National College of Ireland

Object Oriented Software Engineering

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Law Firm Management System

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System Overview and Actor Identification

The Law Firm Management System is a legal management application, enabling law firms to manage client and case information, enhancing efficiency and client communication. The application facilitates data access and management for cases and clients, enabling quicker and more effective interactions between lawyers and clients. It also serves as a customer service resource aligned with firm service protocols, offering clients access to case information and notifying them of relevant updates.

The system categorizes users into three main types: Lawyer, Client, and Administrator. Each user has specific permissions and functionalities:

1. **Lawyer**: This is the primary user of the application, with full access to client and case information. This user can perform tasks such as creating, viewing, editing, and deleting client and case records. They can also manage procedures associated with each case and send relevant notifications to clients.
2. **Client:** This user type is the client of the law firm, who can use the application to check the status of their cases and receive notifications from their lawyer. This user has read-only permissions and cannot make modifications or add data in the system, limiting their use to information retrieval and communication with the lawyer.
3. **Administrator**: This user is responsible for managing the application, with advanced privileges allowing them to add and remove users (lawyers or clients) and make user-related modifications. This role also includes system security administration, such as creating, deleting, and modifying accounts and managing access control.

The system's key functionalities include:

- **Security**: Features access control through user authentication, password change options, and user management.
- **Client Management**: Allows the lawyer to register, edit, view, and delete clients, with restrictions for clients linked to cases.
- **Case Management**: Includes functionalities to create, edit, delete, and view cases, with options to manage internal procedures for each case.

Use Case Model Creation and Description

Use cases are the detailed sequences of steps or activities required to carry out a process in the application. The entities involved in the sequence are called actors. Use case diagrams are used to specify the communication and behaviour of the system through interactions with its users or other systems.

The following model visually represents how different actors interact with the proposed system. Each actor has access to various functions represented by different use cases, which we can organize into distinct groups:

Security Features:

- **Log in:** A user can access the application using their username and password. Based on their credentials, they will enter the client, lawyer, or administrator section.

- **Log out:** Ends the session, allowing a new user to log in.
- **Change User Password:** Allows a validated user to modify their system access password.
- **Create User:** Allows system administrators to add new users to the application and assign them the appropriate role (administrator, lawyer, client).
- **Delete User:** Allows system administrators to remove system users.
- **Modify User:** Allows the administrator to edit user data.

Client Management Features:

- **Create Client:** Allows lawyer users to enter a new client into the system.
- **Delete Client:** Allows lawyer users to delete clients who are no longer needed.
- **Modify Client:** Allows lawyers to modify their clients' data.
- **Consult Client:** Allows viewing the data of a specific client.

Case Management Features:

These functions are aimed at handling cases. Once a case is created, it can contain different procedures.

- **Create Case:** Allows lawyer users to enter a new case in the system.
- **Delete Case:** Allows lawyer users to delete cases that are no longer needed.
- **Modify Case:** Allows lawyer users to make modifications to cases.
- **Consult Case:** Allows viewing the data of a specific case.

Procedures:

- **Create Procedure:** Allows lawyer users to enter a new procedure in the system.
- **Delete Procedure:** Allows lawyer users to delete procedures.
- **Modify Procedure:** Allows lawyer users to modify procedure details.
- **Consult Procedure:** Allows viewing data of the procedures associated with a case. Once one is selected, detailed information about it can be accessed.

