

NAAN MUDHALVAN PROJECT REPORT

ANDROID APPLICATION DEVELOPMENT

A REAL TIME CHAT AND COMMUNICATION APP

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ANDROID APPLICATION DEVELOPMENT

CHATCONNECT – A REAL TIME CHAT AND COMMUNICATION APP.

Here's a detailed explanation of a **Chat Application Project** developed in **Android Studio** using **Kotlin**, with features like a login page, registration page, and a chat interface.

Project Overview:

Objective:

The Chat App allows users to register, log in, and engage in real-time communication with other users through a secure and user-friendly interface.

Key Features:

1. User Authentication (Login and Registration):

- Users can create an account with an email and password.
- Firebase Authentication ensures secure login and registration.
- Validation for email format and password strength.

2. Real-Time Messaging:

- One-to-one chat functionality with instant message updates.
- Messages are stored and retrieved in real-time using Firebase Realtime Database.

3. User List and Status:

- Displays a list of all registered users.
- Includes online/offline status using Firebase Realtime Database.

4. Profile Management:

- Users can set a profile picture and a status message.
- Profile updates are stored in Firebase Storage and Database.

5. Modular and Intuitive Design:

- Built using Kotlin with clear separation of concerns (MVVM architecture).
- Clean UI for better user experience, following Material Design guidelines.

Technologies Used:

- ❖ Programming Language: Kotlin
- ❖ Backend: Firebase (Authentication, Realtime Database, Storage)
- ❖ Libraries Glide/Picasso: For profile picture loading.
- ❖ Retrofit: For external API integration (if adding features like weather in chat).
- ❖ Firebase Cloud Messaging (FCM): For push notifications.
- ❖ Material Design Components: For creating modern and intuitive UI.

Core Functionalities:

1. User Authentication:

- Registration: Users sign up with email and password.
- Login: Validates user credentials against Firebase Authentication.
- Password Reset: Allows users to reset their password via email.

2. Chat Interface:

- Real-time message syncing with Firebase Realtime Database.
- Timestamp for each message.
- Message read/unread indicators.

3. User List and Search:

- Displays all registered users dynamically fetched from Firebase.

- Search functionality to find specific users.

4. Profile Management:

- Option to upload a profile picture (stored in Firebase Storage).
- Update status message or bio.

5. Push Notifications:

- Notifications for new messages using Firebase Cloud Messaging (FCM).

Project Structure:

1. Activities/Fragments:

- LoginActivity: Handles user login.
- RegistrationActivity: Facilitates new user registration.
- ChatActivity: Displays chat interface for one-to-one messaging.
- UserListFragment: Shows the list of users.
- ProfileFragment: Allows users to update their profile.

2. Data Layer:

- FirebaseManager: Manages Firebase Authentication, Realtime Database, and Storage interactions.
- Models: User, Message (defines the structure for Firebase data).

3. UI Layer:

- Material Design components for buttons, text fields, and navigation.
- RecyclerView for displaying chats and user lists.

Code Snippet Examples

1.sign up.kt

```
package com.vivek.chatingapp.ui.registration
```

```
import android.content.Intent
import android.content.SharedPreferences
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import com.vivek.chatingapp.databinding.ActivityRegistrationBinding
import com.vivek.chatingapp.ui.main.MainActivity
import com.vivek.chatingapp.utils.Constant
import dagger.hilt.android.AndroidEntryPoint
import javax.inject.Inject
```

```
@AndroidEntryPoint
```

```
class RegistrationActivity : AppCompatActivity() {
```

```
    private lateinit var binding: ActivityRegistrationBinding
```

```
    @Inject
```

```
    lateinit var pref: SharedPreferences
```

```
    override fun onCreate(savedInstanceState: Bundle?) {
```

```
        super.onCreate(savedInstanceState)
```

```
        binding = ActivityRegistrationBinding.inflate(layoutInflater)
```

```
        setContentView(binding.root)
```

```
        if (pref.getBoolean(Constant.KEY_IS_SIGNED_IN,false)){
```

```
            val intent = Intent(this, MainActivity::class.java)
```

```
            intent.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TASK)
```

```
        intent.addFlags(Intent.FLAG_ACTIVITY_NEW_TASK)
        startActivity(intent)
    }

}

}
```

