Design Document

for

SafeSpace

Version 1.0

Prepared by

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Revisions

Version	Primary Author(s)	Description of Version	Date Completed
v1.0	Group 10 - 404 Team Not Found	SDS 1.0	07/02/2025

1 Context Design

1.1 Context Model

The system interacts with various of its subsystems which complement together and exhaustively provides the best user networking experience. These subsystems are connected to each other as well as with the server making necessary fetch and update queries with the server. Often use of one of the subsystems leads to the use of another as a form of follow-up. The model and its subsystems are as follows:

❖ **Counselor booking system:**
 Users can request an appointment with the counselor of their choice with suitable date and time. Also, will be able to carry forward the conversation or give context through chat.

❖ **Messaging with counselors:**
 Our Platform provides a messaging system to enable people to talk to the counselors of their choice through chat.

❖ **Counselor Search System:**
 Enables users to search counselors to further initiate chats or book appointments.

❖ **Blog Search System:**
 Enables users to search any post that has been uploaded through the title of the post or tags associated with them.

❖ **Blog Feed:**
 This shows the user the most recent post uploaded by the counselling service and other users' posts follow.
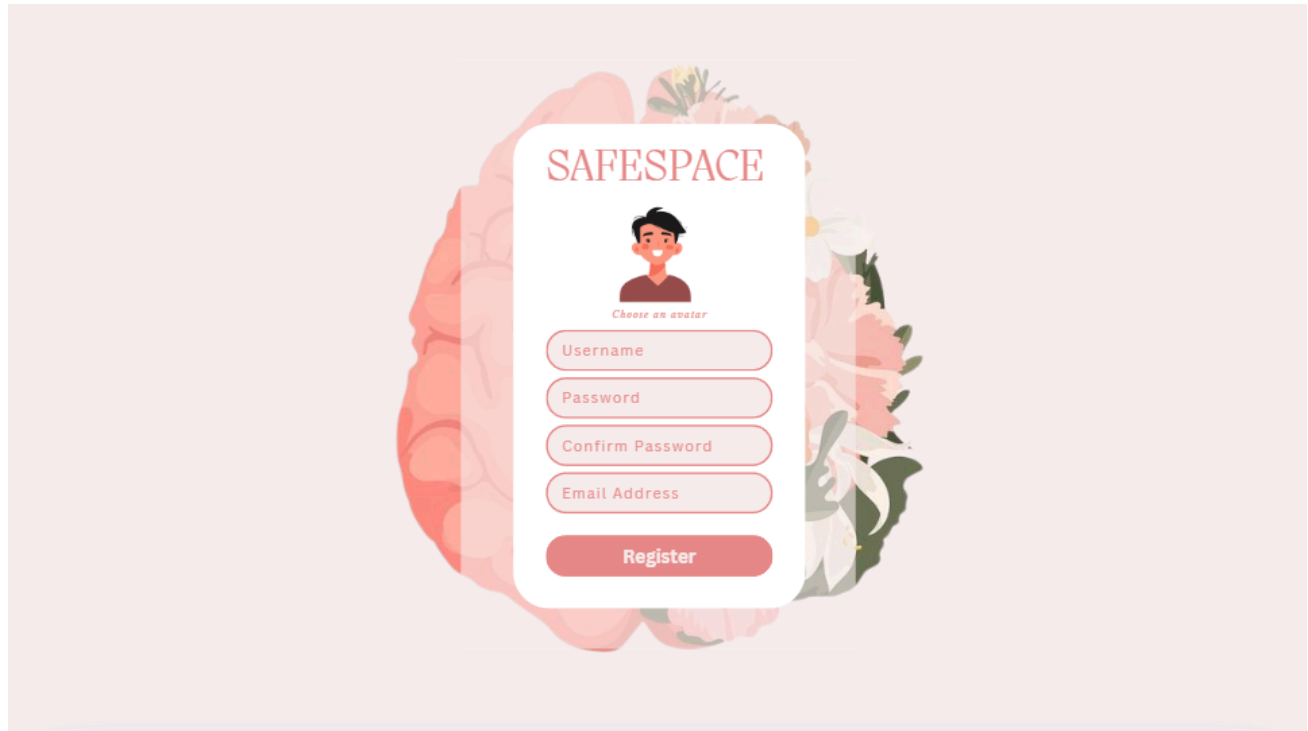
❖ **Comment Section:**
 Every post has a comment section where you can share your opinion as well as foster a healthy discussion.
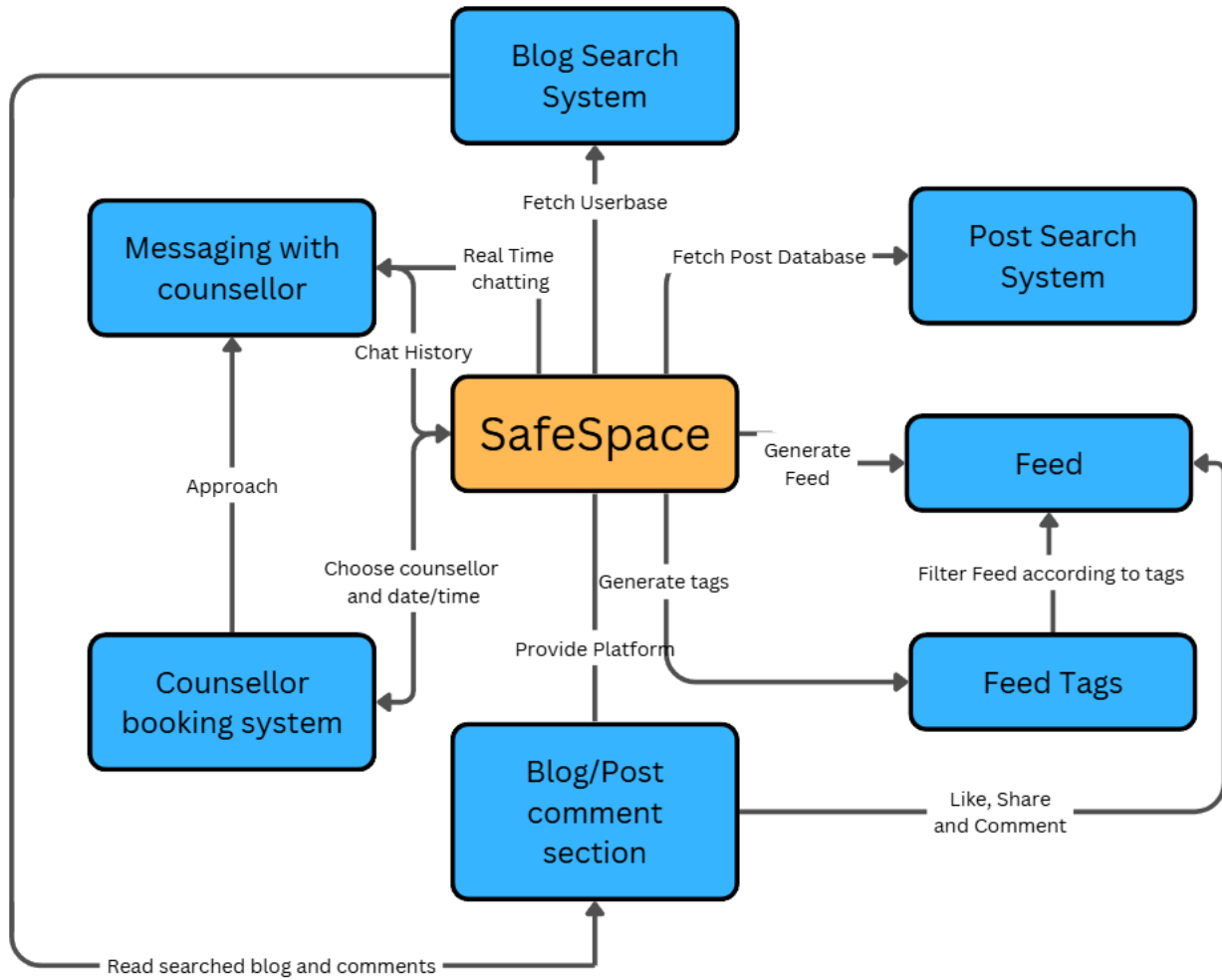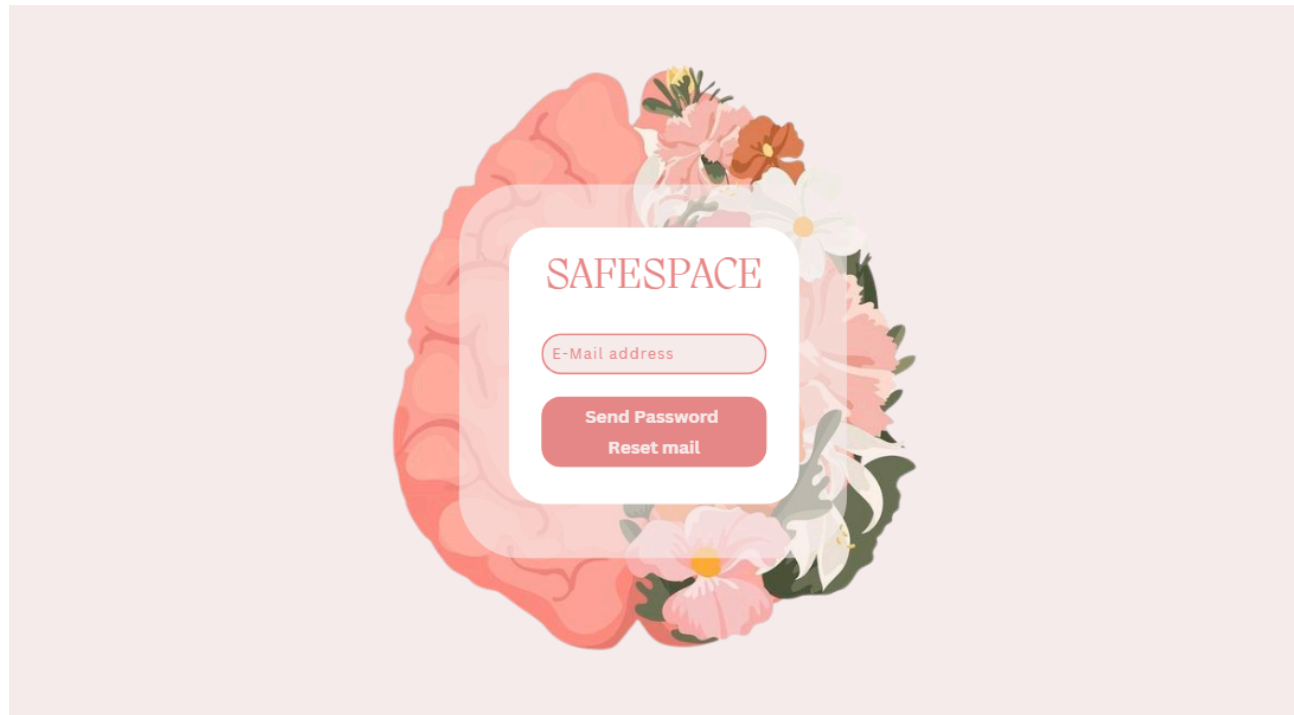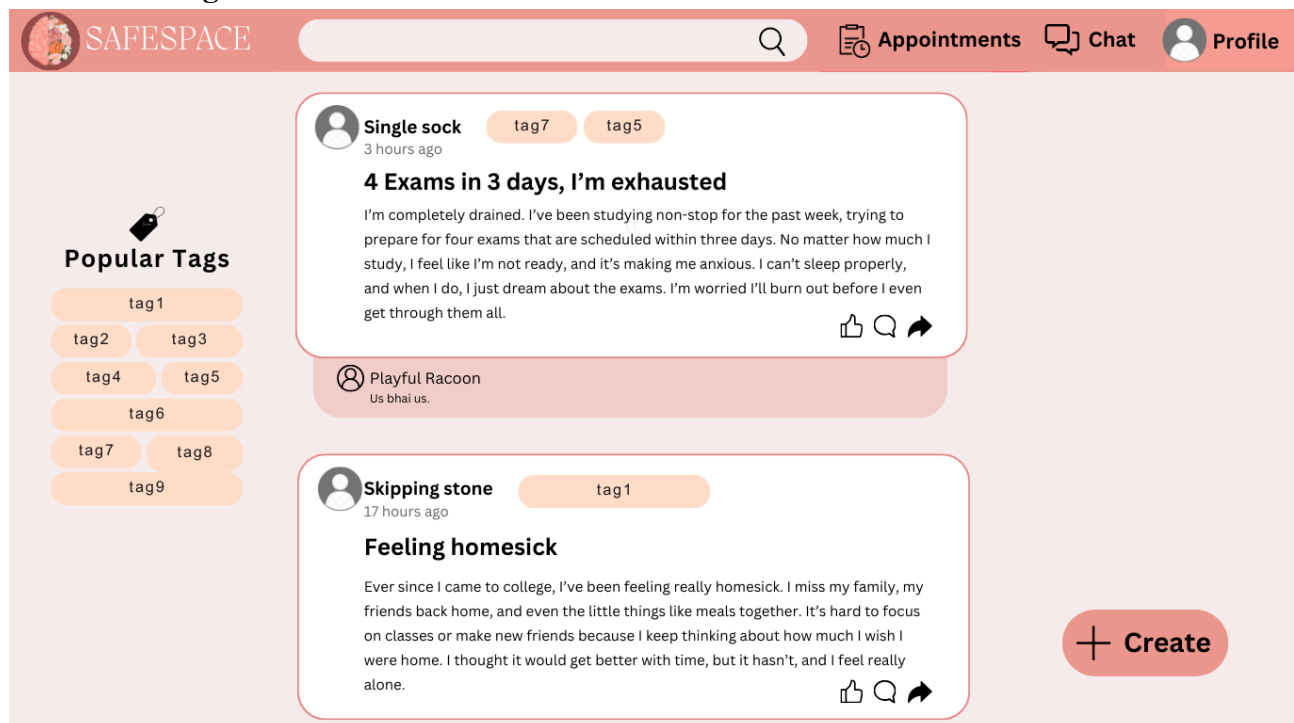
1.2 Human Interface Design

