**Project Presentation of Full Stack Engineering Project (FSE) (22CS037)**

On

# Real Time Chat App

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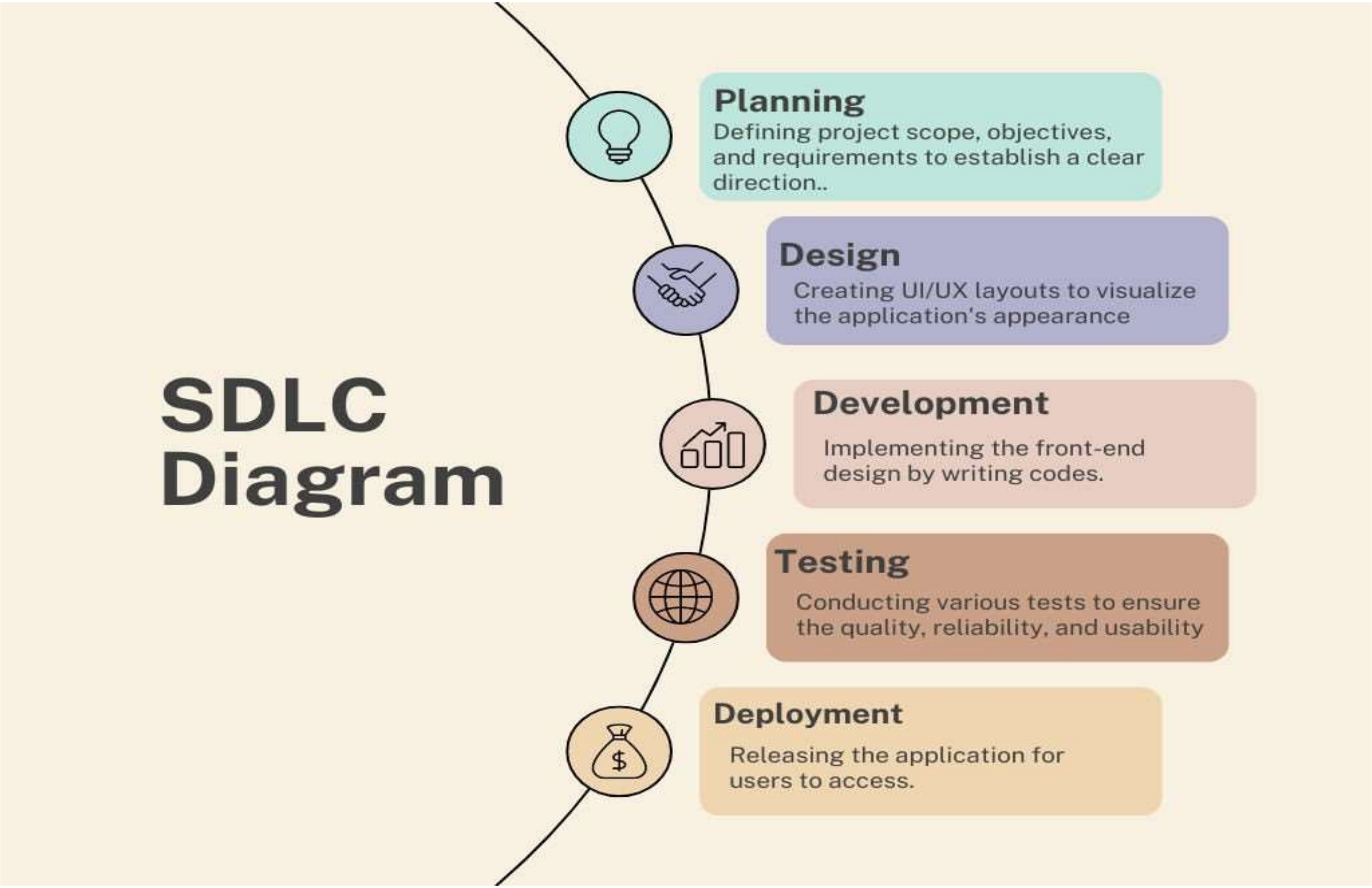
# Introduction

A **Real-Time Chat App** using the **MERN stack (MongoDB, Express.js, React, Node.js)** enables seamless, instant messaging between users. It leverages **WebSockets** (via **Socket.io**) to establish real-time communication. The backend, powered by **Node.js** and **Express**, handles authentication, message storage in **MongoDB**, and WebSocket connections.

