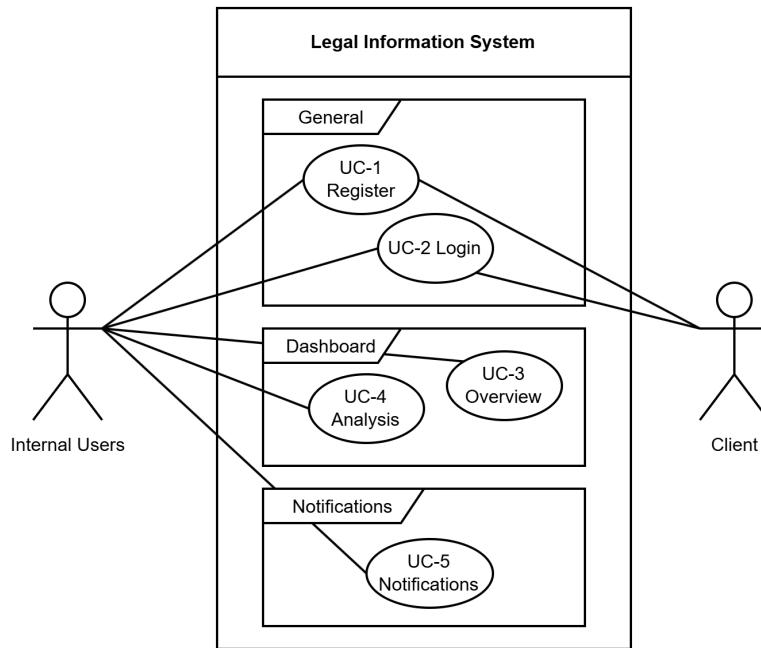


Figure 4.2: Use Case Diagram of Legal Information System (Part 1)

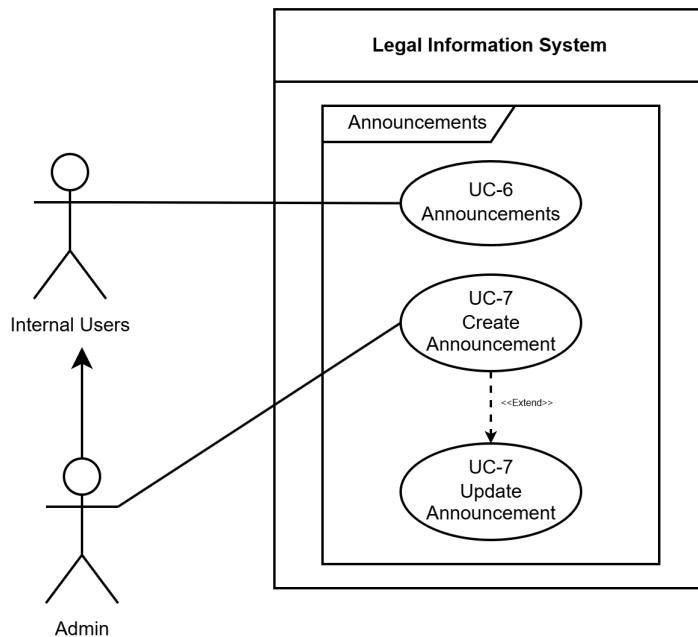


Figure 4.3: Use Case Diagram of Legal Information System (Part 2)

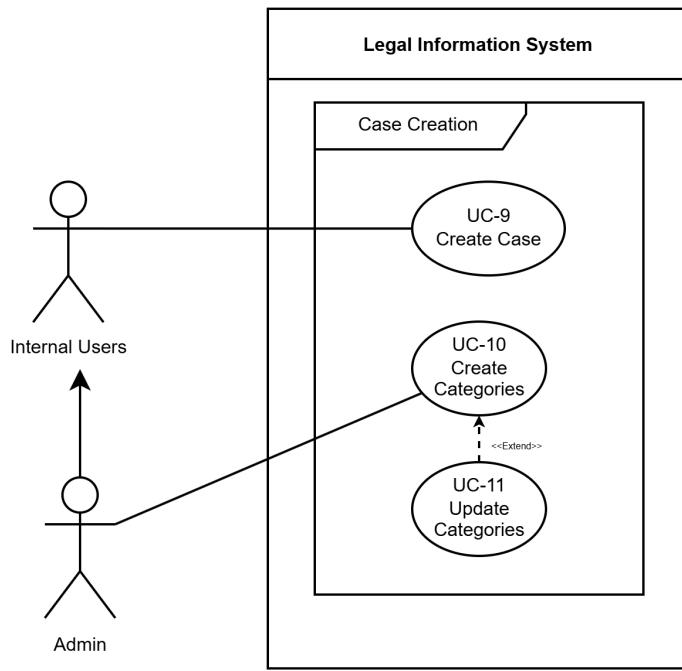


Figure 4.4: Use Case Diagram of Legal Information System (Part 3)

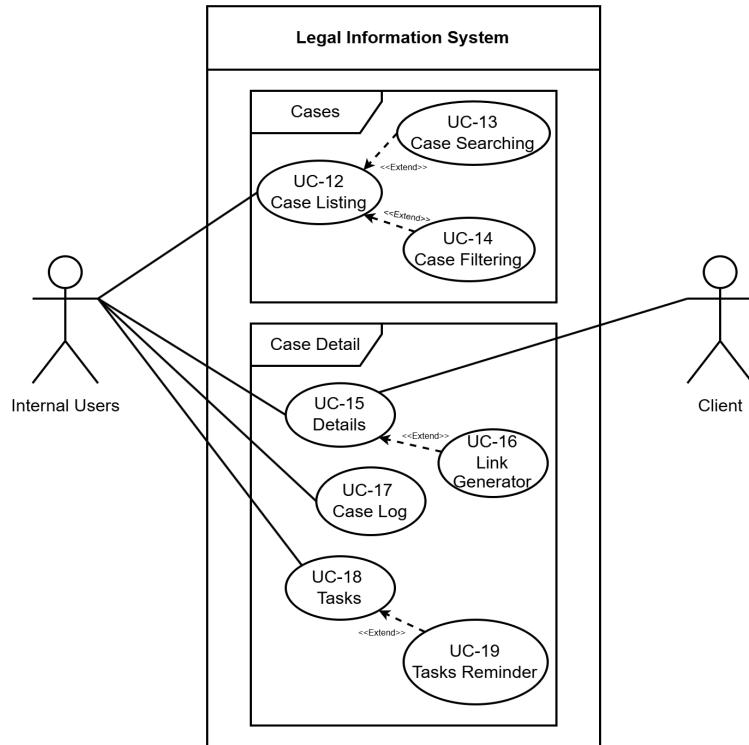


Figure 4.5: Use Case Diagram of Legal Information System (Part 4)

