Unify: All Access Key

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I Project Description

1 Project Overview

Unify- All access key is an application that uses a card that is connected to the application. This card is all in one card that allows users to store all of their cards that use RFID and tickets in the application which can then be used by both the application on the phone and the single card that has RFID which stores all the cards. This application also shows you all of your recurring payments which makes it easier to manage all of your subscriptions. This also has a chatting feature that can be used to talk to people who have similar interests as you do or are going to similar places as you are going to on daily basis.

2 The Purpose of the Project

The purpose of this project is to make it easier for people to carry all of their cards in one single card as well as their phones.

2a The User Business or Background of the Project Effort

Other than the users this application will be used by all kinds of businesses which requires cards or passes to enter like a gym. Businesses can offer their memberships on the application. What this will do is not only promote the business but also help the users to get the memberships easily. This ends up saving the gym money, and makes it easier for them to sell memberships.. The promotion will also be done when people will use the chatting feature in the application to talk to more people and help promote the business. Entertainment and other events can also use this in a similar way as they would not have to worry about other applications charging the customers a huge ticket fee which is why a lot of people decide not to buy a ticket and this will help eliminate the middle man.

<u>Considerations.</u>

The business can put up advertisements and pictures of their gym and can offer memberships to the people who are interested. They can also use the regular customers to promote the gym without actually asking them since the people will be talking to other people who they have similar interests with and what this would do is motivate other people to buy the gym's membership. For Concerts and all of the other places they can also offer

tickets to their services on the application like trains can offer tickets.

Motivation.

The whole goal behind this application is to reduce the number of cards a person has to carry on an average day like all the credit cards, gym membership cards, transit pass, parking pass, office cards, college identification cards, etc, and put them into a single card which would serve as one and can be managed by using the application. And the most important part is making it easier for the consumers to enjoy the things they already love and find new experiences

Considerations

This is not a problem that puts someone's life in danger or hurts someone on day to day basis but if this is successfully executed then a lot of people will have it easier to go into places and do the things they do on their daily lives while not worrying about forgetting or having to carry a lot of cards with them which force them to carry a bigger and fuller wallet. This is designed to make the lives more convenient for the users while promoting the business on the application.

2b Goals of the Project

Content

The primary goal of this project will be to make an application that allows users to carry all of their cards and memberships into one card and make it easier to carry around. This would also allow the users to view what they are paying for as well as talk to people with similar interests and get more recommendations.

Motivation

The motivation behind this application is that users can travel hassle-free and without carrying a lot of things with them. One of the biggest motivations is we carry soo many different cards with us when we are traveling to school and work every day.

Examples

We want to give the customers the opportunity to store all of their cards into one.

We want our customers to be able to buy and repay their subscriptions.

We want to be able to let our customers talk to people who are going to the same places or have similar interests.

We want our customers to be able to check their current active subscriptions.

2c Measurement

The way we plan to measure the success of the application would be to see and talk to the customers and ask them about the difference in the number of cards they carry now vs the number of cards they carried before using this application. Another method we would use it by gathering data about how people after using this application do not forget their cards or do not forget to pay for their memberships.

3 The Scope of the Work

The scope of this project is to make the lives of people easier by combining all of their cards and subscriptions into one making it easier for them to travel around places without forgetting their cards or carrying too many cards with them. This also helps to maintain all the subscriptions easier.

3a The Current Situation

Content

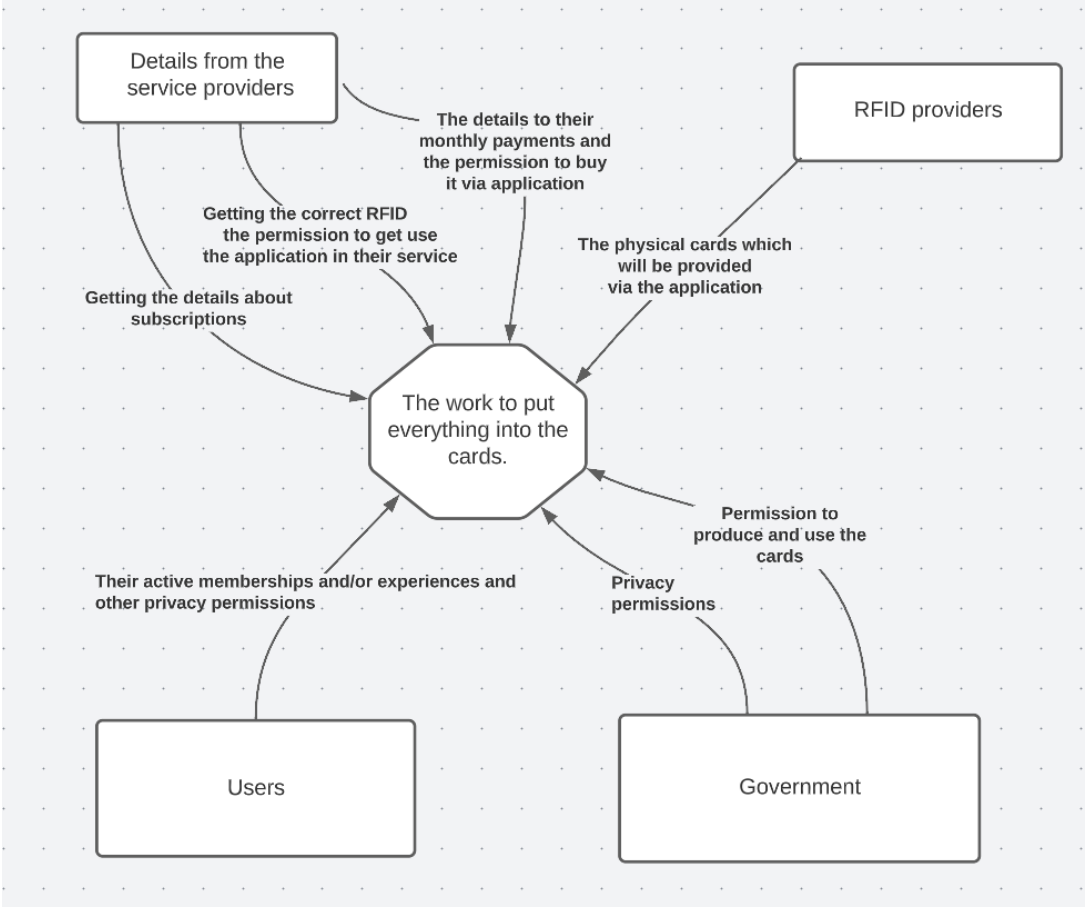
Without this application, currently a person has to carry all of their cards like their credit cards, gym membership cards, travel pass, car parking pass, concert tickets, office id card, college id card, and all of the other cards which they need day to day. What this does is makes people's wallets very big and force them to carry bigger wallets. Also, a lot of the time people forget to bring their membership cards or the pass to the place which wastes time

and money. A lot of times people forget to pay for their monthly gym membership or due to auto payment they pay for the month they do not intend to work out or for any other subscription they pay for.

Motivation

What this app would do is address the above problems of carrying soo many cards and convert them into a single card and make the life of the user very simpler as they would have to only carry one card which would be added to the card provided on the application and future cards with RFID can be added to this card by using the application. This would also help people maintain their subscriptions and monthly payments.

3b The Context of the Work



In this "work" the people who are trying to reduce the number of cards when they are traveling in their day-to-day life and visiting different places and doing different things

in a single day that requires them to carry a lot of cards. But this is not a place where you can completely take over the cards and get rid of them as the applications would still require them to be active and this is not something that would act like PayPal that could give customers the opportunity to replace the whole banking system when paying to the business.

3c Work Partitioning

Event Name	Input and Output
User Sign Up	User Input (in) Payment Information (in)
User accesses an event and/or place	Payment information (in) Location (in) RFID Access to gym, Public Transports, Theater Access
User pays for a product	Payment information (in) Location (in) One tap payments, Ticket Booking, Extending Subscriptions

3d Competing Products

Content

There are a few applications in application marketplaces which are built to perform some individual operations that Unify performs. For example, Simplifi keeps track of any subscriptions, Ventra app manages the ventra account and membership, AMC is used for ticket booking, etc.

