



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SECI 1513 - Sec 07

PROJECT Low Fidelity Prototype - PART 2

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1. Introduction

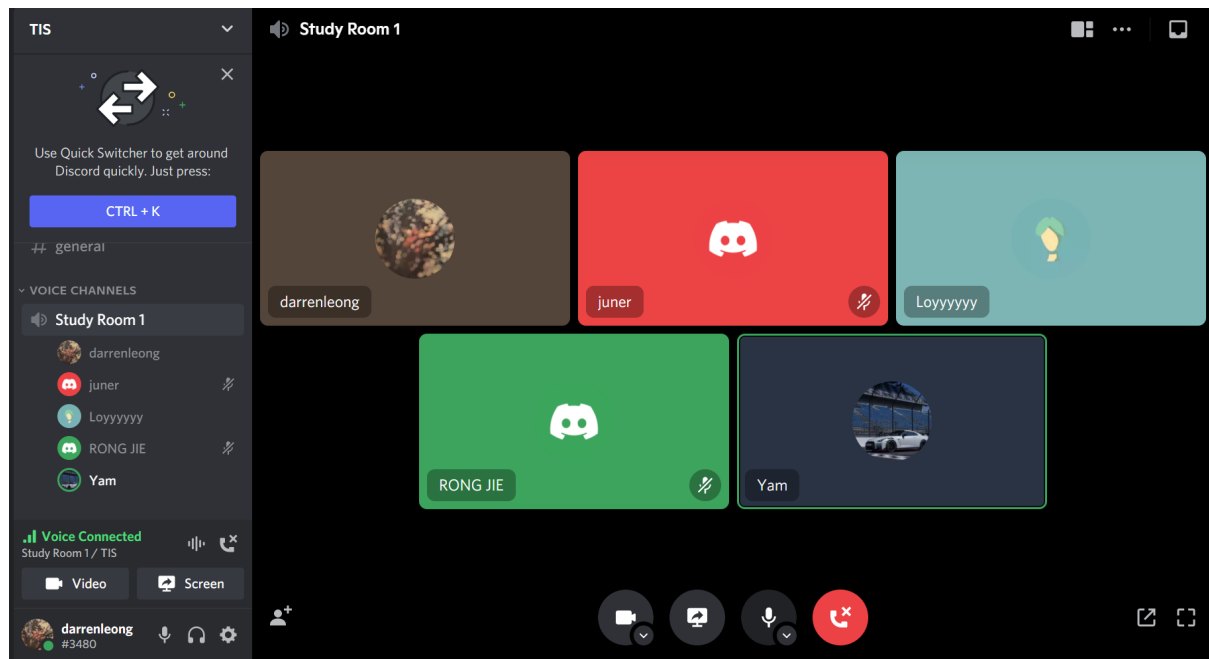
The Fourth Industrial Revolution (4IR) has changed everything in our lives using advanced technologies and advanced digitalization as many traditional labour work such as customer services and package packing have begun to utilise digital and automatic methods to operate these work procedures. The creation of Artificial Intelligence (AI), machine learning, Internet of Things (IoT), big data analytics, 3D printing, Augmented Reality, Virtual Reality and many more have brought innovations and convenience to humankind. Nowadays, we still heavily rely on these advanced technologies as they have already become the backbone of the modern era. For example, every person can set up a smart CCTV in their house so they can always check on their home situation and strengthen security even if they go outside by using the smartphone application remotely. The creation of AI such as a smart home virtual assistant assists in running our job smoothly and conveniently. We can also directly ask them questions and they will search for answers within a few seconds to reply to us.

With the advancement of technology in the world in mind, we did research for problems that we faced on a daily basis. After some research, we came across the issues regarding physical wallets. For instance, the wallet can become bulky and heavy when it is full of cash. It is uncomfortable to carry inside the owner's pocket and takes up space in the handbag. It is also very inconvenient to carry around and insecure as the wallet can be stolen by thieves without any notice. With an E-wallet, everyone can store their money inside the E-wallet digitally and they are not required to bring physical wallets anymore. They can pay anything like groceries, meals, phone bills and many more and also transfer money to other people easily by just entering the amount of money they want to transfer and receiver's account number at any time and anywhere. E-wallet is much more secure as the E-wallet has multi-factor authentication (MFA) before proceeding to transaction and requires a PIN to log in the account. E-wallet have brought many conveniences to everyone and have improved the quality of life.

2. Detailed steps and descriptions related to the project

There are a series of steps before we start our project. First, we need to find a problem or issue that everyone will meet in the future and make it as the main idea of our project. After that, we need to brainstorm ideas about our potential clients and find the solution for our potential client's problems. Then, we need to add some additional features that can improve the client's experience and make us more unique when compared to other existing solutions. We are also required to design the business process flow diagram in order to have a clear vision of how our app is going to run. With the business process flow diagram, we can design our prototype and develop the cloud architecture more easily.

To ensure our project goes smoothly, all team members need to understand the tasks and do more research to make sure we have sufficient knowledge to complete our tasks. Beside doing research, we also try seeking feedback from our friends and lecturer so that we are on the right track to complete our project. In the end, we think that the most effective way is to have a discussion using Discord, a VoIP, instant messaging and digital distribution platform every week.



For the first meeting, we discuss all the tasks that we need to do and we distribute our tasks equally. After that, we brainstorm ideas and find problems together after doing some research. Then, we share our progress about the business flow diagram, AWS architecture design, and the low fidelity prototype during the next few discussions.