1.2.1 Signup Page

1.2.2 Login Page

1.2.3 Forgot Password Page

1.2.4 Home Page

1.2.4 Home Page interface for Counselors

SAFESPACE   🔍   📋 Appointments   💬 Chat   👤 Profile

Counsellor

🏷️
Popular Tags

| tag1 |
| tag2 | tag3 |
| tag4 | tag5 |
| tag6 |
| tag7 | tag8 |
| tag9 |

SEVERE

MODERATE

👤 **Single sock**   tag7   tag5   **SEVERE**
3 hours ago

4 Exams in 3 days, I'm exhausted

I'm completely drained. I've been studying non-stop for the past week, trying to prepare for four exams that are scheduled within three days. No matter how much I study, I feel like I'm not ready, and it's making me anxious. I can't sleep properly, and when I do, I just dream about the exams. I'm worried I'll burn out before I even get through them all.

👍 💬 ➤

👤 Playful Racoon
Us bhai us.

👤 **Skipping stone**   tag1   **MODERATE**
17 hours ago

Feeling homesick

Ever since I came to college, I've been feeling really homesick. I miss my family, my friends back home, and even the little things like meals together. It's hard to focus on classes or make new friends because I keep thinking about how much I wish I were home. I thought it would get better with time, but it hasn't, and I feel really alone.

👍 💬 ➤

➕ **Create**

1.2.5 Upload Post

SAFESPACE   🔍   📋 Appointments   💬 Chat   👤 Profile

Create post

Title

B *I* ~~S~~ 🖼️

How are you feeling.....

Post

1.2.6 Booking Appointment with Counselor

SAFESPACE   🔍   📋 Appointments   💬 Chat   👤 Profile

Meet our counsellors...

Counsellor 1
Qualifications:
Specializations:
Experience:
He believes in creating a safe, non-judgmental environment to help clients explore their challenges and find meaningful solutions. He combines evidence-based practices with a personalized approach.
Available Slots:

Counsellor 2
Qualifications:
Specializations:
Experience:
He believes in creating a safe, non-judgmental environment to help clients explore their challenges and find meaningful solutions. He combines evidence-based practices with a personalized approach.
Available Slots:

Book an appointment 📅

👤 Choose counsellor
[Action ▼]

🕐 Pick slot
[Action ▼]

[Brief description of your problem]

[Book]

1.2.7 Appointment Requests Interface

SAFESPACE   🔍   📋 Appointments   💬 Chat   👤 Profile
Counsellor

Appointment Requests

Sleepy Sloth   27 January 10:00
Problem Description :
I've been feeling really overwhelmed lately, and it's starting to affect my studies and relationships. I'm constantly anxious about whether I'll meet expectations—both my own and my family's. Even when I try to take breaks, I can't stop overthinking. I barely get enough sleep, and I don't feel like I can talk to my friends about this because they all seem to be managing fine. I'm not sure what to do or where to start to feel better.

