Group Project Final Report

Group 6

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1.0 Executive Summary

Worldwide smartphones have become the most widely available and accepted platform for communication. The rapid changes in technology and user behaviour is transforming the payment industry. We want to create an application which lets users connect to their banks through their smartphones and have a one stop solution for all their personal finances, without having to worry about cyber or financial crimes. We noticed that there was a pit in the market, since till date no such application is available.

ComboPay is a financial application which will allow users to store their credit/debit cards and transactions/purchases. Also, it will have a section for users to view and manage their expenses. It will keep a track of who paid what and how much each person owes and is owed for group expenses as well. Lastly, in ComboPay we also have an electronic wallet to facilitate direct payment and money transfer.

To make sure our app is well accepted in the market and we meet and exceed the highest standards of our user's needs, we have created strategies that will enable us to reach out to all different groups of people out there nationwide and internationally. We will create an app which can be easily downloaded from all the three app stores; Apple App Store, Google Play Store and Windows store and is compatible with different operating systems as well. With this sort of launch, we want to capture the market and aim to be the most used financial management application.

2.0 System Proposal and Problem Statement

Project Name: ComboPay – the only financial management app you'll ever need

Background

In the constantly developing world of mobile applications, the average customer has at least 3 or more financial management apps on their phone. The list of financial management applications that are available on Android and iOS platforms is ever growing and with such high amounts of growth, the customers have too many options to choose from and confuses a customer. We are proposing ComboPay as a one-stop solution for all your financial management needs. The application we are proposing has 4 different sections:

- *Personal Finance Management:* View all your debit, credit card transactions in one place.
- *Personal Walle*t: Make payments from your mobile phone
- *Group Finance Management:* Split bills with friends, manage group expenses
- *Transfer Money:* Money Transfer capabilities between clients.

With this application, we want to target customers who have downloaded one or more apps that provide one or two of the above mentioned features, but not all of them. With an early and successful release, we are looking to capture a significant share of the market and will plan our growth from there on.

Project Objectives

ComboPay seeks to provide convenient and high-quality basic financial services. With our all-in-one design application, customers can easily access and manage their bank accounts, which includes transfer money, daily purchases or view balances. Meanwhile, the most significant feature is splitting the bill. ComboPay aims to be the best choice to share rentals with roommates, figure out the costs for a group vacation, and pay back a friend for a slice of pizza or other similar activities. Four major features can be summarized as follows:

- Organize various bank accounts, credit card, debit card, and more

- Keep track of different expenses

- Split bill and send money to a friend easily and quickly

- Notifications alert users for any changes or updates

- (US only) Settle up instantly with PayPal.

Project Assumptions

- The application will be compliant to federal and industry standards relating to mobile financial transactions.
- Customers have signed up for email or SMS alerts from their banks, as that will be our primary source to get personal financial information.
- Customers are using the application to transfer money within the United States. We can add an option for international money transfer later, but legally complicated to do right now.
- Can integrate with banks and credit card APIs for smoother transaction processing.

Deliverables

Features	Descriptions	Dependency	Due Date
MANAGE ACCOUNTS	Multiple financial accounts managed in one place	The first developed feature	3/16/2017
BUDGET BETTER	Budgets for expenses filtered by types & categories	Build upon the ELECTRONIC WALLET feature	3/18/2017
DATA VISUALISATION	Use graphics (pie chart & line chart) to picture the cash flows	Build under the SHARED EXPENDITURES feature	3/20/2017
SHARE EXPENDITURES	Auto-calculation of the shared amounts and free ways to send money	Build under the RECORD EXPENDITURES feature	3/20/2017
RECORD EXPENDITRUES	Enter and label the daily expenses	Build after the BUDGET BETTER feature	3/22/2017
ELECTRONIC WALLET	Transfer money from bank accounts into the app or link to PayPal	Build after the MANAGE ACCOUNTS feature	3/22/2017
ATM LOCATIONS	Locate the nearest ATM branches for money withdraw	Build after the DATA VISUALISATION feature	3/24/2017
STAY SECURED	Users data encryption technology deployed to keep bank accounts and confidential information safe	The last feature, build after the ATM LOCATIONS feature	3/26/2017

Scope

- Friendly user interface with quick tutorials for first time users.
- The application will intelligently scan the users' text messages for bank alerts, promotional offers or any biz messages and divide them as per the general categories.
- Option to backup their data on the cloud and delete text messages from banks if they wish.
- Option to add or delete certain entries manually for a better transparency.
- Collect data and convert it into useful information with visually appealing results.
- Ability to facilitate real-time P2P (Peer to Peer) money transfer to bank accounts using only debit cards.
- Allow users to transfer money in US currency only within the country.
- The application will run on Android 4.0, iOS 8 and Windows 10 version of Smartphones and above.
- Users will be able to view their spending's and expenses even without an Internet connection. However, the feature to transfer money and make online bill payments.
- Password protection would be provided as an additional feature for the app so that the users can safeguard their data.

Out of Scope

- The application will only scan text messages from businesses and no personal messages will be read.
- The application will not require users account numbers and IFSC codes to transfer money and will make the transfers using only debit cards and not credit cards.
- An option to convert currency and transfer money internationally would be legally complicated and not feasible to be implemented right now.
- A standalone desktop application won't be developed but the users can browse their app details on the ComboPay web portal

Project Success Criteria

- The desired features mentioned for the app should be covered
- The app should be cost effective without having to compromise the quality and usage
- The app should be secure since the app is related to transactions and finances
- The software testing group should be able to successfully test and run the app
- All the stages of the project should be completed within the specified time period

Project Stakeholders

CEO
Lead and oversee all the implementation and take management decisions
To communicate effectively with the government authorities, shareholders, employees.

CFO
To sponsor the project and approve the project charter.

Program Manager
To approve the operational productivity and coordinate between the teams involved

Project Manager
Responsible for initiating and delivering the project by meeting all stakeholder needs.

Marketing Manager
Will be responsible for managing sales force, marketing and advertising product

Customer Service
Responsible for handling customer queries and account information.

User
Use the application, provide feedback and reviews

Lead Programmer
To code, integrate, test, debug codes and make an interactive website for optimization of business

Software tester
To test the app under various environments and conditions to make sure that your app isn't released with major bugs or crashes

Data Analyst
To interpret data, analyze results using statistical techniques and make reports.

3.0 Requirements Definition

Functional Requirements

- The mobile application will be available to download for free across iOS and Android platforms.
- The application will require users to sign in with an active email address, which will be verified by a separate email.
- The application will require users to provide their cell phone number, which will be verified by a one-time password.
- The application should be able to accept any 16 digit credit/debit card for payment processing with an expiration date no later than the present day.
- Users should be able to add other users as “Friends” and then be able to create groups of minimum 3 and maximum 20 users.
- The users should be able to record expenses of their own for personal transaction history.
- The users should be able to add shared expenses, that can be split equally, or custom split if the user chooses. The equal split cannot have a difference of more than $0.01 between users.

