CHAT CONNECT-A REAL-TIME CHAT AND COMMUNICATION APP

- **Introduction**

Real-time chat is virtually any online communication that provides a real-time or live transmission of text messages from sender to receiver. A variety of software programs are available to enable real-time chat between individuals using Internet services.

- **Overview**

A chat application makes it easy to communicate with people anywhere in the world by sending and receiving messages in real time. With a web or mobile chat app, users are able to receive the same engaging and lively interactions through custom messaging features, just as they would in person. This also keeps users conversing on your platform instead of looking elsewhere for a messaging solution. Whether it's private chat, group chat, or large scale chat, adding personalized chat features to your app can help ensure that your users have a memorable experience. This is a quick and effective registration method, but limits users to a single, specific device.

A digital chat app that’s composed of real-time messaging features enables users to have an authentic and interactive experience.

Features like message reactions, stickers, emojis, GIFs, provide a way to engage your users directly on your app instead of external platforms–creating a more connected experience.

Other functionalities like identifying active users, push notifications, and message history—to name a few—also add to that immediacy by automatically detecting the presence of users in a real-time chat application.

Feasibility study is the preliminary study undertaken before the real work of the project starts to ascertain the like hood of the project success. It analyses the possible solutions to a problem and a recommendation on the best solutions to use. It involves the evaluation that how the solution will fit into the corporation.

A Feasibility study is defined as a evolution or analysis of the potential impacts of a proposed project or system. A feasibility study is conducted to assist decision makers in determining whether or not to implement a particular project or system. On the basis of result of the initial study, feasibility study takes place. The feasibility study is basically the proposed system in the lights of its workability, meeting user requirements, and effective use of resources and of course, cost effectiveness. The main goal of feasibility study is not to solve the problem but to achieve this scope.

In the process of feasibility study, the cost and benefits are estimated with the greater accuracy. It evaluates the benefits of the new system.

The feasibility study will contain the extensive data related to financial and operational impact and will include advantage and disadvantages of both current situation and plan.

The aim of feasibility study is to see whether it is possible to develop a reasonable cost. At the end of feasibility study a decision is taken whether or proceed or not.

Feasibility study is to determine various solution of the problem and then picking up one of the best solutions. It is the measure of how beneficial the development of 13 information system will be to an organization. The study also shows the sensitivity of business to change in the basic assumption.

For any system if the expected benefits equal or exceed the expected costs, the system can be judged to be economically feasible.

In economic feasibility, cost benefit analysis is done in which expected costs and benefits are evaluated. Economic analysis is used for evaluating the effectiveness of the proposed system. In this type of feasibility study, the most important is cost and benefit analysis. As the name suggests, it is as analysis of the costs to be incurred in the system and benefits derivable out of the system.

The affect that a proposed system may have on the social system in the project environment is addressed in the social feasibility. It may happen that particular category of employees may be short or not available as a result of ambient structure. The influence on the social status of the participants by the project

should be evaluated on order to guarantee compatibility. It must be identified that the employees in the particular industries may have specific status symbols within the society.

Maintenance is a very crucial part for the success of an application. Proper maintenance and updation of the application make it smooth for working and usage, and it also keeps the users satisfied.

Maintenance is done mainly for 2 reasons; first, to correct some software errors which may occur making changes in the application or when the user is facing some problems and other is to enhance the software capabilities according to user needs and requirements.

Maintenance always comes after the application has been successfully implemented and launched. At the start, the maintenance takes time as it has to be updated and changed time to time, but after a certain point of time, it becomes manageable. The starting maintenance process mostly lets us know where errors may mostly occur, which are then corrected. Maintenance is one of the important stages of SDLC. It is basically done for estimation, controlling and making modification to implemented system.

Once the text body has been filled in, the programme uses the XSalsa20 encryption technique to encrypt it, and the Poly1305

verification key computation method to generate the MAC. Having a unique password and nonce for every message increases security since if one key is discovered, it will not be used to decrypt prior communications. In order to send a secure communication, the user's session key must be used to secure communications.

MAC comparisons are used to determine whether the secured text matches the receiving one once it has been received from FCM. Otherwise, the originator session key is used to decode it if the outputs aren't exactly the same. The message content is then checked in the similar manner as the message headers. The text may now be decrypted with the help of the key and nonce. In order to show the text, the message is first encrypted and saved locally.

The demand of chatting and texting apps is on the rise. This is due to the fact that individuals enjoy chit-chatting. When it comes to working with a coworker or looking in on a love one, texting is the preferable means of communication.

Communities can be built using chatting and texting apps that other kinds of communication can't.

Real-time chat platform architectural design may be a daunting challenge to grasp. It's a job we've done before, so we're confident in our ability to do it. We'll crumble the structure of a messaging service in this post to help you figure out the best

method for integrating chat into application or site.

In order to protect the internal memory key from unauthorized users or other apps, a passcode lock should be activated first before app can be started to establish a Keystore that serves as a safe box to keep it.

Just one gadget may be associated with each login, which is identified by the device id. Username and password are also one-of-a-kind features.

To create a new account, you must provide your name, email address, and password. The XSalsa20 method is used to secure the key, which is subsequently provided to the server along with the login details. User IDs are generated by the server when verification is complete. After that, the client program receives an acceptance message for registration process, and the customer data is saved locally.

You must be familiar with the feeling when your chat partner asks more than one question right after another, so you always have to address in your reply which question you are answering at the moment. This slows down the chatting process and it also gives opportunity for big misunderstandings.