Joyful Bee   27 January 16:00
Problem Description :
I've been feeling really isolated lately. Even when I'm around friends, I feel like I don't belong, and it's hard to explain why. I've also been skipping meals and classes because I don't have the energy to face the day. I keep telling myself I'll snap out of it, but it's only getting worse. I'm scared this will start to affect my grades and everything else I've worked hard for

Mark available slots 📅

◄   26 Jan   **27 Jan**   28 Jan   ►

9:00   🟢
10:00   🟢
11:00   ⚪
15:00   🟢
16:00   ⚪
17:00   🟢

1.2.8 Chat Interface
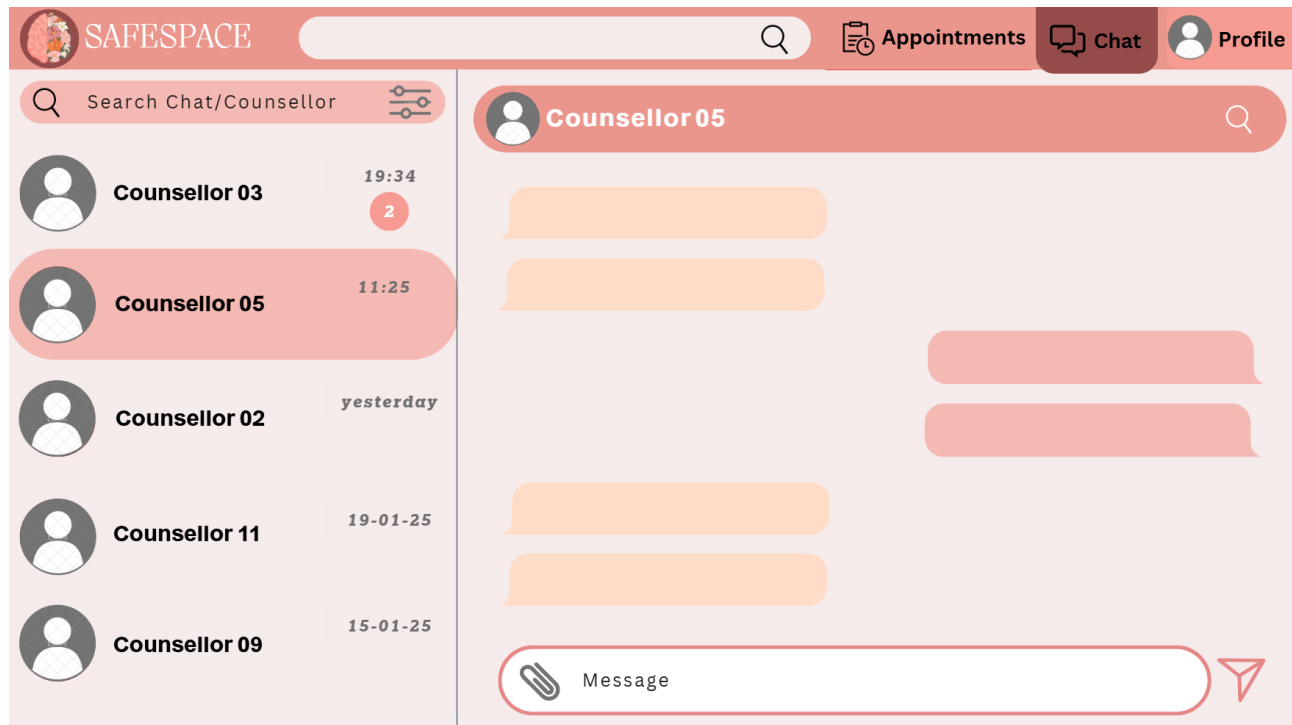
1.2.9 Profile Page
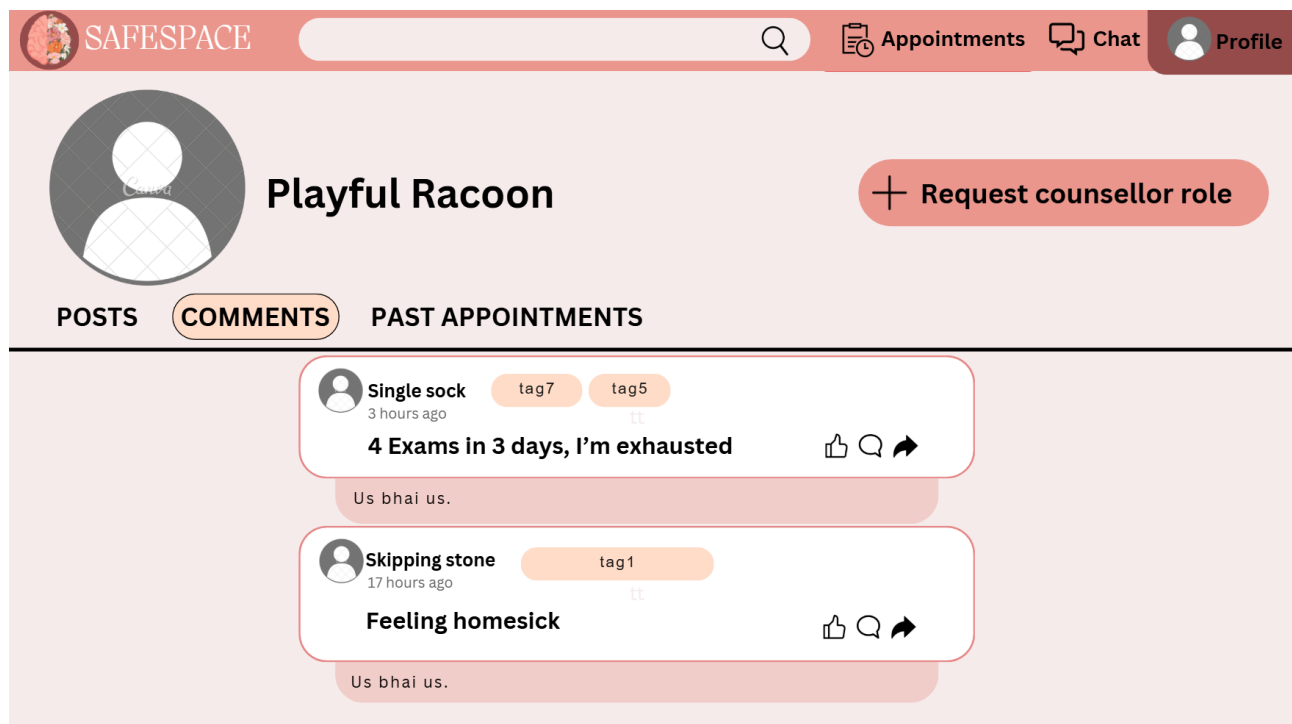
2 Architecture Design

SafeSpace will be designed using a combination of Model-View-Controller (MVC) and Pipe-and-Filter architectural patterns. We use this hybrid approach to allow us a modular, scalable, and maintainable system that can efficiently handle the various features required for the mental health platform.

2.1 Model-View-Controller

1. **Browser Requests Login/Signup**
    a. The user interacts with the web application by requesting login or signup.
    b. This request is sent to the controller for authentication.

2. **Controller Authentication:**
    a. The authentication request is received by the controller and the authentication process starts.
    b. The resolution of the request involves searching the database for the user details which is handled by the model.

3. **Model Processing and Session Data:**
    a. The model searches for the user in the database and processes the request
    b. If authentication is successful, the model generates session data which is then displayed on the screen and the user gets access to interact with the view.
    c. The view is responsible for presenting the data to the user, and creating the user interface.

4. **Real-Time Interaction:**
    a. Users can make some requests by giving input from the view in response to real-time interactions.
    b. The controller categorizes these inputs into appropriate queries.
    c. These queries are forwarded to the model for further processing.

5. **Model Processing for Real-Time Interaction:**
    a. The controller interacts with the model to process the made requests.
    b. Data from the database is fetched or updated based on the requests made by the user.

6. **Updating the View:**
    a. After processing the requests in the model, the controller updates the view using the model (database).
    b. The updated data is then displayed on the user's view.

7. **Severity based Classification**
    a. The relevant data from the model is transferred to a severity classifier which will help classify the posts to facilitate faster responses.

8. **Spam filtering**
    a. The relevant data from the model is transferred to a spam detector to prevent malicious content.
    b. The malicious user is blocked after several reports.

Browser

1.Requests Login/Signup

1.Realtime User Interaction

8. Access granted

Controller
1. Validates the user
2. Manages the request APIs
3. Query Generation

2. Sends the request with user input

View
1. Dynamic GUI
2. Simple and elegant
3. Sends User request Data to controller

3. Segregate request into appropriate queries

2. Authenticate Request

10. Renders Session Data as a page

6. Renders changes to Interface

7. User Logged In

DataBase

4. Search for Counselor/ Tags

5. Authenticate

6. Sends Session Data

4. Update/Fetch Queries

5.Updated Session Data

Business Logic
1. Queries data from the database
2. Updates the database
3. Process data into input for view

User Interest Domains

Spam Filtering/ Priority Generator
1. Warns the sender of inappropriate/ spam messages
2. Sorts the counselor feed as per severity tag

Tags as Input

Model

2.2 Pipe and Filter Architecture

1. **Blog Feed:**
   a. All the blogs/posts written, comments, and interactions done by the user base are collected together to form a Pool of Blogs and Interactions.
   b. This Pool is filtered through a spam filtering pipeline flagging users and removing irrelevant content. The pool of posts is assigned a few tags from a collection of predefined tags to enable filtering and efficient searching.

    c. An ML algorithm then filters the pool of blogs based on their severity and recommends them to the counselors, allowing timely responses and prioritizing accordingly.

    d. The user can like a post, comment on it, have conversations in the comments section, and share it.

