

**GLOBAL CHAT**

*Micro Project Report*

*Submitted in partial fulfillment for the award of the degree*

*of*

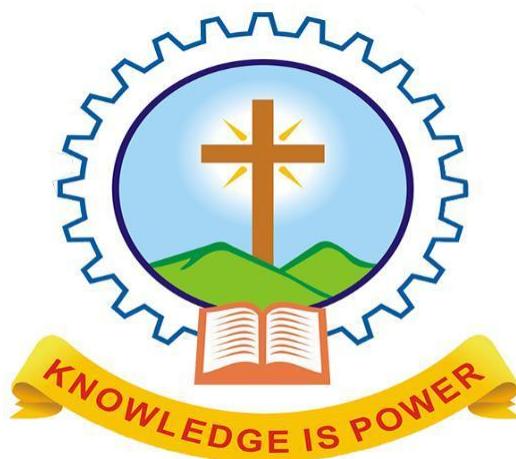
**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**

*of*

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**



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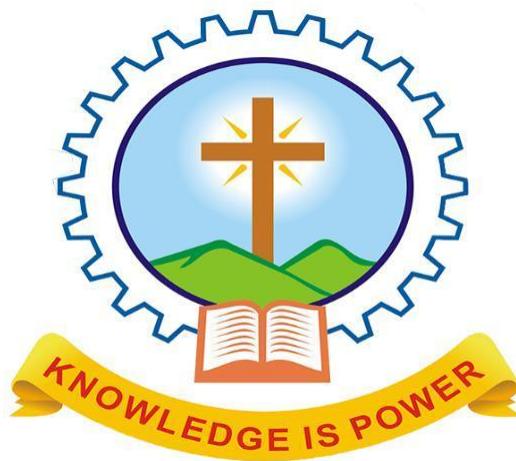
**DECEMBER 2023**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**MAR ATHANASIUS COLLEGE OF ENGINEERING**

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**DECEMBER 2023**



## **CERTIFICATE**

This is to certify that the report entitled “**Global Chat**” submitted by **Mr J Navneeth Krishnan (MAC21CS028)**, **Mr. Joel Sebastian (MAC21CS029)**, **Mr. John K Joseph (MAC21CS030)**, **Mr. K P Ashil (MAC21CS031)** to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science & Engineering for the academic year 2023-2024 is a bonafide record of the project presented by them for the year under our supervision and guidance. This report in any form has not been submitted to any other university or institute for any purpose.

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Project Coordinator

Project Coordinator

Date

Department Seal

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# ABSTRACT

Group chat facilities have revolutionized the way we communicate, offering a convenient and engaging platform for fostering connections, sharing ideas, and collaborating on projects. These virtual spaces have become indispensable tools for both personal and professional endeavors, bridging distances and enabling seamless interactions among individuals, communities, and organizations across the globe. Through the power of instant messaging group chats have transformed the way we stay connected with loved ones, fostering a sense of closeness and belonging despite physical separation. They have become digital havens for friends and families to share their daily lives, exchange laughter and support, and create lasting memories together.

In the professional realm, group chats have emerged as powerful catalysts for productivity and collaboration. They provide a centralized hub for teams to brainstorm ideas, exchange feedback, and coordinate tasks, streamlining workflows and enhancing efficiency. Whether it's a team of designers strategizing their next project or a group of researchers exchanging insights, group chats facilitate seamless communication and collective problem-solving.

Beyond personal and professional spheres, group chats have also emerged as vibrant online communities, bringing together individuals with shared interests and passions. These virtual spaces foster a sense of camaraderie and belonging, providing a platform for members to connect, exchange knowledge, and engage in meaningful discussions. Whether it's a group of gaming enthusiasts sharing tips and strategies or a community of bookworms debating literary classics, group chats cultivate a sense of shared purpose and belonging.

Group chat facilities have undoubtedly transformed the way we connect, communicate, and collaborate. They have become indispensable tools for fostering personal connections, enhancing professional productivity, and cultivating vibrant online communities. As technology continues to evolve, group chats will undoubtedly play an even more central role in shaping our digital interactions, fostering a more connected and collaborative world.

To use a group chat facility, you will need to create an account on the platform you want to use. Once you have an account, you can create a new group chat or join an existing one. When you are in a group chat, you can send messages to all of the other members of the group. You can also see the messages that other people have sent.

