



A Project Submitted
in Partial Fulfillment of the Requirements
for the Degree of
Bachelor In Technology
In
Computer Engineering

by

Ahmad Khashan 1171892
Mohammad Hassan 1171948
Issam Al-Ashhab 1172602

Supervisor

Dr. Ashraf Rimawi

Department of Electrical and Computer Engineering
FACULTY OF ENGINEERING AND TECHNOLOGY
BIRZEIT UNIVERSITY, RAMALLAH-BIRZEIT, PALESTINE
February, 2022

Table of Figure

Figure 2.1	3
Figure 3.2	9
Figure 4.2 the use of flutter framework.	11
Figure 4.2.1 flutter in 2019-2021	12
Figure 5.1.1 modern aesthetic looking layouts and designs in Flutter	17
Figure 5.1.2 modern aesthetic looking layouts and designs in Flutter	17
Figure 5.1.3	18
Figure 5.1.4 Firebase + Flutter	18
Figure 5.3.1 sign up page	20
Figure 5.3.2 login Page	20
Figure 5.3.3 verification page	20
Figure 5.3.4	20
Figure 5.3.5 home page	21
Figure 5.3.6 services browser	21
Figure 5.3.7 Profile page	22
Figure 5.3.8 transaction history	22
Figure 5.3.9 services browser page	23
Figure 5.3.10 cafeterias page	23
Figure 5.3.11 libraries page	23
Figure 5.3.12 academic services page	23
Figure 5.3.13 pay page	24
Figure 5.3.14 rare page	24
Figure 5.3.15 debts page	25
Figure 5.3.16 bookstore admin page	25

Table of tables

Table 1 important differences between Private Key and Public Key.

4

Table of Contents

Table of Figure	II
Table of tables	III
UNDERTAKING	VI
CERTIFICATE	VII
Acknowledgements	VIII
Abstract	IX
الخلاصة	X
The Challenge	1
Research Questions	1
Chapter 1	2
Introduction	2
1.1 Motivation	2
1.1.1 Some Important Remarks	2
Chapter 2	3
Introduction	3
2.1 What Is Cryptocurrency	3
2.2 Security Aspect	3
2.2.1 Public key	4
2.2.2 Private key	4
2.3 Efficiency	6
2.4 Where Does Cryptocurrency Gets Its Value From	6
2.5 The Growth Of Cryptocurrency	6
Chapter 3	8
Introduction	8
3.1 Our Vision	8
3.2 Data Collection:	9
Chapter 4	11
Introduction	11
4.1 Procedure	11

4.2 App Building	11
4.2.1 Why Choose The Flutter Framework	12
1. Support And Community	12
2. Core elements	12
3. Performance	12
4.3 Data Collection	13
4.4 Database Building	13
4.4.1 Why Choose The Firebase Database	13
1. App Development Made Easy	13
2. Growth And User Engagement	13
4.5 Connection Between Frontend and Backend	14
4.6 Implementing A Cryptocurrency Building Method	14
1. Creation Of The Cryptocurrency	14
2. Addition Of Cryptocurrency Payment Method	15
Using Coinbase Payments	15
Chapter 5: App Functionality	16
5.1 Application Development	17
5.2 Application Functionality And Procedure Process	19
5.3 Application Real Life Demonstration	20
Conclusion	26
Ethical Point Of View	27
References	28

UNDERTAKING

We declare that the work presented in this project titled “**Cryptocurrency use in educational institutions**”, submitted to the Department of Electrical and Computer Engineering, Faculty of Engineering & Technology, Birzeit university, Bareilly for the award of the *Bachelor of Technology* degree in *computer engineering*, is our original work. We have not plagiarized or submitted the same work for the award of any other degree. In case this undertaking is found incorrect, We accept that our degree may be unconditionally withdrawn.

February, 2022
Birzeit, Ramallah

Ahmad Khashan
Mohammad Hassan
Issam Al-Ashhsab

CERTIFICATE

Certified that the work contained in the project titled “**Cryptocurrency use in educational institutions**”, has been carried out under our supervision and that this work has not been submitted elsewhere for a degree.

Dr.Ashraf Rimawi
The Department of Electrical and Computer Engineering
Birzeit university

Acknowledgements

We take upon this opportunity to acknowledge the many people whose efforts and time were given to us to teach us and mature us to finally graduate and face the world.

We would like to thank Dr.Ashraf Rimawi for being with us throughout this journey.

Ahmad Khashan
Mohammad hassan
Issam Al-ashhab

Abstract

The major aspects we would like to take a closer look into in this research paper is what this new found cryptocurrency technology offers us and how we could utilize its services to our advantage when building an application and how this affects both the application itself and users using said application.

الخلاصة

الجوانب الرئيسية التي نود أن نلقي نظرة فاحصة عليها في هذه الورقة البحثية هي ما تقدمه لنا تقنية العملة المشفرة الجديدة المكتشفة وكيف يمكننا الاستفادة من خدماتها لصالحنا عند إنشاء تطبيق وكيف يؤثر ذلك على كل من التطبيق نفسه والمستخدمين الذين يستخدمون قال التطبيق.

The Challenge

The first challenge we are trying to address in the following research paper is to be able to clarify what cryptocurrency is to people who have little to no knowledge in this specific field or any understanding of what this new technology is.

the second challenge comes when trying to successfully implement this technology into our application where we did not want the application to stand on its own where we found multiple already built and used application around the world so creating an application to order food or make payments to services via credit cards or plain cash is already played out and is relatively easy to build.

Research Questions

the following article is here to address the questions of

- why use this technology
- the importance of the application
- why mix the two together and not stick to already tested and used transaction methods

Chapter 1

Introduction

The use of cryptocurrency may be challenging for some especially when little known about what they are, who created them and where does their value come from, but more importantly there is an exciting opportunity to try and utilize this new found technology and implement it in our application in order to monitor the students acceptance and how does this affects their lives and thinking process when it comes to educational and life in the educational institute campus. In the end we joined this field of study to be able to make the world better ,easier and accessible to more and more people.

1.1 Motivation

The motivation for this work came from the newly founded crypto technology and the popularity it is gaining day after day. The idea came from a show where a payment method was implemented in an educational facility to motivate the students and to gain a better outcome from said students in a variety of topics and to monitor their academic behaviors when implementing this new concept.