2. Real-Time Communication:

    a. Whenever the user logs in, the session data that is rendered on the user's browser includes his personal messages (read, unread or sent).

    b. The user is free to explore and approach any counselor on the Safespace platform. This is highly facilitated with the messaging option.

    c. Real-time messaging is handled using a Redis server which acts as an intermediary between the Model Business Logic and Model Database.

3. Appointment Handling:

    a. The session data also includes the time slots set by the counselors and the received requests.

    b. The user is free to request any of the available time slots. The counselor has the option to accept or reject the received requests.

    c. The counselor can update their available time slots accordingly which is stored or updated in the database.

Data Source and Data Sink in the Architecture:

Data sources:

The SafeSpace platform primarily sources its data from the following inputs:

1. User Registration: Information provided by students and counselors during account creation, including IITK email IDs, and anonymous usernames provided by the admin.
2. User-Generated Content: Posts, comments, and interactions made by users on the platform.
3. Counselor Inputs: Blogs, articles, and resources posted by counselors.
4. Chat Messages: Text and media are shared in private conversations between users and counselors.
5. Appointment Requests: Data from students booking counseling sessions.

B. Data Sink

The sourced data is processed and utilized through several pathways to create SafeSpace's core features:

1. Anonymous Communication System: Enables students to interact freely while maintaining privacy.
2. Dynamic Blog Feed for Counselors: Prioritizes and displays content based on severity tags.
3. AI-Powered Support: Analyzes posts to categorize cases based on severe situations.

4. Personalized Counseling Interface: Facilitates one-on-one chat sessions and appointment scheduling.
5. Content Moderation: Filters spam and inappropriate content to maintain a safe environment.

These pathways converge to create a supportive and secure mental health platform tailored for the IITK community, emphasizing user privacy, timely intervention, and easy access to professional guidance.
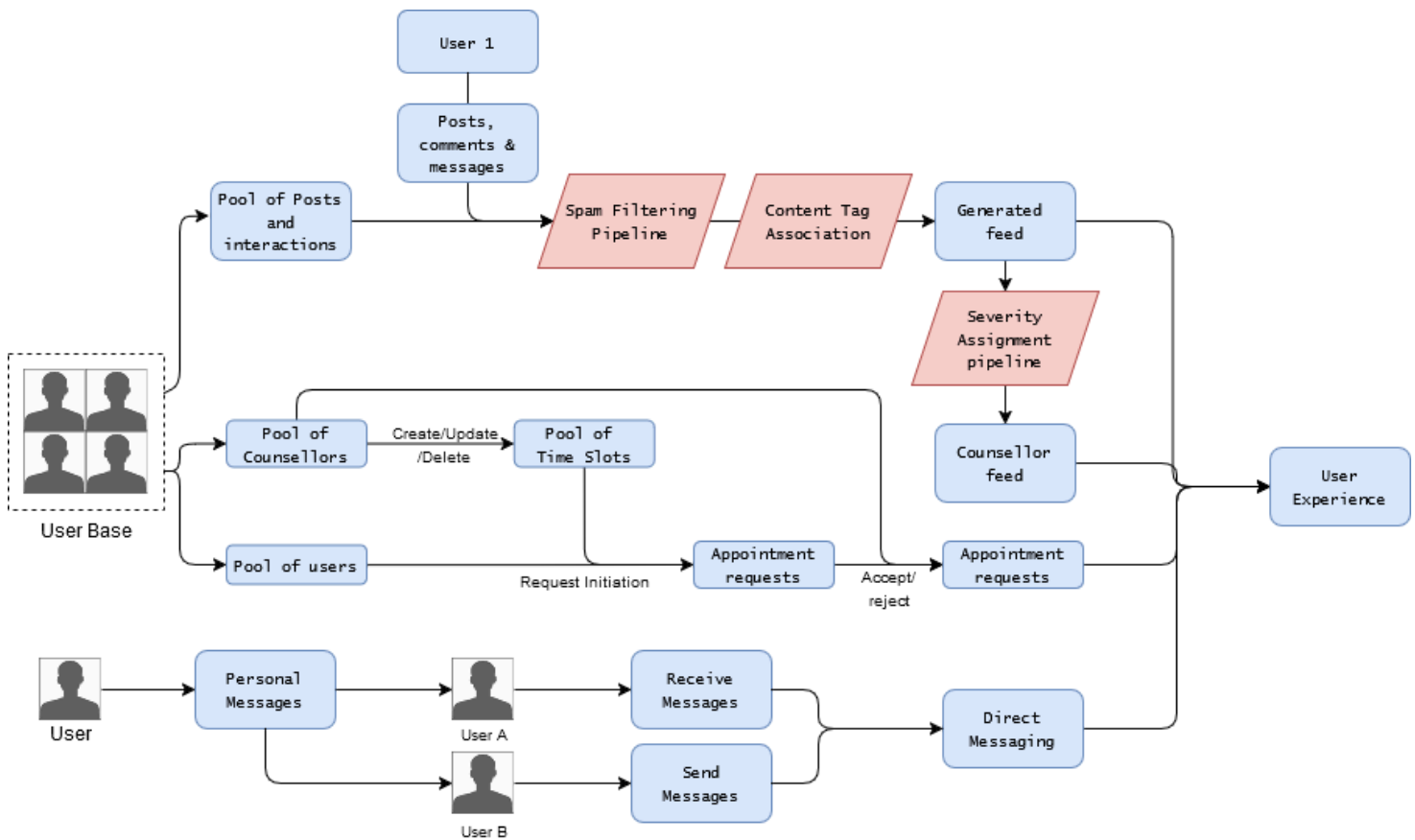
3 Object Oriented Design

