



COMSATS University Islamabad (CUI)

## Final Year Project Report

for

Online Student Counselling System

Version 1.2

By

Soban Mumtaz

CIIT/SP21-BCS-022/VHR

Anas Najmi

CIIT/SP21-BCS-011/VHR

Supervisor

Dr Umar Rashid

Bachelor of Science in Computer Science  
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**Supervised By**  
**Dr Umar Rashid**

**Signature**

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# ABSTRACT

The Online Student Counseling System aims to offer an accessible, secure, and user-friendly platform for student counseling, addressing key needs like career advice, academic guidance, and mental health support. The platform connects students with certified counselors via real-time chat, session scheduling, and personalized dashboards. Core features include separate dashboards for students, counselors, and administrators, a booking and payment system for sessions. This system enhances counseling accessibility, providing flexible, structured, and real-time support for students in need.

# **Chapter 1**

## **Introduction**

### **1.1 Project Scope**

The Online Student Counseling System is designed to provide a secure, accessible, and user-friendly platform for personalized student counseling, focusing on career guidance, course advice, and mental health. By offering a real-time chat interface, it connects students with certified counselors for streamlined, accessible support. Key components include a centralized registration module with distinct roles for students and counselors, a scheduling and payment system for booking sessions, and dedicated dashboards for students, counselors, and administrators. The student dashboard provides access to purchased courses, session scheduling, and digital resources, while the counselor dashboard supports session management and profile updates. The admin dashboard enables platform oversight, including user management, content maintenance. Automated notifications for confirmations and reminders help ensure engagement and

consistent communication throughout the counseling process.

This system is ideal for educational institutions, counseling centers, and mental health organizations looking to extend their reach and make counseling services more accessible. [2]

## 1.2 Project Significance

The Online Student Counseling System plays a crucial role in enhancing the accessibility and effectiveness of student counseling. Traditionally, counseling services may be limited by availability and location, leaving many students without adequate support.[7] This system addresses these limitations by offering:

- **Accessibility:** The platform connects students with certified counselors across various fields, providing high-quality guidance to those who may lack local resources.
- **Structure:** A session-based approach offers a structured environment, allowing students to receive focused support on topics like career planning, course selection, and mental health.
- **Real-Time Interaction:** A chat-based model facilitates immediate communication, offering a comfortable and accessible format for students who may find in-person counseling intimidating.

## 1.3 Target Audience

The Online Student Counseling System is intended for use by a diverse range of individuals and organizations:

- **Students:** Primary users who seek guidance on academic, career, or personal matters.[1] They register on the platform to

purchase counseling sessions, schedule appointments, and engage in real-time chat sessions with counselors.

- **Counselors:** Certified professionals providing expertise in various counseling areas. They utilize the system to manage their profiles, create session slots, and interact with students through the chat interface.
- **Educational Institutions:** Schools, colleges, and universities may integrate this system to offer structured counseling support to their students, enhancing the institution's support resources.
- **Parents and Guardians:** As key influencers in students' lives, they may encourage students to utilize this system, particularly for career and academic guidance.

## 1.4 Project Timeline

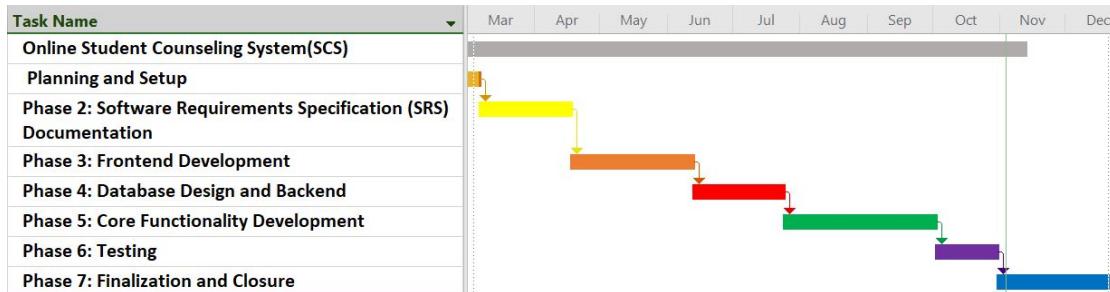


FIGURE 1.1: Project Implementation Timeline

# **Chapter 2**

## **Software Requirement Specification**

### **2.1 Software Requirements Technique**

The software requirements for the Online Student Counseling System are gathered and refined using multiple techniques to ensure that they accurately reflect the needs of all users and stakeholders. The following techniques are utilized:

#### **2.1.1 Interviews:**

Conduct interviews with students, counselors, and administrators to understand the key features required for a successful counseling system. These interviews identify the need for registration, scheduling, and chat functionality, along with user-friendly dashboards for both students and counselors.

### **2.1.2 Use Case Analysis:**

Develop detailed use cases to model interactions between the system and its users, such as student registration, course purchasing, session scheduling, and chat-based counseling. Each use case describes the step-by-step process for completing key actions within the system.

### **2.1.3 Context Diagrams:**

Create context diagrams that visually represent the interactions between system components and external users, including students, counselors, and administrators. These diagrams help clarify data flow and ensure that all system interactions are well-defined.

### **2.1.4 Prototyping:**

Build early prototypes of critical components, such as the registration forms, dashboards, and chat interface. User feedback on these prototypes helps refine the interface and improve the overall usability of the system.

## **2.2 Functional Requirements**

The Online Student Counseling System includes several core functionalities to meet the needs of both students and counselors.

### **2.2.1 Admin Module**

Admin module includes some features which are given below.

#### **2.2.1.1 FR-1: Manage User Accounts**

The admin can view, and deactivate user accounts for students and counselors. This functionality ensures secure access to the system and allows for administrative oversight of all users.

### **2.2.1.2 FR-2: Maintain Book library Data**

The admin can add and view books. These books varies from counseling, mental health and career domains.

## **2.2.2 Student Module**

Student module includes some features which are as following

### **2.2.2.1 FR-6: Profile Creation and Management**

Students can create an account, manage their profile, and update personal details.

### **2.2.2.2 FR-7: Course Purchase and Payment Processing**

Students can select a counseling course, proceed with secure payment through Stripe, and receive a confirmation email. This process ensures that students have access to their chosen counseling services.

### **2.2.2.3 FR-8: Schedule Counseling Sessions**

After registraration and signing-in, students can book counseling sessions with available counselors. They select time slots that fit their schedule.

### **2.2.2.4 FR-9: Access Dashboard and Resources**

Students have access to a personalized dashboard, where they can view their upcoming sessions, engage in real-time chat during scheduled sessions, and access additional resources, such as a book library.

## **2.2.3 Counselor Module**

Counselor module includes some features which are as following

### **2.2.3.1 FR-12: Profile Management**

Counselors can create and update their profiles, including adding qualifications, specialties, and availability. This functionality enables students to view counselor credentials and make informed decisions.

### **2.2.3.2 FR-13: Create and Manage Sessions**

Counselors can set their availability, allowing students to schedule sessions at convenient times. This feature ensures that students and counselors can coordinate effectively.

### **2.2.3.3 FR-14: Real-Time Chat Interface**

During scheduled sessions, counselors can communicate with students through a secure, real-time chat interface. This feature facilitates a comfortable and immediate counseling environment.

### **2.2.3.4 FR-15: Create Counseling**

After accessing Dashboard counselor must create counseling where counselor will set the counseling duration(45 minutes), counseling category, and session price.

## **2.2.4 Chat Module**

Both students and counselors comprises a chat module through they can communicate with each other. The chat section have a fix 45 minutes time session before the session start the input will be disabled both for counselor and student. As the session starts the input box will be enabled for the specific time.

The chat module have features like user availability (online/offline ).

A timer starts when a student schedules a session to the date and time that student had scheduled previously when the time completes then the input box get enabled.

## 2.3 Use-Cases

TABLE 2.1: User Classes and Descriptions

User class	Description
Admin	An Admin is a system supervisor responsible for managing users, book library, and overall system maintenance.
Counselor	A counselor is responsible for real time chat sessions and for creating counseling sessions through his/her dashboard.
Student	A student communicates with counselor through real time chat, and can access books through book library from dashboard
Chat-based Module	Both students and counselors use this real time chat section on their dashboard at the given time.