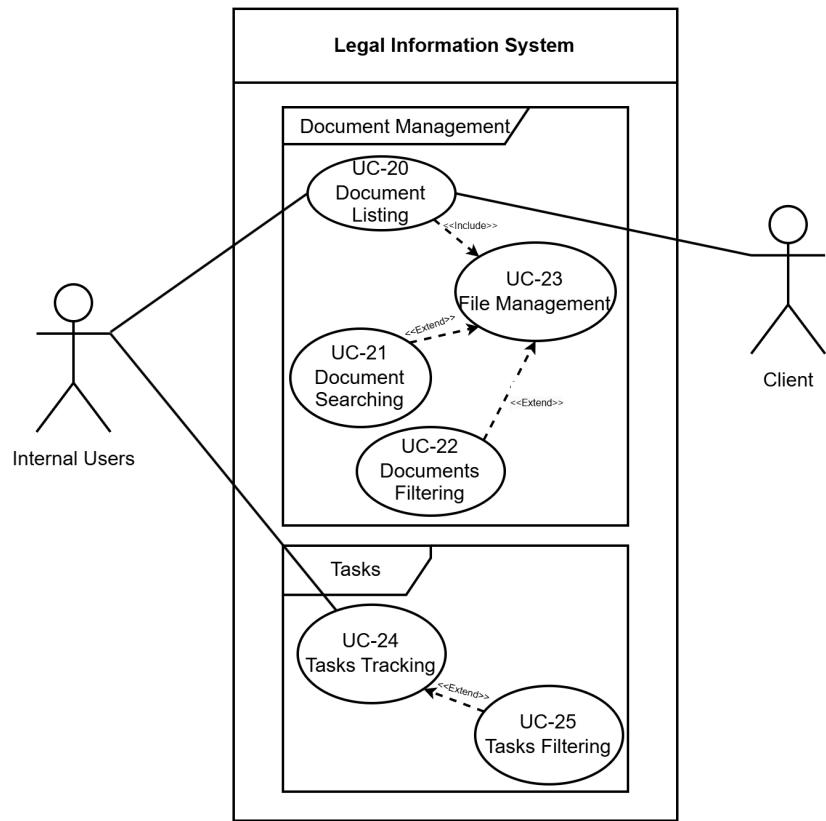


Figure 4.6: Use Case Diagram of Legal Information System (Part 5)

## **4.4 Business Rules and Entity Relationship Diagram**

### **4.4.1 Business Rules**

Business rules offer a more thorough understanding of data relationship constraints and provide how different entities within the system interact with one another. These rules are needed for visualising the relationships between entities in the system since the system will be developed with a NoSQL database structure.

Business rules of the Legal Information System:

1. Users

- A user can be assigned to one and only one role.
- A role can be assigned to one or more users.

2. Cases

- A case can be assigned to one and only one user (Legal Practitioner).
- A user can be assigned to zero or more cases.
- A case can belong to one and only one category.
- A category can have zero or more cases.
- A case can have one or more users (Clients) linked to it.
- A user (Client) can be linked to one or more cases.

3. Tasks

- A task can be linked to one and only one case.
- A case can have one or more tasks assigned to it.

4. Documents

- A document can be linked to one and only one case.
- A case can have zero or more documents linked to it.

## 5. Case Logs

- A log can be linked to one and only one case.
- A case can have zero or more logs associated with it.

## 6. Announcements

- An announcement can be linked to one and only one user (Administrator)
- A user (Administrator) can have zero or more announcements associated with it.