3.1 Use Case Diagrams

3.1.1   Login / Forgot Password
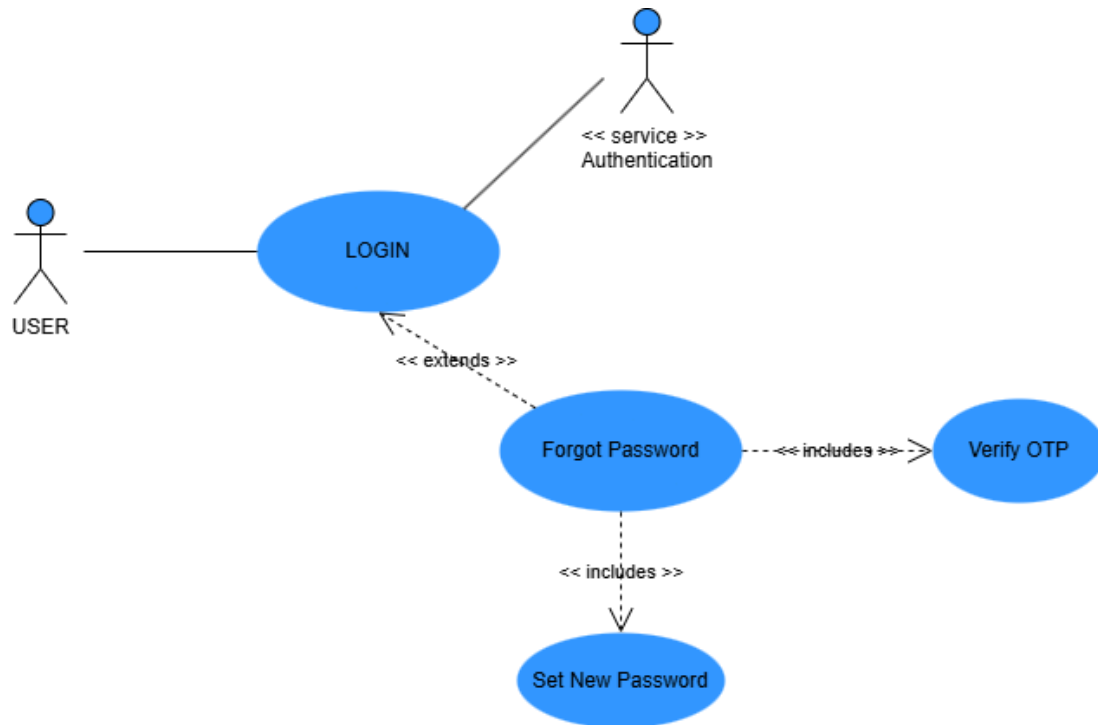
3.1.2   Register
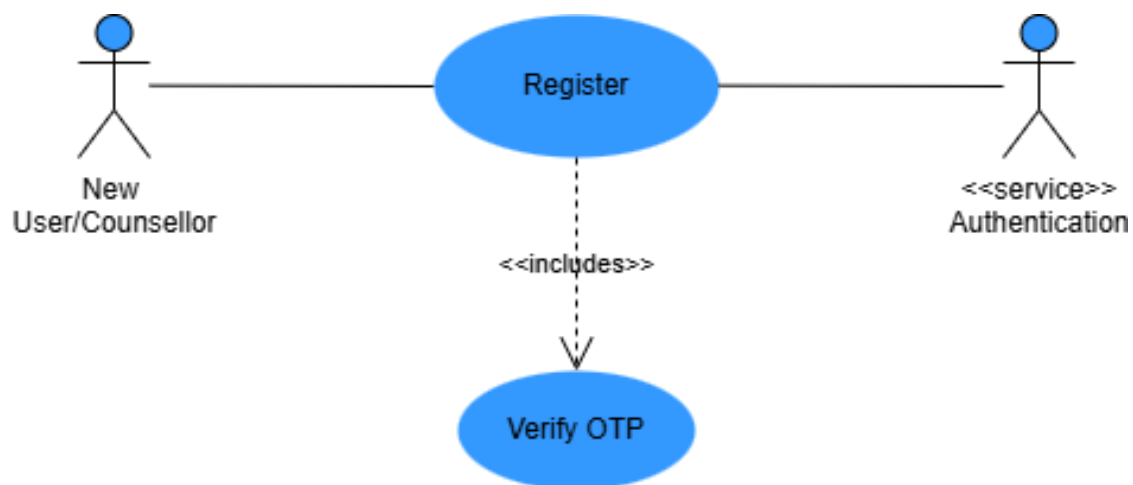
3.1.3   Request Counselor Role
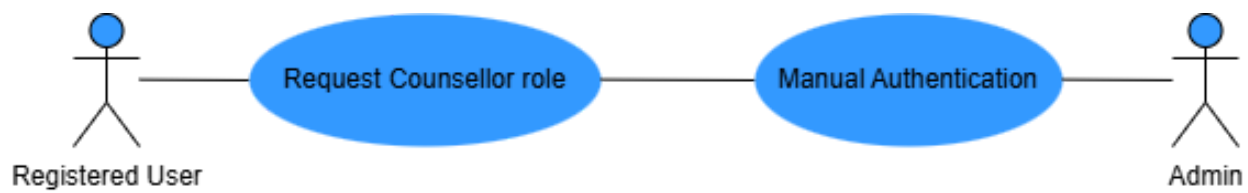
3.1.4 Create Post

3.1.5 Handle Appointments as a counselor
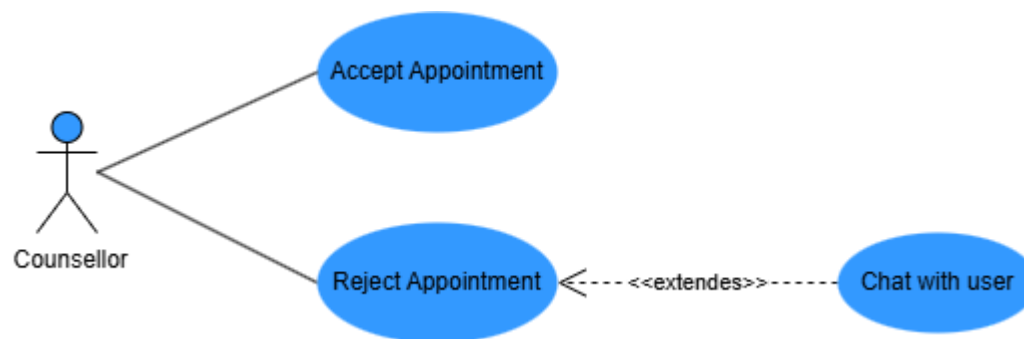
3.1.6 Book Appointments

3.1.7 Chat
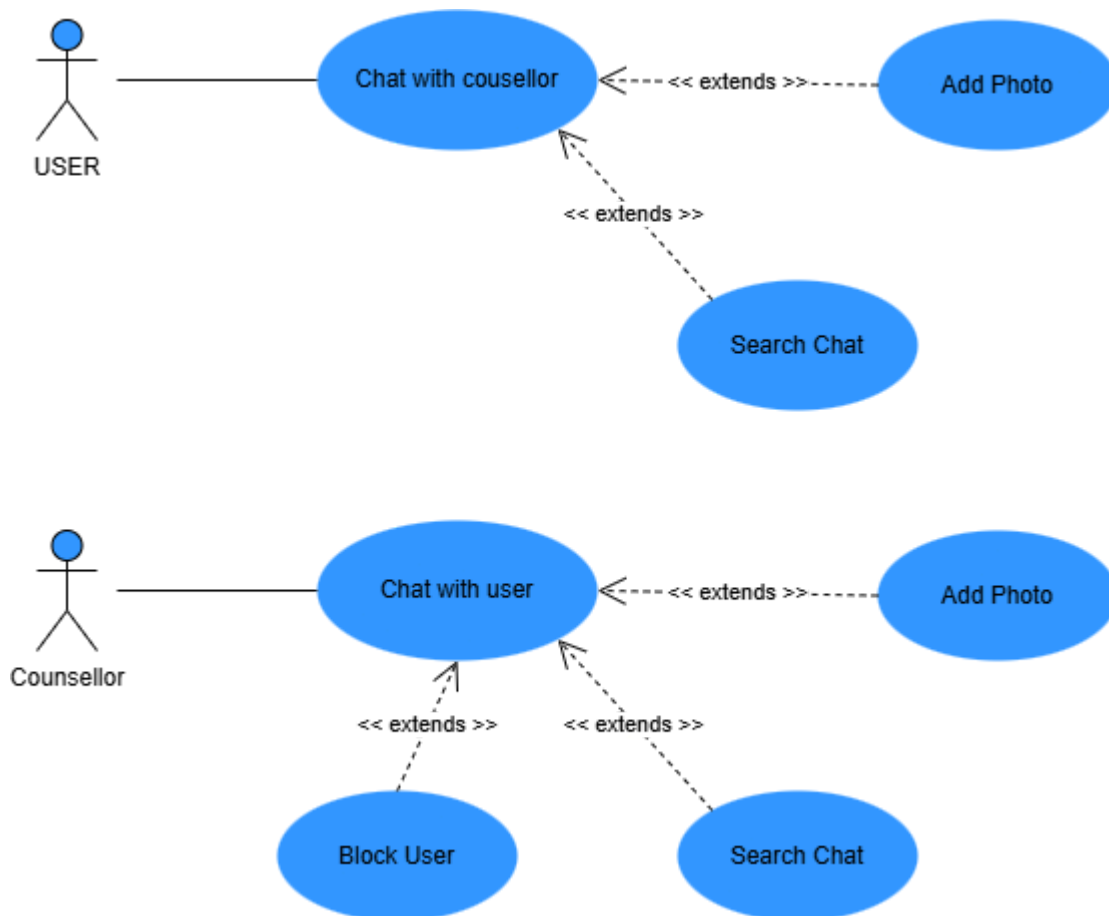
3.1.8 View Profile

3.1.9 Interact with Posts
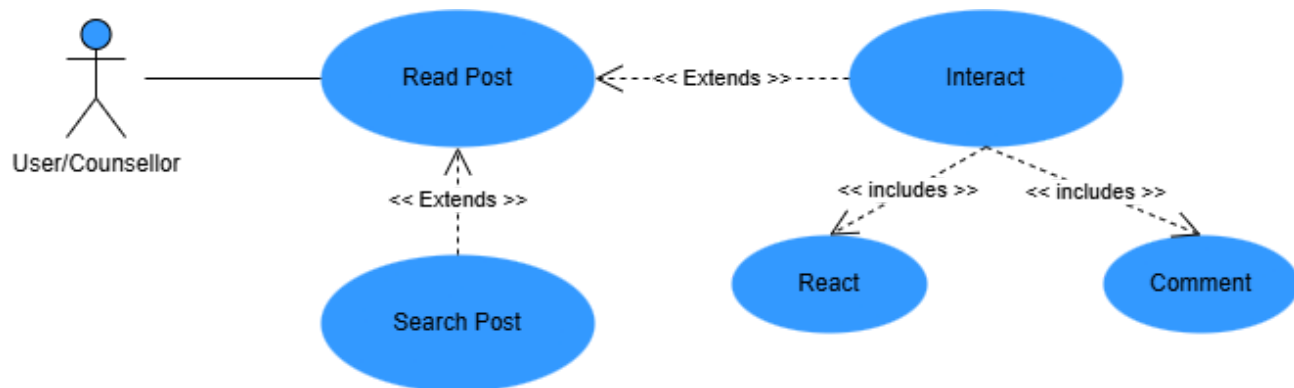
3.1.10 Edit Avatar / Banner
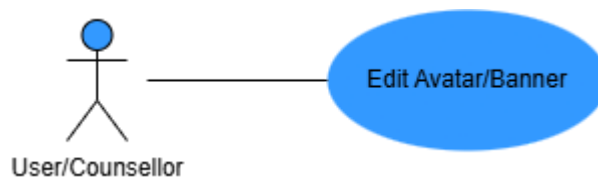
3.1.11 Schedule Appointments
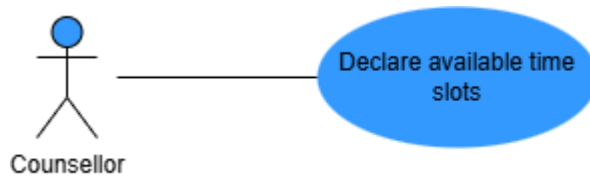
3.1.12 Logout