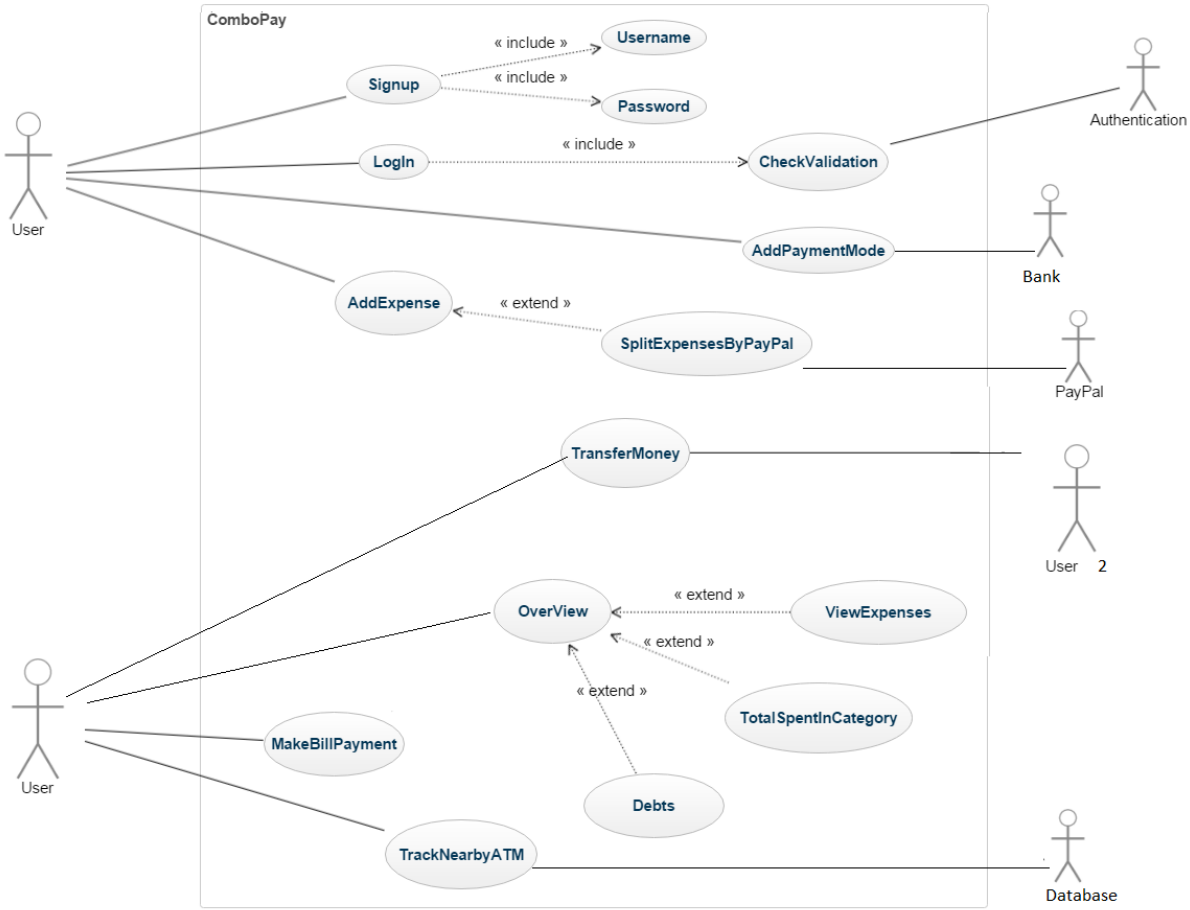
Non-functional Requirements

- All users’ transaction and financial data must be stored in a secure database with encryption standards in accordance with FIPS 46-3.
- The app non-response time should not be more than 10 seconds, after which it needs to force stop and reboot.
- The application design should be in the new “block” shaped design for both iOS and Android, with ease of access within and between all 4 sections.
- The application should be able to fetch data from the users’ email and text messages from banks, if user provides access to these, and update the transaction history in the application database.
- The application should be able to map location, if the user provides access to location services, and then be able to fetch the nearest ATMs within a 5-mile radius from services dataset.
- The application should be able to plug-in with PayPal API to offer financial transactions between 2 parties (users).
- The application should not run in background once user closes it to avoid excessive battery use.

4.0 Behavioural Models

Use Cases:

Use Case Diagram



Use Case Name:	Case 1 - Signup
Primary Actor:	User
Brief Description:	The user has to sign up to use the functionality of ComboPay application
Stakeholders:	*User*
Trigger:	*The user clicks on the Sign up option upon starting the application*
Normal flow of events:	The user enters his desired sing up id, chooses his password and backup mail
Subflows:	*User enters the data and completes the sign up process*
Alternate/Exception flow:	*User can use the sign-in through Facebook/Gmail option*

Use Case Name:	Case 2 - Login
Primary Actor:	User
Brief Description:	The user logins on the home screen by entering his login credentials to get into the main menu
Stakeholders:	*User*
Trigger:	*The user clicks on the login button on to get into the main menu*
Normal flow of events:	The user enters his credentials to get into the Main menu of the app
Subflows:	
Alternate/Exception flow:	*User must click on the Forgot password link to generate a new login password*

Use Case Name:	Case 3 - AddPaymentMethod
Primary Actor:	User
Brief Description:	The user can enter the different card details through which he can make future payments using the application
Stakeholders:	*User, Bank, Paypal*
Trigger:	*The user clicks on the Add payment method option to enter the card/Paypal details*
Normal flow of events:	The user enters his desired the card details alongwith the CVV and the Expiry date
Subflows:	*The user has to enter the OTP code obtained on his phone to verify the access*
Alternate/Exception flow:	*User can add multiple cards to his account*

Use Case Name:	Case 4 – AddExpenses
Primary Actor:	User
Brief Description:	The user can his/her expenses and categorize it based on his spendings
Stakeholders:	*User, Paypal*
Trigger:	*The add expense button lets the user add new expenses to his account*
Normal flow of events:	The user adds the amount of expenses and then categorizes selecting the wide variety of options available
Subflows:	*The user has the option to edit/delete previous entries*
Alternate/Exception flow:	*User can add an expense and split it amongst his friends*

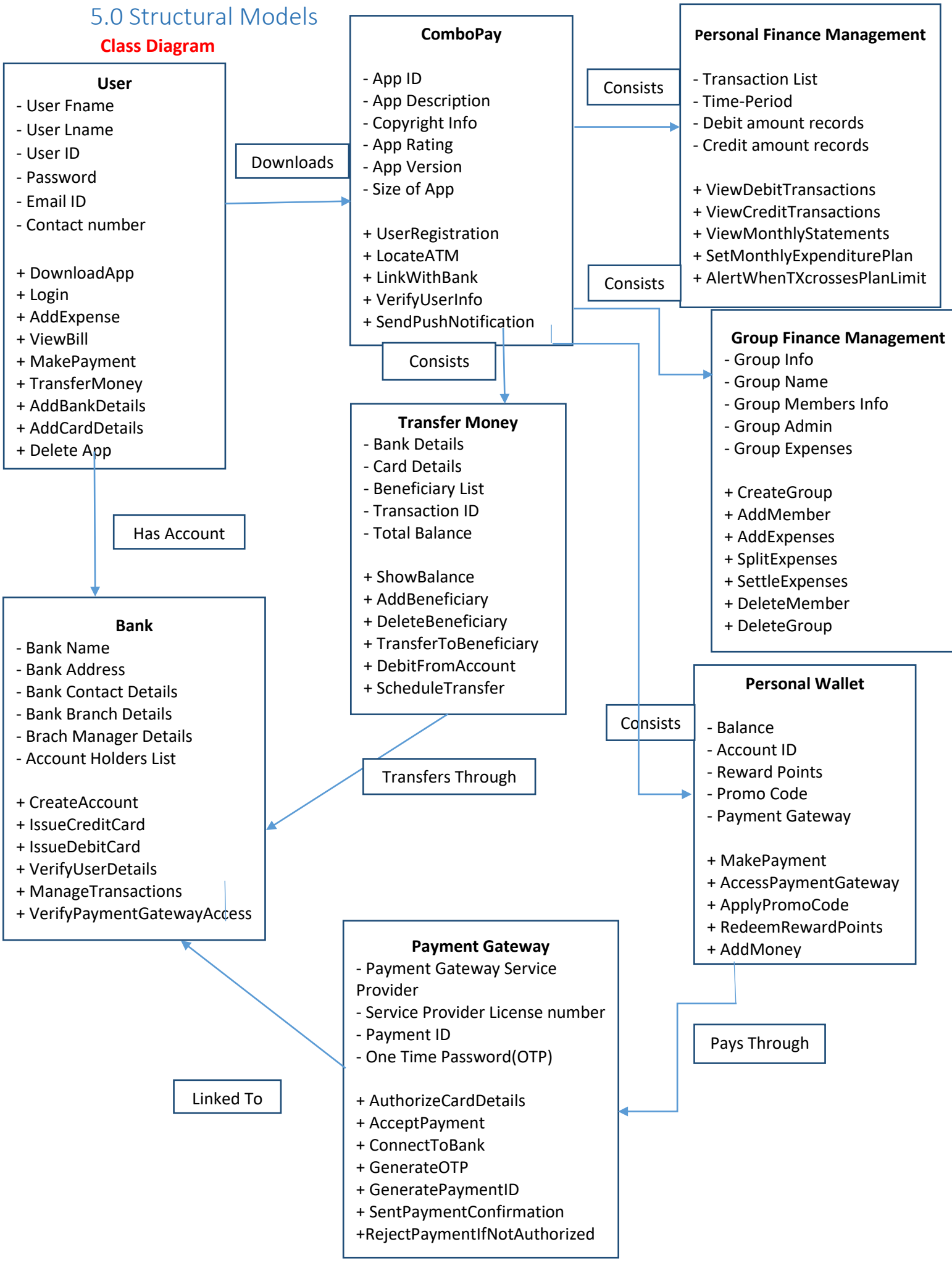
Use Case Name:	Case 5 – MakeBillPayments
Primary Actor:	User
Brief Description:	The user can make his monthly bill payments for Phone, Internet and DTH directly through the app
Stakeholders:	*User, Fellow members of the group*
Trigger:	*Pay bills option lets the user pay the bill*
Normal flow of events:	The user is able to select the mode of payment and make a timely payment of bills
Subflows:	*The user will also get a timely reminder of his/her due bills*
Alternate/Exception flow:	*User will get an Error message if the Bill payment dosent go through*

Use Case Name:	Case 6 – TrackNearbyATM
Primary Actor:	User
Brief Description:	The user can use his GPS position to track the location of the nearest ATM
Stakeholders:	*User, Database administrator, Maps*
Trigger:	*Click on the track ATM button to get the location of the nearest ATM*
Normal flow of events:	The user can use the location of his/her device to get the list of ATMs' in the surrounding region
Subflows:	*The user can select the Maps navigation using the integrated application*
Alternate/Exception flow:	*Users will get a message if there is no Nearby ATM within 2 miles of the user*

Use Case Name:	Case 7 – TransferMoney
Primary Actor:	User
Brief Description:	The user can transfer money to his friends using just their email
Stakeholders:	*User, User 2, Bank*
Trigger:	*Click on the transfer money option to transfer money to the recipient*
Normal flow of events:	The user can enter the amount and the recipient to whom the money must sent
Subflows:	*The User can select the recipient and the date of transfer of money*
Alternate/Exception flow:	*The user will get an error message if he/she enters an invalid email id*

