CLOUD BASED ANDROID CHAT APPLICATION

(MyChat.APK)

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ABSTRACT

The Major objective of this project is to develop an Android based application that can provide connection between all the students and lectures with use the cloud data protection technique through the application.

This application can have to protect chat details in real-time and not used device storage to share multimedia files. Major thing is the connection between students and lectures easily and lectures can have to identify each student separately.

Using the Agile software development approach, the project gathered requirements, designed, analysis, and accomplish the task of the mobile application utilizing the Android platform. In the last phase, the project will be tested by selecting a target group of several student and lecturers who are using the chat application for day to day lives.

ACKNOWLEDGEMENT

This mobile chat application is would not be possible to complete without proper guidance. I would like to especially thank my supervisor Dr. Amal Rajapakse who has been supported to me until the end of this dissertation. With her great instruction, this project leads to a successful end.

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CHAPTER 1- INTRODUCTION

1.1 Current system

Online chatting refers to the process of sending and receiving messages using the internet. There are various chatting applications available in the market. In the first quarter of 2017, the total number of users using chat applications is more than 5.03 Billion, and widely used apps are WhatsApp, Facebook Messenger, We Chat, QQ Mobile, etc.,

All these applications provide various features to ensure security, integrity, and consistency. All these apps let the user send any messages, and the messages can be lewd or inappropriate. There are many cases filed for sending lewd or inappropriate messages in various online mediums.

Most common applications are limited access and limited sharing data, for example WhatsApp can share less than 16mb and Viber is the same. If share multimedia files through current chat apps, the quality will decrease and the too much of time it will take to send.

The application developed for Android, because Android is one of the most widely used mobile operating systems having major market share when compared to other mobile operating systems like iOS, Windows and Blackberry

1.2 Motivation and Objectives of the Project

1.2.1 Problem Identification

Smartphone devices such as iPhone, Blackberry, and those that support the Android operating system are ubiquitous. In addition to serving as a phone device, smartphones are also capable of video, picture, text exchanges, accessing the Internet and executing sophisticated embedded software applications. A large percentage of these users are young adults that include college students. Hence, the interest on engaging in the development of the next generation of software applications for embedded and mobiles devices is arising among students.

The same application like Whatsapp, Viber, Messenger, Imo and Hangouts those are the very common applications. In those application use for chat and share multimedia files and secret files. But there are no installed operations, such as chat rooms and the database aria for sharing the files.

Most common application not using cloud database for store files in a database. In case of that users want to download their files in user device for use. In this solution setup by chat rooms and if a user's want to share multimedia files or normal files they can upload users database and share or directly share for others database.

1.2.2 Solution for proposed system

This chat application will address the above problems mentioned in the section1.2.1

Aim

In this project I will analyze these technologies like mobile data system, cloud database, etc. to develop the application and then implement a system combining the best and most practical technologies to giving the good user experiences.

- In this application have to combine students and the lecturers to share knowledge immediately.
- In the cloud database have to save all the data as a files, if some way device crash or format in devices storage the files will be safe.
- Can have to connect chat rooms for campus faculty wise, if someone want to know something in another faculty then have to request to join other faculty by requesting small period
- This application manly focuses on Horizon Campus students and the lecturers.
- Without worrying backup have to keep safe

1.2.3 Objectives for the proposed system

The Android provides a rich platform with a variety of concepts, techniques, and resources which can be combined to produce useful and marketable applications. In addition to its openness, all the tools in the Android development are free and no special hardware is required. These factors motivated us to practice an instant message application on the Android platform to explore Android's main components and various building blocks, and to acquire a working knowledge of its developing environment

- Student and lecturers can have to register using filling own details.
- Registration details can have to edit and modify the admin
- Chatter can have to request to another users.
- If group chat have to handle from admin
- Update status and profile images and setting updates.
- Provide identification user information
- Data can have to project with store in cloud

1.3 Scope and Limitations of the Present System

Given priority to services with excellent security practices. All services on this list implement some form of end-to-end encryption, which means not even the service provider can read message contents. Some services go a step further by putting security at the center of the product, incorporating additional safeguards like decentralized networks and self-destructing messages.

The Scope of the project is that in a very short span it provides user with many facilities. It provides unlimited experience with data sharing and chat customization with other users.

1.4 Chapter Outline

CHAPTER 1- INTRODUCTION
CHAPTER 2 – LITERARTURE REVIEW
CHAPTER 3 – ANALYSIS
CHAPTER 4 – DESIGN
CHAPTER 5 – SYSTEM DEVELOPMENT
CHAPTER 6 – TESTING AND EVALUATION
CHAPTER 7 – CONCLUSION AND FUTURE WORK

CHAPTER 2 – LITERARTURE REVIEW

2.1Available Applications

Scenario 1- Skype

Skype is an IP telephony service provider that offers free calling between subscribers and low-cost calling to people who don't use the service. In addition to standard telephone calls, Skype enables file transfers, texting, video chat and videoconferencing. The service is available for desktop computers, notebook and tablet computers and other mobile devices, including mobile phones. A number of companies, including Skype, produce dedicated Skype phones.

Included in the free service is a softphone application that can be downloaded to any computing device running Windows, Macintosh, Linux, or Windows Mobile operating systems. A function called Skype Out enables calls to regular telephones; these calls are charged to a prepaid account or to a flat-fee annual subscription [1].

Skype's benefits, beyond the free and low-cost calls, are said to include easy set-up and good audio quality. To use Skype from a desktop computer, you just plug in a headset, a specialized VoIP phone or a regular phone (via an analog telephone adapter). You add contacts similarly to the way you do for instant messaging and then, to make a call, just click the icon next to the contact. [2]

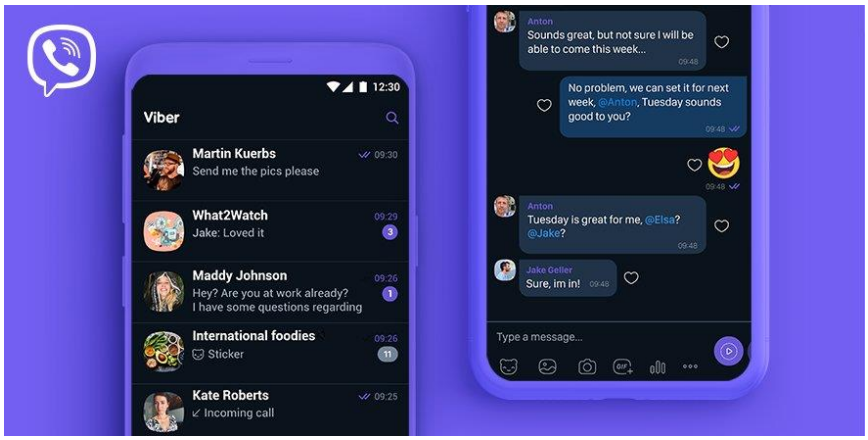
Scenario 2- Whatsapp

WhatsApp, the enormously popular messaging and Voice over IP service owned by Facebook, allows users to send text messages, voice calls, recorded voice messages, video calls, images, documents, and user location. More than 1 billion people in over 180 countries use WhatsApp to stay in touch. [3]WhatsApp went one step further than Skype in a certain direction, that of identifying users on the network. It identifies people through their phone numbers. No need to ask for a username. If you have someone's phone number in your contacts, it means they are already in your WhatsApp contacts if they use the app. This makes it easier for texting than Skype. On WhatsApp, anyone who has your number has you on the network, and you cannot choose to be offline. You also cannot hide behind a fake identity. [4]

Scenario 3- Viber

Viber is a VoIP and instant messaging application with cross-platform capabilities that allows users to exchange audio and video calls, stickers, group chats, and instant voice and video messages. It Is a product of Rakuten Viber, a multinational internet company headquartered in Setagaya-ku, Tokyo, Japan. [5]

Messages sent over Viber are protected with end-to-end encryption. The app is popular for users who want to hold public and private conversations, as well as play games with other users and access the service via desktop. Viber is compatible with voice assistants such as Google Assistant and Siri, as well as the contacts list in a user's phone. Viber's instant messaging includes features like the capacity to share photos, GIFs, stickers, videos and emoticons. [6]



Connecting desktop and smartphone chat, Viber supports iOS, Android, Windows XP and up, Mac OS 10.7 and up, as well as Linux Fedora and Ubuntu. The software also enables switching calls and chats between mobile and desktop. Users who speak different languages can converse with real-time translation features. By tapping a block of text, the user can choose a language and instantly translate the text. [7]

Viber supports extensions for capabilities that allow users to do more without leaving chat windows. Extensions exist for finding restaurants, performing searches and sharing music and video.

The chat program offers direct marketing to help businesses attract users with promotional opportunities like stickers, ads, communities and direct marketing messages. When customers are interested, transitioning from marketing to selling is enabled with e-commerce integration. Viber has over a billion users and supports over two million interactions every minute, according to the company.Most of Viber's features are free, with some exceptions including calls made to landlines, international calls, and calls made to cell phones that do not have the Viber app.

Scenario 4- Facebook Messenger

Facebook Messenger is a mobile app that enables chat, voice and video communications between the social media site's web-based messaging and smartphones. (Specific capabilities vary according to the user's device and geographic location.) Messenger is available for iOS, Android, Windows 10 and Blackberry devices and can connect through Wi-Fi or a mobile data plan. [8]

On Android systems, the app also integrates SMS texting so that users don't have to toggle between communication interfaces for different contacts. Once the user selects Messenger as the default SMS client, text messages and FB chat are available through the interface. SMS messages and threads are color-coded purple to differentiate them from the blue-coded FB messages.