- **Purpose**

A chat application makes it easy to communicate with people anywhere in the world by sending and receiving messages in real time. With a web or mobile chat app, users are able to receive the same engaging and lively interactions through custom messaging features, just as they would in person.

Messaging apps have made communication more interesting than any other regular chat service. They make us feel more connected to others, both personally and professionally on a daily basis. For example, chat apps like WhatsApp or messenger can deliver a meme or message from a friend that can truly make our day.

While on the professional front, apps like Slack or Microsoft Teams helps us to instantly ping a colleague on an ongoing task. I can go on and on with the numerous use cases that chat services provide us these days. And today we will discuss in particular on the advantages of chat apps and how they are used by businesses as

their strategic tool to drive user engagement and build brand loyalty.

If you are here for the same reason, this article will brief you on the several benefits you may achieve by chat development for your brand.

Security and privacy should be given special attention in case of every digital tool and this also applies to messenger app development, be it desktop, web or mobile. Data is extremely attractive to fraudsters, so you will have to implement robust and advanced mechanisms to protect personal data from theft (including identity theft) and hacking attacks.

Implement end-to-end encryption for this purpose, in which case the recipients will be provided with keys for deciphering the messages they receive. This method is popular for ensuring that no third parties have access to the content (including the messenger app provider). This is implemented by WhatsApp or Telegram – the latter regularly changes the cryptographic key in order to prevent hacking of other messages, should one of them actually be intercepted and decrypted.

The global consumer electronics industry is witnessing an impressive growth rate in bothdeveloped and developing countries majorly due to continuous advancement in technologyand increasing

affordability of these devices. Smartphones, cameras, laptops, and tabletshave become an integral part of consumer lives. All these devices are becoming smarterwith the ongoing technological advancements especially in functionality and camerasystems due to the integration of technologies such as AI and IoT. With this, the increase ofsocial media messaging apps, the rise of cyberattacks and user privacy has been a concern for many years and many people are entirely focused on the security, privacy andanonymity. Developing countries across the world are experiencing a substantial increase ofcyberattacks and many disruptive measures of invading messages violating the CIA triadwhich has majorly attributed to the rise in the increase of secure private messenger withcustomized chatroom functionality. These products are looked into the people who wantmaximum privacy with no cutting cost of features enabled in this chatroom application.With so much additional functionalities, users have the option to get control and freedom intheir hands.

An application architecture describes the patterns and techniques used to design andbuild an application. The architecture gives you a road map and best practices to followwhen building an application so that you end up with a well-structured app.The architecture is a starting point or road map for building an application, but you'll needto make implementation choices not

captured in an architecture. For example, the first stepis to choose a programming language in which to write the application.

The architecture is a starting point or road map for building an application, but you'll needto make implementation choices not captured in an architecture. For example, the first stepis to choose a programming language in which to write the application.This is just a simple architecture of the Application and not a detailed one. It demonstrateshow the user interacts with the application. This Application contains the user interface andthe buttons inside consists of different functionalities which are provided in the application.The Images consist of multiple parts of different sections along with the main user interface which we have explained before to get the deep understanding of proper architecture of the application.

A data flow diagram (DFD) maps out the flow of information for any process or system. Ituses defined symbols like rectangles, circles, and arrows, plus short text labels, to show datainputs, outputs, storage points, and the routes between each destination. Data flowchartscan range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDsthat dig progressively deeper into how the data is handled. They can be used to analyze anexisting system or model a new one. Like all the best diagrams and charts, a DFD can oftenvisually "say" things that would be hard to explain in words, and they work for bothtechnical and non-

technical audiences, from developer to CEO. That's why DFDs remains sopopular after all these years. While they work well for data flow software and systems, theyare less applicable nowadays to visualizing interactive, real-time, or database-orientedsoftware or systems.The below image shows the DFD of the Real Time Chat Application. The flow of data issimple in this application due to the high number of functionalities.

In this process, the development team visits the customer and studies their system they investigate the need of the possible software automation in the given system by the end of preliminary investigation, the team furnishes a document that holds a different specific recommendation for the candidate system. It also includes personal assignment cost, project schedule, target dates. Main task of the preliminary investigation phase is:

1. Investigation the present system and identify the function to be perform.

2. Identify the objectives of new system in the general, an information system benefits a business increasing efficiency, improving effectiveness, or providing a competitive advantage.

3. Identify problems and suggests a few solutions, thus every system has a common thing and that is:

4. It is organized combination of different components.

5. They are independent and inter-related.

The current system in use has been designed in a way so as to make desired changes as per the user requirements and according to dynamic environment changes. The flaws in the current system will be removed in the ensured version of the current system. The system has been prevailing is not lacking in the amount of 10 data that the user actually needs but also it is outdated and the changes to be done in the present system by launching the ensured ones are must.

This system does not contain a database which has a lot of content and higher security. Hence, there is a need of the system which has a stronger database in content as well as security.

But the feature that the software is free of cost is to provide the admission facility to even those who do not have access to. Although in future, making this software online will not enhance the cost of the software by a greater degree.

This system which is an e-admission app gives the user facility to do his/her admission digitally which reduces paper work and makes the system more digital which is indirectly a step towards cashless economy.

Facilities which are not there in the current system as follows:

 Currently the admissions to be done are mostly offline. These efforts will be made to bring the process online for the student in near future.