The main problem that unify solves is to save storage space and energy by putting all the necessary pieces of these important applications under the umbrella of 1 single application. It is a subscription manager, map, messenger, ticket booking, gym membership management, all-in-one easy to use app.

Motivation

There are no current applications in the marketplace that provide as many useful features in a single application. We believe that the collection of most necessary everyday features in 1

RFID card and application is what makes Unify a truly unique experience.

4 The Scope of the Product

The scenario goes about to describe the use of the application by a new user. The user downloads this application to experience the benefits of having multiple operations under the umbrella of a single application and RFID card.

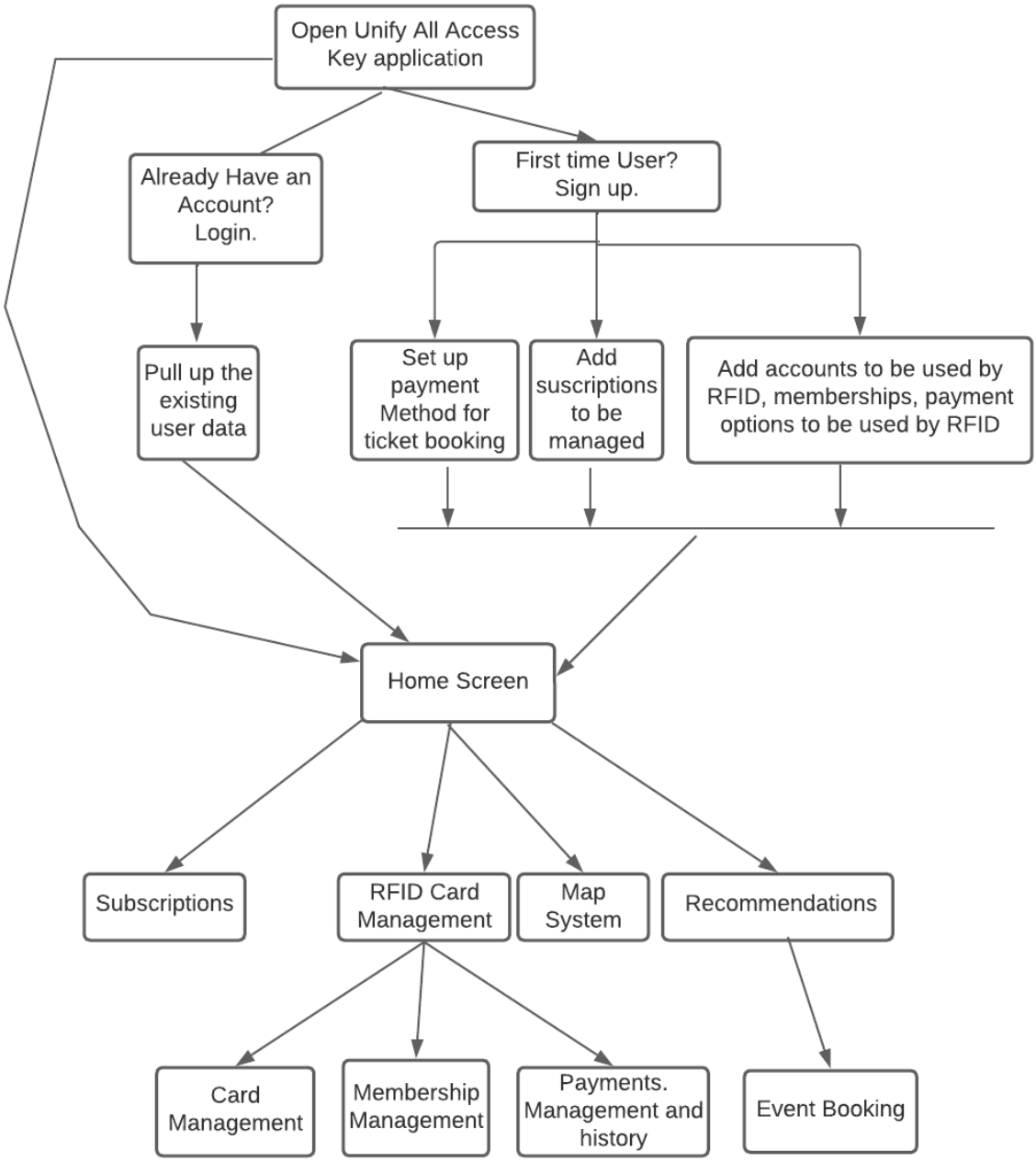
The user starts by downloading the application via any application marketplace like play store, app store etc. If the user already has an account, they proceed to log in or else they sign up in the application and develop a personal profile. The personal profile setup consists of more than 1 step.

The basic first step is to use an email address and set up a corresponding password. Then the user is displayed multiple things to set up like linking the card to the RFID card, selecting movie preferences, linking the RFID card to the bank account to be used for payments, entering the information about subscribed services like amazon prime, or setting up payments for one tap ticket booking.

After finishing the personal profile setup, the application will prompt the user to home screen of the application where the user will be able to -

1. Manage their subscriptions. This user would be able to see when any particular subscription is going to expire and how much the user will be charged.
2. Recommendations for events and/or services that the user would be interested in.
3. An option to go to the inbuilt map system to input any desired location and the app will display different modes of transportation to the destination.
4. Display the user's memberships.
5. A social feature for the user to connect with other people using the application including those with similar interests.

4a Scenario Diagram(s)



4b Product Scenario List

1. Creating a user account
2. Adding a payment method.
3. Linking a payment option and existing accounts with an RFID Card.
4. Experience recommendations.
5. Inbuilt Social Platform.
6. Map.
7. Manages memberships.

4c Individual Product Scenarios

Creating a User Account: A new user will create an account with their email address and a corresponding, at least, 8-digit long password. The user will then be prompted to enter some personal information like name, age, city etc. The application will be using the same given information in the chatting feature of the application.

Setting up payment method for one tap ticket booking: The user after making an account will add a payment option to the application which will be used for booking of movie tickets via application.

Linking a payment option and ventra account with an RFID Card: The user will have an option to link up their ventra account with their RFID card to be used in public CTA transportation. They will be able to add fares and buy passes by setting this.

Movie Recommendations: In the home screen of the application the user will be displayed the information on latest movies shows at the nearest theater.

Inbuilt Chatting Platform: For the users who use the same application (ex - met at the same gym) want to stay connected, they will be able to make private conversations using the chatting option of the app.

Map: To go to any desired location, the application provides a feature of map, where upon entering the desired location, will show the fastest route from the current location to the destination via a personal vehicle, walk or public transportation.

Manages Memberships: Apart from managing the ventra account, the user can also add any other subscriptions to be managed inside the app. The user will be displayed

useful information about any particular subscription.

5 Stakeholders

5a The Client

This application would not be developed for a specific client. Therefore, the developing organization would be the client.

5b The Customer

The customers of this product would be anyone in the general public. That's because this product can be used by anyone that wishes to simplify their cards and passes.

5c Hands-On Users of the Product

- The first, and most important group of users would be the actual people using the software with the app. They would use the application and card in their daily lives to simplify and make their life more hassle free and convenient. Their subject matter experience would range from novice to master since it would include people just getting started with the app to those who have already mastered it and are using it daily. The technological experience with relevant technology would also range from novice to master. The people using this technology could already have experience with RFID from other similar systems or they could be completely new to this technology. The attitude towards technology of these users would be one that sees technology as a way to simplify and make life easier, not more complicated.
- The second group of users would be businesses that are providing experiences and/or memberships through the software with the app. They would use the application to create experiences and/or memberships that users could purchase in exchange for access to those said things. Their subject matter experience would be master since it would be the actual people going into the app and configuring, setting up, and implementing the actual postings that the actual users could purchase. The technological experience with relevant technology would also range from novice to master. The people using this technology could range since it could be a businessman that wants to expand his companies.