# SDLC MODEL



## SDLC Diagram

**Planning**
Defining project scope, objectives, and requirements to establish a clear direction..

**Design**
Creating UI/UX layouts to visualize the application's appearance

**Development**
Implementing the front-end design by writing codes.

**Testing**
Conducting various tests to ensure the quality, reliability, and usability

**Deployment**
Releasing the application for users to access.

# TECHNICAL DETAILS

## HTML:

- Markup language for creating the structure of web pages.
- Utilizes elements like <div>, <p>, <img> to organize content.
- Forms for user input, with various input types like text, password, etc.
- Semantics for accessibility and SEO.

## TAILWIND CSS:

- A utility-first CSS framework for styling HTML elements.
- Simplifies layout design with classes for the box model: content, padding, border, and margin
- Provides utility classes for positioning, display, flexbox, and grid layouts.
- Enables responsive design through media query utilities.

## REACTJS:

- Allows dynamic rendering of HTML content based on real-time data.
- Facilitates reusable components like headers, footers, and forms.
- Supports conditional rendering to tailor content based on user roles or data.
- Seamlessly integrates form handling for actions like login and data submissions.
- Efficiently loops through arrays to render dynamic content such as notices, events, or appointments.

# TECHNICAL DETAILS

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## Backend

### MongoDB:

- NoSQL database designed for handling large volumes of data.
  Uses flexible, JSON-like documents to store data.
  Supports dynamic schemas, allowing easy updates to data structure.
- Provides horizontal scaling for managing distributed data.
- Facilitates fast queries and indexing for efficient data retrieval.

### Express:

- Express is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications.
- Express is a lightweight and flexible routing framework with minimal core features meant to be augmented through the use of Express middleware modules.

### Postman:

- Postman is a global software company that offers an API platform for developers to design, build, test, and collaborate on APIs.

# Features

**User Authentication** – Secure login/signup using JWT and bcrypt.
✅ **Real-Time Messaging** – Instant chat using **Socket.io** for real-time communication.
✅ **One-on-One & Group Chats** – Support for personal and group conversations.
✅ **Online/Offline Status** – Show users' availability in real-time.
✅ **Message Read Receipts** – Indicate when messages are delivered and read.

✅ **Typing Indicators** – Display when a user is typing.
✅ **Media & File Sharing** – Send images, videos, and documents.
✅ **Notifications** – Real-time alerts for new messages.
✅ **Search & Filters** – Find users or messages easily.
✅ **Chat History & Storage** – Store messages securely in MongoDB.

# Target Audience

## •Who is this for?

**1. General Users**

•Individuals looking for instant messaging solutions.

**2. Businesses & Enterprises**

•Teams needing real-time collaboration (e.g., Slack alternative).

**3. Developers & Tech Enthusiasts**

•MERN stack developers learning WebSockets & real-time features.

**4. Educational Platforms**

•Online learning portals requiring live discussions.

# User-Friendly Interface

**Drag-and-Drop File Sharing**
Users can easily send images, videos, and documents by dragging and dropping them into the chat.
**Rich Messaging Experience**
Built-in support for emojis, GIFs, reactions, and formatted text to enhance communication.
**Intuitive Navigation**
A simple and well-structured UI with easy access to contacts, recent chats, and settings.
Would you like me to add more features or refine the content further?