### 4.4.2 Entity Relationship Diagram

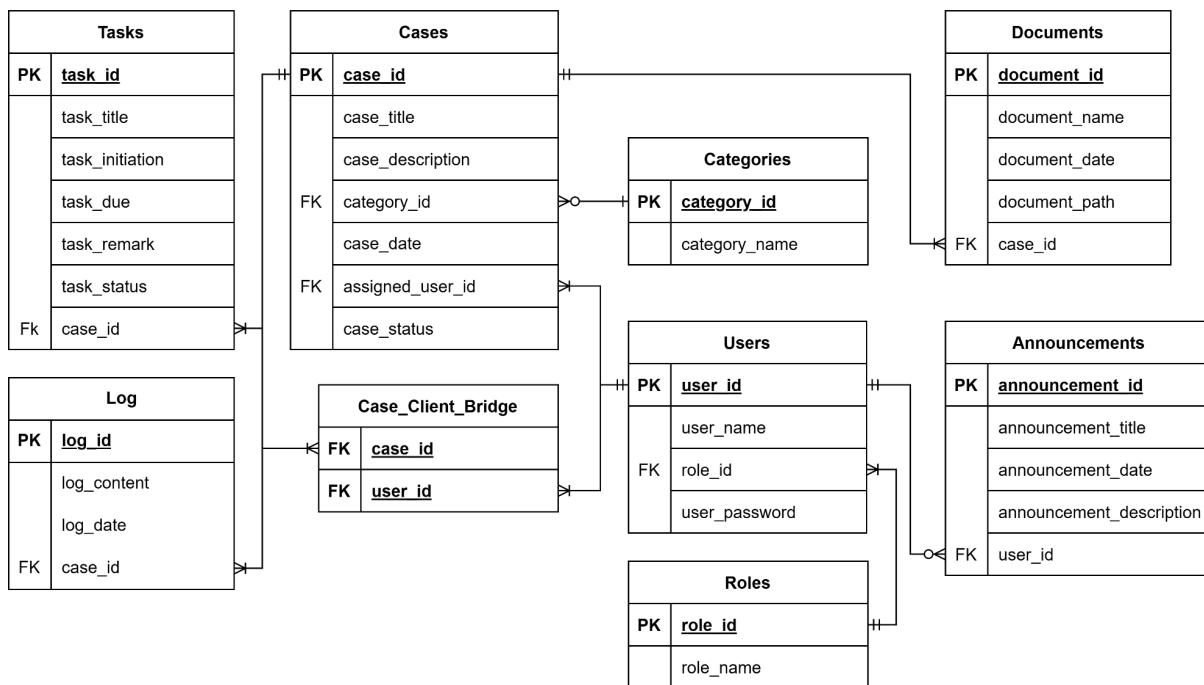


Figure 4.7: Entity Relationship Diagram of Legal Information System

## 4.5 Activity Diagram

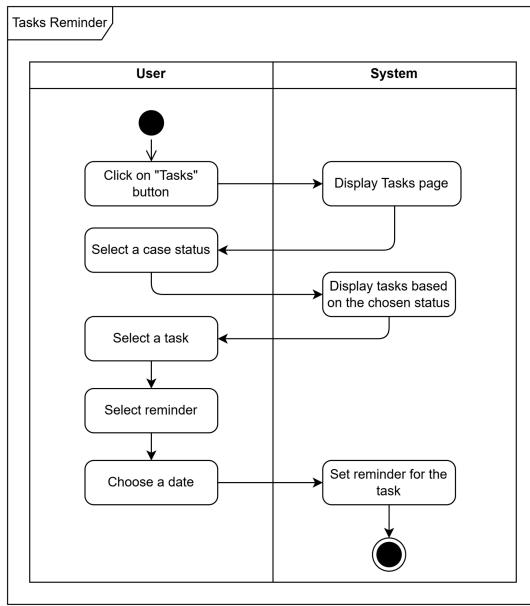


Figure 4.8: Activity Diagram - Setup Tasks Reminder

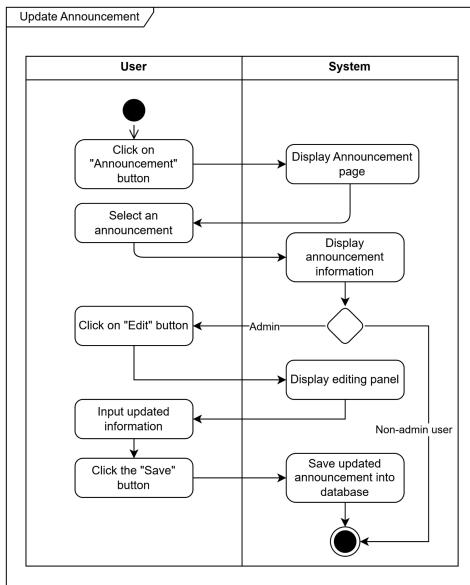


Figure 4.9: Activity Diagram - Update Announcement

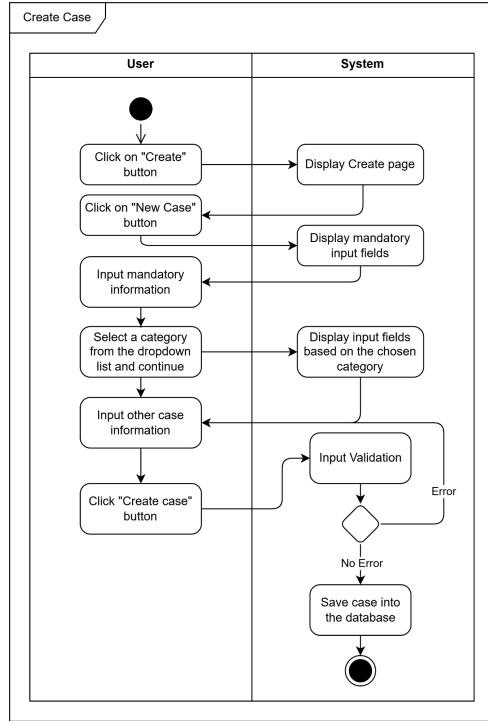


Figure 4.10: Activity Diagram - Create Case

## 4.6 User Interface Design

### 4.6.1 Internal User Interface

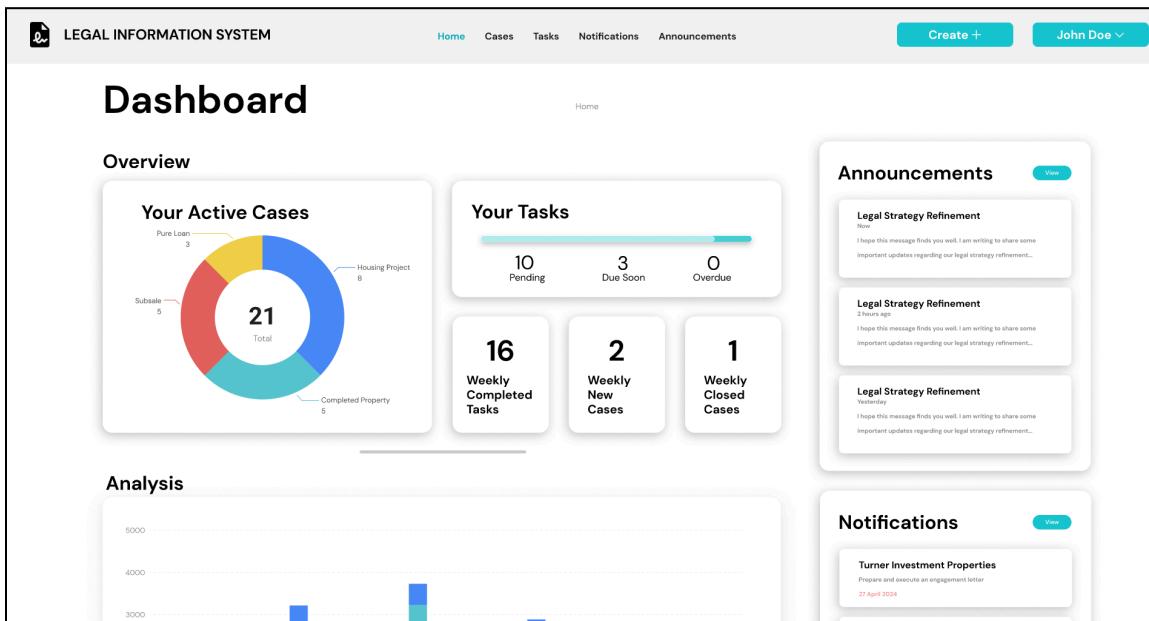


Figure 4.11: Dashboard / Homepage

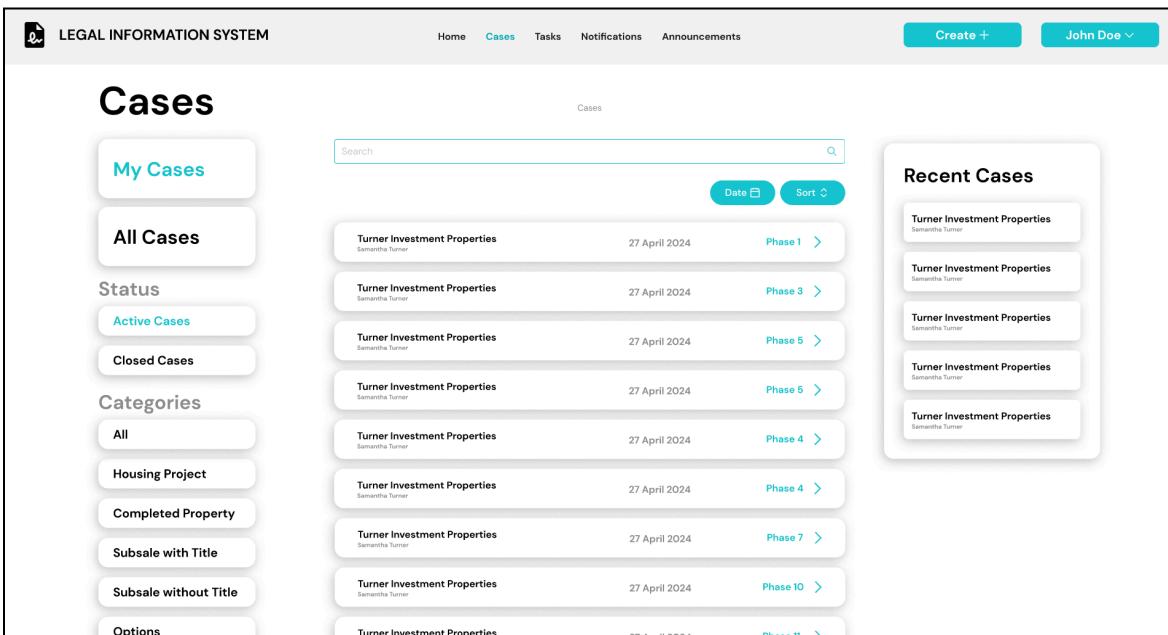


Figure 4.12: Cases page

The screenshot shows the 'Cases' details page. At the top, there are four buttons: 'Edit' (with a pencil icon), 'Mark as Closed' (with a checkmark icon), and 'Generate Link' (with a link icon). Below these are sections for 'Matter Detail' and 'Case Detail'. 'Matter Detail' includes fields for Matter Name ('Subsale Agreement - Smith v. Johnson'), Category ('Subsale with Title'), File Reference ('SS-2024-56789'), Status ('Active'), and Client Name(s) ('Mr. Smith, Mr. Johnson'). 'Case Detail' includes fields for Solicitor in charge ('Jane Doe, Esq.') and Clerk in charge ('Jane Doe, Esq.'). To the right is a 'Case Log' section with four log entries from April 2024, each detailing a task related to drafting purchase agreements and reviewing documents with clients.

Figure 4.13: Details page

This screenshot shows the 'Tasks' section within the 'Cases' details page. It lists eight tasks with checkboxes and due dates. The tasks are:

- Gather information about the client's objectives (27 April 2024)
- Obtain copies of any existing documents (27 April 2024)
- Discuss potential legal issues or concerns (27 April 2024)
- Prepare and execute an engagement letter (27 April 2024)
- Complete client intake forms (27 April 2024)
- Obtain a current title report (27 April 2024)
- Review the title report (27 April 2024)
- Conduct due diligence (27 April 2024)