5d Maintenance Users and Service Technicians

None.

5e Other Stakeholders

Other stakeholders include corporate sponsors. The corporate sponsors would be from a broad range of industries that could all benefit from such a product. They would have to have a low degree of involvement in order to use such a product for the events and experiences that they would sponsor.

An additional stakeholder would be businesses that list their products and/or services on the app. Their degree of involvement would be high as they would to setup and manage their businesses online presence.

5f User Participation

User participation will be necessary in order to test the product before it ships officially. The users participating will be the ones that will actually end up using the product, so that would be daily users and businesses. They would help establish what works and what doesn't work with the app. They can report what the real world performance is like of the product and whether it satisfies their performance requirements.

5g Priorities Assigned to Users

Key users: the ones providing the products for purchase on the application. Without any existing products such as memberships, experiences, and etc. the product would have nothing to offer to users. The users use the product as a way to enjoy the things they already love and use. They are also very important as they will be the ones used daily in their lives.

Secondary users: the ones that have setup the app but have not yet connected subscriptions and/or purchases.

Unimportant users: the ones that do not possess a membership, are attempting to misuse the product for fraudulent purposes.

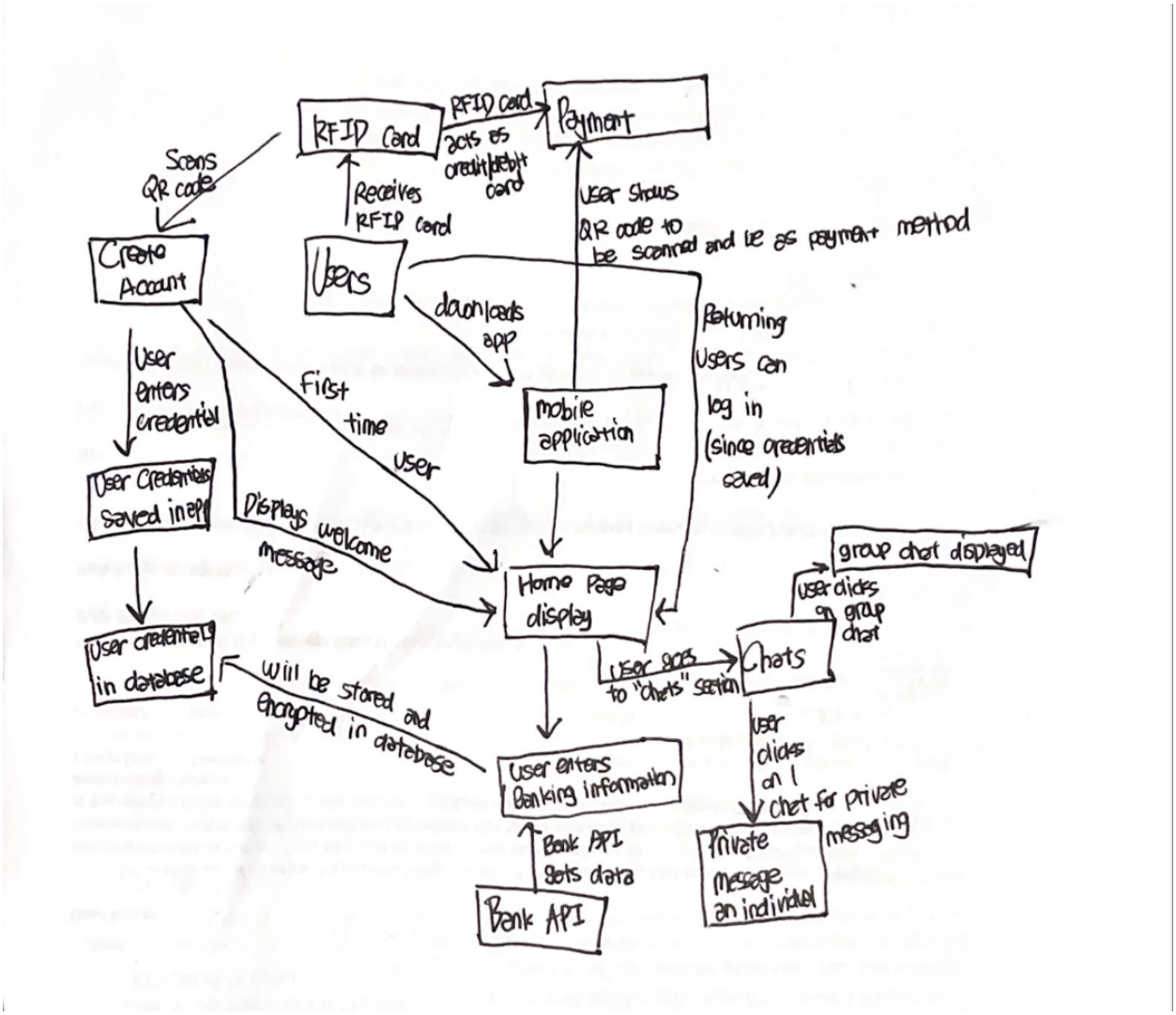
6 Mandated Constraints

6a Solution Constraints

1. Legalities:
    a. Description: The user shall adhere to the rules and regulations that are set
    b. Rationale: The app shall display a Terms and Conditions contract for the user to agree.
    c. Fit Criterion: The user must accept the terms and conditions displayed on the contract in order to continue using the app
2. Operating system:
    a. Description: The product shall work in different devices that have different operating systems
    b. Rationale: The user shall not need to install or change their operating system because the product shall be available in the website if it does not comply with their operating system requirements
    c. Fit Criterion: The development team shall create different user interfaces for at least the IOS, Android and the web application and must look the same
3. Download:
    a. Description: The product shall be obtained through an application marketplace like the App Store for IOS Devices or Google Play for Android devices.
    b. Rationale: The user does not need to set up an application marketplace because the phone should already have an application marketplace available in their phone and could simply download the app.
    c. Fit Criterion: The product shall be available in the application marketplace for the different involved.
4. Security:

    a. Description: The product shall protect all user information
    b. Rationale: The user should be able to input their information (like their username, password, bank account, etc) and their information is encrypted and stored in a safe database
    c. Fit Criterion: The product shall have extra steps in increasing the layers of security. It shall have integrated techniques such as two-factor authentication which can be done using SMS or email verification codes, regular security updates when the app needs to update for better security against newly discovered vulnerabilities, increasing layers of encryption so that only a dedicated user would be able to access their data stored safely in the app.
5. Respectful communication:
    a. Description: As the application contains the social component, the product shall have respectful users
    b. Rationale: The user must be respectful towards other users on the app
    c. Fit Criterion: The app shall have a reporting system in place to have inappropriate content or disrespectful users removed from the app
6. Usability:
    a. Description: The app shall be user friendly and easy to use
    b. Rationale: The user shall be able to set up their own accounts and be able to use it intuitively
    c. Fit Criterion: The app shall have buttons that show them exactly where to go in order to set up

6b Implementation Environment of the Current System



6c Partner or Collaborative Applications

1. Social media apps: since the application has a social component in it, the posts can be shared to other social media apps and not only limited to unify
2. Payment platforms: payment apps/websites such as paypal, venmo, etc, could accept payments made by users through Unify. As the users enter their banking information, their cards can be from different apps and users should be able to request and make payments in the Unify app through the different payment systems
3. Transit cards: this will be used when accessing their passes when getting on to the trains/buses for users. It's a one-tap method for the users to seamlessly enter their desired transit vehicles.
4. Security platforms: since Unify has an integrated security system, other apps could use the security API that Unify has developed especially for banking because security is very important in storing sensitive information like their bank account number, how much money they have, etc.

6d Off-the-Shelf Software

- Smartphone:
    - Smartphones with Android and IOS operating systems could run the application.
- Laptop/Computer:
    - Since the app is available as a website, users can access their information through the website as well.

6e Anticipated Workplace Environment

Since this app will be used with the card to grant access to different places, it must work whenever and wherever people are relying on it to access and/or experience the things they want to do..

This app will be primarily an online app therefore it must be resistant to viruses or malware that could potentially cause problems to the database or server.

