Project Deliverable D: Conceptual Design

GNG 1103: Engineering Design

Section #A02

Group #6

Team members:

Jieying Yang 300103978

Zeyad Abu-El-Quran 300167089

KC Ezirim 300194524

Jeanne Delluc 300231391

Sean Vedachellam 300185873

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The Problem Statement

A loyalty program needs to involve a secure and safe system that can democratize points and allow consumers to be more flexible with how they use their points.

Subsystems created by team members

(These subsystems are based on the team's problem statement, benchmarking and list of prioritized criteria)

Zeyad's Subsystem

Democratizing the idea of loyalty points. We will need to democratize the idea of loyalty points by allowing more flexibility with how the points are used. To do this we will need to find a way to allow the client to use the points on whatever they want, instead of limiting their choices with how the points will be used (as today loyalty points are limited to be specific to one thing, for example for restaurants or for discounts on the next Walmart purchase.. etc.). We need to build something more tech oriented so that we can match the fast modern changes. Now I believe that with my idea I bring more to the table than just solving a loyalty points problem. Because, although banks are one of the engines of the modern economy, the way they work is under threat because of how tech payment giants and digital currencies are revolutionizing how people use money and this could be the downfall of banks. The idea is to create a new point system but instead of using points we can create our own crypto currency, as digital currency can be used on anything because it is essentially money.

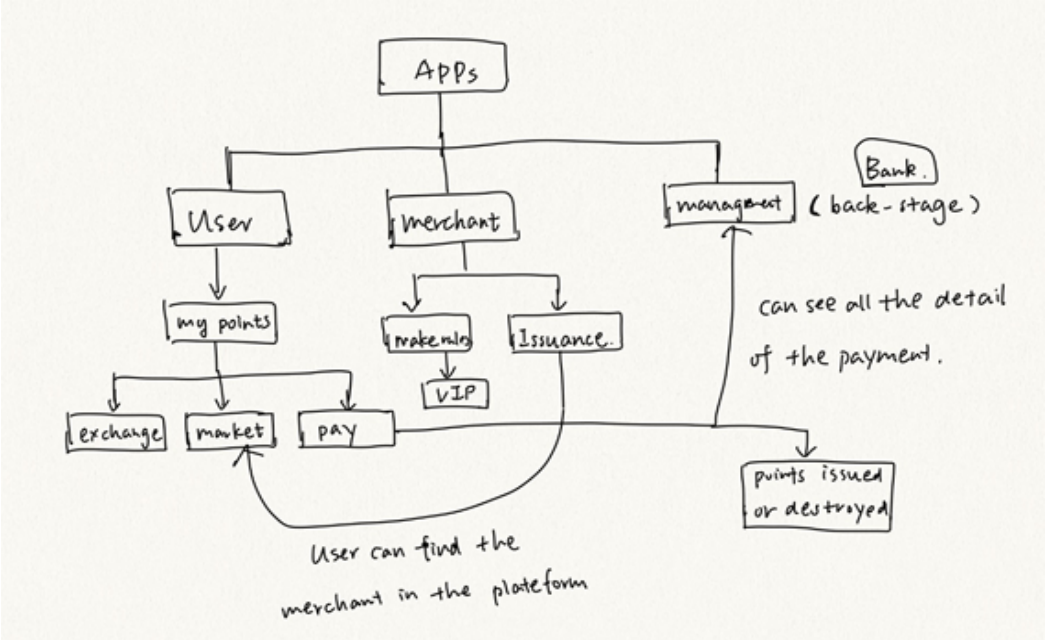
Jeanne's Subsystem

_____The loyalty points program needs to be safe. Because the program will be working with points that have high value and money. These points need to be protected for the customer to use. If they can't trust the security provided by the bank (or rather the program) then they might not trust the bank ALL together, not just for the program. And therefore end up leaving. The ideas to keep the program safe would be to ensure that all personal information is kept safe in a cloud for the software. All information will be kept by passwords that only the users would know. Much like bank apps, everything will be kept by passwords, and the users won't be able to stay logged in more than a couple hours before the software locks them out of their account. In addition, the

users will be advised to change their password every couple of months to ensure that their account is kept safe. To ensure everything is kept safe, we would hire professional coders to ensure that the software won't be easily hacked. As well, we would hire professional hackers to see how easily they could hack and ensure that we are able to limit how easily they do so. We would also need to ensure that the API that we used is well protected from the outside world. Finally we will need to ensure that the data encryption is done properly.

Jieying Yang's Subsystem

Looking for clean structured and functional software. It needs to be aesthetically pleasing. A better-looking website or app, might keep the client interested and value the product more. (Keep them hooked). There are ways to keep this software clean, there are other websites out there that can hel[p you create simple apps and websites with simple code or we can just hire a good front end software engineer to build the user interface. However for the backend development of the program we need to come up with ideas to keep the software functional. My ideas for functions in this software is that we can develop three relatively independent subsystems, which are used by users, merchants and managers (bank). Like three separate applications for the different types of the users. Each application has its corresponding required functions, as described in the following figure.