To the right is a 'Task Detail' panel with fields for Description ('Gather information about the client's objectives'), Initiation Date ('Add initiation date'), Due Date ('Add due date'), Reminder ('Remind me'), and Remark ('Add Remark...'). Buttons for 'Pending' and 'Delete' are also present.

Figure 4.14: Tasks section under Detail page

The screenshot shows the 'Cases' page of the Legal Information System. On the left, there is a sidebar with four buttons: 'Matter Detail', 'Case Detail', 'Tasks', and 'Documents'. The 'Documents' button is highlighted with a teal background. The main content area is titled 'Cases / Case Detail / Documents'. It features a search bar at the top right. Below the search bar are three buttons: 'New +', 'Date ⚙', and 'Type ⚙'. A 'Sort ⚙' button is also present. A table follows, listing documents with columns for Name, Date, and Type. The table contains the following data:

Name	Date	Type
Case Documents	27 April 2024	Folder
Legal Files	27 April 2024	Folder
Financial Documents	27 April 2024	Folder
Client Intake Form	27 April 2024	PDF
Engagement Letter	27 April 2024	PDF
Legal Research Materials	27 April 2024	PDF

Figure 4.15: Documents section under Detail page

The screenshot shows the 'Tasks' page of the Legal Information System. On the left, there is a sidebar with four buttons: 'Pending', 'Overdue', 'On Hold', and 'Completed'. The 'Pending' button is highlighted with a teal background. The main content area is titled 'Tasks' and has a sub-section titled 'Pending'. It lists three tasks:

1.  Subsale Agreement - Smith v. Johnson  
Gather information about the client's objectives  
27 April 2024
2.  Turner Investment Properties  
Complete Client Intake Form  
27 April 2024
3.  Turner Investment Properties  
Obtain a current title report  
27 April 2024

To the right of the tasks, there is a 'Task Detail' panel. It contains the following fields:

- Case Title:** Subsale Agreement - Smith v. Johnson
- Description:** Gather information about the client's objectives
- Initiation Date:** Add initiation date
- Due Date:** Add due date
- Reminder:** Remind me
- Remark:**

At the bottom of the detail panel are two buttons: 'Pending' with a circular icon and 'Delete' with a trash icon.