At Facebook's 2016 F8 developers' conference, the company reported that it was incorporating chatbots to enable conversations with businesses. Facebook also announced that the Messenger Platform would be made freely available for bot development. Users can interact with a business chat bot as they would any other contact, rather than downloading separate apps for each business and switching among apps to communicate. From within Messenger, a user might check sports scores or the weather, make a purchase, get movie tickets or book a restaurant table or a flight – among many other possibilities. [9]

As of April 2016, FB Messenger had over 900 million users around the world.

Scenario 4- IMO messenger

High-quality video and voice calls, encrypted group video with up to six participants. FREE and unlimited encrypted messages and video and voice calls over data or WiFi connections. In other words, avoid SMS (texting) and phone call charges. Oh, and there's stickers for our conversations! imo messenger can also be used on Mac and PC laptops, in addition to iOS and Android smart devices. [10]

Company website: there really isn't one, which is strange. There's the download page above. The imo app is owned by a privately held company called Baby Penguin, LLC, but Google can't track them down. Here's the download page instead, because imo isn't just for mobile devices – there's a PC version, too.

Google+ Hangouts

Google+ Hangouts Google Hangouts- A new G+ Business chat application that connect friends and colleagues in your work place. It facilitates one-on-one conversation and group chat facility by sharing the emoji's, photos, videos, GIF's and maps. Now you can turn any of your conversation in to video call with just one tap with more than 10 members at a time. Make a free call to other hangout users either from Android, IOS or desktop application.

2.2Comparison of existing systems

According to scenarios all application are mostly have same features because of the all application going to do basic thing are same. But other applications and Facebook messenger application have same deferens, whats app viber mostly going to register through mobile number but the Facebook messenger do that application registration through the Facebook profile. [11]

Apps / Comparison	Skype	Whats App	Viber	Messenger	imo	Line	Wire
Surveillance capability built into the app?	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**
Company's general stance on customers' privacy	**Poor**	**Good**	**Poor**	**Poor**	**Poor**	**Poor**	**Poor**
Company collects customers' data?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**
App collects customers' data?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**

Is encryption turned on by default?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**
Can you sign up to the app anonymously?	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Can you add a contact without needing to trust a directory server?	**No**	**No**	**Yes**	**No**	**No**	**No**	**Yes**
Can messages be read by the company?	**Yes**	**Yes**	**No**	**Yes**	**No**	**No**	**No**
Does the app have self-destructing messages?	**No**	**No**	**No**	**Yes**	**No**	**Yes**	**No**
Are messages encrypted when backed up to the cloud?	**No**	**Yes**	**No**	**Yes**	**No**	**No**	**No**

Table 1: comparison of exixsting systems

Common Features of available applications

- All systems are developed according to chatting other same app.
- All systems are send notification messages.
- There is no any report generations in above systems.
- Can have to use android and IOS both systems

Specific Features of available applications

- Used technologies are different.

  Ex- most application developed different platform, IOS android and some are using web technique. In Facebook messenger develop by web application because it can support any system which are using HTML5 otherwise we have to use Microsoft device also.

CHAPTER 3 – ANALYSIS

3.1 Introduction

In this chapter it is going to consider about the data analysis. The main reason of analyzing data is to obtain usable and useful information. The analysis, regardless of whether the data is qualitative or quantitative. For instance, a questionnaire (quantitative research) will often gather factual information like age, salary, length of service (quantitative data) – but may also collect opinions and attitudes (qualitative data).Describe and summarize the data.

The major objectives of data collection are, [12]

- Identify relationships between variables.
- Compare variables.
- Identify the difference between variables.
- Forecast outcomes.

3.2 Feasibility Study

Using feasibility study that looking to find out whether project does work or not. Feasibility study will give a boundary to project.so we have to consider about that selected project whether it will accomplish these feasibilities or not. If project agree with the feasibilities it is possible to continue. If not project will be fail. [13]

We have to mainly consider how viable this mobile chatting application project is in terms of,

- Operational feasibility
- Technical feasibility
- Economic feasibility
- Legal feasibility

3.2.1Technical feasibility

In this case, we are checking about the current chat apps and what are the new technical things want to grow up and develop mobile application will match with

-To current state of the technology

-To the future of the technology

-Acceptability of the technology

Nowadays android mobile phones are much demanded. Therefore android applications also have the same demand. In this application based on android technology. So it is matching with the current state of the technology. [14]

Since the beginning of the android is released many more versions until now and they will release new versions also in the future. Android is getting common nowadays. Therefore people who use android will increase in the future.

In this chat application created using the latest android versions. Therefore it has backward compatibility also. And it will provide all the instructions to the users. Application design in such a way that no need prior knowledge to access it. User just needs only basic knowledge of smart mobile phones as well as Android applications.

3.2.2 Operational feasibility

To check whether this chat application is successfully following or not operational feasibility it should be considered about,

Familiarity with programing language

Familiarity with Database

Available time

Familiarity tools

Familiarity methodology

This chat application basically develops using java programing language.java is a very common programing language. Database connections will establish with the cloud database. The reason to use a cloud database because if sharing files are want to safe forever. In mobile devices are ot surely conform with device storage. If someway the device will slow or stuck then users are used to formatting or reset it. Then the file will be lost. [15]

	Task Name	Duration	Start date	Finished date
2	Final Project	48 weeks	10/03/2019	01/02/2020
3	Project inizialization	1 week	10/03/2019	17/03/2019
4	Shortlist project areas	3 days	18/03/2019	08/04/2019
5	Requirment gathering	2 week	09/04/2019	23/04/2019
6	Subimt proposal	2 week	24/04/2019	08/05/2019
7	Analysis	5 week	09/04/2019	31/05/2019
8	Design	5 week	01/06/2019	07/07/2019
9	Development	15 week	08/07/2019	01/11/2019
10	Testing	5 week	02/11/2019	06/12/2019
11	Disseratation writing	20 week	07/12/2019	01/01/2020
12	Implelentation	4 week	02/01/2020	01/02/2020
13	Submit Disseration			

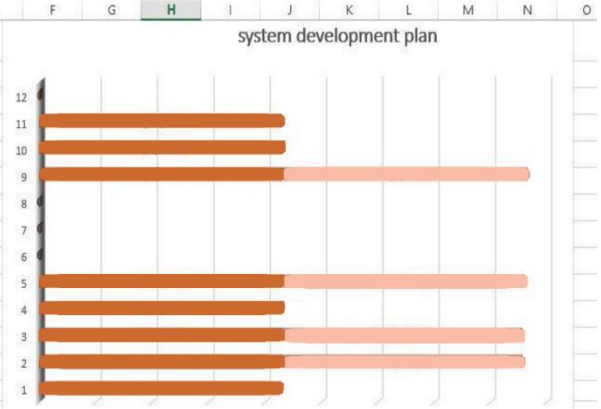


Figure 1: Time schedule

Microsoft Visio. For time scheduling purposes, this is required Microsoft project 2013. If needed it should have to be used Photoshop also.

Hardware requirements

Android mobile phone.

Personal computer (Laptop).

Software requirements

Android studio

Photoshop

The selected methodology for this chat application is agile methodology. The main reason is in developing time we have to apply new related features to the application in real time.

3.2.3 Economic feasibility

According to economic feasibility check, how developed the chat application is in terms of,

Is it a cost-effective solution?

Is it a time-effective solution?

This application is economically feasible. Because it doesn't spend too much money for development purposes. Because all software can get free of charge. Android-based Mobile phone is already available and personal computer is already available. Planned to implement the lite mobile application, so there is no need for more data usage from the internet.

This application is time effective application. Because this is a mobile application it is very lite.so it doesn't take too much time to download.

This application is related to chatting with same application users and as well as group

3.2.4 Legal feasibility

This application is not harmful to society. And also this is an Android application. This application is suitable for current use in terms of law. This application is not very influenced by ethics. [16]

Based on the above reasons, this project shows that it is viable in terms of,

Operational viability, technical viability, legal viability, economic viability

3.2.5 User acceptance

Design of the application in such a way that prior knowledge is not required to access it. The user only needs basic knowledge of smart mobile phones and Android applications.

All instructions are given in the mobile application. The user only has to download the application and use it following the steps of the application.

3.3 Requirement Analysis

Successful applications and products begin with an understanding of the needs and requirements of the users. Benefits may include higher productivity, better quality of work, reductions in support and training costs, and greater user satisfaction.

Requirements analysis is not a simple process. The particular problems faced by the analyst are:

Address complex organizational situations with many stakeholders

Users and designers who think of traditional lines, which reflect the current system and processes, instead of being innovative, etc.

The initial step in the requirements analysis is to gather background information about the users and the processes that are currently taking place. [17]

For user data collected, there are a number of methods to identify such needs.

In this project, the user interview and the questionnaires are selected as data collection methods.

The interview is a commonly used technique where users, stakeholders, and domain experts are consulted to obtain information about their needs or requirements in relation to the new system. Interviews are usually semi-structured based on a series of fixed questions with scope for the user to expand their answers. I have to interview two side user (Students and staff) and admin

- **In this case want to interview for students and staff members.**
    - What kind of information you should want to share through the messenger chat application?
    - What are the facility to in same chat applications?
    - Speed and data protection want to good and if some way device will crash the data want to be safe in the outside storage compartment?
    - What are the basic features of you need to use dally chat applications?