1.1.1 Some Important Remarks

This technology is still relatively new and with every new technology that arises there is a certainty that challenges will arise as well and it is our job to be able to deliver a crystal clear perfect product to our users in order to benefit both parties.

Chapter 2

Introduction

In this chapter we will be explaining in a broad manner what cryptocurrency is and some general aspects that are an important factor to our application build and execution.

2.1 What Is Cryptocurrency

cryptocurrency is just like any other currency, it is the transfer of digital assets where you can trade with it or exchange it for goods and services but the only difference here is unlike the money we have which is paper and can be held and seen, cryptocurrency is 100% virtual and most importantly is the idea of it being decentralized where as the money we use today being printed money or digital assets like a mastercard, all of it is centralized to the bank where it controls who has what and what is sent to who. [2][3]

2.2 Security Aspect

The most important advantage that cryptocurrency holds over current transaction methods, is security. How easy is it really to steal someone's information, by stealing the password of a person's bank account or stealing the card that is connected to that bank or even stealing their whole identity.

As of 2019 Credit card fraud rose by 44.7% to 393,207 reports.

There were 1,387,615 reports of identity theft in 2020.

There were 1,108 data breaches in 2020.[17]

but in cryptocurrency you can say it is almost impossible to commit fraud or give fraudulent credentials, cryptocurrency is built around the idea of a huge ledger that every person that buys into that cryptocurrency has a copy of that ledger, which is pretty much a big spreadsheet that has every known transaction in it and every huge ledger is secured using cryptography in a secured ledger built like a block which is why it is called a blockchain where every block is connected to the other just like a linked list and every node has the name of the previous node and the current one in hash format and includes the who sent it and to who so if i want to fraud my way into some cryptocurrency wealth what do i have to do ?

I would have to hack into almost a million and half computers and change every block. and this is 99.99% impossible to do in this day and age.

2.2.1 Public key

The public key is used to encrypt and a private key is used to decrypt the data. The private key is shared between the sender and receiver of the encrypted sensitive information. The public key is also called asymmetric cryptography.

2.2.2 Private key

is used to both encrypt and decrypt the data. This key is shared between the sender and receiver of the encrypted sensitive information. The private key is also called symmetric being common for both parties. Private key cryptography is faster than public-key cryptography.

The following are some of the important differences between Private Key and Public Key.

Table SEQ Table 1* ARABIC 1important differences between Private Key and Public Key.

Sr. No.	Key	Private Key	Public Key
1	Algorithm	Private Key is used to both encrypt and decrypt the data and is shared between the sender and receiver of encrypted data.	The public key is only used to encrypt data and to decrypt the data, the private key is used and is shared.
2	Performance	The private key mechanism is faster.	The public key mechanism is slower.
3	Secret	The private key is kept secret and not public to anyone apart from the sender and receiver.	The public key is free to use and the private key is kept secret only.
4	Type	The private key mechanism is called symmetric being a single key between two parties.	The public key mechanism is called asymmetric being two keys for different purposes.
5	Sharing	The private key is to be shared between two parties.	The public key can be used by anyone but the private key is to be shared between two parties only.
6	Targets	Performance testing checks the reliability, scalability, and speed of the system.	Load testing checks the sustainability of the system.

Now all of this information is a fairly broad explanation of what is exactly a public key and what is a private key and we should know this information because this will help us more understand how the transactions between two parties will occur.

A more detailed connected explanation of the usage of the public and private key is A public key allows you to receive cryptocurrency transactions. It's a cryptographic code that's paired to a private key. While anyone can send transactions to the public key, you need the private key to "unlock" them and prove that you are the owner of the cryptocurrency received in the transaction. The public key that can receive transactions is usually an address, which is simply a shortened form of your public key.

Therefore, you can freely share your public key without worry. You may have seen donation pages for content-creators or charities with the public keys for their crypto addresses online. While anyone can donate, you'd need the private key to unlock and access the donated funds.

The ledger will contain public key or address which will be a small portion of your public key to be able to see what transaction went from to who received it without actually knowing any other information and will also have the transactions hash with the previous transaction hash to be connected like a we explained (figure 2.1)



2.3 Efficiency

the transfer of cash from one bank to another bank takes about 3-5 business days and that is not including holidays and of course matters may get more complicated if we wanted to send from one bank to another and each of them reside in different areas in the world , you see how using banks can be a little inconvenient to some where our generation is used to process being done in a fast manner and we really do not like to wait.

cryptocurrency can be transferred from one wallet to another in an instant or it may take up some time around 3-5 minutes.

Combining this knowledge with the current generations' wait limit we have the perfect match and the future of money itself.

2.4 Where Does Cryptocurrency Gets Its Value From

Like any currency, cryptocurrencies gain their value based on the scale of community involvement. Cryptocurrency gains value if the demand for it is higher than the supply. When a cryptocurrency is useful, people want to own more of it, driving up the demand. Since people want to use it, they don't want to sell it.

2.5 The Growth Of Cryptocurrency

Global adoption of cryptocurrency has taken off in the last year, up 881%, with Vietnam, India and Pakistan firmly in the lead, according to new data from Chainalysis. [15]

As of 2021, we estimated global crypto ownership rates at an average of 3.9%, with over 300 million crypto users worldwide. And over 18,000 businesses are already accepting cryptocurrency payments.[18]

The University of Pennsylvania will accept cryptocurrency as tuition payment for a new online program at the Wharton School, making Penn the first Ivy League institution and Wharton the first U.S. business school to allow students to pay their tuition using the digital currency, reports the Philadelphia Business Journal. [17]

El Salvador has become the first country in the world to make the cryptocurrency Bitcoin legal tender. [6]

Tesla announced Monday it has bought \$1.5 billion worth of bitcoin. The company said it bought bitcoin for “more flexibility to further diversify and maximize returns on our cash.”

Tesla also said it will start accepting payments in bitcoin in exchange for its products “subject to applicable laws and initially on a limited basis.” That would make Tesla the first major automaker to do so. The \$1.5 billion worth of bitcoin will give Tesla liquidity in the cryptocurrency once it starts accepting it for payments. [19]

Chapter 3

Introduction

In this chapter we will be talking about our vision for cryptocurrency use in education institutions and the benefits it will offer.

3.1 Our Vision

our vision for cryptocurrency use in higher education facilities is simple but quite effective in various aspects in our lives such as but not limited to:

- rebuild and replenish the universities economics.
- help the students in their studies and university life over all.
- give a simple and an easier way to make transactions inside university campus.
- data collection.