 The amount of the facilities available is though less but it has been kept in the bucket list of the project to provide the students with more facilities and ease to do their process for admission.

 The effort will be made to provide more security to this project. So that the users account is not hacked and misused or corrupted.

 This application is currently a window application but in near future the efforts will be done to make it android, IOS and website as well.

 The data available is only useful for the students who are just studying in single college/institution. But the efforts will be made to add various colleges/institution for those who want to enroll at many places at single time.

 The interface will be designed more user-friendly and the queries asked by the user will be replied instantly with the help of application assistant.

 The application will be made to run on any platform. In simple terms, it will be made platform independent.

 The application will be distributed to a large group of users free of cost.

This system will help colleges/institutions in saving their time and money which they invest in the terms of manpower to do the process done by this application. Manual system does not provide high security so this loop hole will be overcome in the new application.

There is need of new system because of the following problems:

 Accessible: The system needs to accessible not only in the remote area but also globally.

 Accurate and fair: The present system lacks accuracy which is one of the biggest lacunas of the present system.

 Modifications are allowed: Any modification can be done with the user profile and corrections can be done anytime which is very lengthy and time consuming in the present system.

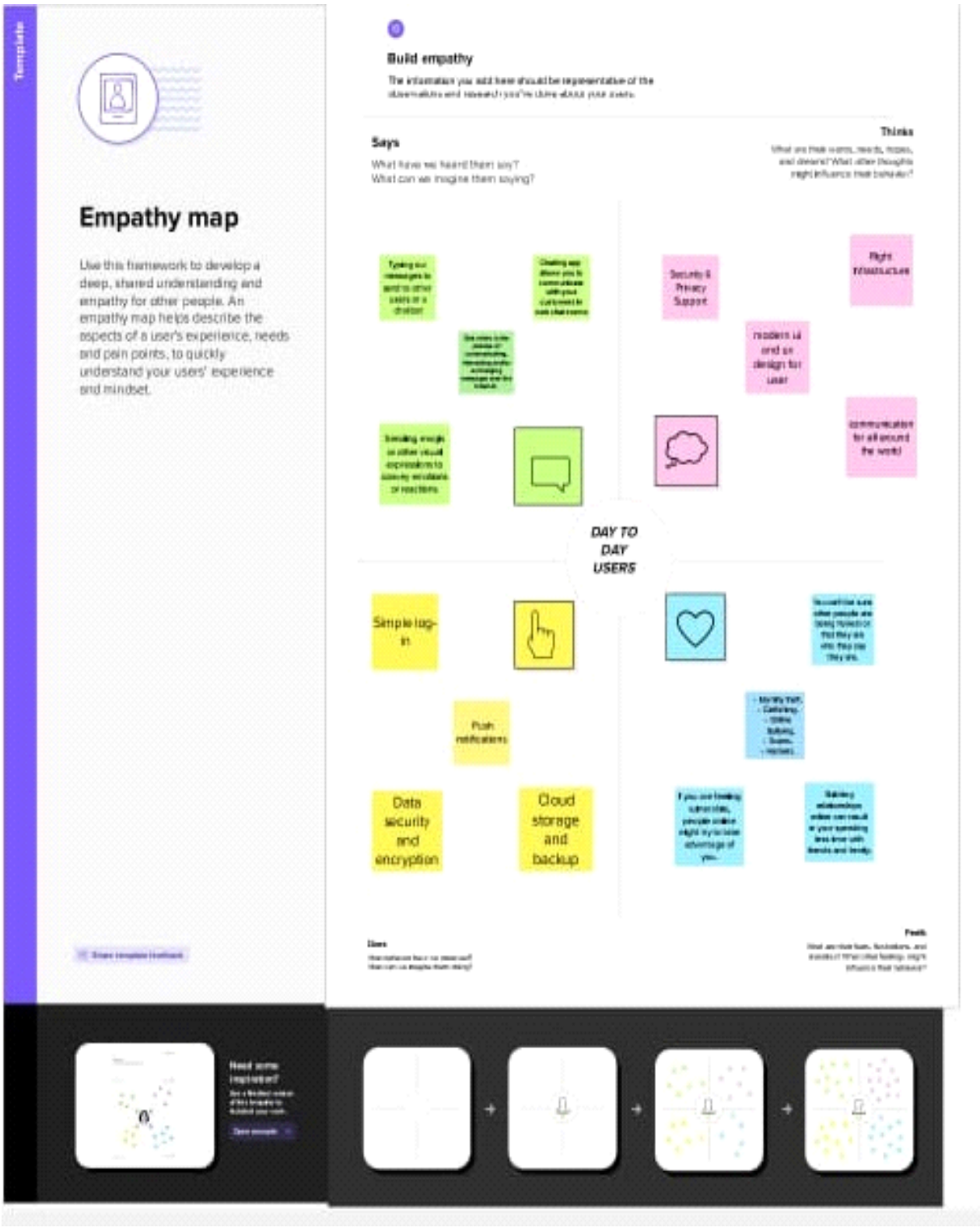
 Reduces paper work: The need of a new system is to reduce the paperwork and make society paperless.