- **In this case want to interview for admin**
    - What details should want to register as a student in the campus?
    - What kind of data basically need to adding char application?
    - How identify the user who chatting on the application, Sharing outsource application, Client mood have to add, User block and unblock method, Database logging with using simple method?
    - What kind of policies need to follow the student and the teachers?
    - How to respect / subject manner question?

3.4 Fact Finding Techniques and User Stories

The fact-finding technique is the process of gathering data and information required based on technical aspects that contain a sample of existing documents, research, observation, questionnaires, interviews, prototyping and joint planning of requirements. [18]

When analyzing the system, use appropriate research techniques to develop and implement the existing system. The collection of required data is very important to apply tools in the system development life cycle because the tools cannot be used efficiently and effectively without adequate data extraction.

Conducting an Effective Interview

The first thing for a safety investigator to do is acknowledge that all humans have emotions, biases and insecurities.

Pointers for interviewing people:

- To be prepared
- Make a list of key questions
- Start with an introduction
- Speak with dignity and respect.

Records

If a failure or malfunction of the equipment was part of the incident, an investigator must obtain the purchase records, manufacturer's instructions and maintenance records for that equipment. These records may contain valuable information.

Questionnaires

Special purpose documents that allow the analyst to collect information and opinions from respondents.

- Developing a good questionnaire
- Determine what facts and opinions should be collected and from whom.
- Examine and edit the questions for construction errors and possible misinterpretations.
- Questions should not offer biases or personal opinions.

3.5 Functional Requirements

Functional requirements explain what has to be done by identifying the necessary task, action or activity that must be accomplished. Functional requirements analysis will be used as the top level functions for functional analysis. According to this application some functional requirements are, [19]

Example - Registration, Login, and Add user details etc.

3.6 Non-Functional Requirements

Non-functional requirements are requirements that specify criteria that can be used to judge the operation on of a system, rather than specific behaviors.

Example - Security, android version of the phone, performance etc.

3.7 Methodology for Proposed System

For developing this system I have decided to use the agile methodology. Since a proper solution for the above mentioned topic has not yet implemented, the requirements and the specifications of the system may change while on the development process.

Since lot of testing has to be done when comes to identifying the proper set of technologies to get the maximum accurate result agile methodology is the most suitable methodology to develop the application. Main processes are. [20] [21]

Problem Identification - Find and understand the problem. Identify difficulties in using current chat applications

Requirements gathering - After finding a problem, think about how to provide a solution to the problem. Trying to add a real-time database like the cloud to the application and take care with more security.

Development - Design and develop an Android-based mobile application according to the defined requirements.

Testing - Test the mobile application before delivering it.

Delivery Integrate and deliver work iteration in production. The main reason that this methodology uses is that the agile model works well for projects where the requirements are very well understood.

CHAPTER 4 – DESIGN

4.1 Introduction

Diagrams for this chapter are designed for the application. Assisting developers in the stage of well-planned animation support, translating into program code and providing guidance to better organize software blocks in a more effective way.

4.2 Evaluation Design Techniques

Design Verification [1]

The software development process is complete with creative documentation, fake code, detailed logic diagrams, process diagrams, and all work or non-work requisites.

Modularization

Modularization is a way of independent busy work, and is a way of distributing a software system to multiple computers and independent modules.

Cohesion

Is a measure that defines the degree of intra-dependability within elements of a module? The greater the cohesion, the better is the program design.

Project schedule

It's more important to start this project. Using a horizontal bar chart, a simple list of graphic techniques is called Gantt chart. The Gantt chart is usually a simple list of dates, but it makes it easier to plan.

Project budgets

As a means of dealing with risks and problems, the Project Manager is based on the cost estimate based on the budget estimate, except for the reserve in the reserve.

Risk Management Plan - Risks to mitigate or alter risk, change in performance today, and special expenses for risk management.

Prototype

Here introduce and describe the prototype. What the prototype does and an overview of its key features.

Project cost: basically two main divisions:

- Development costs-costs of developing and implementing the new solution and, for an IT solution.

  Ex: cost for computer devices.

- Operating costs-costs of running the new system.
  Ex: buying licensing software.

Available resources
This includes the hardware and software resources that are available for product development.

4.3 Decisions taken during the Design Process

To realize the characteristics of the system and find a new way to develop ideas, collect and analyze the duration of the process to start the project. [23]

- Gather data by conducting interviews and questionnaires.
- To complete this project using Android technology basically

4.4 System Design Process

In this section, designs based on chat application diagrams are provided. Under this section Use Case Diagrams, Class Diagrams, Sequence Diagrams, Activity Diagrams will describe.

4.4.1 Use Case Diagrams

The main purpose of the use case diagram is to identify the limits of the system and is a representation of a user's contribution to the system.

Use cases: they represent the functionality provided by a system unit and expressed by a sequence of message exchanges by the system unit and one or more system actors.

The following use cases have been identified for the specification of the proposed system

- Register
- Login
- Email verification send to the registered mail
- Find friend
- Request
- Confirm request
- Create group
- Cloud storage request
- Share files from cloud to directly friends or groups
- Change profile information
- Change email

Actor: An actor represents human users who interact with the system and the actor can participate in one or more use cases.

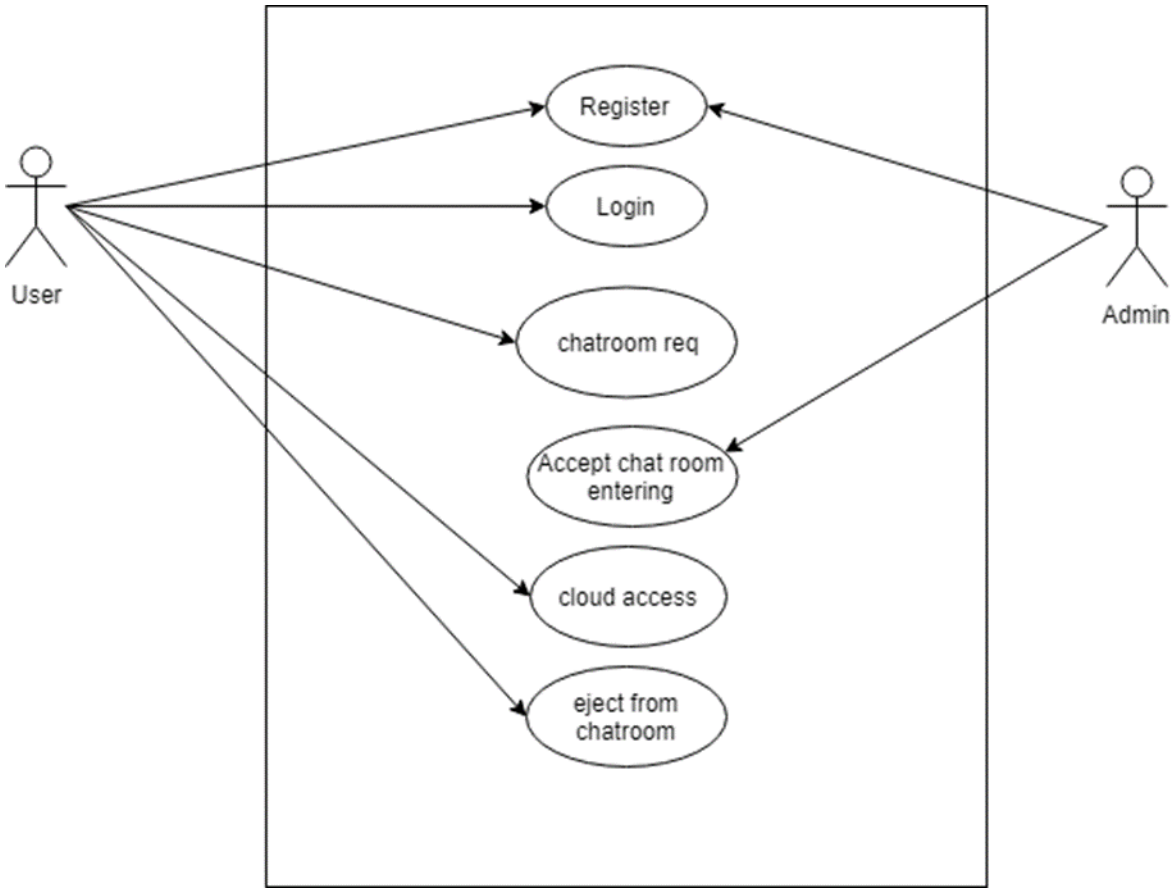


Figure 2:use case diagram

4.4.2 Class Diagrams

The class diagram identifies all the classes for chat application and specifies for each class its attributes, operations, and relationships to other classes.