What we want to achieve and introduce to the university is that we want to substitute plain paper money with cryptocurrency and how we do such a thing is simple and will be explained in 3 simple steps.

the first step is to introduce an application using flutter which is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase, where the application will contain every service the university has to offer from cafeterias to bookstores and also the option to pay for tuition and other needed certificates.

the second step is to create a cryptocurrency which is built on the Ethereum blockchain that way we do not have to worry about security or other factors that come from creating a cryptocurrency from scratch where this way it will be easier and more controlled and this cryptocurrency is limited to the students who attend the university, so for example if a freshman student wants to enter the university and pay for the services said university he will have to buy the cryptocurrency which will be supplied using the app.

The third and final step is to introduce our newly created cryptocurrency to the application which we created and we make it the main and only paying method.

3.2 Data Collection:

In this day of age data is considered more valuable than currency, big companies like Facebook, Google, Apple all now rely on data collection from its users to be able to do two things with them either recycle that data in order to produce a better functioning product for the users and in turn make them more popular and relevant for each individual user or sell that data to the highest bidder where it may be new startups or other big companies.

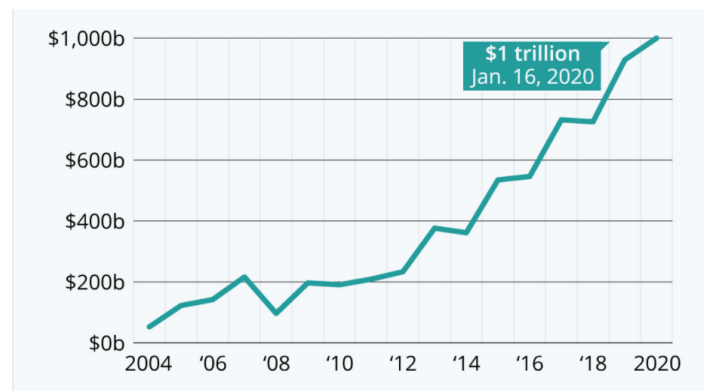
In June 3rd 2020 Google was sued for the illegal use of private data collected by its users even in incognito mode as it has been published by the Reuters news article where the reporter Jonathan Stempel said and I quote:

“The lawsuit seeks at least \$5 billion, accusing the Alphabet Inc unit of surreptitiously collecting information about what people view online and where they browse, despite their using what Google calls Incognito mode.

This helps Google learn about users' friends, hobbies, favorite foods, shopping habits, and even the “most intimate and potentially embarrassing things they search for online, the complaint said.” [13]

In 2016 the New York Times reported that Cambridge Analytica harvested millions of users in order to target voters with political ads in the 2016 elections. [14]

Many more companies have been accused of using data which was supposed to be strictly private in order to recycle this data and improve the product without the consent and knowledge of its users, when seeing how much money Google made throughout the years we can notice a large escalation around 2012 which is predicted considering that Google started the real time data collection around September of 2011.



well from the figure we can conclude and see a clear definitive correlation between data collection and app performance where we can shape our application in a way where we can actually be able to control the users actions and actually improve their overall experience so let's say that the data that our application will provide can benefit the educational institution in deciding what cafeterias to keep and cafeterias to remove based on income and popularity which can be monitored using our private but visible new transaction method, we can see what is the product that is being sold the most and we can give that data to the cafeterias in order to help them improve and in turn make the students have a more pleasant experience which in turn affects their mood in the college campus and can have a huge effect in their overall performance in their studies and we can also control what foods, drinks and entertainment are being consumed and change them in way to see what benefits the students attention span ,marks and overall academic performance.

All of this in turn helps the college to become more efficient in their teaching ways and thus helps the college overall reputation.

In a medical article published on the US National library of medicine national institutes and health it was said that The majority of studies demonstrated a positive association between diet and academic achievement , whereby students who reported consuming regular meals, including specifically a breakfast meal, as well as students who reported higher consumption of fruit, were found to have higher academic achievement. [15]

Chapter 4

Introduction

In this chapter we will begin to explain our application thought and build process starting from basic and general understanding of the resources we will be using to more in depth explanation and illustration.

4.1 Procedure

we will start implementing our project and make it real with the following steps:

- app building (First step)
- data collection (Second step)
- database building (Third step)
- connection between frontend and backend
- implementing cryptocurrency payment method

4.2 App Building

We will start by first building the frontend of our project using flutter framework with the main coding language being dart which is a client-optimized language for developing fast apps on any platform, as shown on figure 4.2 which is an example on the use of flutter framework.



4.2.1 Why Choose The Flutter Framework

1. Support And Community

In just six months since the last stable 1.12 release, developers from the community have managed to:

- reduce the operative memory consumption (in some cases by 70%!)
- reduce the size of apps
- improve the performance of all iOS apps by almost 50%

As you can see, the community plays a huge role in this framework's development.

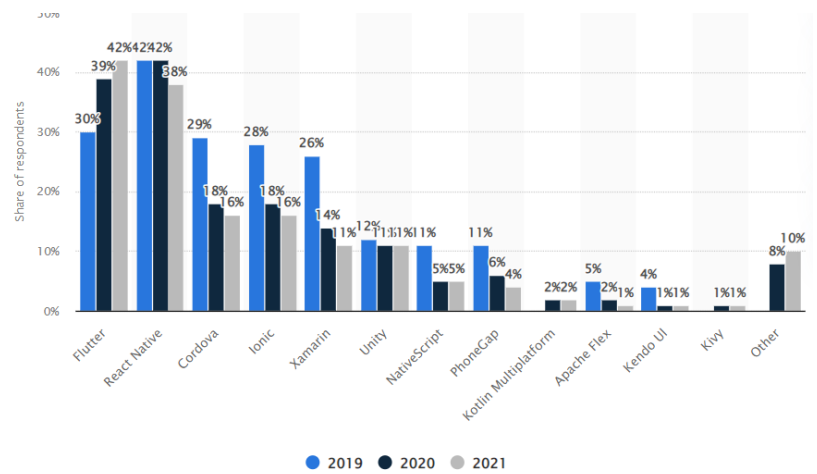
2. Core elements

Like many progressive languages, Flutter uses widgets as its core element. Widgets allow developers to see what they're doing with their code almost immediately and save lots of time on developing basic UI elements for each screen and resolution.