### 2.3.1 Login

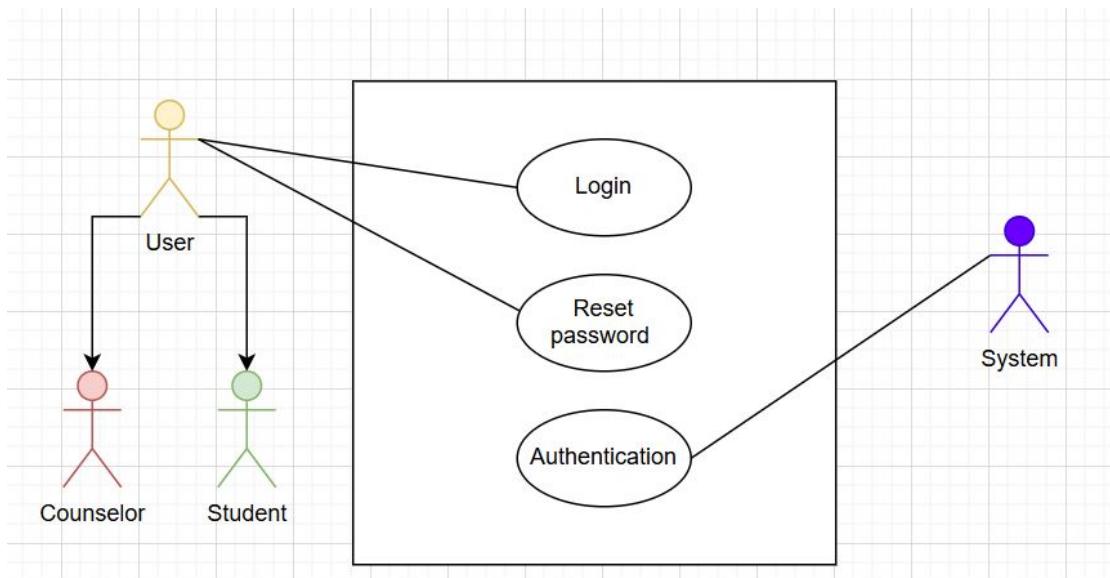


FIGURE 2.1: Login

### 2.3.1.1 Use Case Table for Login

TABLE 2.2: Use Case: Login

<b>Use Case ID</b>	UC-01
<b>Use Case Name</b>	Login
<b>Actors</b>	Primary Actor: User (Counselor, Student)
<b>Description</b>	The "Login" use case allows users (Students and Counselors) to access the Online Student Counseling system. This process involves users entering their credentials to authenticate their identity. Upon successful authentication, the system grants access to the respective user dashboard based on their role (Student or Counselor).
<b>Trigger</b>	A user initiates the login process by entering their username and password on the login page and submits the information.
<b>Preconditions</b>	<ol style="list-style-type: none"> <li>1. The user must be registered in the Online Student Counseling system database.</li> <li>2. The user must have a valid username and password.</li> </ol>
<b>Postconditions</b>	The user is granted access to the system and redirected to their respective dashboard. If authentication fails, the user is presented with an error message and given the option to retry.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. The user navigates to the OSCS login page.</li> <li>2. The user selects their role from the two buttons (Student or Counselor).</li> <li>3. The user enters their username and password.</li> <li>4. The user clicks the "Login" button.</li> <li>5. The system validates the entered credentials against the stored user data.</li> <li>6. If the credentials are valid, the system redirects the user to their respective dashboard (Student or Counselor).</li> </ol>
<b>Alternative Flows</b>	<p>Reset Password:</p> <ol style="list-style-type: none"> <li>1. If the user forgets their password, they can click the "Forgot Password" link.</li> <li>2. The system prompts the user to enter their registered email address.</li> <li>3. The system sends a password reset link to the entered email address.</li> <li>4. The user follows the instructions in the email to reset their password.</li> </ol>
<b>Exceptions</b>	<p>E1: User enters incorrect credentials:</p> <ul style="list-style-type: none"> <li>- The system displays an error message indicating incorrect username or password.</li> <li>- The user is prompted to re-enter their credentials.</li> </ul> <p>E2: System is down or unavailable:</p> <ul style="list-style-type: none"> <li>- The system displays a message indicating that the service is temporarily unavailable.</li> <li>- The user is advised to try again later.</li> </ul>
<b>Business Rules</b>	<p>BR-01: Only registered users can log in.</p> <p>BR-02: Passwords must meet the specified security criteria (e.g., minimum length, complexity).</p> <p>BR-03: User accounts must be active to allow login.</p>
<b>Assumptions</b>	It is assumed that users will remember their credentials or have access to their registered email for password reset.

### 2.3.2 Admin Usecase

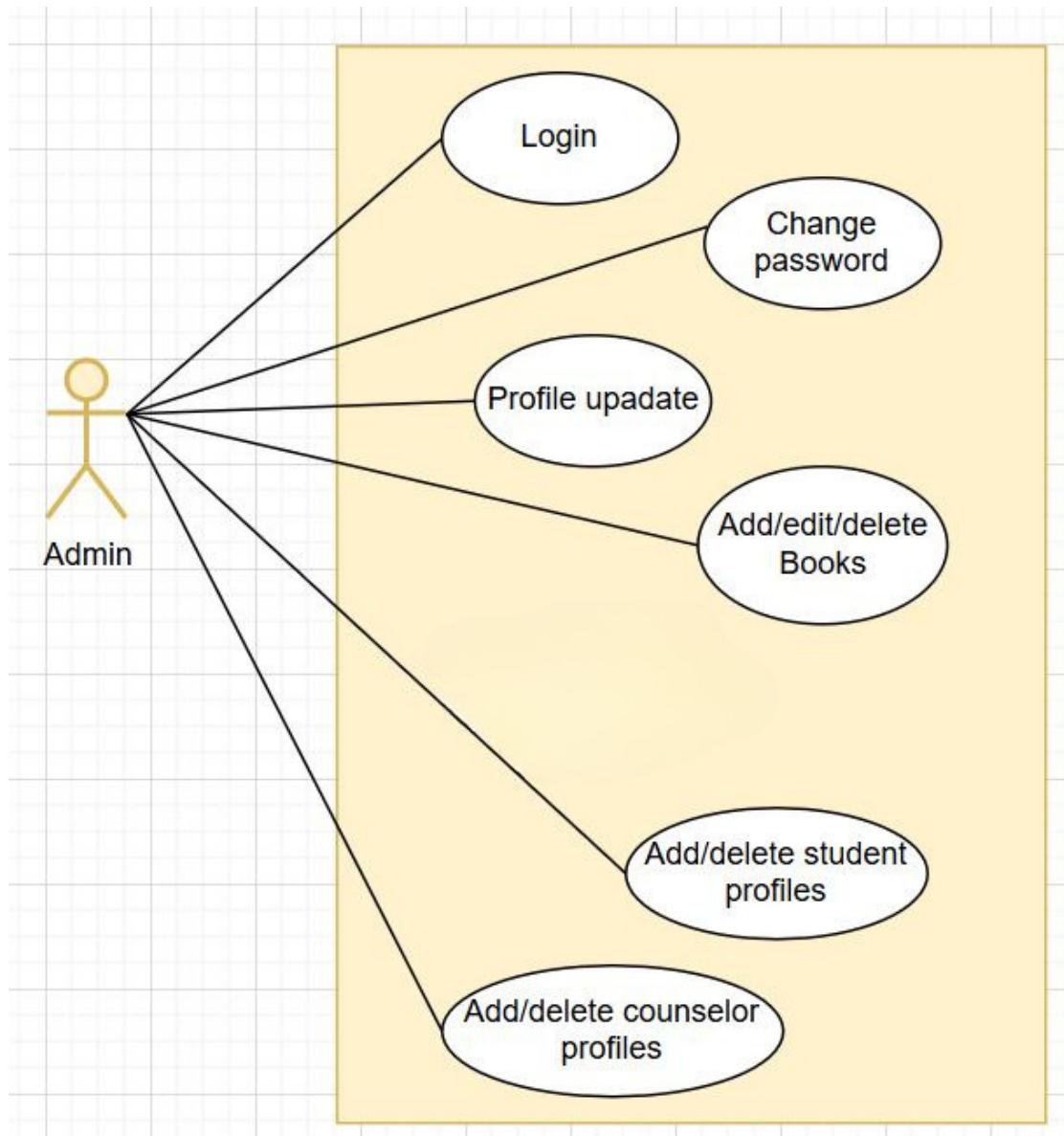


FIGURE 2.2: Admin Usecase

### 2.3.2.1 Manage User Accounts

TABLE 2.3: Use Case: Manage User Accounts

Use Case Name	Manage User Accounts
<b>Actors</b>	Admin
<b>Description</b>	The admin can view and deactivate user accounts for students and counselors to ensure secure access and allow administrative oversight.
<b>Trigger</b>	Admin initiates the action by selecting the "Manage User Accounts" option.
<b>Preconditions</b>	Admin must be logged in and have sufficient privileges to manage accounts.
<b>Postconditions</b>	The account status is updated in the system (either viewed or deactivated).
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. Admin logs in.</li> <li>2. Admin navigates to "Manage User Accounts".</li> <li>3. Admin selects a user account to view or deactivate.</li> <li>4. System updates the account status as per admin's action.</li> </ol>
<b>Alternative Flows</b>	None
<b>Exceptions</b>	If the admin tries to deactivate a non-existent user, the system shows an error message.
<b>Business Rules</b>	Only authorized admins can manage user accounts.
<b>Assumptions</b>	Admin has clear access to manage only authorized user accounts.