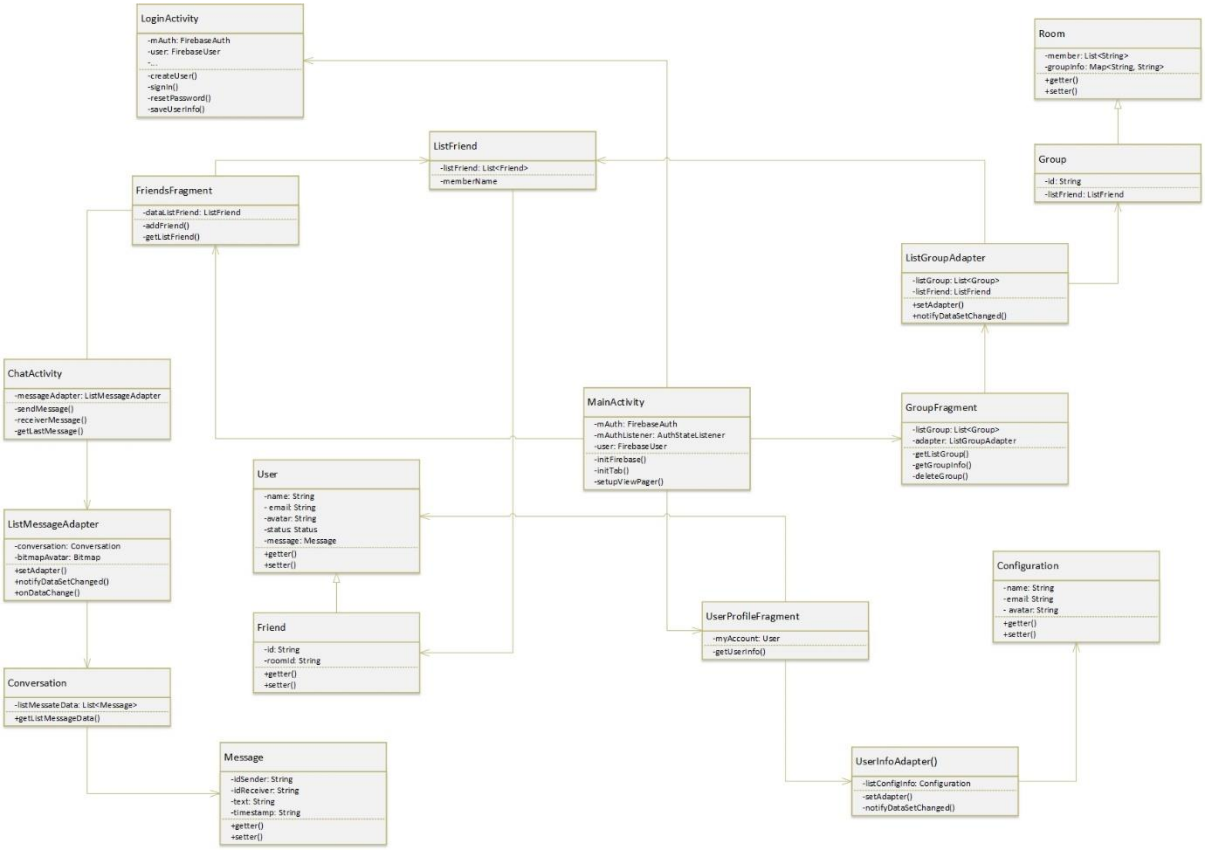


Figure 3:class diagram

4.4.3 Sequence Diagrams

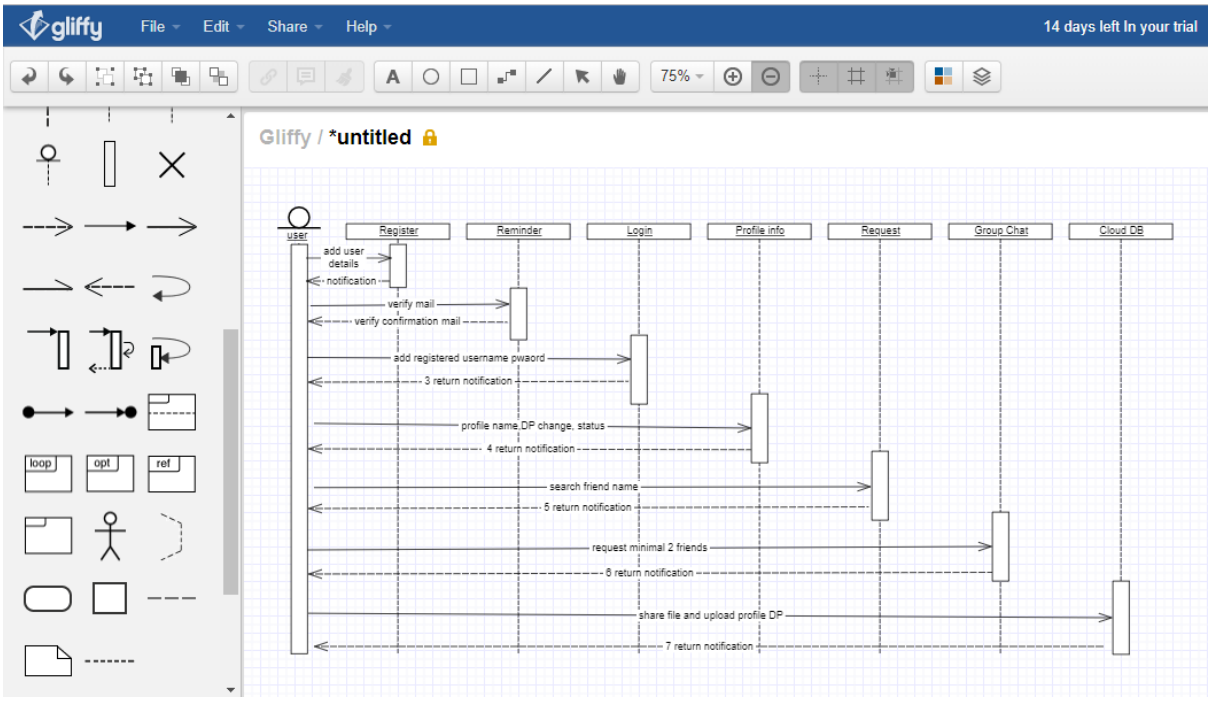


Figure 4: sequence diagram

4.4.4 Activity Diagrams

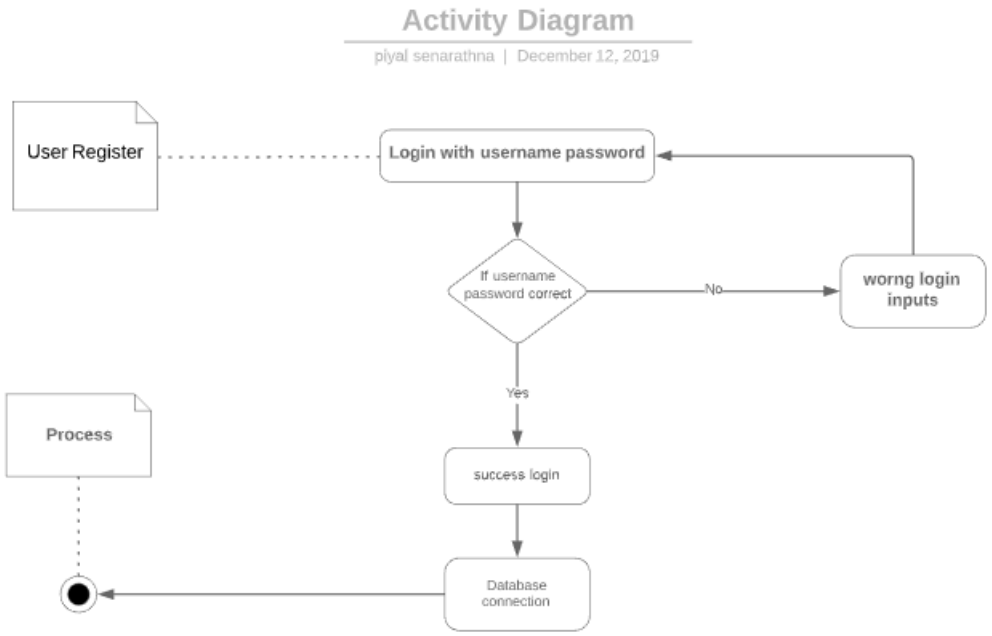


Figure 5: Activity diagram

4.5 Interface Design

4.5.1 Design Principles

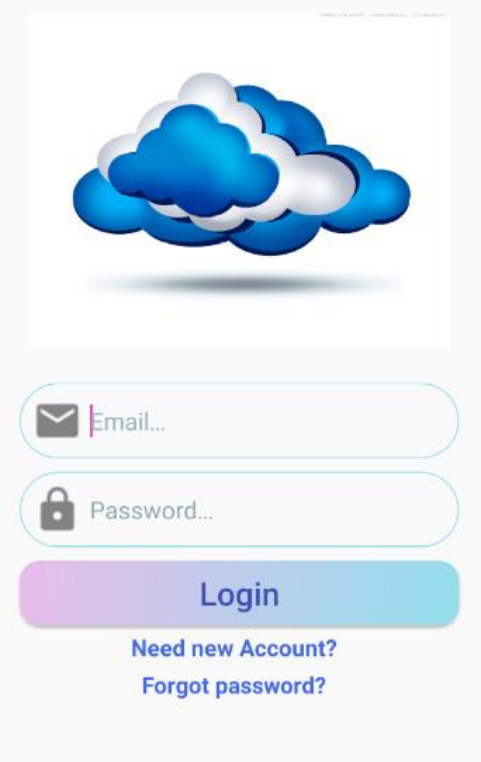
Design principles serve as a starting point for the creation of new designs to solve problems. According to Principles of Design, design principles are aimed at helping designers find ways to enhance usability, influence perception, increase appeal, teach users, and make sound design decisions during projects. [24]

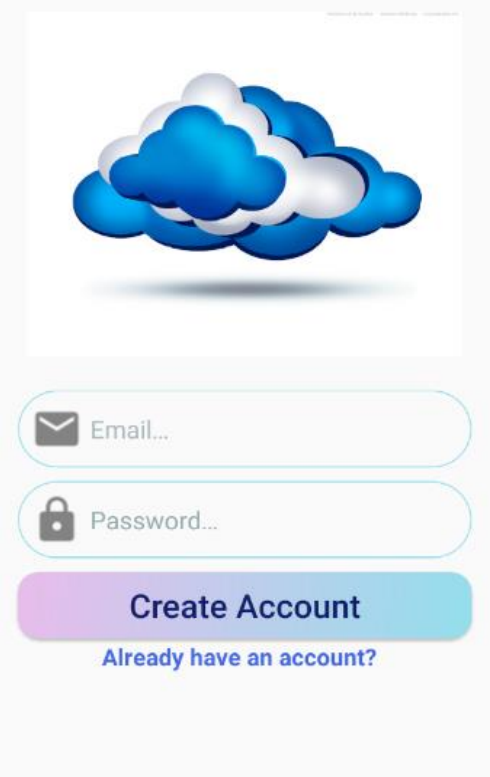
- BALANCE – Balance in design is similar to balance in physics. A large shape close to the center can be balanced by a small shape close to the edge.
- PROXIMITY – Proximity creates a relationship between elements. It provides a focal point. Proximity doesn't mean that elements have to be placed together, it means they should be visually connected in some way.
- ALIGNMENT – Allows us to create order and organization. Aligning elements allows them to create a visual connection with each other.
- REPETITION – Repetition strengthens a design by tying together individual elements. It helps to create association and consistency.
- SPACE – Space in art refers to the distance or area between, around, above, below, or within elements. Both positive and negative space are important factors to be considered in every design

4.5.2 Mock screens of the systems

Under this section some mock screens are showing related this project.

