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UNIVERSITI MALAYSIA SARAWAK

FACULTY OF
COMPUTER SCIENCE &
INFORMATION TECHNOLOGY

FINANCIAL MANAGEMENT SYSTEM WITH MACHINE LEARNING SUPPORT

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CHAPTER 1: INTRODUCTION

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INTRODUCTION

Financial Management System with Machine Learning Support project introduces Spendette, a web-based expense analysis system that helps students manage personal and shared finances. . The system addresses challenges associated manual expense tracking by by providing a single platform for tracking personal expenses and group expenses management. Additionally, Spendette integrates Machine Learning to analyse spending patterns, detect unusual expense and offer personalized budgeting recommendations. This approach encourages responsible spending and improves financial literacy among students.

PROBLEM STATEMENT

1. Difficulty in Expense Tracking

Students often struggle to track personal and shared expenses due to unstructured manual methods and frequent cashless transactions. Small purchases are easily overlooked, leading to overspending, calculation errors, and delayed payments.

2. Limited Budget Control and Financial Awareness

Without real-time tracking and analytical tools, students find it difficult to monitor spending patterns and control their budgets. This often results in prioritizing non-essential expenses over necessities, causing poor financial decisions and financial stress.

3. Challenges in Managing Shared Financial Responsibilities

Shared expenses such as rent and utilities are commonly managed through informal methods like chat messages or spreadsheets, which can lead to confusion, miscalculations, and payment delays. Automated tracking can improve transparency and accuracy.

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PROJECT SCOPE

SYSTEM BOUNDARIES

System Boundaries	Description
User Authentication	Secure access to protect users' financial data
Expense Management	Track personal expenses, manage budgets, and handle shared expenses
Data Visualization	View spending trends and budget usage through charts and summaries
Machine Learning	Analyse spending patterns, detect overspending, and provide budget recommendations
User Interface	Clean, intuitive design for easy use without technical expertise

TARGET USER

University students who require a simple and effective platform to manage both personal and shared expenses

AIM & OBJECTIVES

1. To develop a responsive web application that enables users to record, manage and monitor both personal and shared financial transactions to ensure accuracy and transparency

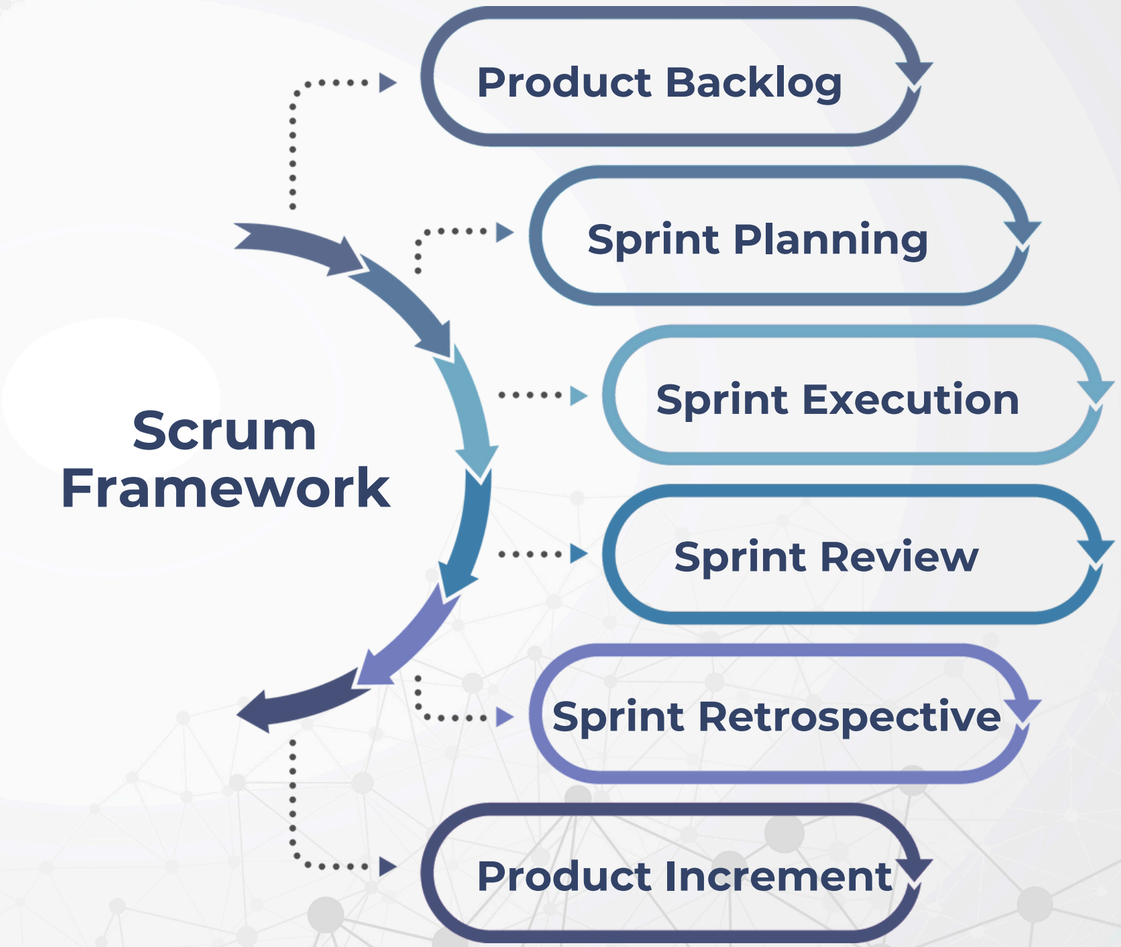
2. To generate clear financial summaries and balance sheets that assist users in monitoring their spending effectively

3. To implement a machine learning model to analyze spending habits and provide personalized budgeting recommendations for improved financial planning

BRIEF METHODOLOGY

Agile Methodology

- The project follows the Agile Scrum framework for flexible and incremental development.
- System requirements are organized into a product backlog and developed through iterative sprints.
- Each sprint includes design, development, testing, and review to incorporate continuous feedback.
- This approach ensures timely delivery, adaptability to changes, and improved system quality.



SIGNIFICANCE OF PROJECT

1. Promotes Financial Awareness and Responsibility.

2. Enhances Transparency in Shared Financial Management.

3. Adaptability with Machine Learning.

FYP I SCHEDULE

Final Year Project I

FYP II SCHEDULE

Final Year Project II

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EXPECTED OUTCOME

1. A fully functional web application financial management system capable of monitoring both personal and shared expenses of an individual.

2. Comprehensive financial summaries that provide users with clear insights into their spending patterns and financial transactions.

3. A machine learning model capable of analyzing users' spending habits and generating personalized recommendations to help them plan and manage their finances more effectively.

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CHAPTER 2: BACKGROUND STUDY

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INTRODUCTION

This section presents a background study of three existing financial management systems: Pennywise, Spendee, and Goodbudget. These systems are analyzed based on their design, features and functional characteristics to identify their strengths and limitations. The comparative review provides a foundation for understanding current solutions and highlights gaps that inform the development of the proposed system, Spendette.