3. Performance

Flutter is one of the highest-performing frameworks even in comparison to native languages, and it wins by a landslide over other cross-platform technologies. The standard is 60 frames per second (FPS), and this alone is rather high. Flutter uses JavaScript Bridge to smoothly initialize screens, which allows them to appear smoothly.

as of 2021 flutter became one of the most used frameworks for building applications as it can be shown on figure 4.2.1



4.3 Data Collection

Our second step will be focused on collecting data from every service the institute has to offer its students to be able to implement that data to our database and in turn showing the students what these services have to offer them.

4.4 Database Building

our third step will be dependent on data collection where we will need to build a huge database which includes every service and what this specific service have and what it does not, it will also include every student login information and also every transaction that goes through our application and we will be doing so using the help from google's firebase which is a Realtime, cloud-hosted database. Data is stored as JSON and synchronized in realtime to every connected client.

figure 4.3 showcases the services that firebase equips us with.

4.4.1 Why Choose The Firebase Database

1. App Development Made Easy

With Firebase, you can focus your time and attention on developing the best app(s) possible for your business. Since the operations and internal functions are so solid, and taken care of by the Firebase interface, you can spend more time developing the high quality app that users are going to want to use.

some of the features it offers is Cloud messaging , Authentication , Hosting , Remote Configuration, test lab , Crash reporting , Real time database , Storage.

2. Growth And User Engagement

One of the most important aspects of app development is being able to grow and engage with users over the course of time. Firebase has a lot of built in features to make sure this is exactly what you do. With the platform being geared towards business apps, this is really at the center of what makes Firebase so great. [1]

4.5 Connection Between Frontend and Backend

Connecting our frontend with our backend should be relatively easy and the reason being is that the flutter framework allows us to easily connect our firebase database using a configuration file that we need to implement after we make our database project which in turn allows us to make that connection in a smooth and time efficient manner.

4.6 Implementing A Cryptocurrency Building Method

we will divide this step into 2 important steps that are crucial for implementation of a cryptocurrency payment method for any web, android or IOS based application:

1. Creation Of The Cryptocurrency

which can be done by choosing one of the 3 available ways, which are:

1.1. Creating a new blockchain from scratch takes substantial coding skills and is, by far, the most difficult way to create a cryptocurrency. There are online courses that help walk you through the process, but they assume a certain level of pre-existing knowledge. Even then, you might not walk away with everything you need to go and create a new blockchain.

1.2. Forking an existing blockchain might be a lot quicker and less complicated than creating one from scratch. This would involve taking the open source code found on GitHub, altering it, then launching a new coin with a different name. The developers of Litecoin, for example, created it by forking from Bitcoin. Developers have since forked several coins from Litecoin, including Garlicoin and Litecoin Cash. This process still requires the creator to understand how to modify the existing code.

1.3. The third and easiest option for those unfamiliar with coding is making a new cryptocurrency or token on an existing platform like Ethereum. Many new projects create tokens on the Ethereum network using the ERC-20 standard, for example.

2. Addition Of Cryptocurrency Payment Method

Using Coinbase Payments

Coinbase, much like PayPal, supports embeddable buttons that you can add on your website. If you're looking for a more advanced integration, though, you'll need to use their API directly.

Chapter 5: App Functionality

In every application either mobile based or web based there are two main stages:

- Front end
- Backend

Frontend

A successful application requires a functional, easy to navigate, clean and attractive application to appeal to the users and maintain their interest and front end development is crucial to this concept being the only side a user will see and interact with and in our case it will be used by university students some with technological backgrounds and basic understanding of how an application works and some with no information at all so we have to factor both sides in consideration when building our front end side of our application, to make it easy on the eyes and more importantly easy to use, to appeal to our targeted audience and make it so that using the application will in the future be more convenient and easier to use.

As many articles and studies have concluded that an applications interface and other factors have a direct effect on the usage and popularity of an application where a conference paper done in 2014 discusses the relations between user interface and the perceived quality where it stated “Previous studies demonstrated that the users' perception, satisfaction, and judgments of mobile apps is influenced by many factors related to app development, such as the change-and fault-proneness of adopted APIs , the complexity of users interfaces ” [21]

Backend

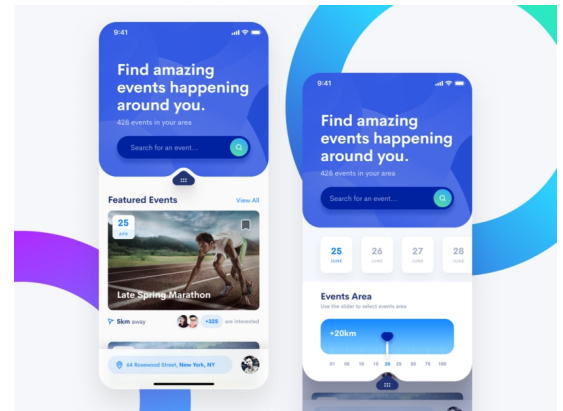
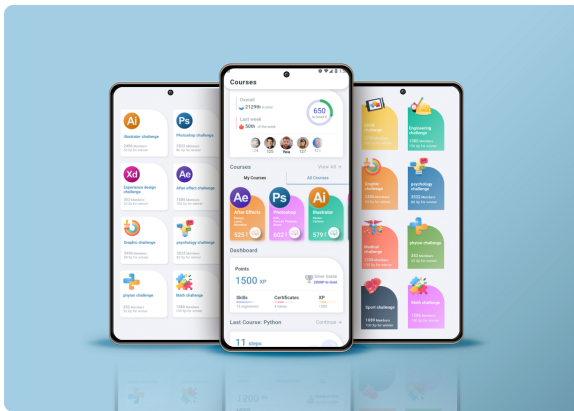
The backend is the side where the user will not see but its effects will have a big impact on the success of the application ,For any application a fundamental crucial aspect is the backend, where it needs to hold many properties for the application to work in a fast, reliable manner and reflect the frontends functional easy to use side, some of those properties being that the backend needs to be fast which means it needs to work with the frontend side in order to deliver required data to be shown to the user, also it needs to be secure where sensitive information is stored on the servers and any interference by an outsider with the information can be problematic in our case the university will have access to this huge database filled with crucial data so it is very important for us to build our backend in a clean, secure manner.

5.1 Application Development

For any application to function in a correctly functioning manner it has to implement the front end and back end aspects in a proper way as explained previously and we will develop the application cut into stages.

