



Helwan university
Faculty of Computer and artificial Intelligence



Software engineering department

Graduation Project Presented by:

[Yousef Ahmed Mahfouz - 20181843]

[Omar Nader Hassan - 20181822]

[Faisal Tag-Elden Fahmy - 20181823]

[Mahmoud Ahmed Ali - 20181833]

[Nour El-Din Mohamed Mahmoud - 20181840]

[Ahmed Tarek Lotfy – 20191848]

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Supervised by: [Dr. Mai El-Dafrawi]

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FastPay Smart E-Wallet





Acknowledgement:

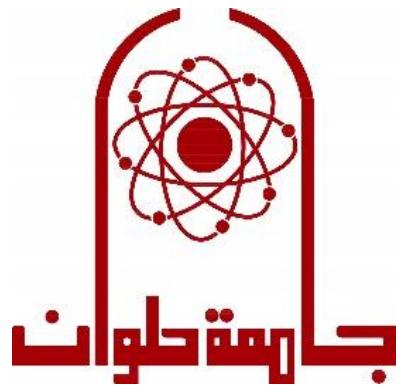
First and foremost, we would like to express our appreciation for our Advisor Dr. Mai El-Dafrawi for the support and guidance making our idea come into light and directing our thinking into the right direction.

We wished time and things were different maybe if we did not have the current situation and the lockdown on the whole city, we would have even gained more experience from her.

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Supervised by DR. Mai El-Dafrawi

Our Team.



Omar Nader



Yousef Mahfouz



Ahmed Tarek



Faisal Tag Elden Fahmy



Nour Elden Mohamed



Mahmoud Fahmy



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Abstract:

Main Idea:

Our mobile application helps our Egyptian users to able to transfer money easily with less restricts that the user found it during create an E-Wallet like you must purchase a SIM Card from the operator that the user going to create the E-Wallet and contract them while FastPay will solve this problem and make money transfer easier, safer, and secured.

Technology:

Structure:

We connect our mobile application with Fire base to create and make our application availability higher approximately to the max and to ensure also the authorization and authentication more securely and easier beside that Firebase is protected by google services to ensure the security of our client data



Firebase is a platform developed by Google for creating mobile and web applications. It was originally an independent company founded in 2011. In 2014, Google acquired the platform, and it is now their flagship offering for app development.

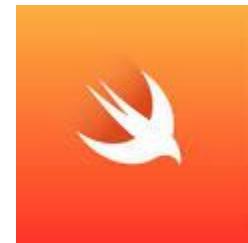
Firebase ensure many services for the applications that depends on them like:

- Real Time Database: Help us in Build serverless apps by storing and syncing JSON data between your users in near-Realtime, on or offline, with strong user-based security.
- Remote Config: Help us to Set up feature flags during prototyping and development so you can dynamically control and optimize the user experience in production.



- Firebase ML: Allow us to Add powerful machine learning features to your app with ready-to-use APIs and support for custom model deployment.
- Authentication: Allow us to Add an end-to-end identity solution to your app for easy user authentication, sign-in, and onboarding in just a few lines of code.
- Cloud Messaging: Help us in Getting infrastructure to reliably send and receive push messages between your server and devices, across platforms at no cost.
- Hosting: Let us to deploy fast-loading, secure websites that are backed by a global CDN without all the hassle.
- Cloud Storage: Help us in storing and serving user-generated content with ease as your app grows from prototype to production-ready.

We use **SWIFT** to develop our mobile application to able to build mobile application for both of android and IOS easily with just one framework.



SWIFT:

SWIFT is a general-purpose, multi-paradigm, compiled programming language developed by Apple Inc. and the open-source community.

First released in 2014, Swift was developed as a replacement for Apple's earlier programming language Objective-C, as Objective-C had been largely unchanged since the early 1980s and lacked modern language features.

Swift works with Apple's Cocoa and Cocoa Touch frameworks, and a key aspect of Swift's design was the ability to interoperate with the huge body of existing Objective-C code developed for Apple products over the previous decades.

It is built with the open source LLVM compiler framework and has been included in XCode since version 6, released in 2014. On Apple platforms, it uses the Objective-C runtime library which allows C, Objective-C, C++, and Swift code to run within one program.



Chapter 1: Introduction

In this chapter we are going to discuss and go deeper in the overview of the project and know more about its scope and limitations and explain some terminologies we will find throughout the document.



1.1 Overview:

FastPay is a mobile application for IOS that allows the user to change his cash money to an electronic money that will allow the users to purchase, transfer and receiving money from anywhere to anywhere beside that FastPay will help user to pay all his monthly bills with just small verification and one click.

Our application will have multi users like:

- Stander user
- Seller user
- Moderator
- Admin

1.2 Objectives:

- Transfer money from anywhere in Egypt to anywhere
- Trading money using contactless way by QR code and scanner
- Buying public transport tickets without using cash money
- Automation for your monthly bills
- Pay all your daily needs with one click

1.3 Purpose:

Make your daily money trading without any need for physical money need in your pocket all you need is your phone that have an internet connection and an account that have been verified by FastPay with your ID and start to recharge your account with any available way you want to recharge your balance with



1.4 Scope:

The approximate work involved to finish the project is divided into these four phases: -

1. Planning

- a. Collecting data about the project and the lack that made us in a need to the App.
- b. Making surveys in different ways (video, questionnaires, forms, etc.).
- c. Determining the functional and non-functional requirements.
- d. Setting a Gantt chart for the project.
- e. Determining the resources of the team

2. Designing

Determining the diagrams to be carried out within the project:

- a. ERD Diagram
- b. DFD Diagram
- c. Class Diagram
- d. Use-case Diagram
- e. Sequence Diagram
- f. Activity Diagram

3. Coding

The main functions that we have developed in our app is

- a. Sign in
- b. Sign up
- c. Checking balance
- d. ID verification
- e. QR Generate
- f. Summaries your outcome money
- g. Purchase product
- h. Buy ticket
- i. Automate your payments
- j. Manage cards
- k. Edit profile
- l. Submit a ticket



4. Testing

- a. Functional Testing
 - i. Unit testing
 - ii. Regression testing
 - iii. Integration testing
- b. Non-Functional Testing
 - i. Performance testing
 - ii. Stress testing
 - iii. Security testing

1.5 General Constraints:

- Tasks division which can be not fair enough.
- Indiscipline “Human factor” like being late in delivering tasks or attending meetings
- Hesitation, especially when it is related to taking a serious step or learning a new technique
- Time management
- Learning new technologies may take much time
- Underestimating the objectives that may not lead to realistic or achievable function



Chapter 2: Project “Planning and analysis”

In this chapter we are going to discuss and go deeper in how we plan the project and show the steps and the instructions that we have followed to plan the application.



2.1 Project Planning:

2.1.1 Feasibility Study

A feasibility study is done to determine if a business or a project is achievable, so for determining the achievability for our project we will go deeper in the following points:

1-Marketing Analysis:

- FastPay will replace the idea of entering this code on your cell phone signal to transfer money and depend on the internet to make it more reliable and secure
- FastPay will allow user to create account with lower restricts than even all you need is just your national ID and a selfie for your face then all your transaction will be done with few clicks
- FastPay have many unique features than the competitors like:
 - FastPay does not need phone number to create account
 - FastPay does not need any bank account to create your account
 - FastPay will ensure your money transfer to the other side using QR code without any conflict or errs while transferring money
 - FastPay always will make you forget the cash (banknote) and depend on changing your money to an electronic money with just one click
 - Ability to recharge from many ways even online or offline not just our point of sale

2-Organizational Analysis:

- Our team will become consist of more this employee will consist of:
 - 2 Developers
 - 2 Security Testers
 - 1 Analyst



- 1 Customer service
- Why do we need such a huge team?

The applications need to be launched on the Android and iOS to make it easier and convenient for the user to access the application and get the right treatment.
The application must be minimal to make the experience unique for our clients.

3- Operational Analysis:

- We provide some rules and services to our employees such as:
 - A very suitable environment for work.
 - Commitment to the deadlines.
 - A very decent salary.
 - Flexibility holidays to ensure our employee to be happy to have their max power of work efficiency
 - Comfortable appreciation system in the office



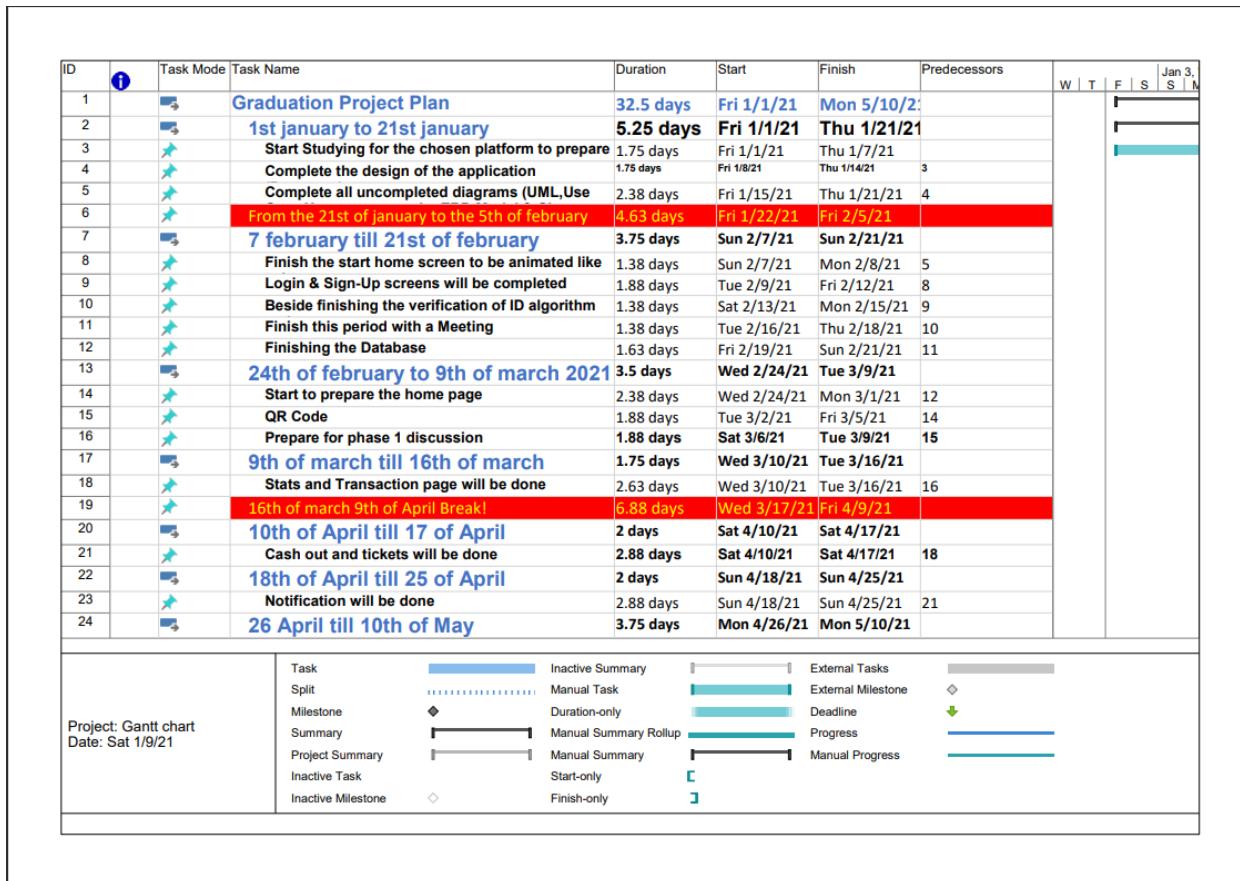
2.1.2 Estimated cost

FastPay estimate cost reach 50,000 LE per month due to the depend on marketing table to face the hugest companies like Vodafone cash, and the other E-Wallet and to build the trust factor with our users faster beside the office rent and the monthly requirement of fire base beside the security data company that will leads FastPay security and ensure the data is secured and safe 24/7

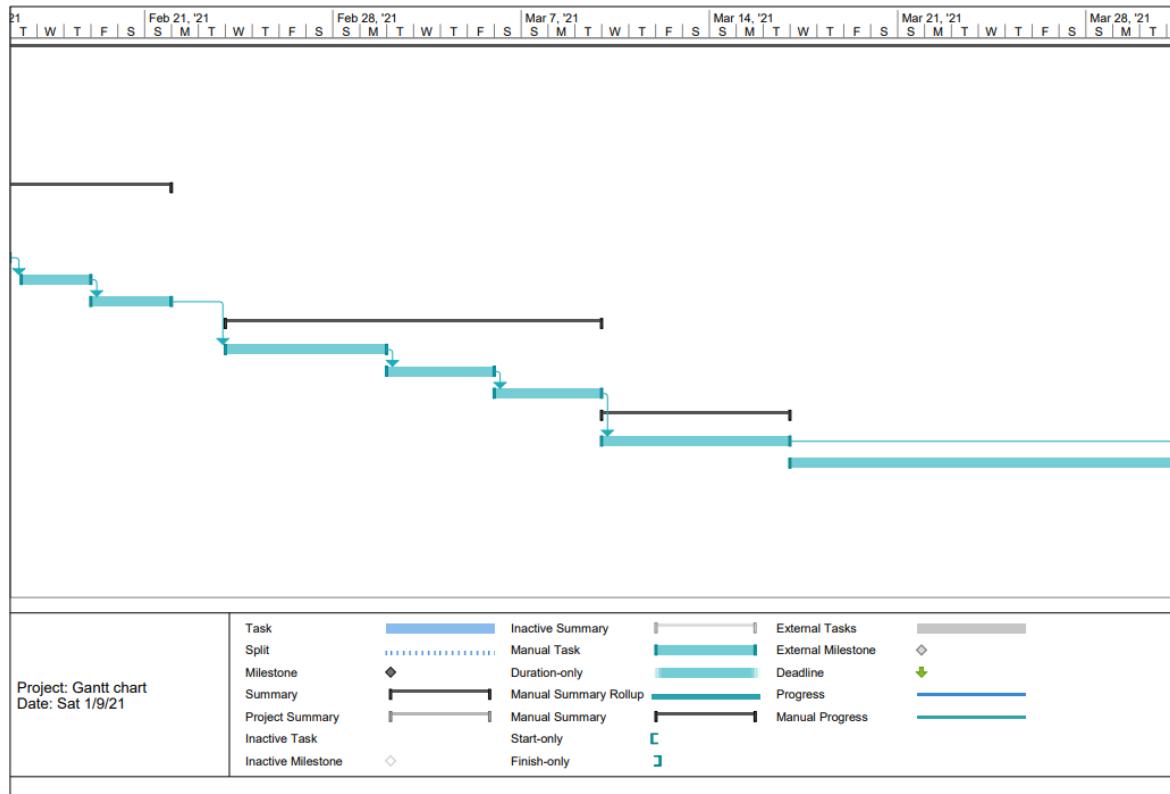
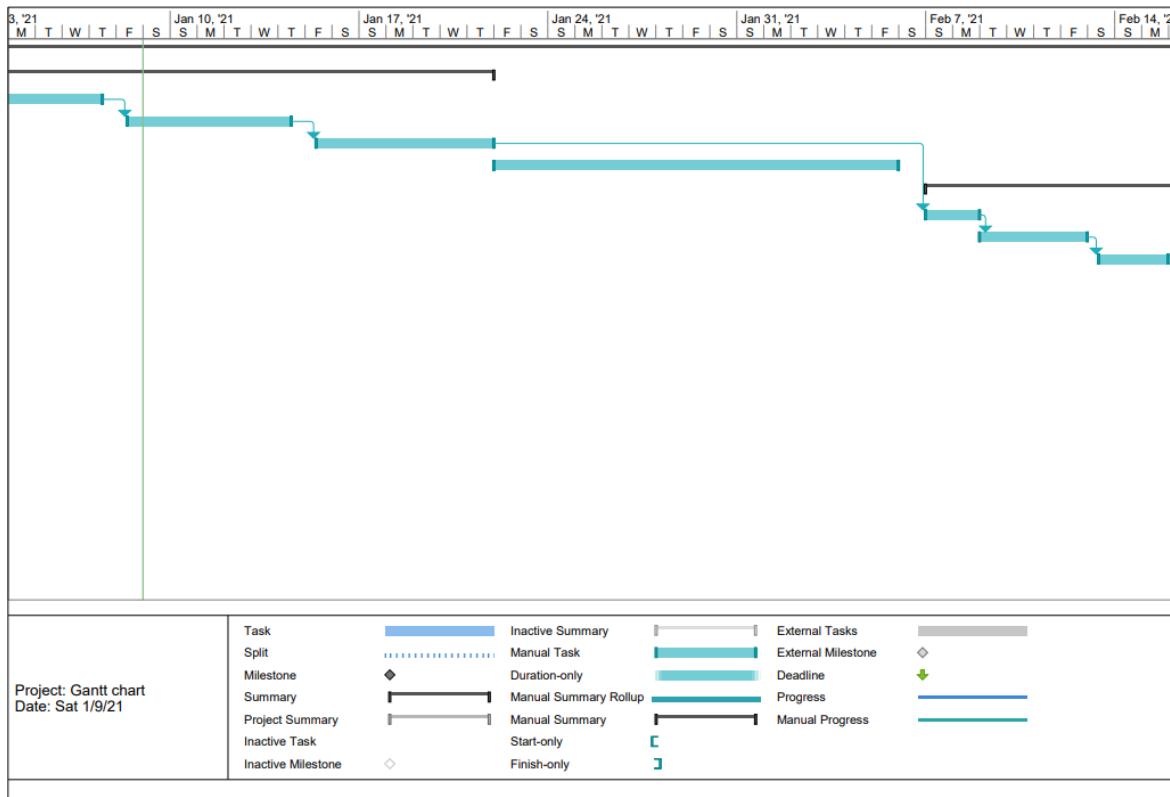
1. About 10,000 EGP monthly office rent in Cairo
2. About 7,000 EGP monthly for Data security
3. About 10,000 EGP for cloud services to able to ensure the availability of FastPay
4. About 20,000 EGP monthly salaries for our employees
5. We will have 3,000 EGP spare if any emergency FastPay will fall in

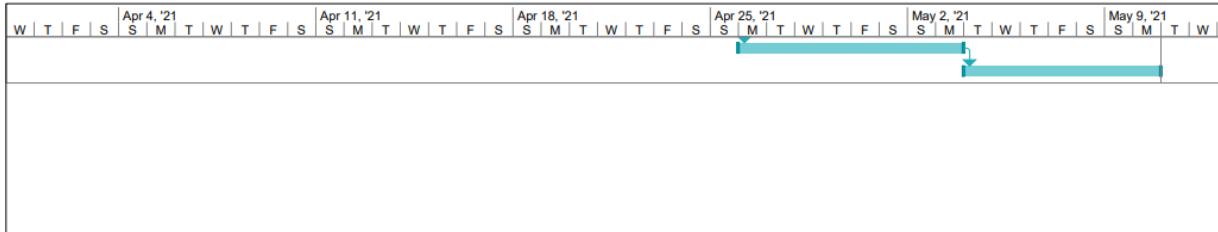
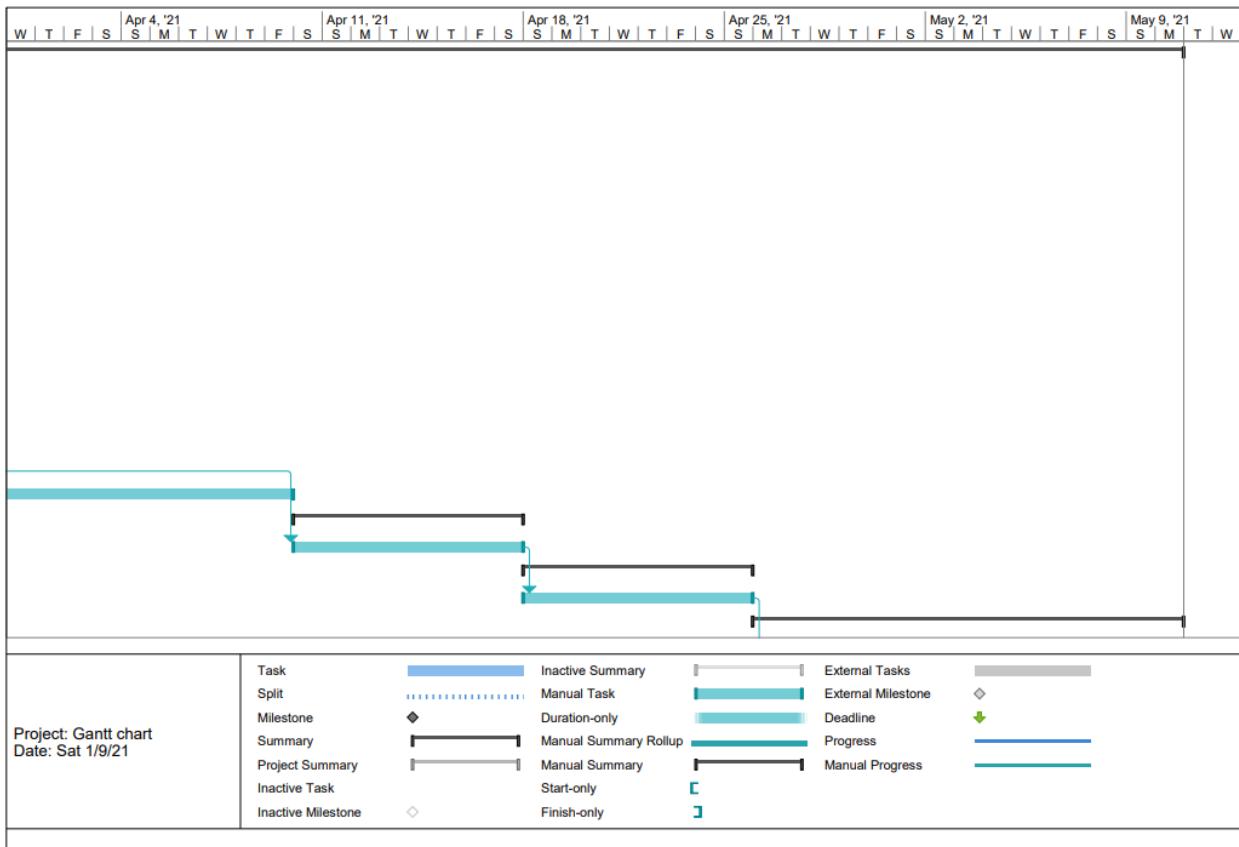


2.1.3 Gantt chart



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	W	T	F	S	S	M
25	↗	Profile will be done	2.88 days	Mon 4/26/21	Mon 5/3/21	23						
26	↗	start putting the testing plans	2.63 days	Tue 5/4/21	Mon 5/10/21	25						







2.2 Analysis and Limitation of existing system:

Vodafone Cash:



Vodafone cash is the oldest E-Wallet in Egypt since 2013 based on network operator to receive money and transfer it in 2018 Vodafone start to create application to use all Vodafone services includes Vodafone Cash also but it has a problem that “Ana Vodafone” app allows the user to use the services while using Vodafone Mobile data that is sync with Vodafone E-Wallet to ensure some security purpose so some of features that Depends on the application like online purchase and QR Code scanning to pay has been disabled until you connected via Vodafone Mobile Data beside that as a client you aren’t able to create an account without being Vodafone User



Etisalat Cash:



Etisalat Cash is the most new E-Wallet in Egypt that has about 0.3% from E-Wallets Clients in Egypt , Etisalat Cash was able to create new mindset for E-Wallet users that allows them to use their wallet without any need to use Network codes or even to call customer support many times all you want to do is using their app under any network without any problems but at some times money senders faces some problem during paying their utilizes and also during sending as the application didn't double check the sender ID and also Etisalat isn't responsible for wrong number transactions and this could make the user afraid to use it



PayPal:



PayPal is a world wide E-Wallet and Payment that Allows people from all the world to receive and send money beside purchasing products and ensure customers security payment and ensure to repay them in case the service they bought did not meet what the buyer said in description but unfortunately the service is not working in Egypt as the people are not able to change their money to cash again in Egypt beside the disability from purchasing locally



2.3 Need for the new system:

2.3.1 BMC Model

Business Model Canvas		<i>Designed for:</i> Cayshly	<i>Designed by:</i>	<i>Date:</i> 4/9/2020	<i>Version:</i> 1.0
Key Partners -Any bank that will activate the online solution for us (Local bank preferred) -the offline payment methods that will allow the user to add funds to his wallet (fawry masary aman) -software security company to secure our app continuously -the national network of banks Mezza -the government and metro company	Key Activities Enable money transfer with high level of authentication for the client Ability to pay in any channel accepts online payments Paying your Utilities Store your funds	Value Propositions Ability to add funds from your home with one click More security during confirming the money transaction transfer Tracking citizen while using public transportation Tracking money flow Contact less payment Adding funds using mobile credits	Customer Relationships Online using the application to able us to catch the transaction that the customer have problem with Using the HotLine to be served in anywhere and any time Using rating about the app after amount of transactions on the application	Customer Segments Target audience: -Age: +13 > 50+ -Location: Cairo and Giza -Class: B, C+, C, D+ Behaviour : -using public transportation regularly -Using online payments -Having mobile wallet -Prefer online payment than cash -Smartphone user	
Cost Structure -Hosting server -Security company -Testing -Bank Revenue -Database Material and maintenance -Updating the application -Application Team salaries -Internet connections -Advertising Campaigns	Key Resources -Server to host the Application -Databases to store the clients data and transaction history -Super high security layers to protect the clients data -Data analysis to be able to visualize the data of the clients -Customer Support -Bank account with API -Developers and testers team for the application	Revenue Streams <ul style="list-style-type: none"> • First, Cayshly service will be totally free • If the first phase ended successfully we will add service cost which will be 1% during the withdrawal only not during paying • After the second phase Cayshly will have an official independent payment method for many users so Cayshly will add 2% service cost while withdrawing money from your wallet if needed, and will start to study the ability to add super markets and markets to be a gateway to use the wallet 			

2.3.2 Specifications

The old system had some restrictions that were not likable to the user:

- Having your wallet connected to your sim card which means you can only send and receive via the cash app if and only if you and the receiver have the same sim card.
- Frequent service outage
- Some restrictions while adding funds
- Unavailability of online payments in the E-Wallet
- Putting a Min. limit to complete the transaction
- Manual payment for your monthly bills



2.4 Analysis of the new system:

1. User Requirements:

- a. Security/Reliability/Maintainability/Availability.
- b. Simplicity
- c. Ease of use
- d. Privacy

2. System Requirements:

- a. Mobile device running IOS 13 or higher
- b. Mobile device with a rear camera system

3. Domain requirements:

- a. Ability to add balance
- b. Withdrawal available balance when needed
- c. Verify identity of the user
- d. Send and receive money with your wallet ID

4. Functional requirements:

a. Sign up

- i. Actor:
 - 1. User
- ii. Perquisite:
 - 1. Having ID
 - 2. download the Application on your mobile
- iii. Description:
 - 1. The user going to enter his validates data to FastPay system to allow him to receive and send money
- iv. Post:
 - 1. Having an activated account on FastPay and ready to use the Wallet

b. Sign in

- i. Actor:
 - 1. User
- ii. Perquisite:
 - 1. Having and valid account



2. Enter the data correctly

iii. Description:

1. A form that asks the user to enter his valid data to access his profile

iv. Post:

1. Allows user to start using the application to able to send and receive money and start to use electronic money in no time

c. Add balance

i. Actor:

1. User

ii. Perquisite:

1. Having an activated account

iii. Description:

1. Increase the money of the user using payment method allowed in the app to start sending money and purchasing

iv. Post:

1. Increase user balance on the account after confirmation the payment from any payment method that is suitable for him

d. Check Balance

i. Actor:

1. User

ii. Perquisite:

1. Having an activated account

iii. Description:

1. Users may try to check his left balance in wallet to ensure his balance to be good for his daily cash requirements
2. Confirming his pin code or confirm his fingerprint to see the left balance

iv. Post:

1. Viewing the left balance



e. Withdrawal (On Card)

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account
 2. Having left balance
- iii. Description:
 1. User requests to Withdrawal his e-wallet to cash on one of his cards
- iv. Post:
 1. Deduce the Withdrawal money from the left balance and transfer it to the bank that the user uses and deposit it in his card

f. Withdrawal (ATM)

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account
 2. Having left balance
- iii. Description:
 1. User requests to Withdrawal his e-wallet to cash
- iv. Post:
 1. Deduce the Withdrawal money from the left balance and transfer it to the bank that the user uses to Withdrawal from it is atm

g. Send Money

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account on FastPay
 2. Having enough balance
- iii. Description:



1. The user wants to send money to other FastPay account using his account ID
- iv. Post:
 1. the sender account deduced the amount of money transfer

h. Send Money Using QR Code

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account on FastPay
 2. Having enough balance
 3. Other user that has FastPay App generate receive QR Code to get his money
- iii. Description:
 1. The user wants to send money to other FastPay account using his QR Code
- iv. Post:
 1. the sender account deduced the amount of money transfer

i. Receive

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account on FastPay
- iii. Description:
 1. The user prepares his account to receive money from any account on FastPay to increase his account balance
- iv. Post
 1. The user receive money from any FastPay account and increase his account balance

j. Check Transaction History

- i. Actor:
 1. User



- ii. Perquisite:
 - 1. Having account
 - iii. Description:
 - 1. The user wants to see all his past transactions done in FastPay
 - iv. Post:
 - 1. The application will retrieve all transaction done on this account to allow the user to review and check his transactions
- k. Edit profile**
- i. Actor:
 - 1. User
 - ii. Perquisite:
 - 1. Having account
 - iii. Description:
 - 1. Allows the user to change any details that our data base has stored about him
 - iv. Post:
 - 1. All changes the user done stored in Database and edited in all other stored data

I. Metro

- i. Actor:
 - 1. User
- ii. Perquisite:
 - 1. Having account
 - 2. Having Enough Balance
- iii. Description:
 - 1. Allows the user to request a metro ticket contactless using electronically money and our POS machines in metro using QR Code scan
- iv. Post:
 - 1. Amount of ticket is deduced
 - 2. The user's stations will be stored to be tracked later



m. Submit a ticket

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account
 2. Having a problem in a transaction
- iii. Description:
 1. The user complains on a transaction that has a problem and the application attached the transaction ID in the ticket to help the Moderation agent to know the issue the client faces and help him
- iv. Post:
 1. The clients will submit a ticket, or he is going to be redirect to one of our agents to solve his problem

n. bills

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account
 2. Pay a bill or any utility
- iii. Description:
 1. The user after paying any utilities or any bill will be asked to pay every month his bills with one click
- iv. Post:
 1. Pay his bills and confirm the payment with just one click with respect to deduction of the amount from his balance

o. Manage cards

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account
 2. Having cards sync into his account



iii. Description:

1. View and manage the priority of his cards during payments and choose action to done on them

iv. Post:

1. Viewing a list of cards, the user owns on his account

p. Add card

i. Actor:

1. User

ii. Perquisite:

1. Having account

iii. Description:

1. Sync your account to new card and verify it is working

iv. Post:

1. Adding a card to ensure that your account have as much as money in all times

q. Delete Card

i. Actor:

1. User

ii. Perquisite:

1. Having account
2. Having more than one card

iii. Description:

1. User chooses to delete one of his cards from his account

iv. Post:

1. The Card is deleted from his account and our database

r. Edit Card

i. Actor:

1. User

ii. Perquisite:

1. Having account
2. Having card connected to the account

iii. Description:



1. The user wants to edit some of his card details to ensure that it is updated
- iv. Post:
 1. The updated data is tested and verified then added to our data base

s. Application Feedback and bug report

- i. Actor:
 1. User
- ii. Perquisite:
 1. Having account
 2. Shake his mobile
- iii. Description:
 1. The user faces an error or failure during using the application or even wants to report a bug in the app
- iv. Post:
 1. A ticket is being established for the technical support to resolve it

t. Change ticket Status

- i. Actor:
 1. Moderation
- ii. Perquisite:
 1. Having account
 2. Having ticket number that is assigned to him/her
- iii. Description:
 1. The moderator changing status on the ticket according to the situation
- iv. Post:
 1. The ticket statuses changed to both the user and moderation team



5. Nonfunctional requirements:

- a. We would have many Interfaces constraints like user interface should follow the design guidelines of all platforms that the app will be available on.
 - i. Easy navigation
 - ii. Responsive UI
 - iii. User centric approach
 - iv. Consistent UI elements
 - v. Perfect colors to feel the user with safety
- b. And some **Performance Constraints** like:
 - i. sending and receiving money should not take more than 1 minute.
 - ii. app loading should not take more than 5 seconds.
 - iii. loading transactions history should not take more than 5 seconds
- c. beside some **Life cycle constraints** like:
 - i. App should receive frequent updates to fix previous bugs and add more features.
 - ii. App should be maintainable and scalable.
- d. Beside some security Constraints like:
 - i. User could not open the app without confirming his face ID first
 - ii. Each account will be tracked using his ID he used in Signup form
 - iii. Each account will not be able to be logged in from 2 different devices

2.5 Advantages of the new system:

1. Ability to send and receive money using QR code or the unique user id
2. Ability to charge wallet with multiple methods (debit/credit card, FAWRY, Vodafone cash, etc.)
3. Ability to Withdrawal money at any time of the day
4. Creating a wallet does not depend on a sim card



5. Ability to track previous transactions
6. System is secure and available 24/7
7. Purchasing Metro Tickets with just scanning QR Code

2.6 Risk and Risk management:

1. Risk Identification:

a. Technology

- i. We may face some of failure in our technology as the users is not familiar with scanning QR codes and E-Wallets in Egypt beside that our server would have many loads during the start of month as many people receive money and Withdrawal their money at the same time and this could make us "FastPay" unable to handle all those requests

b. Market

- i. The other E-Wallet in Egypt has taken the most part in market and build a trust relationship with their clients so FastPay may face some problems in building trust between people and others

c. Organization

- i. Some of our employee may prefer to work with some of competitors rather than working in FastPay which is a new company in the field of E-Wallet

d. Security Issues

- i. FastPay may faces to many tries to be attacked specially that we are a money organization that makes FastPay very worthy target to be hacked

e. Market increase

- i. FastPay may faces increase in client's number in no time that may leads to fatigue in our system that may



cause many failures during very short and broke our trust relationship with our clients

2. Risk Analysis:

- a. Organizational financial problems forcing a reduction in the project budget.
 - i. This situation has low probability to be happened
- b. It is impossible to recruit a staff with the desired skill level required for the project
 - i. This situation has moderate probability to be happened
- c. Server is faulty
 - i. This situation has low probability to be happened
- d. Important staff members are not available at important time.
 - i. This situation has very high probability to be happened
- e. Defect in the software components that limit its functions.
 - i. This situation has Moderate probability to be happened
- f. Changes in the requirements that require major design changes.
 - i. This situation has high probability to be happened
- g. The organization is restructured so that different people are now in charge of the project.
 - i. This situation has low probability to be happened
- h. the data base used cannot process as many requests per second as expected
 - i. This situation has moderate probability to be happened
- i. The time estimated to develop the software is underestimated.
 - i. This situation has very high probability to be happened
- j. Customers fails to understand the impact of requirements change
 - i. This situation has low probability to be happened
- k. The rate of defect repair is underestimated
 - i. This situation has high probability to be happened



Chapter 3: Software Design

In this chapter we are going to discuss and go deeper in FastPay system design and present its diagrams and database



3.1 Firebase Structure:

The screenshot displays the Firebase Realtime Database interface with two main collections visible in the left sidebar: **Complaints** and **MetroTrips**.

Complaints Collection:

- A document named **12345678900000** is selected, showing the following fields:
 - description:** "Breif Description pocovicux"
 - email:** "omar@yahoo.com"
 - isClosed:** true
 - nationalID:** "12345678900000"
 - numberOfAttachments:** 2
 - phoneNumber:** "+201550854289"
 - username:** "omarghanem"

MetroTrips Collection:

- A document named **12345678900000** is selected, showing the following fields:
 - 2021-07-03 11:00:13**
 - cost:** 5
 - destinationPoint:** "Kozzika"
 - startingPoint:** "Helwan"



Fast Pay ▾ Go to docs Bell User icon ?

Cloud Firestore

Data Rules Indexes Usage

Prototype and test end-to-end with the Local Emulator Suite, now with Firebase Authentication Get started X

pendingUsers

fast-pay-ad9f1	pendingUsers	
+ Start collection	+ Add document	
Complaints	38383060686864	
MetroTrips		
pendingUsers		
users		

Cloud Firestore location: eur3 (europe-west)

Fast Pay ▾ Go to docs Bell User icon ?

Cloud Firestore

Data Rules Indexes Usage

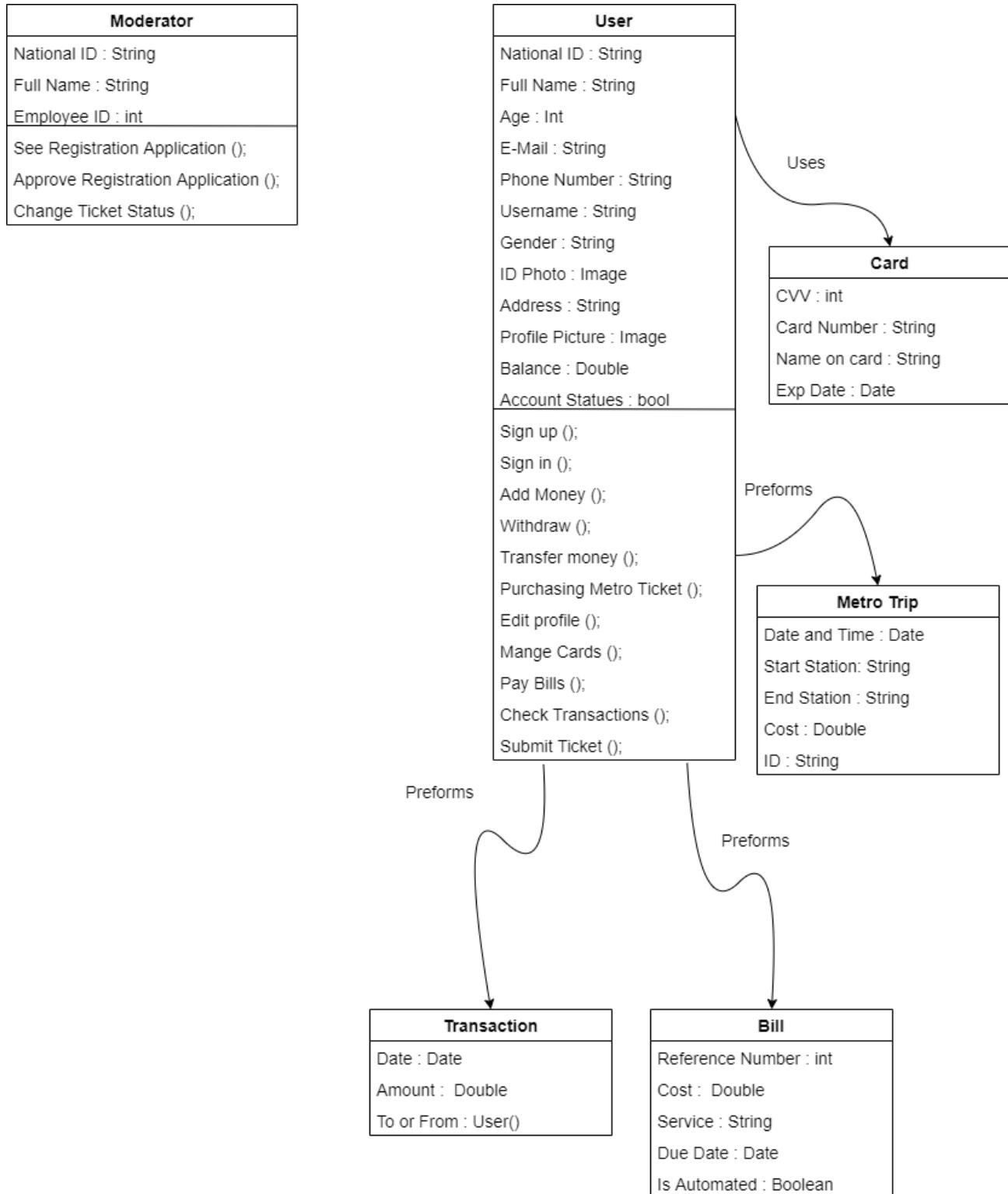
Prototype and test end-to-end with the Local Emulator Suite, now with Firebase Authentication Get started X

users > 1234567890000...

fast-pay-ad9f1	users		
+ Start collection	+ Add document	+ Start collection	
Complaints	12345678900000	+ Add field	
MetroTrips	29910210101816	Bills: {2021-07-04 01:17:00: {ser...}}	
pendingUsers	38383060686864	Cards: {4545467075764484: {name: ...}}	
users	56886060303838	Transactions: {2021-07-03 01:20:15: {amo...}}	

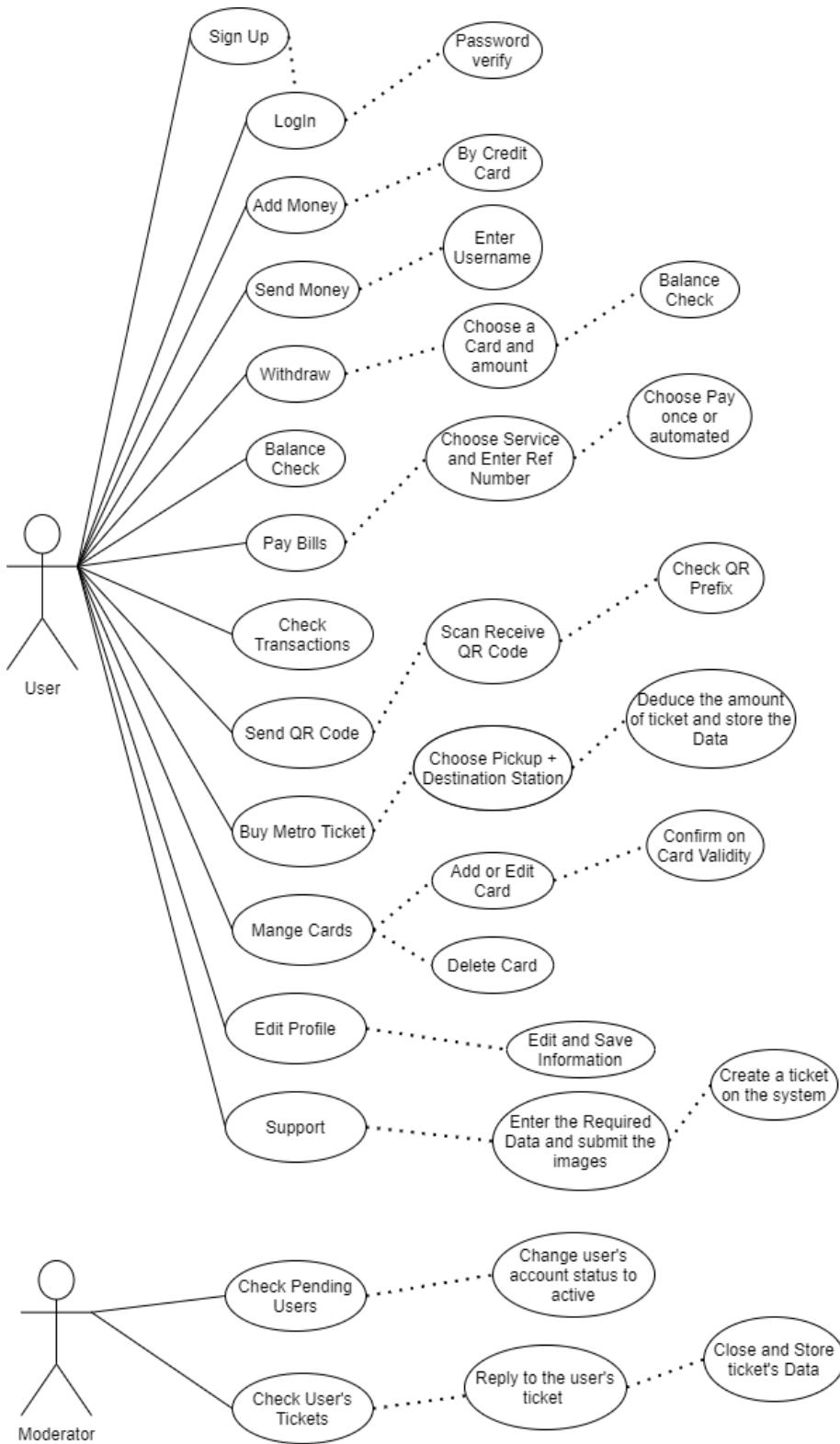


3.2 Class diagram:





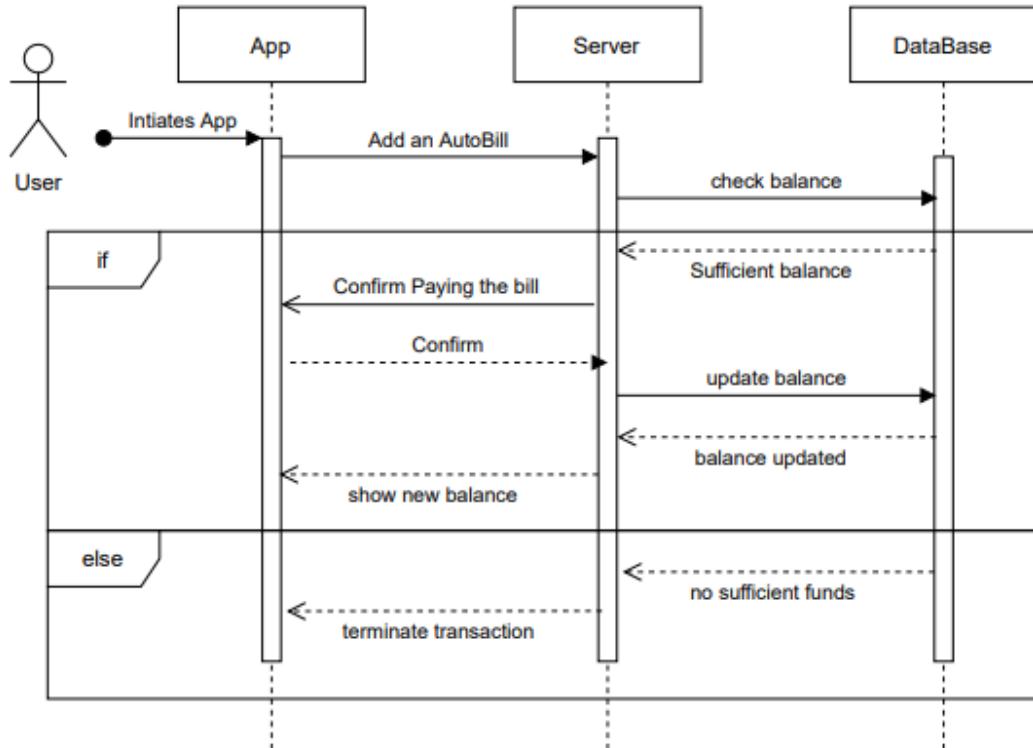
3.3 Use Case Diagram:





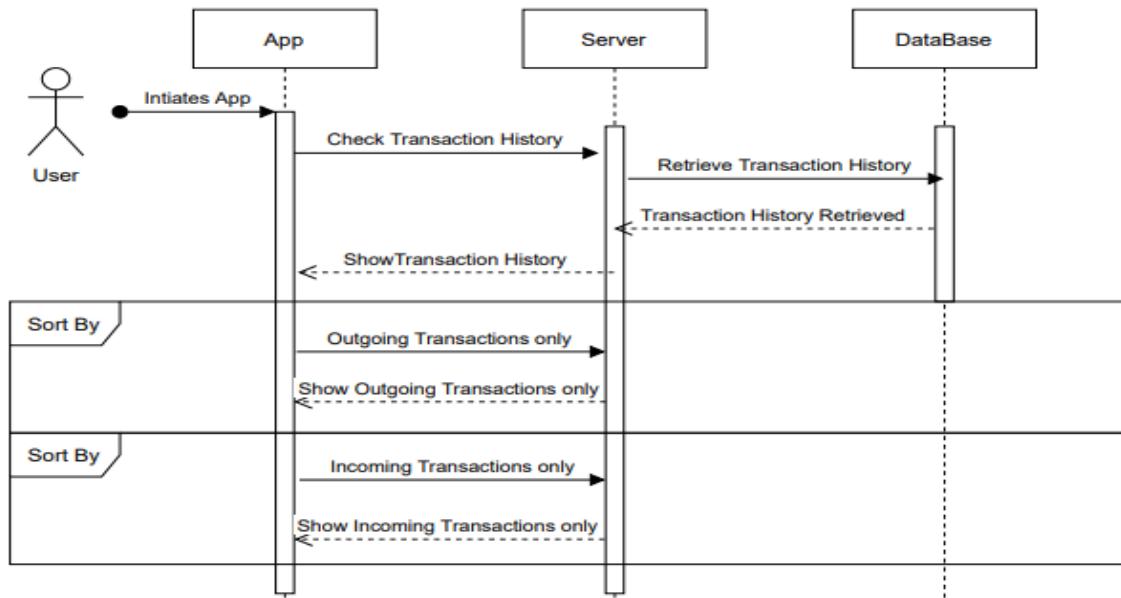
3.4 Sequence Diagrams:

1. Automation of bills

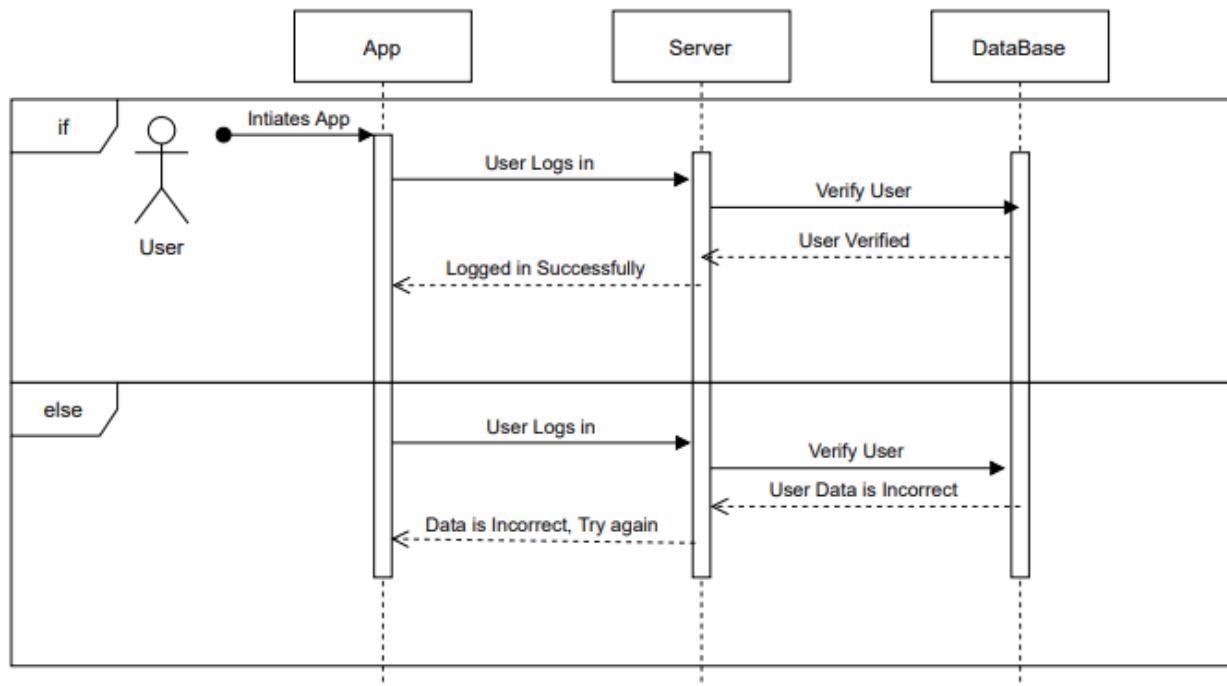




2. Check history transactions

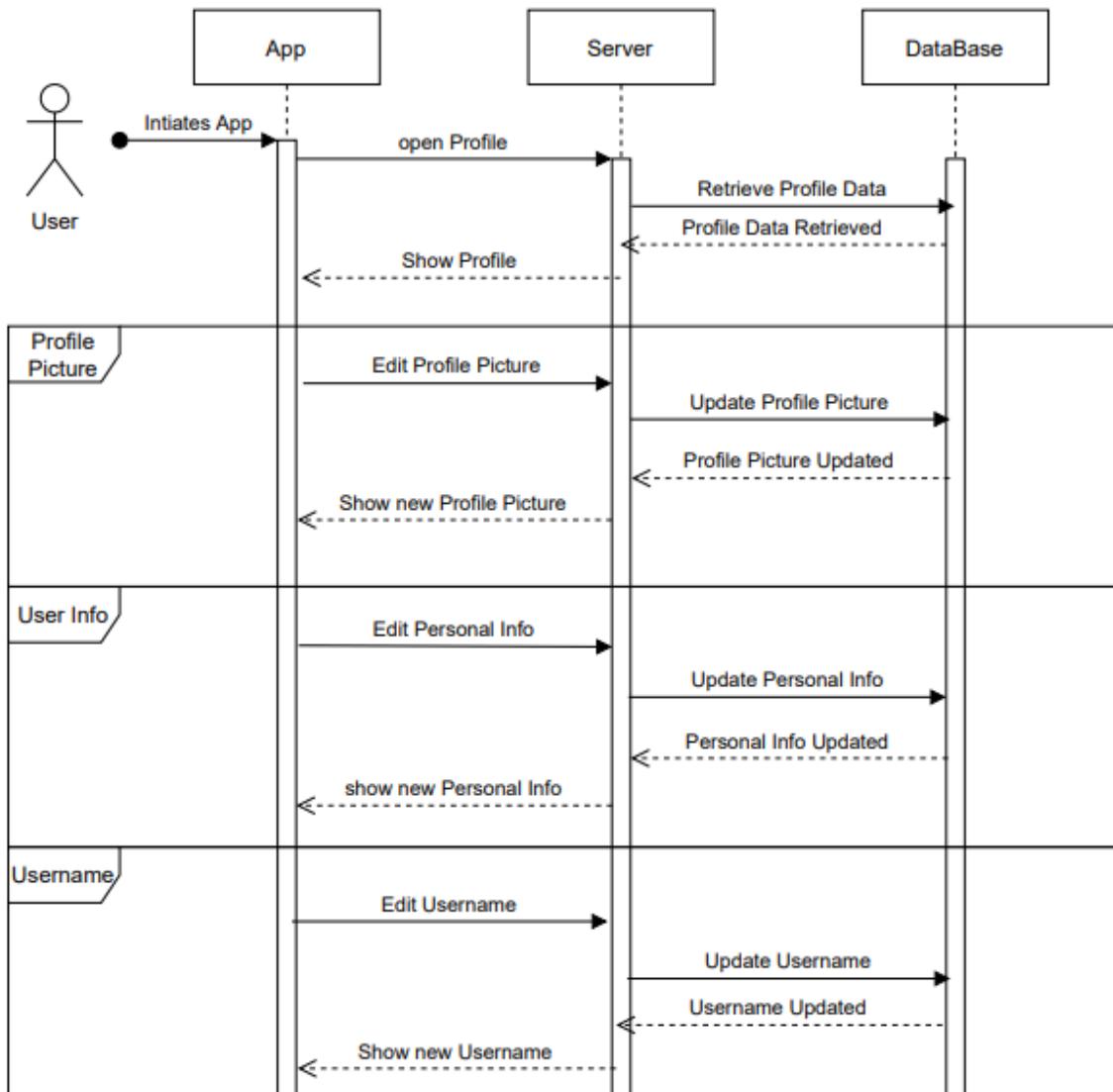


3. Login



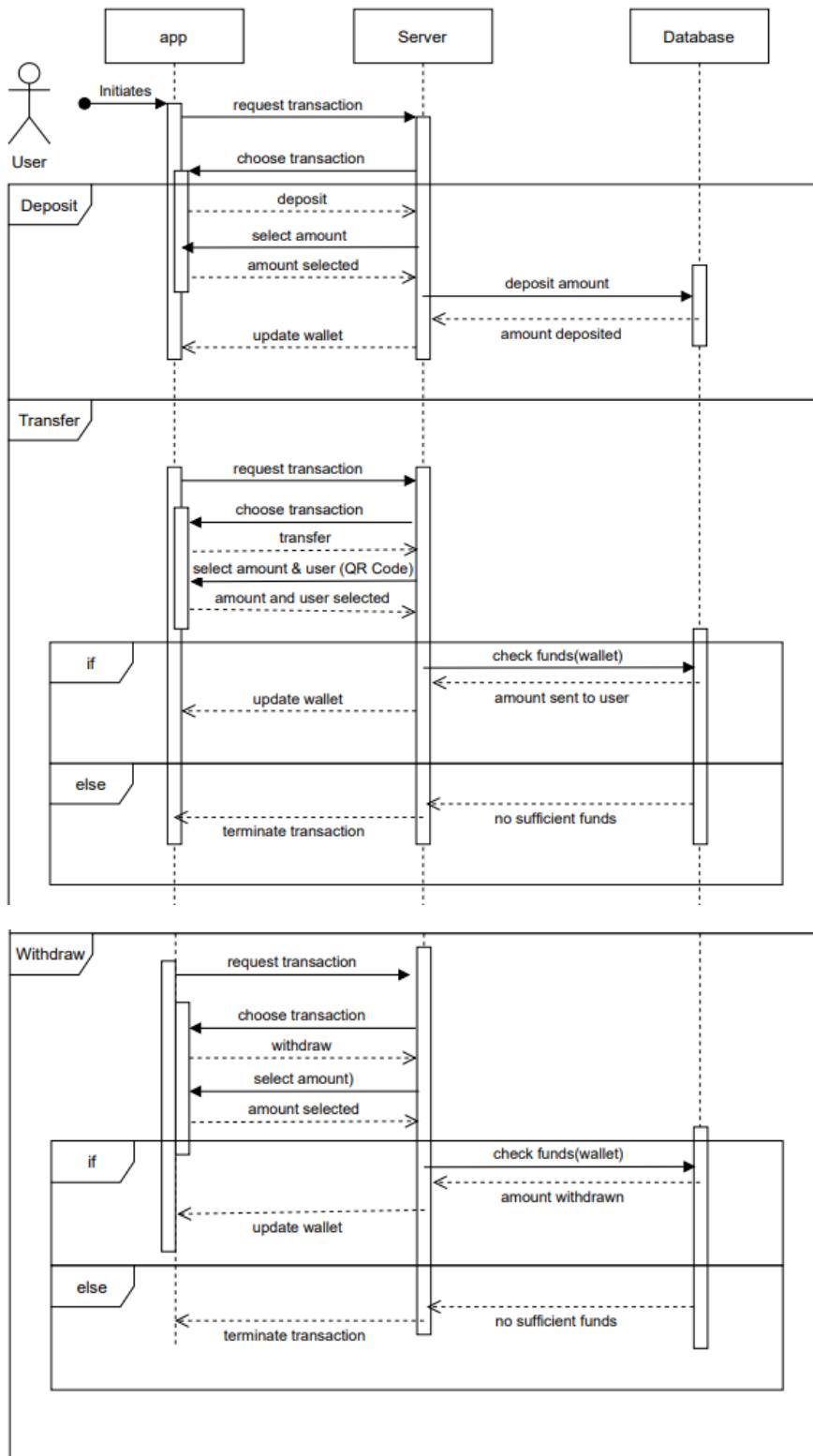


4. Edit Profile



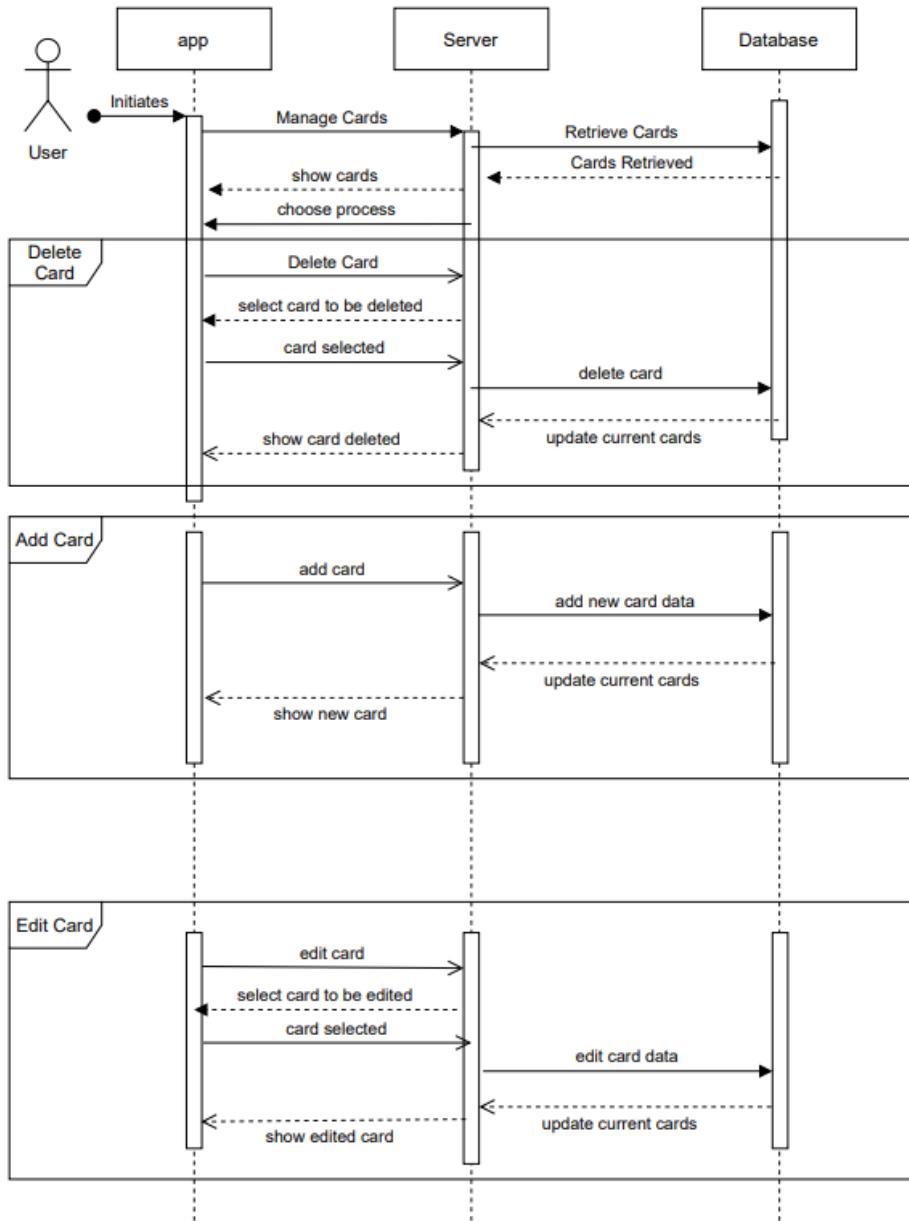


5. Make a transaction:



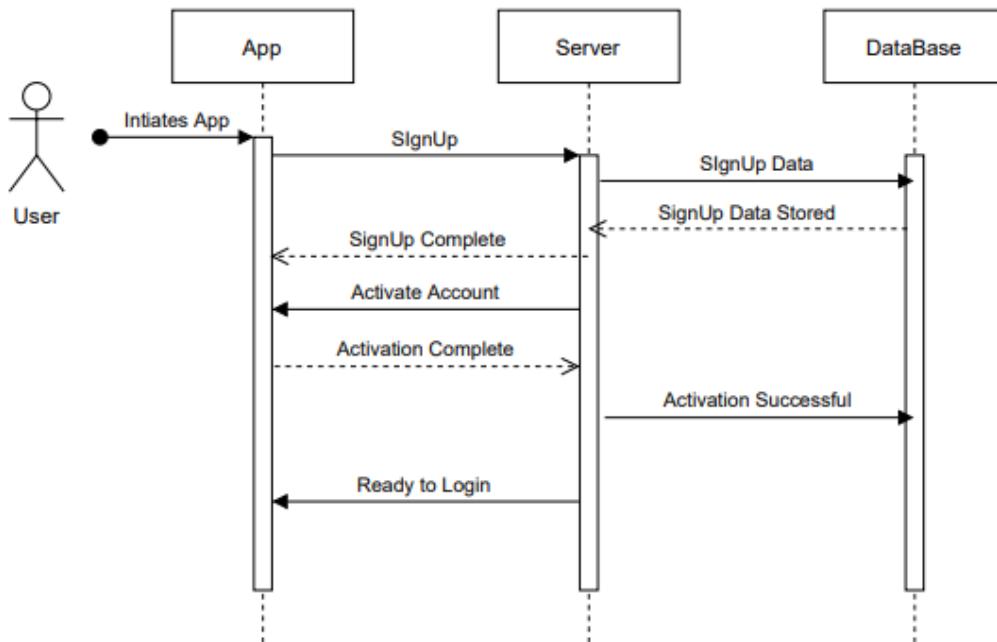


6. Mange card:

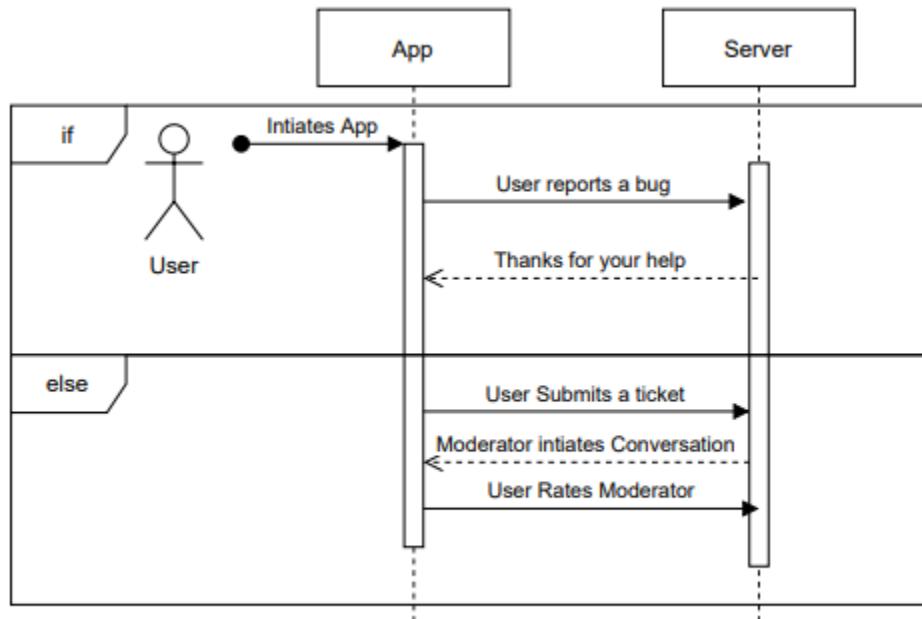




7. Sign up

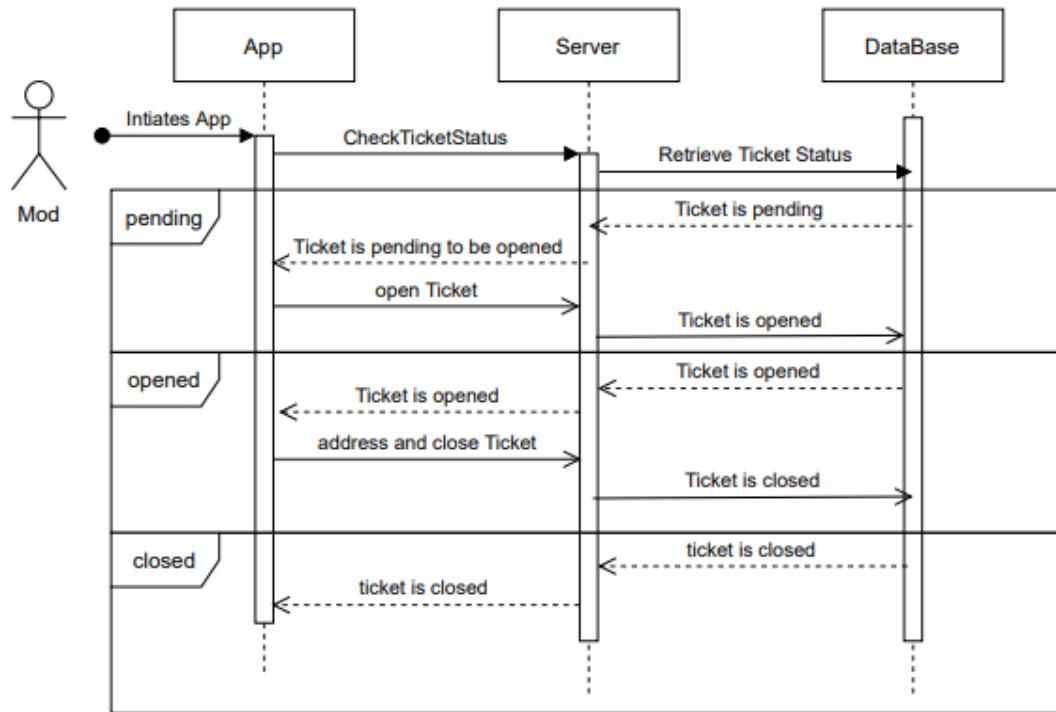


8. Ticket Submit

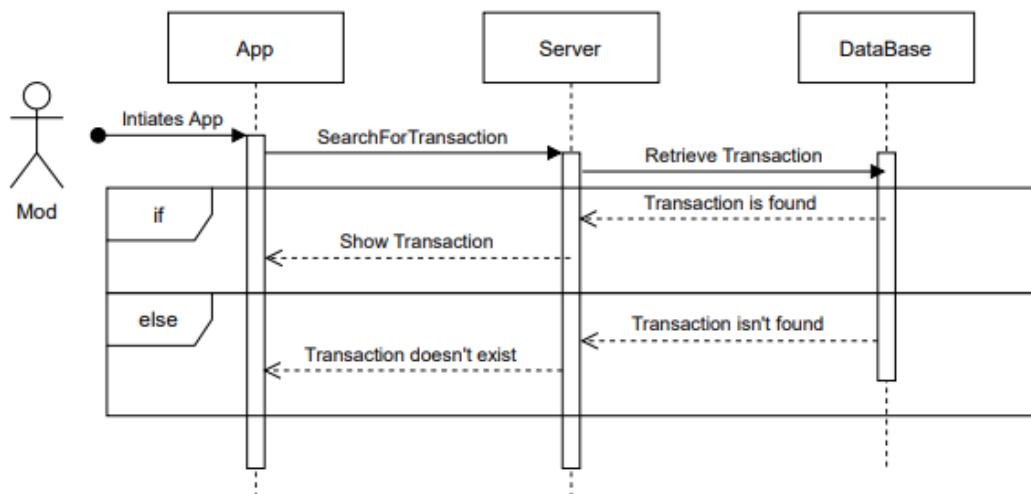




9. Change Ticket Statuses



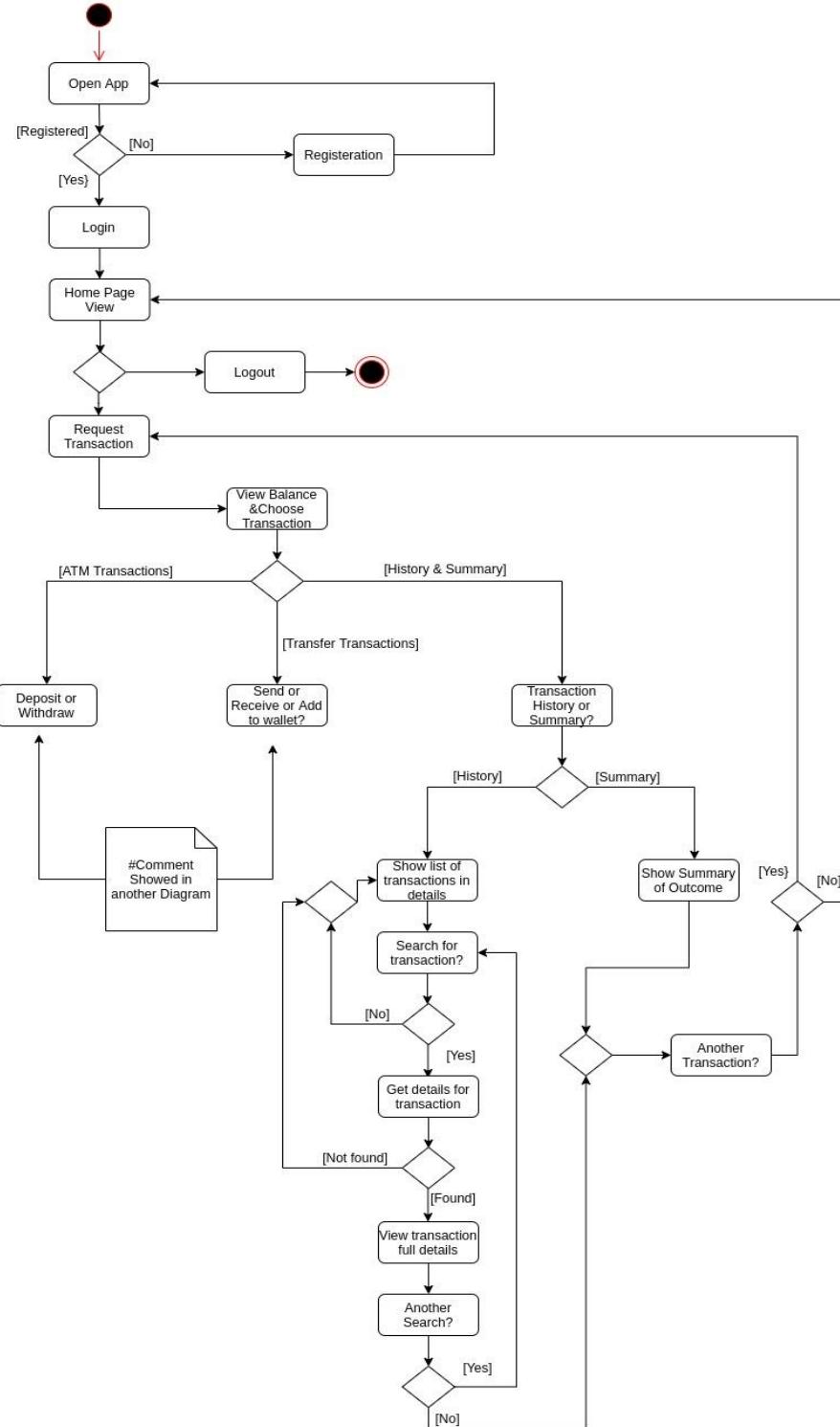
10. Search for transaction





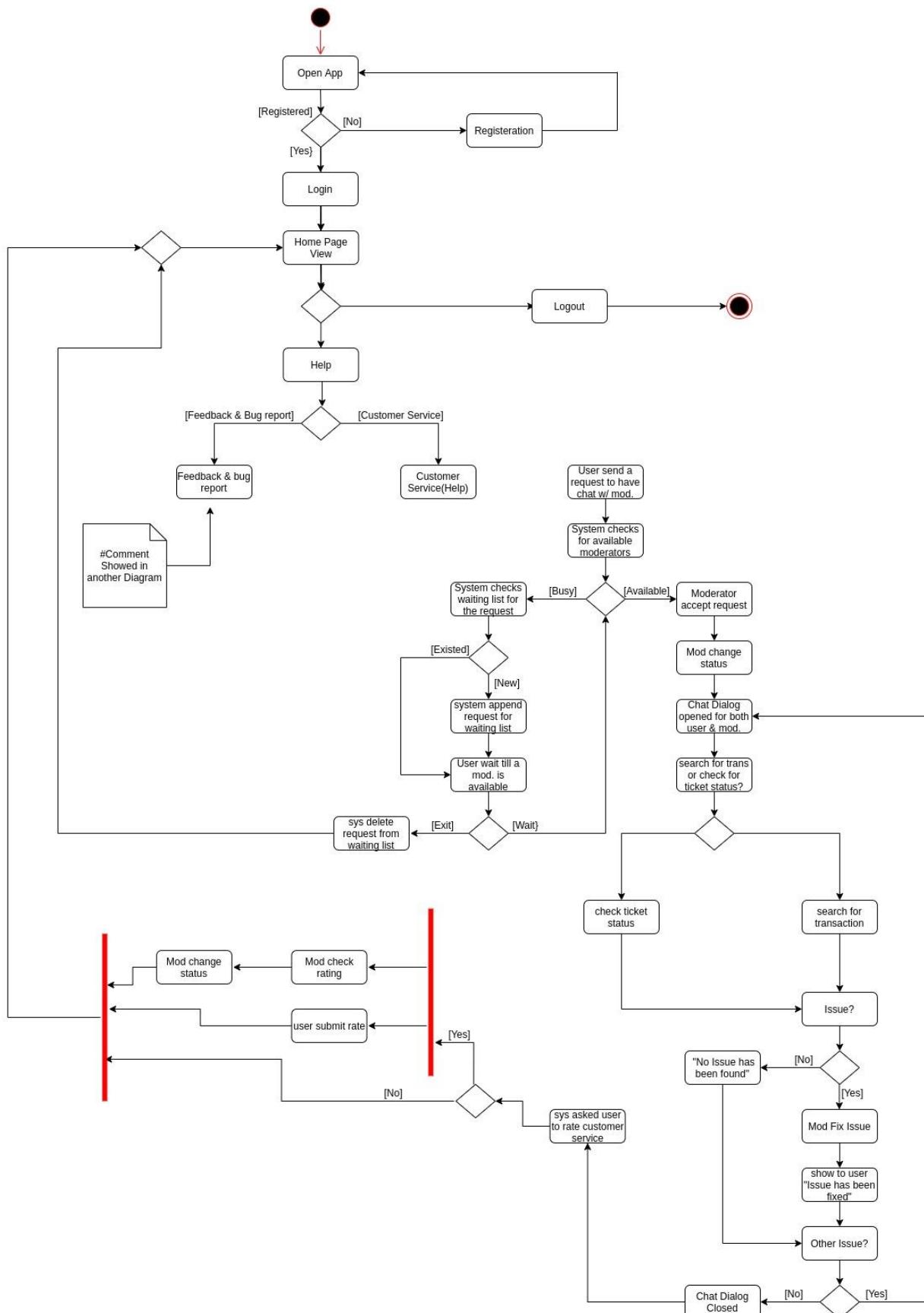
3.5 Activity Diagrams:

1. Transaction history and summary



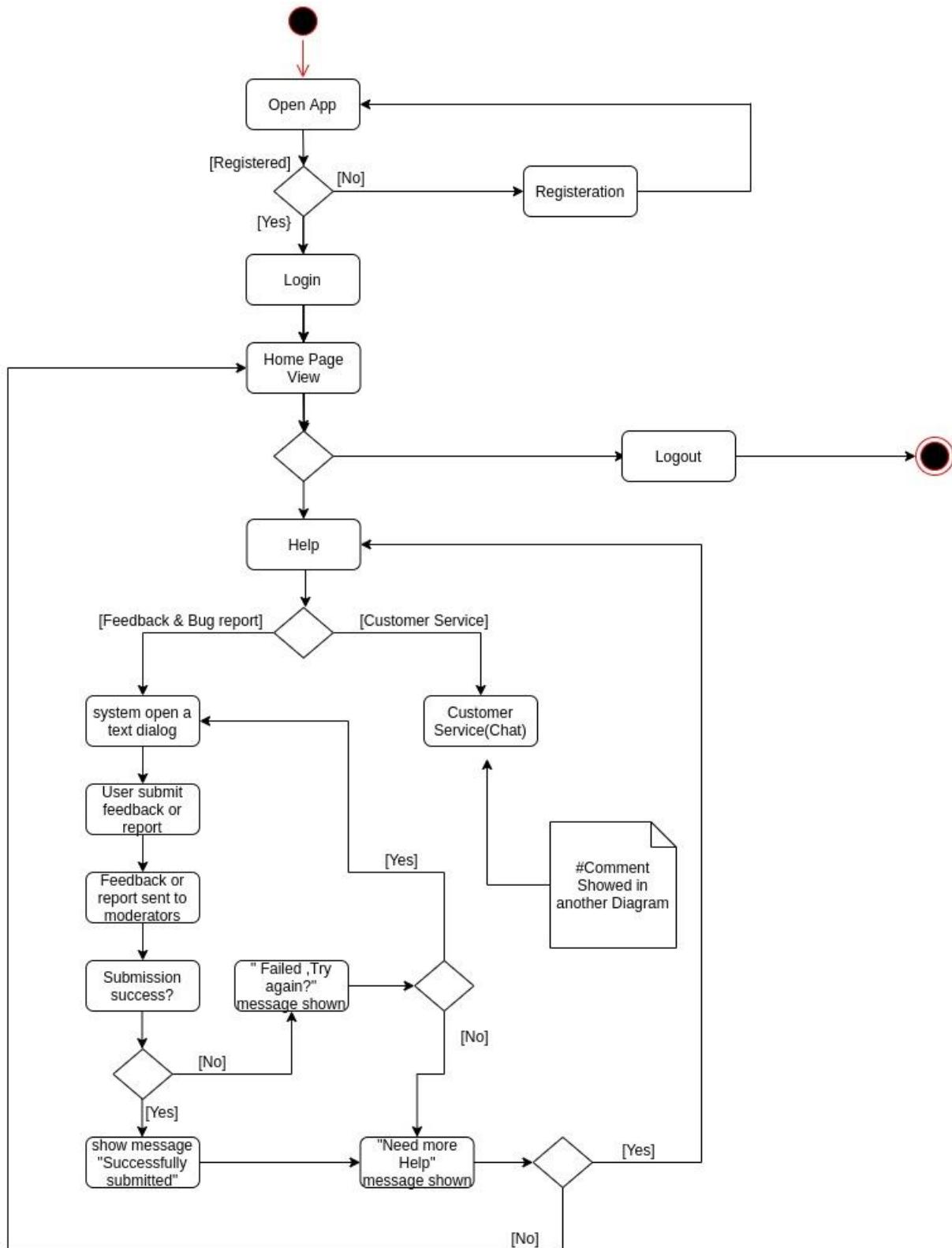


2. Help or request for support



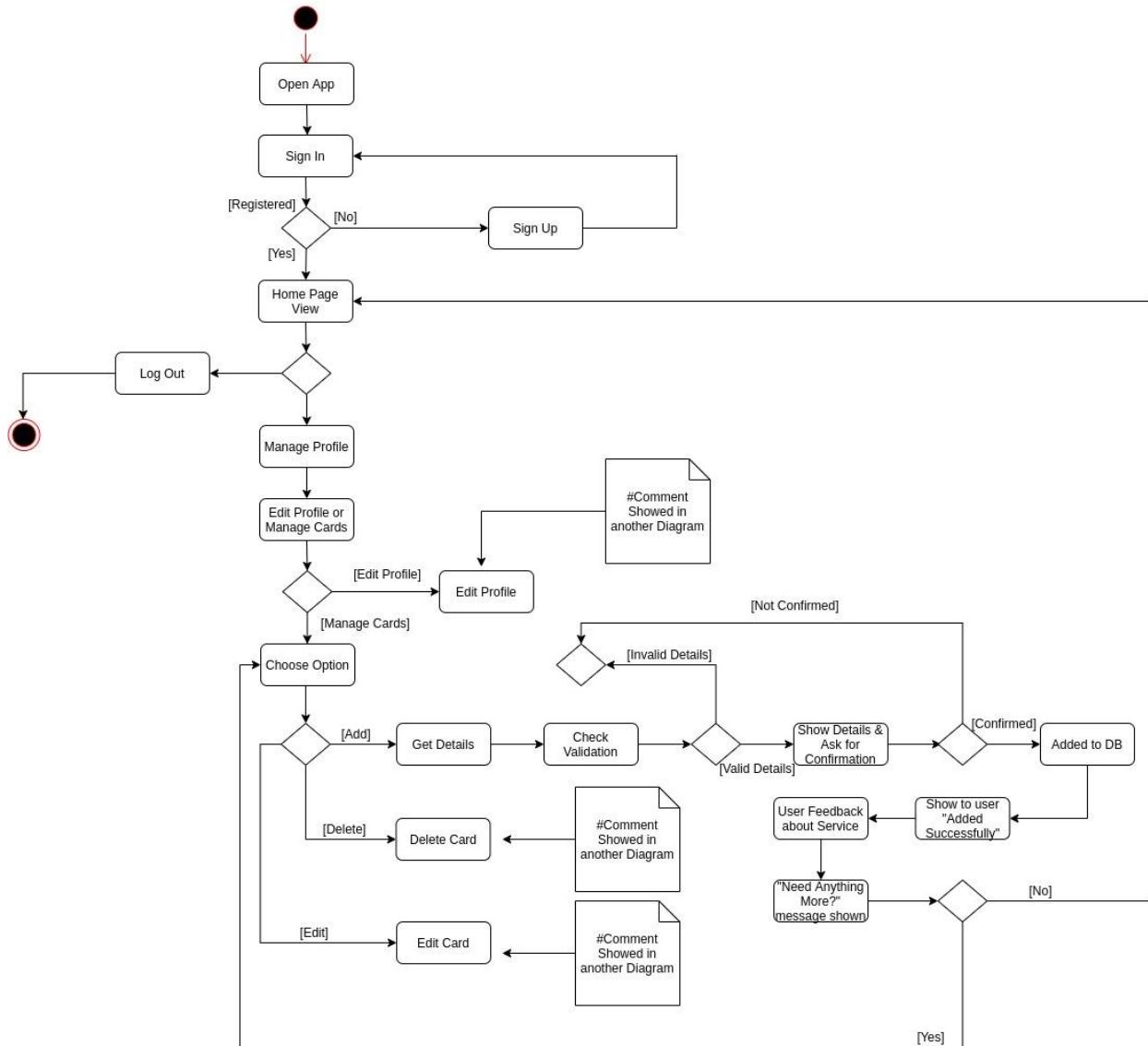


3. Feedback for the application



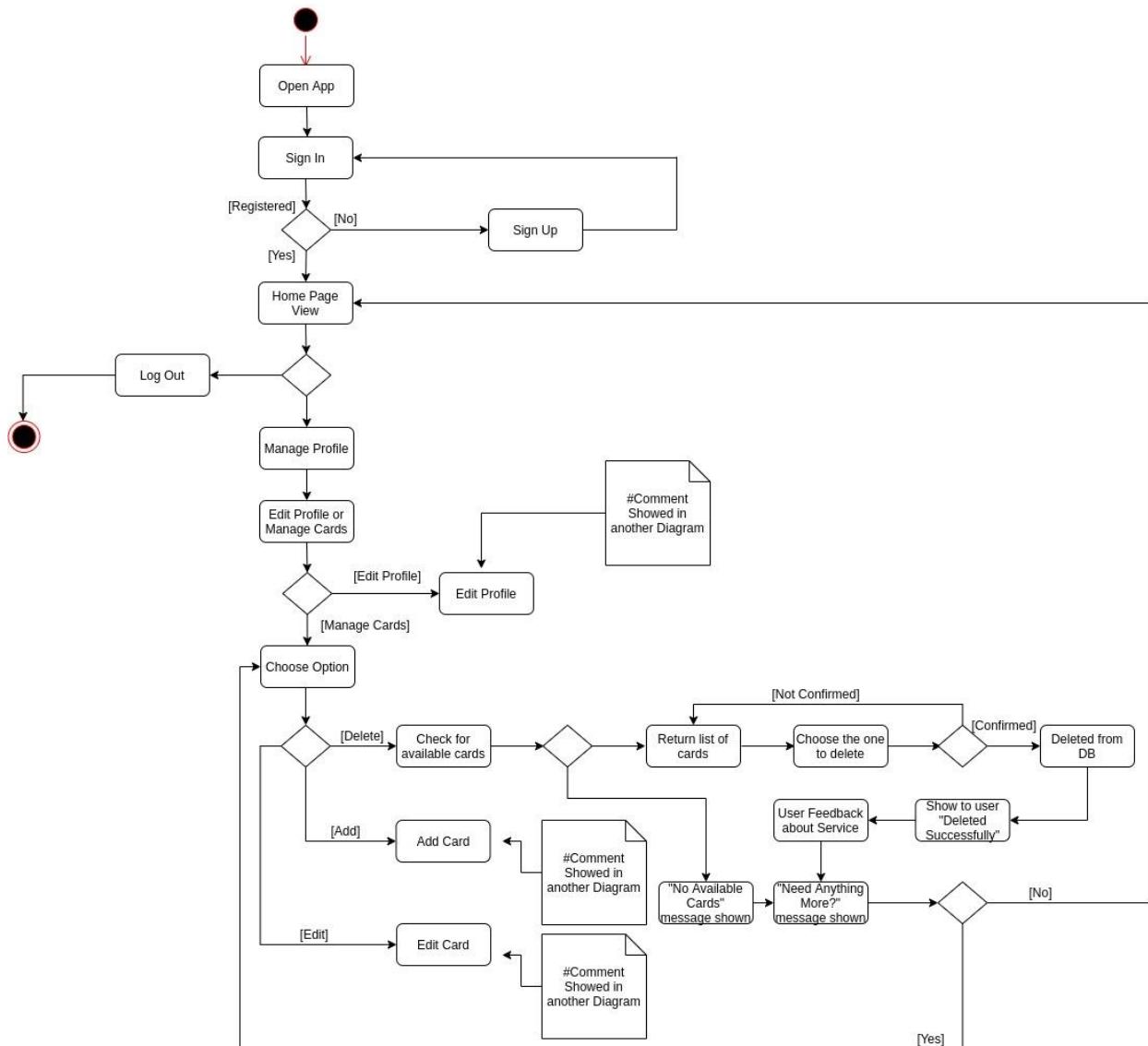


4.Add Card



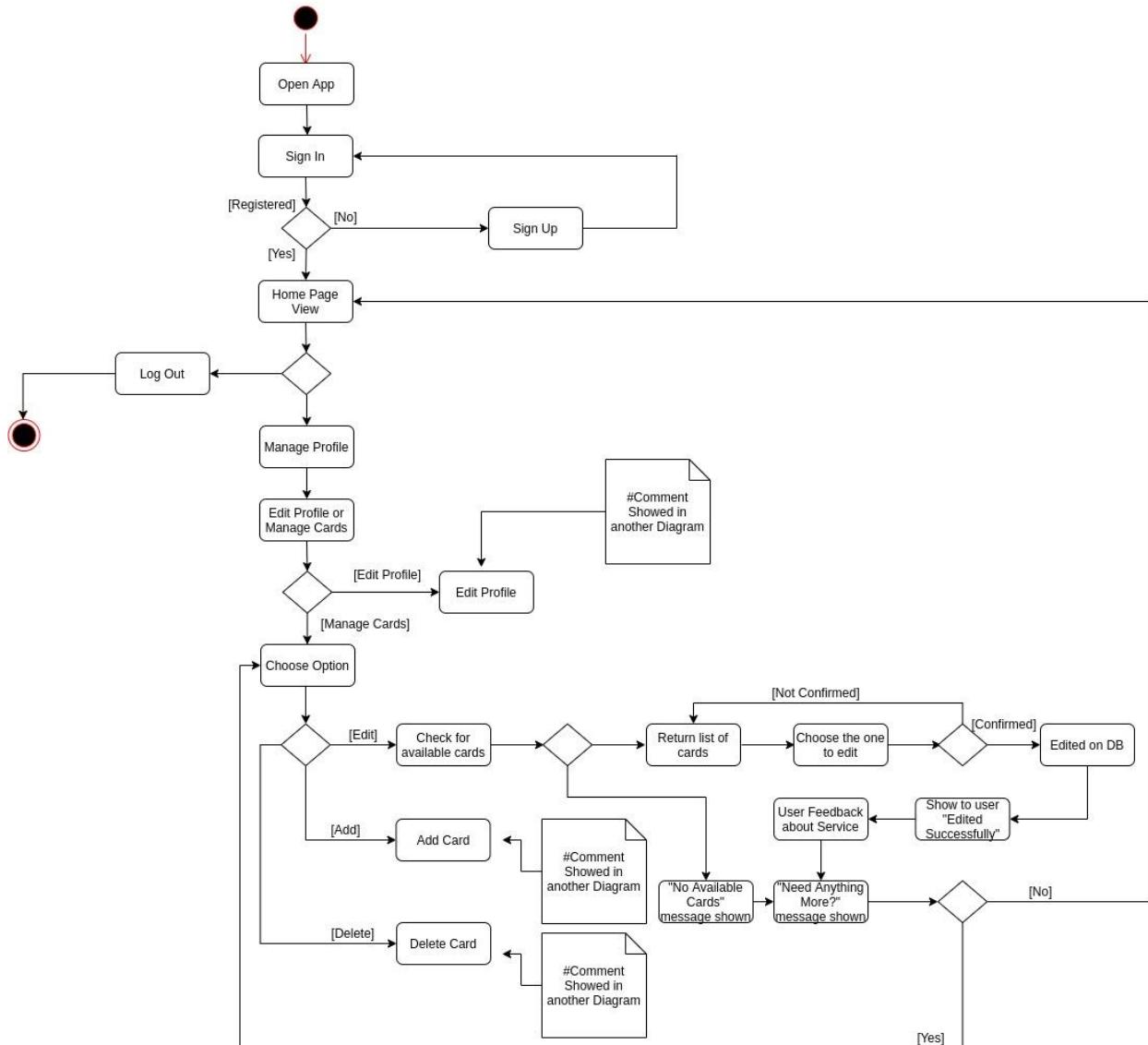


5. Delete Card



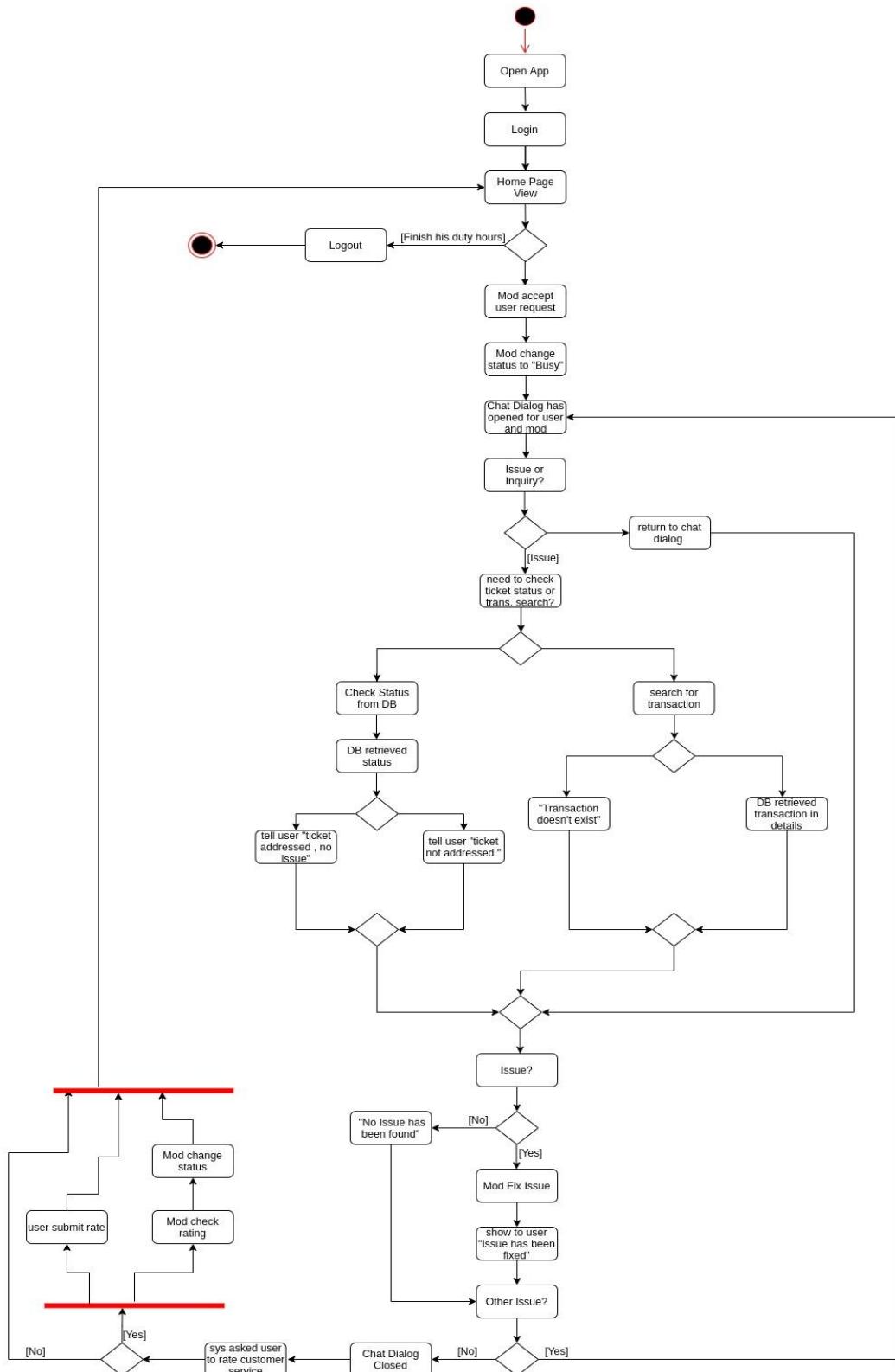


6.Edit Card



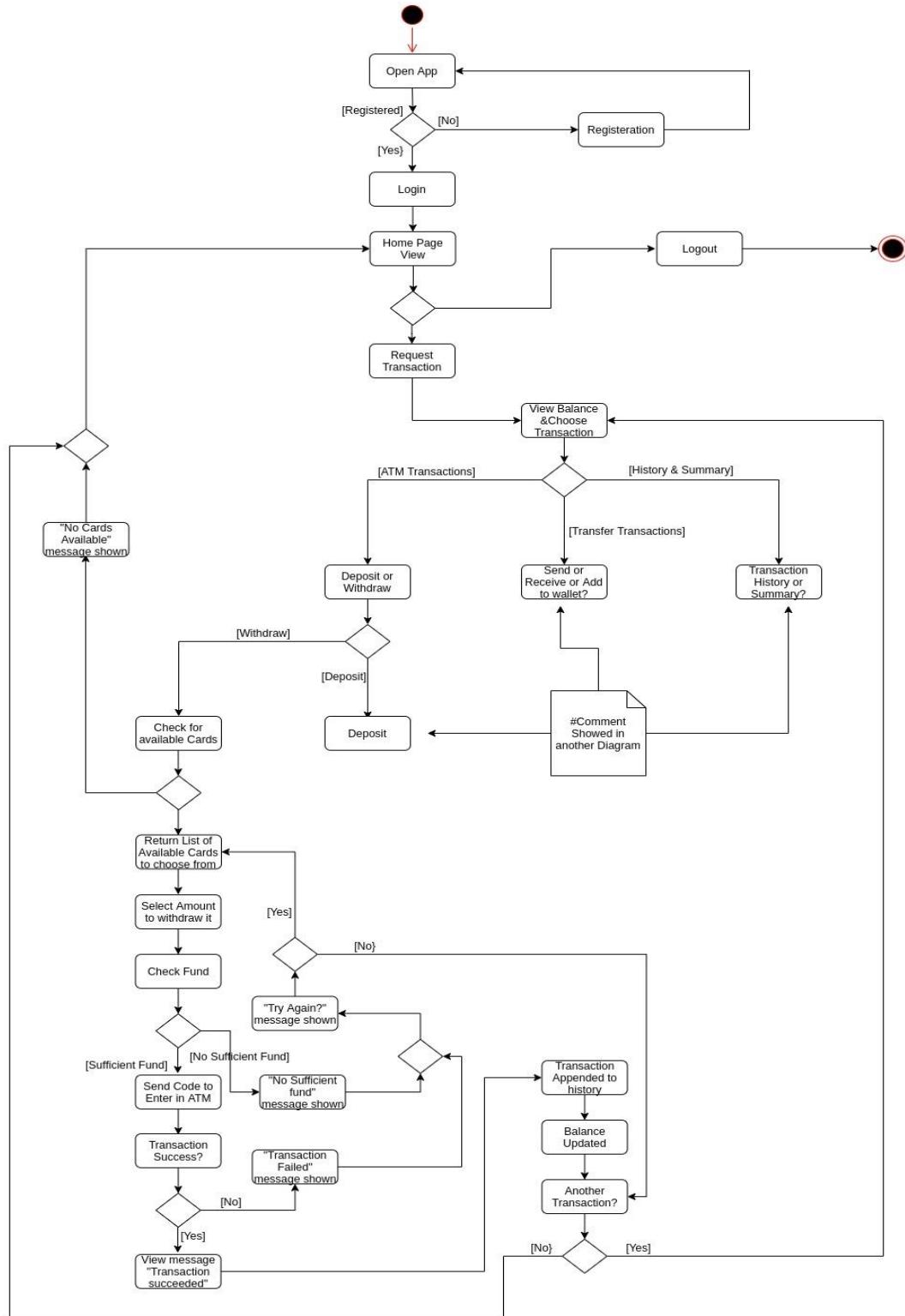


7. Moderator's action



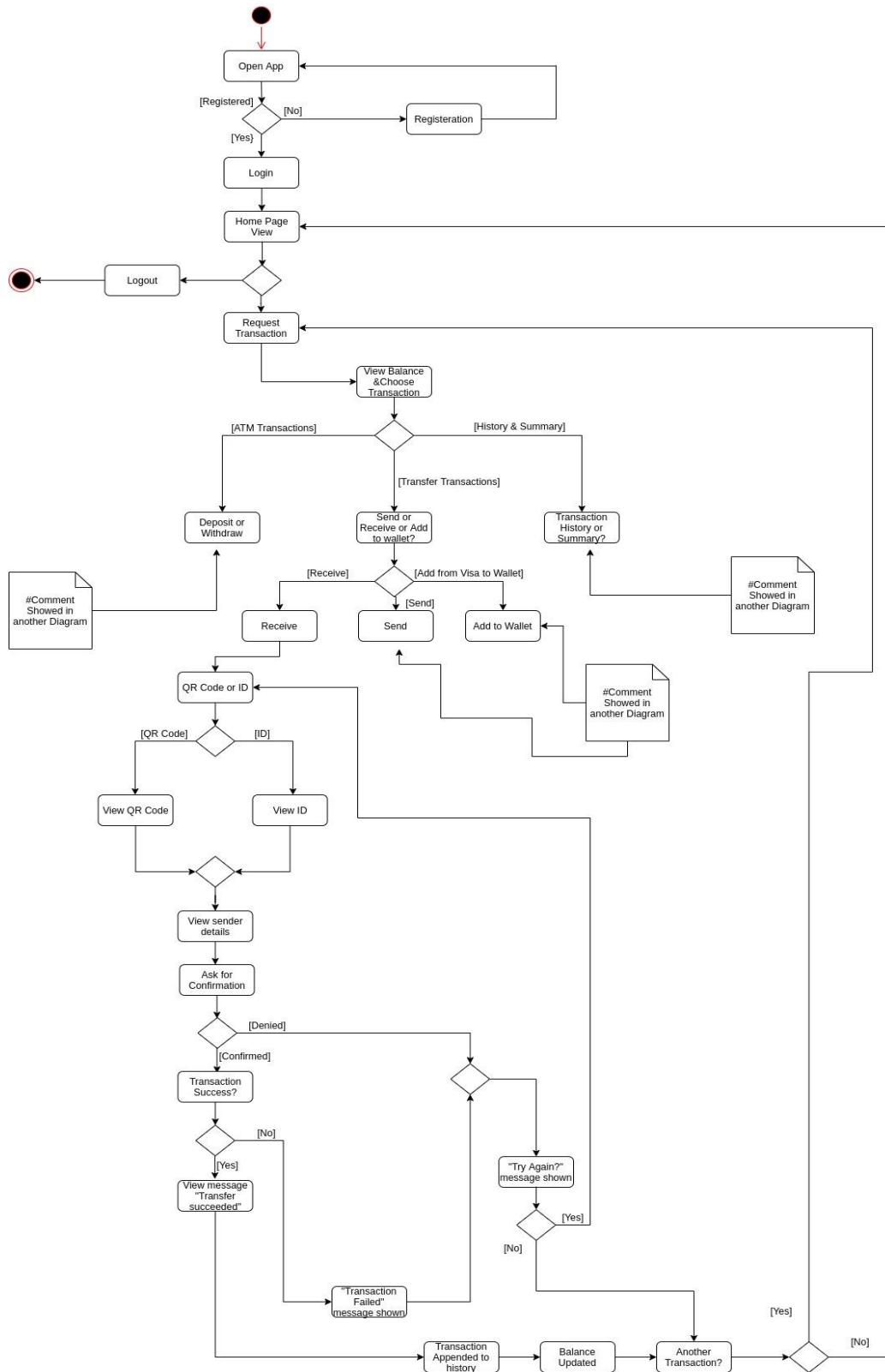