EXISTING SYSTEM VS PROPOSED SYSTEM

Feature	Existing Systems			Proposed System
	Pennywise	Spendee	Goodbudget	Spendette
Personal Expense Management	✓	✓	✓	✓
Group Expense Management	✗	✗	✗	✓
Income Management	✗	✓	✓	✓
Fixed Bills Management	✓	✓	✗	✓
Expense Category Management	✓	✓	✓	✓
Dashboard	✓	✓	✓	✓
Financial Report	✓	✓	✓	✓
Reminders & Notification	✓	✓	✗	✓
Machine Learning Model	✓	✓	✗	✓

TECHNOLOGY REVIEW

Frontend	Backend	Machine Learning
HyperText Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript	PHP and SQL	Random Forest Algorithm using Python

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CHAPTER 3: METHODOLOGY

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INTRODUCTION

This chapter outlines the methodological framework adopted in the development of Spendette. The system is developed using the Agile methodology, specifically the Scrum framework, to enable iterative and incremental development. This allows flexibility in handling evolving requirements and continuous refinement of system features, including machine learning components. User requirements were collected through a structured online survey involving 50 university students, representing the target users of the system and the data were analyzed to inform system design decisions. The chapter also presents the overall system design, including use case diagrams, activity diagrams, sequence diagrams, system architecture and user interface designs to ensure efficient and user-centered system operation.

SCRUM FRAMEWORK

Product Backlog

- Ordered list of prioritized functional and non-functional requirements
- Derived from analyzed user requirements
- Core features prioritized before advanced analytics and machine learning components
- Ensures clear project scope and development focus

Sprint Planning

- Conducted at the beginning of each sprint
- High-priority backlog items selected for development
- Tasks broken into manageable activities with effort estimation
- Focus areas: System Design, Frontend and Backend Development & Machine Learning Integration

SCRUM FRAMEWORK

Sprint Execution

- Design, implementation and testing of selected features
- Development of: personal and shared expense management modules
- Machine learning model integration
- Continuous testing and debugging to ensure reliability and data accuracy
- System diagrams and UI designs produced and refined

Sprint Review

- Conducted at the end of each sprint
- Completed features evaluated against sprint goals and user requirements
- Functional demonstrations performed
- Feedback used to refine features and update the product backlog

SCRUM FRAMEWORK

Sprint Retrospective

- Reflection on development process and team performance
- Improvements applied to future sprints

Product Increment

- Each sprint delivers a usable system increment
- New or enhanced functionalities added progressively
- Ensures steady progress toward a complete and functional Spendette system

SUMMARY OF SURVEY

- A total of 50 respondents participated, with university students identified as the primary target users of the Spendette system.
- Most respondents currently manage expenses manually or without active tracking, and commonly face challenges such as overspending, forgetting small expenses, and difficulty managing shared expenses.
- Users without prior experience emphasized the need for a system that is simple, user-friendly, and convenient, while experienced users highlighted limitations such as complex interfaces, lack of insights, and poor shared-expense support.
- Strong agreement was observed for core features including daily expense and income recording, expense categorisation, clear transaction history, group expense management, and fixed bill tracking.
- Respondents also showed high acceptance of Machine Learning–based features, particularly for overspending detection, intelligent alerts, and personalized financial insights.
- Overall, the survey findings validate the need for Spendette as a simple, intelligent, and student-focused expense management system.

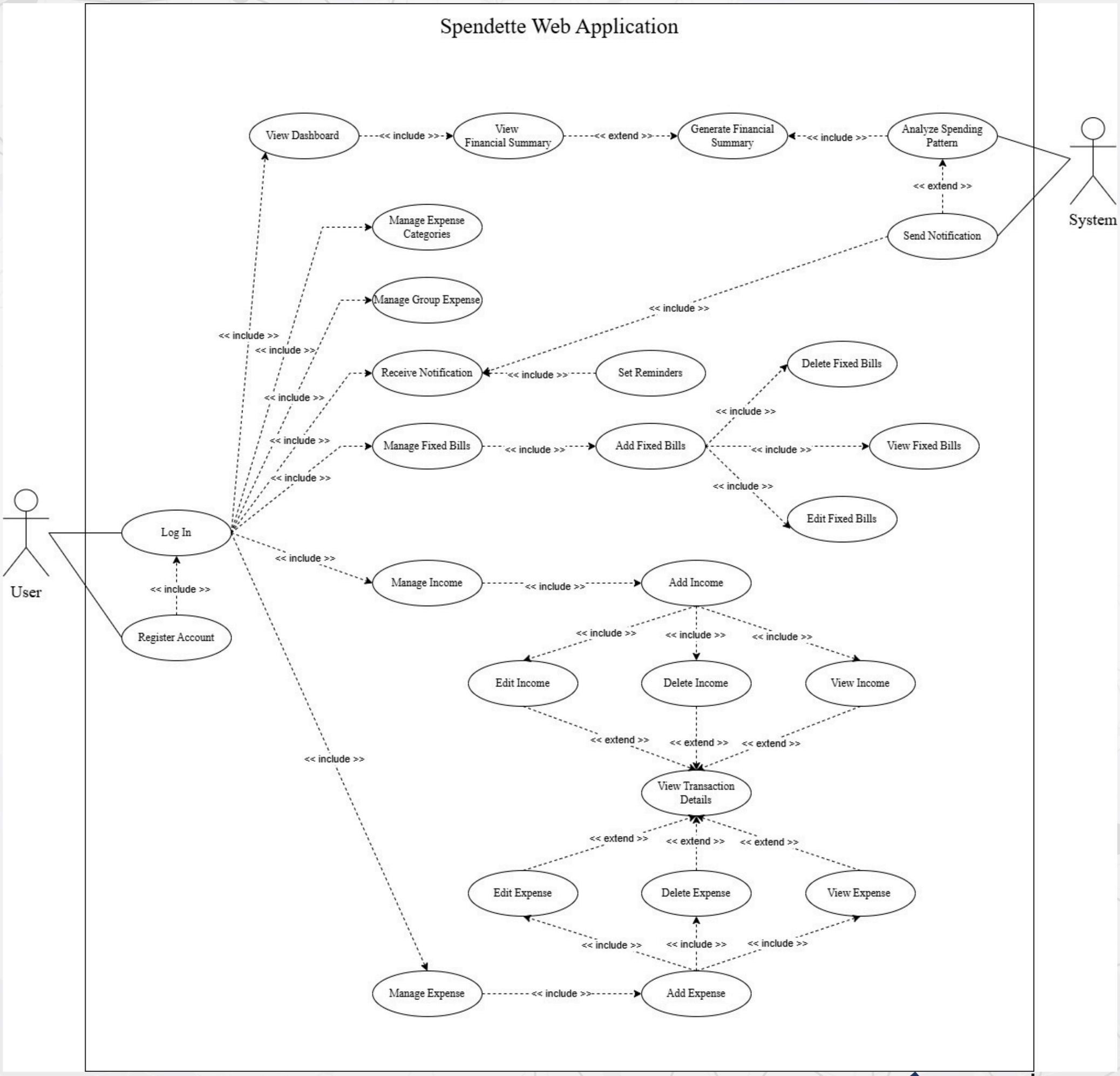
FUNCTIONAL REQUIREMENT

Functional Requirement	Description
User Registration	The system shall allow new users to create an account by providing valid registration details.
User Login	The system shall authenticate users using valid credentials before granting access.
Manage Expense Category	The system shall allow users to create, view, update and delete expense categories for organizing expenses.
Manage Expense	The system shall allow users to create, view, update, and delete expense records with relevant details and categories.
Manage Income	The system shall allow users to create, view, update, and delete income records.
Manage Fixed Bills	The system allow users to create, view, update, and delete fixed bill records and manage bill reminders.
Manage Group Expense	The system shall allow users to create, view, update, and delete group expense records and participant information.
View Transaction History	The system shall allow users to view a consolidated list of income and expense transactions.
View Financial Summary	The system shall generate and display a financial summary based on recorded transactions.
Spending Analysis	The system shall analyze user spending patterns to identify spending behavior.
Notification & Reminder	The system shall send notifications for bill reminders and overspending alerts.