2.Log in.kt

Package com.vivek.chatingapp.ui.registration.signin

```
Import android.content.Intent
Import android.os.Bundle
Import androidx.fragment.app.Fragment
Import android.view.View
Import androidx.fragment.app.viewModels
Import androidx.navigation.fragment.findNavController
Import com.vivek.chatingapp.ui.main.MainActivity
Import com.vivek.chatingapp.R
Import com.vivek.chatingapp.databinding.SignInFragmentBinding
Import com.vivek.chatingapp.utils.*
Import dagger.hilt.android.AndroidEntryPoint
```

@AndroidEntryPoint

```
Class SignInFragment : Fragment(R.layout.sign_in_fragment) {
```

```
    Private val viewModel: SignInViewModel by viewModels()
```

Private lateinit var binding: SignInFragmentBinding

Override fun onCreateView(view: View, savedInstanceState: Bundle?) {

 Super.onCreateView(view, savedInstanceState)

 Binding = SignInFragmentBinding.bind(view)

 setOnClickListener()

 setObserver()

}

Private fun setObserver() {

 viewModel.signIn.observe(viewLifecycleOwner){ it ->

 when(it){

 is Resource.Success -> {

 loading(false)

 requireContext().toast("Sign In Successfully!")

 viewModel.clearSignInData()

 val intent = Intent(requireActivity(), MainActivity::class.java)

 intent.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TASK)

 intent.addFlags(Intent.FLAG_ACTIVITY_NEW_TASK)

 startActivity(intent)

 }

 is Resource.Error -> {

```

        Loading(false)

        It.message?.let {
            requireContext().toast(it)
        }

        viewModel.clearSignInData()
    }

    Is Resource.Loading -> {
        Loading(true)
    }

    Is Resource.Empty -> {

    }

}

}

}

```

```

Private fun setClickListener(){

```

```

    Binding.tvCreateNewAccount.setOnClickListener {
        findNavController().navigate(R.id.action_signInFragment_to_signUpFragment) }

```

```

Binding.btnSignIn.setOnClickListener {
    If (isValidSignInDetails()){
        signIn()
    }
}

```



```
}  
}
```

```
Private fun isValidSignInDetails(): Boolean {  
    If (binding.etEmail.isFiledIsEmpty()) {  
        requireContext().toast("Please Enter Email")  
        return false  
    }  
    If (!binding.etEmail.getText().isValidEmail()) {  
        requireContext().toast("Please Enter Valid Email")  
        return false  
    }  
    If (binding.etPassword.isFiledIsEmpty()) {  
        requireContext().toast("Please Enter Password")  
        return false  
    }  
    Return true  
}
```

```
Private fun signIn(){  
    viewModel.signIn(binding.etEmail.getText(),binding.etPassword.getText())  
}
```

```
Private fun loading(isLoading: Boolean) {  
    If (isLoading) {
```

```

        Binding.btnSignIn.invisible()

        Binding.pbSignIn.visible()
    } else {

        Binding.btnSignIn.visible()

        Binding.pbSignIn.gone()
    }
}

}

3.log in.xml
<?xml version="1.0" encoding="utf-8"?>

<ScrollView xmlns:android=http://schemas.android.com/apk/res/android

    xmlns:app=http://schemas.android.com/apk/res-auto

    xmlns:tools=http://schemas.android.com/tools

    Android:layout_width="match_parent"

    Android:layout_height="match_parent"

    Android:clipToPadding="false"

    Android:overScrollMode="never"

    Android:background="@color/primary"

    Android:padding="@dimen/_24sdp"

    Android:scrollbars="none"

    Tools:context=".ui.registration.signin.SignInFragment">

<androidx.constraintlayout.widget.ConstraintLayout

    Android:layout_width="match_parent"

    Android:layout_height="wrap_content">