6f Schedule Constraints

In order to create an application of this scope, this will require collaboration between software engineers, salesmen, marketers, and corporate sponsors in order to get the job done. This means there will be a short window of time for all these people to get the work needed done in order to have a fully functioning product up and running. Software development will have to be quick in order to accommodate bug fixes. Ideally, the product should be built from the ground up and released within a year or two before being made available to the public. Any longer than that and it might risk causing the product to lose traction in market interest.

The app should be released in the holiday season when everyone is going to travel and we plan on finishing everything by the end of this year which will be Christmas. Since everyone will use trains, buses, airplanes, to go home to their families, the Unify app can be utilized for their payments.

We feel like the holiday season is the best time to finally utilize the app because students are out of school, parents are on vacation and they will try to find a place to go to and schedule dinners with friends and family.

6g Budget Constraints

This app will need funding from investors willing to invest in our product. RFID cards will need to be produced. An application will need to be created. Therefore, it will cost around anywhere from a range of $250,000 to $500,000 in total to compensate for the software engineering team, marketing, sales, research and development, and other costs.

7 Naming Conventions and Definitions

7a Definitions of Key Terms

RFID: (radio frequency identification) is a form of wireless communication that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal or person.

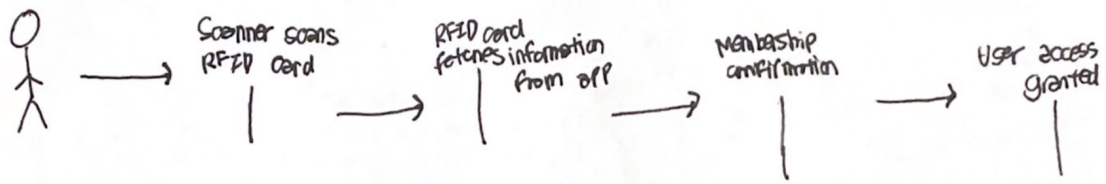
Card: the actual card that will be used by the hands on users in order to pay, access and enjoy the things they want to purchase and/or experience.

7b UML and Other Notation Used in This Document

Sequence diagram for user creation:

Sequence diagram for payment using the RFID card:

Sequence diagram for membership access using RFID card:



7c Data Dictionary for Any Included Models

The contents of the users and their memberships. The contents would have to store whether a user membership is active. If it is, it would have to have some sort of unique identifier. It would also have to have an expiration date. The payment details would be included. The underlying issuer of the subscription/service.

8 Relevant Facts and Assumptions

8a Facts

- 65.3% of the U.S population uses digital banking services
- 25% Americans are reported to have more fun at venues that combined food and drinks together (such as arcade games, bowling, etc)
- It is reported in 2016 that the Ventra app was downloaded more than 1 million times
- The RFID cards cost up to $25
- 44% of Americans would rather do banking via mobile apps

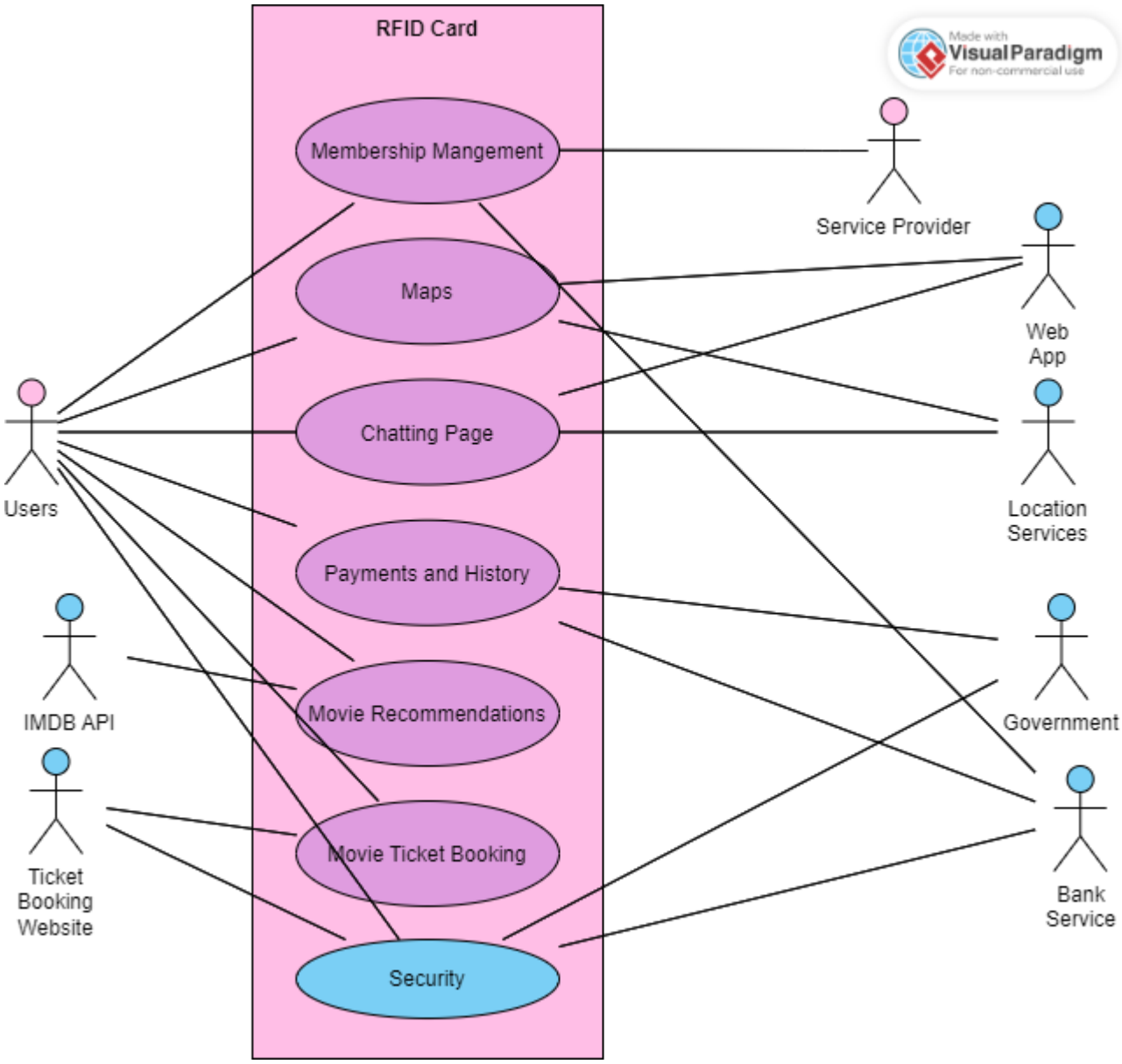
8b Assumptions

- Users must be able to afford the fares (bus fares, train fares, etc)
- Users should already have a credit/debit card set up to be input to the Unify app
- Users live in an area where the public transport is available throughout the week
- Users must have a unique username to identify their account easily if other users might add them to their contacts
- Users are responsible for what they post in the app and will result in termination of usage if they have broken any rules.

II Requirements

9 Product Use Cases

9a Use Case Diagrams



9b Product Use Case List

NOT Applicable.

9c Individual Product Use Cases

Use case ID: 1 Name: Adding payment method pre-conditions: User has the app installed and created/logged in their respective account. post-conditions: N/A Initiated by: User Triggering Event: User selects the option to add a payment method linking to their RFID card. Additional Actors: Government, Bank Service for authentication.
Sequence of Events: 1. User selects the option to add a new payment method. 2. System directs the user to the bank web page i.e. payment gateway to enter the bank information. 3. User enters their personal and Bank information and once finished submits the page. 4. System verifies the entered information and adds the payment method.
Alternatives: N/A Exceptions: If the data entered by the user is invalid and does not pass the authentication, the user will be shown a dialog box with options to “retry” and “cancel”.

Use case ID: 2 Name: Movie Recommendations

pre-conditions: User has the app installed and created/logged in their respective account.

post-conditions: N/A

Initiated by: User

Triggering Event: User selects the option to view the home screen of the application.