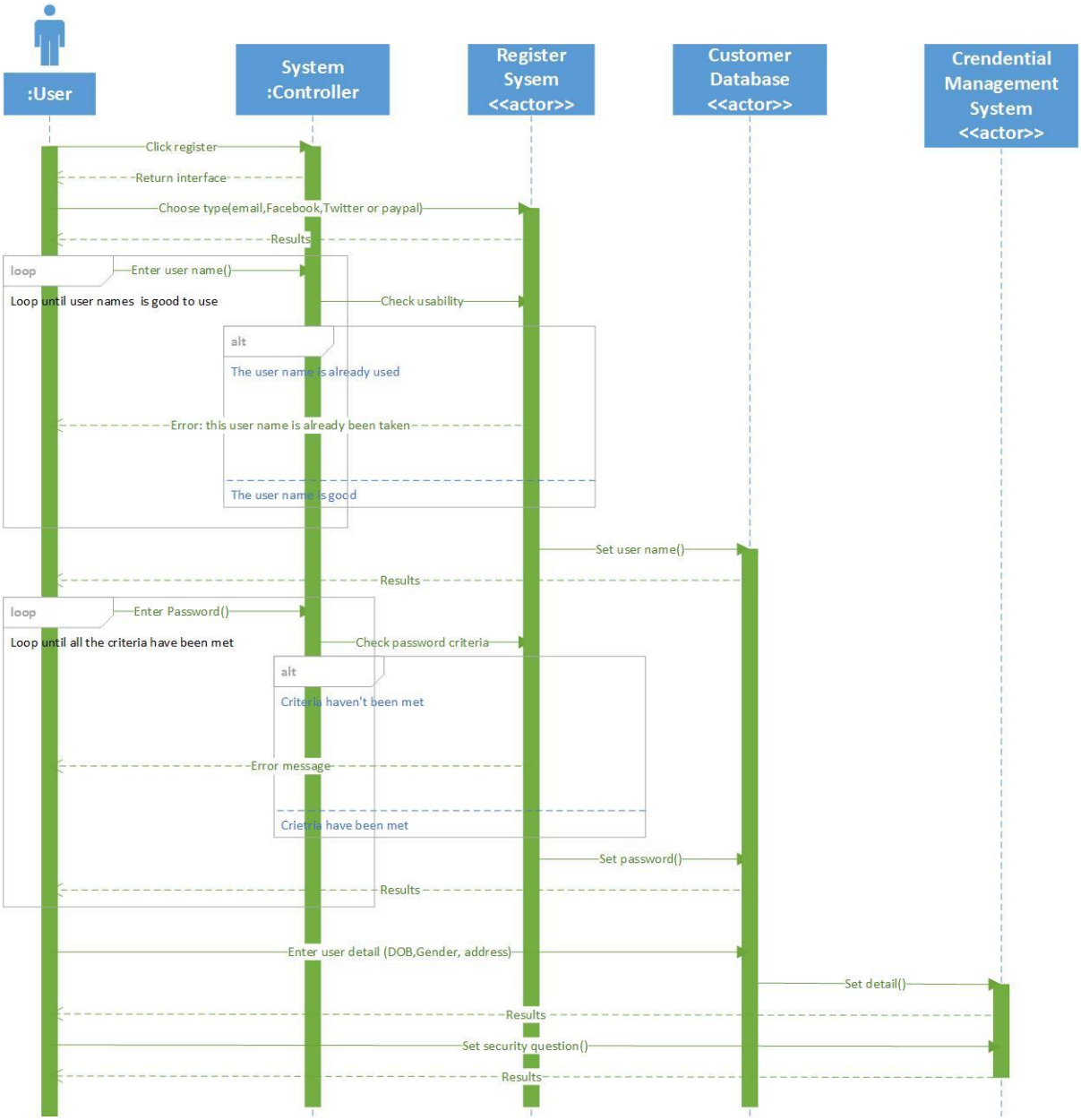
5.0 Structural Models

Class Diagram

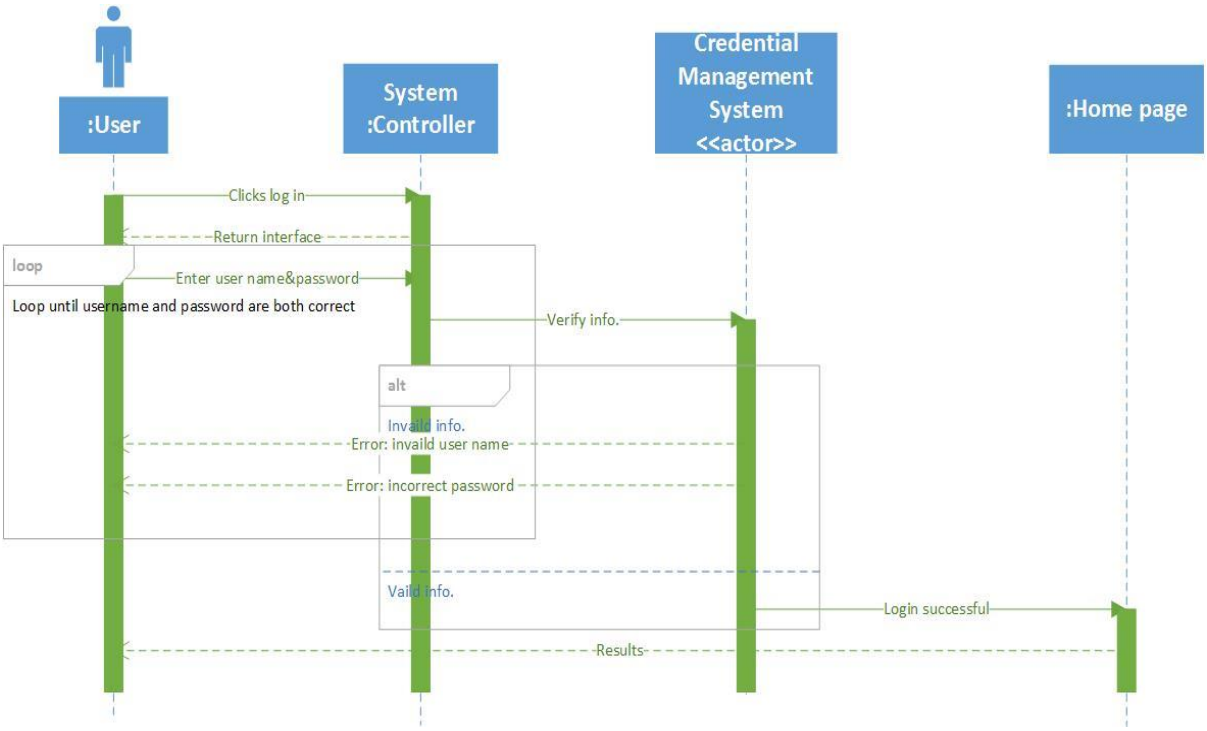


6.0 Dynamic Models

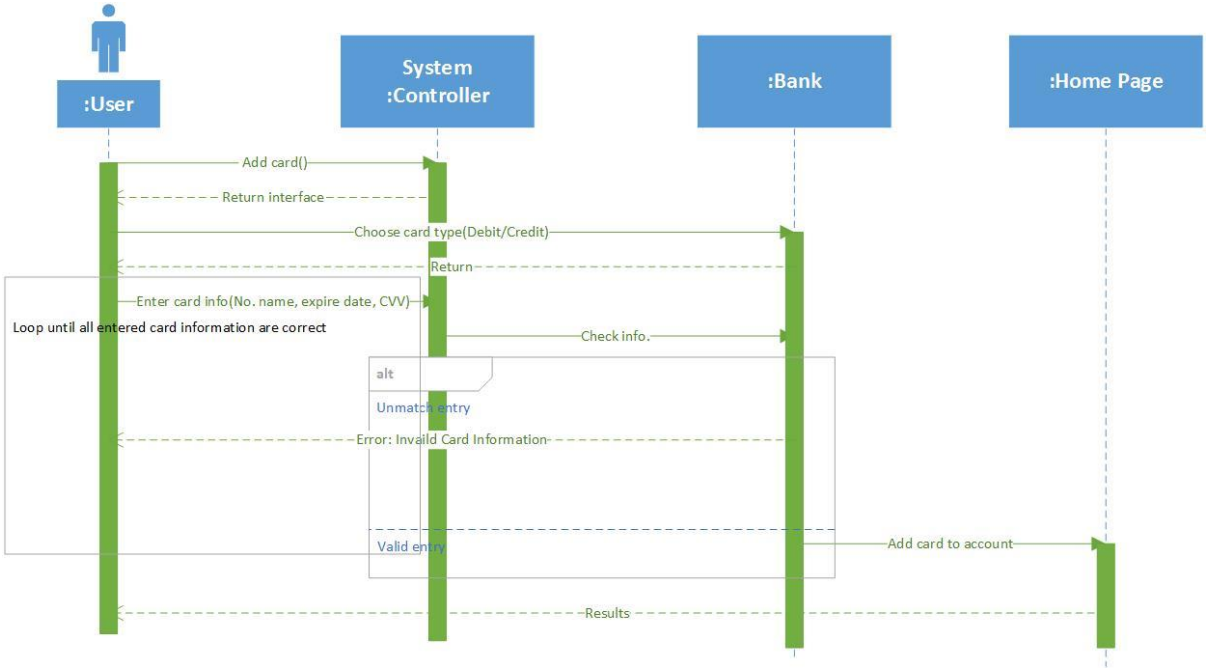
Sequence Diagrams



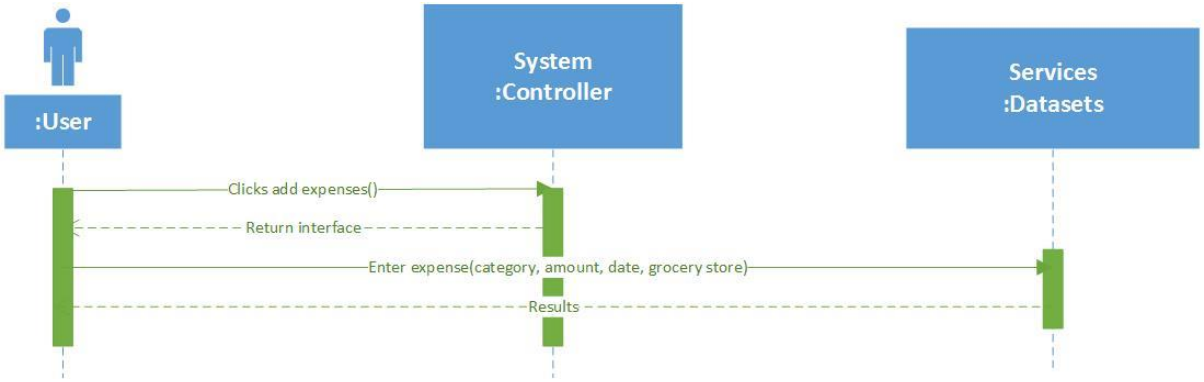
SignUp


:User
System
:Controller
Credential
Management
System
<<actor>>
:Home page
Clicks log in
Return interface
loop
Enter user name&password
Loop until username and password are both correct