8. Withdrawl



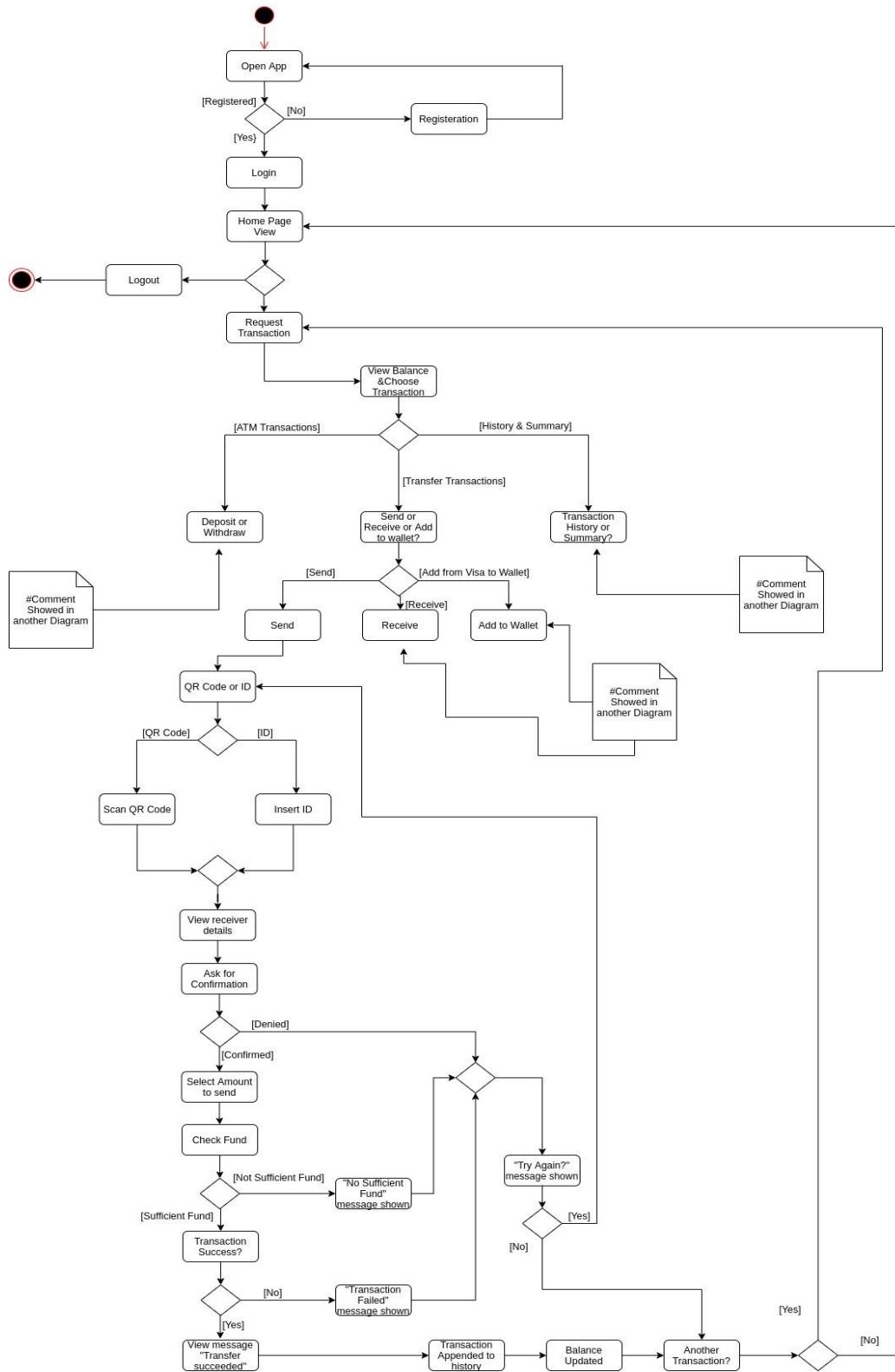


9. Receive money



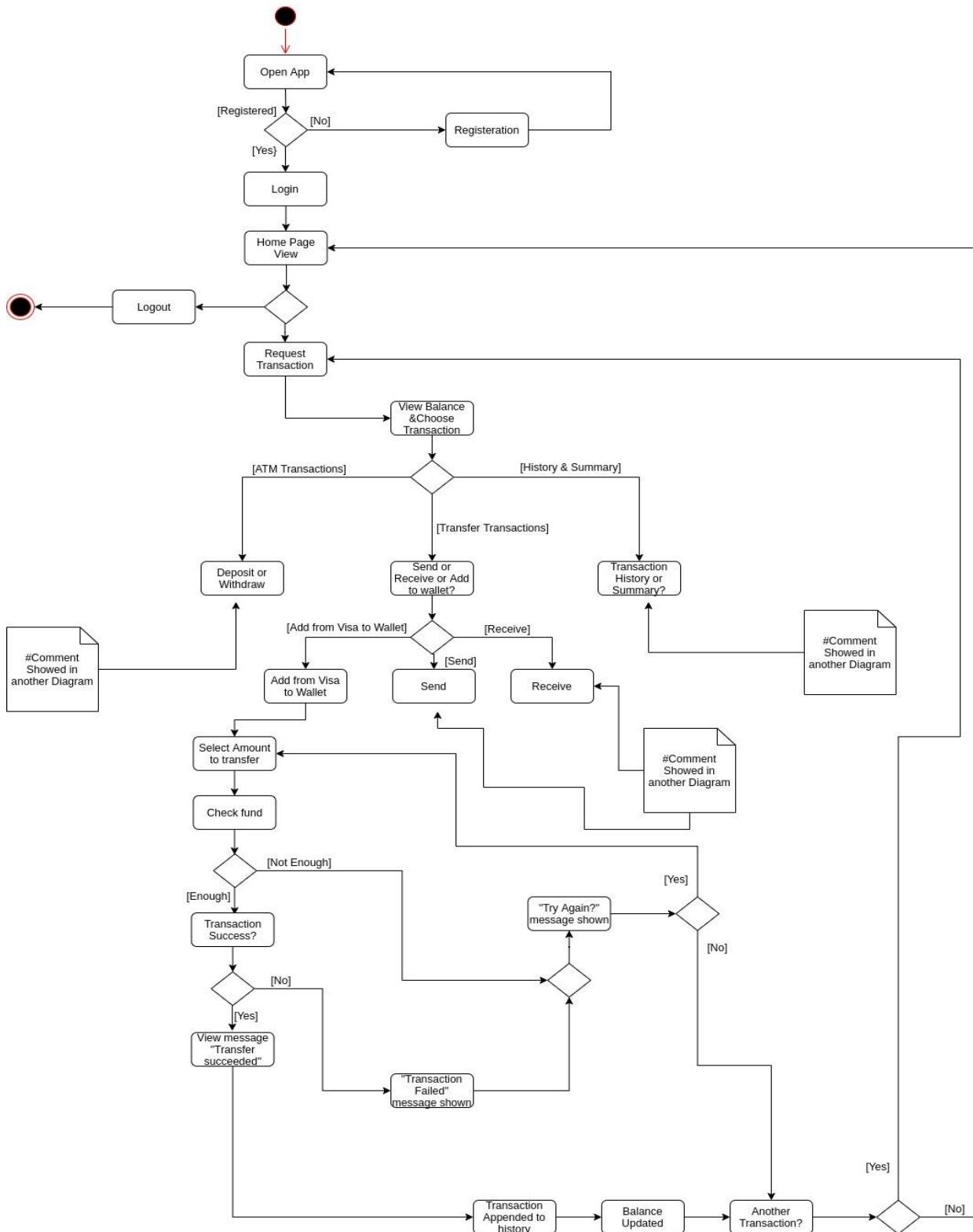


10. Send



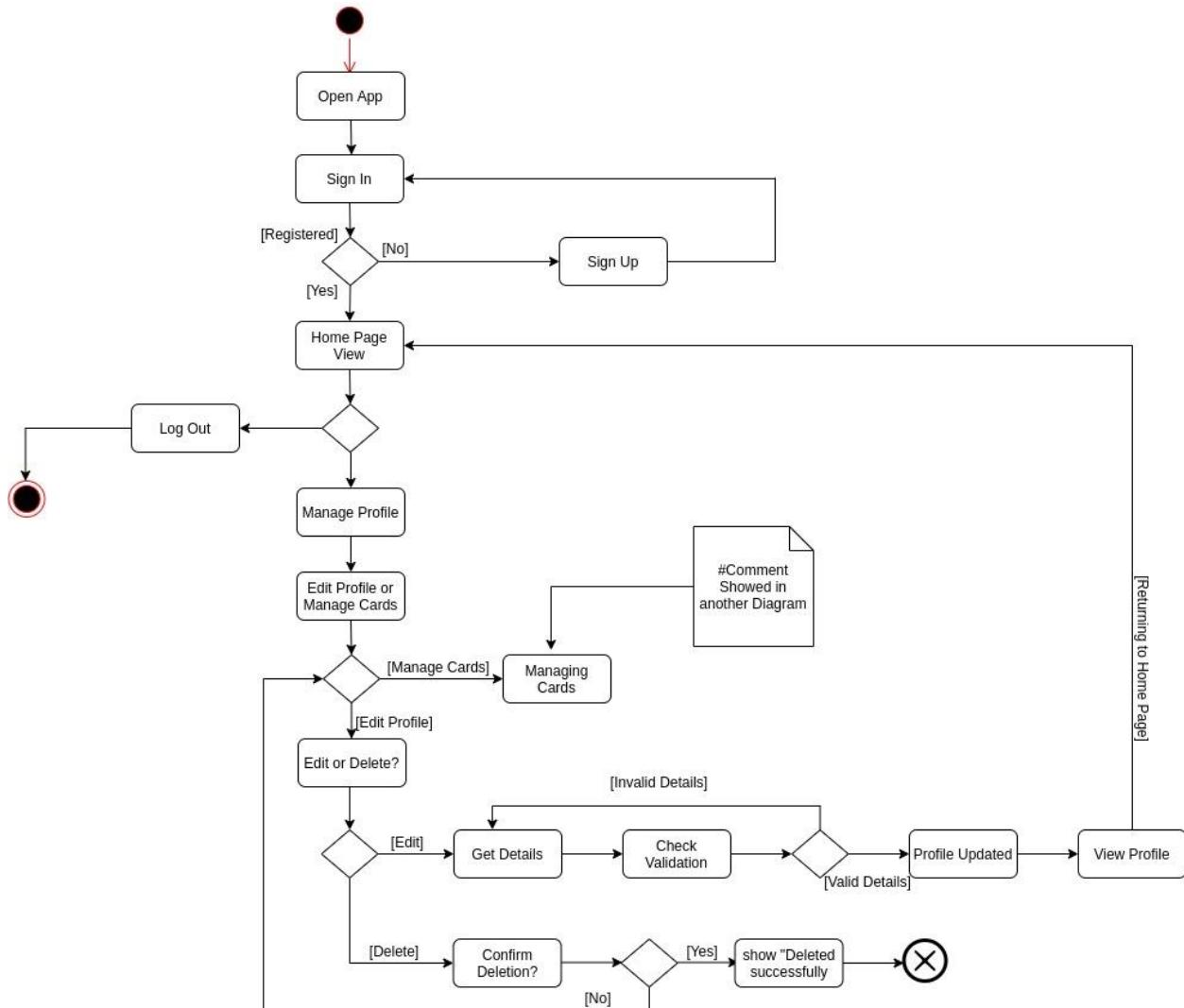


11.Add balance by card





12. Edit Profile





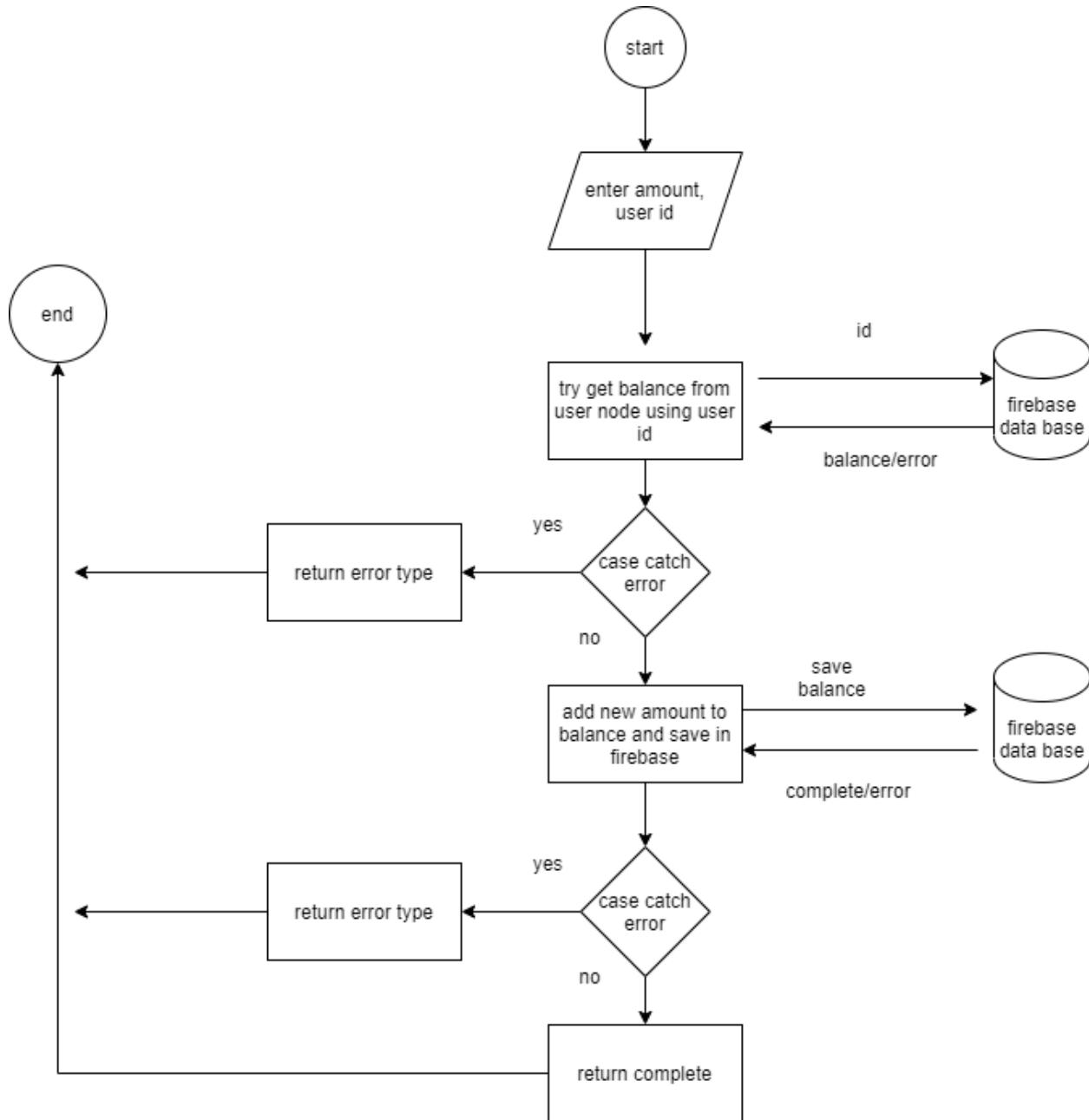
Chapter 4: Implementation

In this chapter we are going to discuss and go deeper in FastPay system implementation and present its code and the algorithms used to build it.