 Help to Administration: This system would help to the

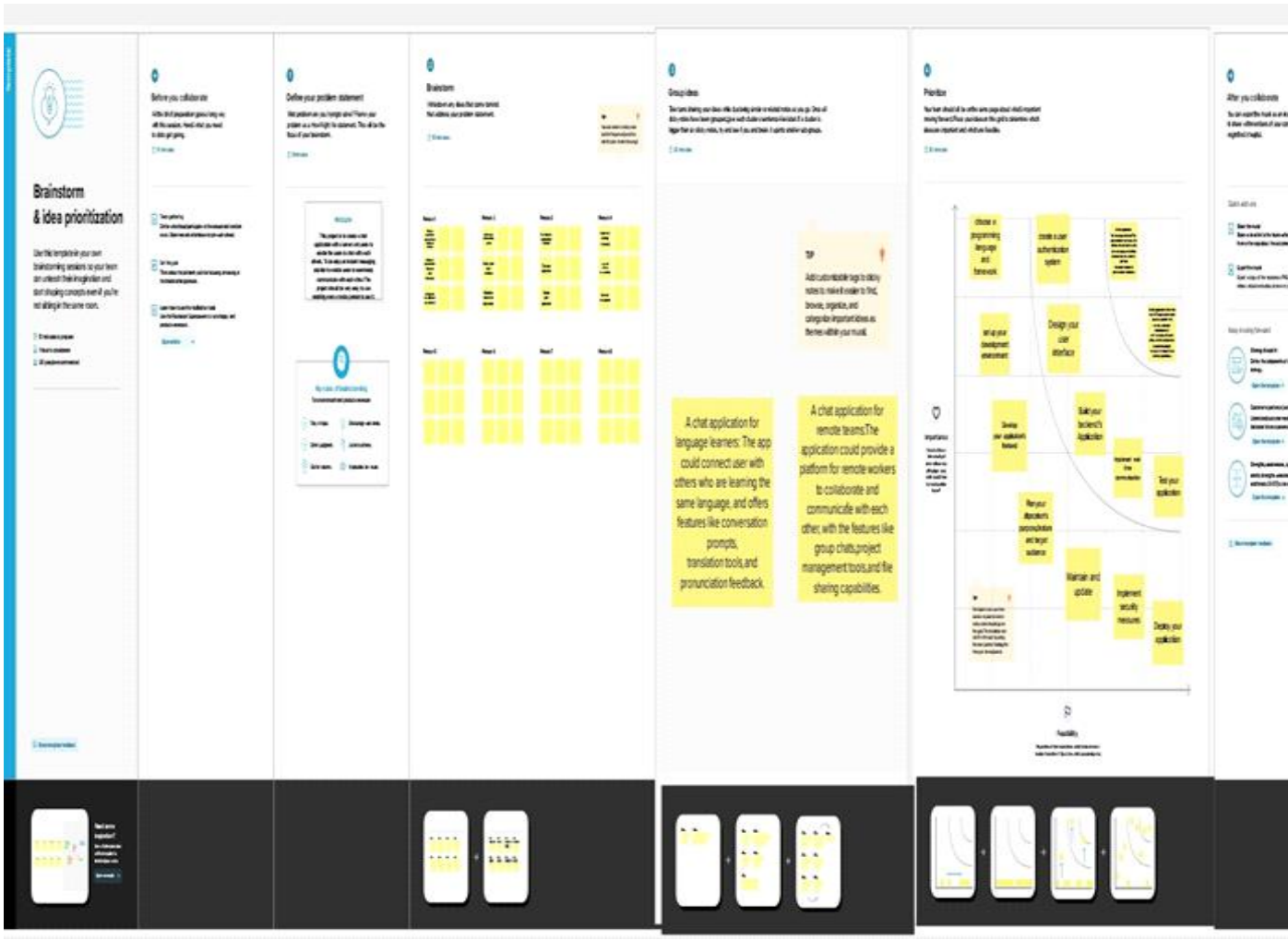
administration department to the educational institutions.