Verify info.
alt
Invaild info.
Error: invaild user name
Error: incorrect password
Vaild info.
Login successful
Results

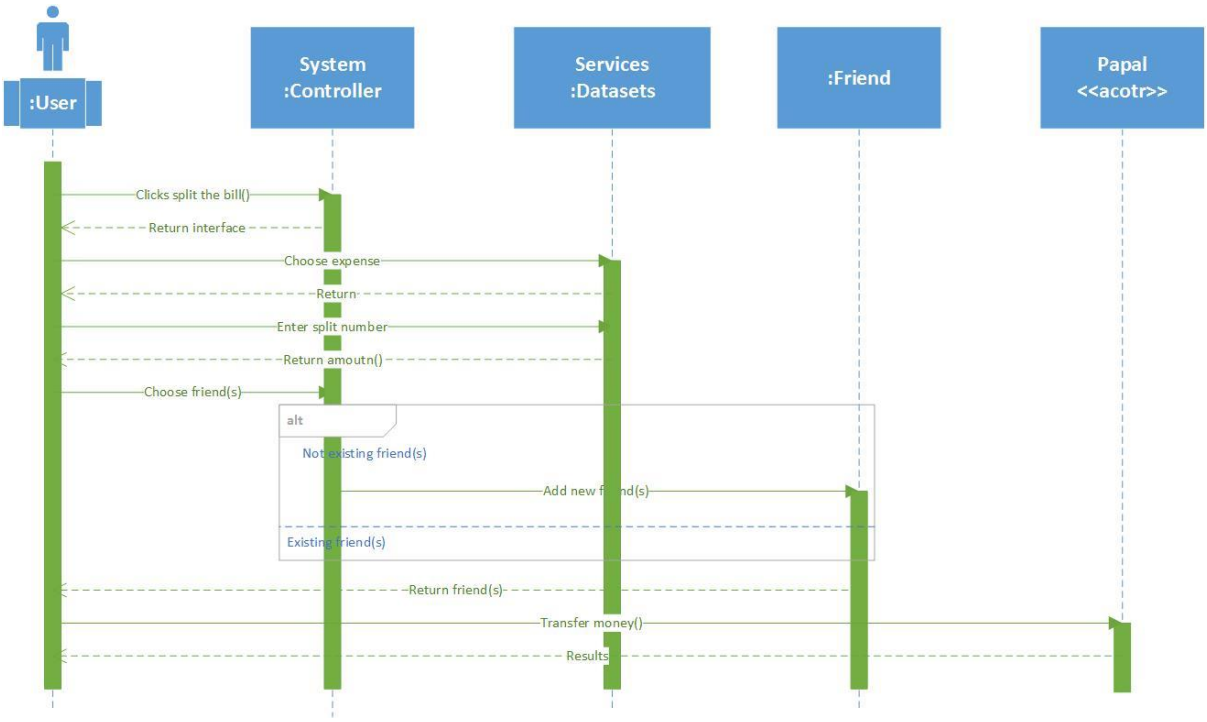
LogIn



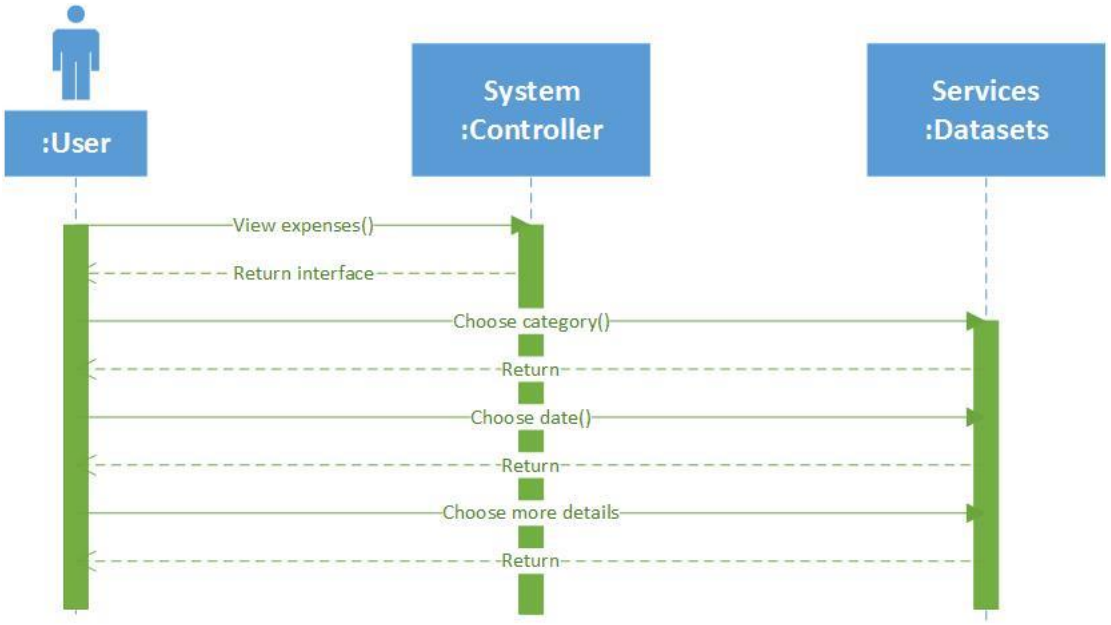
AddPaymentMethod



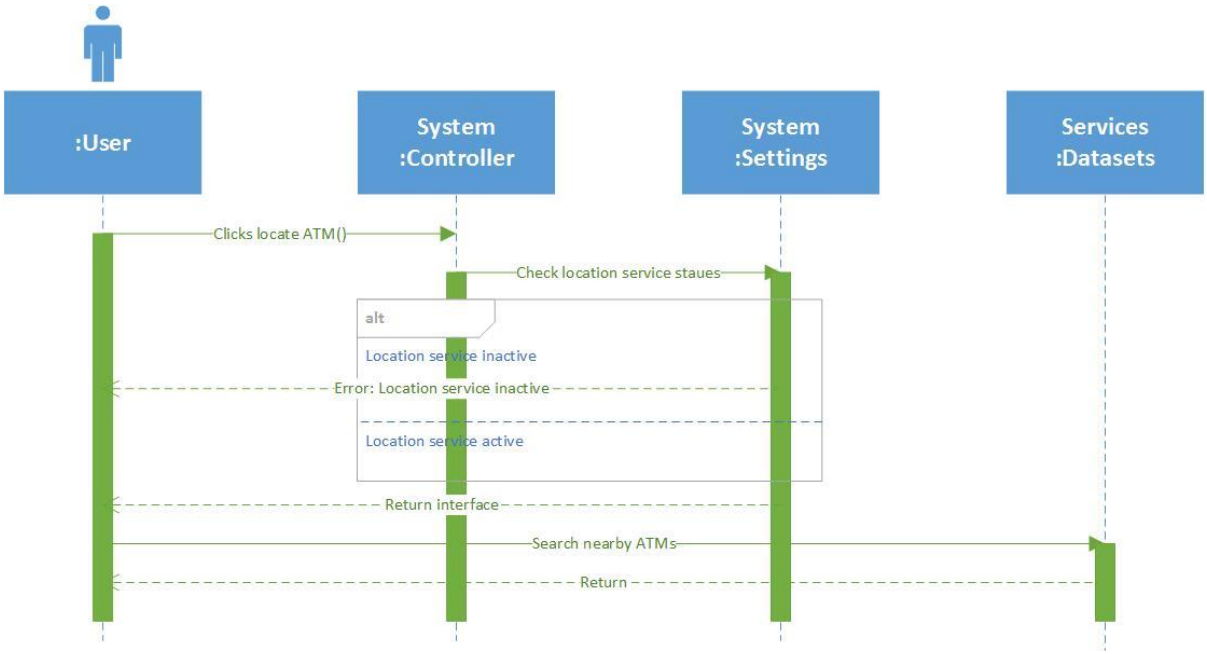
AddExpense



TransferMoney



MakePayment



TrackNearbyATM

7.0 Design Documents

Software design (method constructs used for ComboPay)