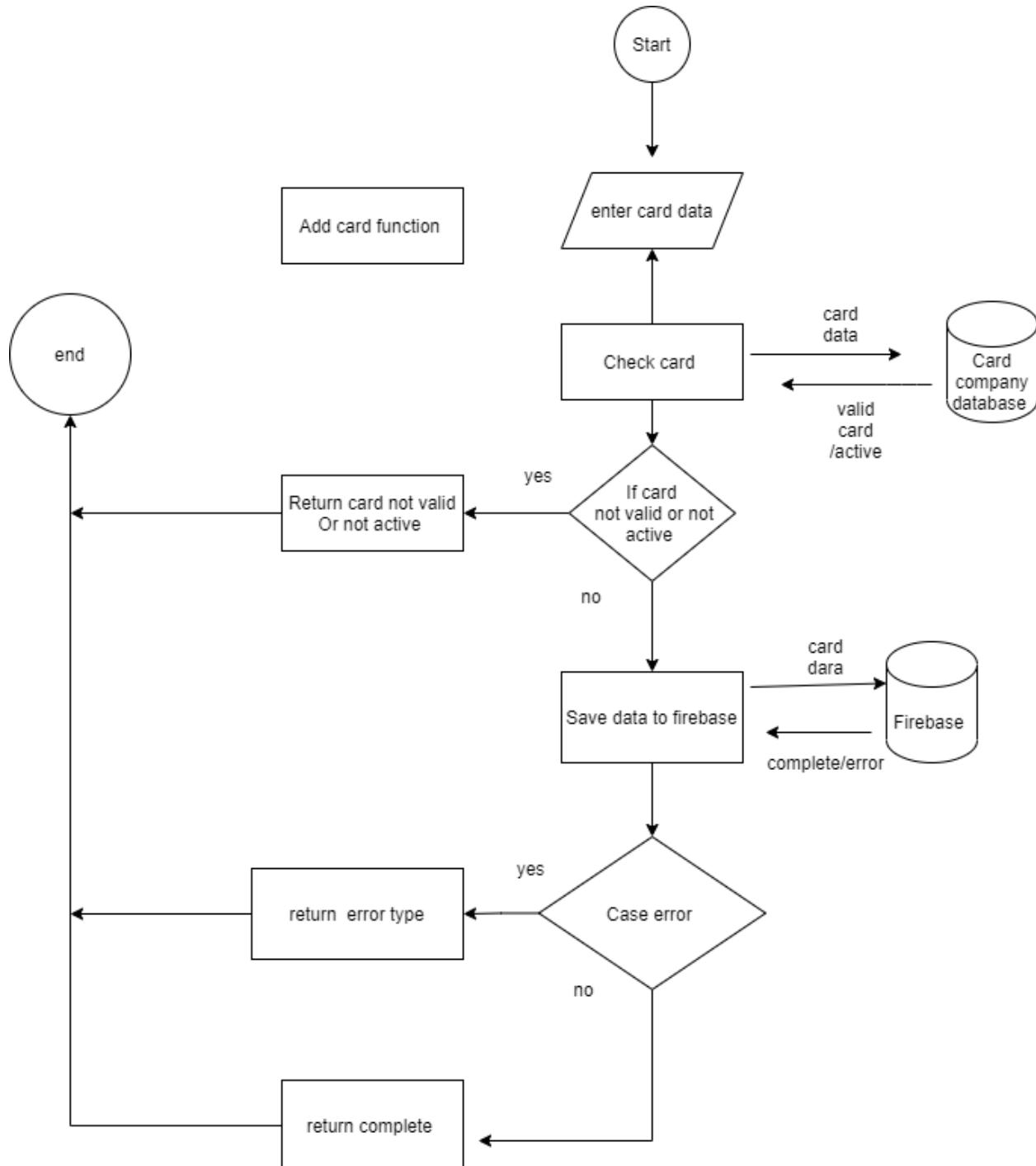
4.1 Flow Chart of the functions

4.1.1 Add Balance



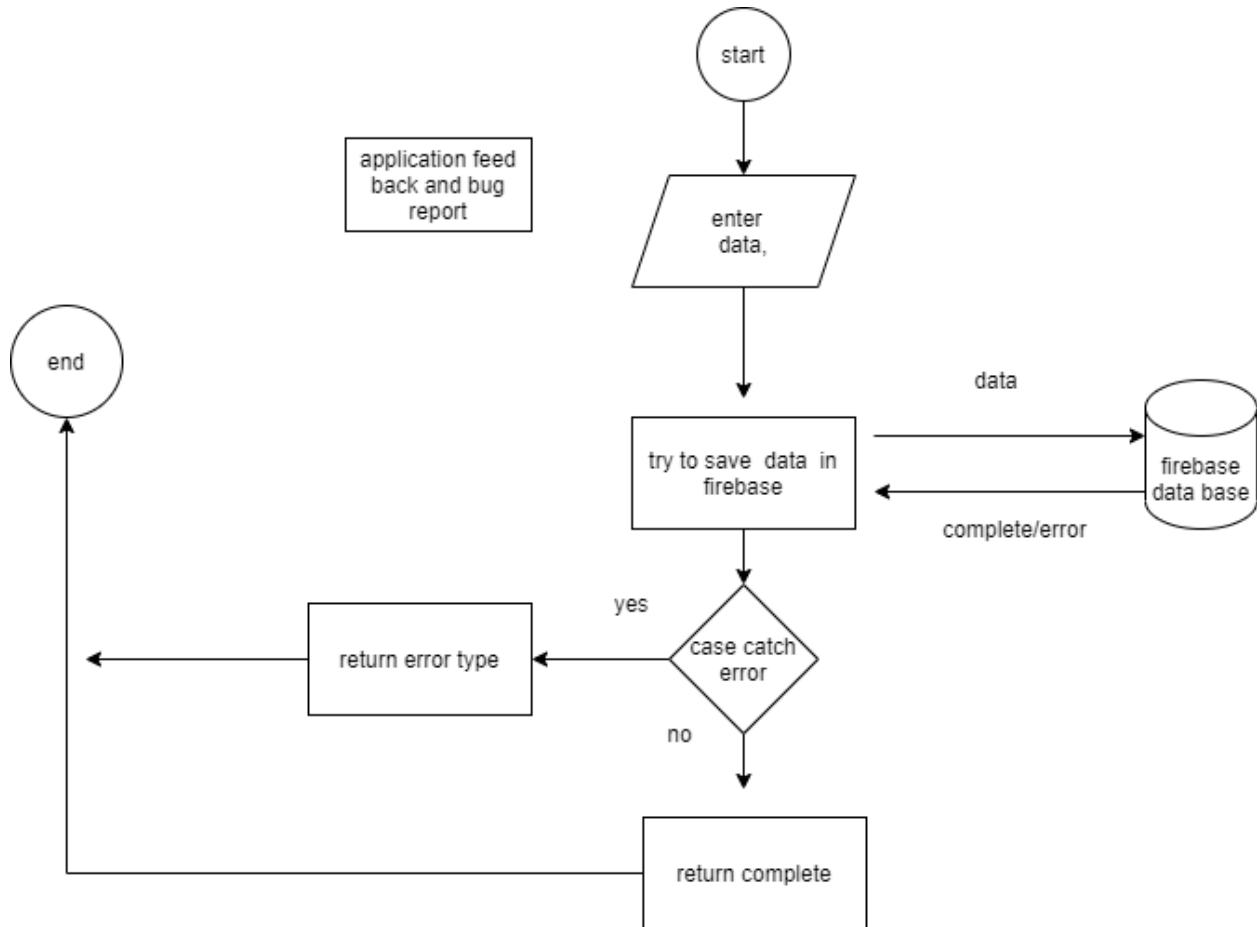


4.1.2 Add card



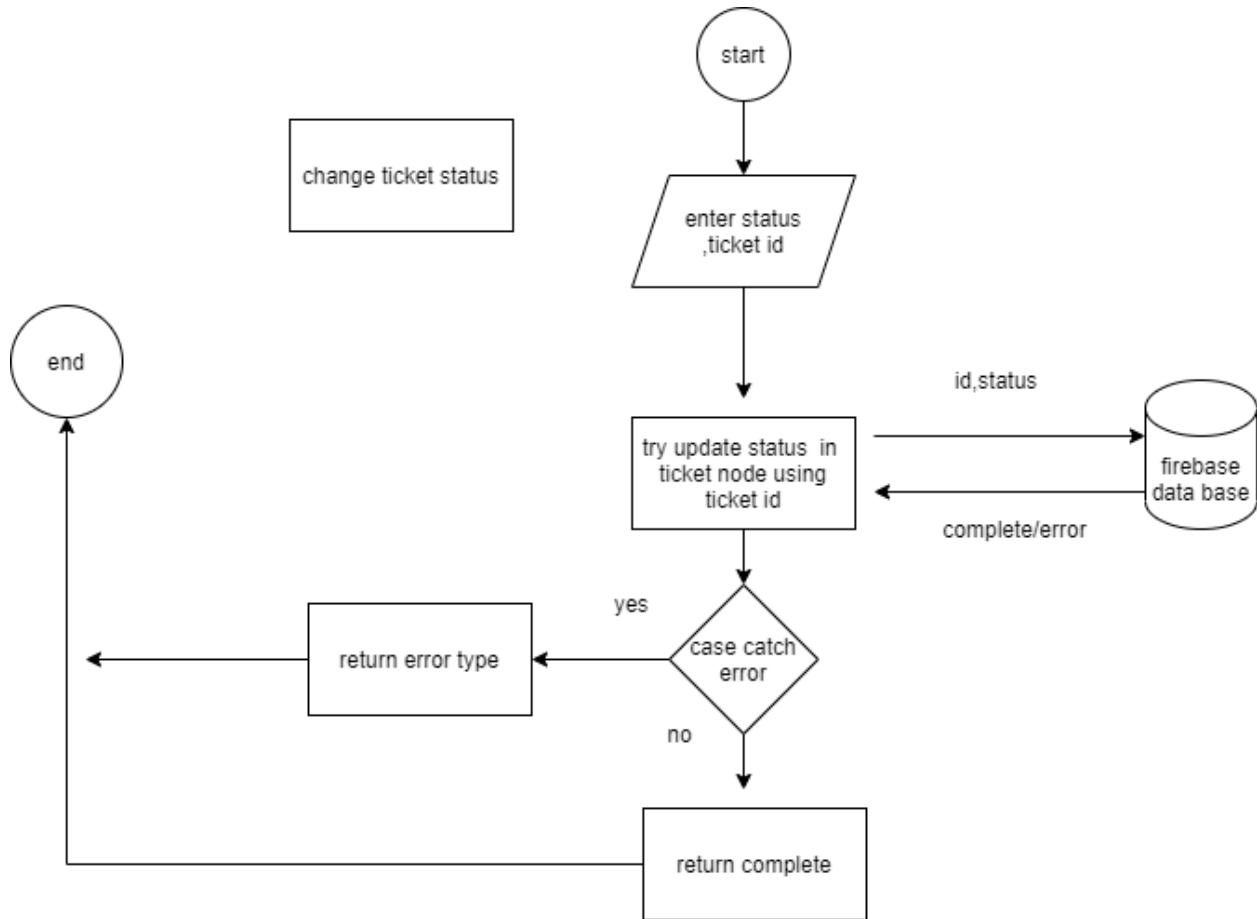


4.1.3 Application Feedback and bug report



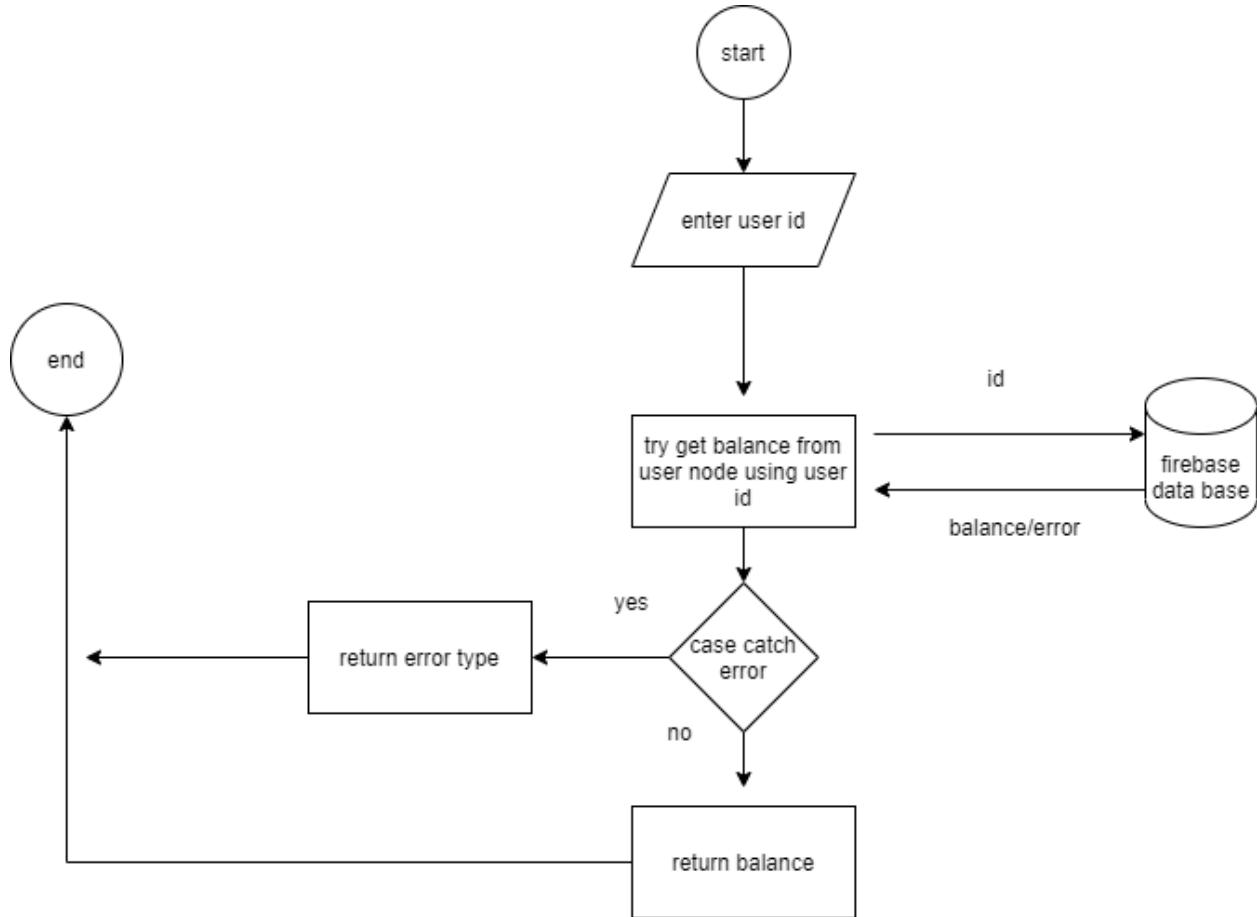


4.1.4 Change ticket Status



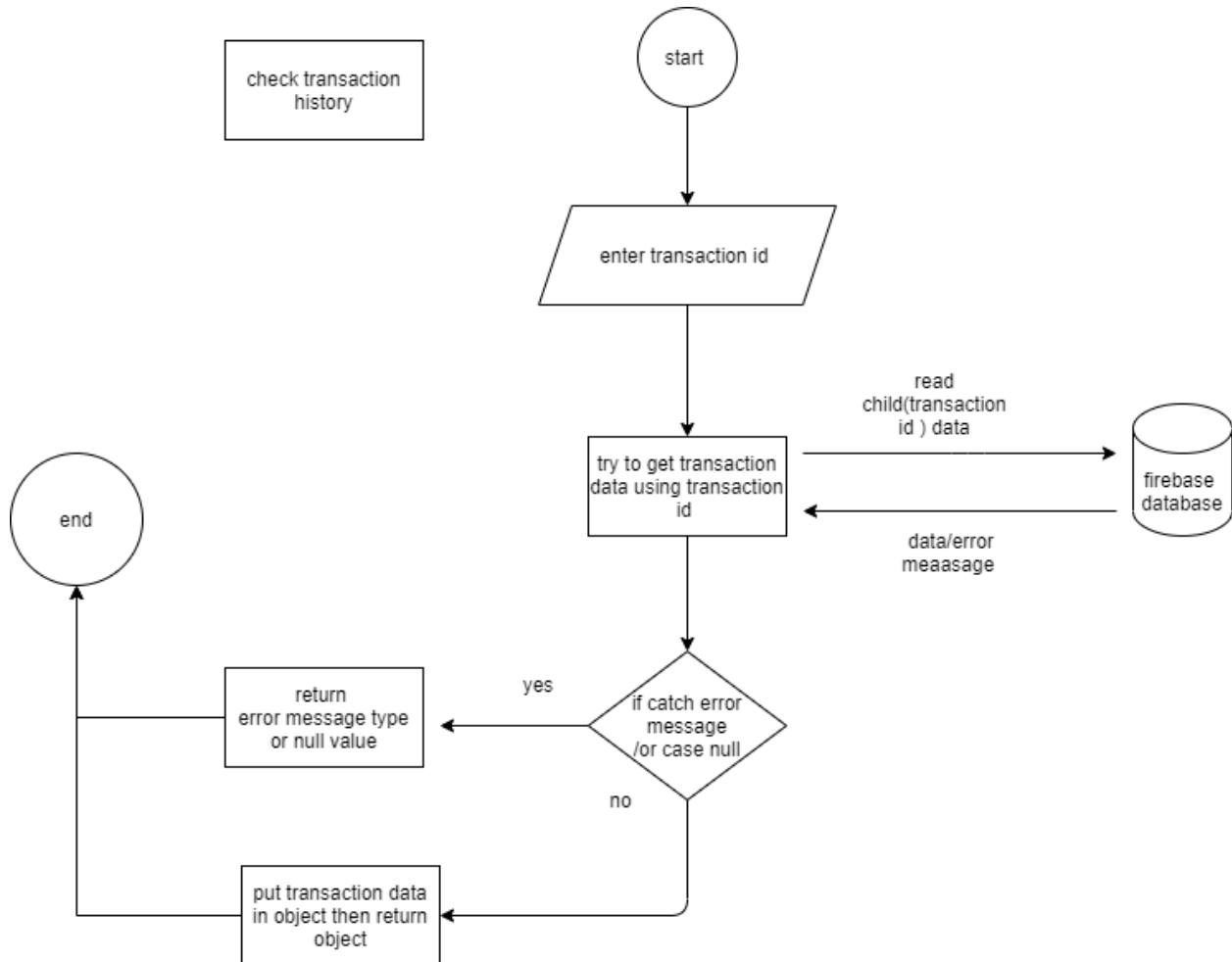


4.1.5 Check Balance



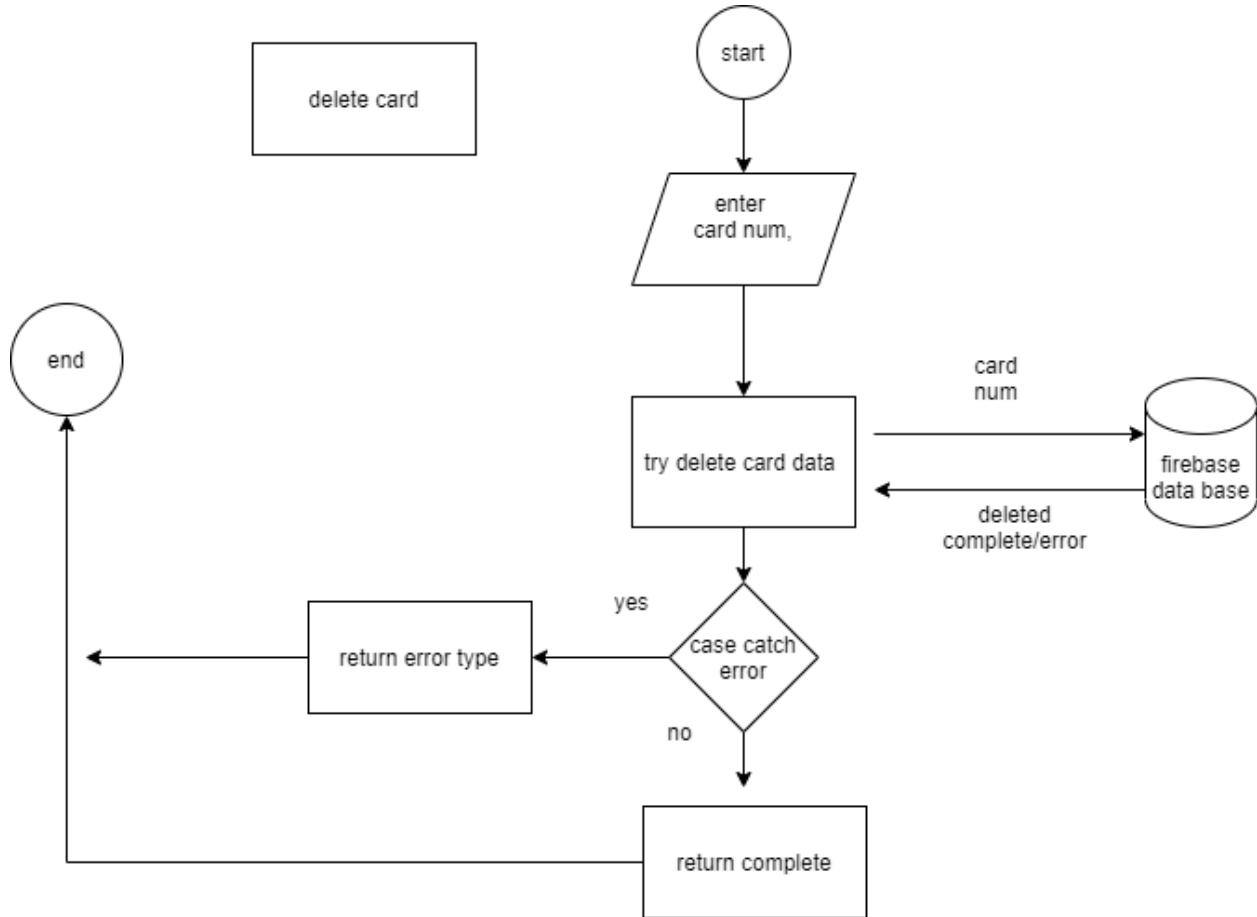


4.1.6 Check Transaction history



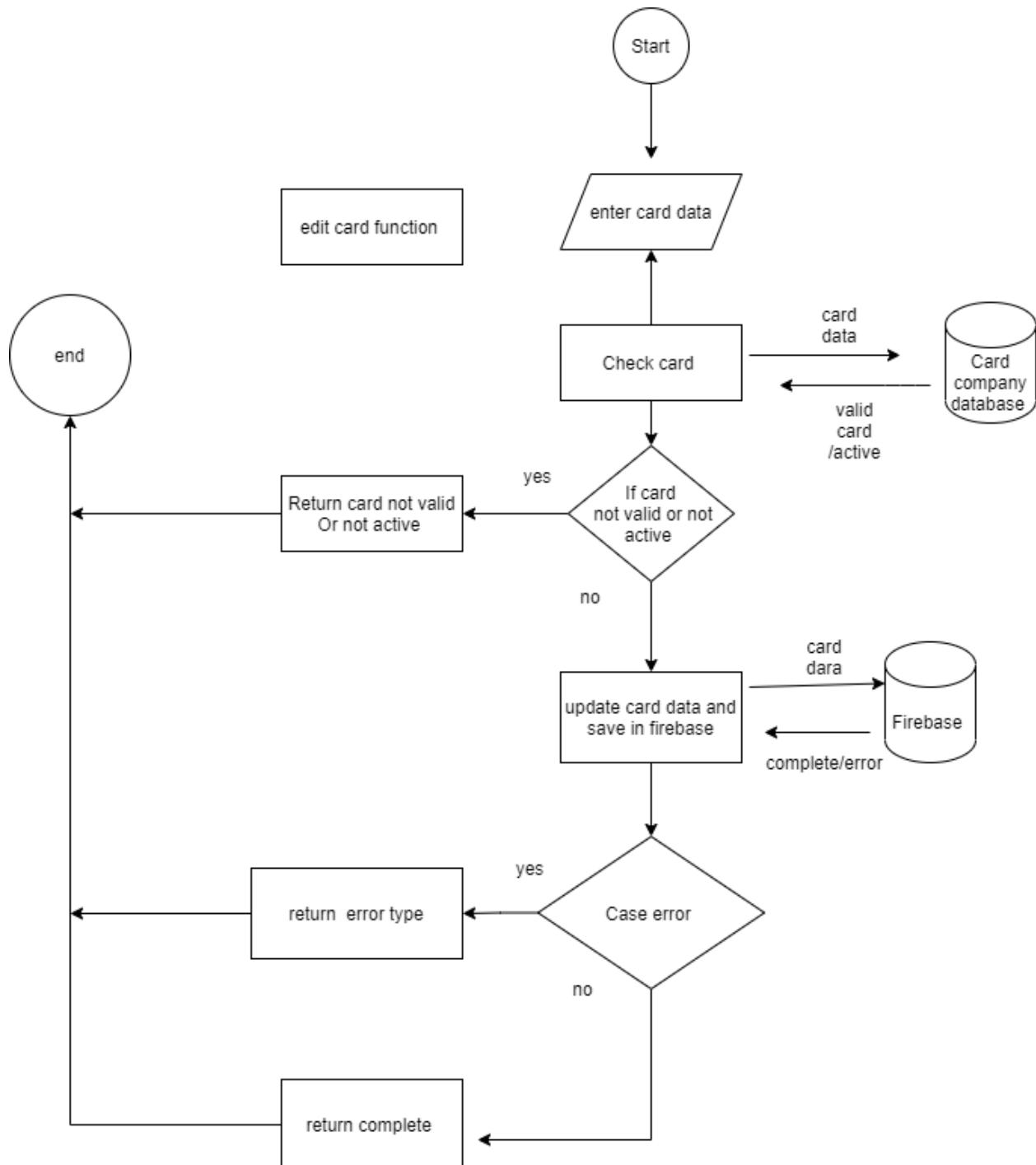


4.1.7 Delete Card



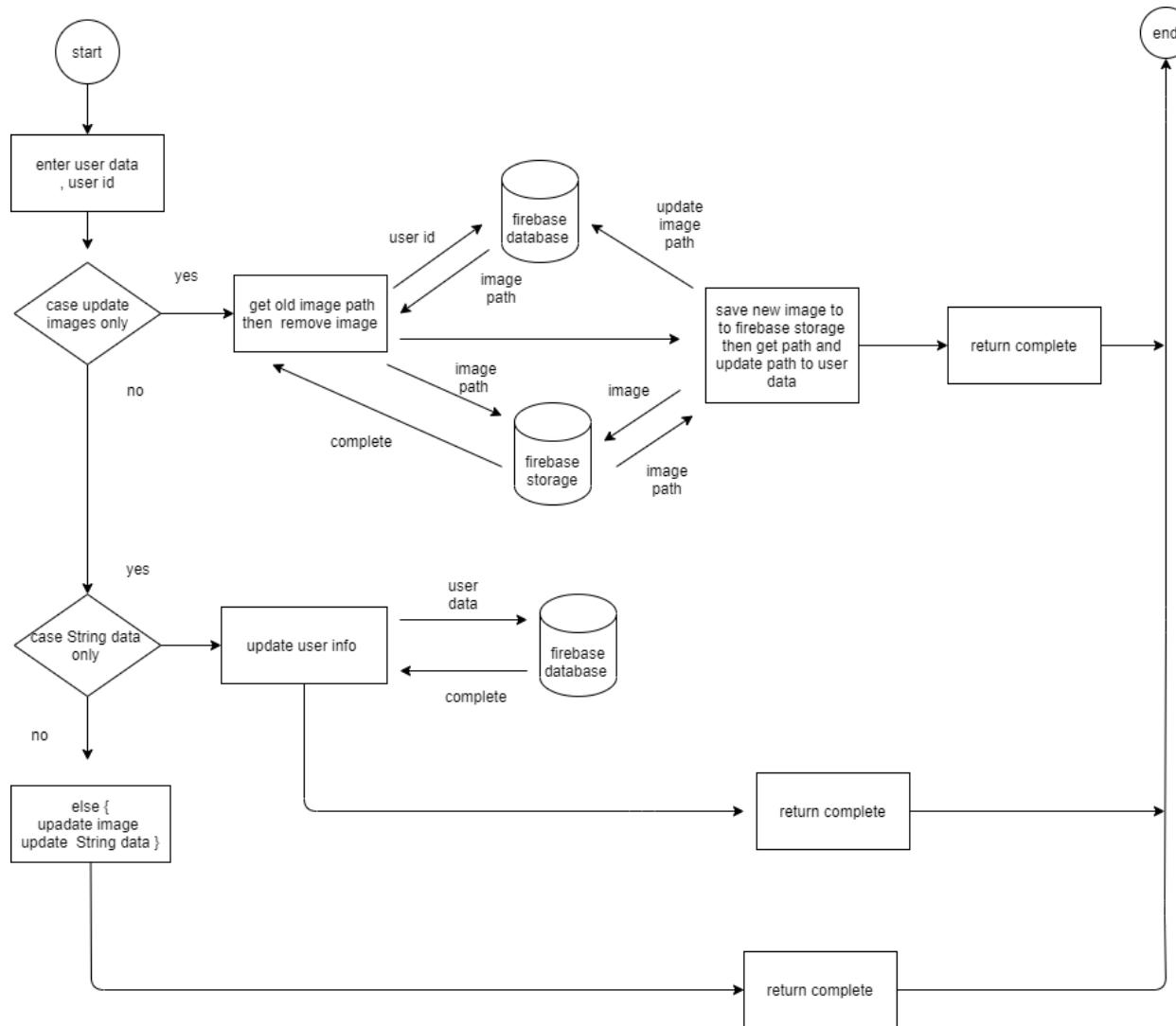


4.1.8 Edit Card



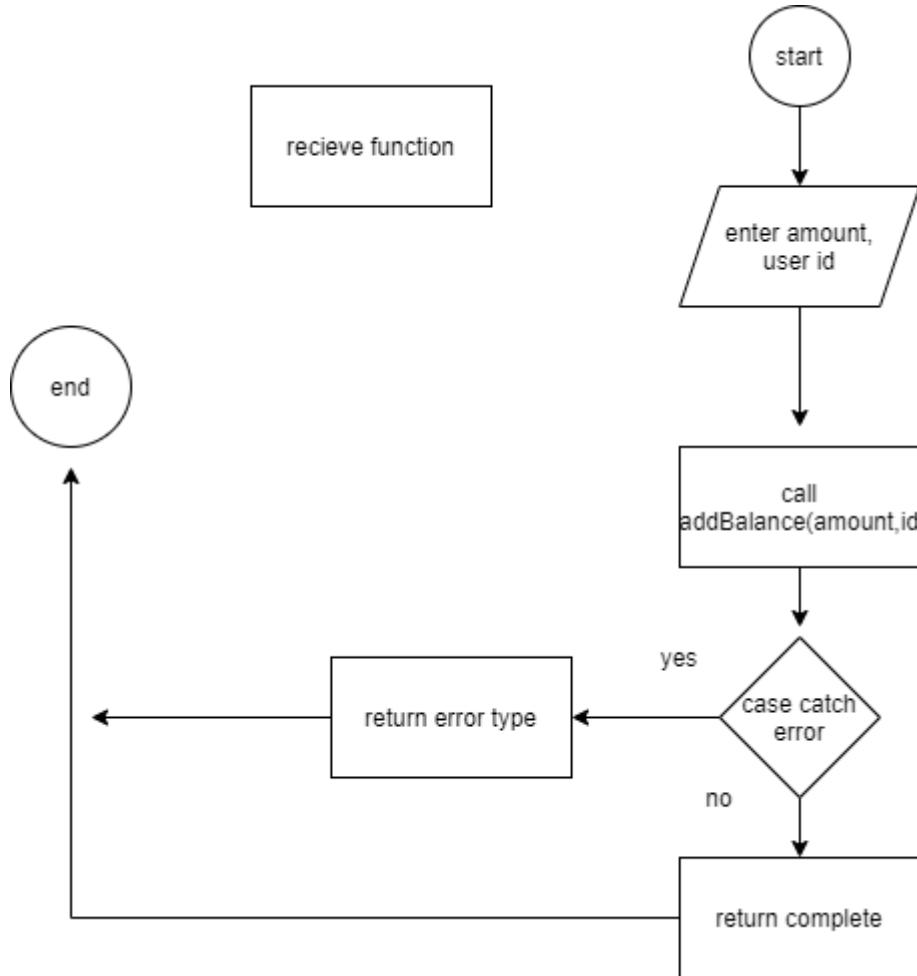


4.1.9 Edit Profile



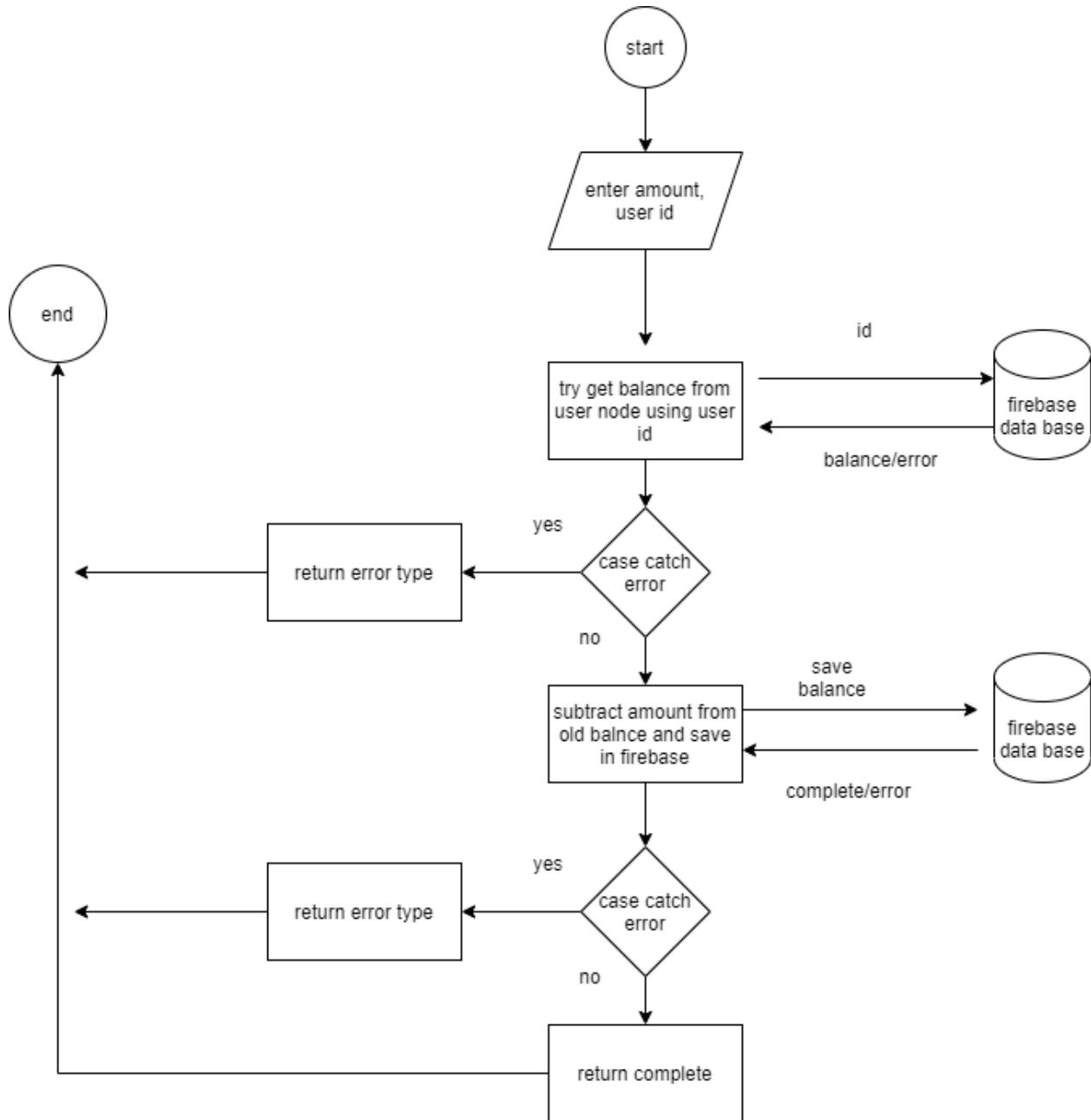


4.1.10 Receive



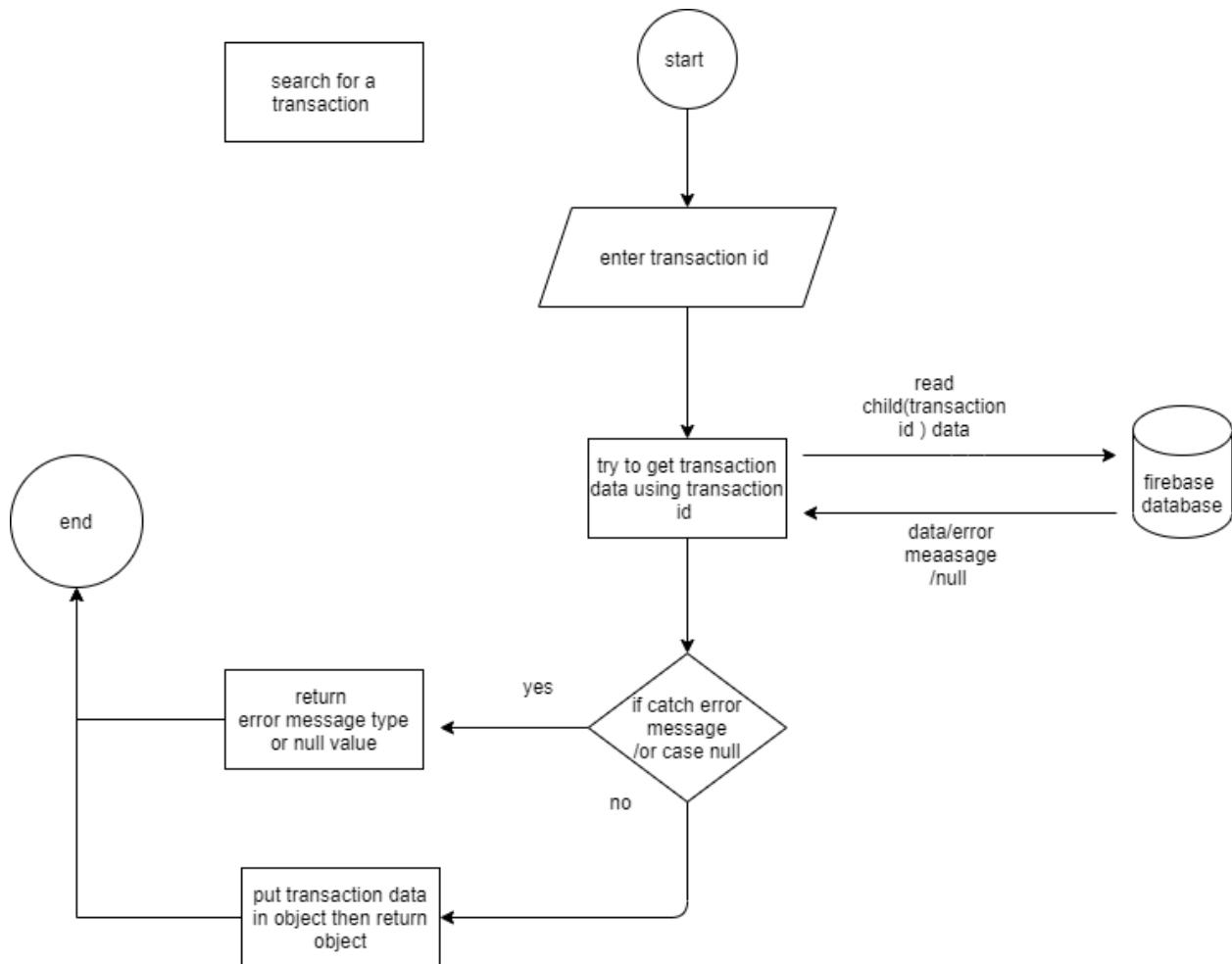


4.1.11 Deduce from the Balance



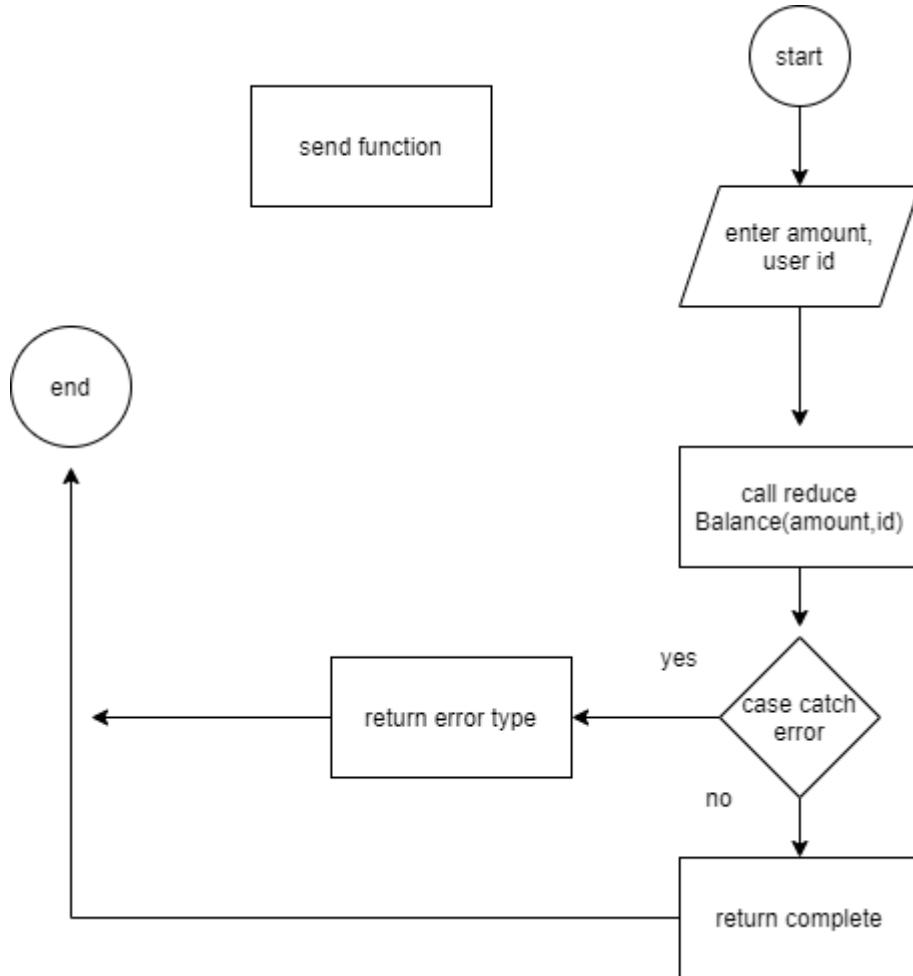


4.1.12 Search for transaction (Moderator)



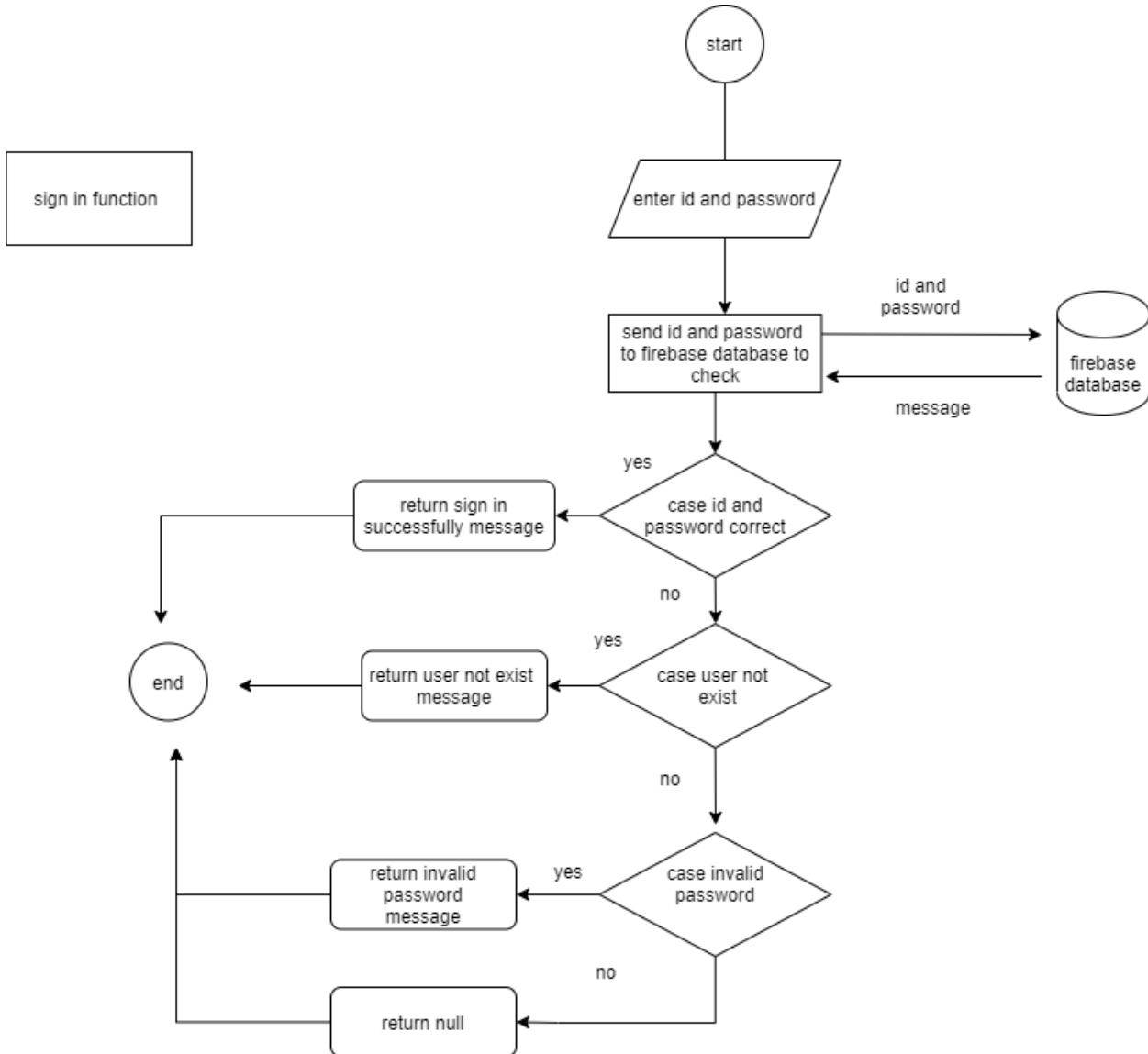


4.1.13 Send Money



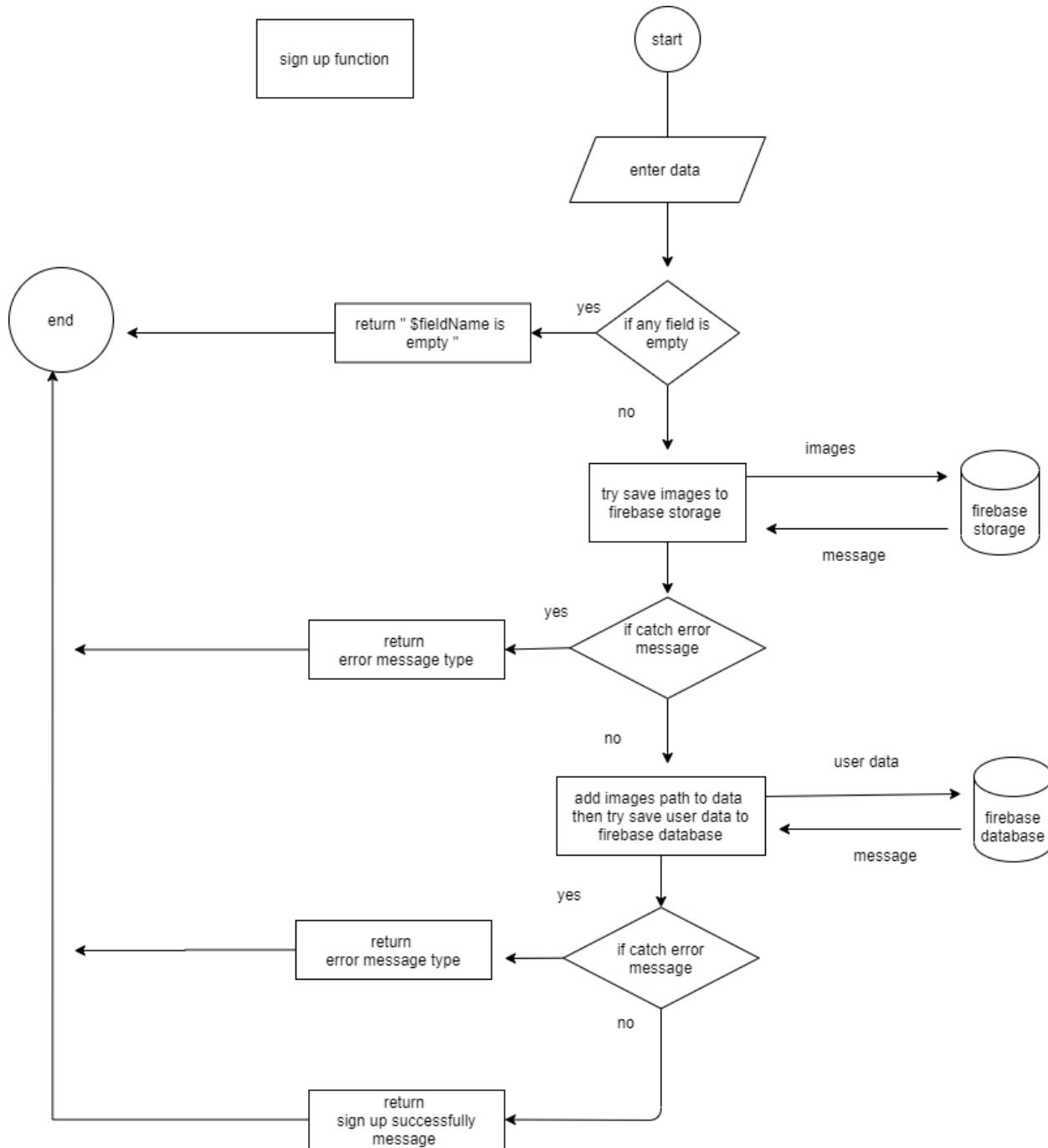


4.1.14 sign in



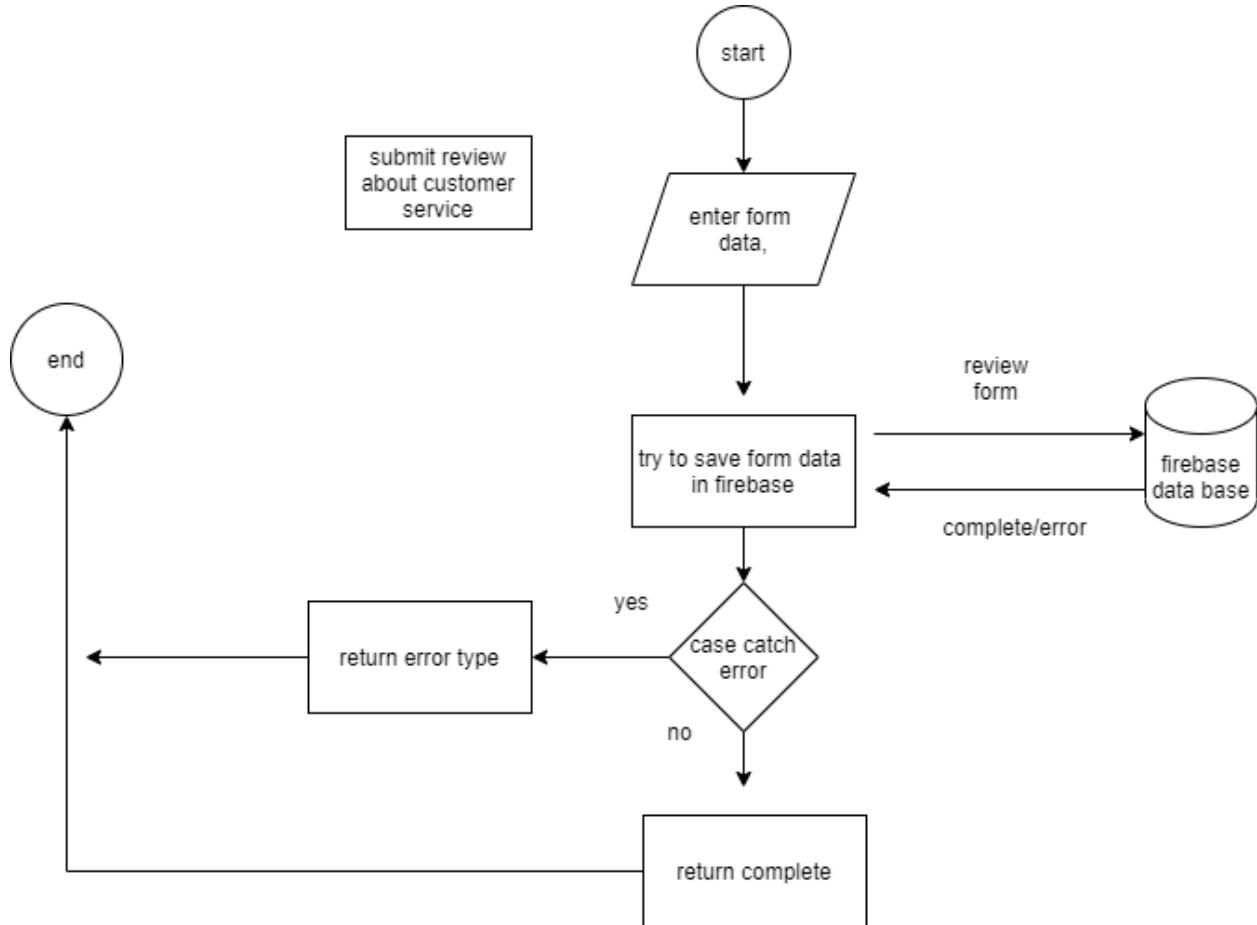


4.1.15 Sign Up



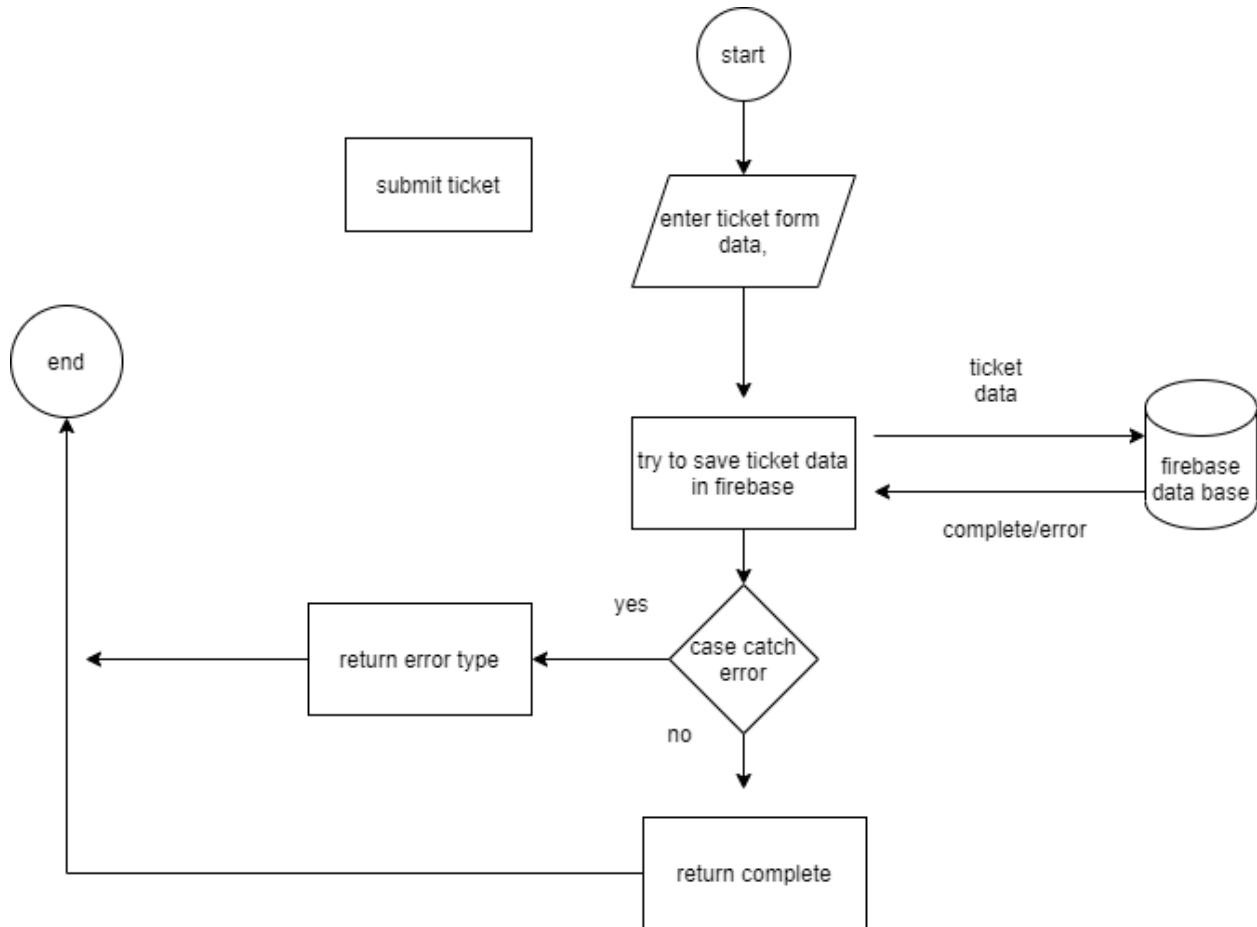


4.1.16 Rate the customer support



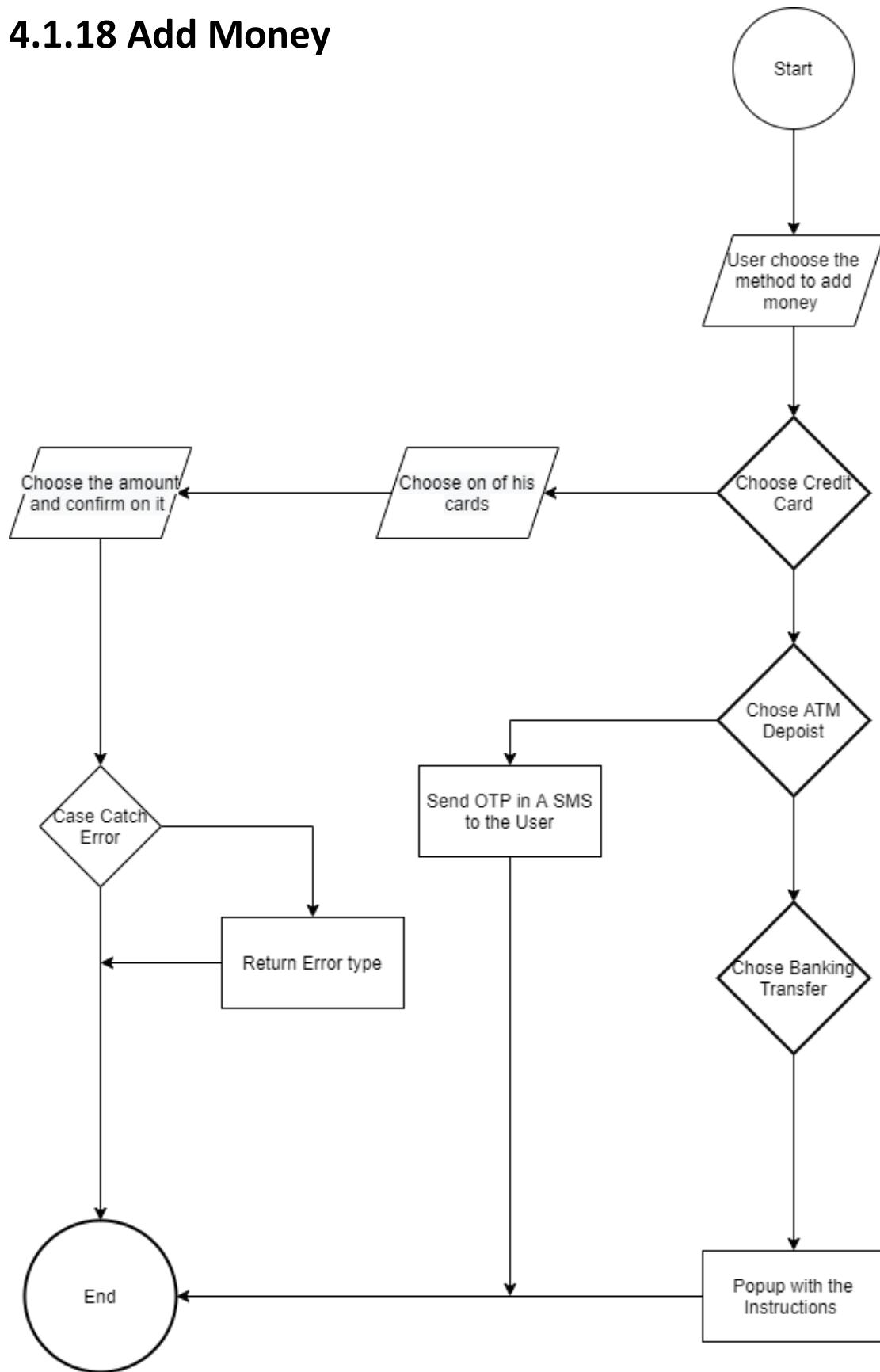


4.1.17 Request for help



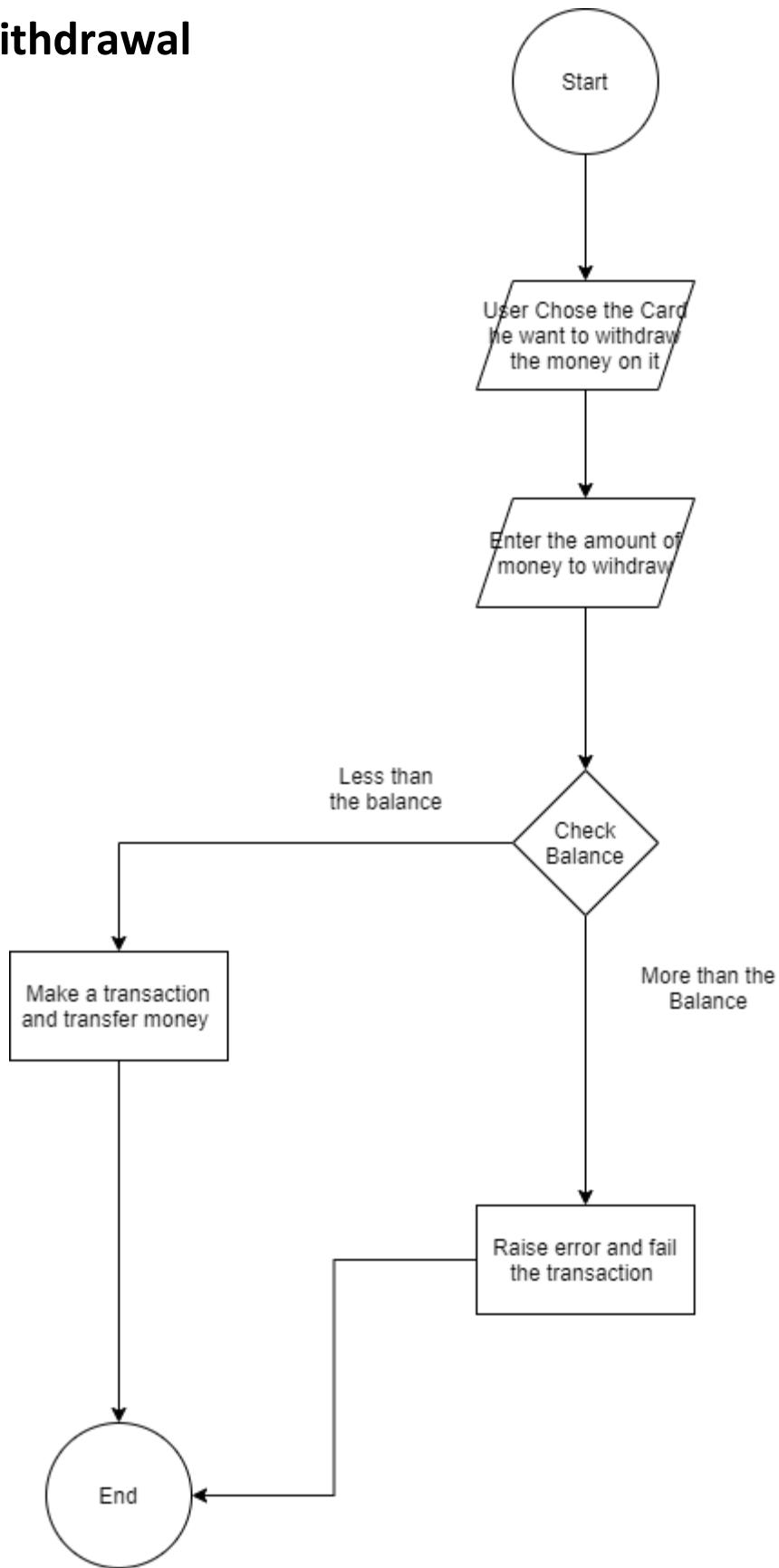


4.1.18 Add Money



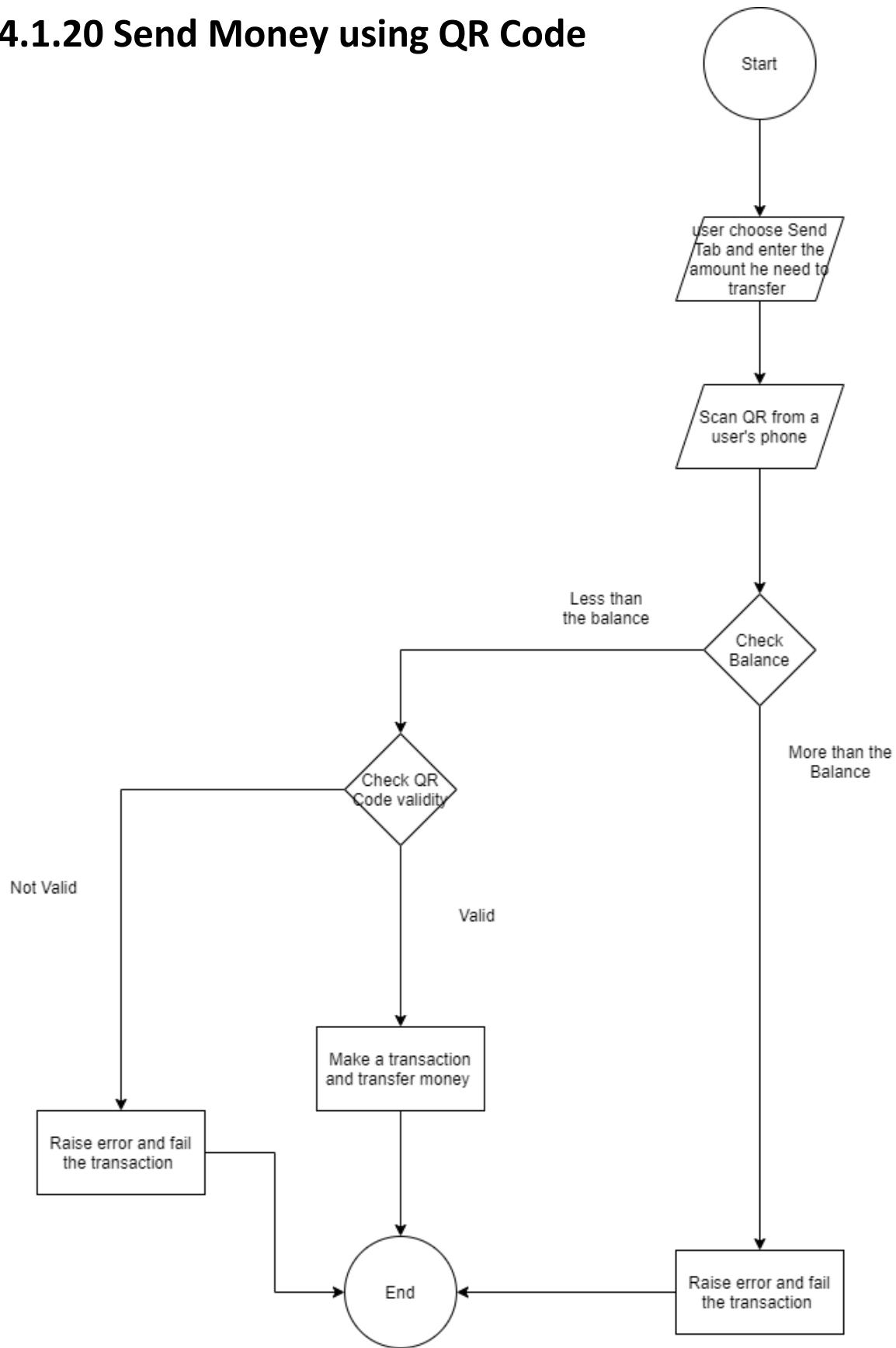


4.1.19 Withdrawal



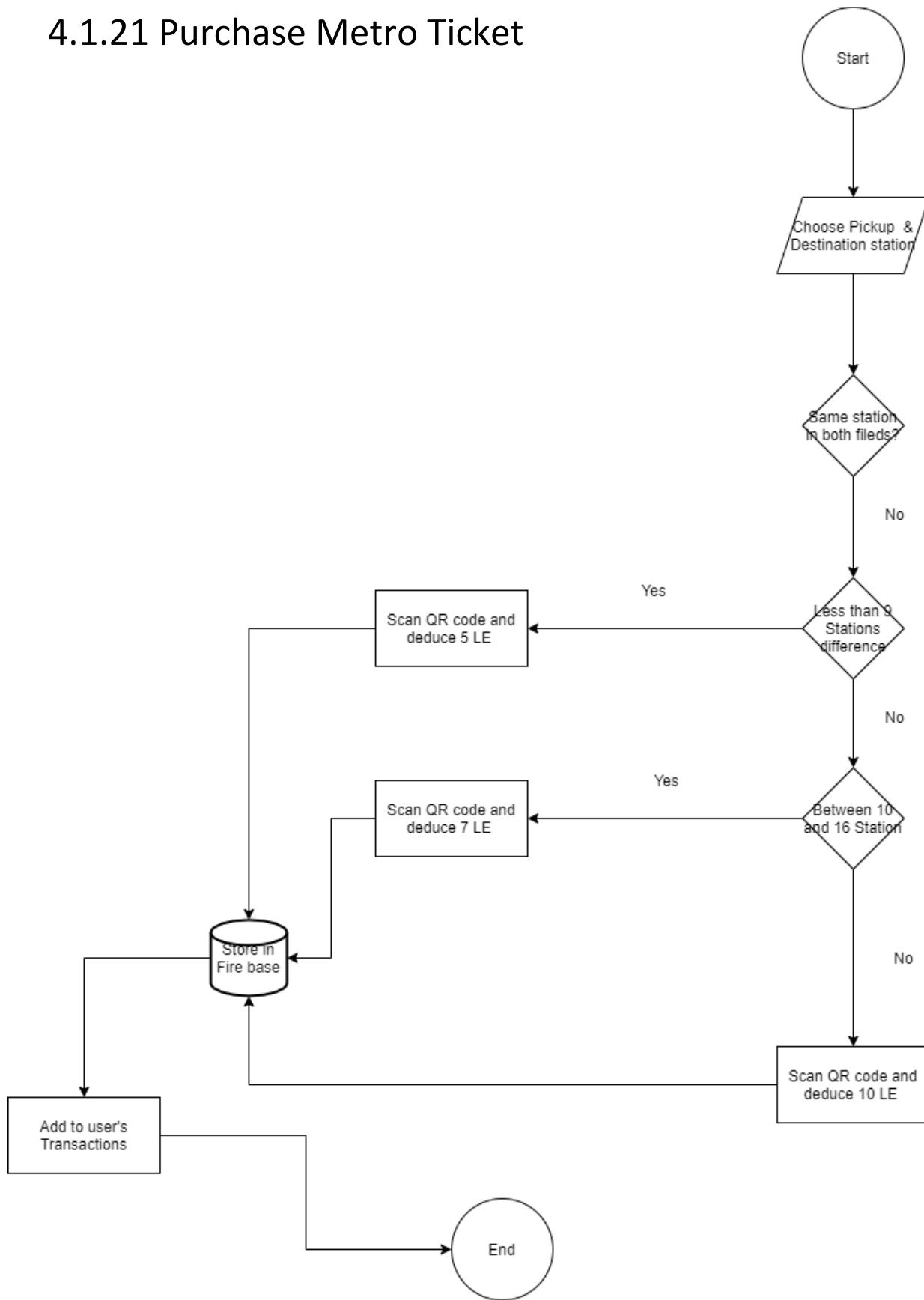


4.1.20 Send Money using QR Code





4.1.21 Purchase Metro Ticket





Chapter 5: Testing

In this chapter we are going to discuss and go deeper in FastPay system testing and present the types of testing to be used and test cases we examined our application through.



5.1 Unit Testing

FastPay during the development phase since we were working using scrum ant each sprint the application was being tested each class individual and all class and the communication way between them and we make sure that all class are working correctly

As development team we make sure to have 100% pass unit test before we are starting in integrating with fire base to store and handle our requests on it

Moderation application were also passed unit testing cases to make sure all classes are ready to be integrated with the firebase system and able to handle all new requests that is being pushed from the user's application and get ready to be in service

5.2 Integration Testing

FastPay integration was not so complicated as all we were need in to connect our app with the Firebase to able to sync all data in just seconds

So, user's app has passed the integration testing with firebase as the user signup process affected some tables in the firebase and after signing in and making many transactions all those steps is being stored securely in the firebase to help us as technical team to analysis it and help the moderator to able to monitor all the problems that appear in the application

Beside that all metro tickets are being integrated with the firebase to store the tickets that the user completely purchasing it to help our investigation team to know the user's history



Also, moderation app has passed all integration testing as the moderator is able to see the new sign-up requests that is being processed manually to approve the new users and make sure that the same person who signed up is the same who uses the app

Also, the support system was successfully integrated with our application and all tickets is being stored in the firebase to help in collecting errors and improve our application



5.3 Additional Testing

1. Sign up:

id	Test Case	Expected result
1	All fields are supplied and match criteria	Signup successful
2	No data is supplied, or some data is left empty	Signup error raised “not all required data is supplied”
3	All or some data fields are supplied but some do not match the criteria (constraints)	Signup error raised
4	User try to sign up using an existing Username in Database	Signup error raised “Choose another username”
5	The user tries to sign up again, but his account is not activated or already signed up	Signup error raised



2. Sign in:

Id	Test case	Expected result
1	Email and password are supplied and found match in database	Login successful
2	Email and password are supplied but no match was found in database	Login unsuccessful and error raised “Email or password may be incorrect”
3	whether email or password or both data is not supplied	Login unsuccessful and error raised “Email or password may be incorrect”
4	The user provides the correct ID and Password, but his account is not activated yet	Login unsuccessful + A message said “account isn't activated yet try again later” will raised
5	The user tries to sign in from different device with correct data	the other device will log out to make only one session is activated

3. Forget Password:

Id	Test case	Expected result
1	Provide an existed ID and activated account	An Email is sent to the user to recover his Account
2	Provide an existed ID and not activated account	Error message said wait for activation
3	Provide an ID that is not exist	Message said sign up now will raised



4. Add money:

a. Credit / Debit Card

Id	Test case	Expected result
1	Enter Zero amount to add money	the transaction will not continue
2	Enter valid money and the transaction is approved	Balance changed and a transaction will be saved with the details and the card submitted the transaction
3	Enter valid money and the transaction is Declined	Error raised to make the user able to contact his bank to know the reason and the balance is not affected

b. ATM Deposit

Id	Test case	Expected result