Scenario

In this modern era, many people have encountered difficulty bringing their regular wallet outside. It is inconvenient to put the wallet in pockets or handbags because it is bulky and heavy when the wallet is full with cash and coins. If the wallet does not fit in the pocket, it will be visible to outsiders and it can be very insecure. Thieves can pickpocket the wallet easily without any notice from the owner. According to the 2016 Visa Consumer Payment Attitudes survey, 49 per cent of respondents prefer using payment cards in their wallets now compared to five years ago. This is because they feel unsafe when carrying large amounts of cash and security issues will arise. According to the UOB Asean Consumer Sentiment Study, 69% of Malaysians are more keen on using mobile e-wallet applications to make payments during the pandemic. Other than that, 75% of Generation Y prefers mobile banking. Thus, by using these statistics and after considering these disadvantages, we decided to make an E-wallet application. It stores money digitally and people just have to carry their smartphone when going outside. Any payment can be made with the help of an E-wallet as all they do is just scan the QR code. We deduct that our potential clients are businessmen and office workers. This is because most of the activities that are done by businessmen are related to transactions and for the office workers, they often find it hard to spare time to micromanage money.



Source: <https://goodyfeed.com/9-things-to-be-superstitious-about-a-wallet-for-a-huat-life/>



Source: <https://www.telenor.com/digi-launches-mass-market-ewallet-in-malaysia/>

3. Detailed descriptions include problem, solution, and team working

Problem

Most businessmen begin their business by setting up shops like grocery stores. They need to prepare spare change for customers and they need to handle a hefty amount of money and store it in a cash box, which is insecure as cash boxes can be broken by robbers. Time is also needed to count the amount of change required to give back to customers. As for customers, they need to calculate the money for paying for the products while the businessman has to recount the change for insurance. This is a time-consuming and inconvenient process. Formerly, people always carry their wallet which is full with cash inside their pocket or handbag when walking around outside and it is very inconvenient because it is heavy and big to put inside the pocket and will make ur handbag become less space. During the Covid 19 pandemic, all the businessmen and customers are best to

minimise contact with each other. This causes some issues during payment as customers cannot use cash and pass it directly to the businessmen to pay for the groceries.

During Covid 19 pandemic, most physical shops were forced to be closed because of the government's order and this caused many businesses to go bankrupt. In order to keep their business going, most businessmen around the world are changing their business model to online, known as E-commerce. E-commerce platforms like Shopee, Lazada, and Shopify have a lot of potential right now. Considering online shopping and the need to pay for the product on E-commerce, most customers need to go to the bank and pay manually using ATM machine transfer which is frustrating and inconvenient.

The second group of people who could use this E-wallet is office workers. Office workers are the ones who rarely have change because they only carry large bills. Carrying spare coins is problematic for them since it makes their pockets large and uncomfortable. Not only that, they have to top up their sim card at a convenience store or a mobile service provider store where it is very inconvenient and will consume their time. Aside from that, security and safety issues will be alleviated because office workers will not be carrying as much cash with the use of an E-wallet. For example, office workers may be required to scan their debit or credit card at the counter in order to pay for something, which may reveal their debit or credit card information. There are some risks and security concerns.

During this Covid-19 pandemic, office workers also faced the same problems where they are all working from home. It is very inconvenient to go out to buy food or groceries because of the Standard Operation Procedure (SOP) that needs to be strictly followed. Therefore, they tend to use apps like Foodpanda or Grab Food to buy their food but there are a lot of steps in the payment procedure. Not only that, online shopping apps such as Shopee or Lazada are used by office workers instead of going to the mall directly. There are also a lot of steps in order to pay for their purchases. Thus, these time consuming payment procedures are the problems for the office workers as they are always busy with their job and they cannot spare time to do other things.

Solution

In order to solve the problems that businessmen and customers meet, we have designed an E-wallet that can ease the micromanagement of money and save time rather than using cash, credit, or debit card. Since customers are using the E-wallet, they can just use the QR code scanning service to pay for their items in the store, which is also known as scan and go. The money will be transferred instantly to the businessman's E-wallet, which is a lot faster than using cash, credit card, or debit card, and they can always track their transaction easily as all the receipts are stored digitally inside the E-wallet. Besides that, the transaction fee is low to none. With an E-wallet, businessmen can store their money in the E-wallet as they are no need to prepare spare change for customers and they need to store tons of money in a cash box and customers are no longer required to always bring their big, heavy regular wallet to the store to pay the groceries. For security, E-wallet have multi-factor authentication (MFA) for proceeding the transaction and requiring a PIN to log in.

With an E-wallet, customers have no need to go to the bank to pay their merchandise using ATM machine transfer when they are shopping on E-commerce as they can just use

the E-wallet with just a few simple steps on their smartphone. When they want to pay for their merchandise on E-commerce, customers just need to open their E-wallet application and transfer their funds to E-commerce and complete the payment, which is very simple.