Stage 1

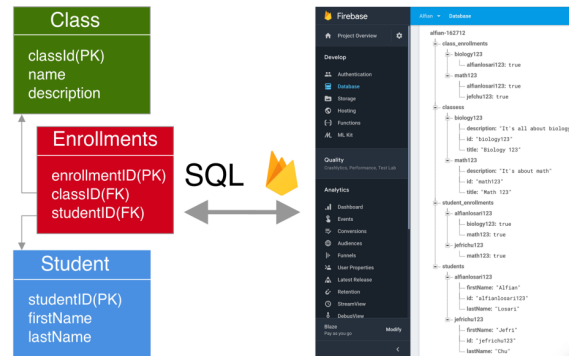
The first step is to develop our layouts for our interface and this is an important stage where it needs to be clean and understandable to use to be able to secure an easy understanding of the applications functionality, using flutter will give us access to modern aesthetic looking layouts and designs as can be seen of figure 5.1.1 and figure 5.1.2



Stage 2

In this stage we will primarily focus on our backend side which includes multiple services to ensure the ability of communication between the back side of the application and its front side and in this stage we will also start building our database

which will be fully on our realtime Firebase database(Figure 1.3) which gives us ease of access and ease of data collection and storing, Firebase also has tools in the flutter framework which will helps us immensely with whatever process we will require in the development of our application.



Stage 3

In this stage our main focus will be the connection between our newly built database and our developed interface, we will implement different tools provided by the flutter framework and firebase tools to ensure the fast and clean delivery of data upon request by user



5.2 Application Functionality And Procedure Process

we start on the login page where you will have the option to sign in if you are already a registered user or sign up using Ritaj official student account to be able to block any attempts to create multiple account for one user and it is an excellent way to keep the application usage only inside the the campus and only by the universities students.

then we continue on the home page as the main page and gateway into other services the application provides where as seen from the figures the user will have the option to go into the service browser and do what is wanted or go to the users' profile to check specific information or for example change the password.

5.3 Application Real Life Demonstration

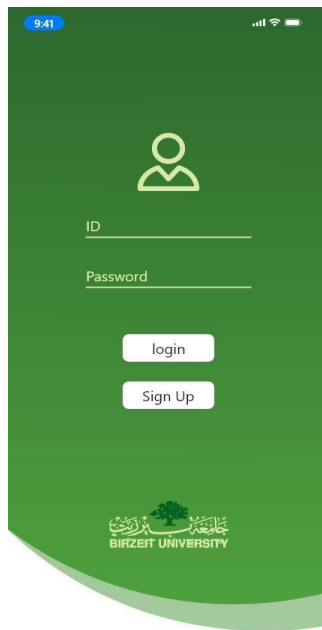
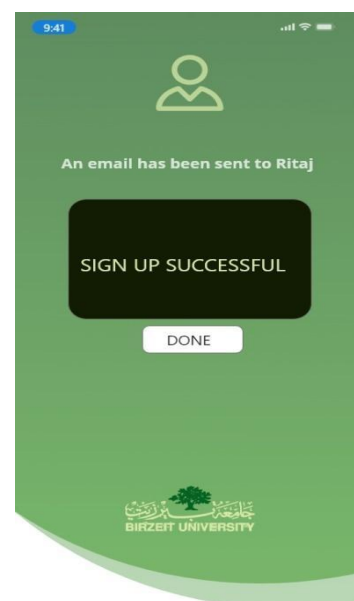
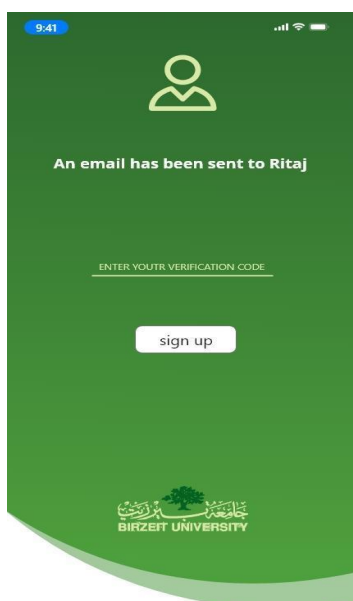
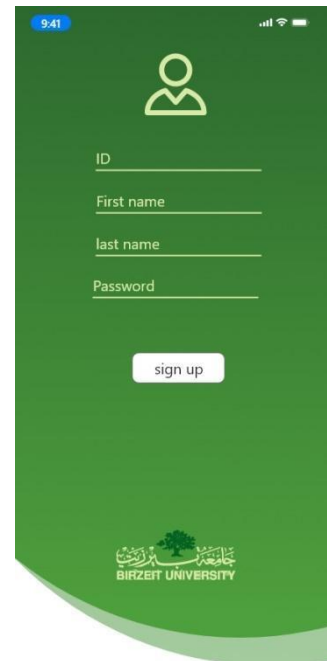
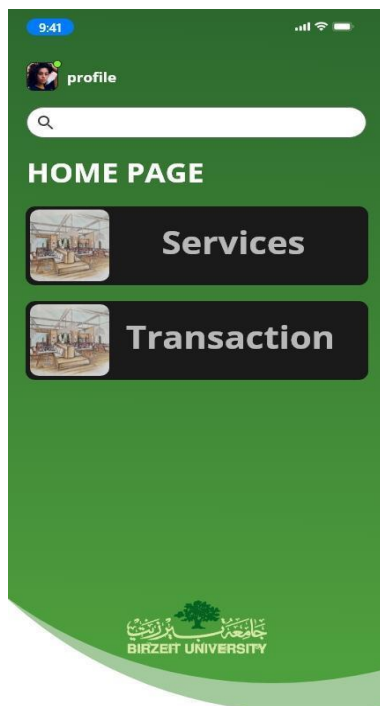