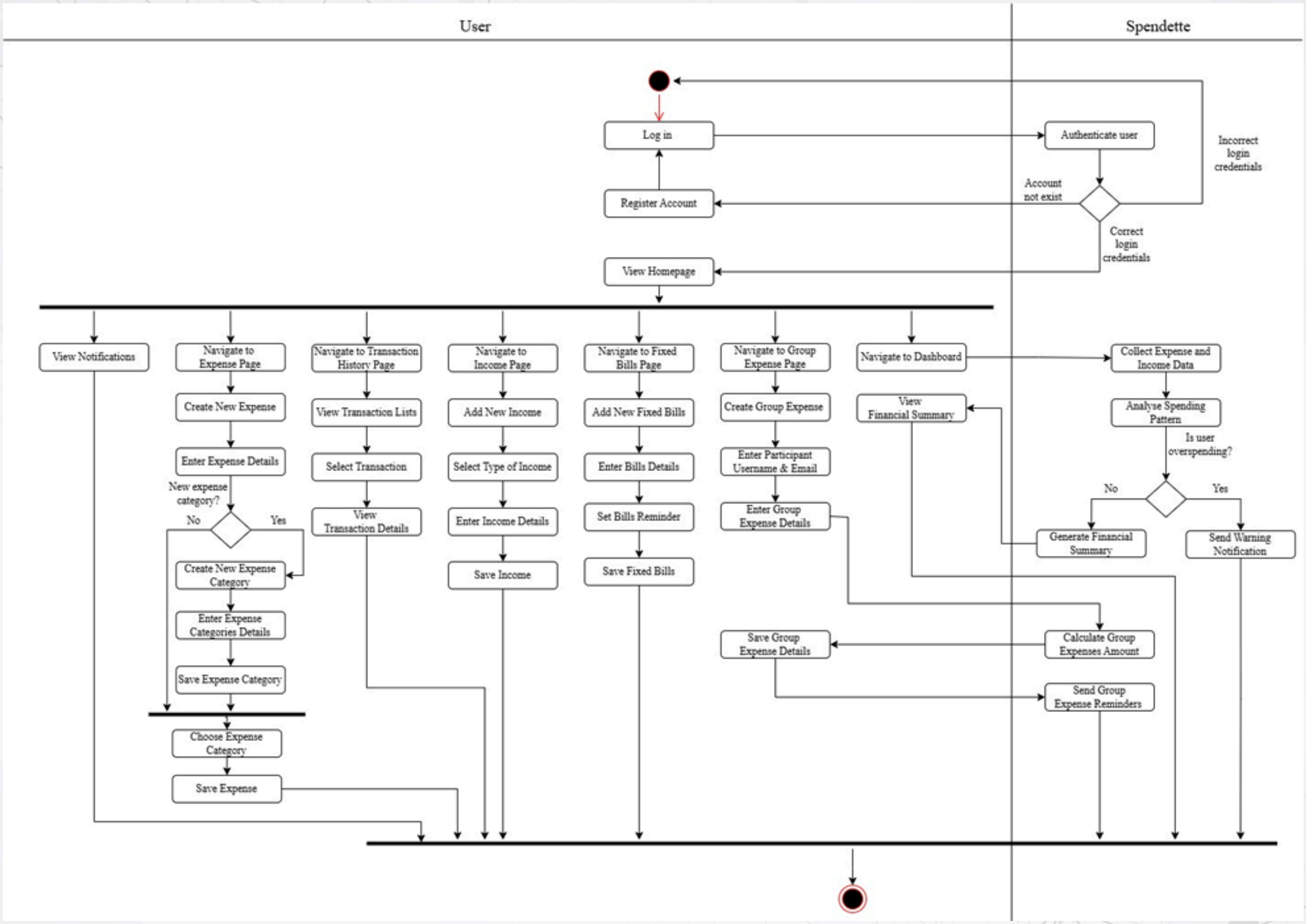
NON-FUNCTIONAL REQUIREMENT

Non-Functional Requirement	Description
Usability	The system shall provide a user-friendly and intuitive interface suitable for university students.
Security	The system shall ensure secure authentication and protect user financial data from unauthorized access.
Reliability	The system shall ensure consistent operation and data integrity during normal usage.
Scalability	The system shall be able to handle an increasing number of users and financial records.
Performance	The system shall process user requests and display results within an acceptable response time.
Data Accuracy	The system shall ensure accurate calculation of expenses, income, and financial summaries.