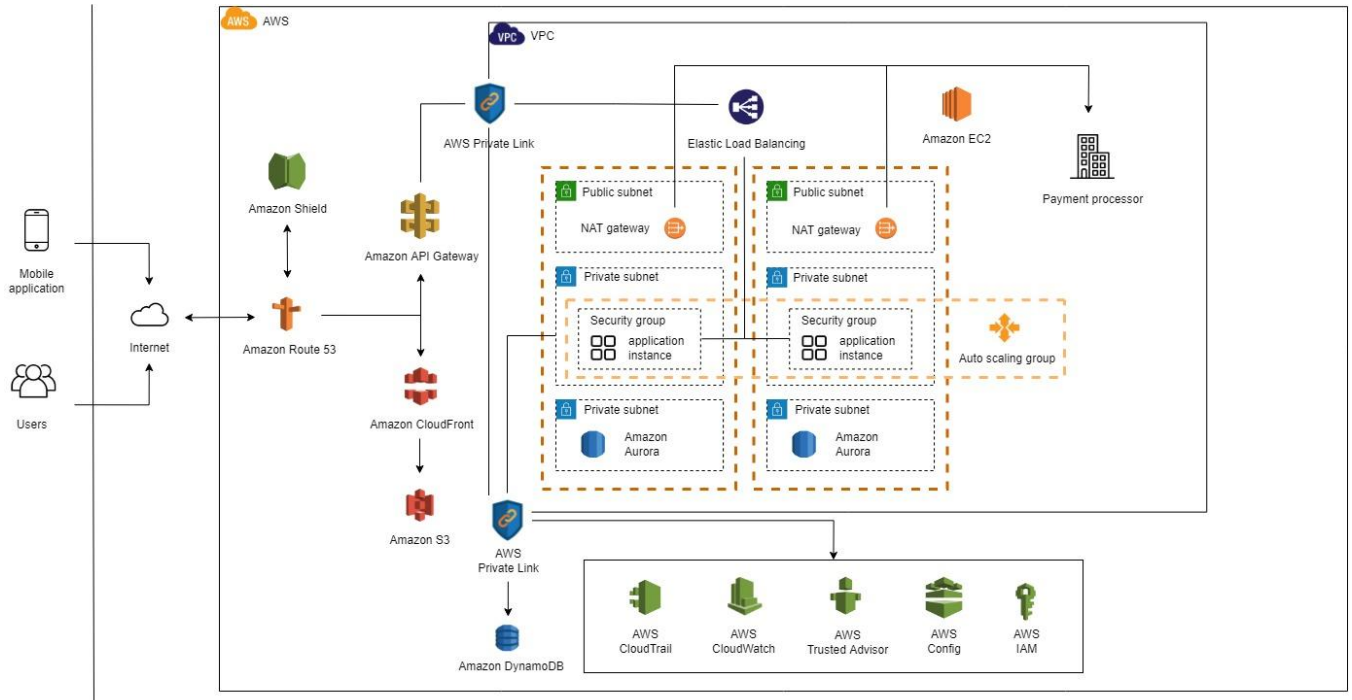
Other than that, the E-wallet also can help solve many problems that are faced by office workers. The E-wallet can eliminate the need for office workers to carry change as they just have to top up their E-Wallet balance. With QR code scanning feature, office workers pay the exact amount of money required and also complete a purchase in seconds. Not only that, with E-Wallet, office workers can pay their water and electric bills quickly and easily without a lot of steps which greatly help them to save their time as the bill payment process is simplified. The office workers who use prepaid SIM card doesn't need to go to a convenient store to top up their prepaid SIM card anymore, because with E-Wallet, office workers can just top up their SIM card at any time and from any location.

Office workers can also use the E-wallet to simply scan a QR code to pay for something without having to reveal any personal information. When utilising the E-wallet, each transaction must be authorised with a PIN, fingerprint scanner, or password. These features just solved the security issues that the office workers might be facing. Next, office workers can earn loyalty points by purchasing more things with the E-wallet, which can be used for coupons, vouchers, cashback, or discounts. It can boost office workers' morale throughout the day and treat them better by encouraging them to buy more goods in exchange for loyalty points. Office workers can manage their finances better as they can check their transaction history easily.

Teamworking

Regarding the teamwork aspect, we have distributed the task of designing the business flow diagram, writing introductions, designing the low fidelity prototype and so on. Everyone is satisfied with their workload and this is important as this can boost our morale in completing our part. The cloud architecture, low fidelity prototype mock up, and business flow diagram is designed together through discussion and all the team members have shared their opinion within each other. Each of the team members contributed their knowledge about each component in the cloud architecture to complete it. Each team member makes changes to the low-fidelity prototype mock up to perfect it and try their best to find a suitable application to stimulate the construction of a cloud architecture while designing the flow of the cloud architecture. With this good team working and the effort of all the team members, we manage to complete every task perfectly, efficiently, and on time.

