Hamdard University

Department of Computing

Final Year Project

Secure Sense (Leveraging Human Behaviour for Security and Building a Secure Digital Culture) Mobile Application FYP-031/FL24

Software Design Specifications

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Document Sign off Sheet

1.1.1 Document Information

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08-01-2025	1.0	First Draft	Umar Younus Khan
12/01/2025	2.0	Second Draft	Abu Uzair

Definition of Terms, Acronyms, and Abbreviations

Term	Description

2 Table of Contents

3 Introduction

3.1 Purpose of Document

This document describes the software design of the project using an Object-Oriented design methodology. It outlines the system architecture, components, and detailed designs necessary for development

3.2 Intended Audience

The intended audience for this document includes the development team, project supervisors, and stakeholders.

3.3 Document Convention

This section specifies the formatting standards for the document:

- **Font:** Defines the font family used throughout the document, such as Arial or Times New Roman.
- **Font Size:** Specifies the size (e.g., 11pt, 12pt) to ensure uniformity.
- **Styles:** Explains the use of bold, italics, or underlines for headings, subheadings, and emphasis.
- **Numbering:** Outlines the numbering conventions for headings, figures, and tables. **Alignment:** Describes text alignment (justified, left, or center).

3.4 Project Overview

This section provides a high-level description of the project:

- **Functionality:** Briefly describes what the system will do and its main features.
- **Design Approach:** Highlights the methodologies or frameworks to be used (e.g., Agile, MVC).
- **Purpose:** Explains the problem the system solves and the value it provides.

3.5 Scope

This section outlines the project's boundaries:

- **What the System Will Do:** List the features and functionalities included (e.g., user registration, data analytics).
- **What the System Will Not Do:** Specify limitations or exclusions (e.g., third-party integrations not covered).

4 Design Considerations

This section addresses preliminary considerations that shape the design process:

- Identifies challenges and prerequisites before starting the design.
- Establishes foundational requirements to guide detailed system architecture.

4.1 Assumptions and Dependencies

- **Assumptions:** Outlines conditions assumed to be true for the project (e.g., users will have internet access).
- **Dependencies:** Lists external factors or systems the project relies on, such as libraries, APIs, or third-party tools.

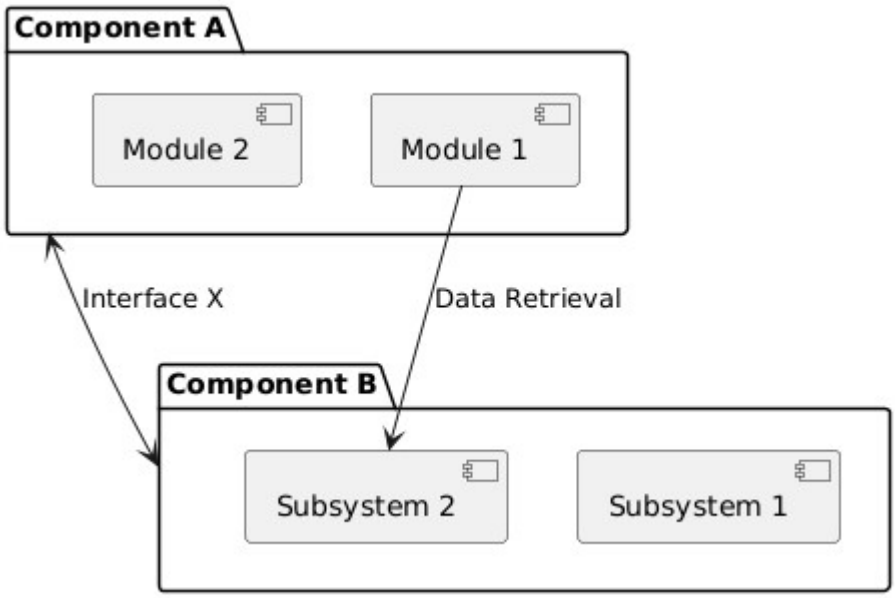
4.2 Risks and Volatile Areas

- Identifies potential changes or risks (e.g., evolving requirements, technology upgrades).
- Suggests mitigation strategies, such as modular design or frequent reviews *System Architecture*

[This section should provide a high-level overview of how the functionality and responsibilities of the system are partitioned and then assigned to subsystems or components. The main purpose is to gain a general understanding of how the system is decomposed, and how the individual parts work together to provide the desired functionality].