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# **CHAPTER 1**

## **PROBLEM STATEMENT**

To develop a reliable and user-friendly group chat facility is essential. Such a platform should enable real-time communication among multiple individuals, providing a central hub for sharing ideas, exchanging information, and collaborating on projects. It should also be accessible from various devices, including smartphones, computers, and tablets, ensuring that users can stay connected from anywhere and at any time.

## **CHAPTER 2**

# **INTRODUCTION**

A comprehensive group chat facility that addresses these challenges would revolutionize the way we communicate and collaborate. It would empower individuals to stay connected with loved ones, enable teams to achieve greater productivity, and facilitate the formation of vibrant online communities. By providing a seamless and secure platform for real-time interactions, such a facility would bridge distances, foster understanding, and drive innovation across various sectors.

## CHAPTER 3

# PROPOSED SYSTEM

We propose the development of a dynamic and user-friendly group chat application designed to facilitate real-time communication among multiple users. The primary goal of this project is to create a seamless and secure platform for users to connect, share information, and engage in instantaneous conversations. The proposed system encompasses the following key functionalities:

#### User Registration and Authentication:

Users can register through the app by providing essential information, including their email, password, and password confirmation.

A secure authentication mechanism ensures that only registered users can access the chat application.

#### Login and Splash Screen:

Upon launching the app, a visually engaging splash screen indicates the loading process, creating a positive user experience.

Users can log in using their registered username and password, ensuring secure access to their accounts.

#### Chat Interface:

After successful login, users are directed to a chat interface where they can engage in group conversations.

Each chat message is associated with the sender's email, message content, and timestamp for effective communication tracking.

#### Message Management:

Users have the ability to edit and delete messages, providing them with control over their communication content.

#### Settings Options:

The app includes a settings option in the app bar, allowing users to customize their experience. Users can toggle between light and dark modes based on their preference.

Help Section:

The settings menu also features a "Help" section, offering users clear instructions on how to use various app features.

Sign Out Functionality:

Users can sign out of their accounts securely, ensuring privacy and account protection.

Security Measures:

The application prioritizes user security through robust login and registration processes, safeguarding user data and ensuring secure access to the chat platform.

This project aims to deliver an intuitive and secure group chat application, providing users with a reliable platform for instant communication. We believe that the integration of key features and security measures will contribute to the success and widespread adoption of the application.

## CHAPTER 4

# DATABASE DESIGN

### DATABASE DESIGN

The proposed database design for the group chat application leverages Firebase, utilizing Firestore for the storage of essential data. The key components within Firestore include:

User Authentication:

Firebase Authentication is employed to manage user registration and login.

User information such as email, unique user IDs, and authentication tokens are stored securely within Firebase Authentication.

Firestore Collections:

Chats Collection:

Each document in this collection represents a chat.

Fields: ChatID, Participants (Array of UserIDs), Timestamp.

Messages Collection:

Documents within this collection represent individual messages.

Fields: MessageID, SenderID, Content, Timestamp.

The relationships between these collections are implicitly established through document references and IDs. The structure of Firestore Collections and Documents naturally supports the dynamic nature of a chat application.

Database Security Measures:

Firebase Authentication ensures secure user authentication and management.