1	A SMS will be sent to the user to show him how to deposit money in the account	After the user deposit the money the balance will be affected with the money, he deposits

c. Bank Transfer

Id	Test case	Expected result
1	An Image will be shown to the user to give him the instructions to transfer money from his account to ours	After the user transfer the money, the balance will be affected with the money, he transfers



5. Withdrawal:

Id	Test case	Expected result
1	The user enters amount of money bigger than the balance to Withdrawal on it	The application will not continue the transaction and raised error to the user to decrease the amount
2	The user enters amount less than the balance and choose one of his cards and the transaction is approved	the user balance will be affected, and a transaction will be added
3	The user enters amount less than the balance and choose one of his cards and the transaction is not approved	the user balance will not be affected

6. Send money:

Id	Test case	Expected result
1	The user enters amount of money bigger than the balance to Withdrawal on it	The application will not continue the transaction and raised error to the user to decrease the amount
2	The user enters amount less than the balance and choose one of his cards and the transaction is approved	the user balance will be affected, and a transaction will be added
3	The user enters amount less than the balance and choose one of his cards and the transaction is not approved	the user balance will not be affected



7. Send QR Code:

Id	Test case	Expected result
1	Try to scan any QR to send money	The application will not continue the transaction
2	Try to enter amount above the balance and try to transfer to another user	The application will raise error
3	Scan valid QR code and enter right amount of money	The money will be deduced from the first account and transfer to the other

8. Receive QR Code:

Id	Test case	Expected result
1	The user has activated receive function	A Qr code is generated successfully and waits for money to be sent
2	Not all data is supplied, or some is incorrect	Money is not sent, and error is raised
3	Data is correct but the amount of money exceeds available balance	Money is not sent, and error is raised to the user “Insufficient funds”



9. Edit profile:

Id	Test case	Expected result
1	The user will be able to only change some fields like Username, Phone Number, and nickname	After the user update any filed form those the profile will be updated with the new data

10. Add card:

Id	Test case	Expected result
1	Supplied card data is correct	Card is added and available to use
2	Supplied card data is incorrect	Card is not added, and error is raised

11. Delete card:

Id	Test case	Expected result
1	If more than 1 card is available	Deletion is successful
2	Only one card is available	Deletion is fails



12. Edit card:

Id	Test case	Expected result
1	Users choose one of his cards and tries to edit its details	The application tests the card and deduces 1 LE and add it to the balance then verified the card

13. Bills:

ID	Test Case	Expected Results
1	Choose a date for today to pay the bill	The application will process your bill in seconds and deduce the amount of the bill from your account
2	Choose a date for later to pay the bill	The application will process the bill in the day that the user chooses and deduce the amount of the bill from your account

14. Metro:

ID	Test Case	Expected Results
1	Choose the destination and the pickup station the same	The window will not continue
2	Try to search for un existed station	The user wont able to choose a station
3	Choosing different point to know the price	The application calculates the difference between the stations and deduce the right amount from the balance



15. Support:

ID	Test Case	Expected Result
1	The user did not write any data in the field of brief description	The form will not be submitted, and an error message said fill all data to submit a complain

16. Logout:

ID	Test Case	Expected Results
1	The user press logout button in the application	All user data will be cleared locally and logged out successfully
2	The user login from another device	The account will logout from the first device to ensure user's security

Moderation Application:

1. Approve user:

ID	Test Case	Expected Results
1	A user that signs up to the application and upload all his documents in right way and one of the moderators approve his signup data	The user will be able to sign into his new account and all data that the user submits it in the sign-up form will be stored



2	A moderator found that the request has some error in the information	The user will not be able to sign in to FastPay and the request will be pending until one of the admins acts towards this request
---	--	---

2. Tickets created by users

ID	Test Case	Expected Results
1	The app has got a new ticket with a complaint from the user about a bug in the	The moderator will be able to see the ticket and all the details that the user submit it included the contact info of the user
2	The moderator has solved the problem that faces the user and need to close the ticket	All ticket details will be removed from the app and uploaded to our database to help us in reviewing it later



Chapter 6: Result

In this chapter we are going to Talk about the results of our project whether they have been achieved or not also the differences between the desired result and the actual one.



6.1 Results:

6.1.1 Expected results:

FastPay must be one of the most application that is being used in Egypt especially when we start to add some features like buying tickets for the public transportation as we see COVID-19 Pandemic seems to be like “New Normal” as the people must wear masks anywhere and tries to decrease the contact with people so FastPay will make contact fewer daily payments possible