# Languages

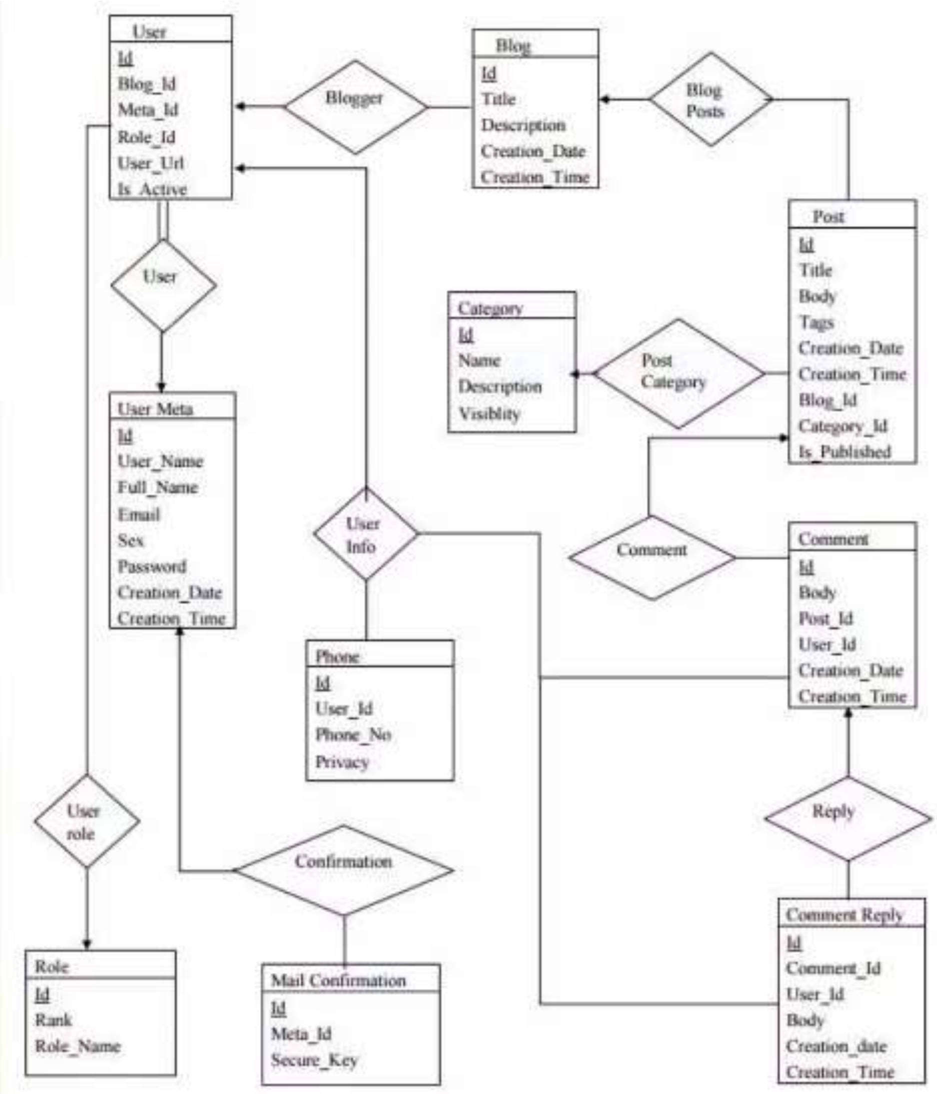
**MongoDB**
A NoSQL database that stores data in flexible, JSON-like documents, perfect for content-rich applications like blogs.

**Express.js**
A minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications.

**React**
A powerful JavaScript library for building user interfaces, enabling the creation of dynamic, responsive, and interactive blog experiences.

**Node.js**
A JavaScript runtime built on Chrome's V8 JavaScript engine, allowing server-side scripting and efficient data handling.

# ER Diagram



User
Id
Blog_Id
Meta_Id
Role_Id
User_Url
Is_Active

Blog
Id
Title
Description
Creation_Date
Creation_Time

Post
Id
Title
Body
Tags
Creation_Date
Creation_Time
Blog_Id
Category_Id
Is_Published