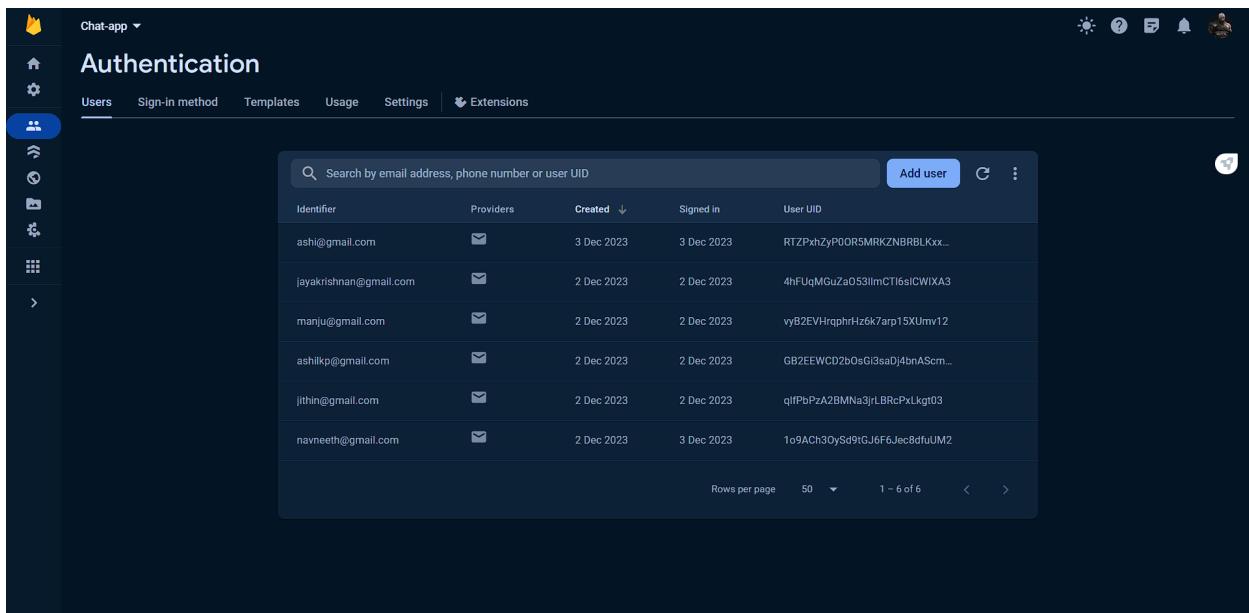
Firestore security rules are implemented to control access to specific collections and documents.

Encryption of sensitive data in transit is enforced by default through Firebase.

Scalability Considerations:

Firestore's scalability allows for seamless handling of a growing user base and chat activity. Indexing and efficient querying of data are inherent features of Firestore, contributing to optimal performance.

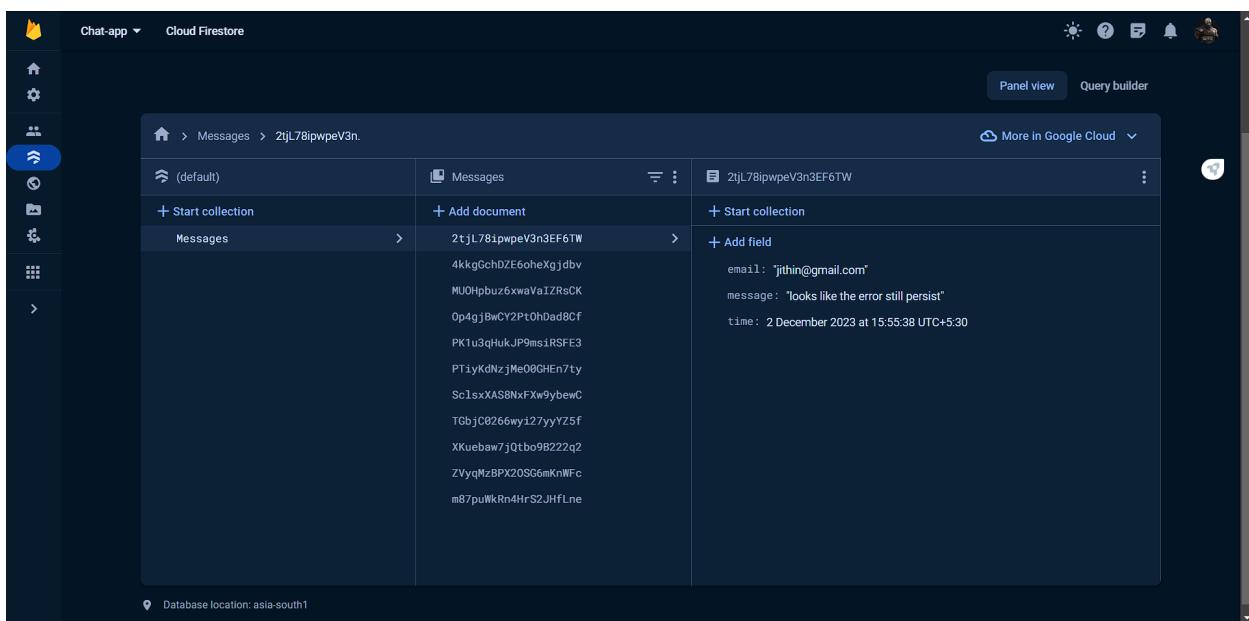
The proposed database design aligns with the goals of the group chat application, leveraging the flexibility and scalability of Firestore for storing chat-related data and messages securely. This design ensures both functionality and security, contributing to a positive and efficient user experience.