Problem Definition & Design Thinking

- **Empathy Map**



- **Ideation & Brainstorming Map**

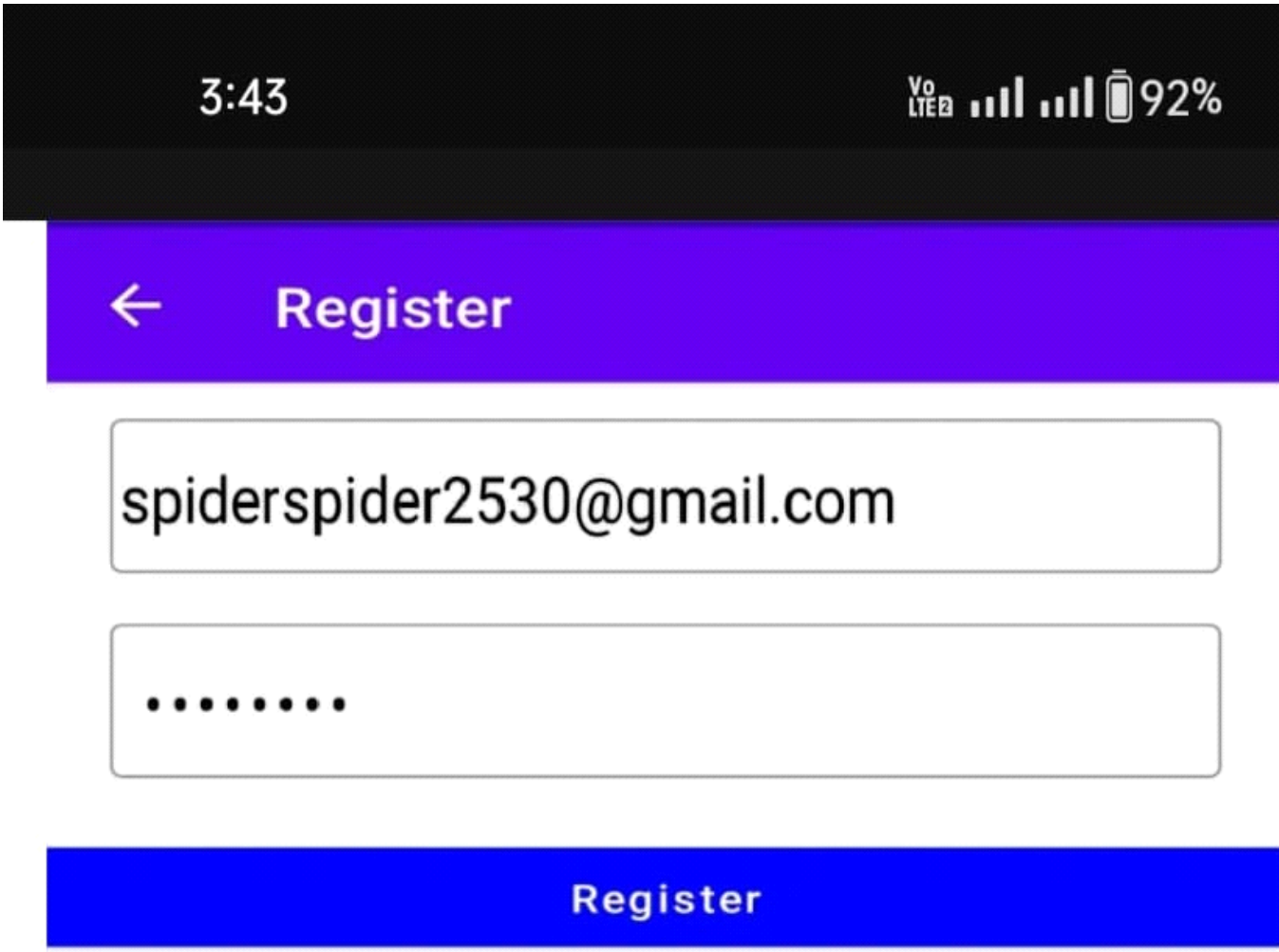

Brainstorm
& idea prioritization
A chat application for language learners. The app could connect user with others who are learning the same language, and offers features like conversation prompts, translation tools,and pronunciation feedback.
A chat application for remote teams.The application could provide a platform for remote workers to collaborate and communicate with each other, with the features like group chats,project management tools,and file sharing capabilities.