### 2.3.2.2 Maintain Book Library

TABLE 2.4: Use Case: Maintain Book Library Data

Use Case Name	Maintain Book Library Data
<b>Actors</b>	Admin
<b>Description</b>	The admin can add and view books in the library, including those related to counseling, mental health, and career domains.
<b>Trigger</b>	Admin selects "Maintain Book Library" from the admin panel.
<b>Preconditions</b>	Admin must be logged in and have access to the book library module.
<b>Postconditions</b>	Books are added or viewed as per admin's action.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. Admin logs in.</li> <li>2. Admin accesses the "Book Library".</li> <li>3. Admin chooses to add or view a book.</li> <li>4. System updates the book library based on admin's action.</li> </ol>
<b>Alternative Flows</b>	None
<b>Exceptions</b>	If an invalid book ID is entered, the system shows an error message.
<b>Business Rules</b>	Only authorized books related to the system's scope are allowed in the library.
<b>Assumptions</b>	The system allows for easy navigation and management of books.

### 2.3.3 Counselor Usecase

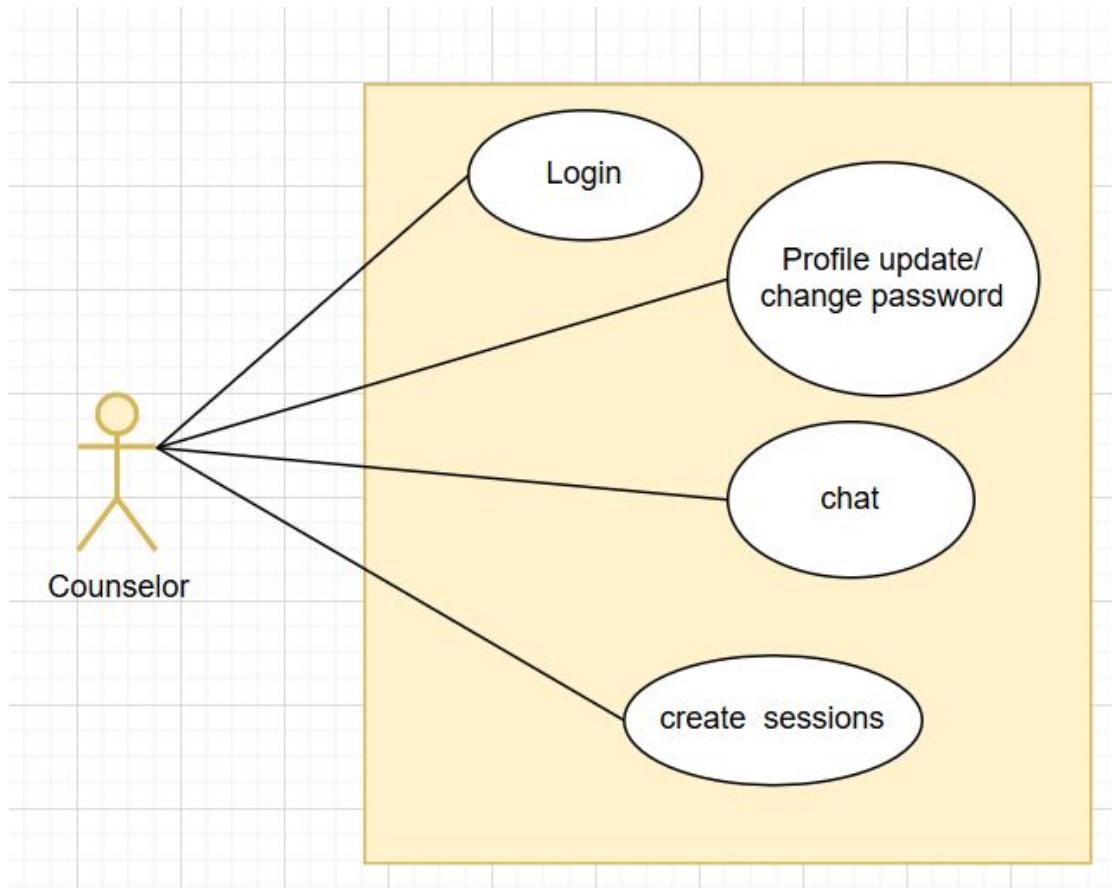


FIGURE 2.3: Counselor Usecase Diagram

### 2.3.3.1 Counselor Login

TABLE 2.5: Use-Case: Login

<b>Use Case ID</b>	UC-01
<b>Use-Case Name</b>	Login
<b>Actors</b>	Primary Actor: Counselor
<b>Description</b>	Allows counselors to log into the system to access their dashboard and counseling tools.
<b>Trigger</b>	Counselor enters their username and password on the login page and submits.
<b>Preconditions</b>	The counselor must be registered in the system and have a valid username and password.
<b>Postconditions</b>	If credentials are valid, the counselor gains access to the dashboard. If authentication fails, an error message appears with a retry option.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. The counselor navigates to the login page.</li> <li>2. The counselor enters their email and password.</li> <li>3. The counselor clicks the "Login" button.</li> <li>4. System validates the credentials.</li> <li>5. If valid, system redirects counselor to their dashboard.</li> </ol>
<b>Alternative Flows</b>	If the counselor forgets their password, they can click "Forgot Password" to initiate the recovery process.
<b>Exceptions</b>	If the system is down, the counselor receives an error message indicating login is temporarily unavailable.
<b>Business Rules</b>	Counselors must log in securely to access student information and sessions.
<b>Assumptions</b>	The system is available and operational.

### 2.3.3.2 Update Profile

TABLE 2.6: Use-Case: Profile Update/Change Password

<b>Use Case ID</b>	<b>UC-02</b>
<b>Use-Case Name</b>	Profile Update/Change Password
<b>Actors</b>	Primary Actor: Counselor
<b>Description</b>	Allows counselors to update their profiles, such as qualifications, specialties, and availability, and change their password if needed.
<b>Trigger</b>	Counselor navigates to the profile management section.
<b>Preconditions</b>	Counselor must be logged in and have access to profile settings.
<b>Postconditions</b>	The updated profile information is saved, and the counselor's availability is visible to students.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. Counselor navigates to "Profile Management".</li> <li>2. Counselor updates their profile information and/or changes their password.</li> <li>3. Counselor saves the changes.</li> <li>4. System confirms the update was successful.</li> </ol>
<b>Alternative Flows</b>	If password change fails due to incorrect current password, system prompts counselor to re-enter.
<b>Exceptions</b>	System notifies the counselor if required fields are missing or contain invalid data.
<b>Business Rules</b>	Counselors must maintain updated and accurate profile information.
<b>Assumptions</b>	Profile updates are saved successfully and visible to students.

### 2.3.3.3 Chat

TABLE 2.7: Use-Case: Chat

<b>Use Case ID</b>	<b>UC-03</b>
<b>Use-Case Name</b>	Chat
<b>Actors</b>	Primary Actor: Counselor, Secondary Actor: Student
<b>Description</b>	Enables counselors to communicate with students via a secure, real-time chat interface during sessions.
<b>Trigger</b>	A counseling session is scheduled, and the counselor or student initiates the chat.
<b>Preconditions</b>	The counselor and student must be logged in and have a scheduled session.
<b>Postconditions</b>	The chat history is saved for future reference.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. Counselor and student join the session at the scheduled time.</li> <li>2. Either party initiates the chat.</li> <li>3. Messages are sent and received in real time.</li> <li>4. Chat ends when the session concludes.</li> </ol>
<b>Alternative Flows</b>	If connectivity is lost, system attempts to reconnect and resume the chat.
<b>Exceptions</b>	System alerts the counselor and student if the chat cannot be initiated due to technical issues.
<b>Business Rules</b>	Chat data should be encrypted for confidentiality.
<b>Assumptions</b>	Chat will be stable and functional during scheduled sessions.

### 2.3.3.4 Create Sessions

TABLE 2.8: Use-Case: Create Sessions

<b>Use Case ID</b>	<b>UC-04</b>
<b>Use-Case Name</b>	Create Sessions
<b>Actors</b>	Primary Actor: Counselor
<b>Description</b>	Allows counselors to create counseling sessions, specifying duration, category, and price.
<b>Trigger</b>	Counselor selects "Create Session" from the dashboard.
<b>Preconditions</b>	Counselor must be logged in and have access to session management tools.
<b>Postconditions</b>	The created session is saved and becomes available for students to book.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. Counselor navigates to "Create Session" page.</li> <li>2. Counselor specifies the session duration (e.g., 45 minutes), category, and price.</li> <li>3. Counselor saves the session.</li> <li>4. System confirms that the session is created successfully.</li> </ol>
<b>Alternative Flows</b>	If session details are incomplete, system prompts counselor to complete them before saving.
<b>Exceptions</b>	If system cannot save the session, counselor receives an error message with retry options.
<b>Business Rules</b>	Sessions must have a clear category, price, and duration for student booking.
<b>Assumptions</b>	Sessions will be created and available for students without errors.