Here I will explain the function of each subsystem.

The subsystem for users:

- On the homepage, users can clearly see the points they have so far, and the point income and expenditure of the current month. Also the button can view historical bill details as shown below.
- You can trade and gift points. (something like e-transfer). Through the circulation of points between users, points can be exchanged between various merchants.

For merchants:

- You can register an institutional account through the point wallet first, and a pair of account and key is generated by the bottom layer of the blockchain. After merchants get their own asset issuance account, they can issue their own points on the platform.
- Merchants can see the number of points under their account in real time.

For manager:

- Points transaction tracking and history.
- Users can track points transactions data collected by Zafin. (a file can be downloaded)
- Tracking user trends and merchant trends.

KC's Subsystem

Increasing the transparency of the procedure. Allow the user to understand better what goes on behind the scenes and make it simple enough for them to get a grasp of the idea. To do this we can set up a quick free course of a few videos on the application that display how the app works, how points are distributed, points work in general. We can also make it simple by the user paying an annual fee to have a beginning set of crypto currency which could be in a sort of savings account. From purchases made in stores or small businesses the crypto currency can build up (basically with every purchase a crypto currency is added to the account) which would make it easy to understand. After a year of being a member, the bank can decide what benefits would be added and it could be with a large company or purchase like travel discount hotel points (like with hilton honors) so it would be clear what purchases would get the user crypto currency and which would not which would be easy to understand.

Sean's Subsystem

We need to make the website more diverse and able to adapt to multiple cultures and languages. Since the customers want the platform to be available in more countries than just Canada, the platform needs to be able to adapt to a diverse environment. To do this we will have to hire some translators, it would also help to find people that understand different cultures so that we can set up a theme for them on the app and website, like how google changes the theme in different countries to celebrate different known events or people in the region of the world. We can also set up easy links in the settings section of the website so that the customer can easily choose and switch between different languages. We could also track what part of the world the client lives in based on their IP address and automatically set up the website to the language of that location. For example, if someone from Mexico used our website, it would automatically display in spanish for them, if someone from Japan used our website, it would display in japanese. This is again similar to the way google personalizes their website. We would have to code this into the website, either we can do it ourselves or we can hire a programmer.

Team Discussion

(What are the pros and cons of each subsystem? How can we make these subsystem's more focused and detailed?)

For Zeyad's subsystem, there is a great pro which is that, people want to get involved with crypto but don't know how to. So the bank can create a "point" system where instead of giving them points they give the consumer crypto coins or tokens. This will allow the customer to buy whatever they want with the "points" or the crypto, making it a more democratic way of using points. It's also great because we can mix jeanne's idea of safety in by using blockchain which is very safe. However a major con would be how we would give value to the crypto that we would invent and how we would market it to the retailers th virtual tokens and understanding how tokens can work. (While crypto coins are essentially digital versions of money, tokens can stand for assets or deeds. To put it simply, a token represents what you own, while a coin denotes what you're capable of owning.)

For Jeanne's subsystem, the pros are that the overall software will be secure and therefore will attract customers and have a great diversity of users as everyone loves the idea of having their information safe. The cons are that to make the software safe it will require a great deal of people and therefore a lot of money to produce a safe product. However, security of information is very important and will need to be incorporated in the final product as if it is not secure, no one will want to use the software.

For Sean's subsystem, a pro is that the website will be diverse and accessible to people all over the world. Many people will feel included to know that the website will be able to run in their language and that it can be personalized to display themes to their native country and even celebrate different events and holidays. A lot of these people will feel more inclined to use our website due to our inclusivity and are therefore more likely to stay and use our product long term. The only con to this idea is that it would be costly to hire multiple people to translate the website into their language and to hire programmers from different parts of the world to code the personalized themes that the clients are able to choose from. We can first start with only translating the website into selective languages. We can choose ones where we receive more clients and have more people speak. English, French, Spanish, Mandarin, Hindi, Arabic are a few

to name. Once we have those in place, we can then start focusing on the personalized themes. We can still offer a couple themes at the beginning but it would just be a change of colour, nothing to do with countries and events.

For Jieying's subsystem, the advantage is that the entire software is beautiful and concise. The software with a simple interface allows people of all ages to use it, even the elderly. The disadvantage is that the connection between the various subsystems needs to be established during development. The cost for programmers to write code is higher. However, for a good system, the connection between the various subsystems is essential, because this makes the system look comprehensive and integrated.