```

```
<TextView
    Android:id="@+id/tvWelcomeBack"
    Android:layout_width="wrap_content"
    Android:layout_height="wrap_content"
    Android:layout_marginTop="@dimen/_40sdp"
    Android:text="@string/welcome_back"
    Android:textColor="@color/white"
    Android:fontFamily="@font/nimbus_san_bolt"
    Android:textSize="@dimen/_18ssp"
    Android:textStyle="bold"
    App:layout_constraintEnd_toEndOf="parent"
    App:layout_constraintStart_toStartOf="parent"
    App:layout_constraintTop_toTopOf="parent" />
```

```
<TextView
    Android:id="@+id/tvLogin"
    Android:layout_width="wrap_content"
    Android:layout_height="wrap_content"
    Android:layout_marginTop="@dimen/_4sdp"
    Android:text="@string/login_to_continue"
    Android:fontFamily="@font/nimbus_san_bolt"
    Android:textColor="@color/light_gray"
    Android:textSize="@dimen/_12ssp"
    Android:textStyle="bold"
    App:layout_constraintEnd_toEndOf="parent"
```

App:layout_constraintStart_toStartOf="parent"

App:layout_constraintTop_toBottomOf="@id/tvWelcomeBack" />

<EditText

Android:id="@+id/etEmail"

Android:layout_width="0dp"

Android:layout_height="@dimen/_45sdp"

Android:layout_marginTop="@dimen/_40sdp"

Android:background="@drawable/background_input"

Android:hint="@string/email"

Android:imeOptions="actionNext"

Android:importantForAutofill="no"

Android:inputType="textEmailAddress"

Android:paddingHorizontal="@dimen/_16sdp"

Android:textColor="@color/primary_text"

Android:textSize="@dimen/_13ssp"

App:layout_constraintEnd_toEndOf="parent"

App:layout_constraintStart_toStartOf="parent"

App:layout_constraintTop_toBottomOf="@+id/tvLogin" />

<EditText

Android:id="@+id/etPassword"

Android:layout_width="0dp"

Android:layout_height="@dimen/_45sdp"

Android:layout_marginTop="@dimen/_16sdp"

Android:background="@drawable/background_input"

```
Android:hint="@string/password"
Android:imeOptions="actionDone"
Android:importantForAutofill="no"
Android:inputType="textPassword"
Android:paddingHorizontal="@dimen/_16sdp"
Android:textColor="@color/primary_text"
Android:textSize="@dimen/_13ssp"
App:layout_constraintEnd_toEndOf="parent"
App:layout_constraintStart_toStartOf="parent"
App:layout_constraintTop_toBottomOf="@+id/etEmail" />
```

```
<com.google.android.material.button.MaterialButton
```

```
    Android:id="@+id/btnSignIn"
    Android:layout_width="match_parent"
    Android:layout_height="@dimen/_50sdp"
    Android:layout_marginTop="@dimen/_20sdp"
    Android:text="@string/sign_in"
    Android:textColor="@color/dark_black"
    Android:textSize="@dimen/_13ssp"
    Android:textStyle="bold"
    App:backgroundTint="@color/light_pink"
    App:cornerRadius="@dimen/_8sdp"
    App:layout_constraintEnd_toEndOf="parent"
    App:layout_constraintStart_toStartOf="parent"
    App:layout_constraintTop_toBottomOf="@+id/etPassword" />
```

```
<ProgressBar
    Android:id="@+id/pbSignIn"
    Android:layout_width="@dimen/_25sdp"
    App:layout_constraintTop_toTopOf="@+id/btnSignIn"
    App:layout_constraintEnd_toEndOf="@+id/btnSignIn"
    App:layout_constraintStart_toStartOf="@+id/btnSignIn"
    App:layout_constraintBottom_toBottomOf="@+id/btnSignIn"
    Android:visibility="gone"
    Tools:visibility="visible"
    Android:layout_height="@dimen/_25sdp"/>
```

```
<TextView
    Android:id="@+id/tvCreateNewAccount"
    Android:layout_width="wrap_content"
    Android:layout_height="wrap_content"
    Android:layout_marginTop="@dimen/_30sdp"
    Android:text="@string/create_new_account"
    Android:textColor="@color/white"
    Android:textStyle="bold"
    App:layout_constraintEnd_toEndOf="parent"
    App:layout_constraintStart_toStartOf="parent"
    App:layout_constraintTop_toBottomOf="@+id/btnSignIn" />
```

```
</androidx.constraintlayout.widget.ConstraintLayout>
```

```
</ScrollView>
```