Category
Id
Name
Description
Visiblity

User Meta
Id
User_Name
Full_Name
Email
Sex
Password
Creation_Date
Creation_Time

Phone
Id
User_Id
Phone_No
Privacy

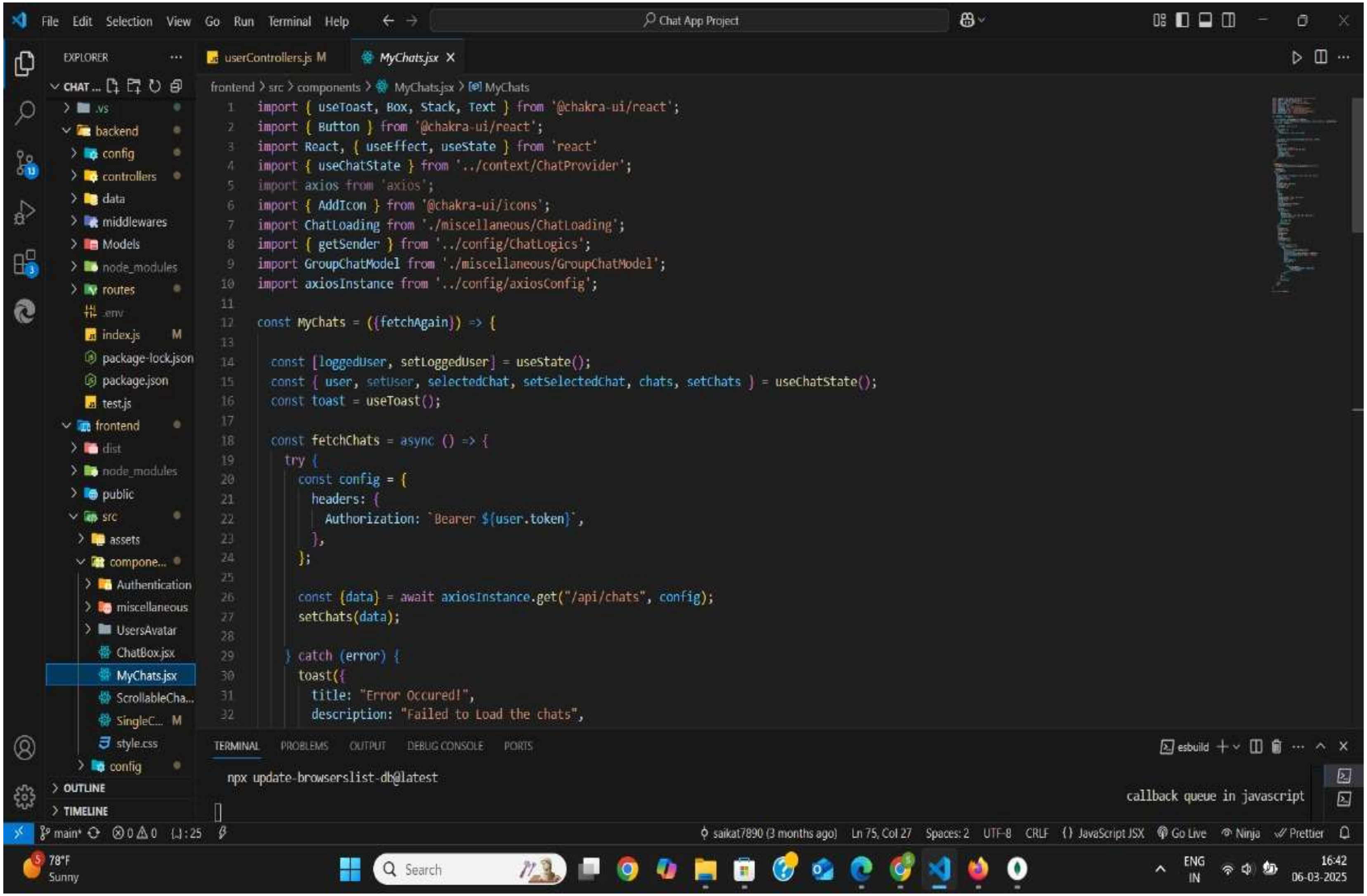
Comment
Id
Body
Post_Id
User_Id
Creation_Date
Creation_Time

Role
Id
Rank
Role_Name

Mail Confirmation
Id
Meta_Id
Secure_Key

Comment Reply
Id
Comment_Id
User_Id
Body
Creation_date
Creation_Time

# Code Snippets



```jsx
import { useToast, Box, Stack, Text } from '@chakra-ui/react';
import { Button } from '@chakra-ui/react';
import React, { useEffect, useState } from 'react'
import { useChatState } from '../context/ChatProvider';
import axios from 'axios';
import { AddIcon } from '@chakra-ui/icons';
import ChatLoading from './miscellaneous/ChatLoading';
import { getSender } from '../config/ChatLogics';
import GroupChatModel from './miscellaneous/GroupChatModel';
import axiosInstance from '../config/axiosConfig';

const MyChats = ({fetchAgain}) => {

  const [loggedUser, setLoggedUser] = useState();
  const { user, setUser, selectedChat, setSelectedChat, chats, setChats } = useChatState();
  const toast = useToast();

  const fetchChats = async () => {
    try {
      const config = {
        headers: {
          Authorization: `Bearer ${user.token}`,
        },
      };

      const {data} = await axiosInstance.get("/api/chats", config);
      setChats(data);

    } catch (error) {
      toast({
        title: "Error Occured!",
        description: "Failed to Load the chats",
```

```
npx update-browserslist-db@latest
```

```
callback queue in javascript
```