4. AWS Architecture Design



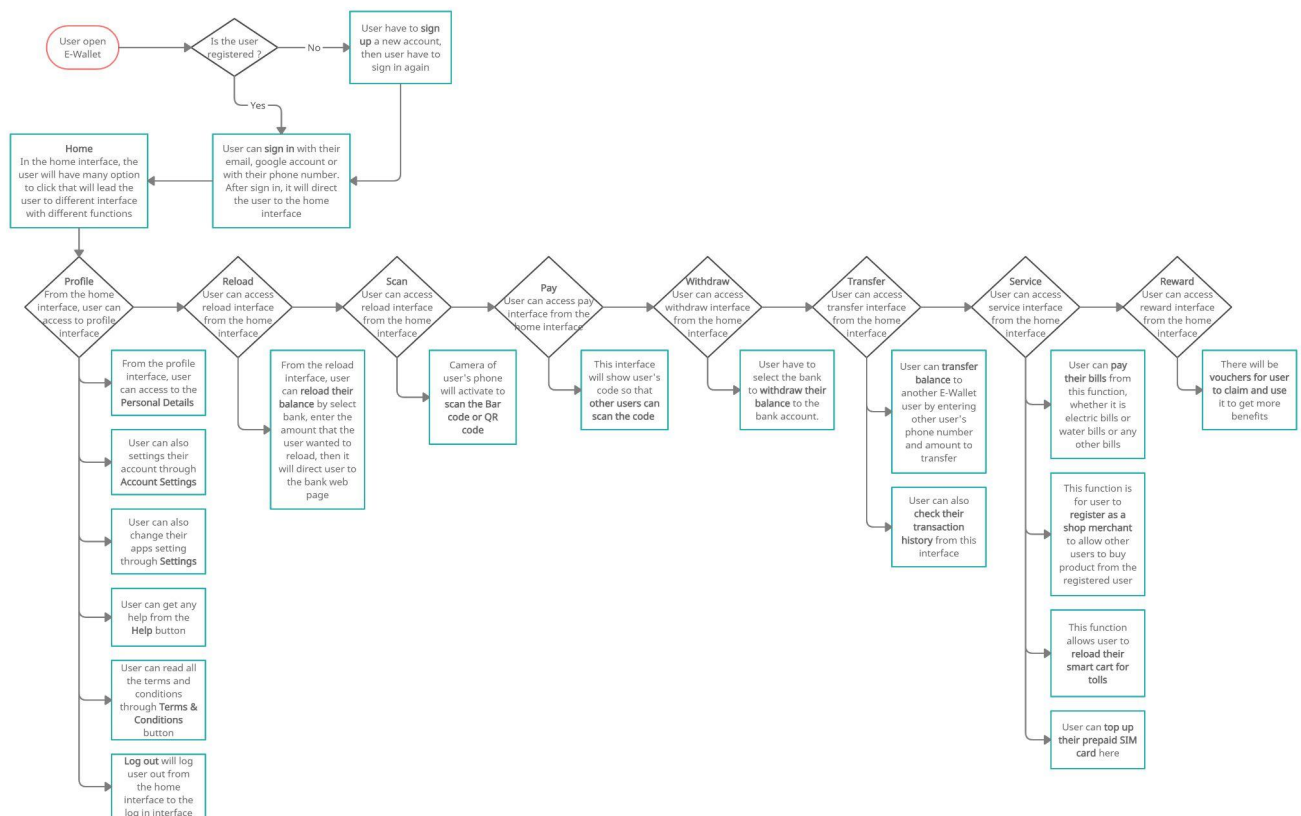
To start, the user can open our application and connect the device to the internet to make sure it is online. After that, Amazon Route 53 will route traffic to an Amazon API Gateway endpoint for dynamic content and static content to Amazon CloudFront. AWS Shield is connected to Amazon Route 53 in order to provide security by protecting the applications against DDoS attacks. So, the user can access our app. Amazon CloudFront is used to return resources found in its cache in addition to static resources from Amazon Simple Storage Service which is used for online backup and archiving of data and applications. So, the user can see the interface from the screen. Amazon API Gateway is used to create, publish, maintain, monitor, and secure application programming interfaces (APIs) at any scale. The traffic is then routed from the AWS API Gateway to an AWS Private link that provides private connectivity between VPCs, AWS services, and our on-premises networks.

After that, it is routed through an Elastic Load Balancing which can handle millions of requests per second and distributes incoming traffic across two targets, the security group which is used to act as a firewall to control inbound and outbound traffic. There is an application instance that can let the user use various types of services inside the security group. So, the user can try to use the services in order to solve their problems or proceed to the next step. NAT gateway is located in the public subnet and connected to the payment processor. It helps to connect the application instance to services outside our VPC and external services cannot initiate a connection with those instances. So, the user can make a payment by using our application. All the information such as the payment transaction information is stored in Amazon Aurora in a private subnet. After that, the traffic is routed

through an AWS private link to Amazon DynamoDB which is used as a backup database and to other 5 services.

The monitoring and logging services are AWS Cloudtrail which is used to captures the actions made directly by the user or on behalf of the user, AWS Cloudwatch which is used to provide the data and actionable insights to monitor our applications, respond to system-wide performance changes, and optimise resource utilisation, and AWS Trusted Advisor which is used to provides the recommendations to help us follow AWS best practises. The security and compliance services are AWS config which is used to assess, audit, and evaluate the configurations of the AWS resources and AWS IAM which is used to provide fine-grained access control across all of AWS.