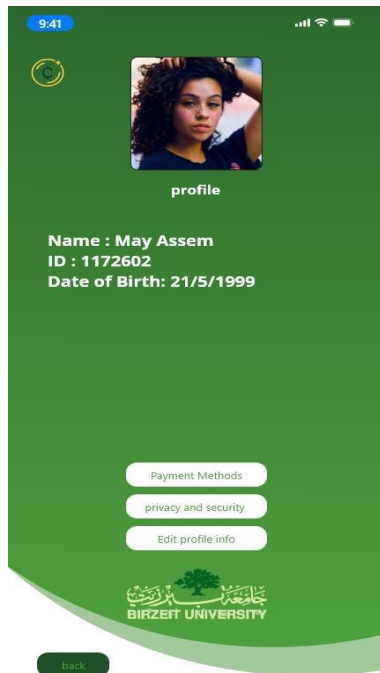
Figure 5.3.1 login Page



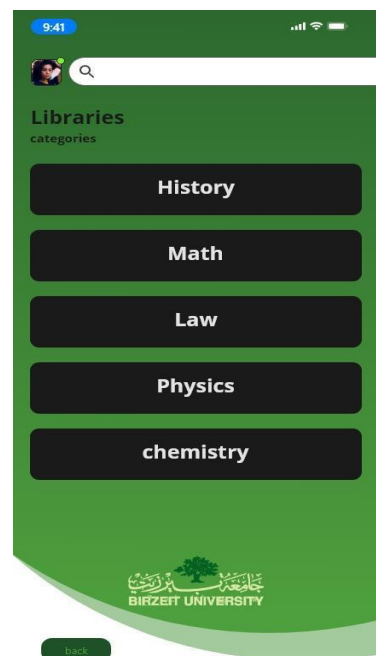
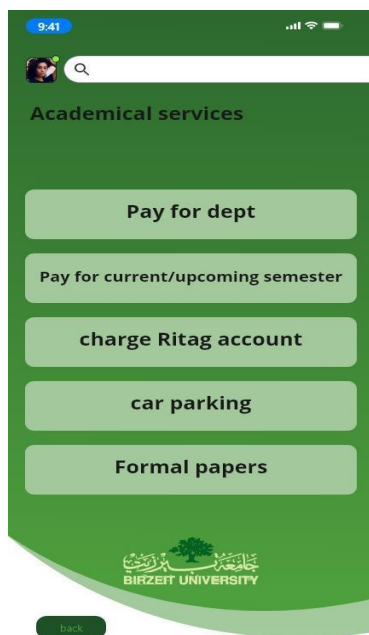
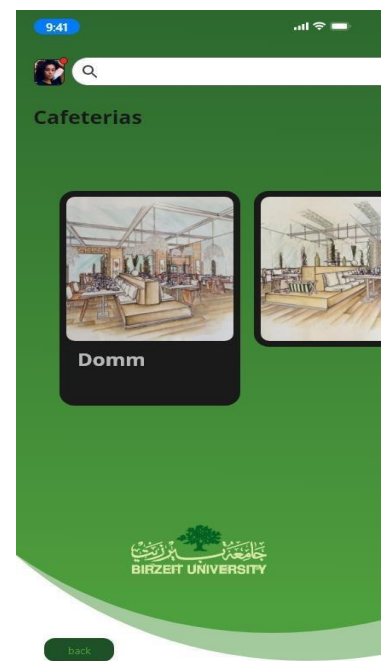
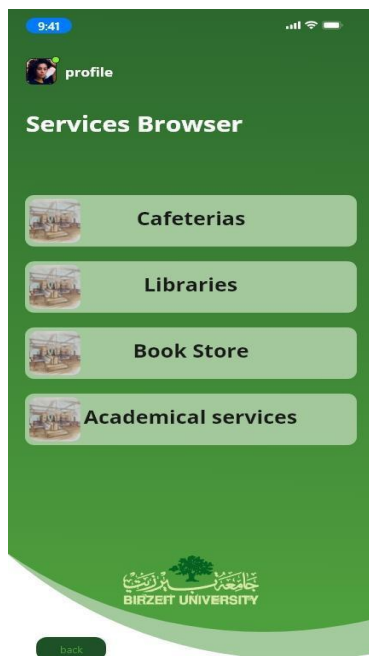
We followed the steps we envisioned for our application starting from the login/sign up page where the student will have both options depending if a new student is trying to enter the application or a current student.



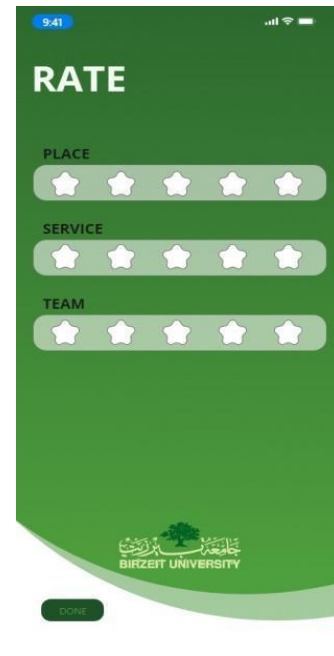
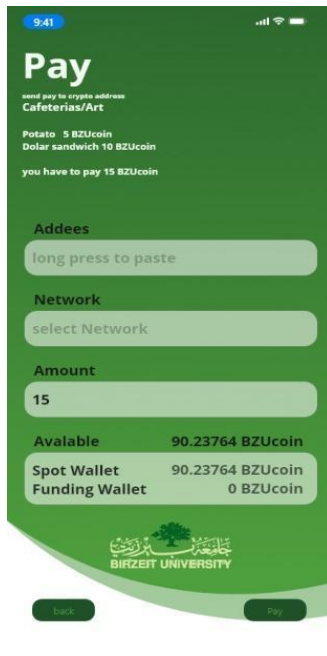
Here we can see the main page that is able to redirect us to wherever the student needs to go to be able to do multiple actions.



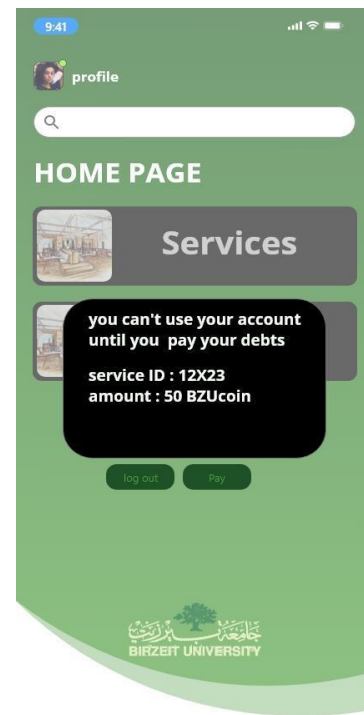
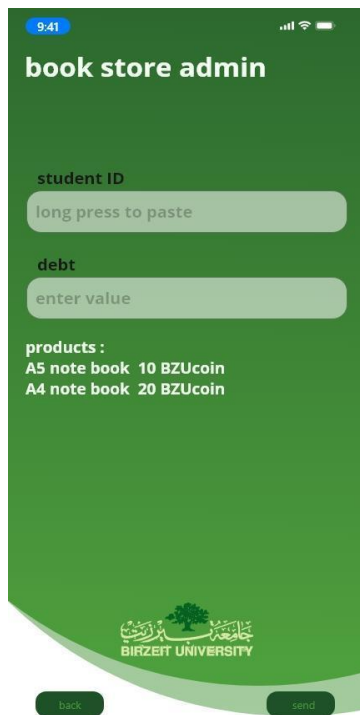
here we can see the Students profile page which will have options one of them is to see the transaction history as demonstrated on Figure 5.12



The following figures represent some of the options that are included in our application where you can choose whatever best fits your needs and continue on to pay for the service in a matter of seconds without having to wait or run into any problems.