Method Name: verifyLogin	**Class Name:** User
Description of responsibilities: The ability of allowing an existing user to log in his/her ComboPay account	
Arguments Received: userName Password	**Data Type:** username: String password: String
Return Value: loginResult	**Data Type:** Boolean
Message and Example: verifyLogin(userName, password): Boolean loginResult = verifyLogin("jeanlee", "Abc#123")	

Algorithm Specification:
 	
check for valid login id and password
If userName is not null or spaces and password is not null or spaces then
Retrieve login id and password from database
--Check for valid login id
If valid login id
--check for valid password
If valid password
Return true
Else return false
Else
Return false
End if
Else
Return false
End if	

Method Name: addCard	**Class Name:** Bank
Description of responsibilities: The ability of users to add one or multiple band cards to their accounts.	
Arguments Received:	**Data Type:**

nameOnCard cardNumber expirationDate cvvCode	nameOnCard: String cardNumber: String expirationDate: String cvvCode:Integer
Return Value: cardResult	**Data Type:** Boolean

Message and Example:

addCard(nameOnCard, cardNumber, expirationDate, cvvCode) : Boolean

cardResult = addCard ("John Dover", "5463,8765,0987,1687", "12/20", 574)

Algorithm Specification:

```
check for valid card information: name, card number, expiration date and cvv
If nameOnCard is not null or spaces and cardNumber is not null or spaces and
expirationDate is not null or spaces and cvvCode is not null or spaces, then
    Retrieve card informamtion from bank database
    --Check for valid nameOnCard
    If valid nameOnCard
     --check for valid cardNumber
       If valid cardNumber
         Check for valid expirationDate
          If valid expirationDate
             Check for valid cvvCode
              If valid cvvCode
         Return true
        Else
           return false
End if
   Else
        Return false
End if
    Else
        Return false
End if
    Else
         Return false
   End if
```

Method Name: scheduleTransfer	**Class Name:** Transfer

Description of responsibilities:

Implement the necessary behavior to preschedule a payment on a regular basis to avoid delay fees or penalties.

Arguments Received:	**Data Type:**
transferDate transferAmount beneficiary description cardNumber	transferDate: String transferAmount: Double beneficiary: String description: String cardNumber: String
Return Value:	**Data Type:**
scheduleStatus	Boolean

Message and Example:

Example 1:

scheduleTransfer (transferDate, transferAmount, beneficiary, description, cardNumber) : Boolean

scheduleStatus = scheduleTransfer("05/12/2017", 347.89, "AAA", "Monthly Auto Insurance Payment", "4678,6753,5467,1908")

Example 2:

scheduleTransfer (transferDate, transferAmount, beneficiary, cardNumber): Boolean

scheduleStatus = scheduleTransfer("03/17/2016", 129, "TXU", "7835,7392,7362,1224")

Algorithm Specification:

```
check for valid transferDate, transferAmount, beneficiary, description, cardNumber
If transferDate is not null or spaces and transferAmount is not null or spaces and beneficiary is not null or spaces and cardNumber is not null or spaces then
    Retrieve transferDate, transferAmount, beneficiary, cardNumber from database
    --Check for valid transferDate
    If valid transferDate
     --check for valid transferAmount
       If valid transferAmount
         Check for valid beneficiary
           If valid beneficiary
             Check for valid cardNumber
               If valid cardNumber
            Return true
          Else
    return false
   End if
    Else
          Return false
    End if
Else
```

```
    Return false
  End if
  Else
    Return false
End if
```

Method Name: splitExpenses	**Class Name:** GroupFinanceManagement
Description of responsibilities: The ability of users to share expense with friends, whoever has a ComboPay account	
Arguments Received: contacts totalAmount count	**Data Type:** contacts: String totalAmount: Double count: Integer
Return Value: result	**Data Type:** Boolean

Message and Example:

splitExpenses (contacts[], totalAmount, count(contacts)): Boolean
result = addOrder(contacts[“Sarah”, “Emma”, “Anna”, “Bill”], 200, count(contacts[“Sarah”, “Emma”, “Anna”, “Bill”]))

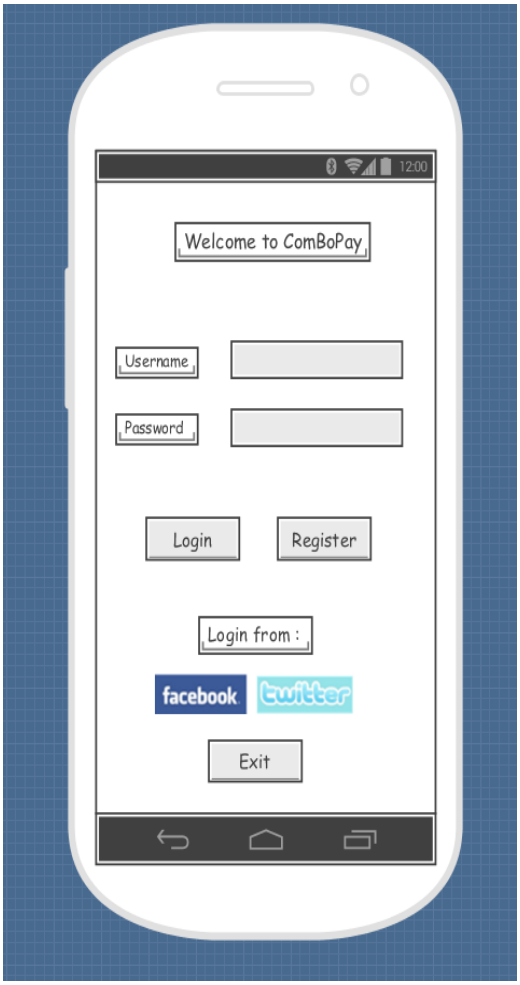
Algorithm Specification:

```
check for valid contacts, totalAmount and count
If contacts are not null or spaces and totalAmount is not null or spaces and count is not null or spaces then
      Check for valid contacts
      If valid contacts
       --check for valid totalAmount
          If valid totalAmount
            Check for valid count
              If valid count
             Return true
           Else return false
End if
      Else
            Return false
      End if
 Else
    Return false
 End if
```

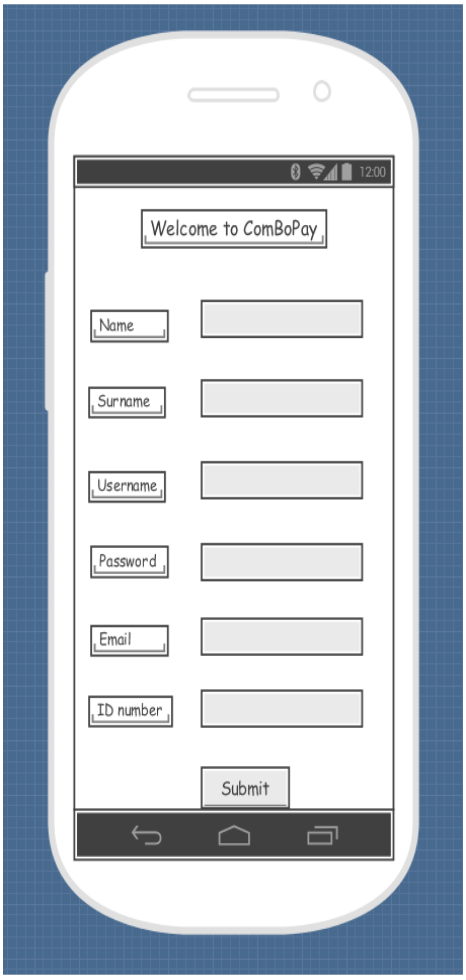
User Interface

The ComboPay application will have an app support for Android as well as iOS and the interface would look like shown below

The Login page



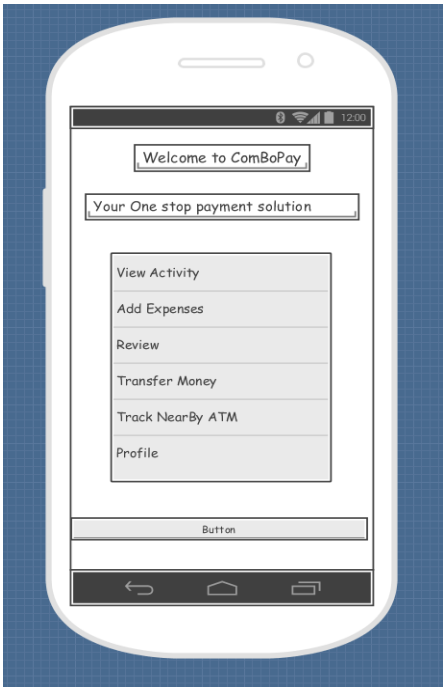
Signup page



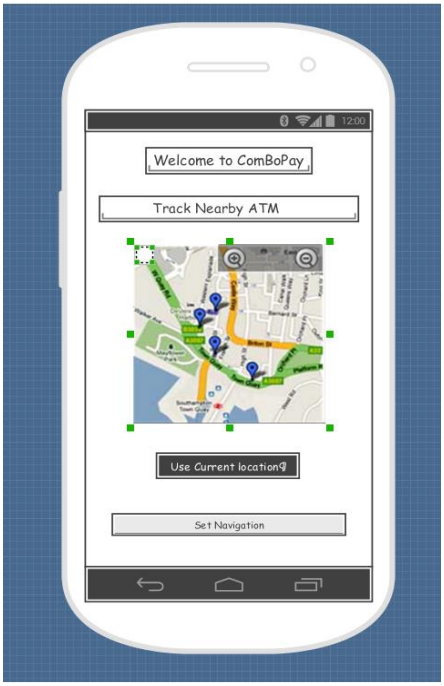
Through the login page the user of the ComBoPay app can select his preferred login method and enter the Main menu of the application