Figure 4.16: Tasks page

**Notifications**

Notifications

**Categories**

- Deadlines
- Reminders
- New Cases
- Status Change
- Details Updates

Event	Details	Status
Task Deadline Approaching	Prepare and execute an engagement letter Turner Investment Properties	27 April 2024
New Case Created	Turner Investment Properties	New
Case Status Changed	Turner Investment Properties Samantha Turner	Closed
Case Status Changed	Turner Investment Properties Samantha Turner	Phase 2
Task Reminder	Prepare and execute an engagement letter Turner Investment Properties	27 April 2024
Detail Updated	Prepare and execute an engagement letter Turner Investment Properties	Updated

**Upcoming Tasks**

- Submit mortgage loan applicati...  
Johnson Residence Renovation

Figure 4.17: Notifications page

**Announcements**

Announcements

**New Announcement +**

Description	Date
Legal Strategy Refinement	3 May 2024
Legal Strategy Refinement	3 May 2024
Legal Strategy Refinement	3 May 2024
Legal Strategy Refinement	3 May 2024
Legal Strategy Refinement	3 May 2024
Legal Strategy Refinement	3 May 2024

**Announcement Detail**

**Edit**

**Title:** Legal Strategy Refinement

**Date:** 3 May 2024

**Description:**

Dear everyone,

I hope this message finds you well. I am writing to share some important updates regarding our legal strategy refinement efforts. Over the past few weeks, our legal team has been diligently reviewing and refining our approach.

Moving forward, we will continue to monitor developments and make necessary adjustments to our strategy as needed. Additionally, we encourage all employees to familiarize themselves with our updated legal protocols and procedures to ensure compliance and alignment with our strategic goals.

Should you have any questions or require further clarification on any of the above points, please do not hesitate to reach out to me. Your cooperation and support are greatly appreciated as we work together to strengthen our legal capabilities and safeguard the interests of our organization.

Best regards,

John Doe  
Managing Partner

Figure 4.18: Announcements page

The screenshot shows the 'Announcements' section of the Legal Information System. At the top, there's a navigation bar with links for Home, Cases, Tasks, Notifications, Announcements, a 'Create +' button, and a user profile for 'John Doe'. Below the navigation, the main title is 'Announcements' with a subtitle 'Announcements / New Announcement'. On the left, a list of existing announcements is displayed in a grid format, each with a title ('Legal Strategy Refinement') and a date ('3 May 2024'). On the right, a large form titled 'New Announcement' is shown. It has fields for 'Title' (with placeholder 'Add Title...'), 'Date' (with placeholder 'Add announcement date'), and 'Description' (with placeholder 'Add announcement details...'). A 'Publish' button is at the bottom of the form.

Figure 4.19: New Announcement Section under Announcements page

The screenshot shows the 'Create' page of the Legal Information System. The title is 'Create' with a subtitle 'Create / New Case'. On the left, there are three buttons: 'New Case' (highlighted in blue), 'Manage', and 'Categories'. The main form area contains several input fields: 'Matter Name' (placeholder 'Add Title...'), 'File Reference' (placeholder 'Add Address...'), 'Solicitor in Charge' (placeholder 'Add Name...'), 'Clerk in Charge' (placeholder 'Add Name...'), 'Client(s)' (placeholder 'Add Name...'), and a 'Select a Category' dropdown menu. A 'Continue' button is at the bottom of the form.