4.3 System Level Architecture

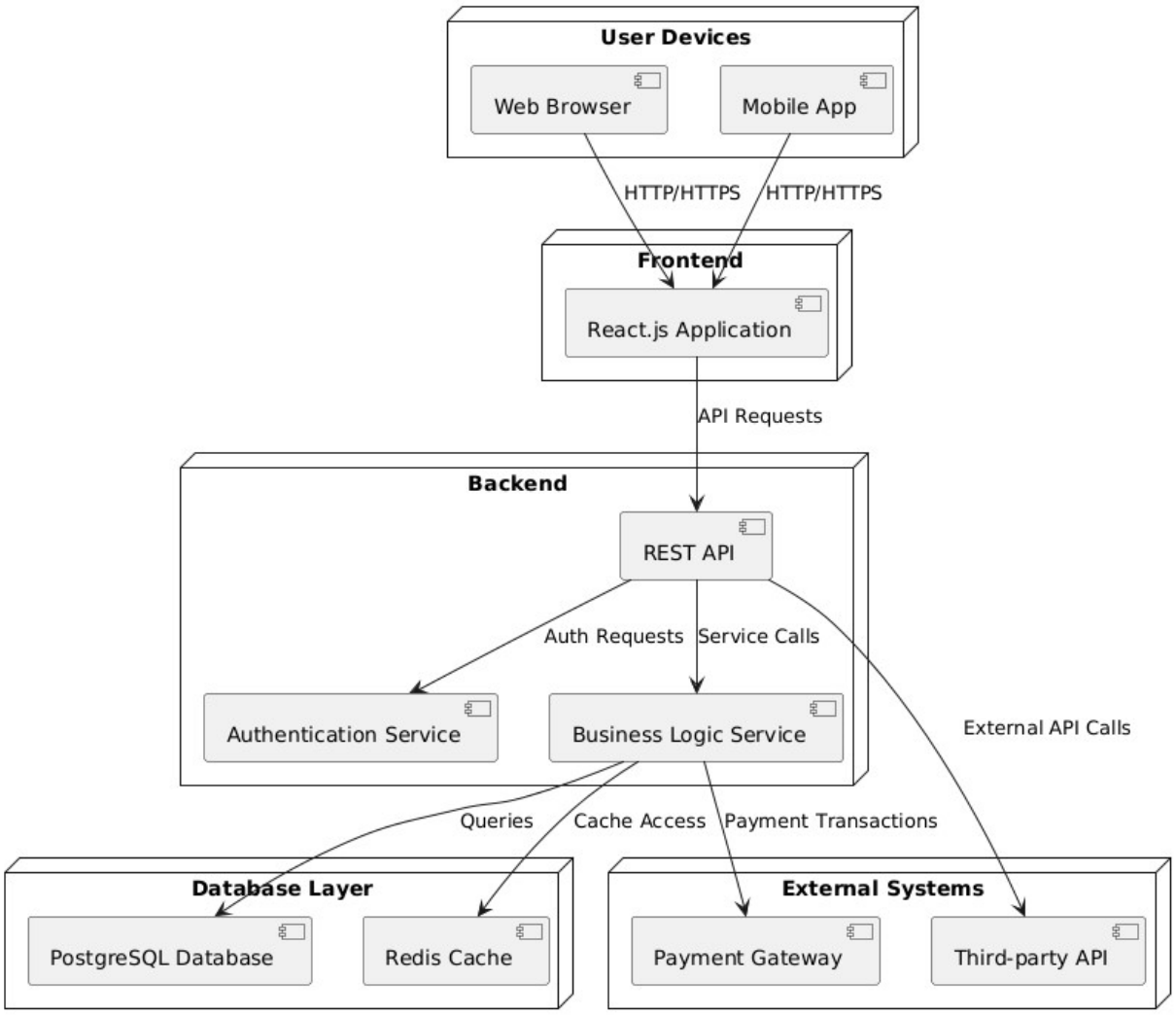
- Describes high-level decomposition of the system into elements like modules or subsystems.
- Includes relationships, interfaces, and physical design aspects.
- Uses UML diagrams (e.g., package, component) to visualize the architecture



4.4 Software Architecture

Explains interactions among layers, such as:

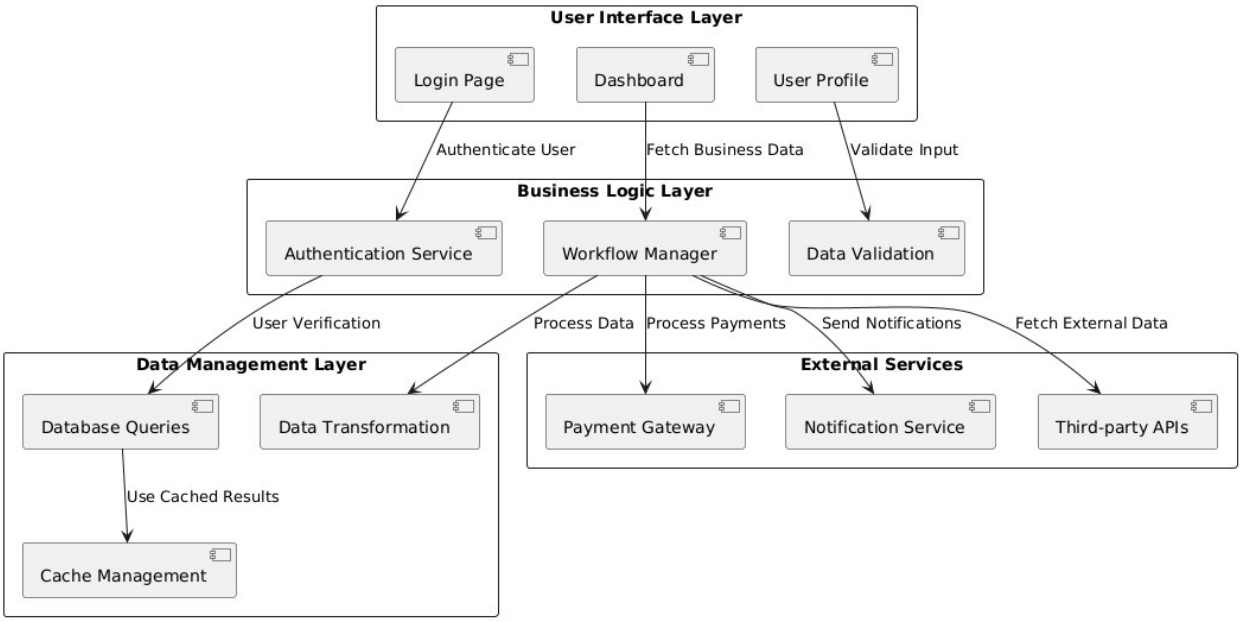
- **User Interface Layer:** Handles user interactions.
- **Middle Tier:** Manages business logic and data processing.
- **Data Access Layer:** Interacts with the database.



5 Design Strategy

Explains interactions among layers, such as:

- **User Interface Layer:** Handles user interactions.
- **Middle Tier:** Manages business logic and data processing.
- **Data Access Layer:** Interacts with the database.
- **Data Management:** Methods for data storage, retrieval, and consistency. **Concurrency:** Handling simultaneous operations effectively.

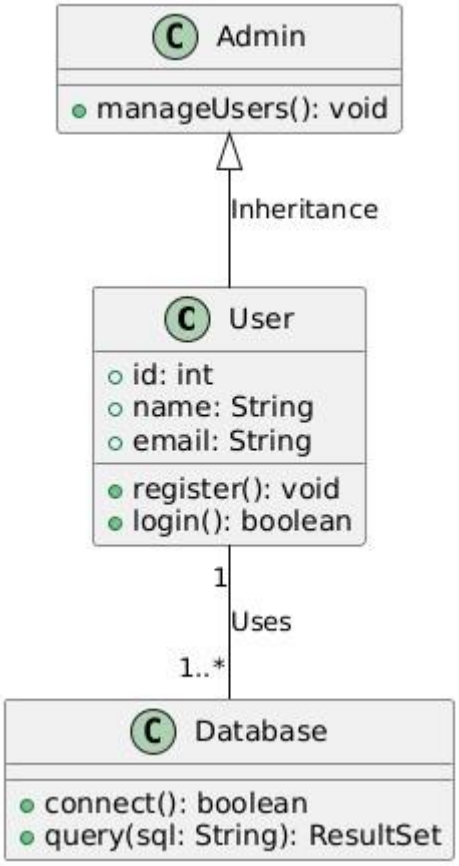

User Interface Layer
Login Page
Dashboard
User Profile
Authenticate User
Fetch Business Data
Validate Input
Business Logic Layer
Authentication Service
Workflow Manager
Data Validation
User Verification
Process Data
Process Payments
Send Notifications
Fetch External Data
Data Management Layer
Database Queries
Data Transformation
Use Cached Results
Cache Management
External Services
Payment Gateway
Notification Service
Third-party APIs

Detailed System Design

This section dives into the specifics of system design.