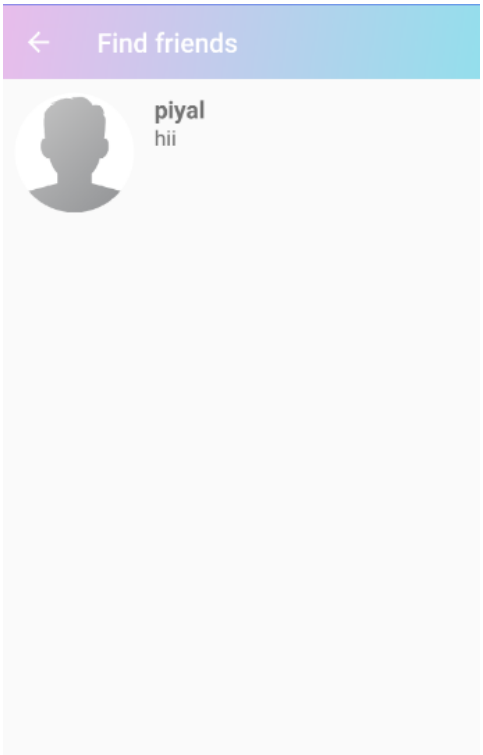
- Registration and login Mock screen



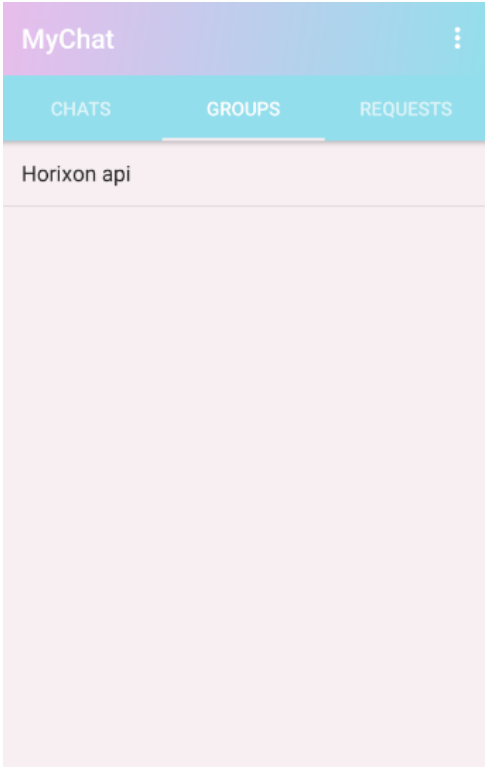


- Chat main menu and starting the chat with friends, friend request and groups

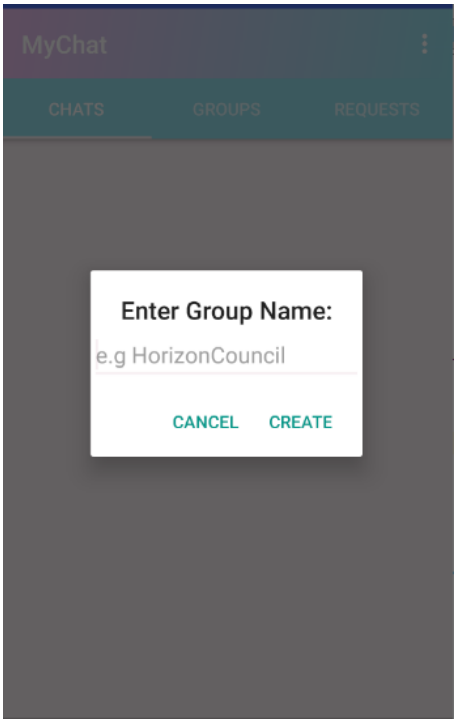
- Find friend who are the using chat app



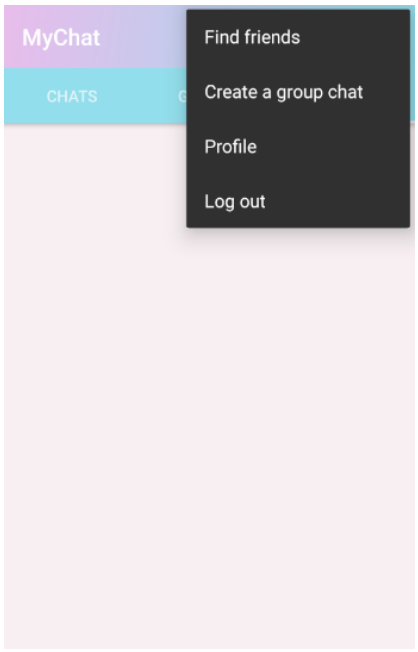
- Croup chatting



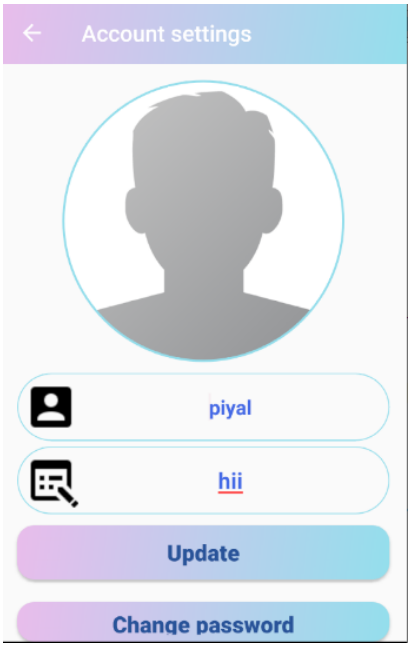
- Create groups with adding minimum two members



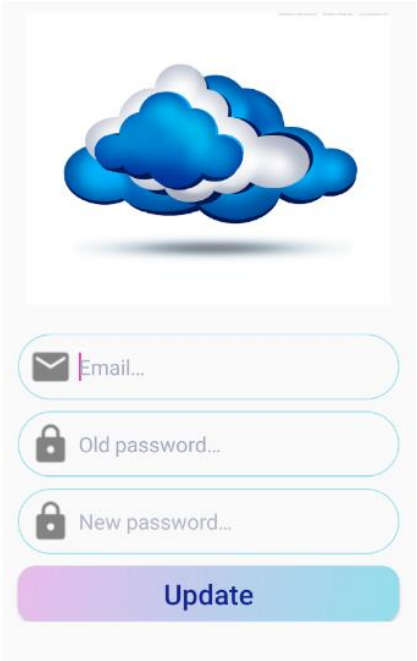
- Set of operations



- Account setting with have customization



- Change password with google operation



Key fuction is email address becouse firbase can have to use with the email address in additionnally user can have to change profile photo and status.

4.6 Database Design

4.6.1 Entity Relationship Diagrams

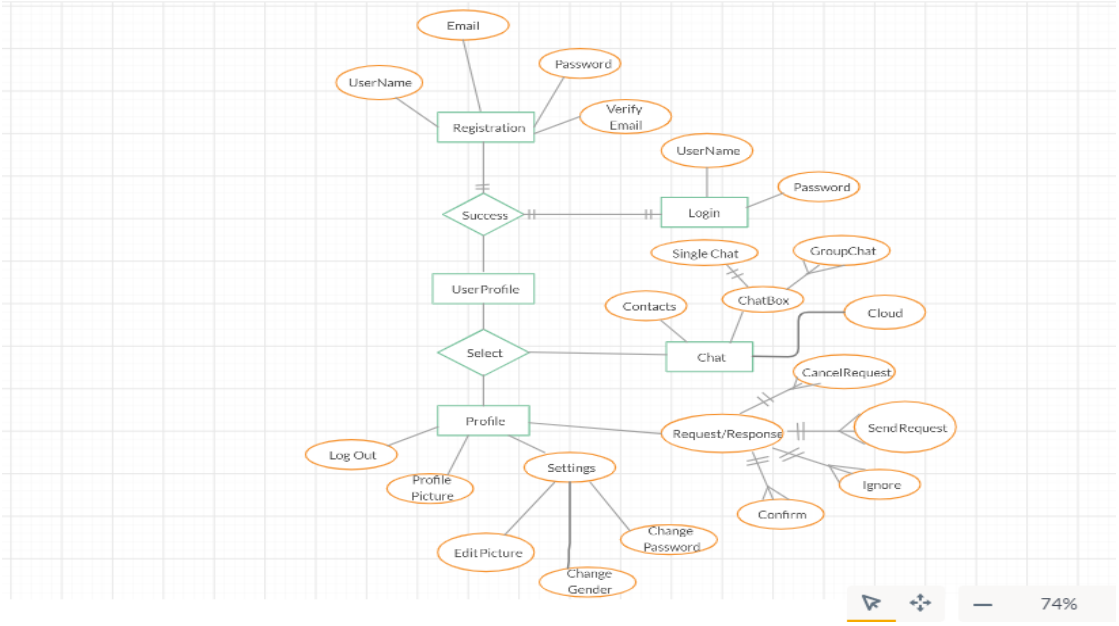


Figure 6: Entity Relationship Diagram

4.6.2 Normalization

The formal definition of Normalization is the sequence of steps by which a relational database model is created and improved. The sequence of steps involved in the normalization process is called normal forms. Essentially, the normal forms applied during a normalization process allow the creation of a relational database model as a step-by-step progression.
For this project, the part of the normalization is shown in Figure 18. [25]