Additional Actors: IMDB API.

Sequence of Events:

1. User selects the option to view the home screen of the application.
   2. System makes a request to the IMDB api and receives the response of the latest movies which are shown to the user.

2. On selecting any of the movies the user directed to a web page displaying more information on booking a ticket for that movie.

Alternatives: In the event where the user makes an search for a movie which is not recognised by the API, the system will display a dialog box with option to “retry” or “go back to home page”

Exceptions: N/A

Use case ID: 3 Name: Membership Management

pre-conditions: User has the app installed, created/logged in their respective account, and set up their RFID card.

post-conditions: N/A

Initiated by: User

Triggering Event: User selects the option to add a new membership from one of the displayed options or using the search bar.

Additional Actors: Service Provider, Bank Service.

Sequence of Events:

1. User selects the option to add a new membership.
2. System displays recommended memberships to add ex- Netflix, gym membership, etc.
3. User is directed to the respective webpage for verification of the membership.
4. On successful verification, the system links the membership to the RFID and adds it to the memberships list of the application.

Alternatives: N/A

Exceptions: N/A

Use case ID: 4 Name: Social Platform

pre-conditions: User has the app installed and created/logged in their respective account. User has enabled location in the device.

post-conditions: N/A

Initiated by: User

Triggering Event: User selects the option to chat with other app users.

Additional Actors: Location Service, Web App.

Sequence of Events:

1. User selects the “Chat” option from the home screen.
2. The system develops a social profile for the user using the current profile.
3. User is directed to a web app which is a chatting platform.
4. System shows a preview of other users of the application utilizing the location services.

Alternatives: N/A

Exceptions: N/A

Use case ID: 2	Name: Maps
pre-conditions: User has the app installed and created/logged in their respective account. Users have enabled location in their device. post-conditions: N/A Initiated by: User Triggering Event: User selects the option to view Maps in the application. Additional Actors: Location Services, GPS, Web App.	
Sequence of Events: 1. User selects “Maps” from the home screen. 2. System directs the user to the web app consisting of their current location. 3. Users have the option to enter their desired destination. 4. System will display users the fastest route to their destination via Public transport, private vehicle, walking or bike.	
Alternatives: N/A Exceptions: N/A	

10 Functional Requirements

1 - Validation

Description: The system shall be able to validate if the user has valid credentials to be able to sign in to their account and then this will activate their card

Rationale: This is important because we need to have the users be able to use their card when their credentials are used to sign in.

Fit Criterion: The user must sign up/sign in (depending if the user has used the account before) on the app when they want to use the card.

Acceptance Tests: Validation test

2 - System Database

Description: The system database shall store the user’s personal information

Rationale: This is important because multiple users will use the app and you would need

to remember which user that signed up.

Fit Criterion: The system shall have a database ready to store the user's information and it should be able to insert a new user when a new user is signed up.

Acceptance Tests: Database test

3 - Encryption

Description: The user's information will be encrypted when they are stored

Rationale: The user's information must be encrypted because they are not only entering their username and passwords but also their banking information which needs a high level of security to prevent their money from being stolen.

Fit Criterion: The system must already have an encryption mechanism when the user enters their personal information in the app.

Acceptance Tests: Encryption testing

11 Data Requirements

4 - User Information

Description: The system shall need to store the user's information

Rationale: This is important because every user's username, password, banking details, etc, are different and the system shall be able to store them separately for each unique user.

Fit Criterion: The user shall already sign up to the application and they should already input their details upon signing up (which will be stored in the database of the system)

Acceptance Tests: Account Creation Test

5 - Card Information

Description: The system shall store the user's card information

Rationale: This is important because every user that has their credentials logged in have their own cards that they own and that card is to be used to access different places that they need to go to. The card information needs to be stored and encrypted as well to prevent other people from using it without the user's consent. Some cards may be lost/stolen and that the users can report it.

Fit Criterion: The card must already be registered by the system database but not yet with the user's information if the card is still not used/will not be used by a user.

Acceptance Tests: Storing Card Test

6 - Location Records

Description: The system shall store the locations that uses Unify for access

Rationale: This is important because the database needs to identify which stores are using the Unify keycards as access keys since it helps ensure the legitimacy of the keycards being presented by users that want to enter. By storing the locations that Unify uses for access, this could help prevent unauthorized access from certain users that might have sensitive information that is stored at the location.

Fit Criterion: The location must be registered in the app so that their area is recorded in the database

Acceptance Tests: Location testing

7 - Access Levels

Description: The system shall store the access levels of each RFID card

Rationale: This is important because not everyone wants to have the same level of access to each location. An example of this would be when different employees have different roles and they should have different access to the different parts of a building.

Fit Criterion: The user must already have their description of what use they are going to have when using the Unify keycard.

Acceptance Tests: Access Level Test

12 Performance Requirements

12a Speed and Latency Requirements

8 - Processing Multiple Users Requests

Description: When multiple users are simultaneously using the app, we want to make sure that the app will still function properly without any delays while serving multiple users.

Rationale: This is important to the app because we want every user to experience the app in its highest performance with minimal lag.

Fit Criterion: The system shall have an efficient algorithm to process requests with minimal delays

Acceptance Tests: Lag Test

9 - Card Authentication Latency

Description: The product shall grant/deny access to a user almost instantaneously once the card is tapped on a scanner

Rationale: This is important to the because we want fast response time for the user to enter a particular building

Fit Criterion: The system shall have an efficient searching and validation algorithm to find the user's access

Acceptance Tests: Latency Test

12b Precision or Accuracy Requirements

10 - Data Encoding

Description: The system shall ensure that the information stored in the card is encoded with precision.

Rationale: This is important because we need to ensure that the information stored in the card can be accurately read by the system to prevent misuse of the keycard.

Fit Criterion: The keycard should be standardized. It must follow the standard protocol for data encoding so that different scanners/systems that follow the set standard protocol can read the data.

Acceptance Tests: Data Encoding Test

11 - Error Handling

Description: The system shall implement precise error handling.

Rationale: This is important because when an error occurs, we want to ensure that the system shall have a precise error handling mechanism to diagnose the error caused and take the appropriate actions needed.

Fit Criterion: The system shall have an error handling mechanism in place

Acceptance Tests: Error Handling Test

12c Capacity Requirements

12 - Simultaneous Key Card Access

Description: The system shall cater to more simultaneous users in the day than in the night.

Rationale: This is important because a lot of users will have to travel to different places during the day and less people would be traveling at night.

Fit Criterion: The system shall be able to process up to 200 simultaneous users during the day and 150 simultaneous users at night.

Acceptance Tests: Simultaneous Access Test

13 Dependability Requirements

13a Reliability Requirements

13 - No long downtime

Description: The app should be available to the users all of the time and should not go down for longer than 60 minutes as we try to replace all of the cards with this application.

Rationale: When the application is down the users cannot add new memberships or cards to their application

Fit Criterion: We expect the application to go under maintenance every month but during very odd times to maintain the reliability and the security of the user data.

Acceptance Tests: Reliability Test

13b Availability Requirements

14 - Available time

Description: The app will only go down once a month for maintenance during late hours from 2am to 3am and will be available 99% of the time without failure.

Rationale: The users will get an error message when they try to use the application also they will have a notification 2 days before the maintenance.

Fit Criterion: The system will go under maintenance every month.

Acceptance Tests: Availability test.

13c Robustness or Fault-Tolerance Requirements

15 - Offline use

Description: The users will be able to use all of the cards and memberships even when not connected to the internet.

Rationale: Cards can only be added when the user is online. Memberships cannot be renewed if the user is offline.

Fit Criterion: The cards should be added when the application is connected to the internet.

Acceptance Tests: Robustness test.

13d Safety-Critical Requirements

16 - Money safety

Description: The application will be programmed in such a way that user data and their bank account details do not go out. Also other people cannot use their application to pay.