3.2 Class Diagrams

CLASS DIAGRAM
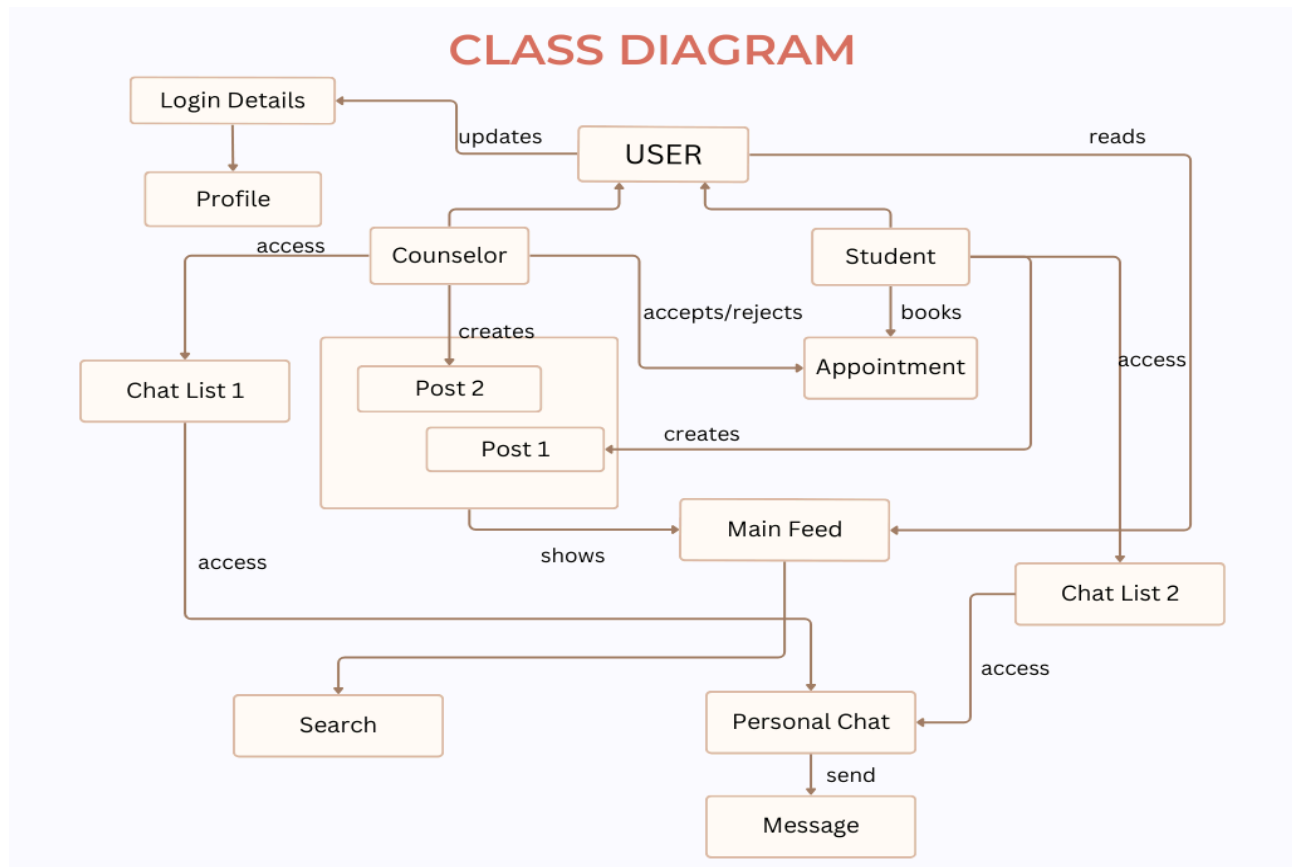
LOGIN DETAILS	
(*)FIXED/DEFAULT	(**)STANDARD FORMAT
USER ID:	NUMBER(*)
EMAIL ID:	STRING(*)
PASSWORD:	HEX(*)
• CHANGE PASSWORD() • FORGOT PASSWORD()	

USER PROFILE	
(*)FIXED/DEFAULT	
USERNAME:	STRING(*)
EMAIL ID:	STRING(*)
USER ID:	NUMBER(*)
PASSWORD:	HEX(*)
AVATAR:	IMAGE
ROLE:	STRING(*)
• EDIT PROFILE()	

APPOINTMENT	
(*)FIXED/DEFAULT	(**)STANDARD FORMAT
ADD APPOINTMENT:	BOOLEAN(**)
SENDER ID: (EMAIL)	STRING(*)
TIMESTAMP:	STRING(**)
TEXT MESSAGE:	STRING
APPOINTMENT ID:	STRING
COUNSELOR ID:	STRING(*)
BOOKED:	BOOLEAN(**)
• REQUEST APPOINTMENT(BY STUDENTS) • ACCEPT APPOINTMENT(BY COUNSELLORS)	

POST	
(*)FIXED/DEFAULT	(**)STANDARD FORMAT
POST TITLE:	STRING
POST CONTENT:	STRING
CONTENT TAG:	STRING
SEVERITY TAG:	STRING
TIMESTAMP:	STRING(**)
COMMENTS:	STRING
LIKES:	ENUM
• ADD COMMENT • LIKE	

CHAT	
(*)FIXED/DEFAULT	(**)STANDARD FORMAT
USER ID:	NUMBER(*)
RECIPIENT ID:	NUMBER(*)
BLOCKED:	BOOLEAN
MESSAGES:	ARRAY OF MESSAGES

MAIN FEED	
(*)FIXED/DEFAULT	
COUNSELLOR BLOGS	ENUM
POSTS	ARRAY OF POST
• SEARCH BY TAGS	

CHAT LIST	
(*)FIXED/DEFAULT	
USER ID	NUMBER(*)
CHAT	ARRAY OF CHAT

MESSAGE	
(*)FIXED/DEFAULT	(**)STANDARD FORMAT
MESSAGE ID:	NUMBER(*)
SENDER/RECIPIENT ID:	NUMBER(*)
MESSAGE TEXT:	STRING
MESSAGE TYPE:	ENUM
TIMESTAMP:	STRING(**)
MEDIA URL:	URL

3.3 Sequence Diagrams

REGISTER

User	System Authentication	System Database

User Details
(email, password)

OTP Sent

OTP verification

Alt

[Authentication Successful]
[Correct OTP]
Redirect to login page

Save user details
(email, password)

[Authentication Fail]

[Incorrect OTP]
ERROR

LOGIN

| User | System Authentication | System Database |

Login Details
(email, password)

Get Password
(email)

Password

Alt

(Password is correct)
Redirect to home page

(Password is incorrect)
Back to Login Page

FORGOT PASSWORD

User — System Authentication — System Database

User email →

OTP sent ⇠

OPT verification →

Alt

(OTP is correct)
Request New password ⇠

GetPassword (password) → UpdatePassword (email,password) →

password ⇠ Password updated ⇠
Redirect to Login Page

(OPT is incorrect)
Back to Login Page ⇠

REQUEST FOR COUNSELOR ROLE

User

Admin

Request for Counselor Role

Alt

(Request accepted)
Counselor profile assigned

(Request denied)

BLOG CREATION AND DELETION

User	User Blog List	Blog

addBlog
(user ID, Blog details)

createBlog
(user ID, blog details)

Blog

Blog saved

deleteBlog (blog ID)

Blog removed
from memory (blog ID)

Blog deleted

COMMENTS

User	Blog

addComment
(blog id, comment details)