### 2.3.4 Student Usecase

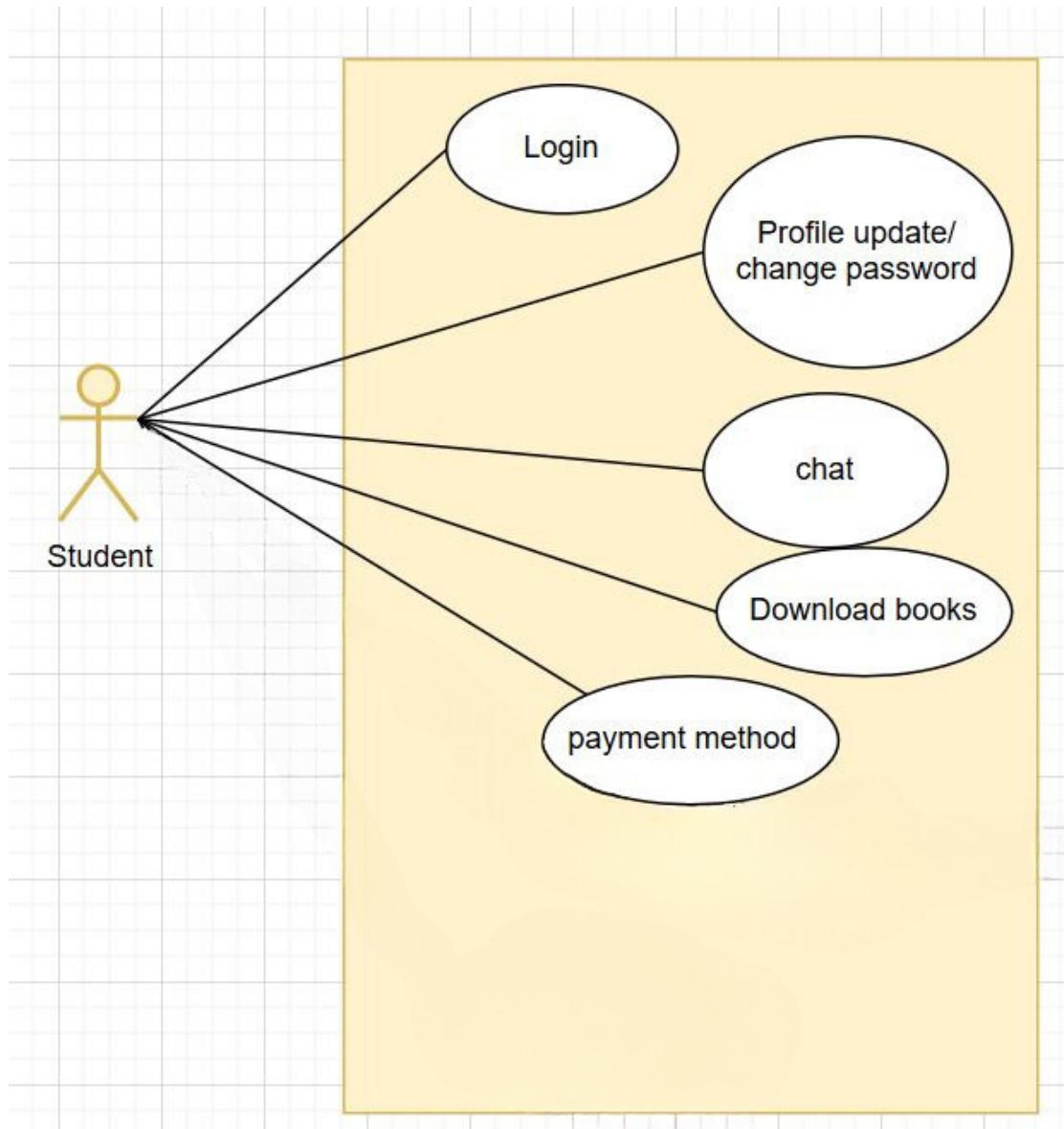


FIGURE 2.4: Student Usecase Diagram

### 2.3.4.1 Profile Creation

TABLE 2.9: Use-Case: Profile Creation and Management

<b>Use-Case Name</b>	Profile Creation and Management
<b>Actors</b>	Primary Actor: Student
<b>Description</b>	Allows students to create an account, manage their profile, and update personal details to maintain accurate information within the system.
<b>Trigger</b>	A student initiates the account creation process or chooses to update their profile.
<b>Preconditions</b>	The student has access to the registration page.
<b>Postconditions</b>	The student's profile is created or updated successfully.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. The student navigates to the profile creation page.</li> <li>2. The student enters necessary personal details.</li> <li>3. The student submits the information.</li> <li>4. The system verifies and saves the details.</li> </ol>
<b>Alternative Flows</b>	None
<b>Exceptions</b>	<ol style="list-style-type: none"> <li>1. Invalid information entered by the student.</li> <li>2. Network issues preventing profile creation or update.</li> </ol>
<b>Business Rules</b>	Profile data must be accurate and up-to-date.
<b>Assumptions</b>	The student provides all necessary and correct information.

### 2.3.4.2 Payment Processing

TABLE 2.10: Use-Case: Course Purchase and Payment Processing

<b>Use-Case Name</b>	Course Purchase and Payment Processing
<b>Actors</b>	Primary Actor: Student
<b>Description</b>	Enables students to purchase counseling sessions, process payments via Stripe, and receive confirmation emails.
<b>Trigger</b>	A student selects a course and initiates the payment process.
<b>Preconditions</b>	The student is logged in and has selected a counseling course.
<b>Postconditions</b>	The course is purchased, and the student receives a confirmation email.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. The student selects a counseling course.</li> <li>2. The student proceeds to checkout and selects Stripe as payment method.</li> <li>3. The student completes the payment process.</li> <li>4. The system confirms payment and sends a confirmation email.</li> </ol>
<b>Alternative Flows</b>	None
<b>Exceptions</b>	<ol style="list-style-type: none"> <li>1. Payment failure due to insufficient funds.</li> <li>2. Network or Stripe service issues.</li> </ol>
<b>Business Rules</b>	Only registered students can purchase courses.
<b>Assumptions</b>	Stripe payment service is available and functional.

### 2.3.4.3 Schedule Counseling Sessions

TABLE 2.11: Use-Case: Schedule Counseling Sessions

<b>Use-Case Name</b>	Schedule Counseling Sessions
<b>Actors</b>	Primary Actor: Student
<b>Description</b>	Enables students to schedule counseling sessions with available counselors by selecting suitable time slots.
<b>Trigger</b>	The student initiates session booking after registration and sign-in.
<b>Preconditions</b>	The student is registered, signed in, and has purchased a counseling course.
<b>Postconditions</b>	The session is scheduled, and the student receives a reminder.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. The student navigates to the session booking page.</li> <li>2. The student selects a counselor and time slot.</li> <li>3. The system confirms the booking and sends reminders.</li> </ol>
<b>Alternative Flows</b>	None
<b>Exceptions</b>	<ol style="list-style-type: none"> <li>1. Counselor availability conflicts.</li> <li>2. Session booking fails due to network issues.</li> </ol>
<b>Business Rules</b>	Bookings should match counselor availability.
<b>Assumptions</b>	The counselor availability information is accurate.

### 2.3.4.4 Dashboard Access

TABLE 2.12: Use-Case: Access Dashboard and Resources

<b>Use-Case Name</b>	Access Dashboard and Resources
<b>Actors</b>	Primary Actor: Student
<b>Description</b>	Students access a personalized dashboard to view their sessions, engage in real-time chat, and access resources.
<b>Trigger</b>	Student logs in and accesses the dashboard.
<b>Preconditions</b>	The student is logged in.
<b>Postconditions</b>	The student successfully accesses the dashboard and available resources.
<b>Normal Flow</b>	<ol style="list-style-type: none"> <li>1. The student logs in and navigates to their dashboard.</li> <li>2. The student views upcoming sessions and accesses resources.</li> </ol>
<b>Alternative Flows</b>	None
<b>Exceptions</b>	<ol style="list-style-type: none"> <li>1. Dashboard loading issues.</li> <li>2. Chat service downtime.</li> </ol>
<b>Business Rules</b>	Resources should be accessible only to registered students.
<b>Assumptions</b>	The student has the necessary access rights.

## 2.4 Non-Functional Requirements

NFRs are the additional requirements for a systems, which describe not the actions but the quality of these actions.

### 2.4.1 Reliability

**Uptime Requirement:** The Online Student Counseling System shall maintain a minimum uptime of 99.9% during standard operational hours to ensure continuous availability for students and counselors.

- A failure is defined as any instance where the system does not respond to user actions within 10 seconds or crashes unexpectedly.
- Consequences of software failure include disruption of counseling services, potential data loss, and decreased user trust in the system.
- Automated backups should be implemented regularly to protect all user data, including chat logs and session information.
- Comprehensive logging and monitoring should be enabled to detect abnormal behavior, with error messages guiding users when issues occur.

#### **2.4.2 Usability**

**USE-1:** The system should offer an intuitive interface, allowing users to complete core tasks (such as booking sessions, accessing resources, or initiating chat) within three clicks.

**USE-2:** The Online Student Counseling System shall adhere to accessibility standards to accommodate all users, ensuring that the interface is usable for individuals with disabilities.