This page will allow any students to finalize their purchase of any wanted product from any available service the institution provides and when the transaction is successful they will be redirected to a rating page to collect data on the service itself and employees working at the establishment.



the following service is added to our application as an answer to the question of what if the student did have their phone or did not have available internet or service to be able to log on the application and make the needed payment so we created and option for the service manager to be able to send debt requests directly to the students account as seen in figure 3.7, to which the students account wont function unless the requested amount is paid in full as seen in figure 3.8.

Conclusion

finally we conclude our work after after giving a detailed review of everything we have learned about what cryptocurrency is all about and how it will help us in implementing our project and make it come to life, and we also talked about the steps we need to take in order to create an application which will hopefully make our lives a bit easier and faster with this newly found technology.

like we mentioned before we pointed the advantages of using such method the first and most important point is to replenish the economics of the university by introducing such method every student has to but the coins to be able to live in the campus and every time the currency is bought the university gets a small cut by using transaction fees and not only buy purchasing the currency but also by buying any product in the campus so if you think about it the university gets pennies by every transaction made in a form of the currency and the when the student buys the currency with real money the university is giving them already recycled currency which in turn makes the university thrive in this environment in terms of finance and the students also get benefits for example when getting an honor they could potentially earn some of that currency for the cost of of nothing to enjoy and spend that money in the university or maybe put that money aside for future plans such as paying for the next semester's tuition, so from what i said you can see how this is a win win situation.

and we also provide an easier way to make purchases around the campus where you could easily just by entering the application choose any service you like and purchase it with no need to wait in lines for a long period of time.

We live in a time where the less communication there is the better and this is what we provide a convenient way to purchase what you want when you want wherever you are.

we can also look at the data this provides like we mentioned before cryptocurrency provides data of what was purchased and when was it purchased without ever revealing who was bought it so this is a great way for the university to collect data of what is being used consumed and what is not and this will provide the university with knowledge it needs for future decisions of for example what to keep what to remove and what to update for the benefits of students.

Ethical Point Of View

Ethics definition in the English dictionary is, the moral principles that govern a person's behavior or the conduct of an activity.

So you might ask yourself this, what separates what the application is trying to achieve from what Google or Facebook did? You see what facebook and google permitted to happen is that they took what people are searching for or what they are reading,talking about, researching and what they are even watching as entertainment to go public and be used against them in order to coerce something specific to happen or to just gain more capital which is border line not or will never be ethical because people in general do not like these information to be known to whoever for a reason which might not even be beneficial to them in any way.

Our application will not cross those lines in terms of what is being bought and what is being consumed on campus ground will be known but it won't be known exactly who it was or for what reason you can even compare it to the questionnaire we get at every semester end, yes students will give reviews for doctors and those reviews will be seen and taken into consideration and we know that students that took the course are the ones who are submitting the reviews but in a way it is completely safe and anonymous and this is exactly what we as a team are trying to achieve in the application to better the students life and educational institution as well.

References

[1] Aicardi, Sergio. "4 Reasons Why Google's Firebase Is Essential if You Have a Business App." June 13, 2016

<https://www.semrush.com/blog/4-reasons-why-google-s-firebase-is-essential-if-you-have-a-business-/>

[2] Voigt, Kevin. "What Is Cryptocurrency? Here's What You Should Know." Feb 18, 2022,

<https://www.nerdwallet.com/article/investing/cryptocurrency-7-things-to-know>.

[3] SiriPurapu, Anshu. "Cryptocurrencies, Digital Dollars, and the Future of Money." September 24, 2021,

<https://www.cfr.org/backgrounder/cryptocurrencies-digital-dollars-and-future-money>.

[4] Buchholz, Katharina. "How Common is Crypto?" Mar 17, 2021,

<https://www.statista.com/chart/18345/crypto-currency-adoption/>.

[5] Lisa, Andrew. "Which Countries Are Using Cryptocurrency the Most?" June 29, 2021,

<https://finance.yahoo.com/news/countries-using-cryptocurrency-most-210011742.html>.

[6] Hernandez, Joe. *El Salvador Just Became The First Country To Accept Bitcoin As Legal Tender*, September 7, 2021,

<https://www.npr.org/2021/09/07/1034838909/bitcoin-el-salvador-legal-tender-official-currency-cryptocurrency>.

[7] Heddings, Anthony. “How to Accept Bitcoin or Cryptocurrency Payments on Your Website.” MAY 26, 2021,

<https://www.cloudsavvyit.com/11324/how-to-accept-bitcoin-or-cryptocurrency-payments-on-your-website/>

[8] Lansiti, Marco. “The Truth About Blockchain.” February 2017,

<https://hbr.org/2017/01/the-truth-about-blockchain>.

[9] Gogol, Frank. “How Does Cryptocurrency Gain Value?”

<https://www.stilt.com/blog/2021/07/how-does-cryptocurrency-gain-value/#:~:text=Like%20any%20currency%2C%20cryptocurrencies%20gain,t%20want%20to%20sell%20it>.

[10] Lake, Sydney. “Bitcoin is coming for higher education—just look at what Wharton is doing.” October 28, 2021,

<https://fortune.com/education/business/articles/2021/10/28/bitcoin-is-coming-for-higher-education-just-look-at-what-wharton-is-doing/>.

[11] “The rise of using cryptocurrency in business.”

<https://www2.deloitte.com/us/en/pages/audit/articles/corporates-using-crypto.html>.

[12] Rabin, Konstantin. “What is the actual use of cryptocurrencies?” 01 August 2019,

<https://www.finextra.com/blogposting/17706/what-is-the-actual-use-of-cryptocurrencies>.