For KC's subsystem, the pros is that it is simple to understand which is the point of the subsystem, not something too complicated. The cons is that it doesn't go with the problem statement of being flexible with the purchase. A way to solve the problem is to give a general exchange rate of a purchase to a crypto currency. For example a dollar could be equal to 10 crypto money vice versa except when paying for the annual fee which would be a sort of welcome gift from the bank.

Coming up with solutions

(We will need to come up with different solutions by mixing and matching the subsystem ideas.)

Solution 1

For solution one, we will build a program that uses crypto instead of the points. This will allow the user to use their points however they want and it will allow different kinds of people to start investing into crypto without having to worry about the aspects of how they will come by the crypto and how they will buy it. Since we are using crypto we will also use blockchain which is safe, because Blockchain technology is secure as it is decentralised and distributed. There is no single point of failure, which makes it much harder to corrupt. Hacking into one part of the system cannot affect other parts.

Solution 2

For our second solution we can design our website to be aesthetically pleasing and easy to use. We will design it in such a way that it is easy to use and the user can find everything they want without having to search for too long. We can hire a programmer to help us out with coding the website. The programmer will also be useful because they can also code in different themes and languages into the website so that the user can personalize it to their liking. For simplicity the website can have a general exchange rate with the crypto currency and purchases made by the user which would make it easy to understand. While being beautiful and personalized, we still want our website or apps to be functional.

For merchants:

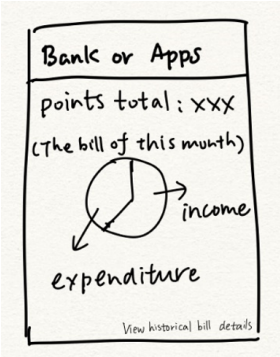
- Can register an institutional account through the point wallet first, and a pair of account and key is generated by the bottom layer of the blockchain. After merchants get their own asset issuance account, they can issue their own points on the platform.
- Through the circulation of points between users, points can be exchanged between institutions naturally. The point exchange between merchants and merchants can be achieved through limited time activities. For example, I like McDonald's very much. I eat McDonald's every day, so I already have a lot of McDonald's points. But today I saw a

Burger King, and he is doing free points redemption activities, so I can use the points I accumulated at McDonald's to pay for this Burger King. In this way, businesses can attract more customers through points.

- Merchants can see the number of points under their account in real time.

For users:

- You can trade and gift points. (something like e-transfer)
- Through the circulation of points between users, points can be exchanged between various merchants.
- In the circulation of points between merchants, the value of the points of the exchanged merchants should be kept equal. Or calculate its equivalent points according to the formula. In this way, the unity of payment is realized.
- Users can pre-deposit points in advance through a valid point redemption code. (The points should have a validity period)
- Rank the user who has the most points and give corresponding rewards.
- Distribute bonus points to those who successfully invite new users.



For management (the bank):

- The platform can be divided into user version, merchant version and developer management system.
- Points transaction tracking and history.
- The platform adds on to the bank app interface.
- Users can track points transactions data collected by Zafin. (a file can be downloaded)
- Tracking user trends and merchant trends.
- Can monitor whether the activities of merchants and users are in compliance.

For these three subsystems, we have separated users, merchants and managers, so that the pages of each subsystem are concise and beautiful. In order to achieve diversity, we also allow users to personalize the page (such as setting colors, themes, fonts, languages, etc.). We will also set up some special activities according to different countries and regions.

Solution 3

For solution 3 we will try to combine all the different ideas and subsystems that we have come up with. We will try to make it such that there aren't too many features that could overwhelm us in the future of building this project. We will use crypto as our points, and we will build our own crypto that the bank will control. We will also implement the usage of blockchain for safety and we will hire cybersecurity engineers to make the system impenetrable. We will also create a website and mobile app. This website will be filled with features that are set up to the users needs and even wants. We will build something aesthetically pleasing and with functions, for example the website can have a general exchange rate with the crypto currency and purchases made by the user which would make it easy to understand. We will also include other features where it is customized to the users in different regions to fit their own culture. We will also include short manuals or videos that can explain to the users how the point system works and how they as a user can collect more of them, so that they understand exactly what they are dealing with.

Final Solution Selection

(We will need to select the best solution and explain the solution with more detail, and explain what makes it the better solution, how we would further develop it and what issues we could encounter along the way.)

We will select the 3rd solution since it uses all the subsystems that we have created. Because it includes every subsystem that we have come up with as a team. Like it was mentioned previously in Yang's subsystem, we will include a function specific to every kind of user. We will use crypto as the form of points. We will make sure it is a safe system and we will make sure that we create a good functional website that is adapted to the user and their needs. This solution is best as it takes every important interpreted need into consideration. However, this is not to say that we will not come across problems. One of the major problems that we will be working on in the future, is how we will market or promote the crypto to the retailers and the people that will use it/accept it as payment. And the other problem is figuring out how we will set the value for the crypto.