6.1 Design Class Diagram

- Provides a detailed class diagram.
- Attributes, methods, and interactions between classes are described.
- Logical data models (e.g., E/R models) are included.

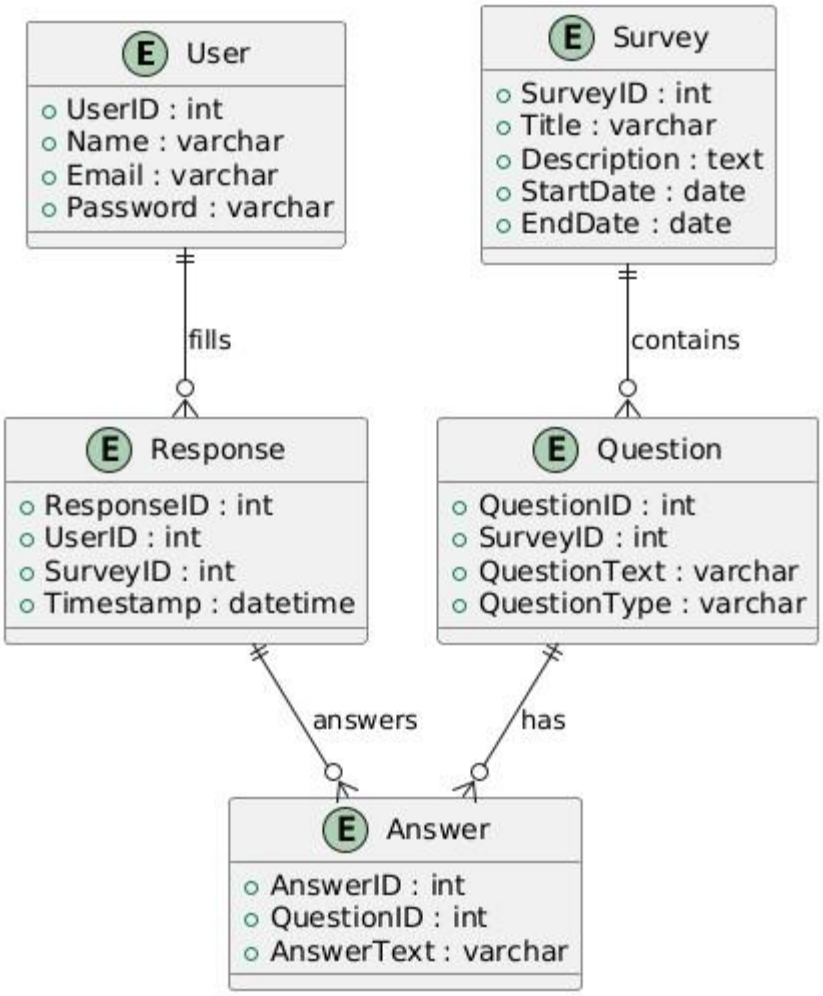


6.2 Database Design

- Presents the database's logical design with E/R diagrams.
- Includes a **Data Dictionary** with detailed descriptions of tables and columns.

6.2.1 ER Diagram

Visual representation of entities, relationships, and attributes in the database



6.2.2 Data Dictionary

- **Name:** Primary name of the entity.
- **Alias:** Alternate names.
- **Where-used/how-used:** Usage description.
- **Content description:** Details of fields, data types, and constraints

6.2.2.1 Data 1

[Description (Refer to Template on next page).]

6.2.2.2 Data 2

[Description (Refer to Template on next page).]

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6.2.2.3 Data n

[Description (Refer to Template on next page).]

6.2.2.4 1. User Data

- **Name**: User
- **Alias**: Participant, Survey User **Where-used/how-used**: ○ Used by the system to authenticate users during login and registration.
    - Used in the `Response` process to track which user submitted responses.
- **Content Description**:
    - The `User` data contains personal details about each survey participant.

Table: User

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
UserID	Unique identifier for the user	INT	11	No	None	PK
Name	Name of the user	VARCHAR	100	No	None	
Email	Email address of the user	VARCHAR	150	No	None	
Password	Hashed password	VARCHAR	255	No	None	

6.2.2.5 2. Survey Data

- **Name**: Survey
- **Alias**: Questionnaire
- **Where-used/how-used**: ○ The `Survey` data is used to create, edit, and display surveys to users.
    - Used as a reference in the `Question` and `Response` entities. **Content Description**:
    - The `Survey` data includes metadata about the survey like its title, description, and time duration.