Adds comment

Comment added

CHAT

User	Chat	Receiver

addMessage(message)

sendMessage(message)

readReceipt(true)

Message Delivered

BOOK APPOINTMENT

User	Appointments	Counsellor

Appointment details
(date, time, reason for
consultation) →

Request Appointment
(date, time, reason for
consultation) →

Alt
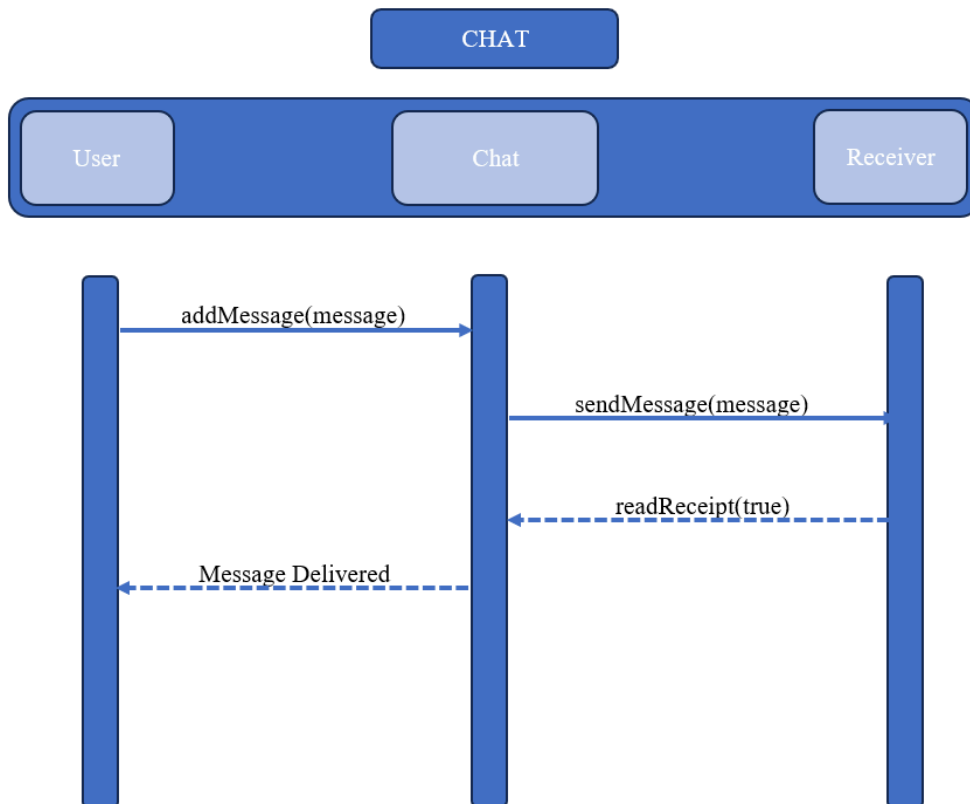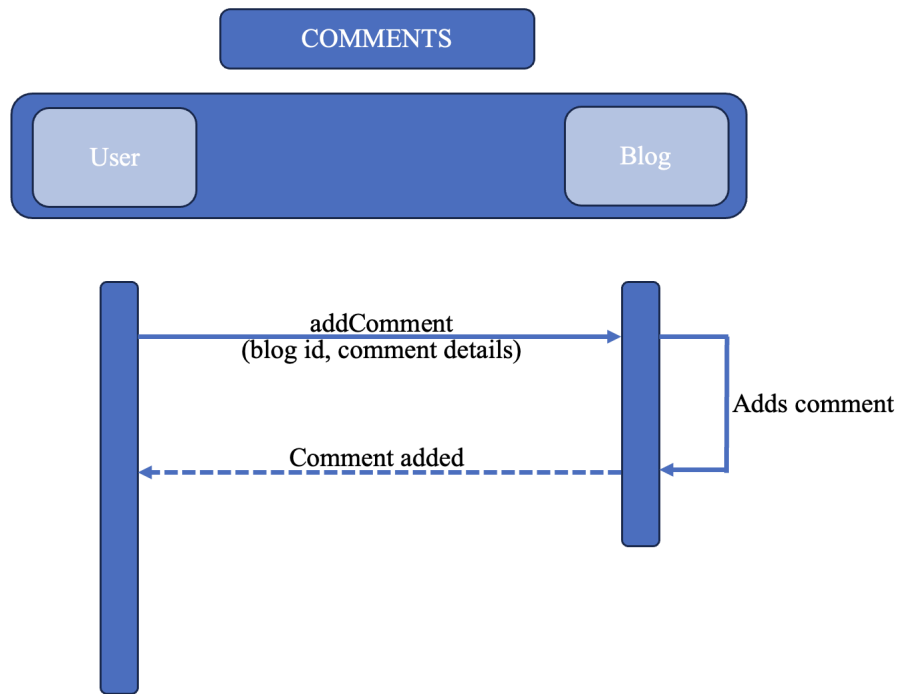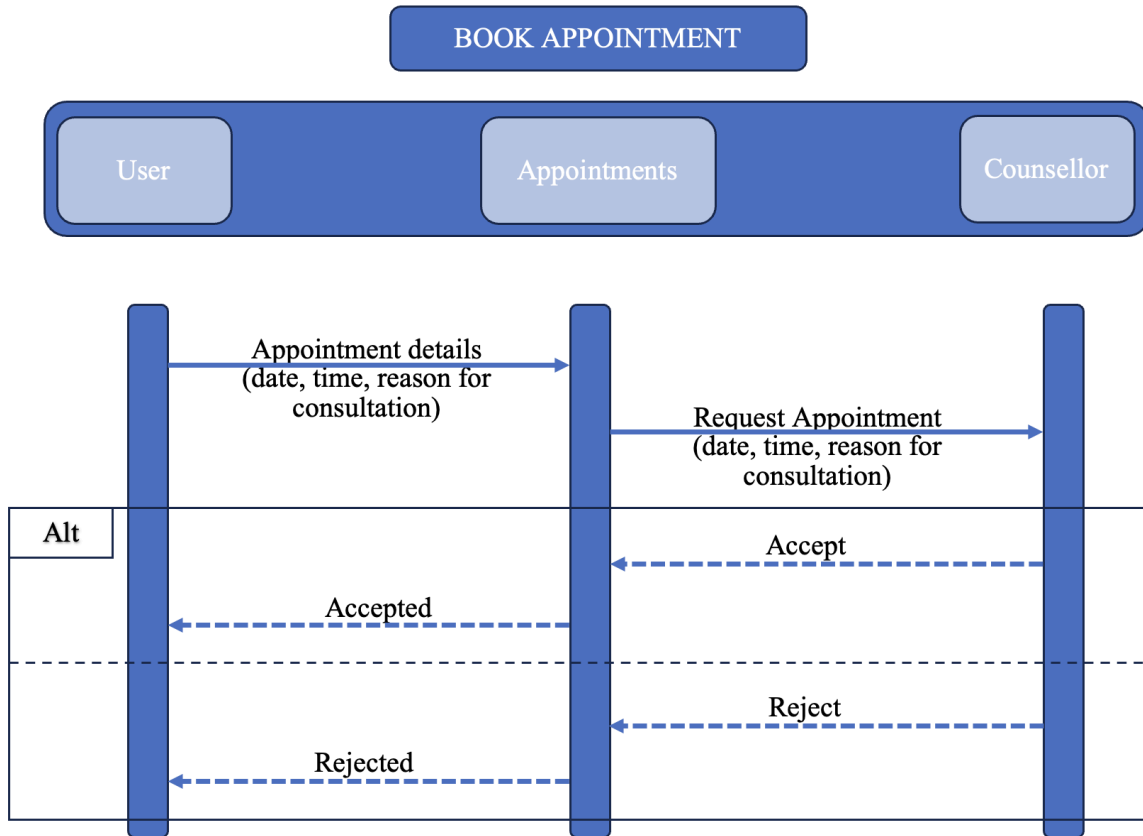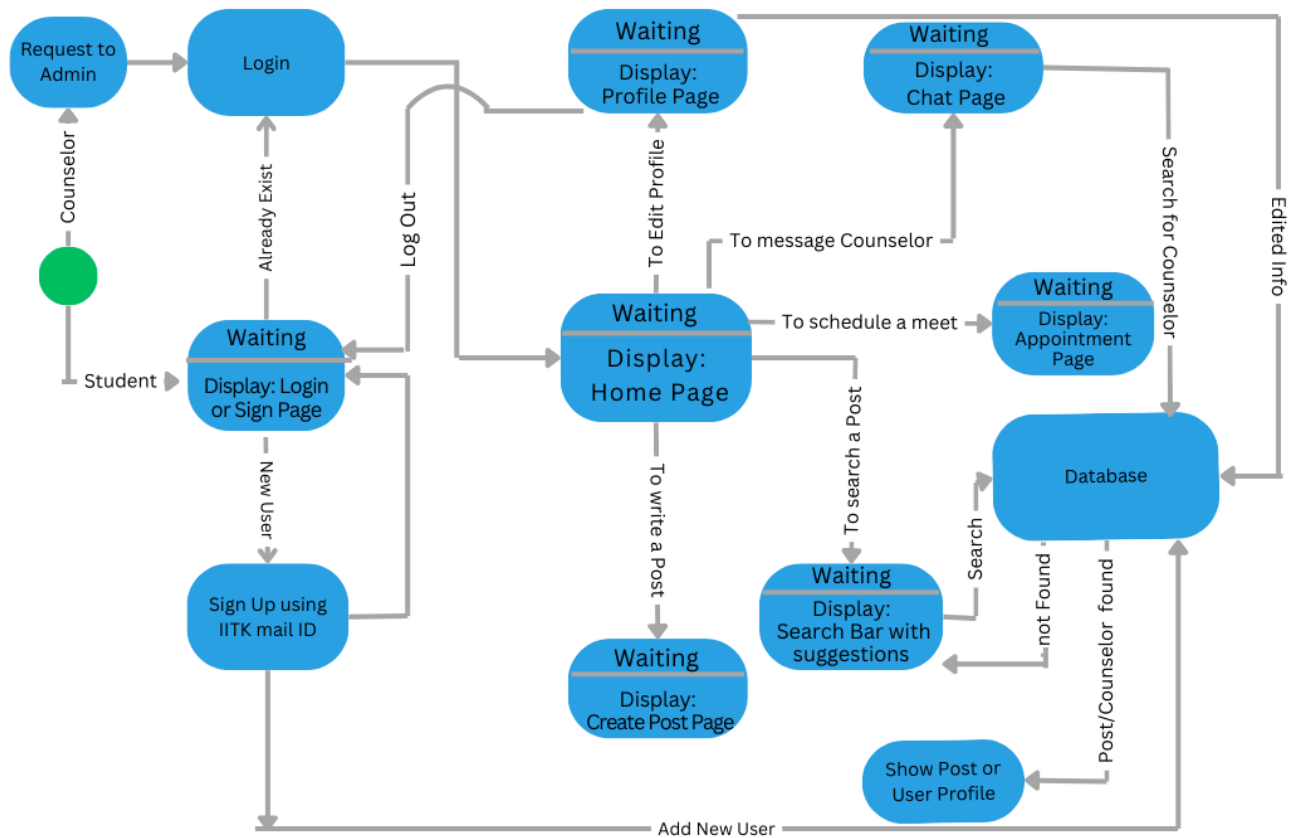
Accept