**USE-3:** The system should display real-time indicators, such as counselor availability, to facilitate effective communication.

#### **2.4.3 Performance**

**PER-1:** The real-time chat feature should maintain minimal latency to enable smooth communication during counseling sessions, with messages delivered within 1 second under normal network conditions.

**PER-2:** Search functionality within the dashboard and resources should return results within 2 seconds for user queries related to sessions, resources, or counselors.

**PER-3:** Booking and payment processing should be completed within 5 seconds after submission, ensuring quick transactions for users purchasing courses.

#### **2.4.4 Security**

**Data Encryption:** All sensitive data, including chat messages, payment details, and personal information, should be encrypted using JWT Algorithm HS256 encryption algorithm or higher for data transmission, ensuring secure communication between users and the system.

**Access Control:** Role-based access control (RBAC) should be enforced to limit access to sensitive features based on user roles (e.g., admin, student, counselor).

**Session Management:** User sessions should automatically expire after 45 minutes of inactivity, with options for secure re-authentication if needed.

# Chapter 3

## Design

### 3.1 Data Flow Diagrams (DFDs)

#### 3.1.1 Zero Level DFDs

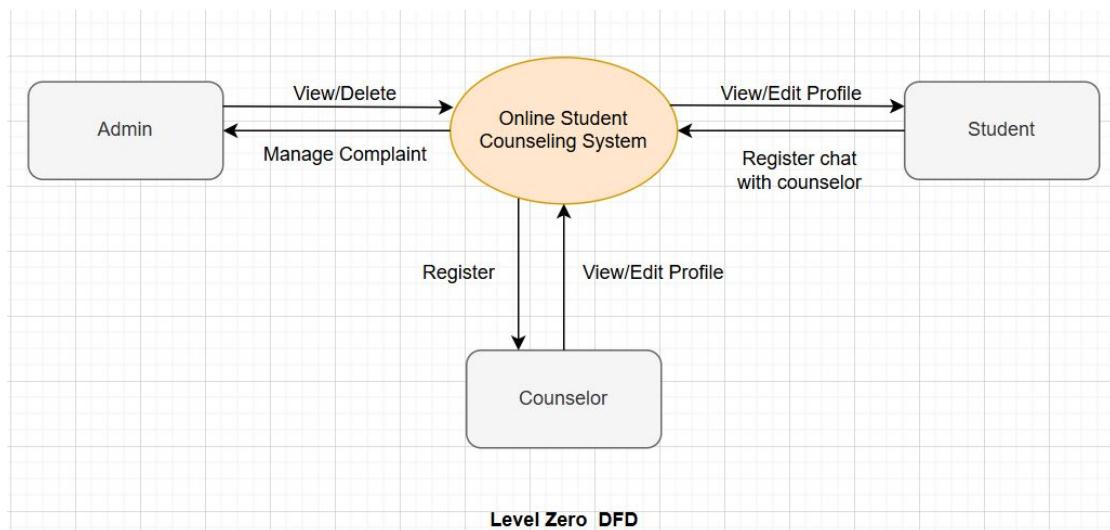


FIGURE 3.1: DFD(Level zero) of Online Student Counseling System

### 3.1.2 First Level DFDs

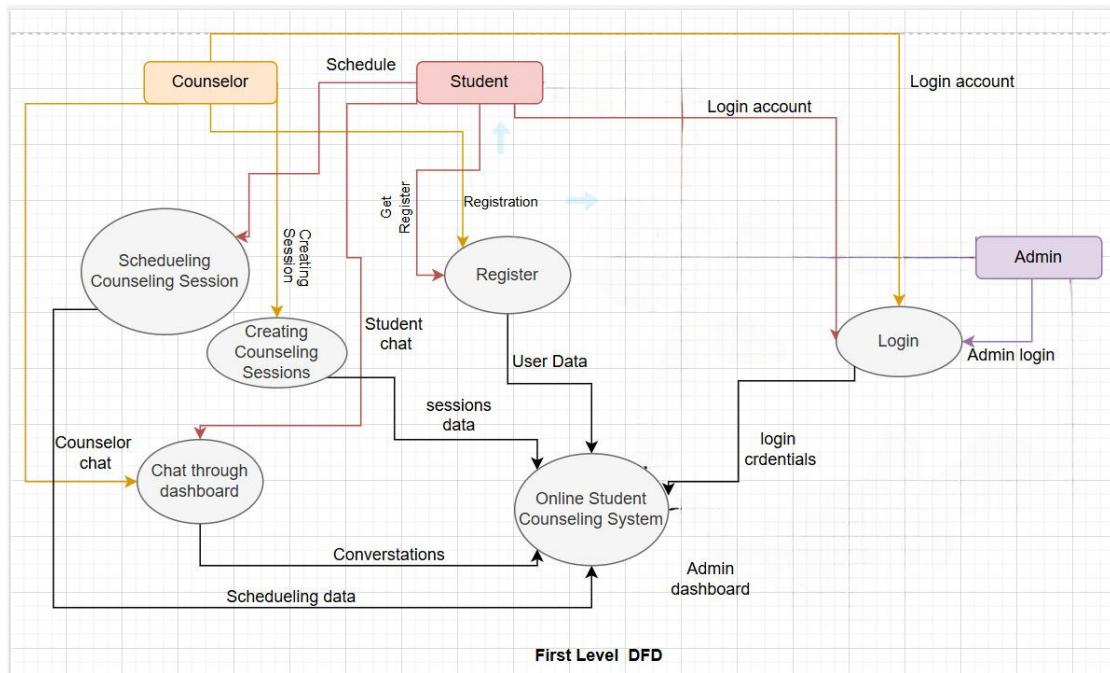


FIGURE 3.2: DFD(First level) of Online Student Counseling System

### 3.1.3 Second Level DFDs

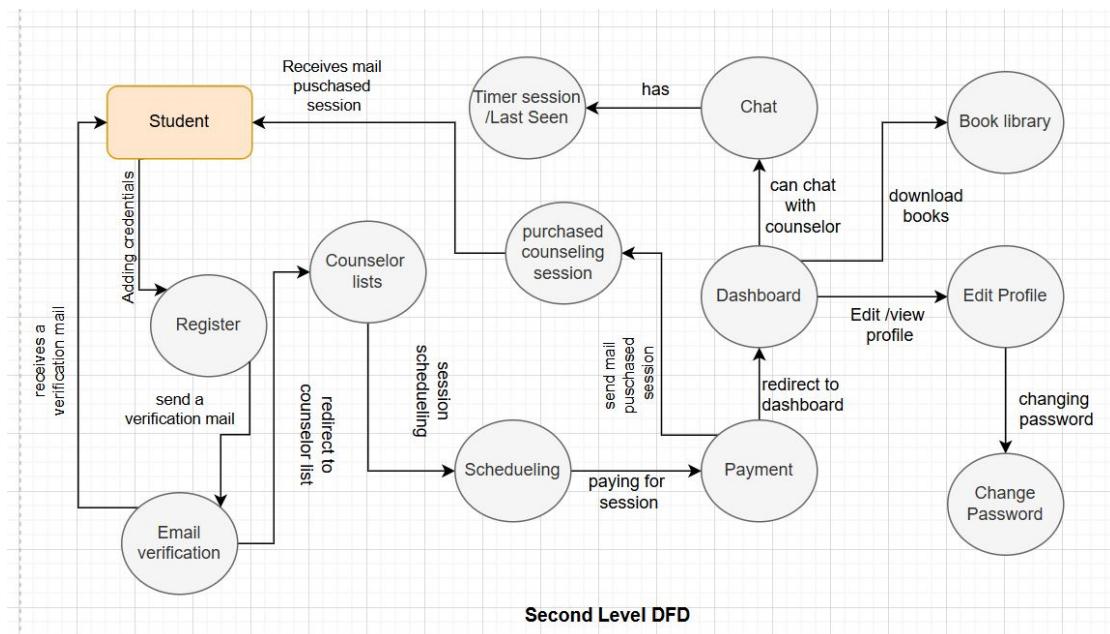


FIGURE 3.3: DFD(Second level) of Online Student Counseling System