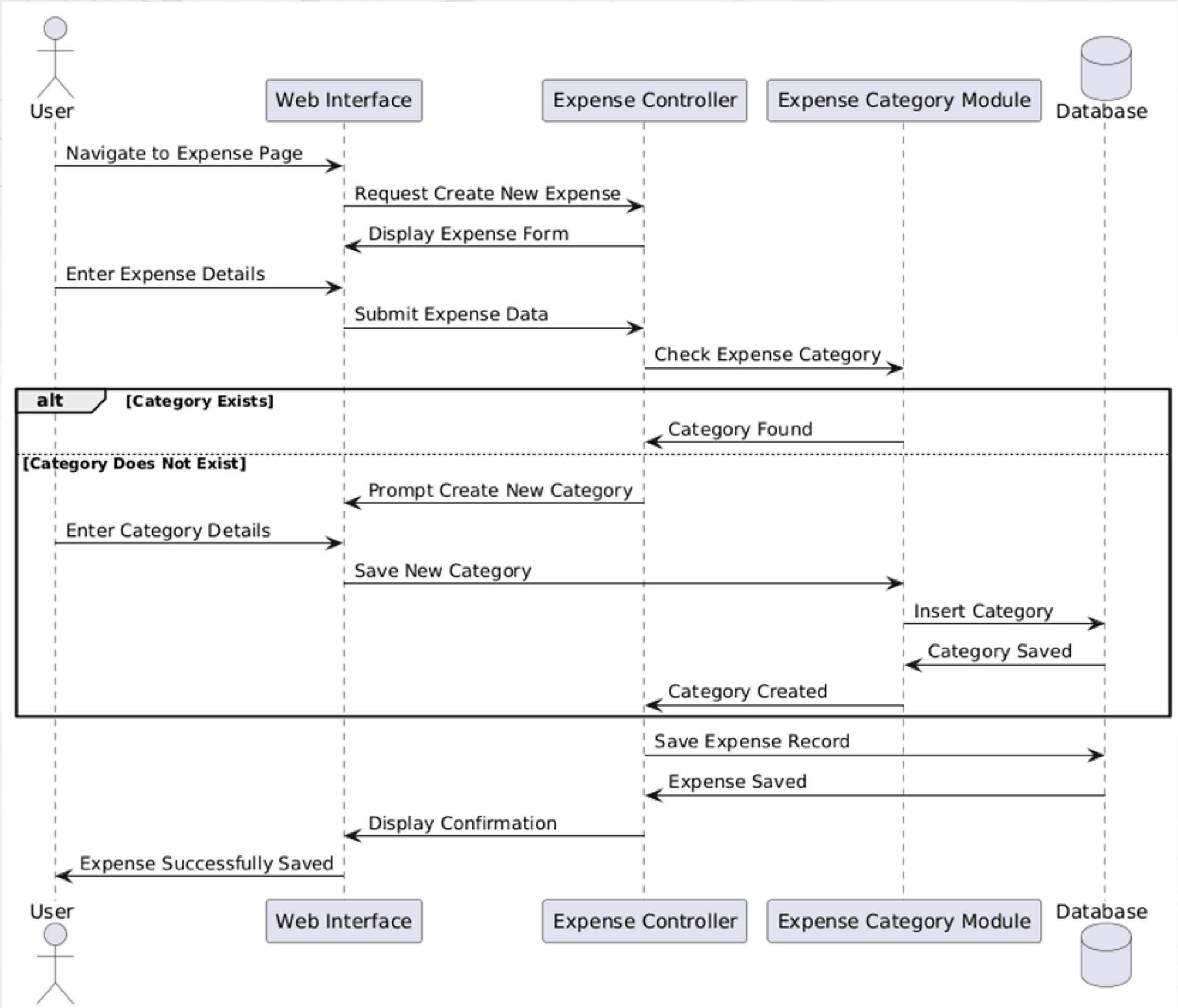
USE CASE DIAGRAM



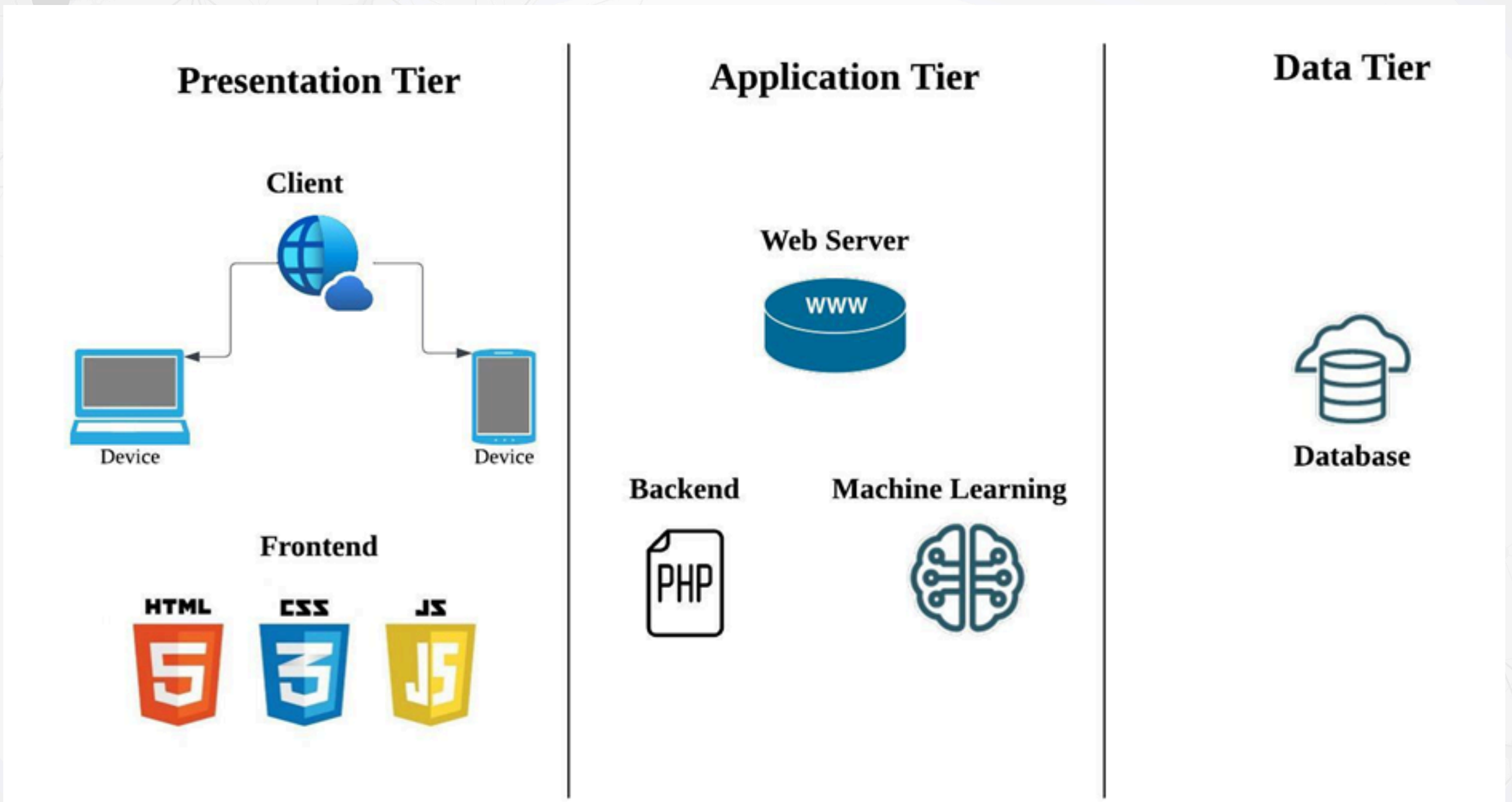
ACTIVITY DIAGRAM



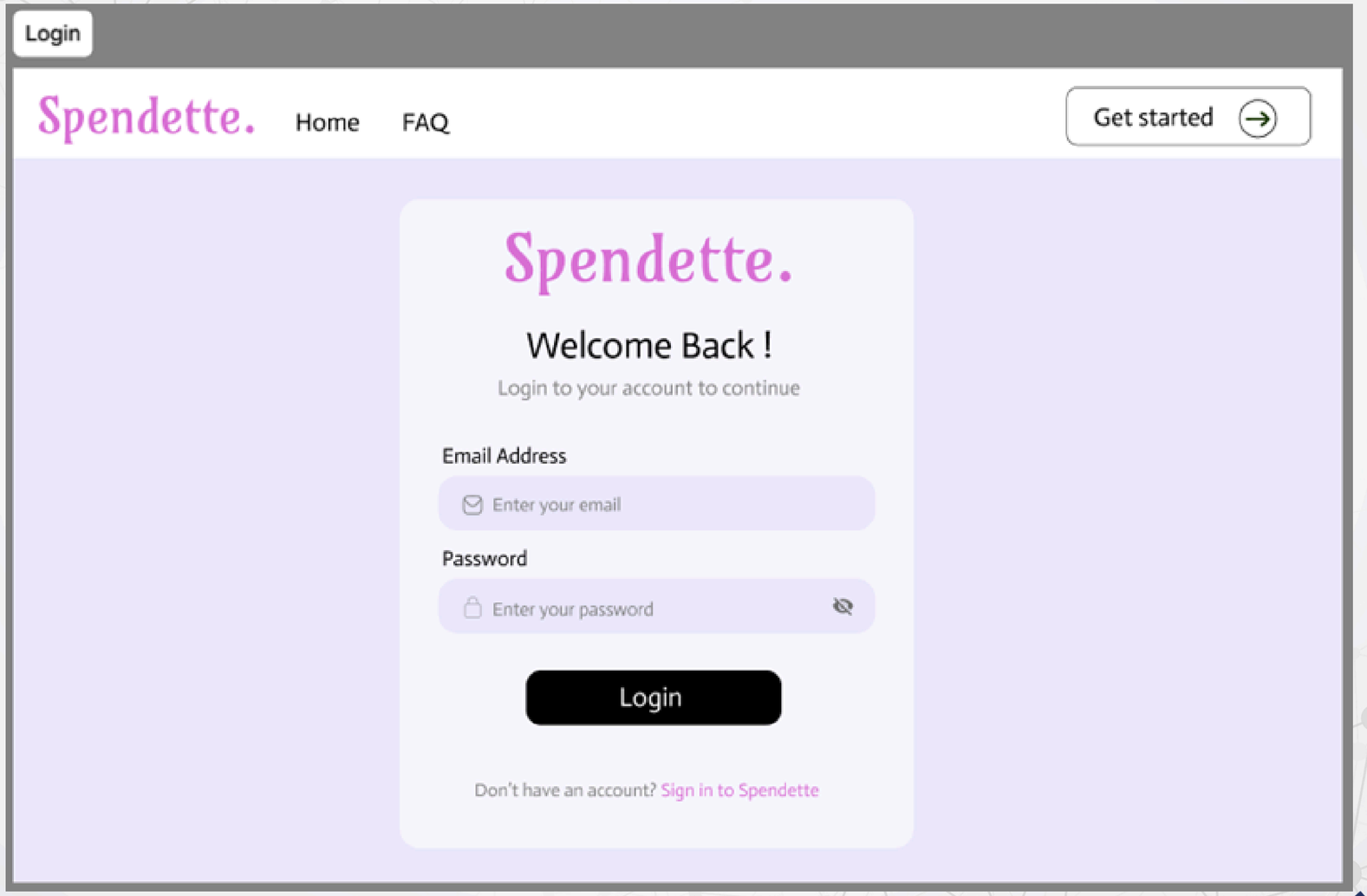
SEQUENCE DIAGRAM



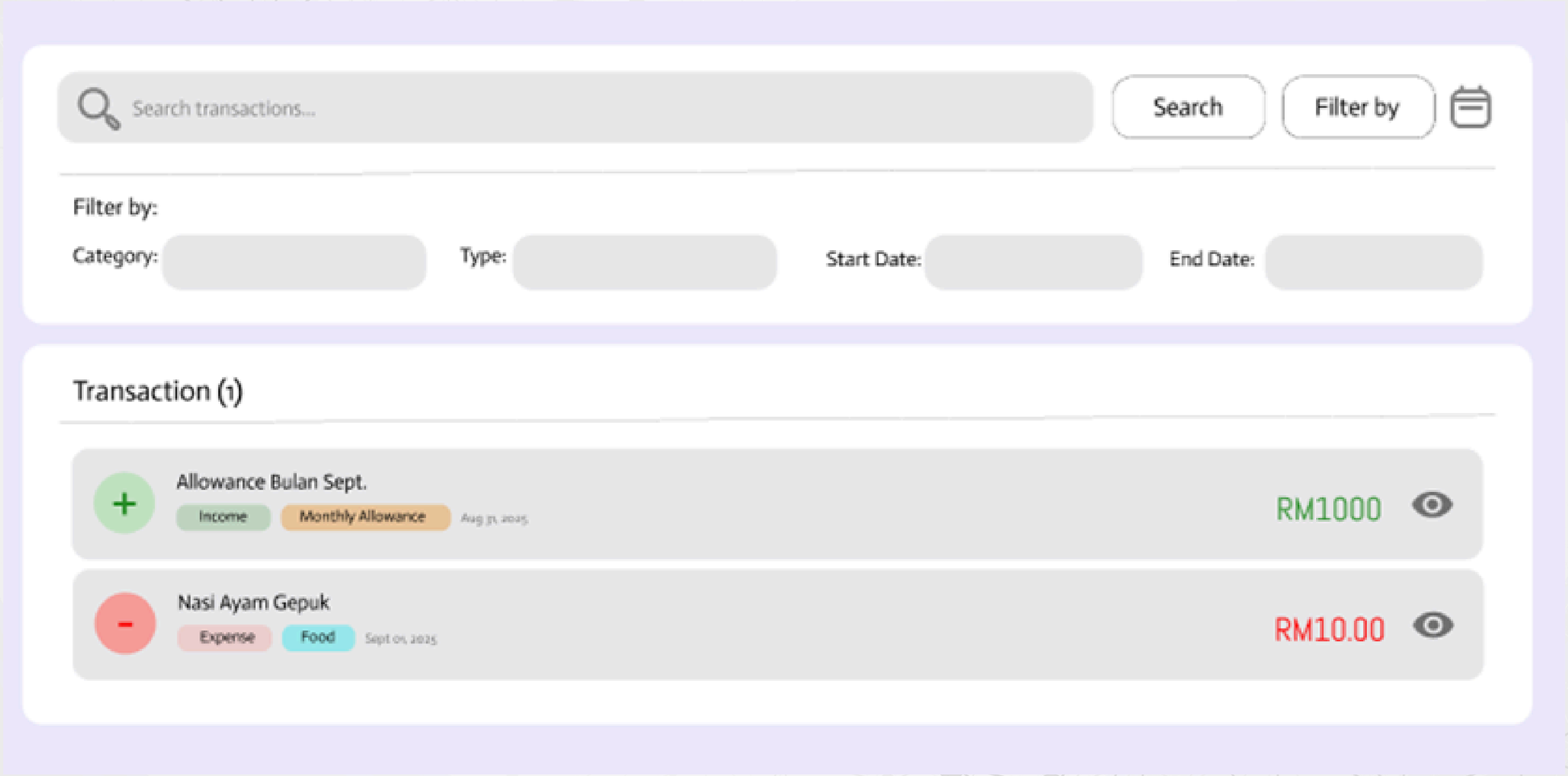
SYSTEM ARCHITECTURE



LOGIN PAGE


Login
Spendette.
Home
FAQ
Get started
Spendette.
Welcome Back !
Login to your account to continue
Email Address
Enter your email
Password
Enter your password
Login
Don't have an account? Sign in to Spendette