- **RESULT**

⚡ ChatConnect

Register

Login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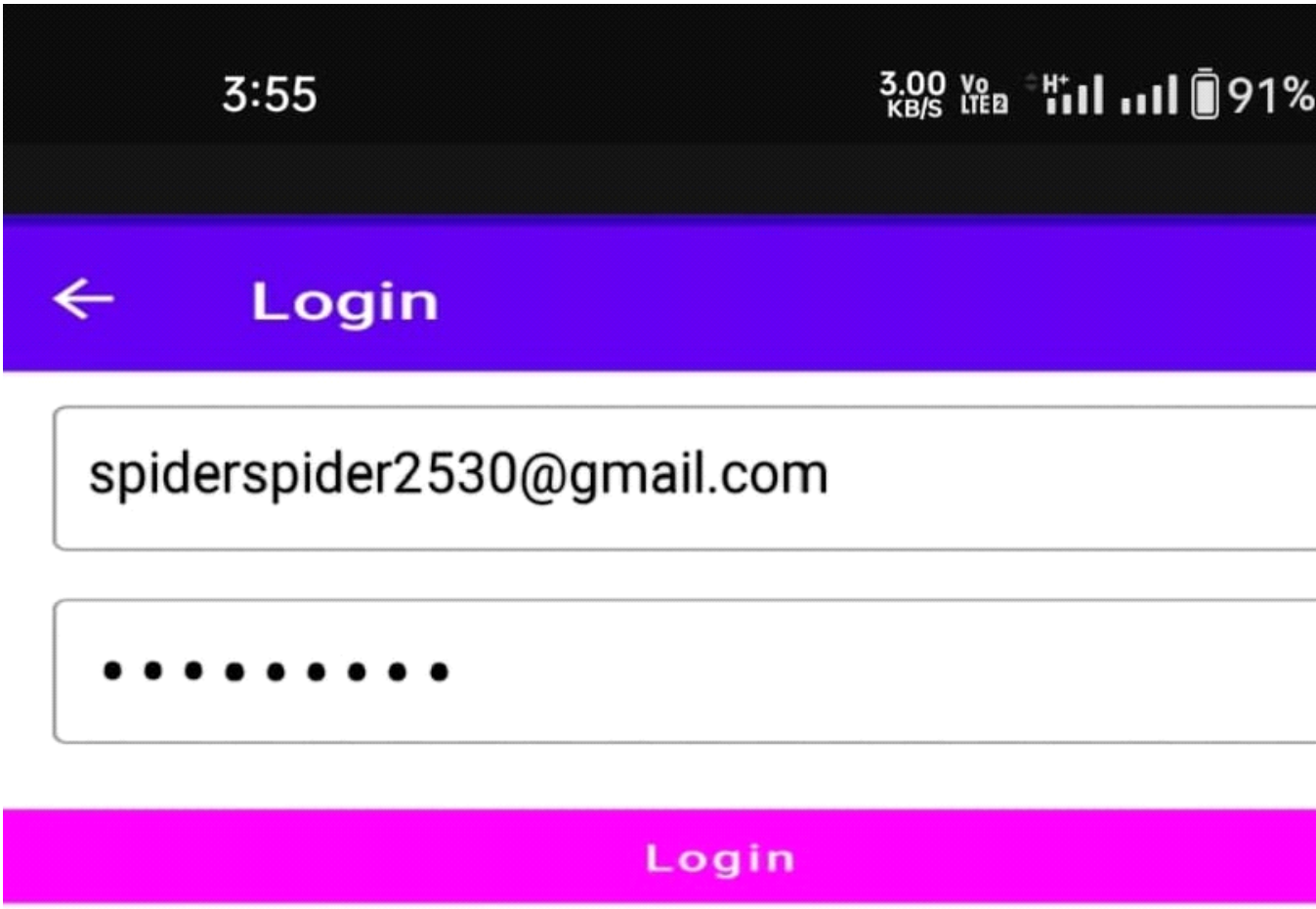
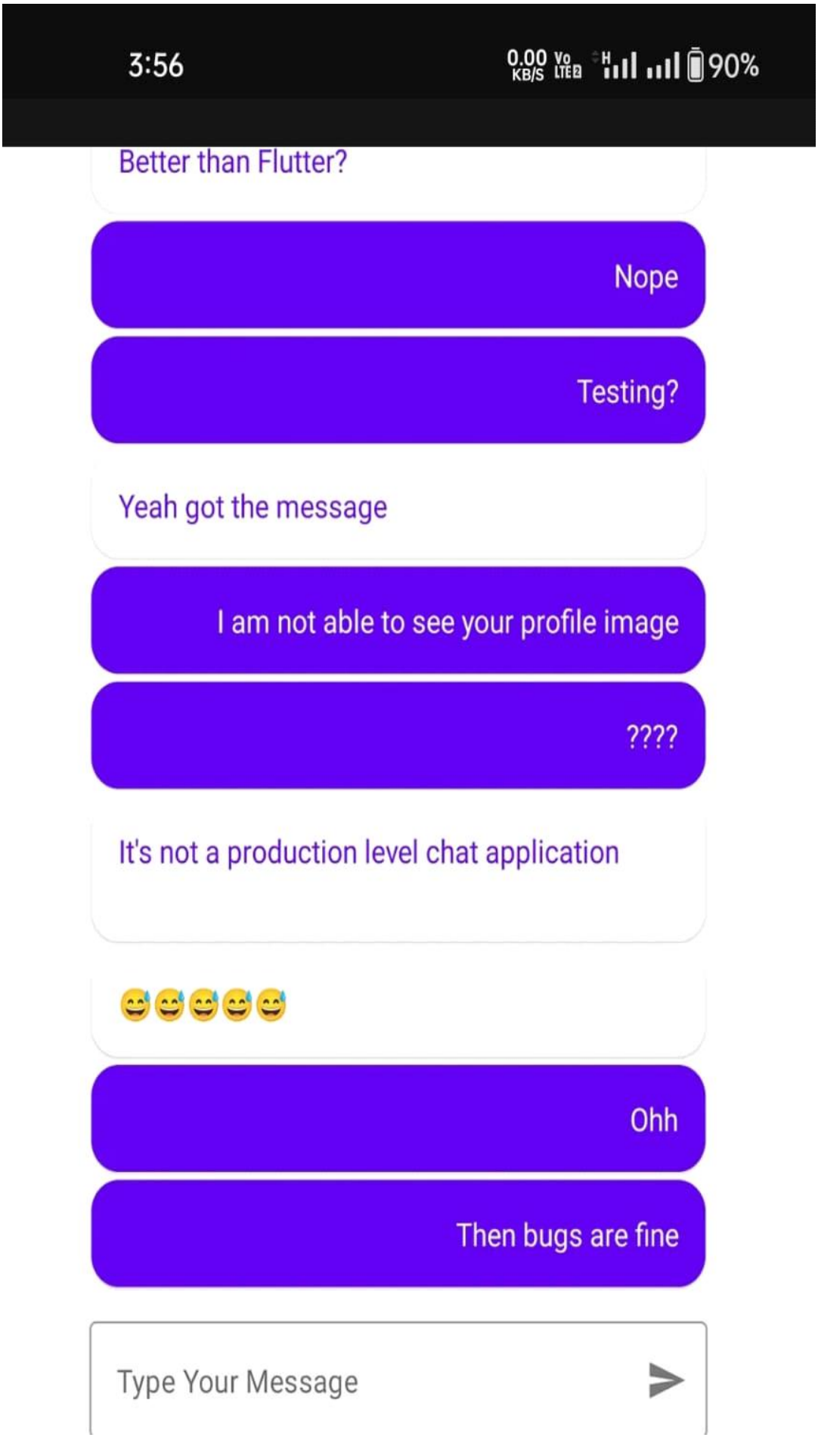
92%
Register
spiderspider2530@gmail.com
Register