Normal forms:

- First normal form (1NF): a relation is in first normal form if it contains only simple atomic values for attributes, without sets; that is if the attributes do not have sub-attributes.
- Second normal (2NF) form because it is in 1NF and each non-primary key attribute depends entirely on the primary key of the relationship.
- Third normal form (3NF): a relationship is in third normal form if it is in 2NF and no non-primary key attribute transitively depends on the primary key.

4.6.3 Relational Schema

The relational scheme refers to the organization of data as a model of how the database is constructed (divided into database tables in the case of relational databases). For this project, the part of the relational scheme is shown in Figure 18.

CHAPTER 5 – SYSTEM DEVELOPMENT

This step comes after the design process. At this stage, the coding will be done using the appropriate software platforms, programming languages, and tools. This chapter presents the system interfaces for each module and the functionality for it.

5.1 Development Environment

The system development environment describes the essential resources that must ensure that the implementation works.

5.1.1 Hardware requirements

Following table will describe what kind of hardware needed to be to complete this project.

Hardware	**Description**
Processor	Intel(R)core(TM) i3 CPU @ 2.00GHz
Memory	4GB
Hard Disk	500GB
Other	Internet router

Table 2:Hardware Requirements

5.1.2 Software requirements

Following table will describe what kind of hardware needed to be to complete this project.

Software	**Description**
Operating system	Windows 10
Web server	Apache, Firebase
Database	Firebase
Tools	Android studio, Visual Studio Code
Programing languages	JAVA

Table 3:Software Requirements

5.2 Technologies

As the technologies used for this project used the Android study platform as a framework. Because this project is related to the mobile application. To make the connection between the mobile application and the server that used the Firebase hosting package.

5.3 Tools

To develop this application used Java, and Firebase cloud as the tools.

- JAVA

In this project, the Java language is mainly used. Most of the coding part is done with an Android study framework that is a Java-compatible framework.

Java is a popular general-purpose programming language and computing platform. It is fast, reliable and safe. According to Oracle, the company that owns Java, Java runs on 3 billion devices worldwide.

Given the number of Java developers, the devices that run Java and the companies that adopt it, it is safe to say that Java will exist for many years. [26]

- XML- Extensible Markup Language

The user interface design of the Android application was done using the XML language. XML is designed to transport and store data. XML is important to know and very easy to learn. XML tags are not predefined. You must define your own tags. XML is defined to be self-descriptive. With XML the data can be stored in separate XML files. [27]

- Firebase

Firebase is a mobile platform that helps you quickly develop high-quality apps, grow your user base, and earn more money. Firebase is made up of complementary features that you can mix-and-match to fit your needs, with Google Analytics for Firebase at the core. You can explore and integrate Firebase services in your app directly from Android Studio using the Assistant window. Firebase frees developers to focus crafting fantastic user experiences. You don’t need to manage servers. You don’t need to write APIs. Firebase is your server, your API and your data store, all written so generically that you can modify it to suit most needs. Yeah, you’ll occasionally need to use other bits of the Google Cloud for your advanced applications. Firebase can’t be everything to everybody. But it gets pretty close. [28]

5.4 Major Code Segments

This section describes the main parts and functionalities of the application code.

User registration

```
package com.android.mychat.ui;

import ...


public class RegisterActivity extends AppCompatActivity {
    FloatingActionButton fab;
    CardView cvAdd;
    private final Pattern VALID_EMAIL_ADDRESS_REGEX =
            Pattern.compile( regex: "^[A-Z0-9._%+-]+@[A-Z0-9.-]+\\.[A-Z]{2,6}$", Pattern.CASE_INSENSITIVE);
    private EditText editTextUsername, editTextPassword, editTextRepeatPassword;
    public static String STR_EXTRA_ACTION_REGISTER = "register";

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_register);
        fab = (FloatingActionButton) findViewById(R.id.fab);
        cvAdd = (CardView) findViewById(R.id.cv_add);
        editTextUsername = (EditText) findViewById(R.id.et_username);
        editTextPassword = (EditText) findViewById(R.id.et_password);
        editTextRepeatPassword = (EditText) findViewById(R.id.et_repeatpassword);
        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.LOLLIPOP) {
            ShowEnterAnimation();
        }
        fab.setOnClickListener((OnClickListener) (v) -> { animateRevealClose(); });
    }
    private void ShowEnterAnimation() {
        Transition transition = TransitionInflater.from(this).inflateTransition(R.transition.fabtransition);
        getWindow().setSharedElementEnterTransition(transition);

        transition.addListener(new Transition.TransitionListener() {
            @Override
```

Figure 7: Register Code segment

In this figure shows the conversion of the buttons and input elements (Edit text) with the design and connection created with the database.

```
}
@Override
public void onBackPressed() {
    animateRevealClose();
}

public void clickRegister(View view) {
    String username = editTextUsername.getText().toString();
    String password = editTextPassword.getText().toString();
    String repeatPassword = editTextRepeatPassword.getText().toString();
    if(validate(username, password, repeatPassword)){
        Intent data = new Intent();
        data.putExtra(StaticConfig.STR_EXTRA_USERNAME, username);
        data.putExtra(StaticConfig.STR_EXTRA_PASSWORD, password);
        data.putExtra(StaticConfig.STR_EXTRA_ACTION, STR_EXTRA_ACTION_REGISTER);
        setResult(RESULT_OK, data);
        finish();
    }else {
        Toast.makeText(this, "Invalid email or not match password", Toast.LENGTH_SHORT).show();
```

Figure 8: Register Code segment

Above figure showed way of pass the required data through the parameters. Then adding to connect with Java to XML.

Login user

```
public class LoginActivity extends AppCompatActivity {
    private static String TAG = "LoginActivity";
    FloatingActionButton fab;
    private final Pattern VALID_EMAIL_ADDRESS_REGEX =
            Pattern.compile( regex: "^[A-Z0-9._%+-]+@[A-Z0-9.-]+\\.[A-Z]{2,6}$", Pattern.CASE_INSENSITIVE);
    private EditText editTextUsername, editTextPassword;
    private LovelyProgressDialog waitingDialog;

    private AuthUtils authUtils;
    private FirebaseAuth mAuth;
    private FirebaseAuth.AuthStateListener mAuthListener;
    private FirebaseUser user;
    private boolean firstTimeAccess;

    @Override
    protected void onStart() {
        super.onStart();
        mAuth.addAuthStateListener(mAuthListener);
    }

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_login);
        fab = (FloatingActionButton) findViewById(R.id.fab);
        editTextUsername = (EditText) findViewById(R.id.et_username);
        editTextPassword = (EditText) findViewById(R.id.et_password);
        firstTimeAccess = true;
        initFirebase();
    }
```

Figure 9: Login Code segment

Above figure described the once valid username and password entered then move to the dash board.

Firebase connection

```
Variant: debugAndroidTest
Config: debug
Store: C:\Users\Piyal\.android\debug.keystore
Alias: AndroidDebugKey
MD5: 46:A2:21:37:56:A2:B3:7E:7E:14:47:E9:D5:D7:82:39
SHA1: 35:43:2F:91:0B:1A:FF:D1:01:7D:F1:7E:EB:FC:0E:B1:33:1B:FF:2D
SHA-256: 9E:20:46:C0:66:EF:C1:61:B0:94:9D:A6:09:EC:DF:F9:EB:0B:49:1D:11:B3:FB:6A:5A:75:52:CC:03:6D:D6:B3
Valid until: Monday, November 15, 2049
----------
```

Figure 10: Firebase path

In this SHA1 encrypted address want to connect with the applications firebase account

```
buildscript {
    ext.kotlin_version = '1.3.50'
    repositories {
        google()
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle:3.5.1'
        classpath 'com.google.gms:google-services:4.3.2'

        classpath "org.jetbrains.kotlin:kotlin-gradle-plugin:$kotlin_version"
        classpath "org.jetbrains.kotlin:kotlin-noarg:$kotlin_version"
    }
}
```

Figure 11:server

In this classpath address also want to add the application's "build.gradle" file under the dependencies class.

CHAPTER 6 – TESTING AND EVALUATION

The expectation of this test chapter is to ensure that the implemented system achieves the objectives defined above. Multiple types of tests will be included in this chapter. The test is an important chapter of system development because it can make the system match the specifications.

6.1 Introduction

When the application is going to be tested, broken links that are not correctly linked to the corresponding page may appear. And compatibility may also occur during testing, for example, when the implanted mobile application uses an old version of Android such as Ice Cream Sandwich, which may not be compatible with the latest versions of Android such as Android 9 or pie. Therefore, in this implementation unit, the tests will work. The reason for selecting the unit test was that an individual object can be tested separately. It has high precision.