New users of the application can register on the application by entering their details and proceed with the usage of the application

The Main Menu



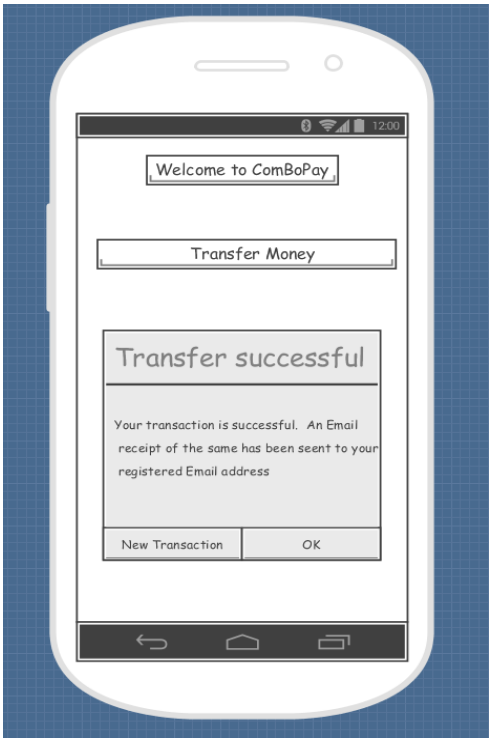
Track nearby ATM



Main menu - The main menu has all the diverse options provided by the ComboPay app. It consists of features like View activity, add expenses, review expenses, transfer money, track nearby ATM and the final option to edit the current user's profile.

Track nearby ATM – One of the standout feature of the application is the ability to track the nearby ATM's based on the location of the user

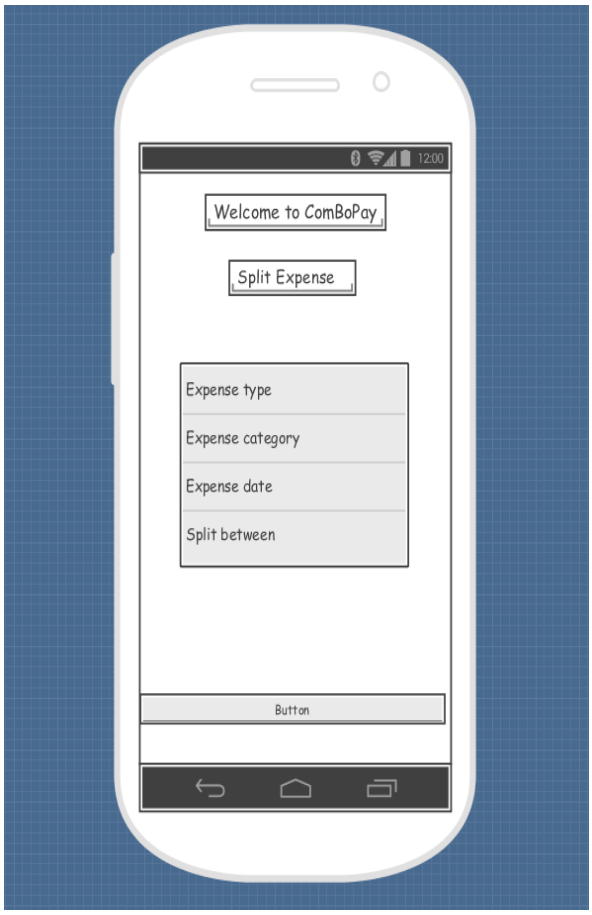
Transfer Money

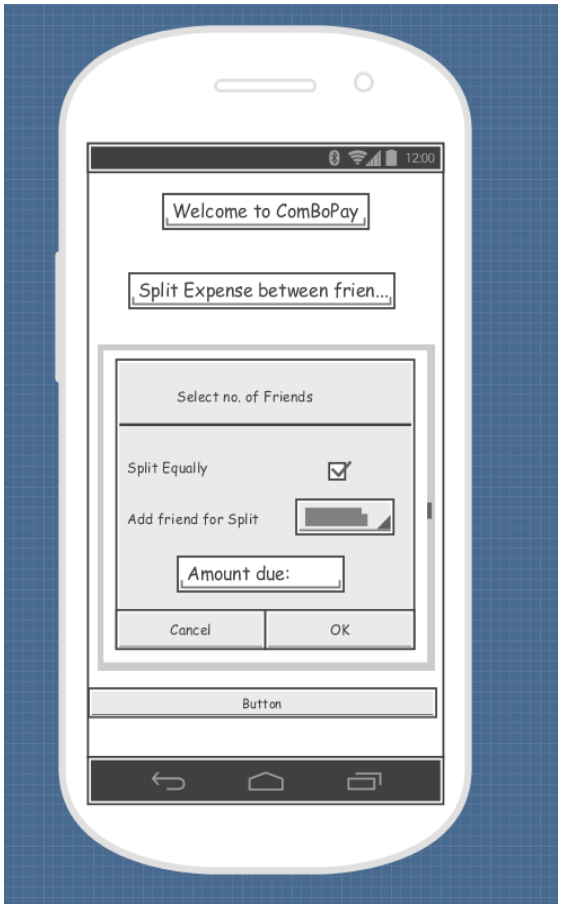


The transfer money is another standout feature of the ComboPay application. It lets the user select the transfer target, the transfer type, the method through which the transfer can be made, the authentication method to make the app more secure and the memo to keep a track of the transactions.

The next stage of transfer money feature gives the status of the transfer request to the user. It lets the user make a new transfer or go back ok the main menu of the application.

Split Money





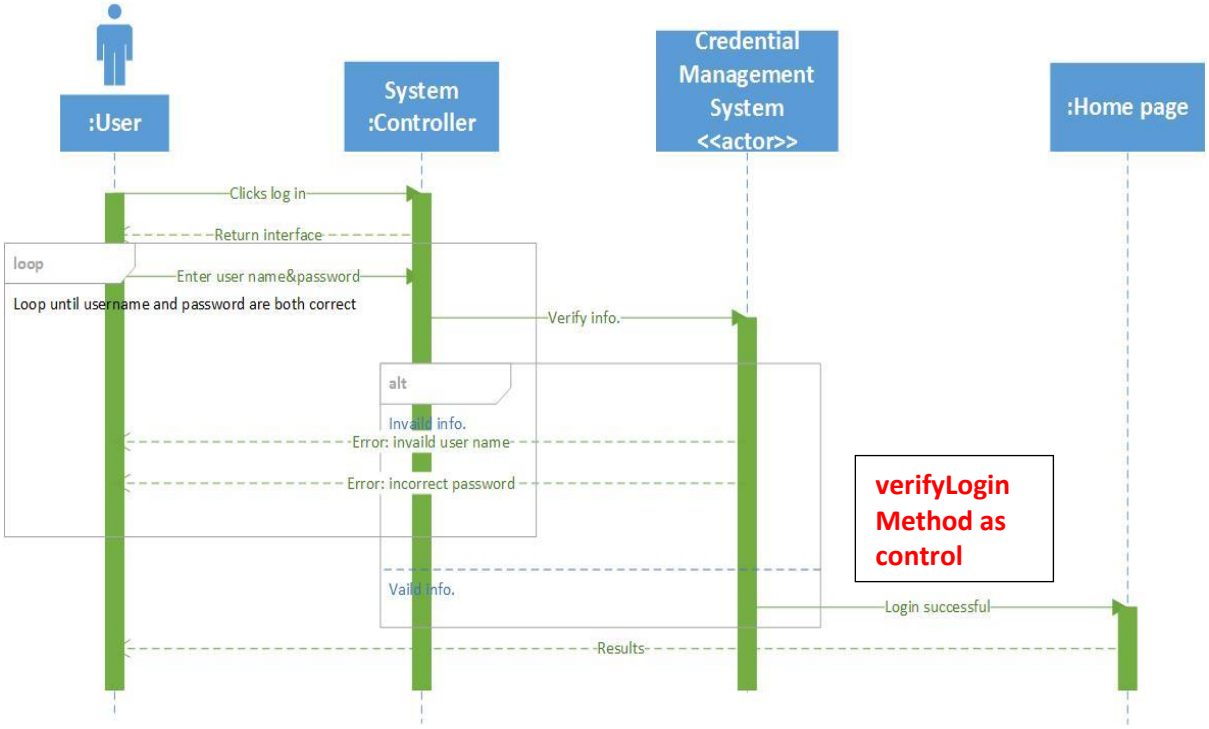
The Split Expense option of ComboPay lets the user split his/her expenses between the friends or between a group. The user can select the Expense type the category, the date of the expense and select the no of people between whom they want to split the expense. Upon splitting, the user can find out which person is due how much amount.