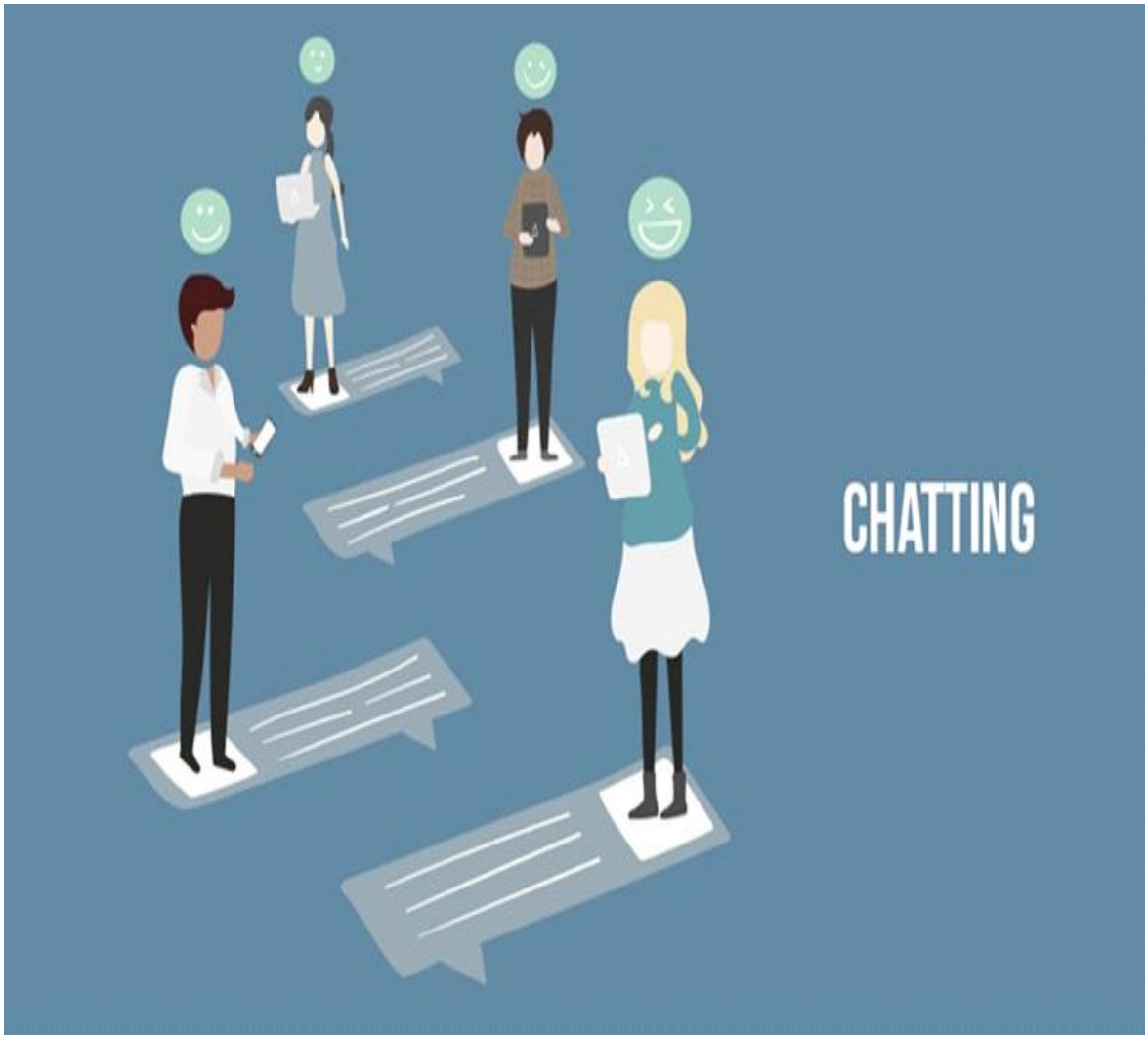

3:55
3.00 KB/S
91%
Login
spiderspider2530@gmail.com
Login


3:56
0.00 KB/S
90%
Better than Flutter?
Nope
Testing?
Yeah got the message
I am not able to see your profile image
????
It's not a production level chat application
😅😅😅😅😅
Ohh
Then bugs are fine
Type Your Message

- **ADVANTAGES & DISADVANTAGES**
- **ADVANTAGES**

Multitasking

You can complete other tasks while chatting over the Internet. For example, you can read and reply to emails, finish typing a document, or have a conversation with someone who is in the room. This can be an advantage if you are busy and don't have much time for personal chatting. This can also be a disadvantage because you aren't giving the other person or task your full attention.



Time Management

Because you can multitask while chatting on the Internet, it can become easy to lose track of time. You can end up chatting longer than you intended to, which can make it difficult to complete other tasks.

Speed

A chat application allows you to message or contact a person in real-time. In some cases, it becomes the bridge on where customers, potential leads, prospects could ask inquiries about products or services, and you can respond instantly. This factor alone has a tremendous effect on the productivity of your business and a perfect reason to incorporate chat application for your business.

Familiarty

Businesses started sending emails to customers and potential clients right after they learned that people use chat applications as a means to communicate with friends and family. Likewise, companies had only adopted the use of GIF’s and emojis in their social media posts, emails, and on their website after audiences had

started using GIFs and emojis as a different way of communicating with one another.

People nowadays send messages to one another to discuss just about anything. With the growing number of users of social media, businesses could take advantage of using chat applications as their medium in communicating with customers. Almost 70 million businesses are on Facebook right now, and only 20 million of them started sending Facebook messages, it means that there is a considerable gap in the total addressable market. It shows that most businesses aren't there yet. But when the time comes that they decide to use this platform, we will see a massive increase of integration because of the familiarity of the users with the channel.