4.sign up.xml

```
<?xml version="1.0" encoding="utf-8"?>

<ScrollView xmlns:android=http://schemas.android.com/apk/res/android

    xmlns:app=http://schemas.android.com/apk/res-auto

    xmlns:tools=http://schemas.android.com/tools

    Android:layout_width="match_parent"

    Android:layout_height="match_parent"

    Android:clipToPadding="false"

    Android:background="@color/primary"

    Android:overScrollMode="never"

    Android:padding="@dimen/_24sdp"

    Android:scrollbars="none">

    <androidx.constraintlayout.widget.ConstraintLayout

        Android:layout_width="match_parent"

        Android:layout_height="wrap_content">

        <TextView

            Android:id="@+id/tvCreateNewAccount"

            Android:layout_width="wrap_content"

            Android:layout_height="wrap_content"

            Android:layout_marginTop="@dimen/_20sdp"

            Android:fontFamily="@font/nimbus_san_bolt"

            Android:text="@string/create_new_account"

            Android:textColor="@color/white"

            Android:textSize="@dimen/_18ssp"
```

```
Android:textStyle="bold"  
App:layout_constraintEnd_toEndOf="parent"  
App:layout_constraintStart_toStartOf="parent"  
App:layout_constraintTop_toTopOf="parent" />
```

```
<com.makeramen.roundedimageview.RoundedImageView  
    Android:id="@+id/ivProfile"  
    Android:layout_width="@dimen/_80sdp"  
    Android:layout_height="@dimen/_80sdp"  
    Android:layout_marginTop="@dimen/_20sdp"  
    Android:background="@drawable/background_image"  
    Android:scaleType="centerCrop"  
    App:layout_constraintEnd_toEndOf="parent"  
    App:layout_constraintStart_toStartOf="parent"  
    App:layout_constraintTop_toBottomOf="@+id/tvCreateNewAccount"  
    App:riv_oval="true" />
```

```
<TextView  
    Android:id="@+id/tvAddImage"  
    Android:layout_width="wrap_content"  
    Android:layout_height="wrap_content"  
    Android:fontFamily="@font/dexapro_narrow_medium"  
    Android:text="@string/add_image"  
    Android:textColor="@color/secondary_text"  
    Android:textSize="@dimen/_10ssp"  
    App:layout_constraintBottom_toBottomOf="@id/ivProfile"
```



```
App:layout_constraintEnd_toEndOf="@id/ivProfile"  
App:layout_constraintStart_toStartOf="@id/ivProfile"  
App:layout_constraintTop_toTopOf="@+id/ivProfile" />
```

```
<EditText
```

```
    Android:id="@+id/etName"  
    Android:layout_width="0dp"  
    Android:layout_height="@dimen/_45sdp"  
    Android:layout_marginTop="@dimen/_20sdp"  
    Android:background="@drawable/background_input"  
    Android:hint="@string/name"  
    Android:imeOptions="actionNext"  
    Android:importantForAutofill="no"  
    Android:inputType="textPersonName"  
    Android:paddingHorizontal="@dimen/_16sdp"  
    Android:textColor="@color/primary_text"  
    Android:textSize="@dimen/_13ssp"  
    App:layout_constraintEnd_toEndOf="parent"  
    App:layout_constraintStart_toStartOf="parent"  
    App:layout_constraintTop_toBottomOf="@id/ivProfile" />
```

```
<EditText
```

```
    Android:id="@+id/etEmail"  
    Android:layout_width="0dp"  