Table: Survey

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
SurveyID	Unique identifier for the survey	INT	11	No	None	PK

Title	Title of the survey	VARCHAR	200	No	None	

Description	Detailed description of the survey	TEXT	255	Yes	None	
StartDate	Start date of the survey	DATETIME	20	No	None	
EndDate	End date of the survey	DATETIME	20	No	None	

6.2.2.6 3. Question Data

- **Name**: Question
- **Alias**: Survey Question
- **Where-used/how-used**:
  - The `Question` data defines the questions available for each survey.
  - Used by the `Response` entity to capture user answers.
- **Content Description**:
  - The `Question` data includes the question text, question type (e.g., multiplechoice, text answer), and the survey it belongs to.

Table: Question

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
QuestionID	Unique identifier for the question	INT	11	No	None	PK
SurveyID	Survey ID associated with the question	INT	11	No	None	FK
QuestionText	The actual question text	VARCHAR	255	No	None	
QuestionType	Type of question (e.g., multiple choice, text)	VARCHAR	50	No	None	

6.2.2.7 4. Answer Data

- **Name**: Answer
- **Alias**: Possible Answer
- **Where-used/how-used**:
  - The `Answer` data represents possible answers for a multiple-choice question.

- Used by the `Response` entity to store a user's selected answer.

- **Content Description**:
  - Contains possible answers for each `Question`, storing both the answer and the question it belongs to.

Table: Answer

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
AnswerID	Unique identifier for the answer	INT	11	No	None	PK
QuestionID	ID of the associated question	INT	11	No	None	FK
AnswerText	Text of the possible answer	VARCHAR	255	No	None	

6.2.2.8 5. Response Data

- **Name**: Response
- **Alias**: Survey Response
- **Where-used/how-used**:
  - The `Response` data captures user input for each survey.
  - Linked to both `User` and `Survey` entities to track who filled out which survey.
- **Content Description**:
  - The `Response` data includes user answers to each question in the survey.

Table: Response

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
ResponseID	Unique identifier for the response	INT	11	No	None	PK
UserID	ID of the user who provided the response	INT	11	No	None	FK
SurveyID	ID of the survey being responded to	INT	11	No	None	FK
Timestamp	Date and time of the response submission	DATETIME	20	No	None	

6.2.3 Content Description Notation for Data Constructs

- **=**: Composed of (e.g., a `Survey` is composed of multiple `Questions`).
- **+**: And (e.g., a `Response` contains `Answer` for each `Question`).
- **[|]**: Either-or (e.g., for question types: multiple choice [|] text answer).
- **{}n**: Repetition (e.g., `{10}n` represents 10 possible answers for a question).
- **( )**: Optional data (e.g., an optional description of a survey).

6.3 Application Design

This section focuses on system workflows and interaction.