5. Business process flow diagram and description



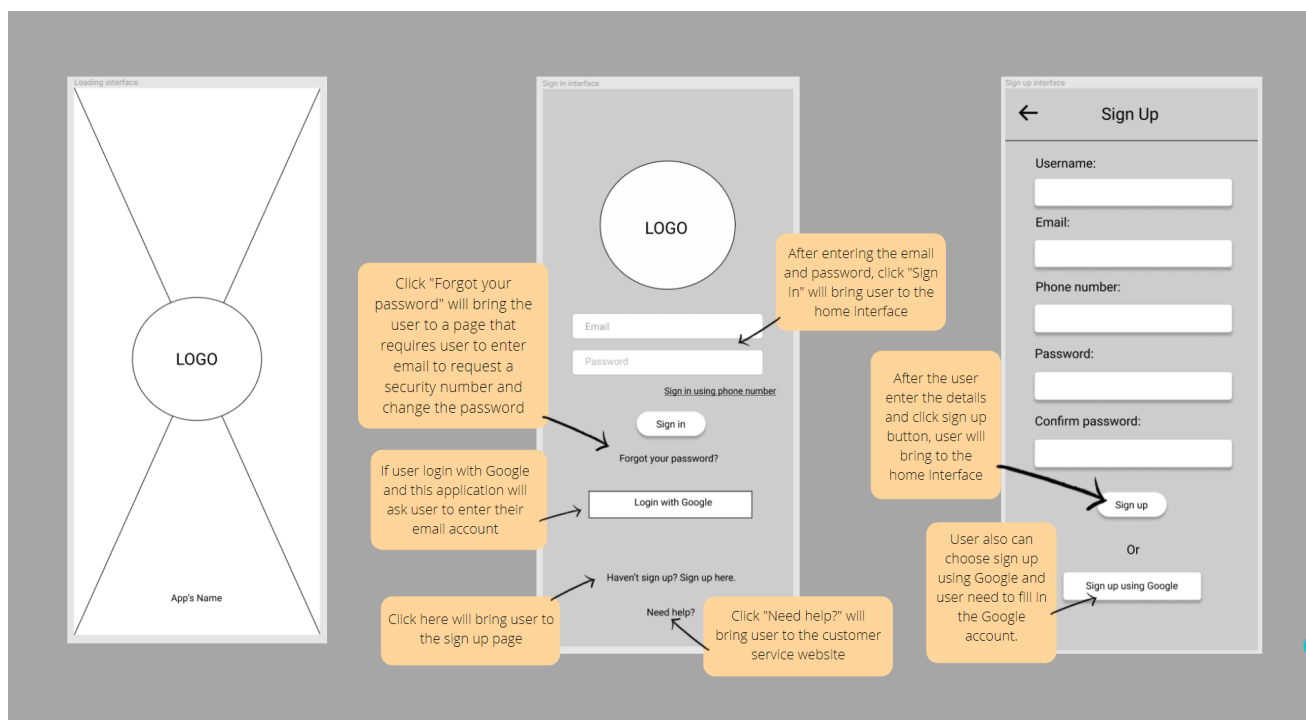
When users open the E-Wallet, users will go through a loading screen, which usually takes up to 3 seconds. After that, users will be directed into the sign in interface. If users already have an account, users can just type their email or phone number, together with their password to sign in. If users don't have an account, users need to press sign up to create a new account. After signing in, users will be directed to the home interface. From the home interface, users can press their profile picture to access their profile interface. From there, users can access their Personal Details, Account Settings, Settings, Help, Terms and Conditions, and Logout. There will also be a Reload button on the home interface where it will direct the user to the reload interface. Users can reload their E-Wallet balance by selecting a bank and amount to reload. Not on that, from the home interface, users also can