## 3.2 Interaction Diagram

### 3.2.1 Sequence Diagram of Counselor

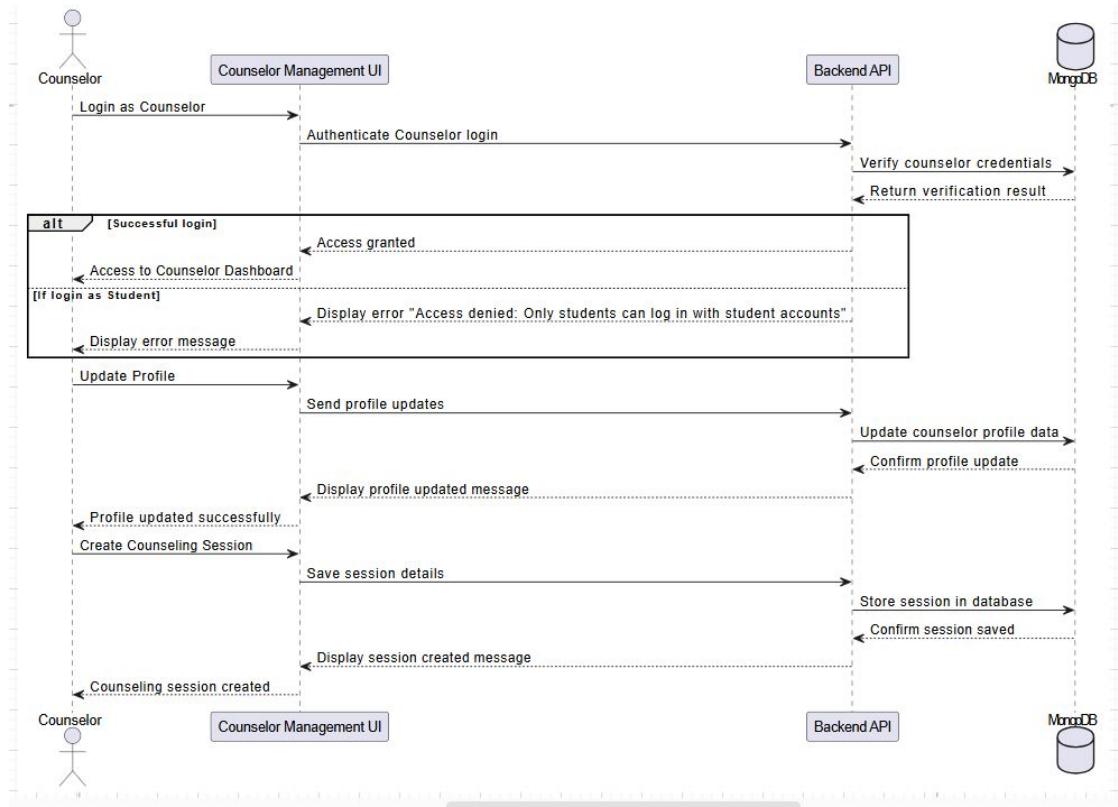


FIGURE 3.4: Sequence diagram (Counselor) of Online Student Counseling System

### 3.2.2 Sequence Diagram of Student

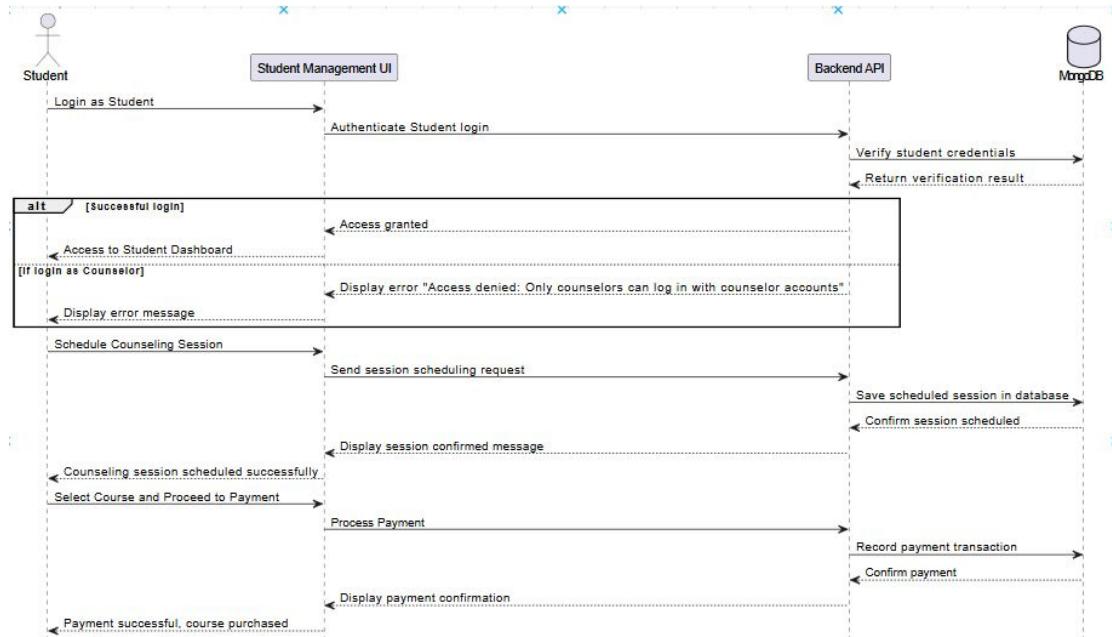


FIGURE 3.5: Sequence diagram(Student) of Online Student Counseling System

### 3.2.3 Sequence Diagram overall

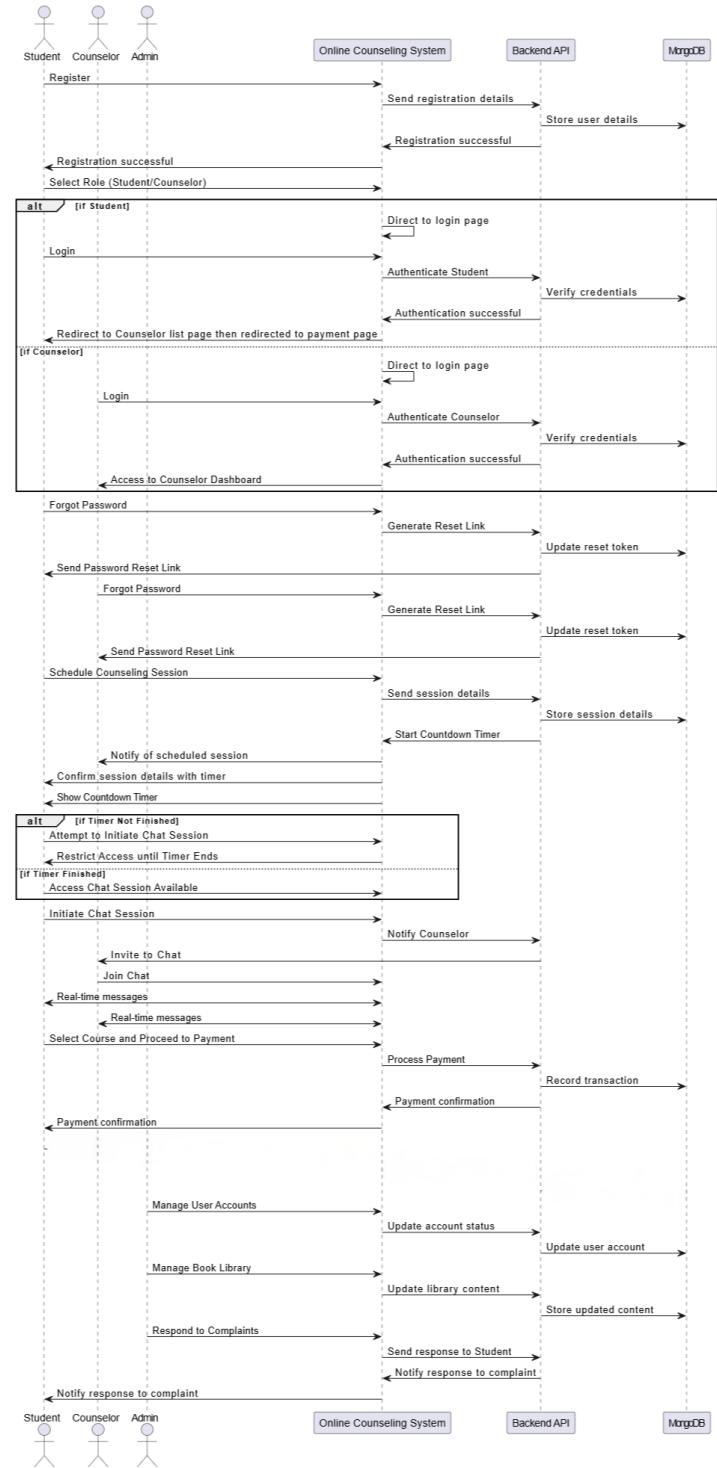


FIGURE 3.6: Sequence diagram(Student) of Online Student Counseling System

### 3.2.4 ERD

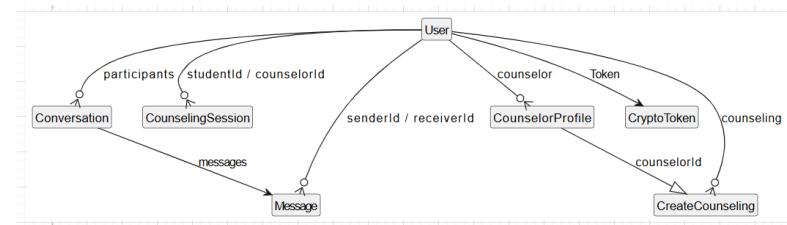


FIGURE 3.7: ERD of Online Student Counseling System

# **Chapter 4**

## **Implementation**

### **4.1 Database Design**

Database Design Purpose The MongoDB database is designed to store, manage, and retrieve data efficiently for the counseling website. This database supports the core functionalities, including user registration, counselor profiles, messaging between students and counselors, and user ratings. Our Mongodb database comprises of collections such as

- **Counselors Collection:** Stores details about each counselor, including their profile information, areas of specialization, profile image, and ratings from students.
- **Students Collection:** Stores details about students, including their enrolled counselors and messaging history.
- **Messages Collection:** Stores individual messages between counselors and students, if messaging is separated from the Students or Counselors collection. We have sender and receiver id's, they keep getting exchanged according to their roles.
- **Conversations:** Stores conversations between two users like student and counselor. We will have so many conversations and

each conversation will have different and unique document id[5]

And a conversation contain different references like messages, student and counselor.