Figure 4.20: New Case Section under Create page

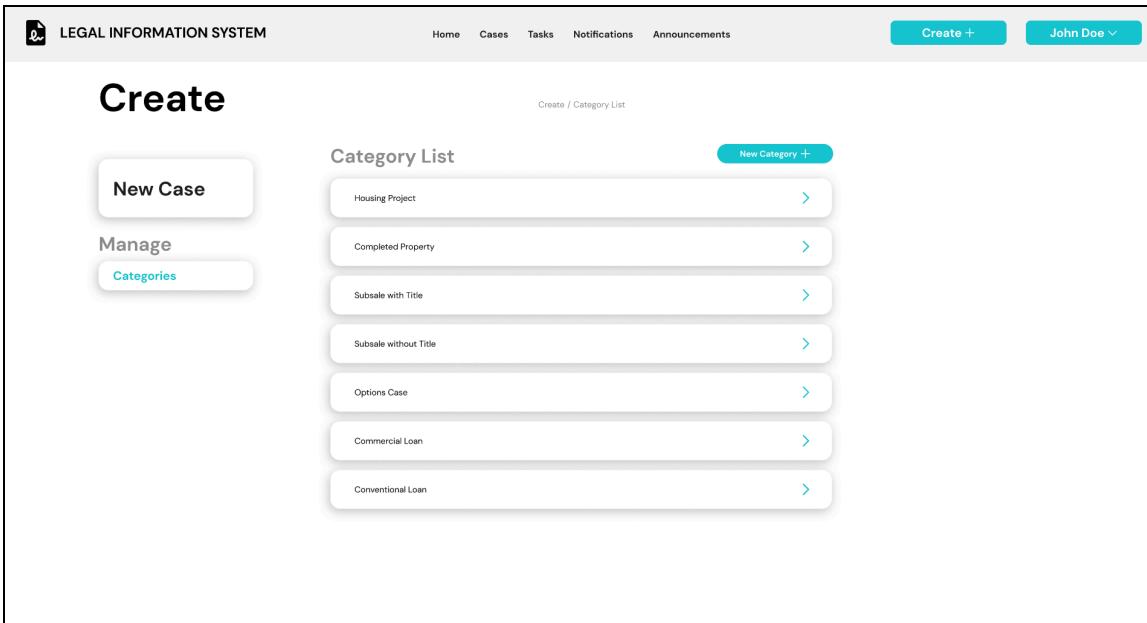


Figure 4.21: Category List section under Create page

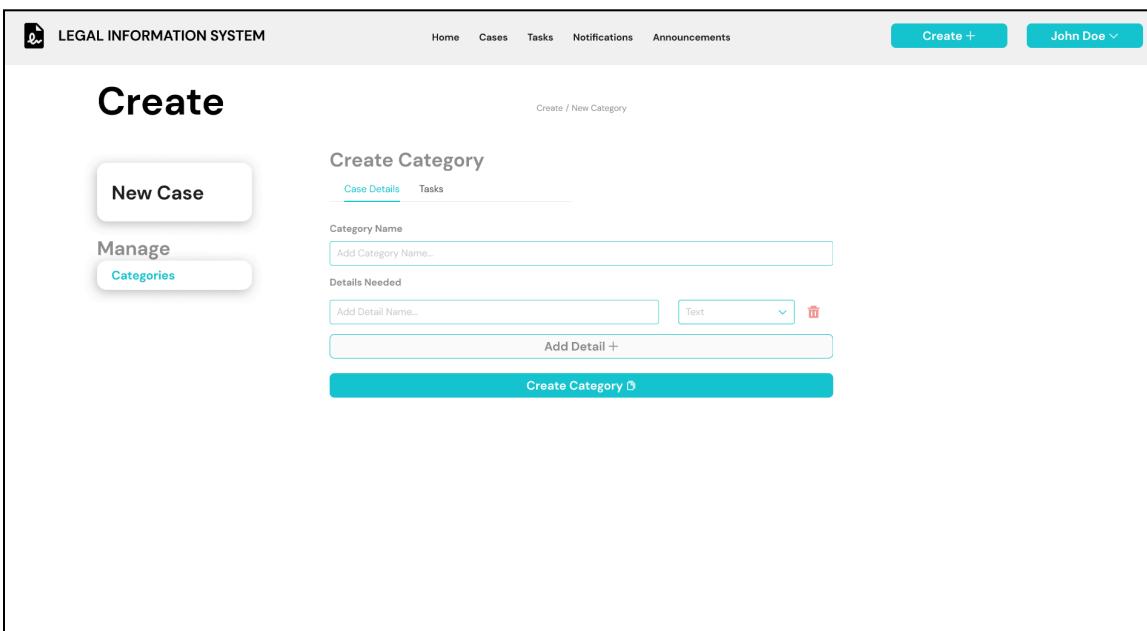


Figure 4.22: Create Category section under Create page

## 4.6.2 Client Interface

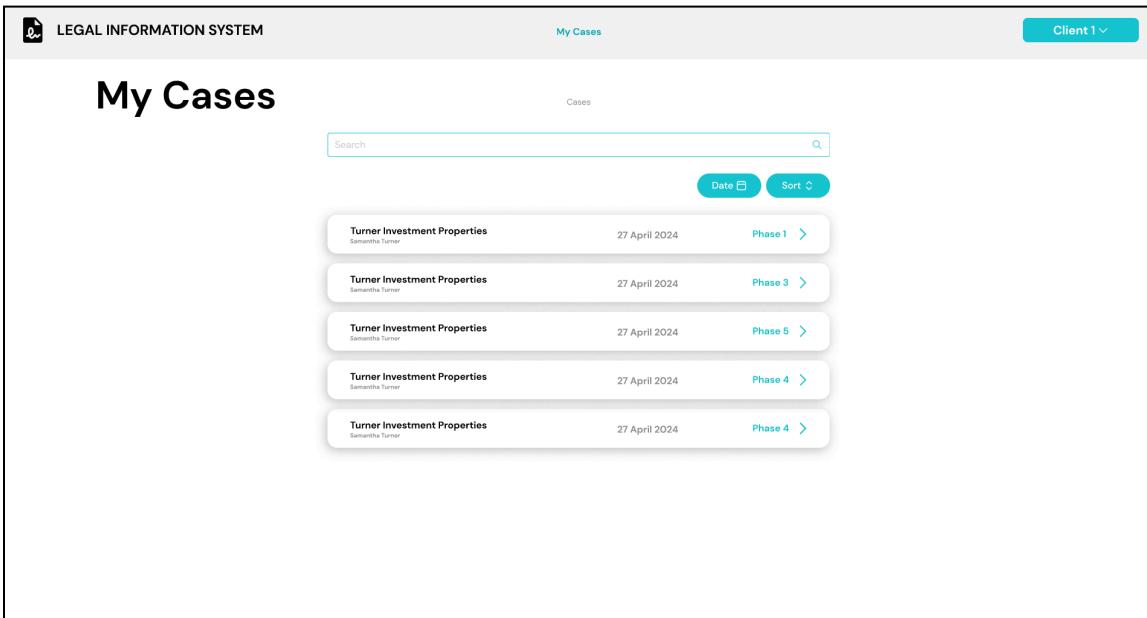


Figure 4.23: Case List under My Cases page

Matter Name	Category
Subsale Agreement - Smith v. Johnson	Subsale with Title

File Reference	Status
SS-2024-56789	Active

Solicitor in charge	Clerk in charge
Jane Doe, Esq.	Jane Doe, Esq.

Client Name(s)	IC No.
Mr. Smith Mr. Johnson	11111-11-1111 11111-11-1111

**Case Summary**  
Mr. John Smith is engaged in a subsale transaction with Mr. Michael Jones for the purchase of a residential property located at 456 Oak Street. The transaction involves the transfer of title from the current owner, Mr. Jones, to Mr. Smith, subject to the terms and conditions outlined in the purchase agreement.