# Output

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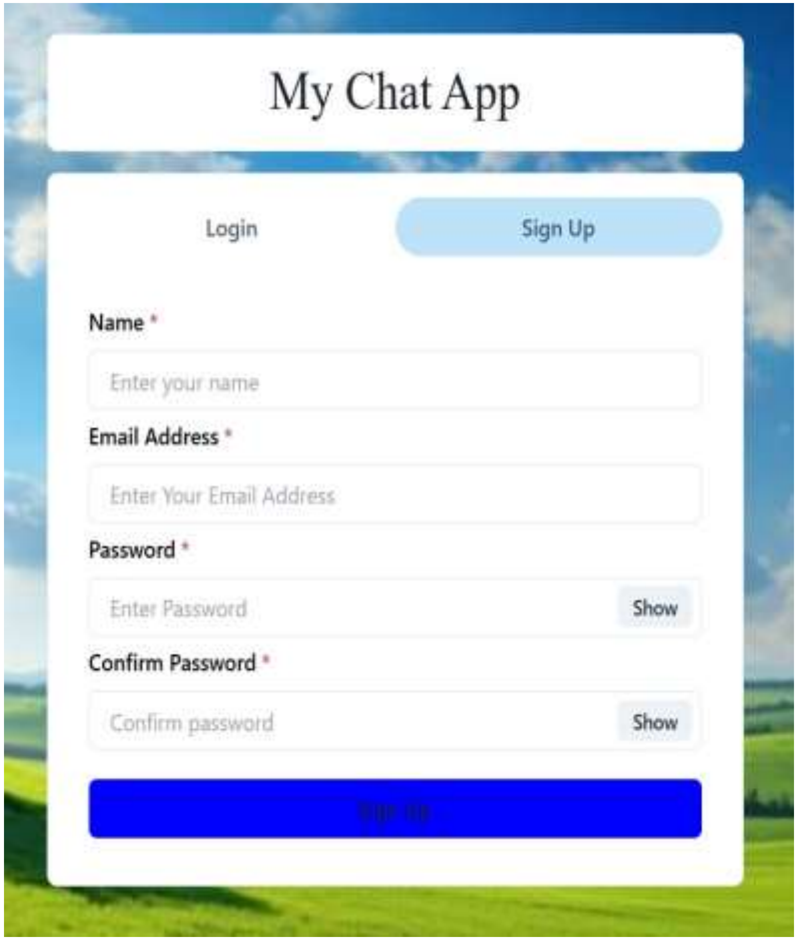
## Sign up