Rationale: The app will be active in one device only and any suspicious login will be reported to the user

Fit Criterion: The user has to set up a 2 factor authentication

Acceptance Tests: Safety Test

14 Maintainability and Supportability Requirements

14a Maintenance Requirements

17 - Account management

Description: All of the accounts which are not being used for over a year will be sent an email confirmation to continue their accounts and if not responded within 2 months of the email the account will be terminated

Rationale: By removing users who do not use their accounts their personal information will be deleted and the database will be cleared.

Fit Criterion: Check for inactive accounts every month.

Acceptance Tests: Maintenance test

14b Supportability Requirements

18 - 24/7 helpdesk

Description: There will be a 24/7 helpdesk which will be in both email and phone calls.

Rationale: The users will be able to get help with any technical issue at any time of the day.

Fit Criterion: The users will be able to submit their complains as well as gt help with any part they are having trouble with

Acceptance Tests: Support Test

14c Adaptability Requirements

19 - Application usage.

Description: Users can use this application on any operating system.

Rationale: The application will run on any given platform such as android and IOS. It will also be available as a web application.

Fit Criterion: The account can only be running on one device at a time for security reasons.

Acceptance Tests: Adaptability Test

14d Scalability or Extensibility Requirements

20 - Expanding

Description: The product will be launched with the capacity of 100,000 users

Rationale: The application will be ready to take 20-25% more users than the number which it is released with.

Fit Criterion: The application will keep growing as the number of users cross the 100,00 mark.

Acceptance Tests: Expandability test.

14e Longevity Requirements

21 - Application life.

Description: The application will work for an indefinite time and is expected to run for no less than 10 years.

Rationale: The application will not die because there are infinite users who want to have their cards and memberships in their phones.

Fit Criterion: The features and functionality of the application will always be growing and new business and services will be expanded.

Acceptance Tests: Longevity Test

15 Security Requirements

15a Access Requirements

22 - 2 Factor authentication

Description: The user will have to use 2fa to get into the application.

Rationale: This would minimize the risk of the account being compromised.

Fit Criterion: User has to use an application which supports 2fa like duo.

Acceptance Tests: Access test

15b Integrity Requirements

23 - Fraud prevention

Description: The application will prevent fraud/unverified businesses from selling their services.

Rationale: Before any business is listed on the application the business should pre verify all of it's services

Fit Criterion: Business who are trusted will only be allowed to access the applications

Acceptance Tests: Fraud Test

15c Privacy Requirements

24 - Privacy policy

Description: The application will need users to accept the privacy policy.

Rationale: The privacy policy will confirm that the user is willing to share their data as

well as their location with the application.

Fit Criterion: The user has to agree to give the basic private information to the application like name and an ID proof

Acceptance Tests: Privacy test

15d Audit Requirements

Does not apply

15e Immunity Requirements

25 - Virus/malware Protection

Description: The application will have a virus/malware prevention feature

Rationale: The application will have a firewall which will prevent from any virus or cyber attacks

Fit Criterion: The firewall system installed in the application will protect the users data

Acceptance Tests: Immunity test.

16 Usability and Humanity Requirements

16a Ease of Use Requirements

26 - Step-by-Step Walkthrough of each feature

Description: During the setup process of the product, the user will be displayed dialog boxes on each step while also providing explanations of each feature.

Rationale: Users may be confused on the understanding of each feature and may find it hard to set up and link their information with features.

Fit Criterion: 90% of the users will only find the setting up phase of using the application difficult. The rest of the application is simple enough to be used by 13 year olds.

Acceptance Tests: Walkthrough Test.

16b Personalization and Internationalization Requirements

27- Movies Sorting

Description: The product will allow users to sort movies by genres, country, ratings and review.

Rationale: Different users prefer movies of different genres, and may prefer to watch it in its original language .

Fit Criterion: 90% of product will user will be able to view

Acceptance Tests: Movie Sorting Test

16c Learning Requirements

28 - First User

Description: The product will be set up using the walkthrough for all first time users which will provide a smooth way of building a profile.

Rationale: The walkthrough is aimed to help any user above or of 13 years in age.

Fit Criterion: 90% of the users will be able to easily learn the app once it is set up.

Acceptance Tests: First User Test

16d Understandability and Politeness Requirements

29 - Product Icons

Description: The products consist of icons which are easily recognizable and understandable by any user.

Rationale: All users will be able to understand the well known icons. For example chat icon looks like 💬.

Fit Criterion: 95% of the users will be able to reciprocate what the icon means.

Acceptance Tests: Icon Test

16e Accessibility Requirements

30 - Hearing Disability Test

Description: The user will be able to listen and also visualize instructions to the walkthrough instruction when setting up the product.
Rationale: To allow hearing disabled people to use the product.

Fit Criterion: The user must enable the microphone function in their device setting.

Acceptance Tests: Hearing disability test

16f User Documentation Requirements

31 - Contact Us and Documentation of Walkthrough

Description: The product will have a documented walkthrough of each feature of the product and will also have an option to contact services in case of an anomaly.

Rationale: Documentation will help users understand clearly in simple terms how the feature works.

Fit Criterion: 90% of the users will find helpful and clear information on how-to's of the product.

Acceptance Tests: Contact Test and Walkthrough test

16g Training Requirements

32 - Training

Description: Apart from the walkthrough, the user will be able to navigate easily around the product. In the event the user needs assistance, they can refer to documentation, repeat walkthrough, or contact administrator.

Rationale: The user should be able to understand how to navigate through the product to learn and access all of its features

Fit Criterion: 90% of users will be able to easily learn to navigate around the product.

Acceptance Tests: Training test

17 Look and Feel Requirements

17a Appearance Requirements

33 - Color Requirements

Description: The app shall display consistent color in the different sections of the app.

Rationale: This is important because we want to eliminate muddled designs in the app that would make it unattractive to the users.

Fit Criterion: The app shall not have bright colors in the app but rather a neutral color to prevent eye strains when the user uses the app.

Acceptance Tests: Color Requirements Test

34 - Font Requirements

Description: The app shall display consistent fonts in the different sections of the app.

Rationale: This is important because we want the users to be able to see what the text is displayed in the app. It must be a medium sized length to ensure intuitive designs.

Fit Criterion: The app shall not have a font that is too small or too big for the user to read.

Acceptance Tests: Font Requirements Test

17b Style Requirements

35 - Style Specifications

Description: The product shall utilize an intuitive style that allows the user to understand the flow of the app and could understand how the product works.

Rationale: This is important because a lot of users would want to learn how the app works in a fast way.

Fit Criterion: The app must already follow the requirements in 17a.

Acceptance Tests: Style test

18 Operational and Environmental Requirements

18a Expected Physical Environment

36 - Indoor Building Environment

Description: The product shall work in an indoor environment

Rationale: Majority of the users will use the card inside the location because there might be technology that can interfere with the hardware of the card for example the keycard scanner when it is a rainy,stormy or a windy day.

Fit Criterion: More users will be able to use the product when they are indoors

Acceptance Tests: Indoor Building Environment Test

37 - Sunny Outdoor Building Environment

Description: The product shall work in a sunny outdoor environment

Rationale: The product shall work in a sunny outdoor environment because the product shall have no interference with the sunny environment when they are in use. Since it is sunny and there is no rain, the product shall have no trouble sustaining itself.

Fit Criterion: The majority of users can use the product outside as well

Acceptance Tests: Sunny Outdoor Building Environment test

18b Requirements for Interfacing with Adjacent Systems

38 - Chatting Requirement

Description: As the product contains a chatting feature, it will allow users to share their phone numbers with each other.

Rationale: It is important because they would want to connect with one another and make more friends through the app. In a way, it can help bring more diversity to the app.

Fit Criterion: The product shall have a messaging system integrated already in the app.

Acceptance Tests: Chatting Test

18c Productization Requirements

39 - App Weight

Description: The product app shall be at the most 300 MB

Rationale: This is important because users need to download the app and there might be updates for the app and we want to allow the users to not take a long time to update it.

Fit Criterion: The app must already be in either the App Store or the Google Play store for the user to download

Acceptance Tests: App Weight Test

18d Release Requirements

40 - Updates

Description: The app shall receive updates every month

Rationale: We aim to minimize the occurrence of bugs in the app.