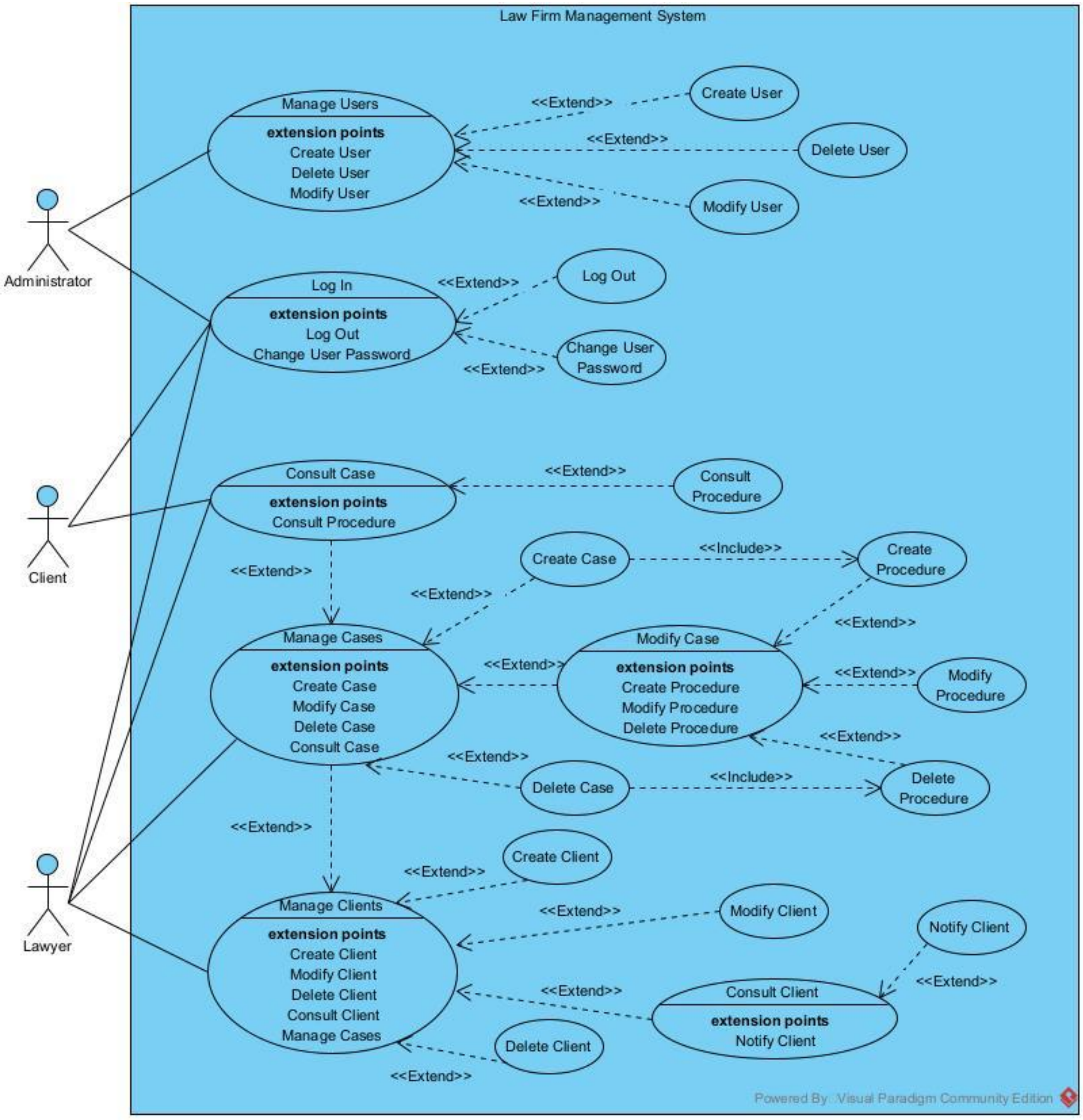

Figure 1. Use Case Model

Use Case Elaboration: Manage Clients

The choice of the use case “Manage Clients” is based on its fundamental role from the lawyers’ perspective. When considering a real project for a law firm, this function stands out as one of the most interesting and potentially utilized. Client management is a central component of legal work, and this use case provides an excellent opportunity to demonstrate how the proposed system can add value to the firm’s business.

"Manage Clients" not only allows lawyers to efficiently manage their relationships with clients but also extends its functionality to "Manage Cases," thereby enhancing overall performance in client management. Through this use case, it can be shown how the system can increase client satisfaction by providing smoother and more organized access to their data and needs.

Name	Manage Clients
Actors	Lawyer
Description	This use case starts when the lawyer selects this option from their

	main menu, granting them access to client management.
Precondition	The lawyer is logged in and validated in the session.
Postcondition	The lawyer accesses the client management options.
Normal Flow	Once the lawyer enters the client management section of the application, they are shown their currently registered clients and the management options available for each. After completing the management tasks, the lawyer exits the use case and returns to their main menu.
Alternative Flow	The user can initiate Modify Client and Delete Client by selecting one of the displayed clients. Once completed, they return to the initial step of the normal flow. The user may also initiate Create Client and after finishing this use case, they return to the initial step of the normal flow.
Inclusions	None.
Extensions	Create Client, Modify Client, Delete Client and Consult Client.