My Chat App

Login | Sign Up

Name *

Enter your name

Email Address *

Enter Your Email Address

Password *

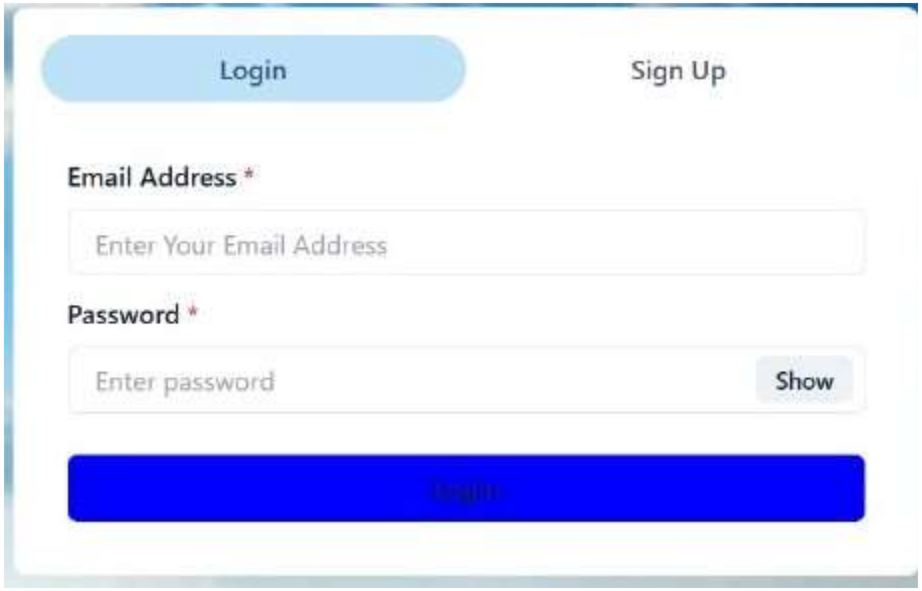
Enter Password Show

Confirm Password *

Confirm password Show

Sign Up

## Login



Login | Sign Up

Email Address *

Enter Your Email Address

Password *

Enter password Show

Login

# Project Snippet

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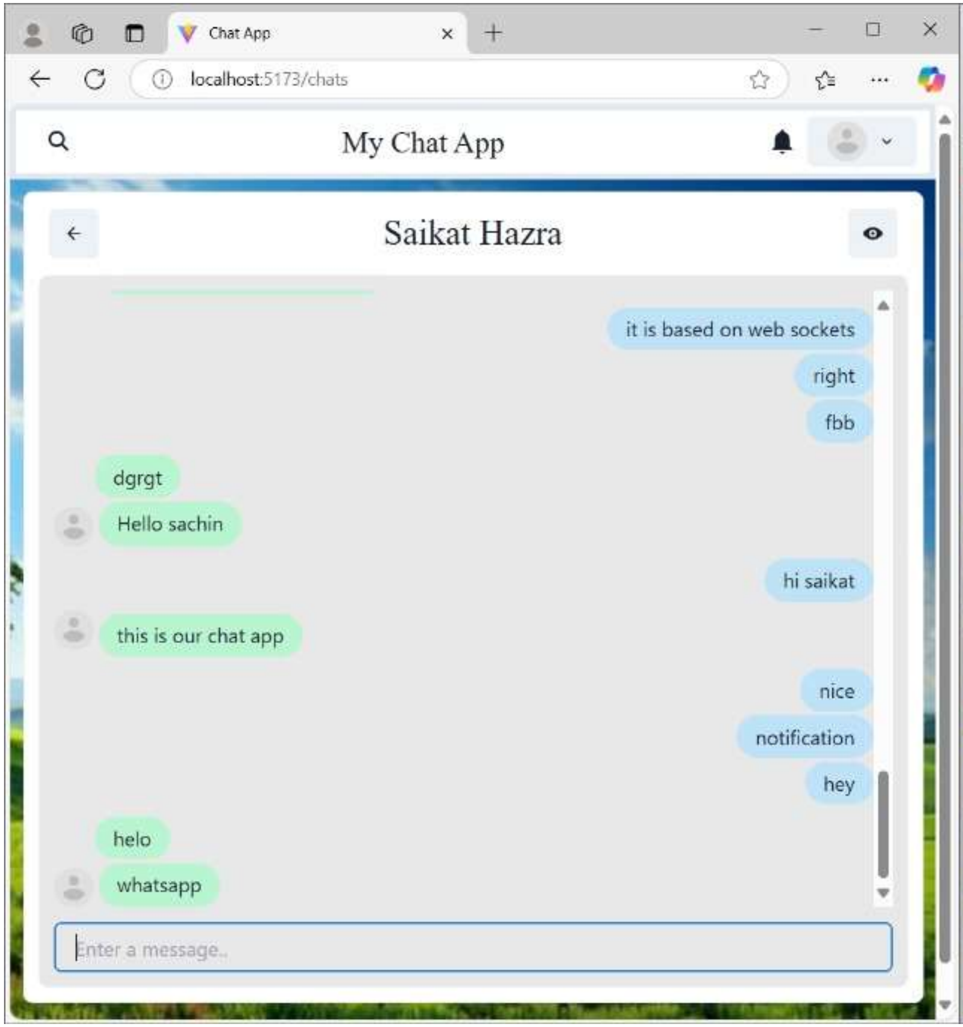