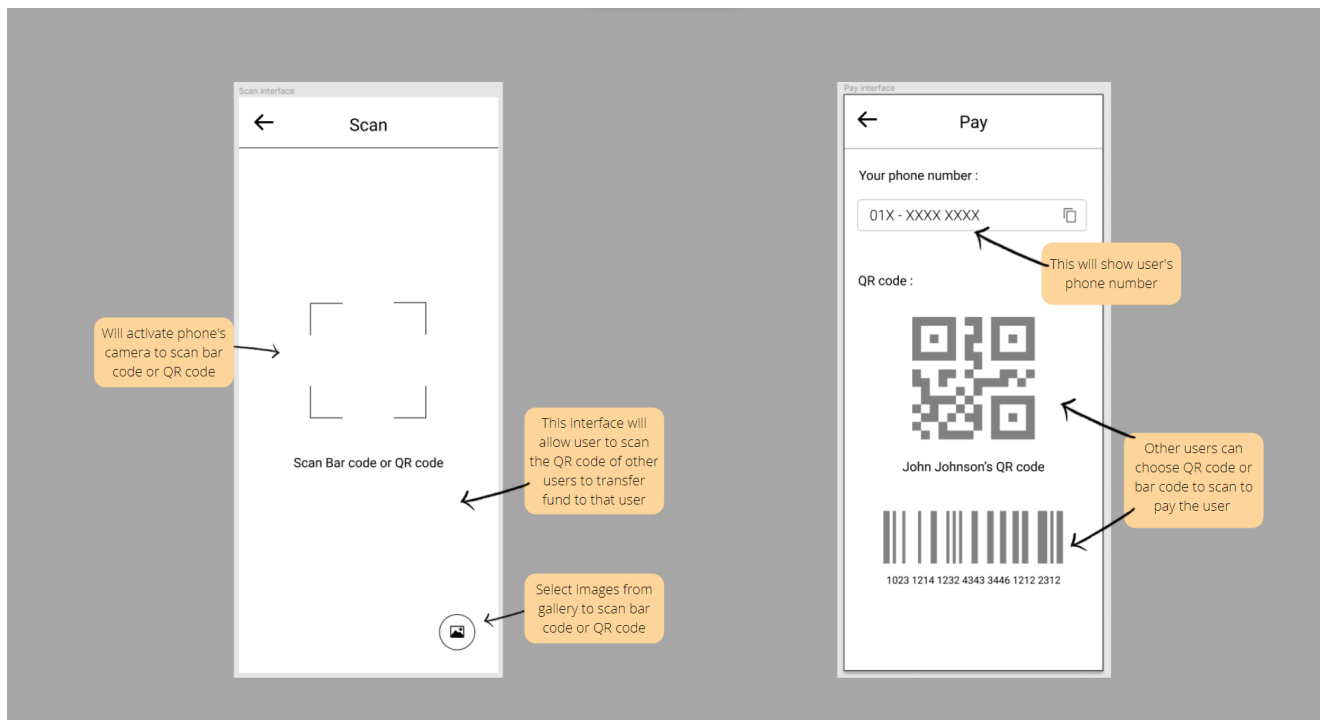
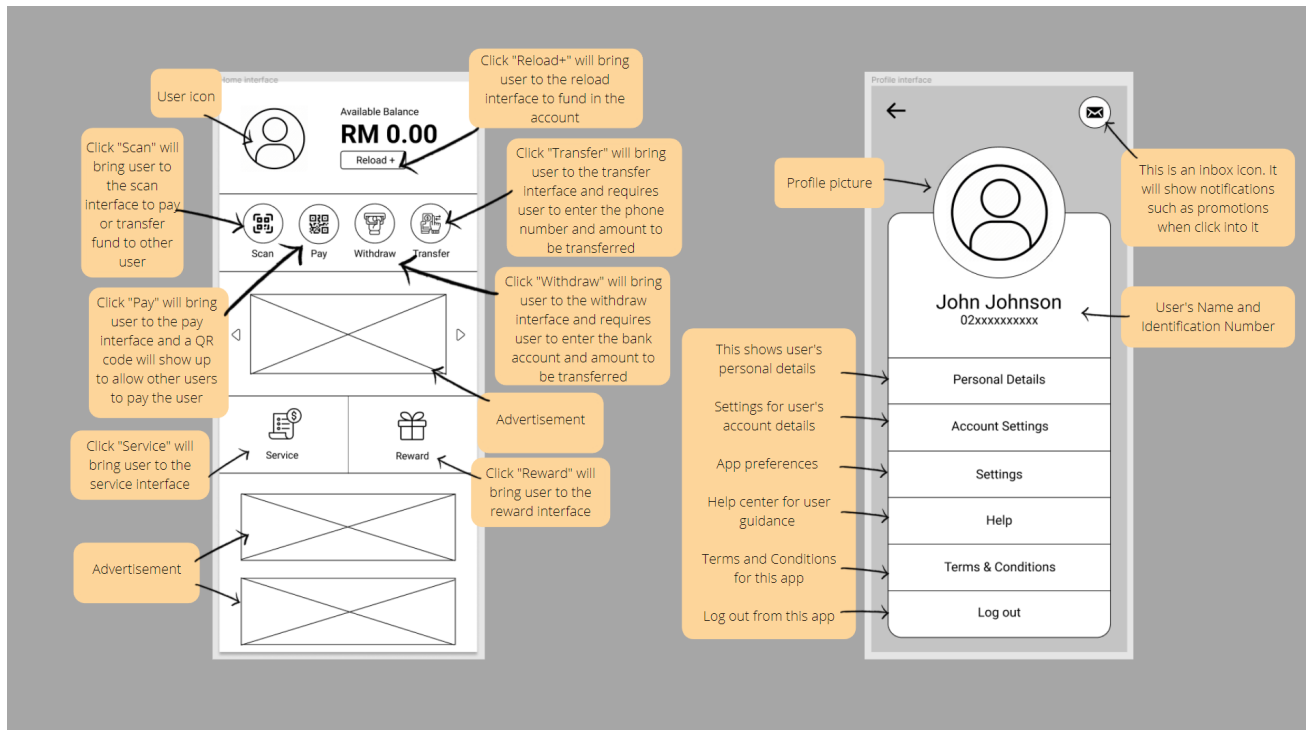
select the Scan, Pay, Withdraw, and Transfer button. Scan will allow users to use their phone camera to scan other users' QR code or barcode, Pay interface will display users' phone number, QR code and barcode so that other users can scan their code. Next, the Withdraw button will lead users to the withdraw interface and it allows users to transfer their E-Wallet balance back to their bank account.