Conceptual Class Diagram and Object Representation

The conceptual class diagram for "Manage Clients" outlines the structure of client management within a system. It features key classes:

- **Client** (with attributes like clientID, name, email, and address),
- **Case** (caseID, caseType, status, etc.),
- **Procedure** (procedureID, type, details), and
- **Contact** (contactID, name, relation).

Each **Client** can have multiple **Cases** and **Contacts** (1..*), while each **Case** is linked to one **Client** (1..1) and can have multiple **Procedures** (Multiplicity). Strong composition relationships indicate that if a **Case** or **Client** is deleted, associated **Procedures** or **Contacts** are also removed. This diagram clarifies system relationships, enhancing data integrity and management.

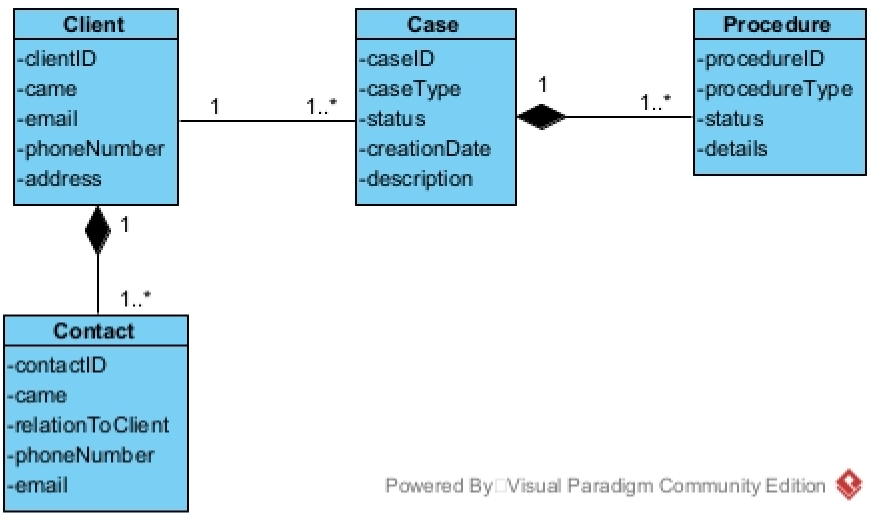

Figure 2. Class Diagram

The following Object Diagram serves as a concrete example of the "Manage Clients" process, demonstrating how individual instances of classes, like a specific client and their related cases and contacts interact in real scenarios.

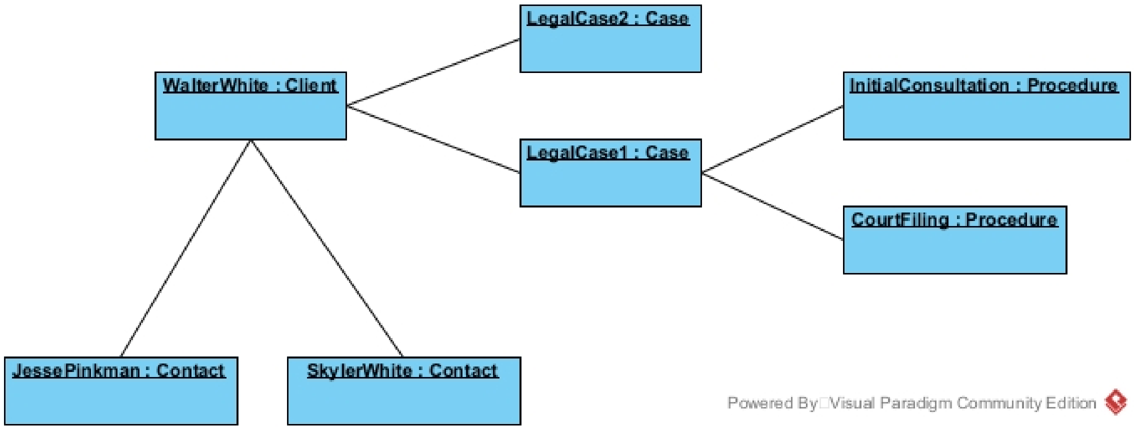

Figure 3. Object Diagram

Sequence Diagram Development and Interpretation

This sequence diagram shows that the system helps a Lawyer retrieve client and case information through the Law Firm Management System. It helps to visualize the sequence of the message flows in the system and shows the interaction between different lifelines as a time-ordered chain of events.