My Chat App

Saikat Hazra

it is based on web sockets

right

fbb

dgrgt

Hello sachin

hi saikat

this is our chat app

nice

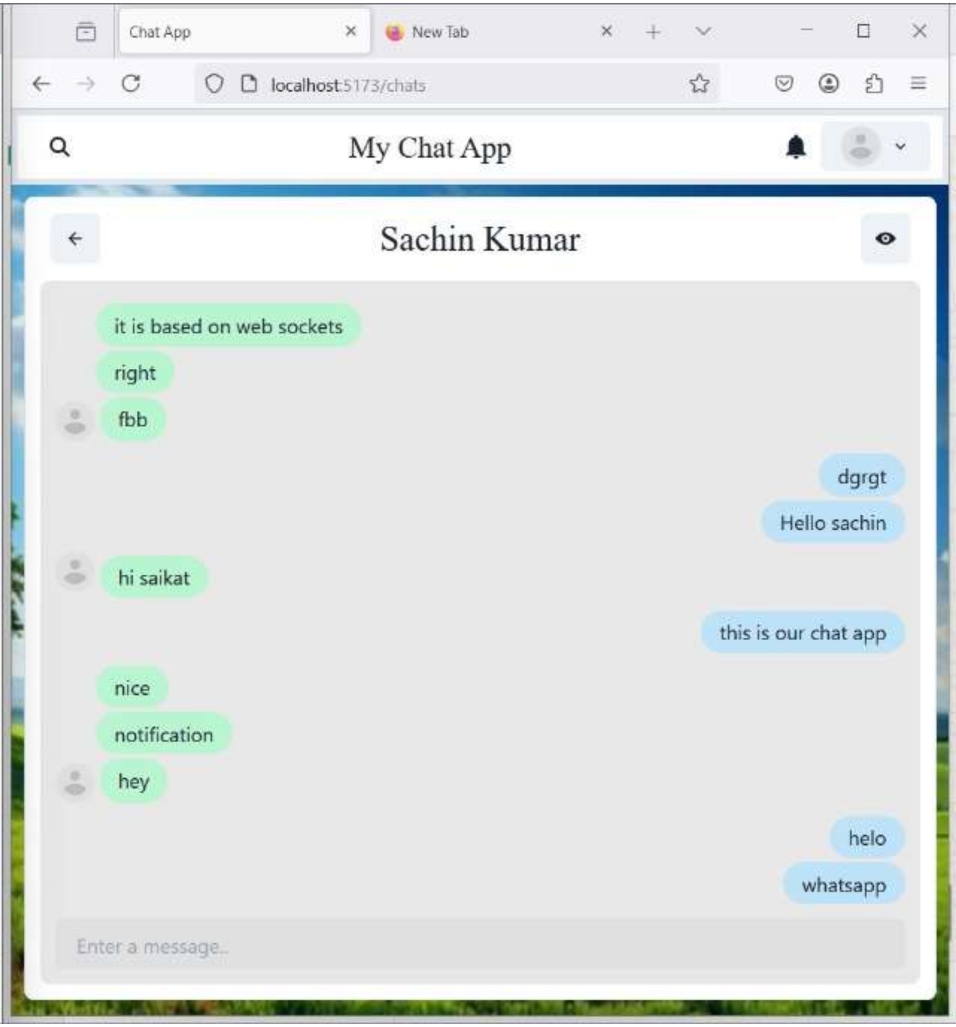
notification

hey

helo

whatsapp

Enter a message..



My Chat App

Sachin Kumar

it is based on web sockets

right

fbb

dgrgt

Hello sachin

hi saikat

this is our chat app

nice

notification

hey

helo

whatsapp

Enter a message..

# CONCLUSION

- The Real-Time Chat Application built using the MERN stack (MongoDB, Express.js, React.js, Node.js) provides a scalable, secure, and efficient communication platform. By integrating Socket.io for real-time messaging, JWT authentication for security, and cloud storage for media handling, the application ensures a smooth and seamless user experience.Following an Agile development methodology, the project is designed for continuous improvement, scalability, and adaptability to future enhancements like voice/video calls, AI chatbots, and multi-device synchronization.

Thank
you!