Try to imagine with me if you start your day and take the Metro as your daily commute transport to the work or university so you take a money from your pocket that is being touched from other people, so the bank note became unsafe for the first person and then others touch it which helps to spread the virus faster.

Also, can you imagine how many times you forget to pay your monthly bills like your landline bill, water or even the electricity and then you surprised that you are running out of deadline to pay your bills and enjoy your life without any utilities



6.1.2 Actual testing results:

Fast pay able to pass all test cases that we generate during the production phase (Beta Testing) during using all functionalities that the app provides to the user and the moderation team.

Also, FastPay will ensure that the application will continue in his development to ensure that all users data is secure and monitored as we are going to build a database for all the users who are going to use our app in transferring money and adding money to make sure that the users use our app in a legal way.

FastPay will make sure to replace the traditional way during paying to other and purchasing products to make all our daily money contactless and electronic without using CASH.



Chapter 7: Conclusion

In this chapter we are going to Talk about our next steps to improve our system for our audience and makes its better



7. Conclusion:

During studying the market in Egypt to see how could we able to help our users and also how we could compete with a huge competitors like Vodafone Cash, and other E-Wallet in Egypt found that all the Egyptian users missed is the 100% Availability that is impossible to be achieved in Egypt Locally due to the bad connection and some failures that happen during integrating with other systems which makes the user worry about storing his money in any E-Wallet.

But in FastPay, We plan to make sure our app provides the users for more features that the user may missed in other E-Wallet like Depending on the online App 100% as you don't have to leave home for any reason to make transaction and without worry about the system being down because FastPay will run on some of Google Server (Firebase) that allows the application to be almost 100% available in any time and during maintenance the users will be notified with the down of the system to make sure to finish all their transaction before.



Chapter 8: Future Work

In this chapter we are going to Talk about our next steps to improve our system for our audience and makes its better



8. FastPay in Future:

Soon we are planning to add new features that will attract people to our application like

- Each user will be going to register for a free debit card linked to his account in FastPay to feel more safer during using online websites and to track all his money in just seconds without call or even a text
- The retails will have an application to able to monitor their goods and income anytime without needing for any person in help and receive all their transaction in seconds electronically

Also, we are going to change some finance basics in FastPay as soon as it reaches 1 million transactions like:

- Adding 1% Withdrawal fees on any transaction that the client needs to cash out his wallet money from any ATM
- Adding 1% fees on automated bills doe by FastPay
- Deduce 1% from the monthly outcome money in case the clients request monthly report for his transactions.



Chapter 9: User Interface Design

In this chapter we are going to Talk about our next steps to improve our system for our audience and makes its better



9.1. Home Page:





9.2. Sign in page:

Sign In Now

National ID

Password

[Forgot Password?](#)

[Sign In](#)

[Sign Up Now](#)



9.3. Sign up page:

Sign Up Now

 National ID

 username

 +20

 Email

Identity Verification

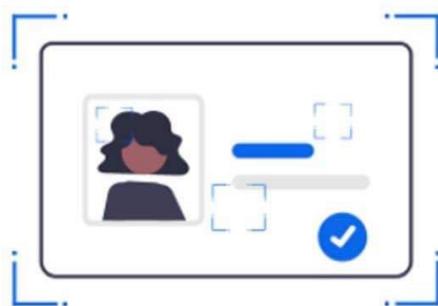


9.4. Identity Verification page:



Take a clear picture of your National ID

We'll request a permission to your camera



Position your National ID inside the highlighted rectangle

Make Sure all details are clear after taking each photo for the ID

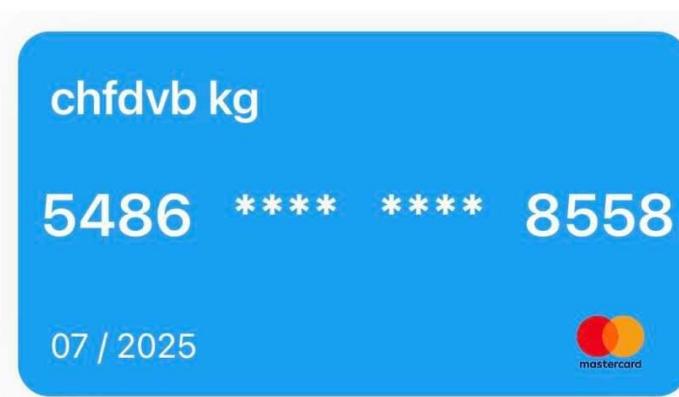


9.5. Add Money Using Card:

< Add Money

Card Deposit

EGP



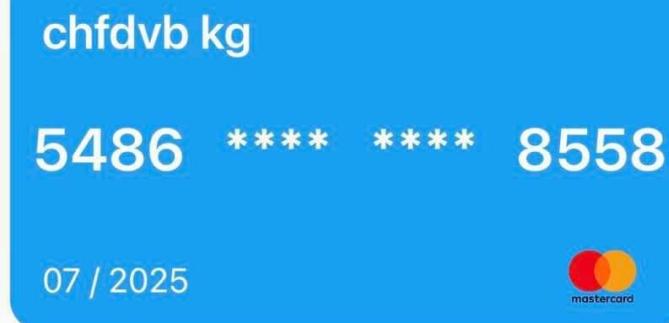
Confirm Deposit



9.6. Withdrawal Money:

Card Withdrawal

EGP



Confirm Withdrawl



9.7. Bills Payments:

The screenshot shows a mobile application interface for bill payments. At the top, the title "Bill Payment" is displayed in large, bold, black font. Below it is a large, bold, black number "123456". Underneath the number, the text "Service Provider" is visible. Below this, there are three icons: a blue flame, a blue plug with a green checkmark, and another blue flame. A white rounded rectangle covers the lower portion of the screen, containing the word "Electricity" in large, bold, black font. To the left of "Electricity" is the name "youssef mahfouz" and to the right is the amount "-250.0". At the bottom, there are two blue rounded rectangular buttons with white text: "Automate Bill" on the left and "Pay Once" on the right. A horizontal line is centered below the buttons.



9.8. Scan And Go:



Home



QR



Metro



Cards

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@ [youssefmahfouz](#)

👤 [youssef mahfouz](#)

[+201550856349](#)

✉ [youssef@yahoo.com](#)

👤 [29910210101816](#)

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