Lawyer Requests Client Details (1): The Lawyer starts by asking the system to view a client's details. The Law Firm Management System fetches this information from the Client class and sends it back to the Lawyer.

Lawyer Requests Case List (2): Next, the Lawyer asks to see the client's case list. The system retrieves these details from the Case class and sends the list back to the Lawyer.

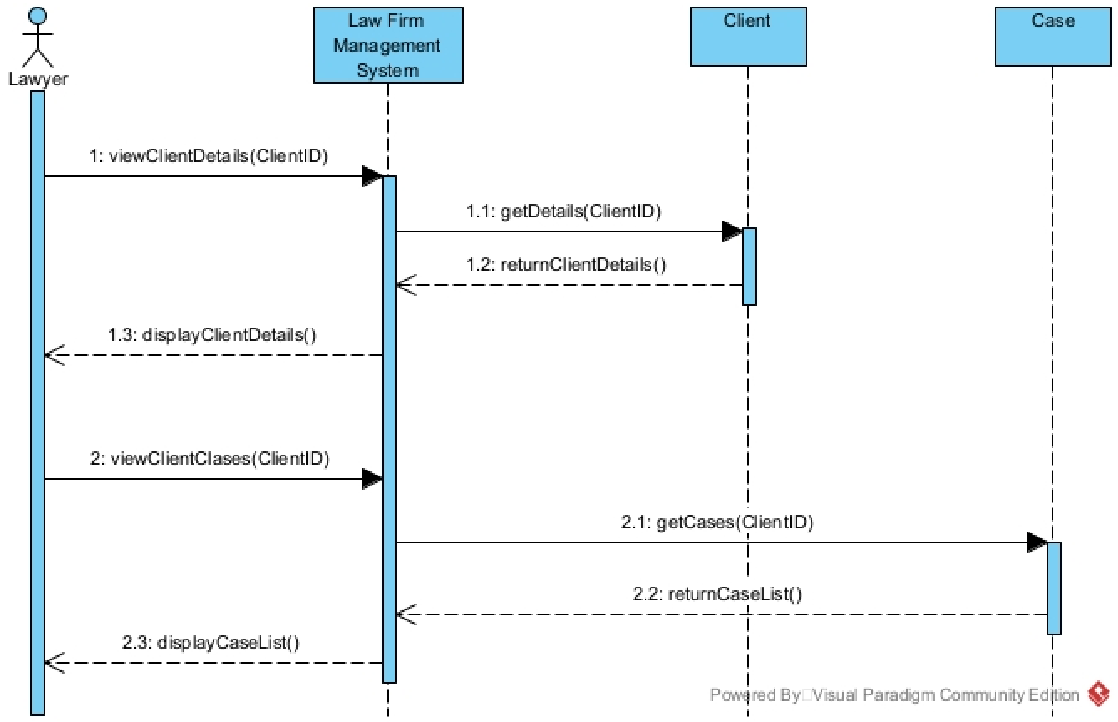

Figure 4. Sequence Diagram

Operation Contract Definition

The next contract provides a clear specification of what is expected from this operation, including input and output details, error handling, and preconditions. It can serve as a reference for developers and stakeholders to ensure that the implementation meets the defined requirements.

Name	viewClientDetails(clientID)
Responsibilities	The purpose of this operation is to allow a Lawyer to request detailed information about a specific client based on their unique identifier (clientID).
Preconditions	The Lawyer must be authenticated and authorized to access client information. The clientID provided must exist in the system; otherwise, an error will occur.
Postconditions	If successful, the Law Firm Management System retrieves the client's details and displays them to the Lawyer. If unsuccessful (e.g., if the clientID does not exist), an appropriate error message is returned.
Input Parameters	clientID: A unique identifier for each client in the system.
Output	Client Details: A data structure containing the client's information: Client Name Contact Information Date of Birth Address Additional Notes

	OR Error Message (if applicable): A message indicating the nature of the error if the operation fails.