The screenshot shows the Firebase Authentication console under the 'Chat-app' project. The 'Users' tab is selected. A search bar at the top allows searching by email address, phone number, or user UID. Below the search bar is a table listing six users:

Identifier	Providers	Created	Signed in	User UID
ashi@gmail.com	Email	3 Dec 2023	3 Dec 2023	RTZPxhZyP0OR5MRKZNBRBLKxx...
joyakrishnan@gmail.com	Email	2 Dec 2023	2 Dec 2023	4hFUqMGuZaO53ilmCTl6sICWXA3
manju@gmail.com	Email	2 Dec 2023	2 Dec 2023	vyB2EVHrqphrHz6k7arp15XUmv12
ashilkp@gmail.com	Email	2 Dec 2023	2 Dec 2023	GB2EEWCD2bOsGi3saD4bnAscm...
jithin@gmail.com	Email	2 Dec 2023	2 Dec 2023	qfPbPzA2BMNa3jLBrcPxLgt03
navneeth@gmail.com	Email	2 Dec 2023	3 Dec 2023	1c9ACh3OySd9tGJ6F6Jec8dfuUM2

At the bottom of the table, there are buttons for 'Rows per page' (set to 50), '1 – 6 of 6', and navigation arrows.



The screenshot shows the Cloud Firestore console under the 'Chat-app' project. The 'Messages' collection is selected. A specific document, '2tjL78ipwpeV3n3EF6TW', is viewed. The document structure is as follows:

```
2tjL78ipwpeV3n3EF6TW
  +-- 4kkgGchDZE6oheXgjdbv
  +-- MUOHpbuz6xwaVaIZRsCK
  +-- OpaGjj8wCY2P0h0ad8Cf
  +-- PK1u3qhukJP9msiRSFE3
  +-- PT1yKdnzjMe000HEN7ty
  +-- Sc1sxXAS8NxXw9ybevC
  +-- TGBjC0266wy127yyYZ5f
  +-- XKuebaw7jQtbo98222q2
  +-- ZVyqMzBPX20SG6mKnWFc
  +-- m87puWkRn4HrS2JHfLne
```

On the right side of the document view, there is a detailed preview of the data:

- email: "jithin@gmail.com"
- message: "looks like the error still persist"
- time: 2 December 2023 at 15:55:38 UTC+5:30

At the bottom left, it says 'Database location: asia-south1'. The top right of the screen shows standard Firebase navigation icons.

# CHAPTER 5

## IMPLEMENTATION DETAILS

### 5.1 SYSTEM REQUIREMENT SPECIFICATIONS

#### 5.1.1. Hardware Specification

- CPU: Intel Core i7 9750h
- Memory: 8GB
- Cache: 12 MB
- Hard Disk: 512 GB
- Display: 15" Monitor
- Keyboard: Standard Keyboard
- Mouse: Standard Mouse

#### 5.1.2. Software Specification

- Operating System: Windows OS, macOS
- Front End: Flutter
- Back End: Firebase

### **5.1.3. Front End**

#### Flutter

Flutter, developed by Google, has emerged as a powerful framework for cross-platform app development, offering a unified solution for creating applications on mobile, web, and desktop platforms. Utilizing the Dart programming language, Flutter enables developers to write code once and deploy it seamlessly across diverse environments, reducing the complexity associated with managing multiple codebases.

At the core of Flutter's success is its widget-based architecture, where every element, from buttons to entire screens, is treated as a widget. This approach provides a high level of customization, allowing developers to design cohesive and visually appealing user interfaces. The flexibility of widgets not only enhances the creative aspect of app development but also ensures consistency across different platforms.

A standout feature of Flutter is its "Hot Reload" capability. This allows developers to see real-time changes in the application as they modify the code, eliminating the need for time-consuming restarts. The rapid feedback loop facilitated by Hot Reload enhances productivity, making the development process more efficient, particularly for beginners who can experiment and iterate quickly.

In the realm of project development, Flutter's robust and growing community stands out as a valuable asset. The community actively contributes to the improvement of the framework, providing a vast repository of tutorials, documentation, and forums.

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### 5.1.4. Back End

#### Firebase

Firebase, developed by Google, is a versatile platform offering essential services for streamlined project development. The Realtime Database is a key feature, allowing for seamless real-time data storage and synchronization, fostering collaboration and ensuring a responsive user experience.

Firebase Authentication simplifies user sign-ins with secure methods like email/password, social logins, and custom authentication systems. This ensures robust data security and provides a smooth user experience during login.