    Android:layout_height="@dimen/_45sdp"  
    Android:layout_marginTop="@dimen/_16sdp"
```

```
Android:background="@drawable/background_input"
Android:hint="@string/email"
Android:imeOptions="actionNext"
Android:importantForAutofill="no"
Android:inputType="textEmailAddress"
Android:paddingHorizontal="@dimen/_16sdp"
Android:textColor="@color/primary_text"
Android:textSize="@dimen/_13ssp"
App:layout_constraintEnd_toEndOf="parent"
App:layout_constraintStart_toStartOf="parent"
App:layout_constraintTop_toBottomOf="@+id/etName" />
```

```
<EditText
```

```
Android:id="@+id/etPassword"
Android:layout_width="0dp"
Android:layout_height="@dimen/_45sdp"
Android:layout_marginTop="@dimen/_16sdp"
Android:background="@drawable/background_input"
Android:hint="@string/password"
Android:imeOptions="actionNext"
Android:importantForAutofill="no"
Android:inputType="textPassword"
Android:paddingHorizontal="@dimen/_16sdp"
Android:textColor="@color/primary_text"
Android:textSize="@dimen/_13ssp"
App:layout_constraintEnd_toEndOf="parent"
```

```
App:layout_constraintStart_toStartOf="parent"  
App:layout_constraintTop_toBottomOf="@+id/etEmail" />
```

```
<EditText
```

```
    Android:id="@+id/etConfirmPassword"  
    Android:layout_width="0dp"  
    Android:layout_height="@dimen/_45sdp"  
    Android:layout_marginTop="@dimen/_16sdp"  
    Android:background="@drawable/background_input"  
    Android:hint="@string/confirm_password"  
    Android:imeOptions="actionDone"  
    Android:importantForAutofill="no"  
    Android:inputType="textPassword"  
    Android:paddingHorizontal="@dimen/_16sdp"  
    Android:textColor="@color/primary_text"  
    Android:textSize="@dimen/_13ssp"  
    App:layout_constraintEnd_toEndOf="parent"  
    App:layout_constraintStart_toStartOf="parent"  
    App:layout_constraintTop_toBottomOf="@+id/etPassword" />
```

```
<ProgressBar
```

```
    Android:id="@+id/pbSignUp"  
    Android:layout_width="@dimen/_25sdp"  
    Android:layout_height="@dimen/_25sdp"  
    Android:visibility="gone"  
    App:layout_constraintBottom_toBottomOf="@+id/btnSignUp"
```

```
App:layout_constraintEnd_toEndOf="@+id/btnSignUp"  
App:layout_constraintStart_toStartOf="@+id/btnSignUp"  
App:layout_constraintTop_toTopOf="@+id/btnSignUp"  
Tools:visibility="visible" />
```

```
<com.google.android.material.button.MaterialButton  
    Android:id="@+id/btnSignUp"  
    Android:layout_width="match_parent"  
    Android:layout_height="@dimen/_50sdp"  
    Android:layout_marginTop="@dimen/_16sdp"  
    Android:text="@string/sign_up"  
    Android:textColor="@color/dark_black"  
    Android:textSize="@dimen/_13ssp"  
    Android:textStyle="bold"  
    App:backgroundTint="@color/light_pink"  
    App:cornerRadius="@dimen/_8sdp"  
    App:layout_constraintEnd_toEndOf="parent"  
    App:layout_constraintStart_toStartOf="parent"  
    App:layout_constraintTop_toBottomOf="@+id/etConfirmPassword" />
```

```
<TextView  
    Android:id="@+id/tvSignIn"  
    Android:layout_width="wrap_content"  
    Android:layout_height="wrap_content"  
    Android:layout_marginTop="@dimen/_10sdp"
```