Accepted

Reject

Rejected

3.4 State Diagrams

A state diagram can effectively illustrate the software's response to each request. It depicts how the system transitions between different states based on user inputs and system actions, as shown below.

4 Project Plan

4.1 Landing Page:

This page serves as the entry point for the website, offering two primary options:
A. Register
- New users input their institute email.
- Email verification is initiated through an OTP sent to the provided mail ID.
- After successful verification, users set a password for their account.
- Direct redirection to the login page upon completion.

B. Login
- Existing users enter their email and password.
- Pressing the login button verifies credentials; successful login redirects to the homepage.

- An error message pops up for unsuccessful login attempts, providing users with the option to retry.
- A "Forgot Password" option enables users to set a new password via the email verification page used during registration.

4.2 Homepage:

A. Navigation Bar:

    i. Chat Page:
- Displays previous and unseen chats.
- Allows users to view, and send messages.

    ii. Personal Profiles:
- Directs users to the personal profile page.
- Enables viewing and avatar.

    iii. Compose/Edit Blog:
- ❖ Provides a platform to write new blogs or posts.
- ❖ Users can add images to their blogs before posting.

    iv. Search Counselors:
- ❖ Allows users to search for counselors by name.

B. Feed:
- ❖ Contains blogs uploaded by counselors and students, with the topmost posts being the ones from counselors.
- ❖ Users can like and comment on blogs.

4.3 Backend:

  A. Database:
    a. Utilizes a single database to store collections of objects for all classes used.
    b. For each user, instances of the UserProfile and LoginDetails classes are created, storing user details, email, and password.

   c.   Objects are instantiated for each blog or comment mentioned by the user from the Blog or Comment class.

B. Logic Design :
- ❖ **Register() :** Registers the user and stores login data in the database.
- ❖ **verifyLogin() :** Verifies email and password for login access.
- ❖ **changePassword() :** Accepts a new password and updates it in the database.
- ❖ **sendMessage() :** Allows users to send messages.
- ❖ **addBlog() :** Allows users to save and post blogs.
- ❖ **deleteBlog() :** Allows users to delete their blogs.
- ❖ **addComment() :** Allows users to comment on a blog.
- ❖ **renderBlogs() :** Loads blogs from the main blog feed for presentation on the user's homepage.
- ❖ **requestAppointment() :** Allows users to request an appointment with a counselor.

4.4 Roles and Timeline:

Team A : Anirudh Singh, Archita Goyal, Brinda Fadadu, Nakul Patel, Naman Yadav.
Team B : Om Chaudhari, Rohit Yadav, Sayani Patra, Vivek, Yatharth Sharma.
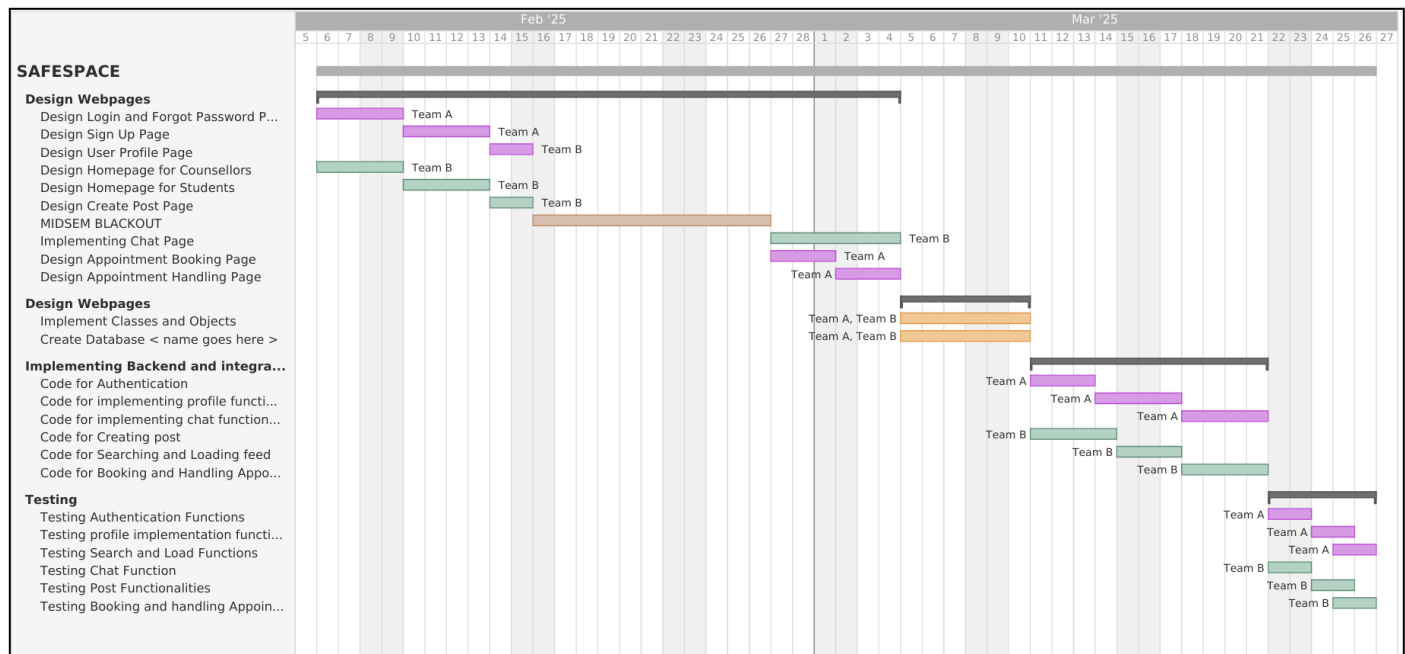
5 Other Details

Appendix A - Group Log

S no.	Date	Description
1	30/01/2025	Studied the document template given.
2	31/01/2025	Held a meeting to discuss the document and divided work among ourselves.
3	01/02/2025	Started working on the document.
4	03/02/2025	Held an online meet to discuss work updates and resolve any doubts.
5	06/02/2025	Engaged in an online chat with the TA to take his feedback.
6	07/02/2025	Made the final changes required and submitted the document.