6.2 Testing Procedure

6.2.1 Unit testing

Program units with errors will be sent back to the development stage to correct errors or errors, and the correct functioning error components will be applied for implementation. [29]

Unit tests make sure to find syntax and semantic errors from the only programming unit.

6.2.2 Integration testing

After correcting all functional errors, the application reaches the integration tests. While integration tests ensure that the pages or paths of the chat application are linked correctly.

In this mobile application, the user must be registered and after registering, the user can log in to the system. If the username and password of the correct user, the user will go to the control panel. These pages must be navigated correctly

6.2.3 System testing

At this stage, verify the entire process of the mobile application. Because this is the final test stage before the launch of the application. Verify that all server connections work fine.

All types of previous tests are under the alpha test. Because the tests are performed by the internal testing team.

6.2.4 User testing

User testing slightly changes with the above three testing types because user testing coming under beta testing. The sampling user audience takes to check or test the application.

After completion and fixing all errors, the application sends it to a selected user to user testing. From this stage, the selected user can check whether the mobile application is met with the objectives which are mentioned very first or not. The application should be tested with the user's preferences. For example, can share with the other application users too. then have to provide the application tasks

6.3 Test Plan and Test Cases

6.3.1 Test Plan

Risk	**Problem**	**Impact**	**Mitigation plan**
Schedule Time schedule is not enough to complete the project on time	medium	high	The time plan is strict, there were no extended days for the project. He took every vacation day to complete the project.
Resources The laptop gets stuck when dealing with a large amount of data.	medium	medium	Manage with resources without expanding to new resources. Reduce the amount of trading data.
Defect Time spent while developing graphics with Android. Because there are not enough resources to find.	medium	medium	Graphics library but that is complicated to handle

Scope Cost plan was little bit changed because of the internet data cost.	medium	high	Scope is not change while developing the system.

Table 4: Test plan

6.3.2 Test Cases

Test case 01

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/Fail
TC01	user login	Open the app Enter email, password	Username= piyalsmg@gmail.com Password= Piyal123	User logged in successfully.	As expected	pass

Table 5: Test case1

Test case 02

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/Fail
TC02	Login with invalid data	Open the app Enter email, password	Username= piyalsmg@gmail.com Password= 12345	User name or password invalid	As expected	pass

Table 6: Test case2

Test case 03

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/Fail
TC03	Add friend	Search friend using name	Username = senarathna	Request send to the friend	As expected	pass

Table 7: Test case3

Test case 04

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC04	Create group	Including main user two more request to send the selected friends	Monitoring who are the admins and application users	All request are conformed	As expected	pass

Table 8: Test case4

Test case 05

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC05	Adding profile details more	Enter the name and status with profile pictures	Name status and the photo save in to the database	Save and update information	As expected	pass

Table 9: Test case5

Test case 06

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC06	Change email	Enter the valid email address to reset	Request to email and verifying the actual email address	Email changed successfully	As expected	pass

Table 10: Test case6

Test case 07

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC07	Forget password	Enter email address and sent to the verification email	Emails match the current database and create new password	Password changed	As expected	pass

Table 11: Test case7

Test case 08

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC08	Cloud access	Enter the chat rooms data and change profiles photo	Check the send data and change DP to send it to the database	Database retrieved	As expected	pass

Table 12: Test case8

Test case 09

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC09	Check notification	Close the chat app and close reminder. And send to message using another same chat app.	Notify the notification panel and view sample message	Notification working success	As expected	pass

Table 13: Test case9

Test case 10

Test case Id	Test scenario	Test steps	Test data	Expected result	Actual result	Pass/ Fail
TC10	logout	Setting screen under press the log out button	Press the log out button after application notify log out succeeded	Logout success	As expected	pass

Table 14: Test case10

6.4 Test Data and Test Results

Database

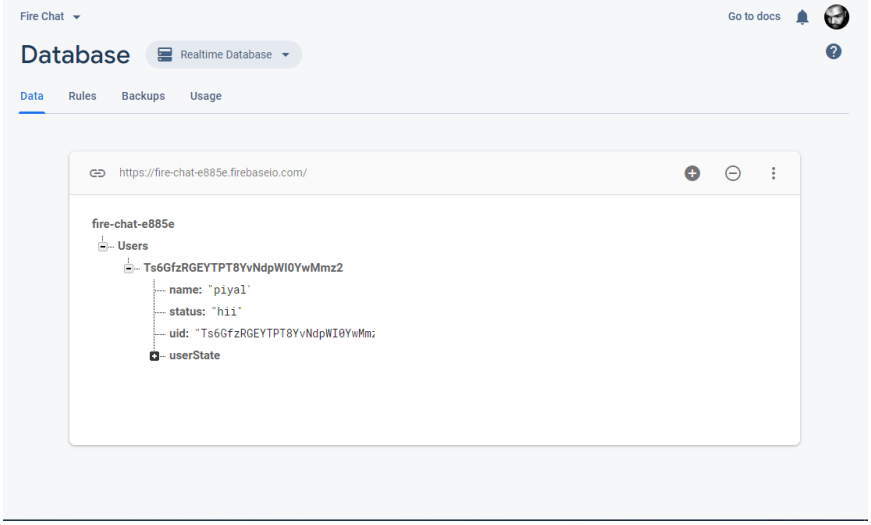


Figure 12: Firebase Database

All the changes are saving in data base name and status and profile photo are saving database presently.

Database storage

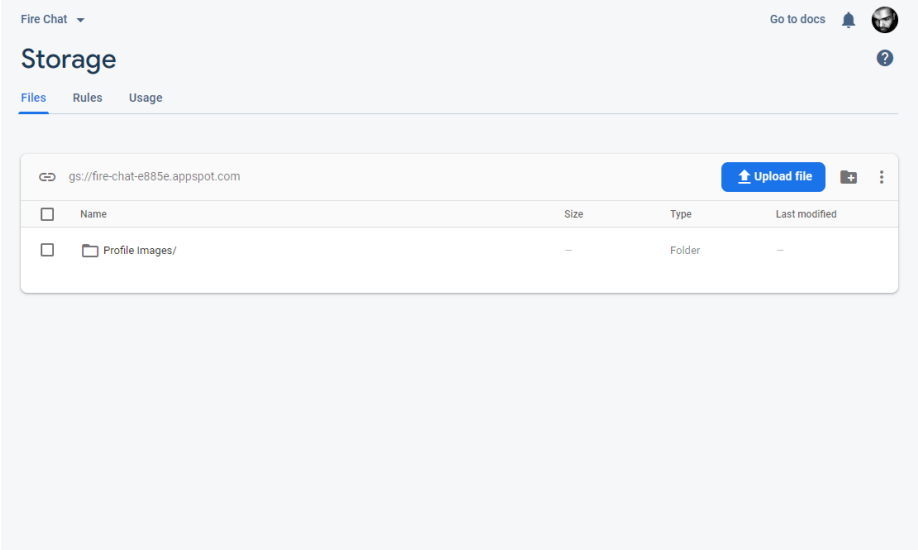
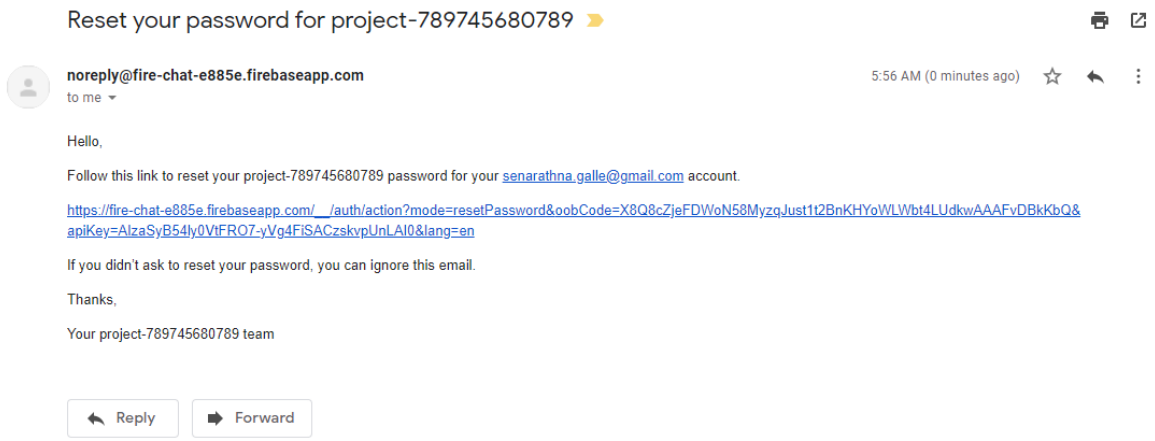


Figure 13: DB storage

In this firebase storage most used to minimal bite of files to upload. In this time storage to save that account profile pictures also change that store database immediately.