Android:text="@string/sign_in"

Android:textColor="@color/white"

Android:textStyle="bold"

App:layout_constraintEnd_toEndOf="parent"

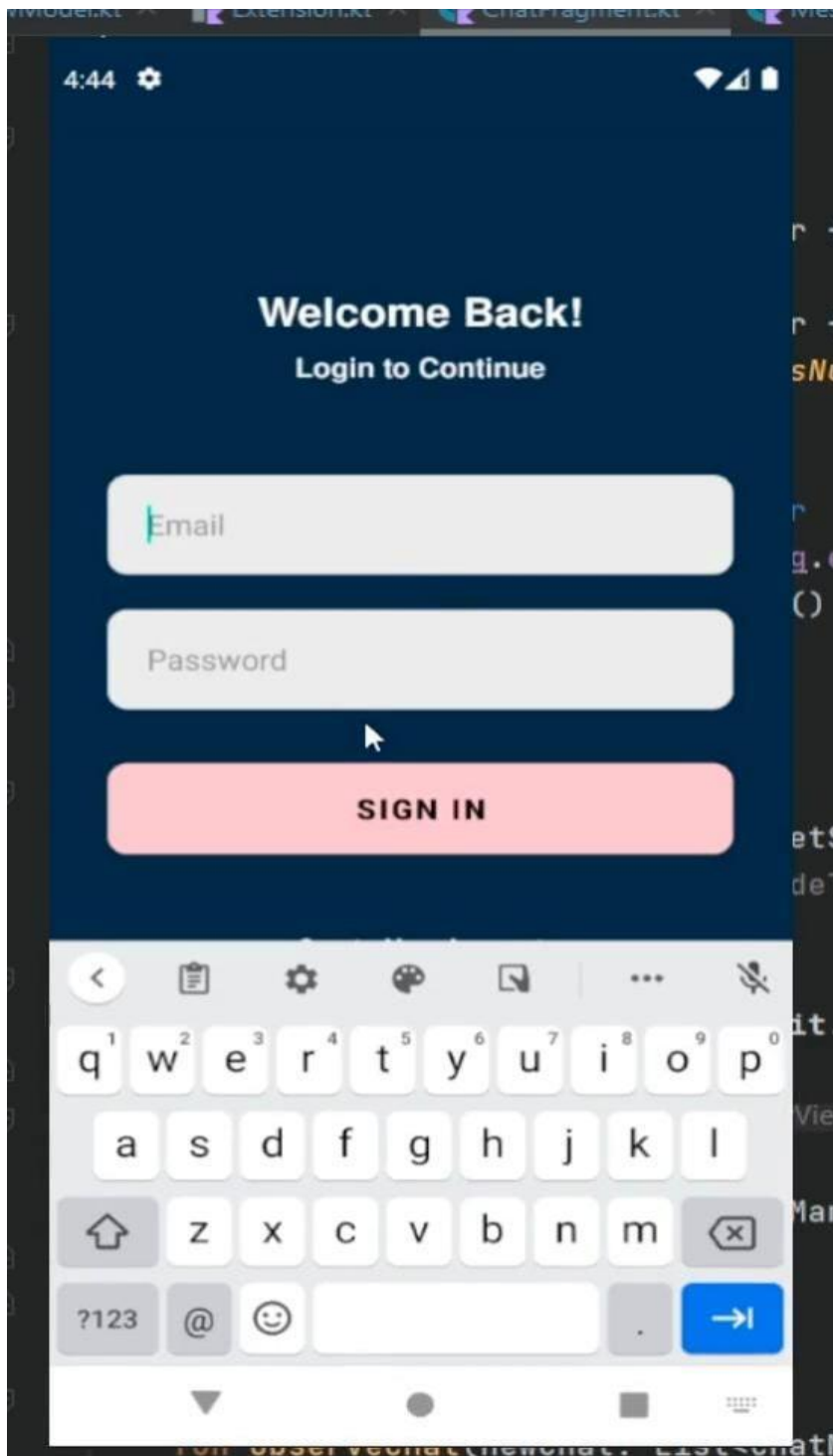
App:layout_constraintStart_toStartOf="parent"