Fit Criterion: The app should already be released by then and after 1 month of release, the app shall have another update test and by then we would need to see the performance report of the app to fix what bugs occur on a daily basis.

Acceptance Tests: Updates Test

19 Cultural and Political Requirements

19a Cultural Requirements

N/a. The product can be used by anyone.

19b Political Requirements

41 - Comments and texting policy

Description: The chatting feature of the application will allow users to block or report any discriminatory, racist comments or texts.

Rationale: The chatting feature is the only platform in the app for any 2 users to interact with each other. The product is meant to be friendly and ecorages other users to be a part of the same community

Fit Criterion: Reported users will be subject to receive a permanent ban from using the app.

Acceptance Tests: Content testing

20 Legal Requirements

20a Compliance Requirements

42 - User data

Description: This application will require the user to give its location as well as the user data.

Rationale: This makes sure that the application does not get into legal troubles because of having the user data.

Fit Criterion: We will consult a law firm and make sure that every ascept of the application will meet the legal requirements.

Acceptance Tests: User data test

20b Standards Requirements

43 - Bank Legal requirements.

Description: The application should comply with all of the bank requirements.

Rationale: The application should not violate or go against any of the bank regulations or even have some feature which puts the process in a gray area.

Fit Criterion: We will take all of the necessary legal steps and meet the requirements to make the application legal and trustworthy.

Acceptance Tests: Bank legal Test

21 Requirements Acceptance Tests

21a Requirements – Test Correspondence Summary

Test	Requirements																																										
	Req 1	Req 2	Req 3	Req 4	Req 5	Req 6	Req 7	Req 8	Req 9	Req 10	Req 11	Req 12	Req 13	Req 14	Req 15	Req 16	Req 17	Req 18	Req 19	Req 20	Req 21	Req 22	Req 23	Req 24	Req 25	Req 26	Req 27	Req 28	Req 29	Req 30	Req 31	Req 32	Req 33	Req 34	Req 35	Req 36	Req 37	Req 38	Req 39	Req 40	Req 41	Req 42	Req 43
Validation test	X			X																								X															
Database test		X																																									
Encryption testing			X		X	X																																					
Account Creation Test				X																																							
Storing Card Test					X																																						
Location testing						X																																					
Access Level Test							X																																				
Lag Test								X																																			
Latency Test									X																																		
Data Encoding Test										X																																	
Error Handling Test											X																																
Simultaneous Access Test												X																															
Reliability Test													X																														
Availability test.														X																													
Robustness test.															X																												
Safety check					X											X																											
Maintenance test																	X																										
Support Test																		X																									
Adaptability Test																			X																								
Expandability test.																				X																							
Longevity Test																					X																						
Access test							X															X																					
Fraud Test					X	X	X																X																				
Privacy test					X																			X																		X	
Immunity test.																									X																		
Walkthrough Test.																										X					X												
Movie Sorting Test																											X																
First User Test																												X															
Icon Test																													X														
Hearing disability test																														X													
Contact Test																															X												
Training testing																																X											
Color Requirements Test																																	X										
Font Requirements Test																																		X									
Style test																																			X								
Indoor Building Environment Test																																				X							
Outdoor Building Environment test																																					X						
Chatting Test																																						X					
App Weight Test																																							X				
Updates Test																																								X			
Content testing																																									X		
User data test						X																																				X	
Bank legal Test																																											X

21b Acceptance Test Descriptions

- Validation Test:- This test is so that users can only access it with valid credentials.
- Database Test:- This test will make sure that the user data is being stored in the database.
- Encryption:- This test makes sure that the user data is encrypted.
- Account creation test:- This makes sure that the new user is saved in the database.
- Card Information:- This makes sure that the card information is stored correctly and safely into the database.
- Location Test:- This test makes sure that location is being stored in the application. This would be the location of the user's activity so that the application can maintain safety as well as give further recommendations.
- Access Level Test:- This is to make sure that only people with correct access will be able the data and no other person using the application or providing service is able to access the user's data.

- Lag Test:- This will test that the application will run without any lag when run with multiple users as well as the application capacity.
- Latency Test:- This will make sure that the application is fast and reliable to use as a replacement to physical cards.
- Data Encoding Test:- This will make sure that any data stored in the database will be encoded.
- Error Handling:- This will ensure that the system is able to handle any and all kinds of errors that may occur while using the application.
- Simultaneous Access Test :- This will make sure that the application can be run by multiple users especially during the day time
- Reliability Test:- This will ensure that the application does not have a long downtime and it does not go offline or crashes during busy hours.
- Availability Test:- This will make sure that the application only goes down for maintance only once a month.
- Robustness Test:- This will ensure that the user can still access the cards while the application 9is not connected to the main server.
- Safety Test:- This will make sure that the user details and their bank accounts do not go out or are not misused by any other person.
- Maintenance Test:- This will make sure that the users who are inactive will be sent an email and then removed from the database to make sure that database is not filled and the user's information is cleared for privacy reasons.
- Support Test:- This is to ensure that the user has access to the helpdesk all 24/7 and via phone call and via email.
- Adaptability Test:- This will ensure that the application runs on all of the operating systems and does not have limitations on any of them.
- Expanding Test:- This is to ensure that the application will keep growing and adding new features as well as increase the capacity.
- Fraud Test :- This will make sure that the application is fraud proof.
- Privacy Test:- This is to let the user know about the privacy policy for all of the legal reasons.

- Immunity Test:- This test is to ensure the saftey of the application and the firewall so that there are no random attacks and data stealing.
- Walkthrough Test;- This test will make sure that the user will be able to userstand the whole application and will get a guidance to all of the features available to them.
- Movies Sorting Test:- This will make sure that the application is able to suggest the user movies and TV shows based on their location.
- First User Test:- This will make sure that the user who is logged in for the first time will have a smooth experience building the application.
- Icon Test:- This is to make sure that the user is able to figure the icon easily.
- Hearing Disability Test:- This will make sure that people with disabilities can still use this applcation without any issues.
- Contact Test:- This will enable the user can directly contact the business or service provider so that they can have their issues resolved.
- Training Test:- This makes sure that the user is trained to use the application without making any costly mistakes.
- Color Requirement Test:- This test checks that the color scheme is consistent throughout the application.
- Font Test:- This test checks the consistency of font based on Title, Header, and description.
- Style Test:- This test checks that the style d is consistent throughout.
- Indoor Building Enviroment Test:- This makes sure that the application runs correctly when used in indoors.
- Outdoor Building Enviroment Test:- This makes sure that the application runs correctly when used Outdoor.
- Chatting Test:- This makes sure that the application runs correctly when using the chatting feature and that the messages are encrypted.
- App Weight Test:- This makes sure that the application is not too big in size.
- Updates Test:- This makes sure that the application regularly receives updates.
- Content Test:- This application makes sure that the things which are posted on the application does not hurt an individual or a community.

- User data Test:- This makes sure that the application follows all of the legal requirements for user data.
- Bank legal Test:- This makes sure that the application meets the bank legal requirements.

III Design

22 Design Goals

SV: Identify the important design goals that are to be optimized in the proposed design. Your text goes here . . .

23 Current System Design

*SV: **IF** the proposed new system is to replace an existing system, then the current system should be described here. Otherwise insert a brief statement that there is no pre-existing system.*

Your text goes here . . .

24 Proposed System Design

This section will make heavy use of class diagrams, and also sequence and deployment diagrams where noted. However don't overlook finite state, activity, communication, or other diagram types as needed for effective communication.

24a Initial System Analysis and Class Identification

SV: Perform grammatical and similar analyses to identify the most import and obviously needed classes, and to organize them into an initial class structure. An initial class diagram is appropriate, containing few if any internal details.

Your text goes here . . .

24b Dynamic Modelling of Use-Cases

SV: Insert sequence diagrams of (at least the most important) use-cases, as a means of identifying other needed classes.

Your text goes here . . .