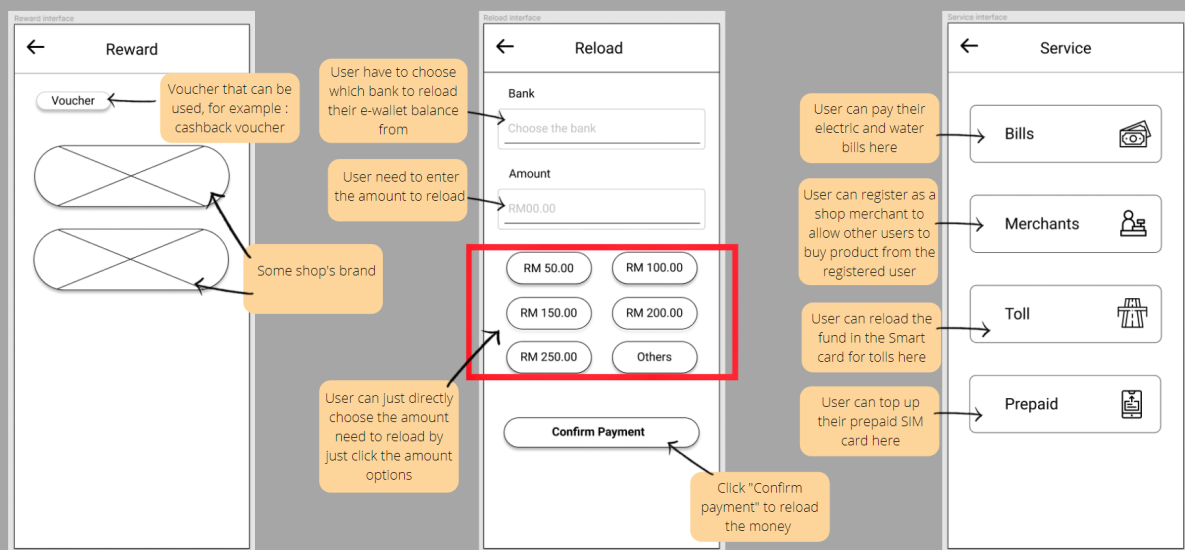
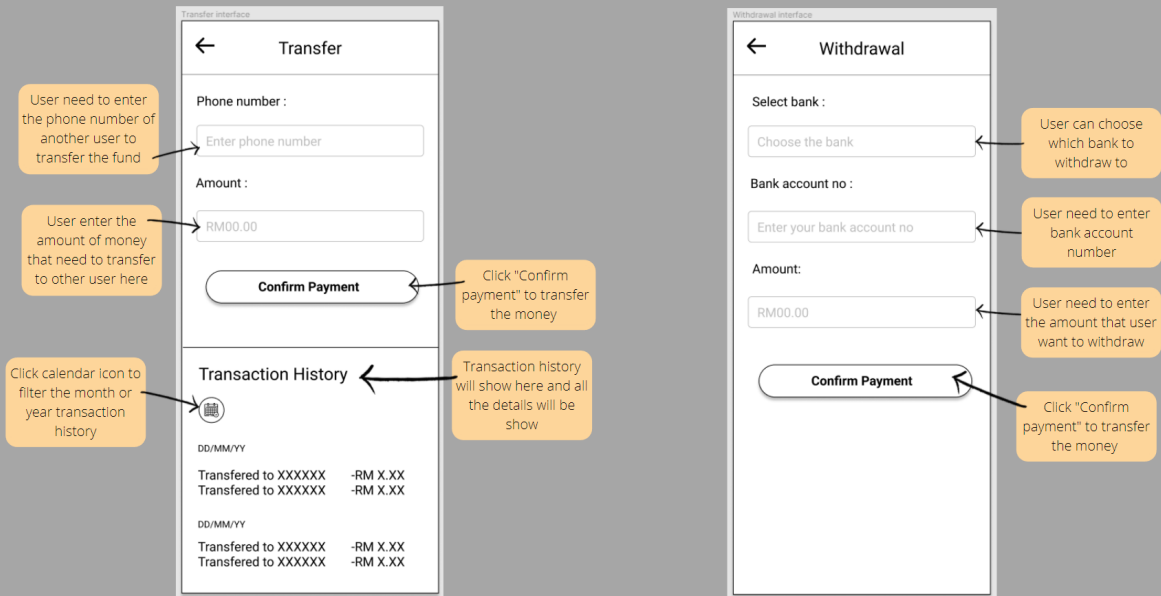
The Transfer button that will lead users to the transfer interface. Users can transfer their E-Wallet balance to another users' account. It is an alternative way of using QR code and barcode to transfer money. If users want to pay their bills, whether it is electric bill or water bill or others, users can just press the Service button and in the service interface, there will be an option to pay their bills. Other than that, users can also register themselves as merchants that allow other users to buy products from the registered users. On the service interface, there will be another two buttons, which are Tolls and Prepaid where it allows users to reload their balance in their smart card for tolls and also allows users to top up their prepaid SIM card.

Every interface that is accessed from the home interface will have a back arrow that allows users to go back to the home interface.

6. Low-fidelity mock-ups







For more details please visit this website:

<https://www.figma.com/file/TXxJfci27szVwwZbv22EP1/Untitled?node-id=0%3A1>

7. Reflection

a. What have you learned and your motivation to complete this project?

I have learned how to design a prototype from scratch using Figma with my team members, brainstorming the ideas, planning and designing the cloud computing architecture including frontend and backend, and I have learned the importance of team working. I think that to fulfil my knowledge about the prototype design so that I have experience when finding a job is my biggest motivation to complete this project. - **Yam Yuan Zhan A21EC0146**

I get to know about what low fidelity is, what is the first step for us to start a low fidelity project, how to design it and write a report, and many more. Other than that, I also learnt how to conduct AWS architecture design and also what are the AWS cloud computing services that are suitable for our project. My motivation to complete this project is that I know that I can learn more and more knowledge and skills from this project and that is what makes me more motivated to complete this project. - **Darren Leong Kah Xiang A21EC0021**

I have learned about how a low-fidelity prototype looks and its basic requirements. Also, I learned how a basic AWS architecture design looks and how it works. I think this project will be a good experience for me to acquire knowledge in the IT field is my motivation to complete this project. - **Chin Jun Er A21EC0168**

From this project, I learned a lot. I learn to design the cloud computing architecture from frontend to backend by using my AWS knowledge and some example services. I also learned how to design a low fidelity prototype by using Figma. The layout, icon, text size, and type of text will be the components that we need to emphasise. My motivation to complete this project is that I want to have a project which really requires me to use my AWS knowledge as I'm just a newbie to AWS and I'm passionate about UI design. - **Tan Zeng Chai**

Through the process of completing this project, the main thing that I have learned is how to design a cloud architecture. My motivation in doing this project is that I will be able to touch on new topics that I never experienced before. - **Chok Rong Jie A21EC0169**

b. What issues and solutions are implemented to make the project a success?