Communication Diagram

The next Communication Diagram is based in the Contract developed previously. It depicts in a graphical way the interactions between objects in the system using message passing, emphasizing structural aspects of the system.

Figure 5. Communication Diagram

Glossary

Term	Type	Comments
Law Firm Management System	System	A software solution for law firms to manage clients and cases, enhancing efficiency and client communication.
Lawyer	Actor	Primary user of the system, with permissions to create, edit, delete, and view client and case records.
Client	Actor	The client of the law firm who can view their case information and receive notifications from their lawyer.
Administrator	Actor	User responsible for user management, access control, and overall system security administration, such as creating and deleting accounts.
Client Management	Feature	Functionality that allows lawyers to add, edit, delete, and view clients, essential for maintaining up-to-date client information.
Case Management	Feature	Includes tasks for creating, editing, deleting, and viewing cases, as well as managing associated legal procedures.
Procedure	Component	A specific action or legal step associated with a case, managed within the system to streamline case handling.
Use Case	Modeling	Represents a sequence of actions or steps in the

	Concept	system, detailing how users (actors) interact with it to achieve specific goals.
Manage Clients	Use Case	A selected use case focused on client management, where lawyers manage their client list and access case-related details.
Normal Flow	Scenario	Standard sequence of steps a user follows to complete a task within a use case.
Alternative Flow	Scenario	Variations in the normal workflow that provide additional options or error handling.
Conceptual Class Diagram	UML Diagram	A visual model showing the structure and relationships among the system's main classes.
Object Diagram	UML Diagram	Depicts instances of classes in a real scenario, useful for showing concrete examples of interactions and relationships in "Manage Clients."
Sequence Diagram	UML Diagram	Shows the flow of messages between objects in the system over time, illustrating a specific scenario in a use case.
Operation Contract	Specification	Defines the input, output, and conditions (pre- and postconditions) for specific operations in the system, ensuring clarity and consistency in development.
viewClientDetails (clientID)	Operation	A specific operation allowing the lawyer to view detailed information about a client, with defined parameters and expected results.
Communication Diagram	UML Diagram	Illustrates interactions between system objects based on message passing, emphasizing the structural relationships and message flows.
Security	Feature	A set of system functionalities that provide access control, authentication, and password management to protect user information.
Log In / Log Out	Action	Entry and exit points for user access to the system; authentication depends on user credentials and role (lawyer, client, administrator).
Change User Password	Action	An action that allows users to update their password, helping maintain system security.
Create User	Administrator Action	Allows the administrator to add new users (lawyers, clients, administrators) and assign roles, necessary for user management.
Delete User	Administrator Action	Enables the administrator to remove users from the system, with safety restrictions to prevent self-deletion by an administrator.
Modify User	Administrator Action	Allows the administrator to edit user information, such as roles or personal details.
Create Client	Lawyer Action	Allows the lawyer to register a new client in the system, essential for initiating case and client management tasks.
Delete Client	Lawyer Action	Permits the lawyer to remove a client who is no longer needed, with restrictions if the client is associated with ongoing cases.
Modify Client	Lawyer Action	Allows lawyers to update client information, keeping client records accurate.
Consult Client	Lawyer Action	Provides the lawyer with a view-only access to specific

		client details without making modifications.
Create Case	Lawyer Action	Enables the lawyer to register a new case in the system, creating the foundation for managing associated procedures and client interactions.
Delete Case	Lawyer Action	Allows the lawyer to remove cases that are no longer required, essential for maintaining a streamlined case database.
Modify Case	Lawyer Action	Permits lawyers to update case information, ensuring accurate records for ongoing or archived cases.
Consult Case	Lawyer Action	View-only access for lawyers to examine case details without making changes, useful for case review and reference.
ClientID	Attribute	A unique identifier assigned to each client in the system, used to differentiate and access client records.
CaseID	Attribute	Unique identifier for each case, facilitating tracking and management of individual legal cases.
ProcedureID	Attribute	Identifier assigned to each procedure within a case, helping organize and retrieve specific steps in the legal process.