Verifying email



It can have to reset current password to using the link. After the data pass with the mail we can't have to use that link after creating new password

6.5 Acceptance Testing

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC01	User login	User has to signed up first	Correct username password	Enter username Enter password Click on log	User logged in and view the chat overview	pass

Table 15: Acceptance Test table 01

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC02	Login with invalid data	User has to signed up first	Give incorrect username password	Enter username Enter password Click on log	User not logged in and view the error message will popup	pass

Table 16: Acceptance Test table 02

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC03	Add friend	User has to logged in first	Friends name	Find the searched friend request to pressing with button	Accepted friend request	pass

Table 17: Acceptance Test table3

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC04	Create group	User has to signed up first In the chat app with selected two friend create group request	Select two or more friends by their names	Click on the group screen create group icon button and select 2 or more friend to create group	Sends group request for other if the no like to join reject it	pass

Table 18: Acceptance Test table4

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC05	Adding profile details more	User has to signed up first In the chat app after have to change name, profile photo and also status	Click the setting and the select profile. Then fill the name as well as their profile status	Click the setting and type in field	Change profile information	pass

Table 19: Acceptance Test table5

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC06	Change email	User have to change their current email address	Go to the setting and click the change email address	Click the setting and change the current email and type on field new email address	Send to verification mail to new mail address	pass

Table 20: Acceptance Test table6

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC07	Forget password	In log screen user can have to change password if not remember	Type current email verify	Select forget password and put the current email and send to the mail verification mail. after that using the mail go to the link and add new password twice	Change login password	pass

Table 21: Acceptance Test table7

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC08	Cloud access	User details store in firebase database	Login details and profile information	In normal usage working with chat app change or registered details can have to store	Data store successfully	pass

Table 22: Acceptance Test table8

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC09	Check notification	User notify in message notification	(null)	Application working on	View notification	pass

Table 23: Acceptance Test table9

Test case ID	Purpose	Precondition	Input	Action/s	Expected result	Pass/fail
TC10	Logout	Click setting under the profile have to see logout button	Log out button	Click log out button and verify it	Logging out successfully	pass

Table 24: Acceptance Test table10

CHAPTER 7 – CONCLUSION AND FUTURE WORK

7.1 Conclusion

This project is the most used to protect data in real-time and stored with the devices. Most applications are using storage on the device and then fail or lose the allocated memory, then the data will be lost because fog users are not sure in the data backup method.

Problem identification, analysis of the data collected, literature review, design, implementation, and testing. He carried out the research technique of answering the questions and interviews with a sample audience.

The project has been continued to achieve the objective of protecting real-time data in cloud storage

7.2 Future Work

As future work, I expect to more develop this application with new functionalities.

I hope to connect this application with AI security system with updatable technologies

I would like to release this app to play the store and make sure free download available.

In the future, this application not only for the android I hope to develop this app compatible with the IOS platform also.

And also hope to develop a kind of social media platform with this chat application based on real-time lives.

I would expect to provide an online web application combined with this chat application

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Appendix A-System Documentation

In this cloud based android chat application framework. Used coding language was java.

Before install android studio to personal computer that user has been downloaded android studio service pack and the setup. Use below URL link to download latest version of android studio platform.

https://developer.android.com/studio/install

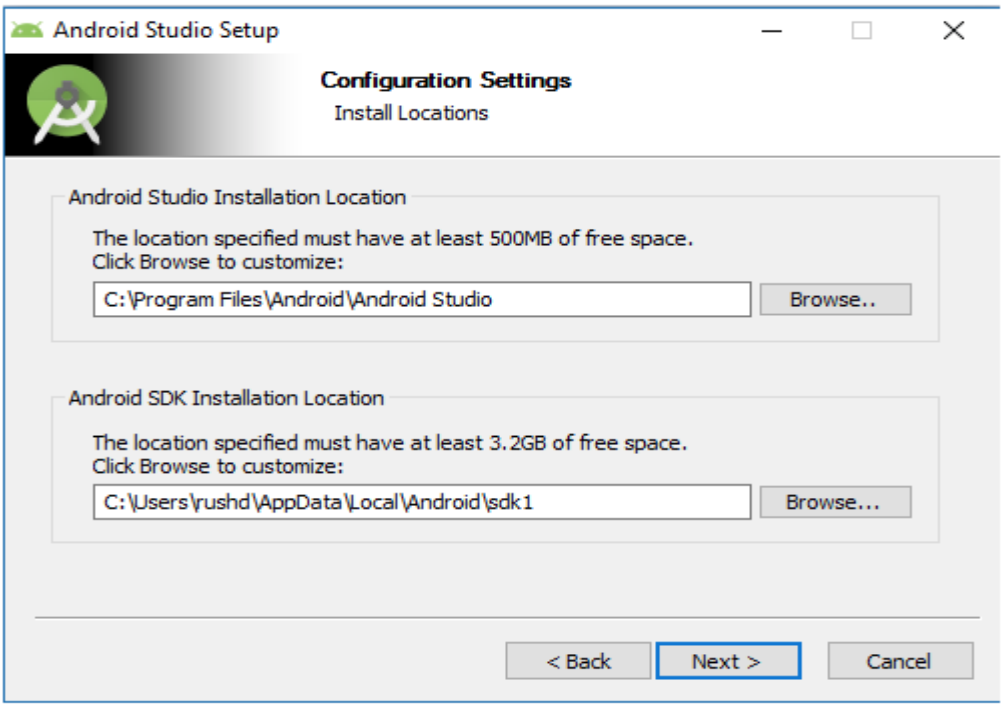

Figure A 1 Installation

After install android to personal computer it is ready to develop to programs.

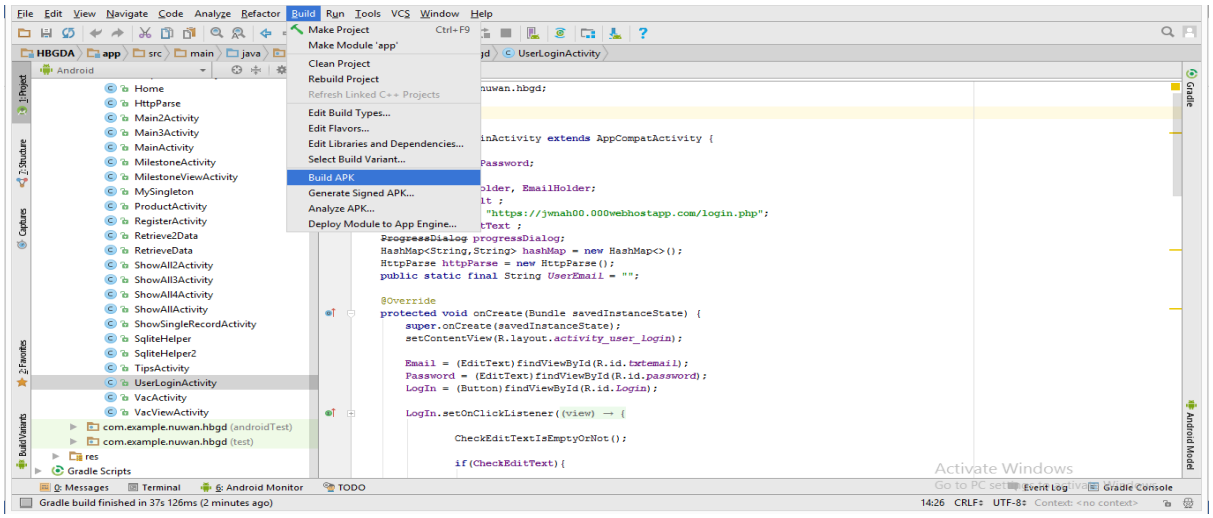

Figure A 2 Compilation

Above figure is described to how to compile developed application.

After compilation process system is getting pop up the Location of "APK".

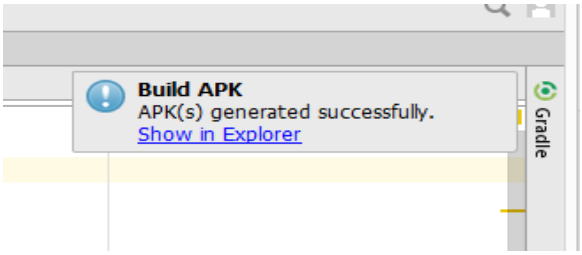

Figure A 3 Build APK

If click on the "Show in Explorer" link, that is redirected to file manager of personal computer.

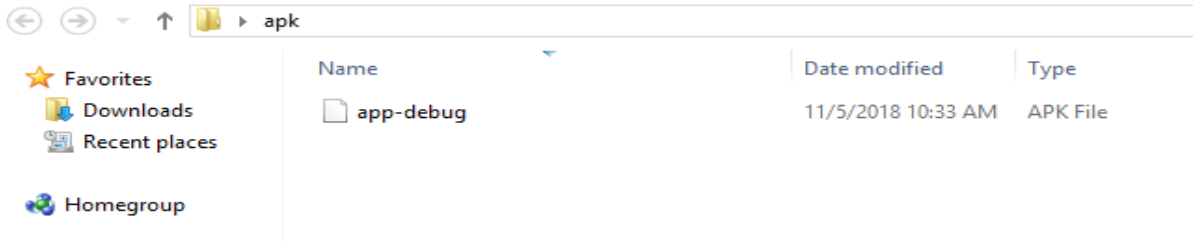

Figure A 4 Open APK

This is the questionnaire form that has been given to collect the necessary information.

CLOUDE BASED CHAT APPICATION

I am Piyal Senarathna, IT student at the Horizon Campus Malabe. I am in the process of making my final project, the topic being “CLOUD BASED ANDROID CHAT APPLICATION”.

As part of my primary data collection, I am conducting a survey regarding people who are using chat applications what are the main barrios and how they work with that and what are the solutions that i had to follow.

Then I start to researching solution to the points and have to create the android application .This is the result of my one-off effort, so if you have any shortcomings or ideas to add, don't hesitate to tell me.

I'm ready to bring this to you all in a timely manner so that everyone can download it in real-time. Contact me if you have any questions. Advance for your assistance.

Thank You..!!

Piyal Senarathna