Firebase Cloud Functions enables server-side code execution in response to events triggered by Firebase or HTTPS requests. This serverless approach streamlines backend logic implementation without the need for server infrastructure management.

Firebase Hosting provides a reliable solution for deploying web applications globally, featuring a Content Delivery Network for low-latency access. The seamless integration with other Firebase services offers a unified platform, addressing both frontend and backend needs for efficient project development.

## 5.2. SYSTEM IMPLEMENTATION

The chat app is built using Flutter and Dart for the frontend, connecting to Firebase for the backend services. Firebase Authentication ensures secure user sign-in, and the Realtime Database facilitates efficient data storage and retrieval.

User-defined Dart functions interact with Firebase services, handling actions like sending messages through the Flutter app. Real-time updates are achieved through Flutter's reactive framework, providing users with immediate message delivery.

The Flutter app communicates seamlessly with Firebase using Dart, offering a dynamic user interface and real-time updates. Dart's asynchronous programming ensures swift data handling for instant user feedback.

Firebase's Realtime Database efficiently stores and retrieves chat messages, streamlining user interactions. This integration of Dart, Flutter, and Firebase creates a secure and responsive chat application that meets modern expectations for dynamic digital communication.

In summary, the Flutter and Dart-based chat app seamlessly integrates with Firebase, ensuring secure authentication and real-time communication for an enhanced user experience.

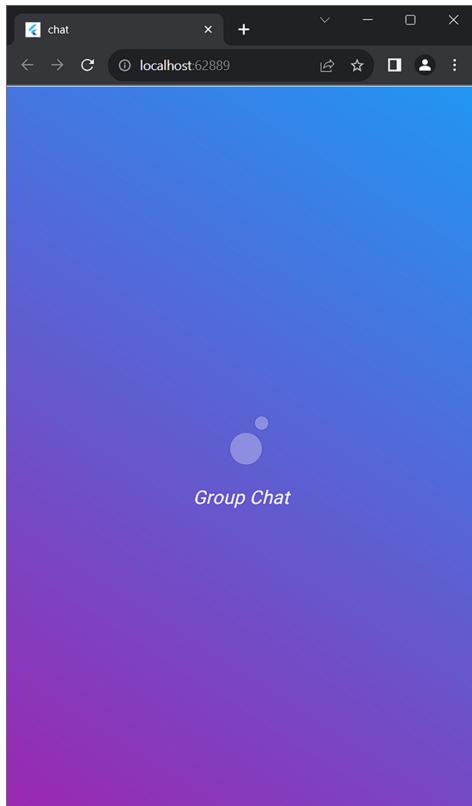
# CHAPTER 6

## RESULT

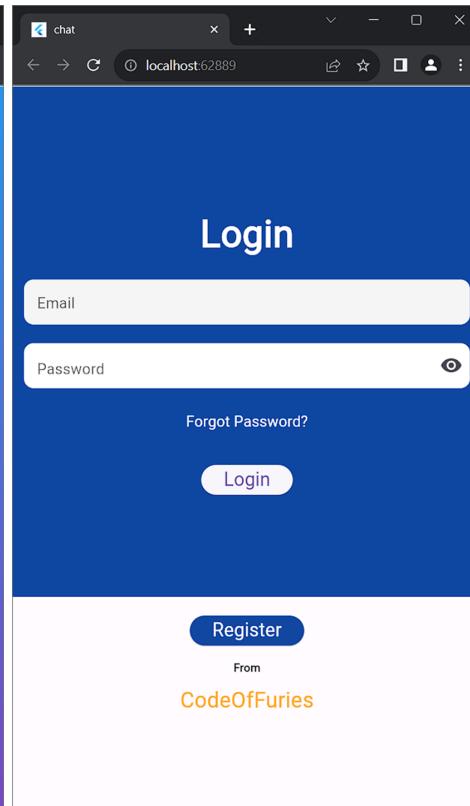
We have successfully developed a global chat application that revolutionizes the way users connect and communicate seamlessly through their mail accounts. The primary objective of this project is to offer users a convenient and accessible platform for simultaneous chatting, integrating the familiarity of email accounts. This innovative application not only enhances user experience but also ensures the security of sensitive conversations and information. By leveraging advanced technology, the chat app reduces manual efforts, improves communication accuracy, and accelerates message processing times. This transformative project positions our application as a competitive player in the market, providing users with novel features and a modernized approach to global communication. It represents a significant investment for any entity seeking to adapt and excel in the dynamic landscape of digital communication.