24c Proposed System Architecture

SV: Identify the Software Architecture to be applied to this project, such as Client

Server, Repository, MVC, etc., along with justification for the choice.

Your text goes here . . .

24d Initial Subsystem Decomposition

SV: A slightly more detailed class diagram, showing the classes identified in sections 24a, 24b, and 0 above, partitioned into subsystems. For each subsystem provide a brief description of the subsystem, including its key responsibilities. There should still be few if any internal details.

Your text goes here . . .

25 Additional Design Considerations

SV: The sections listed here do not need to be presented in the order given, and may not all be relevant for any particular project. Those that are relevant can help identify additional classes that are needed as a result.

25a Hardware / Software Mapping

SV: This is particularly important for distributed systems, such as those employing a client-server architecture. Use a deployment diagram to indicate which subsystems are mapped onto which piece(s) of hardware, and what communication subsystems need to be added to the system as a result.

Your text goes here . . .

25b Persistent Data Management

SV: Document the classes and perhaps subsystems necessary to store persistent data when the system shuts down, and to restore that data when the system starts back up again.

Reiterate key data structures and information as necessary for the understanding of this design phase. Refer the reader back to the data dictionary in section ***Error! Reference source not found.*** *to avoid undue repetition, while reviewing only the most relevant items here.*

Your text goes here . . .

25c Access Control and Security

SV: Identify the access control and security concerns for this system, and the new classes and/or subsystems that must be added to handle those concerns.

Your text goes here . . .

25d Global Software Control

SV: Identify the global software control concerns for this system, and the new classes and/or subsystems that must be added to handle those concerns.

Your text goes here . . .

25e Boundary Conditions

SV: Identify the boundary condition concerns for this system, and the new classes and/or subsystems that must be added to handle those concerns. In particular consider startup, shutdown (normal or abnormal), and the creation and/or maintenance of any configuration files, databases, or similar supporting data files.

Your text goes here . . .

25f User Interface

SV: Include a preliminary user interface design here, possibly as a rough sketch or other mockup, in order to identify additional classes needed to implement the interface.

Your text goes here . . .

25g Application of Design Patterns

SV: Any design patterns applied as a result of previous sections should have been addressed there, and identified as such at the time. Use this section to document only the additional design patterns that were not previously covered elsewhere. (If any.)

Your text goes here . . .

26 Final System Design

SV: Include here the final version of the overall system design, incorporating all the subsystems and classes added as a result of additional design considerations. Multiple diagrams may be needed, possibly starting with an overall package diagram showing all the different subsystems and the (important) classes contained within each one. Still not a lot of internal details.

Your text goes here . . .

27 Object Design

This section documents the internal details of each class, to the extent that they can be designed at this time. Included should be the class interfaces (public method

signatures and responsibilities) and constraints. It is probably best to break this section up into subsections corresponding to subsystems as documented above, and/or by (Java) packages if those are designed. It may also be appropriate to address additional design pattern considerations here, but not to the point of being redundant of previous documentation.

Certain methods, such as simple getters, setters, and constructors are not always documented, unless there is something special about them such as in the Singleton or Factory Method design patterns.

27a Packages

SV: If the design involves assigning classes to packages (.e.g Java packages), then the packages to be created should be documented here.

Your text goes here . . .

27b Subsystem I

Your text goes here . . .

27c Subsystem II

Your text goes here . . .

27d etc.

Your text goes here . . .

IV Project Issues

28 Open Issues

SV: Issues that have been raised and do not yet have a conclusion.

Your text goes here . . .

29 Off-the-Shelf Solutions

SV: Discussion of products or components currently available that could either be incorporated into the new solution or simply used instead of developing (parts of) the new solution. The distinction between sections 35 a, b, and c is subtle, and not very important.

Your text goes here . . .

29a Ready-Made Products

SV: Products available for purchase that could be used either as part of a solution or instead of (a part of) a solution.

Your text goes here . . .

29b Reusable Components

SV: Similar to 35a, but for components such as libraries or toolkits instead of fully blown products.

Your text goes here . . .

29c Products That Can Be Copied

SV: Products that could legally be copied would typically be past projects developed by the same development group, provided there were no restrictions that would prevent their reuse.

Your text goes here . . .

30 New Problems

SV: The proposed new system certainly has its benefits, but it could also raise new problems. It is a good idea to identify any such potential problems early on, rather than being surprised by them later.

30a Effects on the Current Environment

SV: Could the new system have any adverse effects on the working environment, e.g. the way people do their jobs?

Your text goes here . . .

30b Effects on the Installed Systems

SV: Could the new system have any adverse effects on other hardware or software systems?

Your text goes here . . .

30c Potential User Problems

SV: Could the new system have any adverse effects on the users of the software? Could users possibly have a negative response to the new system?

Your text goes here . . .

30d Limitations in the Anticipated Implementation Environment That May Inhibit the New Product

SV: Are there any (physical) limitations in the expected environment that could inhibit the proposed product? (e.g. weather, electrical interference, radiation, lack of reliable power, etc.)

Your text goes here . . .

30e Follow-Up Problems

SV: Basically any other possible problems that could occur.

Your text goes here . . .

31 Migration to the New Product

SV: This section only applies when there is an existing system that is being replaced by a new system, particularly when data must be preserved and possibly translated / reformatted. Otherwise just write "Not Applicable" under section 38 and remove sections 38a and 38b.

31a Requirements for Migration to the New Product

SV: These are a list of requirements relevant to the migration procedures. For example a requirement that the two systems be run in parallel for a time until the client is satisfied with the new system and the users know how to use it.

Your text goes here . . .

31b Data That Has to Be Modified or Translated for the New System

*SV: This section specifically addresses **data** that must be preserved and/or translated / reformatted during the migration process.*

Your text goes here . . .

32 Risks

SV: Consideration of the potential risks that could cause the project to fail / underperform.

Your text goes here . . .

33 Costs

SV: An estimate of what it will cost to complete this project. Think not only in terms of

dollars, but also time, resources, lost opportunities, etc.

Your text goes here . . .

34 Waiting Room

SV: This is a place to record ideas or wishes that will not be included in the current release of the product, but which might be worth reconsidering at a later date.

Your text goes here . . .

35 Ideas for Solutions

SV: When developing requirements only, it is not the role of the business analyst to dictate the implementation of the solution. However they can pass along any ideas they have here as suggestions to the developers. For CS 440 this report includes system and object design, so this section would make suggestions for implementation and

testing that would come after design, such as the use of a particular language, IDE, library, or other tools.

Your text goes here . . .

36 Project Retrospective

SV: At the conclusion of the (CS 440) project, reflect back on what worked well and what didn't, and how the process could be improved in the future.

Your text goes here . . .

V Glossary

SV: The glossary is a more complete and inclusive dictionary of defined terms than that found in section I.7.a, the latter of which only covered the most important key terms needed to understand the report.

Your text goes here . . .

VI References / Bibliography

This section describes the documents and other sources from which information was gathered. This sample bibliography was generated using the "Insert Citation" and "Bibliography" buttons in the "Citations & Bibliography" section under the "References" tab of MS Word. Creating new citations will not update this list unless you click on it and select "Update Field". You may need

to reset the style for this paragraph to "normal" after updating.

[1] Robertson and Robertson, Mastering the Requirements Process.

[2] A. Silberschatz, P. B. Galvin and G. Gagne, Operating System Concepts, Ninth ed., Wiley, 2013.

[3] J. Bell, "Underwater Archaeological Survey Report Template: A Sample Document for Generating Consistent Professional Reports," Underwater Archaeological Society of Chicago, Chicago, 2012.

[4] M. Fowler, UML Distilled, Third Edition, Boston: Pearson Education, 2004.

VII Index

This section provides an index to the report. The sample below was generated using the "Mark Entry" and "Insert Index" items from the "Index" section on the "References" tab, and can be automatically updated by right clicking on the table below and selecting "Update Field". To

remove marked entries from the document, toggle the display of hidden paragraph marks (the paragraph button on the "Home" tab), and remove the tags shown with XE in { curly braces. }