TRANSACTION LIST PAGE



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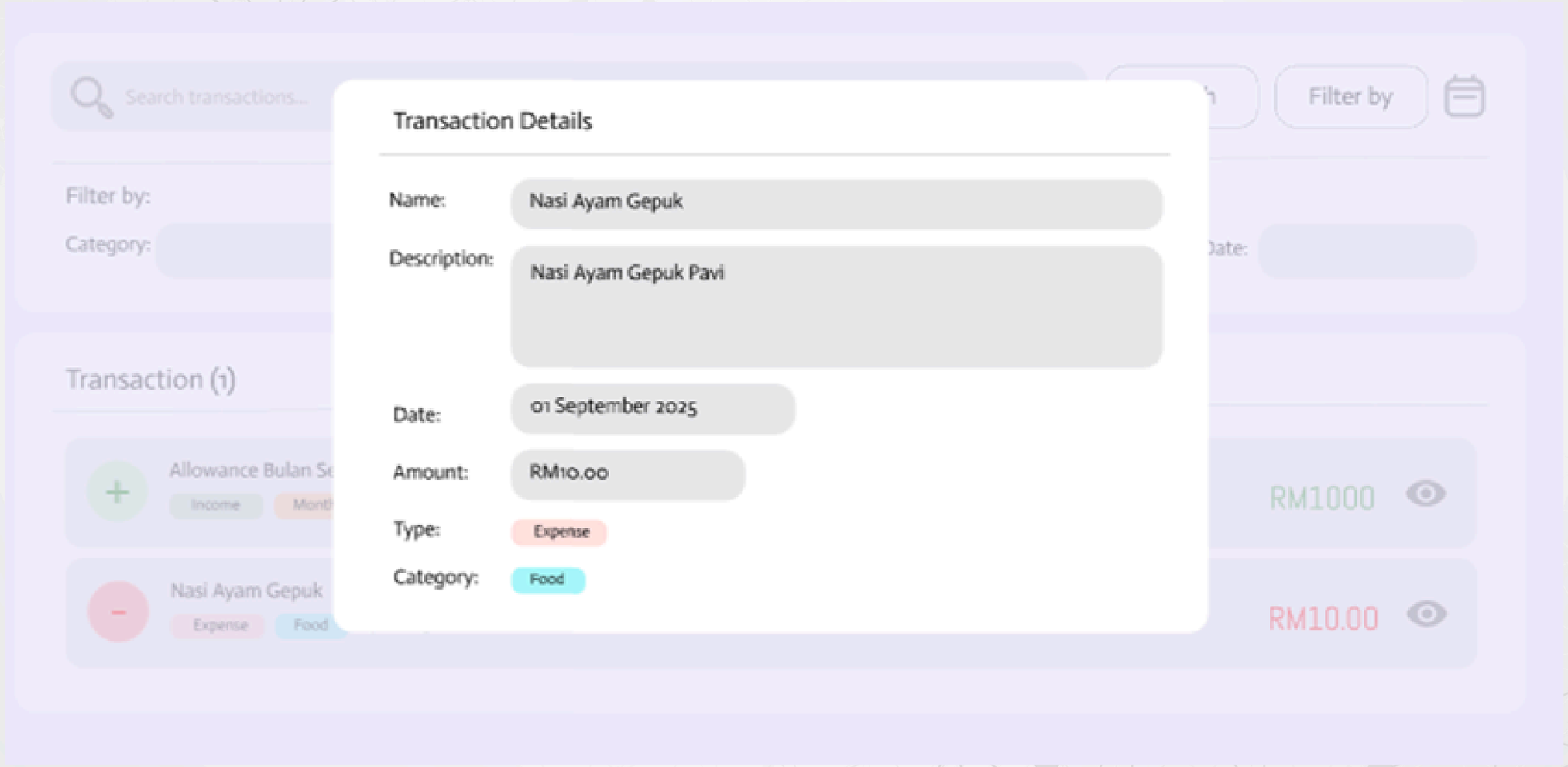
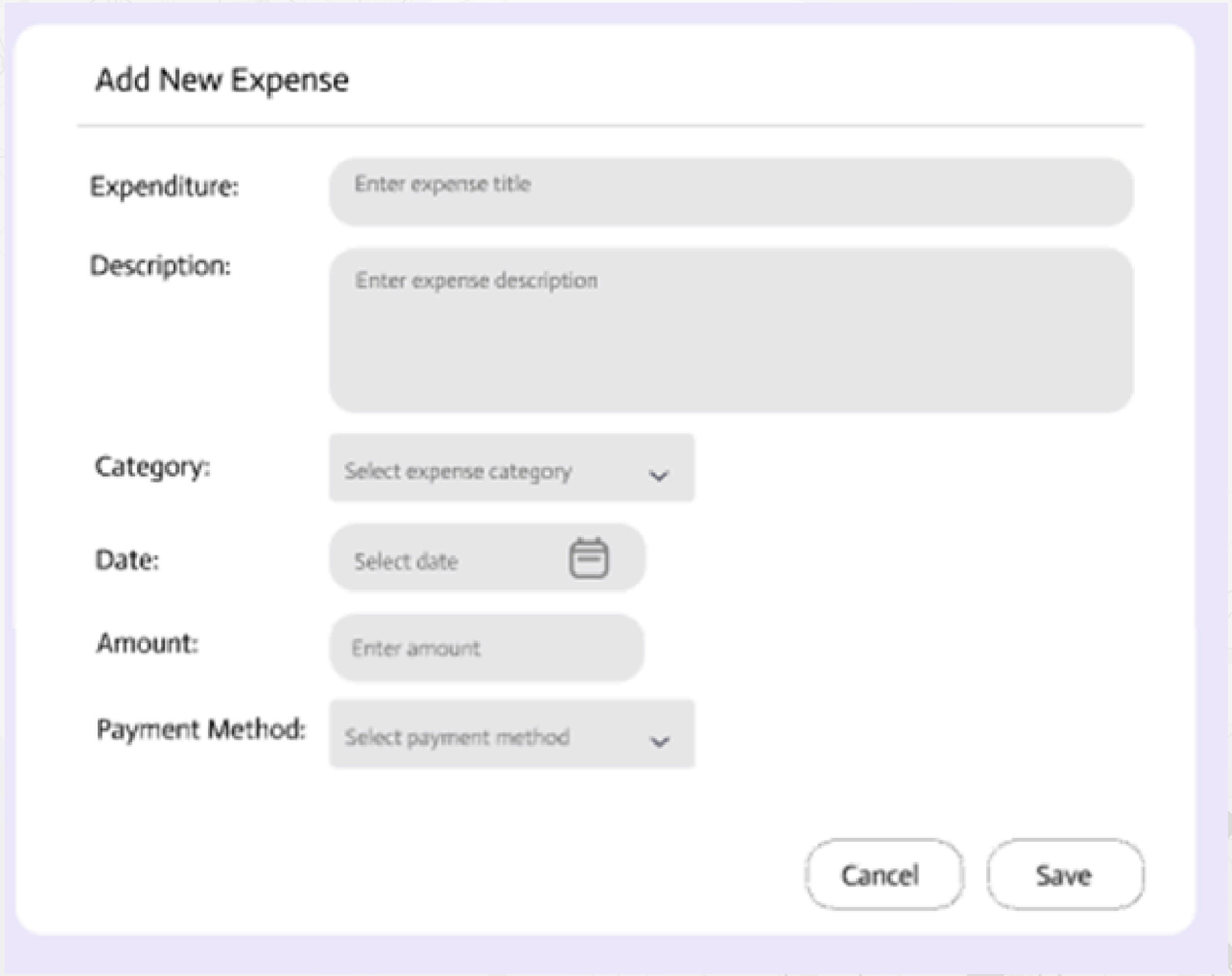
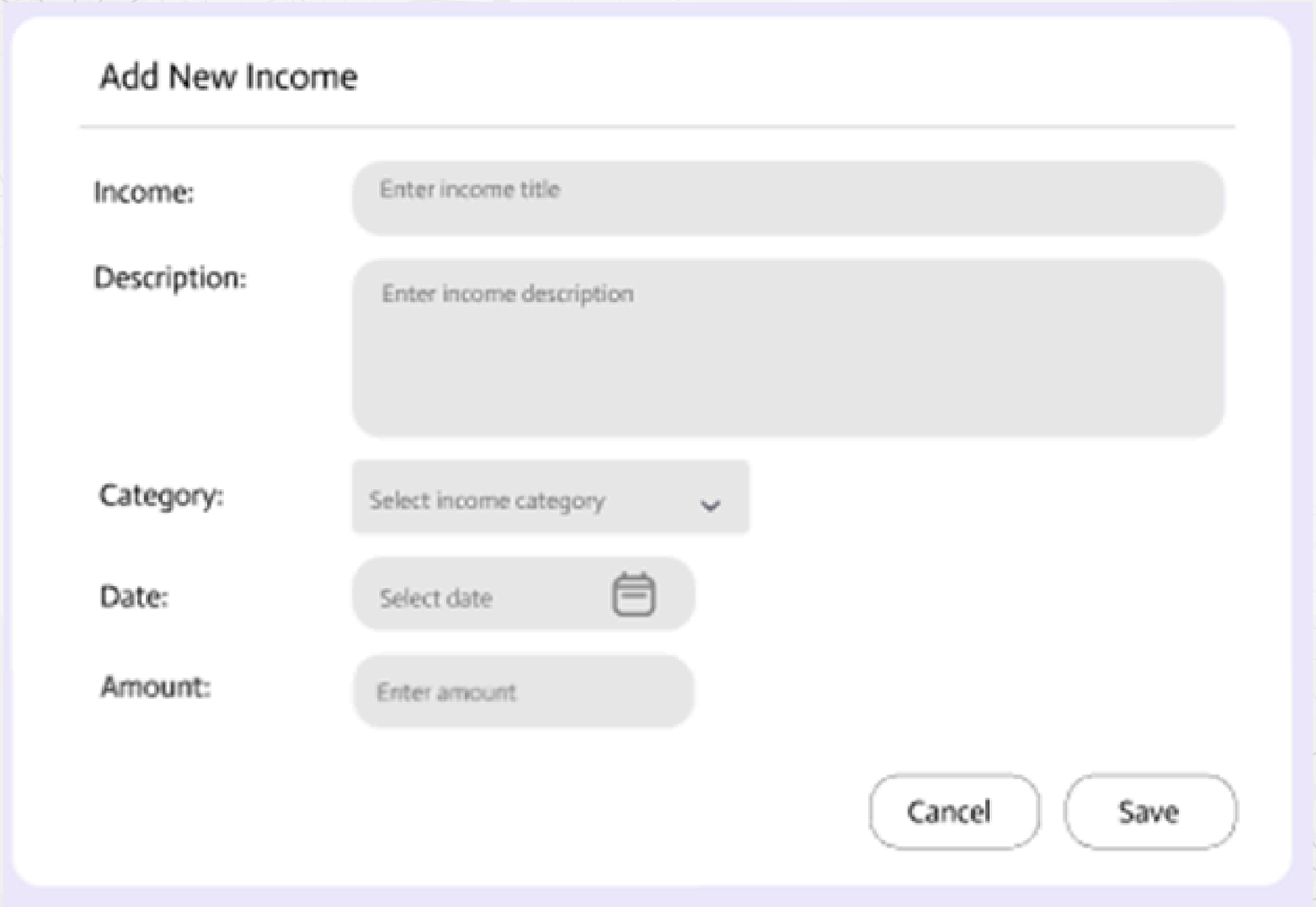