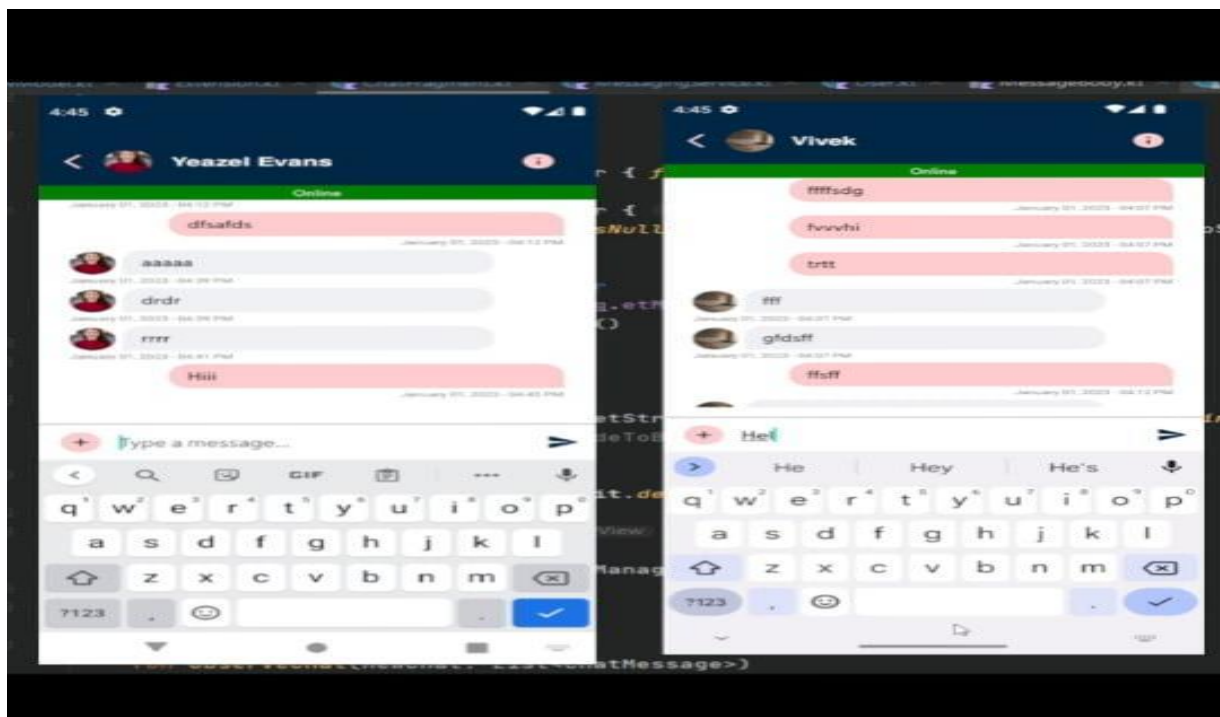
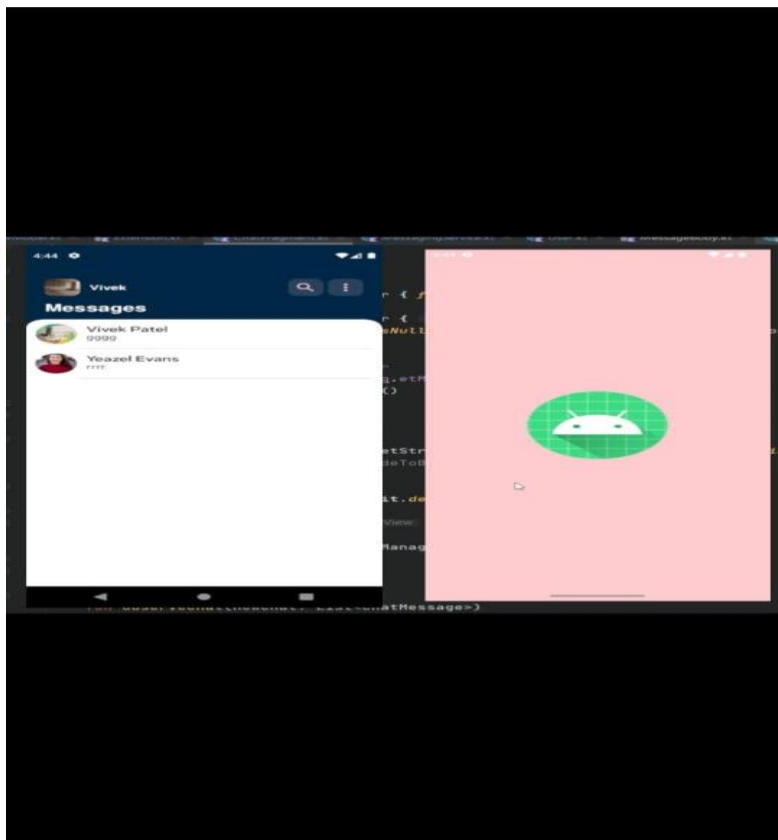
App:layout_constraintTop_toBottomOf="@+id/btnSignUp" />