Figure 4.24: Matter Detail section under Details page

The screenshot shows a web-based legal information system interface. At the top left is the logo 'LEGAL INFORMATION SYSTEM'. In the top right corner, there are buttons for 'My Cases' and 'Client 1'. Below the header, the main title 'My Cases' is displayed in large bold letters. Underneath it, a breadcrumb navigation shows 'My Cases / Case Detail / Documents'. A search bar with a magnifying glass icon is positioned above a table. To the left of the table, there are two buttons: 'Matter Detail' and 'Documents', with 'Documents' being highlighted in a white box. The table has three columns: 'Name', 'Date', and 'Type'. It lists six items:

	Name	Date	Type
	Case Documents	27 April 2024	Folder
	Legal Files	27 April 2024	Folder
	Financial Documents	27 April 2024	Folder
	Client Intake Form	27 April 2024	PDF
	Engagement Letter	27 April 2024	PDF
	Legal Research Materials	27 April 2024	PDF

Figure 4.25: Documents section under Details page

## CHAPTER 5: TECHNICAL IMPLEMENTATION

### 5.1 Tools Used for Development

Web Development		
<b>Frontend</b>	ReactJS	Material UI
<b>Backend</b>	ExpressJS	
<b>Database</b>	MongoDB	
<b>Runtime Environment</b>	NodeJS	

Table 5.1: Tools Used for Web Development

#### 5.1.1 Frontend

The system's frontend will be built using ReactJS, a powerful JavaScript library for creating user interfaces. ReactJS was chosen because of its component-based architecture, which allows for the creation of reusable UI components, improving maintainability and scalability. It also enables the development of dynamic and responsive user interfaces, making sure that users have an enjoyable experience. Furthermore, Material UI will be used during frontend development to ensure a modern and consistent design. Material UI is a popular React UI framework based on Google's Material Design principles. It includes a large number of pre-designed components, allowing you to quickly create a clean and professional user interface.

#### 5.1.2 Backend

The system's backend will be built with ExpressJS, a minimalist web framework for NodeJS. ExpressJS was chosen because of its simplicity and flexibility which allows for the creation of reliable APIs to handle the system's operations. It supports middleware, which is required for handling requests, managing sessions, and implementing security features. ExpressJS provides a solid foundation for developing a scalable and maintainable backend, ensuring that the system can efficiently handle an increasing number of users and data.

### **5.1.3 Database**

MongoDB will be used to manage the database. MongoDB is a NoSQL database known for flexibility, scalability, and performance. It stores data in a JSON-like format, making it suitable for systems with different and dynamic data structures. MongoDB's schema-less design allows quick development, which is important for adapting to changing requirements throughout the project lifecycle. The database design includes collections for managing cases, clients, documents, and tasks, ensuring that data is organised and accessible when required by the system's functionalities.

### **5.1.4 Runtime Environment**

NodeJS will be used as the system's runtime environment. NodeJS is a JavaScript runtime which is known for its non-blocking, event-driven architecture. This makes it very efficient at handling simultaneous operations, which is important for the system's real-time features like task notifications and status updates. With NodeJS, JavaScript can be used to develop both the server-side and backend logic, giving developers a unified language to work with across the entire stack.

## CHAPTER 6: STAKEHOLDERS COLLABORATION AND CONTRIBUTIONS

The project stakeholder is Ms. Loh Fen Hui from the WONG & LOH Advocates & Solicitor, Kuala Lumpur. She provided valuable information and guidance in the project, assisting us in identifying the problem to be addressed and recommending solutions and strategies for implementation.

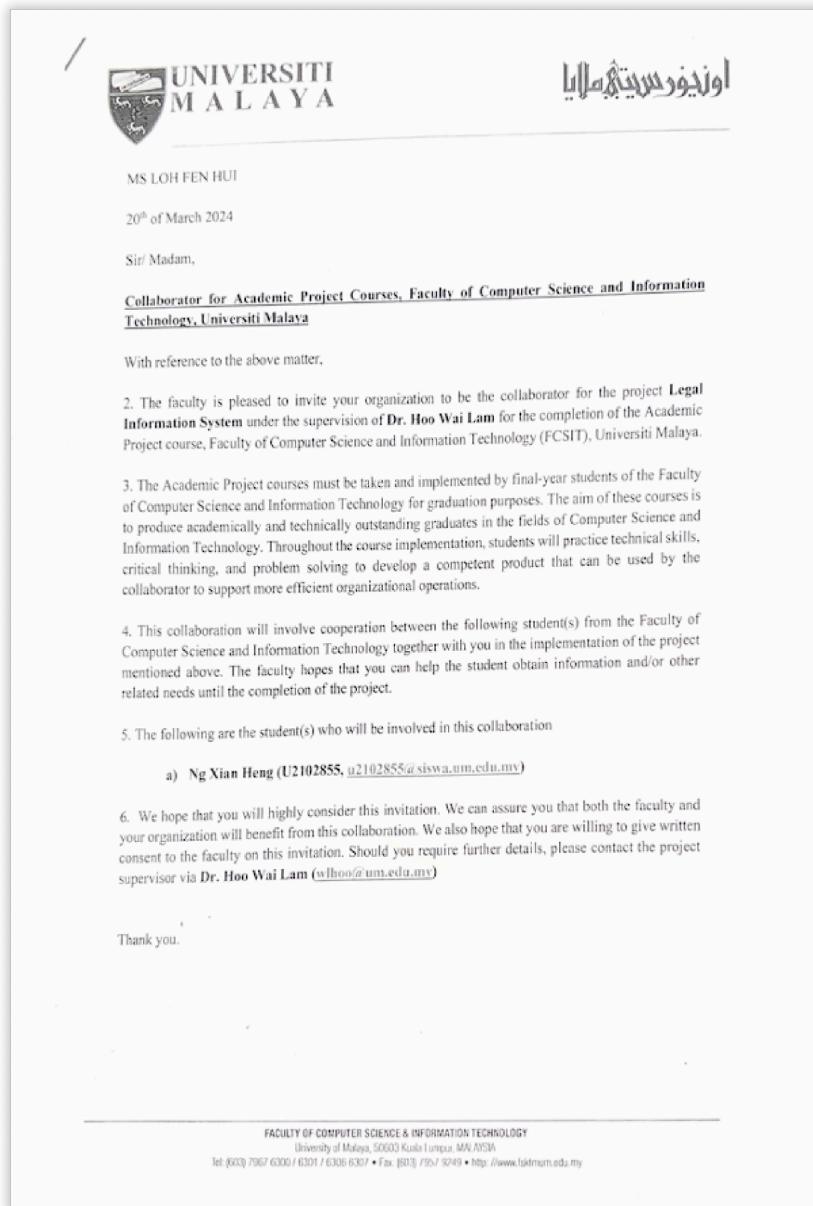
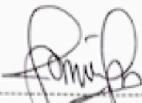