Control objects

1. System Boundaries: The application boundary wil be clearly defined when it comes to financial transactions. When it interacts with Paypal or other such external system, the boundary limits the transaction from being recorded until a confirmation of transaction is received from external source with a valid transaction ID. The application itself will not be in charge of deciding the transfer amount, the conditions or provide any indications of credit card numbers. This will all be externally validated. In this case, the external system itself along with the system boundary is a control entity to avoid transaction fraud. System boundaries can also be defined at logical levels like login, credit card storage, expense manager, ATM finder to make the application more secure, and by segmenting the database in different systems, we can define better security controls to confidential data. In this way, system boundaries themselves will act as control objects internally.

2. verifyLogin: the verifyLogin method is an entry control and helps to avoid fraudulent/malicious activity. Only an active, registered user can pass through the gateway and view their own system. It carries out checks for user id and password match, and can reset password for users after 3 failed tries to ensure security controls.

3. Method Specifications: Control objects can also be a part of a method, to allow a 2-step security process. For eg, when we run the addCard method, it checks if the credit card entered is a valid 16-digit number, cross-checks the cvvCode and the zip code with the credit card company database, checks the expiry date validity and only after performing these checks will we update the database with a new card. These controls have been pre-defined by banks and financial institutions to avoid fraudulent activity, and so can be easily implemented across the platform, keeping in line with FICO guidelines.


:User
System :Controller
Credential Management System <<actor>>
:Home page
Clicks log in
Return interface
loop
Enter user name&password
Loop until username and password are both correct
Verify info.
alt
Invaild info.
Error: invaild user name
Error: incorrect password
Vaild info.
Login successful
Results
verifyLogin Method as control

8.0 Testing

The everchanging Mobile Technology has transformed the way people use their mobile phones. Demand for mobile apps is growing rapidly, and therefore it's important to emphasize on creating strategies and roadmap before implementing the application. It is also important to build an application having the required features and functionality and at the same time is beneficial to the app user. However, it is even more crucial to have a meticulous testing plan before the mobile application is implemented.

The type of testing that we will be using for our App is Functional and Non-Functional test.

Functional Test Cases:

- Test Case 1: *User Login Successful*
  This test is run to verify the user login. When the user enters the correct username and password the user should be able to login successfully.
- Test Case 2: *User Login Fail*
  This test is run to check the alert the user gets after an unsuccessful attempt at login. The user should not be able to login into the app if an incorrect combination of username and password is entered and an error message should be shown saying 'the username or password is incorrect'.
- Test Case 3: *Search Functionality*
  This test is run to whether the search function is working. The user should be able to navigate through the app using the search option.
- Test Case 4: *Registration Field*
  This test is run to verify the registration option in the app. First time users should be able to register after filling out the required details. An error message should be shown if something does not match the required details. For example, characters like '@', '$' not allowed in the username, or the password should not be less than 6 characters.

Non-Functional Test Cases:

- Test Case 1: *OS Compatibility*
  This test is run to verify the compatibility of our app with various OS like iOS and Windows. The user enters should be able to view the app without any distortions or lags in all the operating systems.
- Test Case 2: *Search Functionality Lag*
  This test is run to check the alert the lag time in different searches or when the user moves from one page to another. For example, the if a user moves from Personal Wallet to Group Finances, the results should be displayed within 5 seconds.
- Test Case 3: *Load Testing*
  This test is run to check how much load can our system bear at once. Multiple users should be able to login and use the app successfully at the same time. There should not be any delay in the application to handle the load.
- Test Case 4: *Display Size*
  This test is run to verify whether the home page is displayed without any distortions on different display sizes. The application should be consistent in terms of item placing on different display sizes.

9.0 Project Management Documents

Project Plan & Meeting Minutes

Meeting/Project Name:	Project Proposal Memo		
Date of Meeting:	01/26/17	**Start time:**	07:00pm
Location:	Jsom MBA Lounge	**End time:**	08:00pm
		Minute taker:	60min

1. Meeting Objective(s)

Discuss topic of project

2. Attendance

Present			**Apologies**
Aditya Thakur			Abhidha Arya
Devashish Shirolkar			
Youqi Zhao			
Kuan Ying Chen			

3. Agenda, Decisions, Issues

Topic/ Discussion notes	**Discussion led by**
Disscuss and exchanged several ideas of useful applications that are technology feasible and are useful for the modern society.	
Decisions of making the personalized financial services application, came up with name and started on the memo	Aditya, Devashish

4. Action Items

Action	**Responsible**	**Due Date**
After some research, we have identified the necessity for a personalized financial services application which we name it “ComboPay”. It provides a one stop solution for all personal finances.	Team	01/30/17

5. Next Meeting

Date:	02/02/17	**Time:**	7:00pm	**Location:**	Jsom MBA Lounge
Objective(s):	**Project Initiation and Planning**				

Meeting/Project Name:	Project Initiating and Planning		
Date of Meeting:	02/09/17	**Start time:**	07:00pm
Location:	Jsom MBA Lounge	**End time:**	08:00pm
		Minute taker:	60min

1. Meeting Objective(s)

Develop project charter and scope statement

2. Attendance

Present			**Apologies**
Aditya Thakur			Abhidha Arya
Devashish Shirolkar			
Youqi Zhao			
Kuan Ying Chen			

3. Agenda, Decisions, Issues

Topic/ Discussion notes	**Discussion led by**
Go over the project initiation and planning overview and requirements	
Develop Systems proposal and assigned work between team members	

4. Action Items

Action	**Responsible**	**Due Date**
1.Title Page	Abhidha	02/20/17
2. Executive summary and a problem (Opportunity) Statement	Abhidha	
3.Project charter and scope statement	Aditya , Devashish , Youqi	
4.Work Breakdown Structure		
5. Meeting minutes for all team meetings	Kuan Ying	

5. Next Meeting

Date:	02/18/17	**Time:**	7:00pm	**Location:**	Jsom MBA Lounge
Objective(s):	**Project Initiation and Planning**				

Meeting/Project Name:	Project Initiating and Planning		
Date of Meeting:	02/18/17	**Start time:**	07:00pm
Location:	Jsom MBA Lounge	**End time:**	08:30pm
		Minute taker:	90min

1. Meeting Objective(s)

Discuss and go through all work have done by each person for the Project Initiation and Planning

Add/remove/edit any information

2. Attendance

Present			**Apologies**
Aditya Thakur	Abhidha Arya		
Devashish Shirolkar			
Youqi Zhao			
Kuan Ying Chen			

3. Agenda, Decisions, Issues

Topic/ Discussion notes	**Discussion led by**
Discussed through several ideas of useful applications that are technology feasible and are useful for the modern society.	
Decisions of making the financial services application	Aditya, Devashish

4. Action Items

Action	**Responsible**	**Due Date**
1.Title Page	Abhidha	02/20/17
2. Executive summary and a problem (Opportunity) Statement	Abhidha	
3.Project charter and scope statement	Aditya , Devashish , Youqi	
4.Work Breakdown Structure		
5. Meeting minutes for all team meetings	Kuan Ying	

5. Next Meeting

Date:	03/31/17	**Time:**	7:00pm	**Location:**	Jsom MBA Lounge
Objective(s):	**Analysis**				

Meeting/Project Name:	Analysis		
Date of Meeting:	03/31/17	**Start time:**	07:00pm
Location:	Jsom MBA Lounge	**End time:**	08:30pm
		Minute taker:	90min

1. Meeting Objective(s)

Discuss and go through all work that are required to be done by each person for the Analysis part.

2. Attendance

Present			**Apologies**
Aditya Thakur	Abhidha Arya		
Devashish Shirolkar			
Youqi Zhao			
Kuan Ying Chen			

3. Agenda, Decisions, Issues

Topic/ Discussion notes	**Discussion led by**
Discuss and break down the work for each person in group	group
Complete the 6 analysis activities	group

4. Action Items

Action	**Responsible**	**Due Date**
1.Title Page and table of contents	Devashish	04/03/17
2. Simple Requiremtns Document	Devashish	
3. Use Case diagram and Use case descriptions	Aditya , Kuan Ying	
4. Class diagram	Abhidha	
5. Sequence diagram	Youqi	
6. Meeting minutes for all team meetings	Kuan Ying	

5. Next Meeting

Date:	04/14/17	**Time:**	7:00pm	**Location:**	Jsom MBA Lounge
Objective(s):	**Design**				

Meeting/Project Name:	Group Project Milestone 4 - Design		
Date of Meeting:	04/14/17	Start time:	07:00pm
Location:	Jsom MBA Lounge	End time:	08:30pm
		Minutetaker:	90min

1. Meeting Objective(s)

Discuss and go through all work that are required to be done by each person for Design Activities.