### APP PAGES

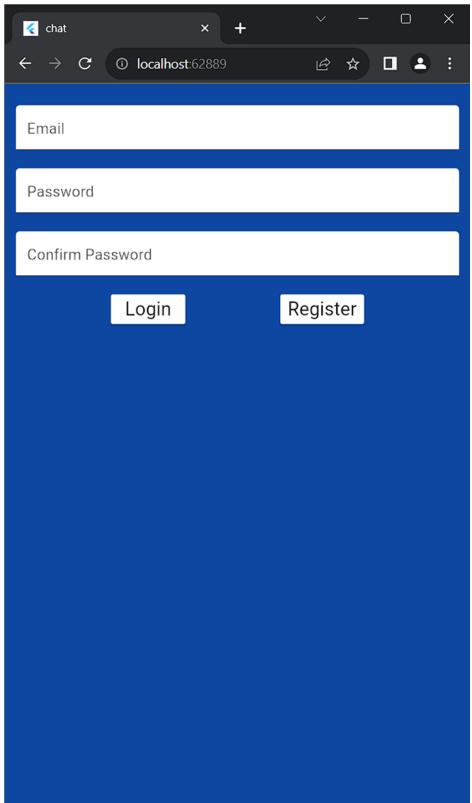
SPLASH SCREEN



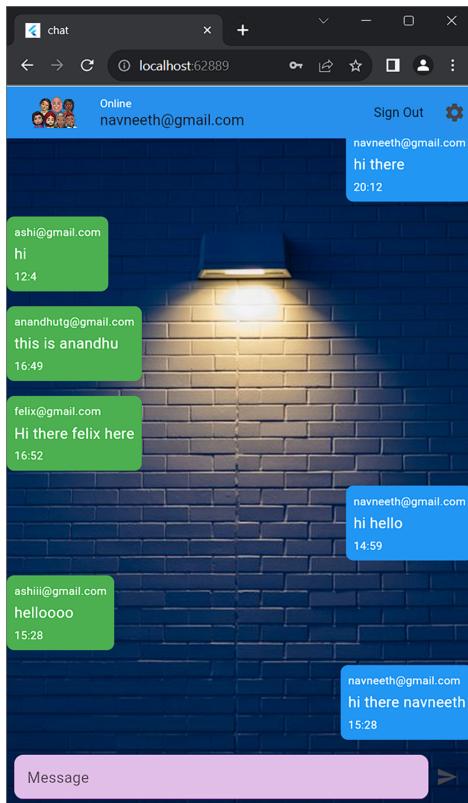
LOGIN SCREEN



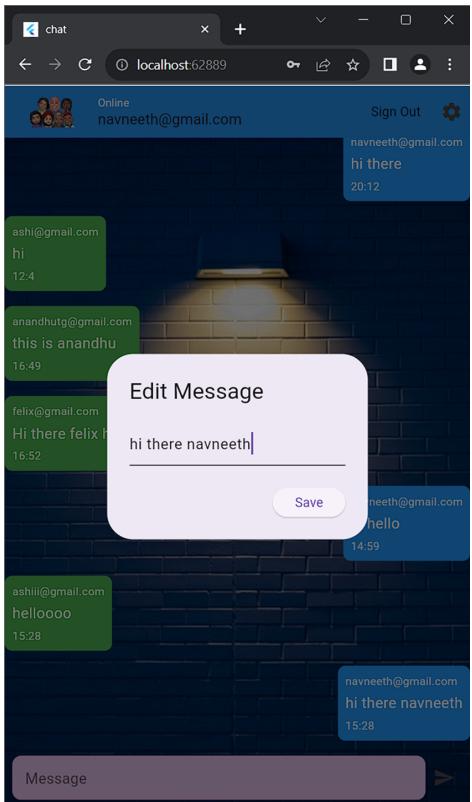
## REGISTER SCREEN



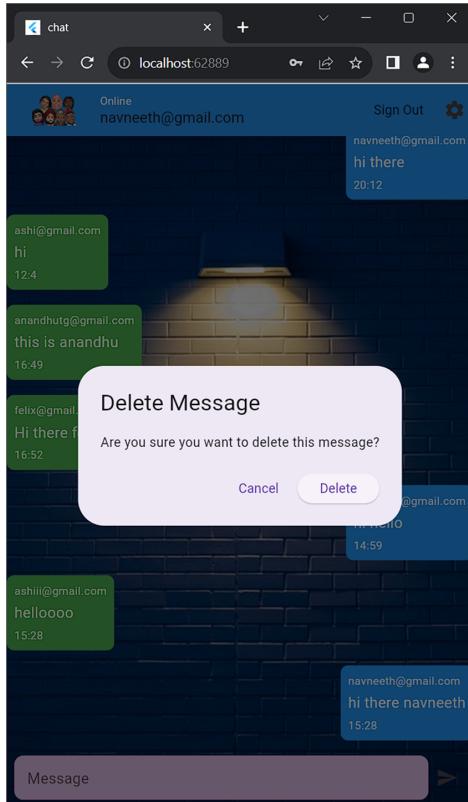
## CHAT SCREEN



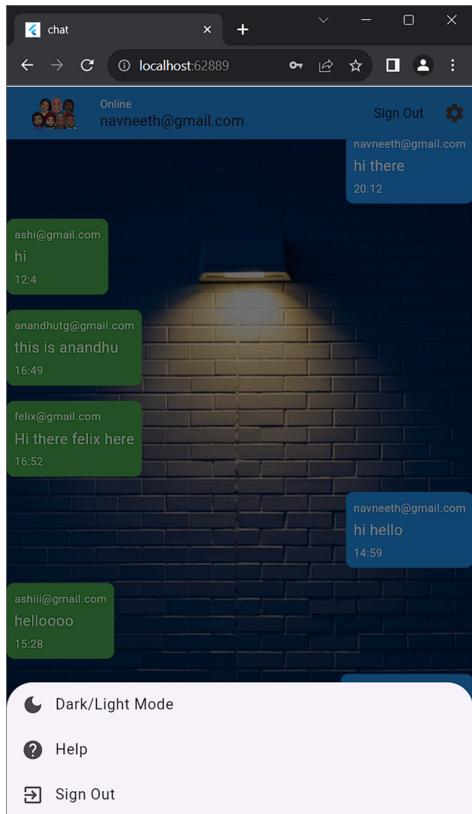
## EDIT MESSAGE



## DELETE MESSAGE



## SETTINGS SCREEN



## **SAMPLE CODE**

```
import 'package:chatapp1/screen/splash_screen.dart';
import 'package:firebase_core/firebase_core.dart';
import 'package:flutter/material.dart';
import 'login.dart';

//Future<void>
void main() async {
  WidgetsFlutterBinding.ensureInitialized();
  //await Firebase.initializeApp();
  await Firebase.initializeApp(
    options: FirebaseOptions(
      apiKey: "AIzaSyCjCNOY0abNhUClXjnRyWHudHiWHLIp76I",
      appId: "1:145987851812:web:65eca1d6e5dc57d0ba6ab1",
      messagingSenderId: "145987851812",
      projectId: "chat-app-16606",
    )));
  runApp(MyApp());
}

class MyApp extends StatefulWidget {
  const MyApp({Key? key}) : super(key: key);

  @override
  _MyAppState createState() => _MyAppState();
}

class _MyAppState extends State<MyApp> {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'chat',
      theme: ThemeData(
        primaryColor: Colors.orange[900],
      ),
      home: SplashScreen(),
      debugShowCheckedModeBanner: false,
    );
  }
}
```

# CONCLUSION

The need for a well organized chating has been analysed and understood. A solid group chatting facility have been implemented. Its main features are:

**Real-time Communication:** The ability to engage in instant interactions with multiple participants is crucial for effective collaboration and decision-making. Traditional communication methods often introduce delays and hinder the flow of conversation.

**Cross-Platform Accessibility:** A group chat facility should be accessible from a variety of devices, allowing users to participate from the platform of their choice. This ensures that everyone can stay connected regardless of their access to technology.

**User-Friendly Interface:** The platform should be easy to use and navigate, even for those with limited technological experience. A straightforward interface encourages participation and makes the platform accessible to a wider audience.

**Scalability and Reliability:** The facility should be able to accommodate a large number of users and handle a high volume of messages without compromising performance or reliability. This ensures that the platform can support the needs of growing communities and organizations.

**Security and Privacy:** Protecting user data and ensuring the privacy of conversations is paramount. The platform should implement robust security measures to safeguard sensitive information and prevent unauthorized access.

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