Figure 6.1: Collaboration Letter (Part 1)

Yours sincerely,



Associate Professor Dr. Norisma Idris

Deputy Dean (Undergraduate)

Faculty of Computer Science and Information Technology,

University of Malaya,

Kuala Lumpur



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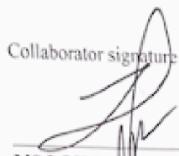
University of Malaya,

Kuala Lumpur

Figure 6.2: Collaboration Letter (Part 2)

### Acceptance of Collaboration

I hereby acknowledge that I accept this proposal for collaboration with the Faculty of Computer Science & Information Technology, Universiti Malaya pertaining to the research project entitled **Legal Information System**.

Collaborator signature  
  
LOH FEN HUI  
Advocate & Solicitor  
Kuala Lumpur  
(BCL2153)  
  
MS LOH FEN HUI  
Associate  
WONG & LOH Advocates & Solicitors  
Date:  
30 May 2024.

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Figure 6.3: Collaboration Letter (Part 3)

## CHAPTER 7: CONCLUSION

The Legal Information System project's main goal is to develop a system that manages cases and documents for a legal firm, WONG & LOH Advocate & Solicitor, Kuala Lumpur, based on the requirements obtained. This project addresses the gaps or challenges of document overload, struggling to keep track of deadlines, as well as relying on manual case updates and client communication that are faced by the legal firm. A web-based system will be developed to allow users to manage cases and documents, tracking tasks, allow better collaboration in the firm, and provide clients with real-time status and updated information about their case.

During the course of Academic Project I, the focus revolved around gathering project requirements, analysing and designing the architecture of the web-based system, and initial implementation of the system which includes General, Case Creation, Case Detail, and Cases modules. In the requirements gathering phase, extensive interviews with stakeholders and a review of existing literature provided a clear understanding of the firm's needs.

The analysis and design phase converted these needs into detailed system requirements and defining the overall architecture of the web-based system, ensuring that the final system is matched to the specific operational demands of the firm. Moving on, by using the chosen technology stack which includes ReactJS, NodeJS, ExpressJS, and MongoDB, the core features of the system have been implemented.

As Academic Project I concludes, it is evident that the groundwork has been laid for the next phase of the project. The initial implementation has validated the design and requirements, showing that the system can meet the primary objectives of the project. Looking ahead to Academic Project II, the focus will shift to full-scale implementation, testing, and deployment.

This next phase will also explore potential enhancements such as integrating AI for predictive analytics or include reporting features that facilitate legal processes.

In conclusion, Academic Project I has successfully established the foundation for enhancing WONG & LOH Advocate & Solicitor's operational capabilities. The systematic approach taken during the phases ensures that the project is on the right track to meeting its objectives. With the foundational elements in place, the next phase will promise to achieve the fully functional and optimised Legal Information System, finally increasing the firm's productivity and client service quality.

## REFERENCES

- Aarthi, S., Siddharth, S., Athreya, V., & Balaji, P. (2018). LEGAL FILES MANAGEMENT SYSTEM USING BIG DATA. *Proceedings of the International Conference on Communication and Electronics Systems (ICCES 2018)*.  
<https://doi.org/10.1109/CESYS.2018.8723904>
- Armour, J., & Sako, M. (2020). AI-enabled business models in legal services: from traditional law firms to next-generation law companies? *Journal of Professions and Organization*, 7(1), 27–46. <https://doi.org/10.1093/jpo/joa001>
- Davis, A. E. (2020). The Future of Law Firms (and Lawyers) in the Age of Artificial Intelligence. *Revista Direito GV*, 16(1). <https://doi.org/10.1590/2317-6172201945>
- Evans, N., & Price, J. (2017). Managing information in law firms: changes and challenges. *Information Research*, 22(1). <https://informationr.net/ir/22-1/paper736.html>
- Kawya, T. (2020, January). *Lawyers' Work Management at Law Firms Lawyers' Work Management Through Digitization*.  
[https://www.researchgate.net/publication/359758530\\_Lawyers'\\_Work\\_Management\\_at\\_Law\\_Firms](https://www.researchgate.net/publication/359758530_Lawyers'_Work_Management_at_Law_Firms)
- Letlape, G. (2016). The Impact of Digitization on a Law Firm's Overall Profitability. *Historical Papers Research Archive, University of the Witwatersrand*.  
<https://doi.org/10.13140/RG.2.1.1161.7047>
- Mishra, A., & Mishra, D. (2011). A Legal Business Information System: Implementation Process Context A Legal Business Information System: Implementation Process Context. *Acta Polytechnica Hungarica*, 8(2).

[https://www.researchgate.net/publication/259148863\\_A\\_Legal\\_Business\\_Information\\_System\\_Implementation\\_Process\\_Context](https://www.researchgate.net/publication/259148863_A_Legal_Business_Information_System_Implementation_Process_Context)

Mithas, S., Ramasubbu, N., & Sambamurthy, V. (2011). How Information Management Capability Influences Firm Performance. *MIS Quarterly*, 35(1), 237.

<https://doi.org/10.2307/23043496>

Zhao, Y. (2015). The Design and Implementation of Documents System for Law Application. In *Atlantis Press*. <https://www.atlantis-press.com/article/18567.pdf>