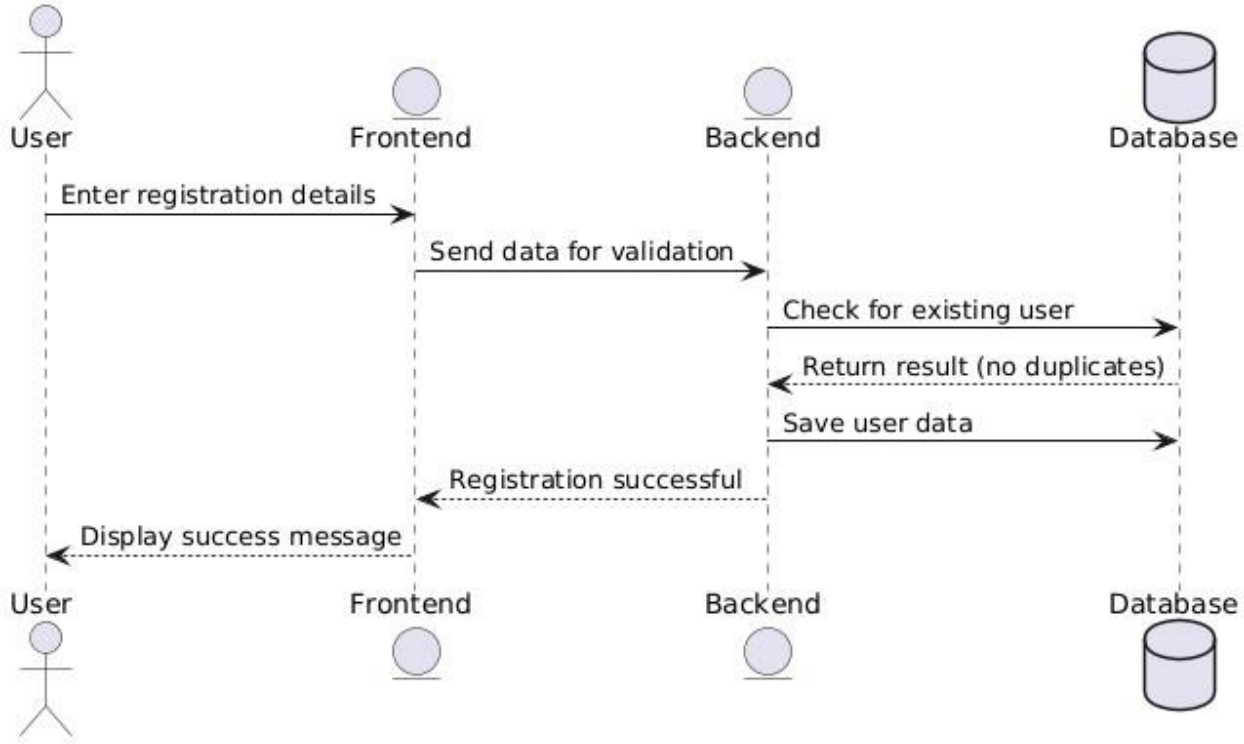
6.3.1 Sequence Diagram

- Illustrates object interactions over time.
- Each diagram includes explanations.

6.3.1.1 Sequence Diagram 1

Diagram Explanation:
This diagram represents the flow of interactions during a user registration process in an application. The main components include the `User`, `Frontend`, `Backend`, and `Database`. The steps include:

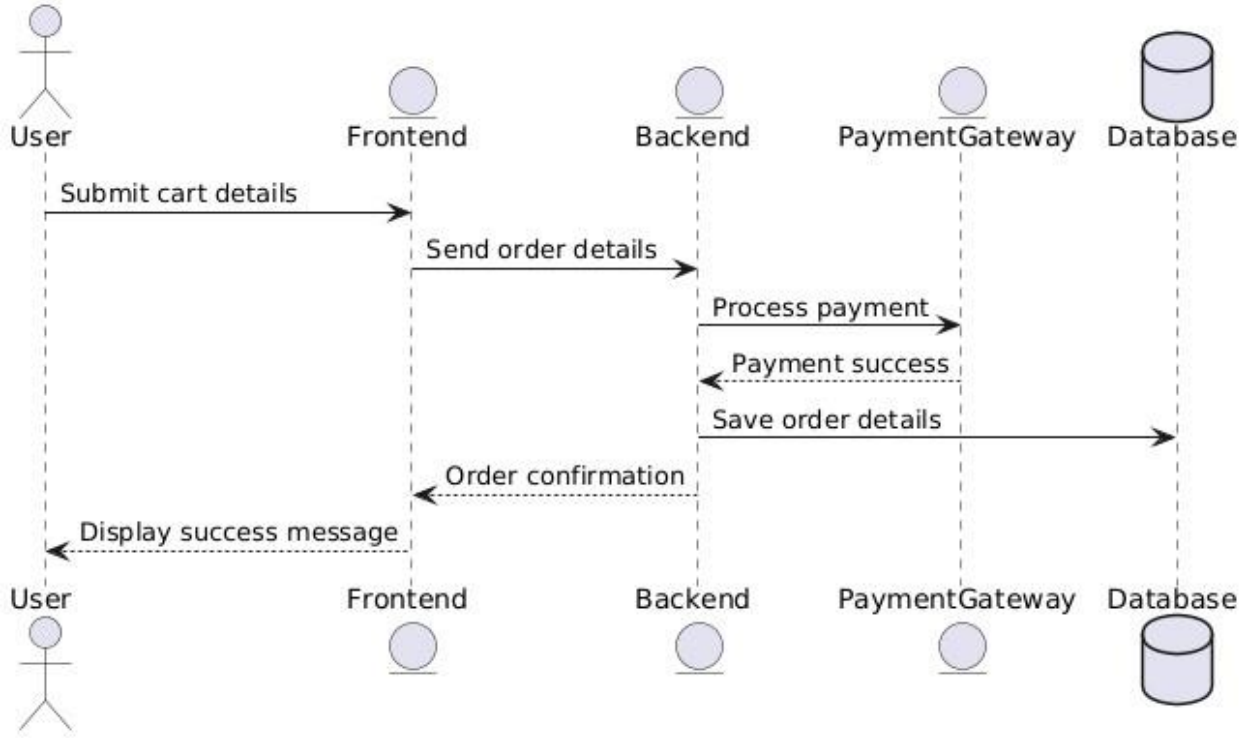
1. **User Input:** The `User` provides registration details via the frontend.
2. **Validation:** The `Frontend` sends data to the `Backend` for validation.
3. **Database Check:** The `Backend` checks the `Database` for duplicate entries.
4. **Save User Data:** If no duplicates are found, the `Backend` saves the user's data in the `Database`.
5. **Response to User:** Confirmation is sent back to the `Frontend` and displayed to the `User`