- **Users Collection:** Stores users on the basis of their roles. In student role profile image and friends are added. Along with reset password token. In counselor role an object personal-info is created with name,email,password along with editprofile and counselor, counseling as references
- **Counselor Profiles:** CounselorProfiles collection stores education, payment, degree file.
- **Create Counseling:** Create Counseling stores counseling category, duration and per session price.
- **Counseling Session:** Counseling Session includes (counselorID, StudentID) as reference. Counselling session has a StartDate and an EndDate for session end and start and duration(45 minutes) comes from createcounseling collection.
- **Cryptos:** Crypto collection is used during email verification. It temporary stores user info as an object named PersonalInfo (name, email,password) role, token. This token comes back as params when user verifies through email.
- **books:** books collection stores data related to Books.

#### 4.1.1 Relationships

- A counselor can have many-to-many relationships with students
- A counselor has one-to-one relationship with counselor profile, counselor profile belongs to counselor
- A counselor has one-to-one relationship with create counseling

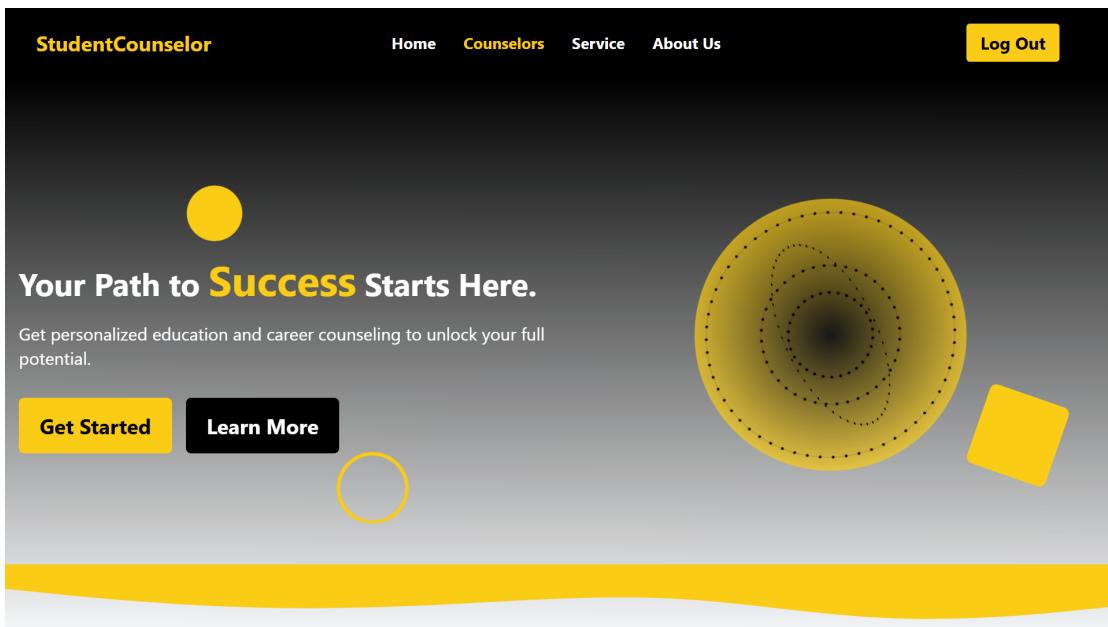
- A counselor has many-to-many relationship with student conversations. This is facilitated by the Conversation collection, where each conversation document links a specific studentId with a specific counselorId.
- Conversation has many-to-many relationship between User (both student and counselor roles) and Message entities.
- A Student has many-to-many relationship with counselor
- Counselingsession has one-to-one relationship between a student and a counselor for a specific counseling session, but students and counselors can have multiple sessions, making it a many-to-many relationship overall (many students and counselors engaging in different sessions over time)

## 4.2 Deployment Requirements

- **MongoDB** is a NoSQL database used for storing application data in a flexible, JSON-like format called BSON.
- **Express.js** A web application framework for building API's and handling HTTP requests
- **React** is a javascript library specially for single page applications
- **UseContext** Hook in react is a powerful way to manage state and your component tree without having to pass props down manually at every level. React's context API to share global data like user authentication etc.
- **Restful API** is a stateless web service using HTTP methods to exchange data, enabling scalable and flexible integration across platforms.

- **Node.js** is a runtime environment that allows JavaScript to be run on the server side.
- **Socket.io** Socket.IO is a JavaScript library that enables real-time, bidirectional, and event-based communication between web clients and servers. It is commonly used to build applications that require real-time updates, such as chat applications.

## 4.3 Graphic User Interface(GUI)



### Our Expert Counselors

A profile card for a counselor named "soban-counselor". It includes a placeholder profile picture, the name "soban-counselor", a 4.6 rating icon, and a "1 year exp." badge. It also shows "0+ clients" and a "Read More" button.

The footer of the homepage. It features the text "Your Website Name" in yellow. Below it is a navigation menu with links to Home, About Us, Services, Admin, Terms of Service, and Privacy Policy. A copyright notice at the bottom states "© 2024 Your Company Name. All rights reserved."

FIGURE 4.1: Homepage of Online Student Counseling System

## CHAPTER 4.

The screenshot shows the login page of the Online Student Counseling System. At the top, there is a black header bar with the logo "StudentCounselor" on the left and navigation links "Home", "Counselors", "Service", and "About Us" on the right. To the right of these are two yellow buttons: "Log In" and "Book a session". Below the header is a white login form with a title "Login" at the top. It contains fields for "Email" and "Password", both represented by input boxes. Below these fields is a large yellow "Login" button. Underneath the button are two small blue links: "Forgot Password?" and "Register".

Your Website Name

Home About Us Services Admin

© 2024 Your Company Name. All rights reserved.

Terms of Service Privacy Policy

FIGURE 4.2: Login of Online Student Counseling System

The screenshot shows the registration page of the Online Student Counseling System. At the top, there is a black header bar with the logo "StudentCounselor" on the left and navigation links "Home", "Counselors", "Service", and "About Us" on the right. To the right of these are two yellow buttons: "Log In" and "Book a session". Below the header is a white registration form titled "Personal Information". It contains four input fields: "Name", "Email", "Password", and "Confirm Password", each with its own input box. Below these fields is a blue "Login" button. At the bottom of the form are two yellow buttons: "Previous" on the left and "Next" on the right. Below the registration form is a black footer bar with the text "Your Website Name" and a navigation menu: "Home", "About Us", "Services", and "Admin". On the right side of the footer are two small blue links: "Terms of Service" and "Privacy Policy".

Your Website Name

Home About Us Services Admin

© 2024 Your Company Name. All rights reserved.