- **DISADVANTAGES**

If you chat with strangers over the Internet, you can open yourself to predators. People can lie about who they are in an effort to hurt you in some way. Your conversations can also be saved, which can come back to haunt you if someone has bad intentions. According to the United States Computer Emergency Readiness Team, you should be careful about what you reveal unless you are certain of who the person on the other end of the chat is. The US-CERT also recommends updating your security settings to protect yourself from a software attack from a malicious user.

Sure, as a live chat software company, we like to stress the advantages of live chat. But we are honest with our customers and educate them about live chat disadvantages as well. With over 10,000 clients, we have learned a lot about potential challenges and how to face them.

- **APPLICATIONS**

Define the features and functionality you want in your app, such as text messaging, voice and video calls, file sharing, group chat, and more.

Choose a programming language and development environment to build your Android app. Java and Kotlin are popular languages for Android app development, and Android Studio is the official integrated development environment (IDE) for Android.

Implement a user authentication and registration system, allowing users to create accounts and log in to the app. You can use Firebase Authentication, Google Sign-In, or other third-party authentication services to simplify this process.

Set up a real-time messaging system using a messaging protocol such as XMPP, MQTT, or WebSockets. You can use a third-party messaging platform like Firebase Cloud Messaging or Twilio Programmable Chat to handle the messaging infrastructure.

Design and develop the user interface (UI) of your app, including the main screen, chat screen, settings, and other screens. Use the Android Material Design guidelines to ensure your app is visually appealing and easy to use.

Test and debug your app on multiple devices and Android versions to ensure it is stable and works correctly. You can use automated testing tools like Espresso or Robolectric to simplify this process.

Publish your app to the Google Play Store or other Android app stores. Follow the store's guidelines and policies to ensure your app meets their requirements and is approved for distribution.

Remember to prioritize user privacy and security when developing your chat app. Implement end-to-end encryption to ensure messages and files are protected from unauthorized access, and use

secure user authentication methods to prevent unauthorized access to user accounts.

- **CONCLUSION**

The main idea of the project is to develop a Secure Chat Application. I had taken a wide range of literature review in order to achieve all the tasks, where I came to know about some of the products that are existing in the market. I made a detailed research in that path to cover the loop holes that existing systems are facing and to eradicate them in our application. In the process of research I came to know about the latest technologies and different algorithms.

I analyzed various encryption algorithms (DES, AES, IDEA…), Integrity algorithms (MD5, SHA), key-exchange algorithms, authentication and I had implemented those functionalities in my application. I had done a detailed research on Certificate Authority and key tool for the generation of certificates.

The portability of the application has been achieved by using some of the latest JSSE technologies. I implemented these functionalities using JSSE api's. I had gone through core and security concepts of java (JSSE, JCA) packages and for developing GUI I had implemented java swings.

- **FUTURE SCOPE**

Over the decade calls and emails to customer care have been replaced by the slew rate advancement and development of chatbots. Nearly 11,000 chatbots have been deployed in chatting services of Facebook leading to the release of the Chatbot Development Kit.

Chatbots are based on a certain domain of technology called Artificial Intelligence(AI). The word of focus however is intelligence, with all AI programs aiming to achieve and demonstrate higher levels of intelligence. Chatbot or chatting applications are certainly no strangers to this aspect. With advancement in AI and NLP, we are looking into highly advanced and intelligent chatting interfaces or chatbots. Certain aspects for the same would be advanced text to voice output for those with disabilities thus eliminating the boundaries in communication and sharing of information. Other aspects include human like interactive AI chatbots. There are already some existing human like interactive AI chatbots but many developments are imminent to occur to polish the software running under the hood. These include Microsoft's Zo and Ruuh, Xiaolce in China and Jasper. Another aspect including advanced voice commands control.

There are many aspects of advancements to cover as chat applications become more smarter and chatbots more intelligent

and human-like. However, only future will tell of what these chat applications will be in the future.

- **APPENDIX**

```
package com.project.pradyotprakash.flashchat.view.register


import androidx.lifecycle.LiveData
import androidx.lifecycle.MutableLiveData
import androidx.lifecycle.ViewModel
import com.google.firebase.auth.FirebaseAuth
import com.google.firebase.auth.ktx.auth
import com.google.firebase.ktx.Firebase
import java.lang.IllegalArgumentException


/**
 * View model for the login view.
 */
class RegisterViewModel : ViewModel() {
    private val auth: FirebaseAuth = Firebase.auth
```

```
private val _email = MutableLiveData("")
val email: LiveData<String> = _email

private val _password = MutableLiveData("")
val password: LiveData<String> = _password

private val _loading = MutableLiveData(false)
val loading: LiveData<Boolean> = _loading

// Update email
fun updateEmail(newEmail: String) {
    _email.value = newEmail
}

// Update password
fun updatePassword(newPassword: String) {
    _password.value = newPassword
```

```
    }


    // Register user
    fun registerUser(home: () -> Unit) {
        if (_loading.value == false) {
            val email: String = _email.value ?: throw
IllegalArgumentException("email expected")
            val password: String =
                _password.value ?: throw
IllegalArgumentException("password expected")


            _loading.value = true


            auth.createUserWithEmailAndPassword(email, password)
                .addOnCompleteListener {
                    if (it.isSuccessful) {
                        home()
                    }
                    _loading.value = false
```

```
            }
        }
    }
}
```