6.3.1.2 <Sequence Diagram 2>

Diagram Explanation:
This diagram illustrates the sequence of interactions involved in placing an order in an ecommerce system. The main components include the `User`, `Frontend`, `Backend`, `Payment Gateway`, and `Database`. The steps include:

1. **Cart Submission:** The `User` submits their cart details via the `Frontend`.
2. **Order Creation:** The `Frontend` sends the cart details to the `Backend` to create an order.
3. **Payment Processing:** The `Backend` communicates with the `Payment Gateway` to process the payment.
4. **Order Confirmation:** Upon successful payment, the `Backend` saves the order details in the `Database`.
5. **User Notification:** A confirmation is sent back to the `Frontend`, and a success message is displayed to the `User`.

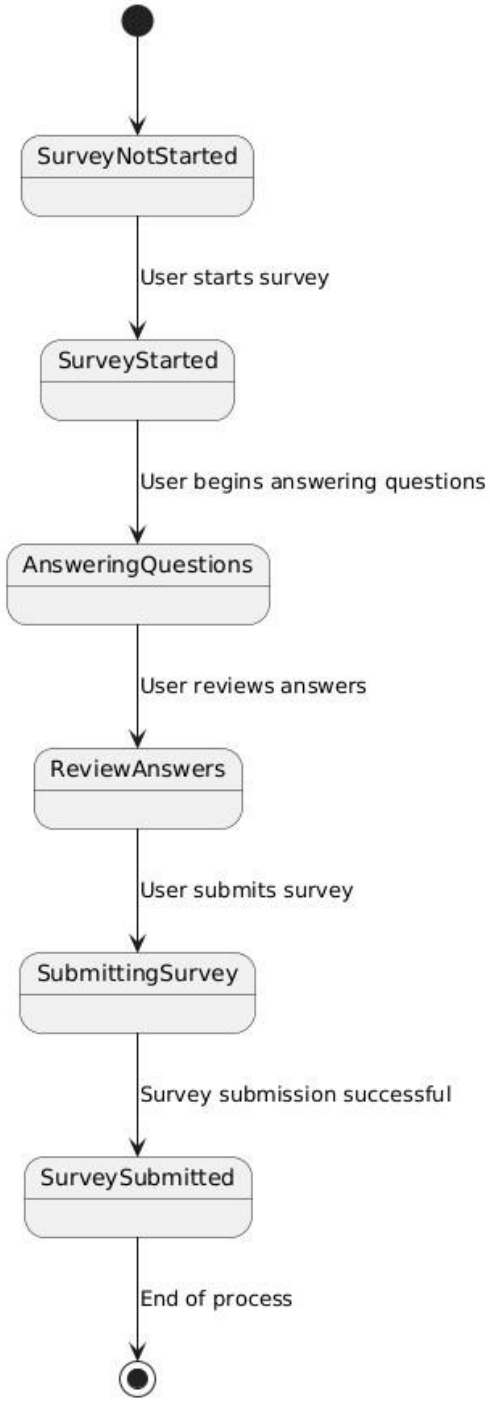


6.3.2 State Diagram

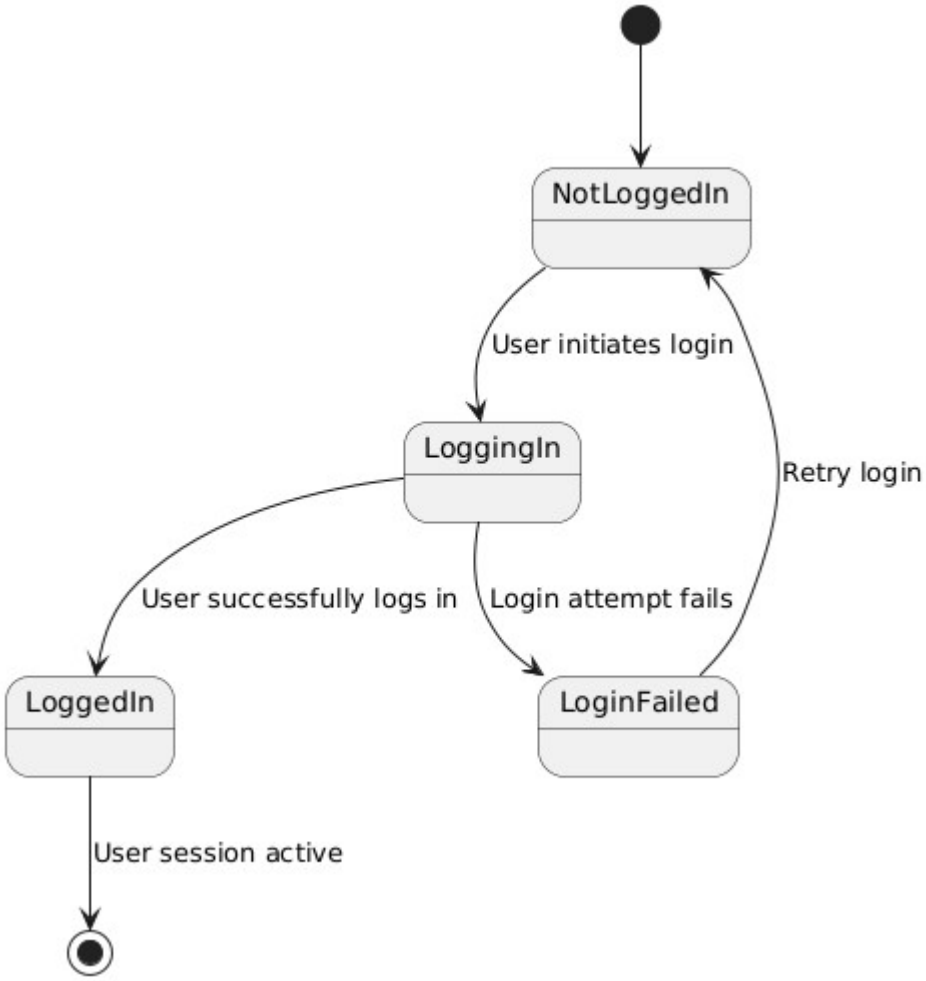
- Shows state transitions for system components.

- Explains various states and their triggers. **6.3.2.1**

<State Diagram 1>



6.3.2.2 <State Diagram 2>



6.4 GUI Design

Describes and provides mockups of user interface designs for key use cases.

6.4.1.1 6.4.1 Login Screen Mockup

- **Purpose:** Allows users to authenticate themselves with their credentials (username/email and password).
- **Components:**
  - Input fields: Username/Email, Password ○ Buttons: Login, Forgot Password, Sign Up ○ Text: "Welcome to Survey App! Please log in to continue."

Mockup Description:

- The screen will have a login form with two text fields (one for the username/email and the other for the password).

- A login button below the text fields.
- A link below the login button to navigate to the registration screen.

6.4.1.2 6.4.2 Survey Form Screen Mockup

- **Purpose:** Allows users to answer survey questions.
- **Components:**
  - Title: "Survey Questions"
  - A series of questions (multiple-choice, text input, etc.) ○ Submit button ○ Progress bar to indicate how much of the survey has been completed.

Mockup Description:

- The screen will display a list of questions with options for answers (radio buttons, checkboxes).
- A submit button will be located at the bottom to submit the answers once completed.
  - A progress bar will show how far the user has reached in the survey.

6.4.1.3 6.4.3 Survey Results Screen Mockup

- **Purpose:** Displays results after submitting the survey.
- **Components:**
  - Title: "Survey Results" ○ A summary of the responses ○ Option to view detailed results or reattempt the survey.

Mockup Description:

- After completing the survey, the results screen will show a summary of the user's responses.
- A button will be available to allow the user to either review their answers or retake the survey.

7 References

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