I have met some issues on designing the cloud architecture for my project and designing a low fidelity prototype because basically I know nothing about how to design the cloud architecture and low fidelity prototype model. But, my team and I have searched for some YouTube tutorial videos and asked our lecturer, Dr. Hairudin for some guide and explanation to design the cloud architecture and low fidelity prototype model so that this project can be done successfully. -**Yam Yuan Zhan A21EC0146**

Some of the issues are about how to start this project. Like what should we do first, what should we do next, how do we design this and that. To solve these issues, we did a lot of research about this project and gained a lot of information so that we can complete this project. Other than that, me and my team also face issues such as not knowing our ideas' directions are correct or not, but with the help of our lecturer, we slowly gain our confidence and we think that we are in a correct direction for this project. - **Darren Leong Kah Xiang A21EC0021**

I have met a lot of issues when involving in this project. I don't have enough knowledge to start the project. So, I tried to find some information about it to understand how it works. This is my first time experiencing designing a low-fidelity prototype. I have to learn how to use the tool, Figma, to design the low-fidelity prototype. Then, I went through it with the support of my team members to help me to analyse and solve the problem that I faced. - **Chin Jun Er A21EC0168**

I met a lot of issues when doing this project. First, I don't have any kind of experience in cloud computing before so it's hard for me to design a cloud computing architecture. So, I tried my best to do more research and ask my friends and my lecturer in order to make sure my group is on the right track. I also don't have any experience in designing a low-fidelity prototype by using Figma. So, I try to watch some youtube videos to learn how to use Figma to design a prototype. It's also hard for me and my group members to reach a consensus on the design. So, we will try to have a meeting when any of us is facing problems. - **Tan Zeng Chai A21EC0136**

During the discussion of design of our cloud architecture for our e-wallet, small conflicts happen as each team member has their own approach toward the design. Initially I did also find it hard to design one as I am new to this particular topic and have no experience whatsoever. In order to progress, my team members and I work together by doing a lot of discussion sessions to further our understanding in cloud architecture designing while building one. I also refer back to the notes I made while I was studying the AWS course to get some insight on designing the cloud architecture for the e-wallet application. - **Chok Rong Jie A21EC0169**

c. What is your direction after completing this project?

I think I will like to learn and explore more things regarding cloud computing architecture after completing this project. Also, I will try to find out what potential cloud computing architecture is so that I also can become a cloud computing engineer in the future. - **Yam Yuan Zhan A21EC0146**

My direction after completing this project is that I would like to know more about low fidelity, front end back end, and UI/UX designing. I'm quite interested in this field and excited to get to know more about that. - **Darren Leong Kah Xiang A21EC0021**

I would like to learn more about cloud computing because it might be very useful in the future if you require the use of databases, storage, etc. I will try to figure out more advanced information about it. - **Chin Jun Er A21EC0168**

I will try to explore more in cloud computing, especially the services of AWS because I think it will be beneficial for my future job. Other than that, I will try to improve this project or create another application by coding and prototyping to make it become functional because I'm quite passionate about UI and UX design. - **Tan Zeng Chai A21EC016**

After completing the project, I find myself interested in designing cloud architecture as its structure can be understood as long as I study the complexity of the design. I find that I can take advantage of the experience I gained to increase my value while job searching as technology is advancing every single day and the expertise in cloud architecture is needed to implement cloud technology into the development of many companies. - **Chok Rong Jie A21EC0169**

d. What is the improvement necessary for you to improve your potential in the industry?

I would like to improve my problem solving skills and critical thinking skills because critical thinking skills and problem solving skills are almost required of every employee nowadays and every employer is looking for these skills. If I advance my problem solving skill and critical thinking skill, I will be able to become more creative and manage to give some solutions for a project faster and efficiently. - **Yam Yuan Zhan A21EC0146**

I have to improve my leadership and communications skills. For me, knowledge and skills for that particular field are very important but I think that soft skills are also important. Soft skills like leadership and communications are the skills that help a person to stand out in the industry. Because everyone might have that knowledge about the particular field, but not everyone has leadership and communication skills. - **Darren Leong Kah Xiang A21EC0021**

Problem solving skills and communication skills are very important for me to improve because they play a crucial role in team working tasks. Communication skills are important in discussion and making decisions among team members. Problem solving skills are useful in any situation that I will face in my future career. So, I need to improve those skills to become more advanced. - **Chin Jun Er A21EC0168**

I will need to improve my hard skills and my soft skills. For hard skills, I need to improve my programming language and coding ability in order to improve my potential in the industry as I'm an engineering student. I also need to improve my communication skills especially when using English as English is a global language. For soft skills, I need to improve my problem-solving skills as it is very important for programming. I also need to improve my creativity so that I'm able to create interesting and unique content. I also need to improve my leadership so that I will become more responsible and independent. - **Tan Zeng Chai A21EC0136**

To further improve my potential in today's industry, I do think I have to first gain some insight on the trend of society. After grasping the information regarding the important skills required, I find myself in need of attending courses to further my knowledge in cloud technology and cloud architecture while polishing my skills to further pursue my future job. Intense competition is unavoidable thus I have to be mentally prepared to face new challenges head on. - **Chok Rong Jie A21EC0169**

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- Links related to project

LINKS RELATED TO THE PROJECT:

Presentation slide:

<https://www.canva.com/design/DAE2cQyAJ4g/BUbRPhZaYDIRRGrMSJTDbg/edit>

Project video link:

<https://youtu.be/KhkLzc-epQw>

Presentation video link:

<https://youtu.be/FY24T3D4Fw0>