Terms of Service Privacy Policy

FIGURE 4.3: Register of Online Student Counseling System

## CHAPTER 4.

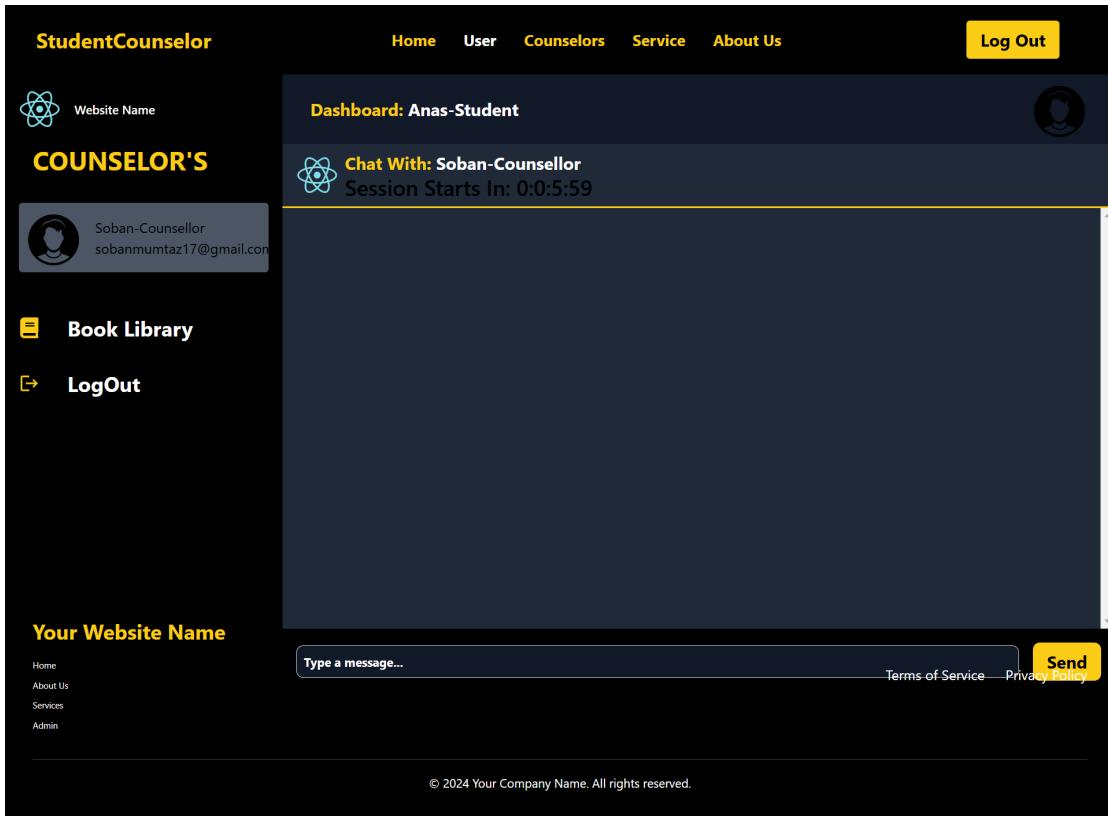


FIGURE 4.4: Dashboard of Online Student Counseling System

# **Chapter 5**

## **Testing**

Testing is a crucial phase in the software development lifecycle that ensures the quality, functionality, and reliability of a software product. It involves executing a program or system to identify any defects, inconsistencies, or deviations from the expected outcomes. The primary goal of testing is to validate that the software meets the specified requirements and performs as intended under various conditions. Through different types of testing, such as unit testing, integration testing, system testing, and acceptance testing, developers can systematically evaluate both individual components and the system as a whole. Effective testing not only helps in detecting errors early in the development process but also enhances user satisfaction by delivering a product that functions seamlessly and efficiently. As technology continues to evolve, the importance of comprehensive testing becomes increasingly significant, making it an indispensable part of the software engineering process.

### **5.1 Unit Testing**

Each module is tested individually to verify functionality.

- **Objective:** To validate that the Online Student Counseling System meets all requirements and performs as expected.

- **Scope:** Covers the full system workflow, from user login to scheduling and real-time chat in counseling sessions.

### 5.1.1 User Authentication

- **Objective:** Ensure secure login, logout, and registration.

TABLE 5.1: User Authentication

No.	Test Case	Input	Expected Result	Result
1	Register user with valid data	Name, Password, Email	User account created and confirmation shown	Pass
2	Register user with missing fields	Email only	Error message for required fields	Pass
3	Login with correct credentials	Correct Email/-Password	Redirect to user dashboard	Pass
4	Login with incorrect credentials	Incorrect Email/Pass-word	Error message for invalid credentials	Pass
5	Logout user	Click on logout button	User is logged out and session terminated	Pass

### 5.1.2 Counselor Management

- **Objective:** Allow counselors to manage profiles and session availability.

TABLE 5.2: Counselor Management

No.	Test Case	Input	Expected Result	Result
1	Update counselor profile	New profile info	Profile updated successfully	Pass
2	Set session availability	Availability time slots	Slots updated successfully	Pass

### 5.1.3 Scheduling System

- **Objective:** Enable students to schedule counseling sessions with available counselors.

TABLE 5.3: Scheduling System

No.	Test Case	Input	Expected Result	Result
1	Book a session with available counselor	Select counselor and time slot	Session booked and confirmation shown	Pass
2	Book a session with unavailable counselor	Select counselor with no available slots	Error message for unavailable slots	Pass

### 5.1.4 Chat Interface

- **Objective:** Facilitate real-time chat communication between students and counselors.

TABLE 5.4: Chat Interface

No.	Test Case	Input	Expected Result	Result
1	Initiate chat during scheduled session	Open chat at session start	Real-time chat interface opens	Pass
2	Chat after session ends	Attempt chat post-session	Error message or disabled chat	Pass

## 5.2 Functional Testing

Functional testing focuses on the performance of each module as specified in the requirements.

- **Objective:** Validate core functionalities, including scheduling, real-time chat, and profile management.

### 5.2.1 Student Dashboard

TABLE 5.5: Student Dashboard

No.	Test Case	Scenario	Expected Result	Result
1	Access dashboard	Student logs in	Dashboard with options displayed	Pass
2	View upcoming sessions/chats	Select "Upcoming Sessions"	List of scheduled sessions/chats shown	Pass

## 5.3 Integration Testing

Integration testing ensures that modules interact correctly with each other to provide a seamless user experience.

### 5.3.1 Session Booking and Chat Integration

- **Objective:** Confirm integration between session booking and real-time chat.

TABLE 5.6: Session Booking and Chat Integration

No.	Test Case	Scenario	Expected Result	Result
1	Book session and start chat	Book session and initiate chat at scheduled time	Chat window opens as session starts	Pass
2	Attempt chat without session	Initiate chat without booking	Error message or disabled chat	Pass

## 5.4 Automated Testing

Automated testing scripts verify input validations across devices and form fields.

## 5.5 Validation Testing

Validation testing ensures that input data for each form and field is properly validated according to the schema requirements. This includes testing for valid formats, required fields, and boundary conditions.

### 5.5.1 Counseling Session Date Validation

- **Objective:** Ensure that the counseling session date is in the correct format, has valid date and time components, is in the future, and is scheduled at half-hour intervals.

TABLE 5.7: Counseling Session Date Validation

No.	Test Case	Input	Expected Result	Result
1	Validate date format	2023-13-01 10:00:00	Error: Invalid month	Pass
2	Date is in the future	2022-11-01 10:00:00	Error: Date must be in the future	Pass
3	Validate time format	2023-12-01 10:15:00	Error: Only 00 or 30 minutes allowed	Pass

### 5.5.2 Counselor Personal Information Validation

- **Objective:** Verify that personal information for the counselor is provided in the correct format, with matching password and confirm password fields.

TABLE 5.8: Counselor Personal Information Validation

No.	Test Case	Input	Expected Result	Result
1	Validate email format	test@	Error: Invalid email format	Pass
2	Password length check	12345	Error: Password must be at least 8 characters	Pass
3	Matching passwords	Password and Confirm Password mismatch	Error: Passwords do not match	Pass

### 5.5.3 Counselor Education Information Validation

- **Objective:** Ensure that counselor's educational details are valid, including degree, institution, and a description within the specified word count.

TABLE 5.9: Counselor Education Information Validation

No.	Test Case	Input	Expected Result	Result
1	Validate degree name length	D	Error: Degree must be at least 2 characters	Pass
2	PDF file upload	Non-PDF file format	Error: File must be a PDF	Pass

### 5.5.4 Payment Information Validation

- **Objective:** Validate payment details including account number, branch code, and card information to ensure data integrity.

TABLE 5.10: Payment Information Validation

No.	Test Case	Input	Expected Result	Result
1	Account number format	1234abc567	Error: Account number must contain only numbers	Pass
2	Validate CVV format	12	Error: CVV must be a 3-digit number	Pass
3	Expiration date check	01/20	Error: Expiration date cannot be in the past	Pass

### 5.5.5 Student Registration Validation

- **Objective:** Ensure student registration fields meet validation requirements.

TABLE 5.11: Student Registration Validation

No.	Test Case	Input	Expected Result	Result
1	Validate email format	example.com	Error: Invalid email format	Pass
2	Password length	abcde	Error: Password must be at least 8 characters	Pass
3	Matching passwords	Mismatch in Password and Confirm Password	Error: Passwords do not match	Pass

# **Chapter 6**

## **Conclusion**

The *Online Student Counseling System* has been designed to bridge the gap between students and professional counseling resources[6]. By providing a secure and accessible digital platform, this system enhances students access to critical services such as career guidance, mental health support, and academic counseling.

This project sought to address several challenges inherent in traditional counseling services, including limited availability, geographic restrictions, and scheduling conflicts. Through real-time chat, session scheduling, and personalized dashboards, the system caters to both students and counselors needs, making professional guidance more structured and convenient[3].

## **Future Scope**

While the Online Student Counseling System provides a solid foundation, there are several avenues for future enhancement:

- **Expanded Counselor Network:** Broader inclusion of specialized counselors can improve accessibility to a wider range of guidance fields.

- **Enhanced Real-Time Features:** Integrating video call functionality and advanced real-time analytics can enrich the counseling experience.
- **AI-Driven Insights:** Implementing AI-based suggestions based on students' backgrounds and previous interactions could provide more tailored guidance.
- **Multi-Language Support:** Expanding language options to accommodate diverse users can improve system usability on a global scale.

## Conclusion

In conclusion, the Online Student Counseling System offers a promising solution for students seeking reliable, accessible, and structured counseling. By addressing the core requirements of the counseling process, this system empowers students to make informed academic and personal decisions, thereby contributing positively to their overall growth and well-being. With the potential for future developments, this system stands poised to become a valuable tool in educational and mental health support services[4].

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