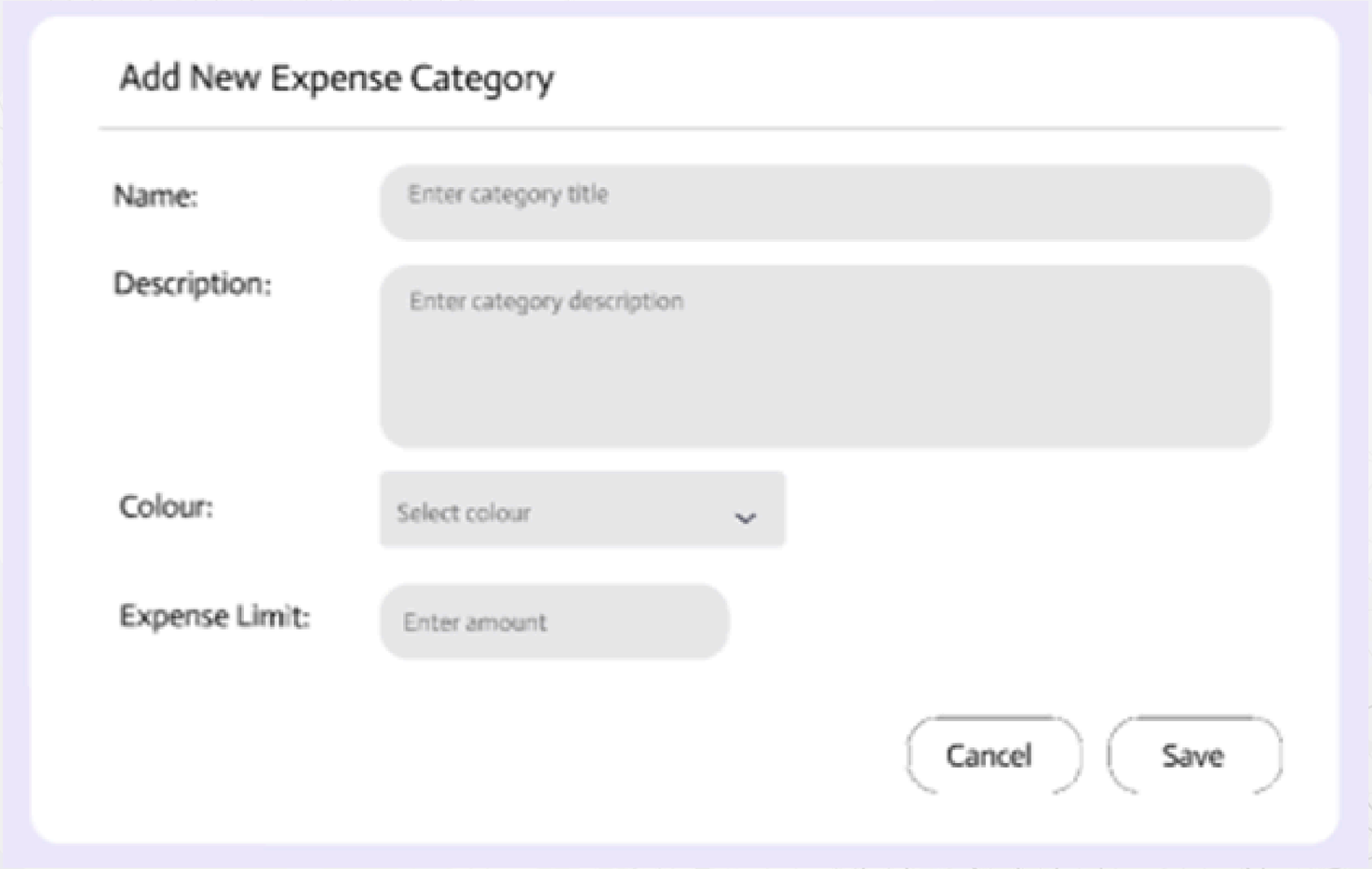
ADD EXPENSE FORM



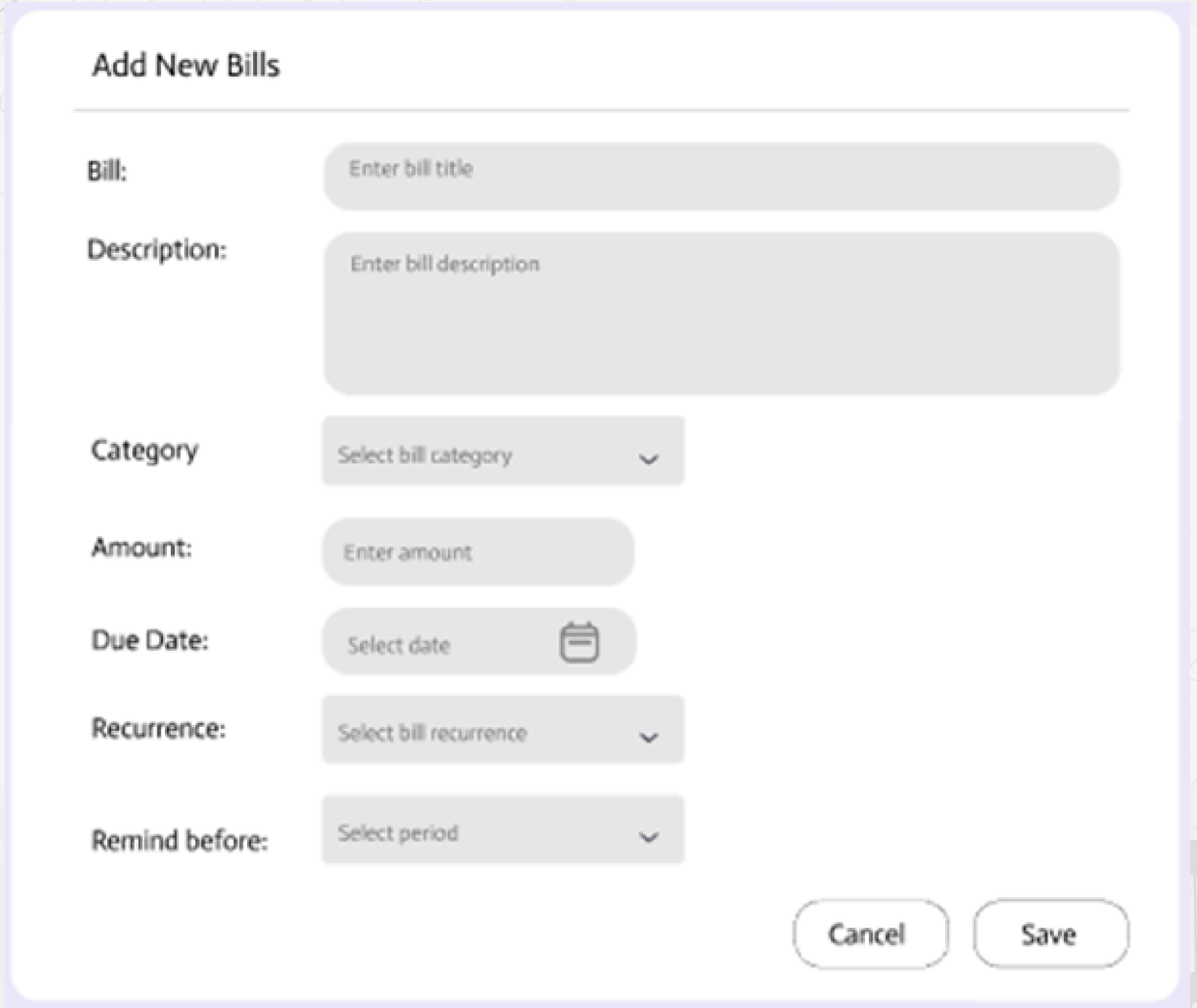
ADD INCOME FORM



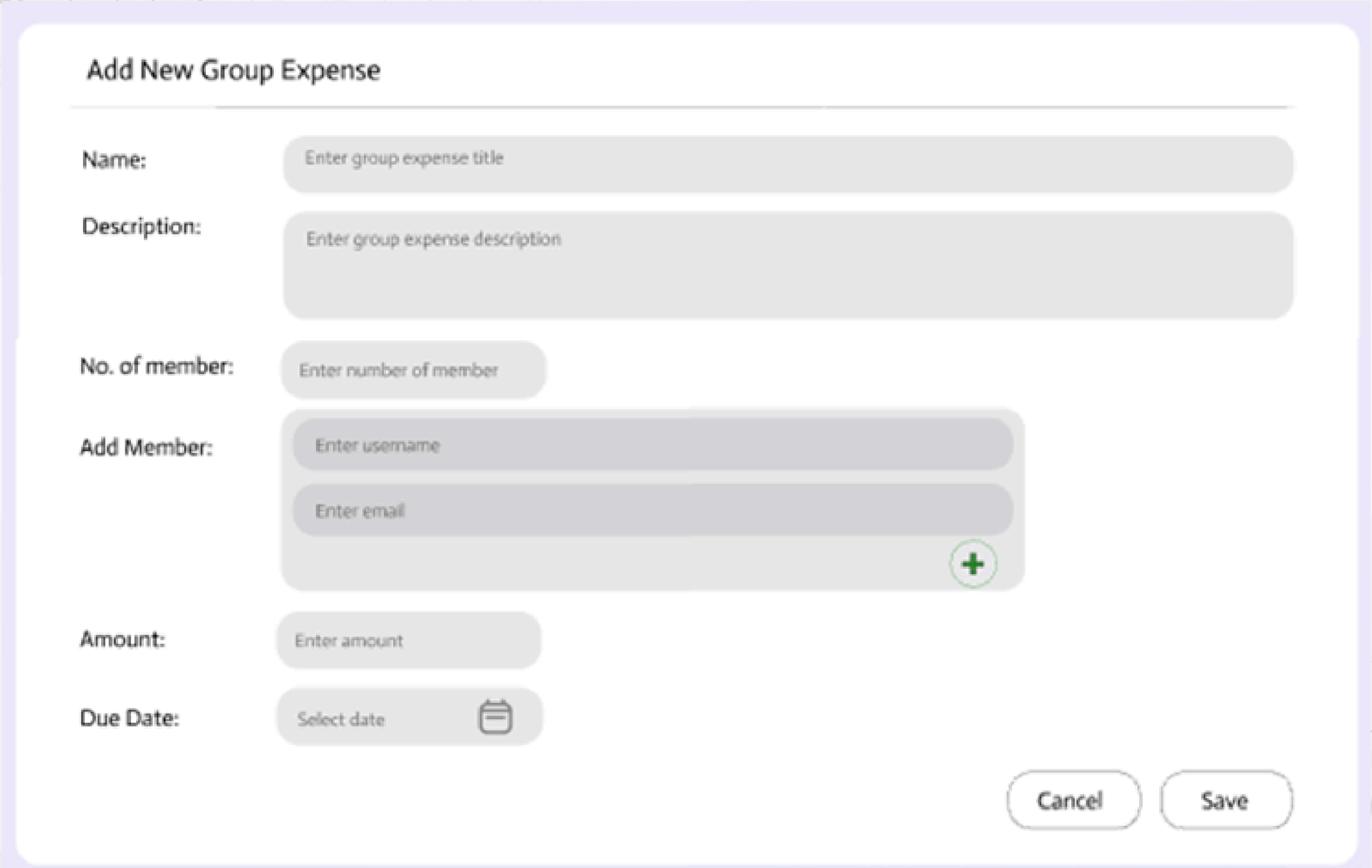
CREATE NEW EXPENSE CATEGORY FORM



ADD NEW FIXED BILLS FORM



CREATE GROUP EXPENSE FORM



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THANK YOU

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