2. Attendance

Present			Apologies
Aditya Thakur	Abhidha Arya		
Devashish Shirolkar			
Youqi Zhao			
Kuan Ying Chen			

3. Agenda, Decisions, Issues

Topic/ Discussion notes	Discussion led by
Discussed the completed work done by each person in group prior meeting for desing activities	Group
Discussed the final report details and prepared the presentation materials	Group

4. Action Items

Action	Responsible	Due Date
1. Controls 2. Testing 3. UI Design 4. Design Compile 5. SDLC 6. Meeting minutes Final Report Compile 8. PPT	Devashish Abhidha Aditya Aditya Youqi Kuan Ying Abhidha	04/17/17

5. Next Meeting

Date:	04/16/17	Time:	2:00pm	Location:	Jsom MBA Lounge
Objective(s):	**Final Report and Presentation**				

Meeting/Project Name:	Group Project Milestone 4 – Design		
Date of Meeting:	04/16/17	Start time:	02:00pm
Location:	Jsom MBA Lounge	End time:	03:30pm
		Minutetaker:	90min

1. Meeting Objective(s)

Final Report and Presentation

2. Attendance

Present			Apologies
Aditya Thakur	Abhidha Arya		
Devashish Shirolkar			
Youqi Zhao			
Kuan Ying Chen			

3. Agenda, Decisions, Issues

Topic/ Discussion notes	Discussion led by
Discussed the work done by each person in group prior meeting for final report and presentation	Group
Assign each person presentation tasks	Group

4. Action Items

Action	Responsible	Due Date
Executive Summary System proposal/Problem Statement Requirements Structural diagrams- Class diagram Behavioral Model - Use case Diagram Dynamic Model - Sequence Diagram Design Lessons learnt	Abhidha Abhidha Kuan Ying Chen Devashish Youqi Youqi Aditya Aditya	04/17/17

5. Next Meeting

Date:	04/17/17	Time:	2:00pm	Location:	Jsom MBA Lounge
Objective(s):	**Final Report and Presentation**				

10.0 Takeaways from the Project

First, I would like to thank Professor Prithi Narasimhan to give me the opportunity to work on such a challenging and interesting project. The entire project has been an elevating experience right from the beginning of selecting the project problem statement to delivering the final project.

Before coming to USA for my master's program, I have had 3.8 years of work experience which gave me a fair idea of how projects work in the corporate world. Earlier, I only used to look at a project from a customer's point of view. This project however, taught me a lot of different aspects tied to a project.It has broadened my horizon in terms of thinking about the project from a Stakeholder's point of view, or a Project Sponsor or a Client point of view.In my past-experience, I was part of the risk placement team in the company and my contribution was limited only to work on the task I was assigned to do. This project has exposed me to the business side of a project as well. Working on this project gave me a better understanding about project management since I got an opportunity to implement the theoretical knowledge imparted in class in a practical way.

I always love to work with a team and to work with highly motivated and likeminded people on this project has really been an enriching experience. We used the Scrum Project Management method to meet weekly and share updates and discuss what our next plan of action would be to make sure that all members of the team are up to date about the project.

After this project, I am confident that now I understand the significance of each iteration in a project and how one iteration can impact the other in a positive or negative way. It taught me the concept of attention to detail, time management and prioritizing the tasks accordingly. When facing rigid deadlines all these learnings come in handy to deliver the project successfully on time. It really has been an amazing academic experience and I am hoping to take this learning forward and implement it in all my future projects.

Abhidha Arya
Axa162031

After completing the project, I have learned a lot from it. I have a better understanding of the five principles of the project management which include initiating, planning, executing, controlling, and closing. By taking deeper research of each principle, I have learned each phase in more details. The two major phases that I have learned the most are the planning and the executing. The importance of planning phase includes the creating of scope statement and developing project plan. Scope statement is very useful which summarize the whole project that in the future industry, we would be able to apply it to our job. Design tests and different models of what we learned from class are able to apply to the project. The project gives us very well rounded practices of what would be able to apply to future industry.

One of the most important lessons that I learned from this project besides all the requirements of project, I learned the need of communication is very important. It is the skill that is irreplaceable. Improving self communication skills is very important. Being an effective communicator would definitely help bring the project to succeed. The definition of a good communicator could be the ability to deliver information to other people with good understanding of what the information is delivered. If the receiver cannot understand what the information is sent, then there would be no communication between and it would not come to a success. No matter in what industry in the future or project that to be worked on, a good communicator is always necessary. Additionally, Inspiration is another important thing to focus. Being active inspire is a step closer to project success. We need to inspire the group and being able to know what each person desires.

Being able to work along with team members is also an important thing that I have learned throughout the milestone project. Being able to discuss with team members and exchange ideas with each other has given me more opportunities to see the same topic in completely different perspectives. Learning how to respect people with different thoughts in group will definitely guide me through not only work but also real life event in future. Moreover, throughout the project and completing the project, I have learned how important team work could be. It would not be able to be done as good as if I were working alone and would not be as efficiency as it is now. Team power has played an important role in this project.

Kuan Ying Chen
Kxc101420

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Along the way of gradually building up our group project, I got a chance to put the theories or concepts I learned from class into a real-life practice. From the very beginning of deciding what we should do. Everyone in our team contributed a great idea based on what we had searched. After deeply analyzed and discussed about each idea, all of us agreed on developing this ComboPay app due the niche of the market as well as the potential profit growth power. By following the homework instructions, our team has involved all the five phased during the process, here are the things I learned from the project:

1. Communication

It's often the case that customers don't even know what do they want or need before they see the product. Therefore, figuring out the underlying or unspoked aims of their requirements is the very first step to take. That's the reason why I think communication is on top of the list. Regarding gathering the requirements, we need to help customers find out what are the features have to be accomplished. Then, we need to analyze these requests based on the available resources, and negotiate with the customers of what can be achieved or can be added later. Only when the two parties have reached to an acceptable degree of agreement, the initiating phase can be started.

2. Define and rephrase the requirements

Most of the requirements aren't explicit and clear. In fact, they are ambiguous, mixed and unmeasurable. The best example I learned is "The websites must finish loading very quickly". This statements sounds fine in our daily life, while the situation becomes too complex in digital word. Thus, to change it to "Appear every webpage on the screen in 3 seconds" is the correct format of a non-functional requirement. Besides, I wasn't aware that requirements can be classified as functional and non-functional. While doing our project, we must take care of the non-functional part to facilitate the achievement of the desired features.

3. Documentation and diagrams

In our group project report, use case diagram, class diagram and sequence diagram are used jointly to depict the functional picture of ComboPay. By thinking thoroughly to link actions to methods, I get a better understanding of how to run this app, and it also helped me to identify any potential problems that haven't been noticed during the previous steps. Doing a good documenting job and keeping these records make it easier for reference if anything needs to be changed.

4. Monitor and control

While doing the project, all the phases and steps need to be monitored. This doesn't mean we should plan for everything at the beginning and be strict to follow the plan all the time. There are unexpected things happen in our lives every day. Thus, to main the normal smooth flow of the project, we better monitor and control during the process. If we have spent too much energy on something that is currently out of the scope, or running out of the preschedule time for this work. Either case could cost more money and waste the resources. Once we have noticed something like that, we should take actions immediately to prevent any further loss.

5. Team work

Our team has been a great team and everyone is responsible and diligent. I believe there is nothing called small project, everything we have done has great meaning. To have people possess skills in different skill sets, and always be supportive to each other is a key element in make a project successful.

Youqi Zhao

Working on the project ComboPay under the guidance of Professor Priti Narsimhan and along with a very talented and focused team members has been a truly enthralling experience. The class has helped me broaden my scope from a project manager's point of view and anticipate the issues that can be encountered while working on a project making me learn valuable project management lessons about how to drive the change and to build something from scratch, how to get results by breaking organizational structures and processes.

I learnt how to adapt to the change and become more action oriented and anticipate problems early. I have learnt that while planning a project, the end in must be very clear from the onset, with the start-point, end-point and the development part of transition points in between kept in view. We can be flexible in our tactical approach but the focus should always be on strategic goals and objectives of the project throughout. Implementation and execution of the project counts a lot on getting things done by following up and following through what has been laid out in the project plan, efficiently and effectively. Do not blindly rush into decisions. Careful thought needs to be given to the circumstances at hand prior to engaging in decision making. This will save time in the long run by minimizing the need to redo work.

While working with my previous organization, I had to interact with the clients as well as the technical team daily. I encountered situations where I couldn't visualise the hindrances that can cause in the development of certain projects. Ability to see the big picture of the project and focus on details when needed deserves a mention. For each project the details level would be different, but the key is the ability to shift your focus. Additionally, I could work with a new team with distinct perspective of doing things. Each one had their own views and opinions about approaching a problem statement. We together weighted the pros and cons of each decision and experienced first-hand how a small decision in the planning phase can have a gigantic impact in the implementation phase. The valuable knowledge I have gained from this class will help me in manage projects in a much better way in the future.

- Aditya Thakur (ast160830@utdallas.edu)

This project has so far been one of the best learning experiences of my graduate level courses. What we learned with this project was the overall working style and process adopted in the industry to create, maintain and manage a project through its entire lifecycle. Working with a team of bright and talented people from diverse backgrounds, I realized that it takes real team-work to effectively manage any project. In this project, we brainstormed about an idea and conceptualized it and then set about deciding it's requirements, time-frame, resources etc. and just planning the entire project as the first milestone seemed like an achievement in itself. We realized that for key stakeholders and project sponsors to be involved in this activity was an integral part of the whole system. Next, we set about defining our requirements, the kind of structure or exoskeleton our project would have, and how we would divide resources to effectively manage the project. Then, we defined the technical aspects of the entire mobile application and this gave us an inside view of how applications work, with their pre-defined states and flows of activity to bring about a product that does exactly what you want to do it. This was the most interesting part of the whole project, wherein we designed and analysed our system to make it function exactly as we wanted it to function, using class diagrams, sequence diagrams and use cases. Finally, we were ready to implement software design, user interfaces and add controls to ensure security, and our product would be ready for testing. We also wrote the test cases for the application, and the application would be improved further by extensive testing, just as it would in the real world. Hence, going through all of the above activities every week with my team-mates was a very enriching educational experience for me, and I hope I can say the same for my teammates as well.

Devashish Shirolkar