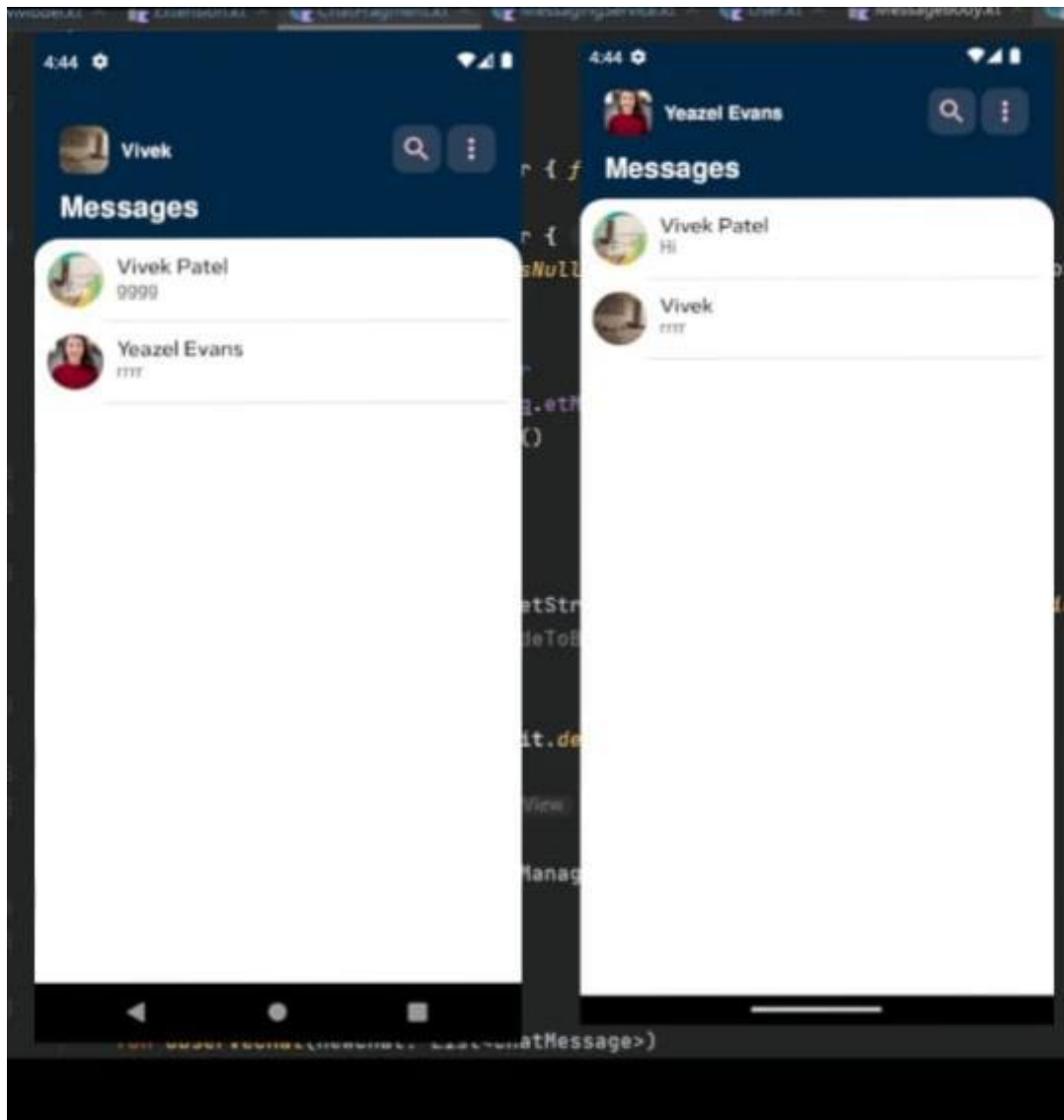
</androidx.constraintlayout.widget.ConstraintLayout>

</ScrollView>

OUTPUT:







Enhancements to Consider:

1. **Group Chats:** Add support for group conversations.
 2. **Media Sharing:** Allow users to share images and files.
 3. **Message Encryption:** Implement end-to-end encryption for privacy.
 4. **Themes:** Provide dark mode for better user experience.
-

This project provides a strong foundation for building a modern and secure chat application, showcasing skills in Kotlin, Firebase integration, and Android app development.