[13] Stempel, Jonathan. “Google faces a \$5 billion lawsuit in the U.S. for tracking 'private' internet use.” JUNE 3, 2020,

<https://www.reuters.com/article/us-alphabet-google-privacy-lawsuit-idUSKBN23933H>.

[14] Confessore, Nicholas. “Cambridge Analytica and Facebook: The Scandal and the Fallout So Far.” April 4, 2018,

<https://www.nytimes.com/2018/04/04/us/politics/cambridge-analytica-scandal-fallout.html>.

[15] L, Tracy. “Associations between Dietary Intake and Academic Achievement in College Students: A Systematic Review.” 2017 Sep 25,

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5746694/#:~:text=The%20majority%20of%20studies%20demonstrated,to%20have%20higher%20academic%20achievement>.

[16] Chainalysis. “The 2021 Global Crypto Adoption Index: Worldwide Adoption Jumps Over 880% With P2P Platforms Driving Cryptocurrency Usage in Emerging Markets.” OCTOBER 14, 2021, <https://blog.chainalysis.com/reports/2021-global-crypto-adoption-index/>.

[17] Daly, Lyle. “Identity Theft and Credit Card Fraud Statistics for 2021.” Aug. 26, 2021, <https://www.fool.com/the-ascent/research/identity-theft-credit-card-fraud-statistics/#:~:text=There%20were%201%2C387%2C615%20reports%20of,most%20cases%20of%20identity%20theft.&text=Credit%20card%20fraud%20rose%20by,2019%20levels%20to%20393%2C207%20reports> .

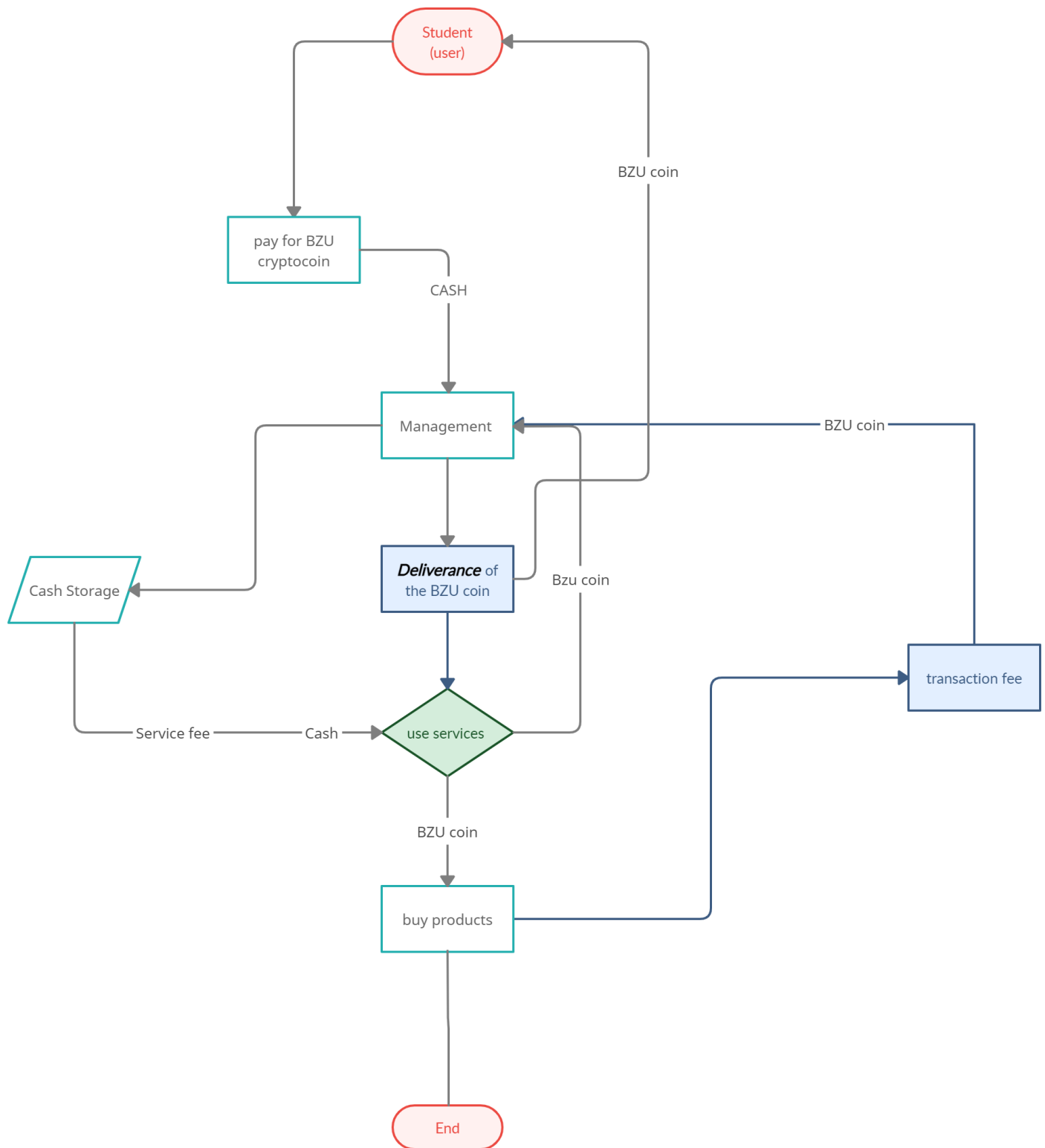
[18] Mulligan, Ryan. “University of Pennsylvania becomes first Ivy League school to accept cryptocurrency as tuition payment.” Oct 28, 2021, <https://www.bizjournals.com/philadelphia/news/2021/10/28/penn-tuition-cryptocurrency.html>.

[19] “Global crypto adoption.” <https://triple-a.io/crypto-ownership/>.

[20] Kovach, Steve. "Tesla buys \$1.5 billion in bitcoin, plans to accept it as payment." MON, FEB 8,
<https://www.cnbc.com/2021/02/08/tesla-buys-1point5-billion-in-bitcoin.html>.

[21]Taba, Seyyed. "An Exploratory Study on the Relation between User Interface Complexity and the Perceived Quality." July 2014,
https://www.researchgate.net/publication/283612537_An_Exploratory_Study_on_the_Relation_between_User_Interface_Complexity_and_the_Perceived_Quality.

Appendix A [22]



Appendix B
[23]