# Product Requirements Document v2

**Team:**

| | |
|---|---|
| Benjamin Liu (group lead) | bliu00@umail.ucsb.edu |
| Joanne Li (scribe) | joanneli@umail.ucsb.edu |
| Junayed Naushad | junayednaushad@umail.ucsb.edu |
| Howard Lin | hlin@umail.ucsb.edu |
| Julia Liu | julialiu@umail.ucsb.edu |

**Company Name:** PayJunction

**Team Name:** Grand Potato

**App Name:** Text2Pay

**Project Description:**

The goal of our project is to create a secure and efficient application that allows consumers and merchants to complete transactions through the consumer's phone, via SMS, email, or QR code, rather than using a credit card terminal. The product will send the consumer a text with the transaction summary sent through the app from business to consumer for the consumer to pay within 24 hours. The highest-level expectation is to make payments easier for the consumer, faster and cheaper for the merchant, and more secure to reduce fraud.

**Problem:**

With credit and debit cards being one of the main ways to make payments, payment card terminals are used millions of times a day. Although payment card processing terminals are everywhere, the current ones being utilized are often old and outdated. These machines are costly, slow, and frequently errors occur forcing

you to swipe or insert your card multiple times before a transaction is made. There is also a danger of credit card skimming when terminals are involved. Apple Pay revolutionized the convenience of business-consumer transactions through phones. While the emergence of other payment apps such as Samsung Pay and Google Pay, have made nearly all phones compatible with mobile payments, not all point of sale systems support near-field communication (NFC). Other problems that can occur with credit card terminals include data input errors, printer troubles, system malfunctions, no WiFi, and just complete failures. Text-to-Pay would be a fast and easy solution to making payments completely mobile by eliminating the need for a credit card terminal.

**Competing Technologies:**

- Apple Pay revolutionized the convenience of business-consumer transactions through phones. While the emergence of other payment apps such as Samsung Pay and Google Pay, have made nearly all phones compatible with mobile payments, not all point of sale systems support near-field communication (NFC). These apps use NFC to attempt to replicate the use of a credit/debit card. However, a better solution would be to just completely eliminate the use of credit card terminals. With our Text-to-Pay application, we could do this and make it so payments could be made completely through two mobile phones, making transactions fast as well as more efficient for both businesses and consumers. By using QR Codes to access another person's account, merchants will be able to quickly find a user's profile, request the necessary amount, and consumers will be able to complete the payment immediately afterwards.

- Another similar application is Venmo. With its easy friend to friend money transfers, this application quickly rose in popularity. However, it is the friend to

friend transfers that limit its ability to target larger businesses and merchants. With that said, the main difference between Venmo and our PayJunction app is with the way transactions and accounts are verified. With Venmo, each payment/transaction is verified separately meaning that large payments would be flagged for suspicious activity. This would clearly be an issue for businesses or merchants as they'll constantly be receiving and sending out large sums of money on a daily basis. With PayJunction's API however, accounts would be verified before any transactions are made so that after it's verified, all payments would be sent and received smoothly and without any problems.

- Zelle Quickpay is payment application where transactions are made through a user's bank account. A user can request and send money like the other apps. It works with a large list of banks around the world. Unlike our PayJunction app, Zelle is meant for transactions between friends and family. Since the user is directly sending money from their bank account, there is a big security issue if the sender does not know the receiver.

**Project Outcome:**

The project provides businesses with a solution that enables them to receive payments through customers' phones. This eliminates the problem of using outdated payment card processing terminals as well as creating a more efficient process for business-to-customer transactions.

**Assumptions:**

Our project targets businesses that want to have a more efficient and safe transaction process with their customers. However, we will assume that the businesses that we work with are of a service type. Ideally, it would work best

with doctor appointments, haircuts, pizza orders, etc. Since it is a webapp, it will work on any browser.

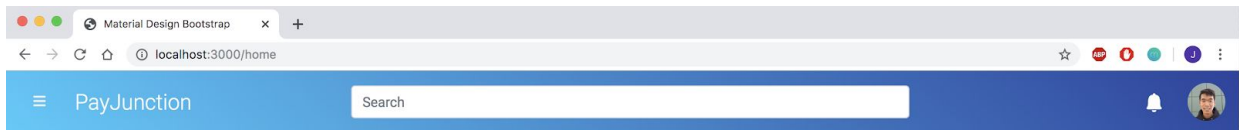**High Level Diagram:**
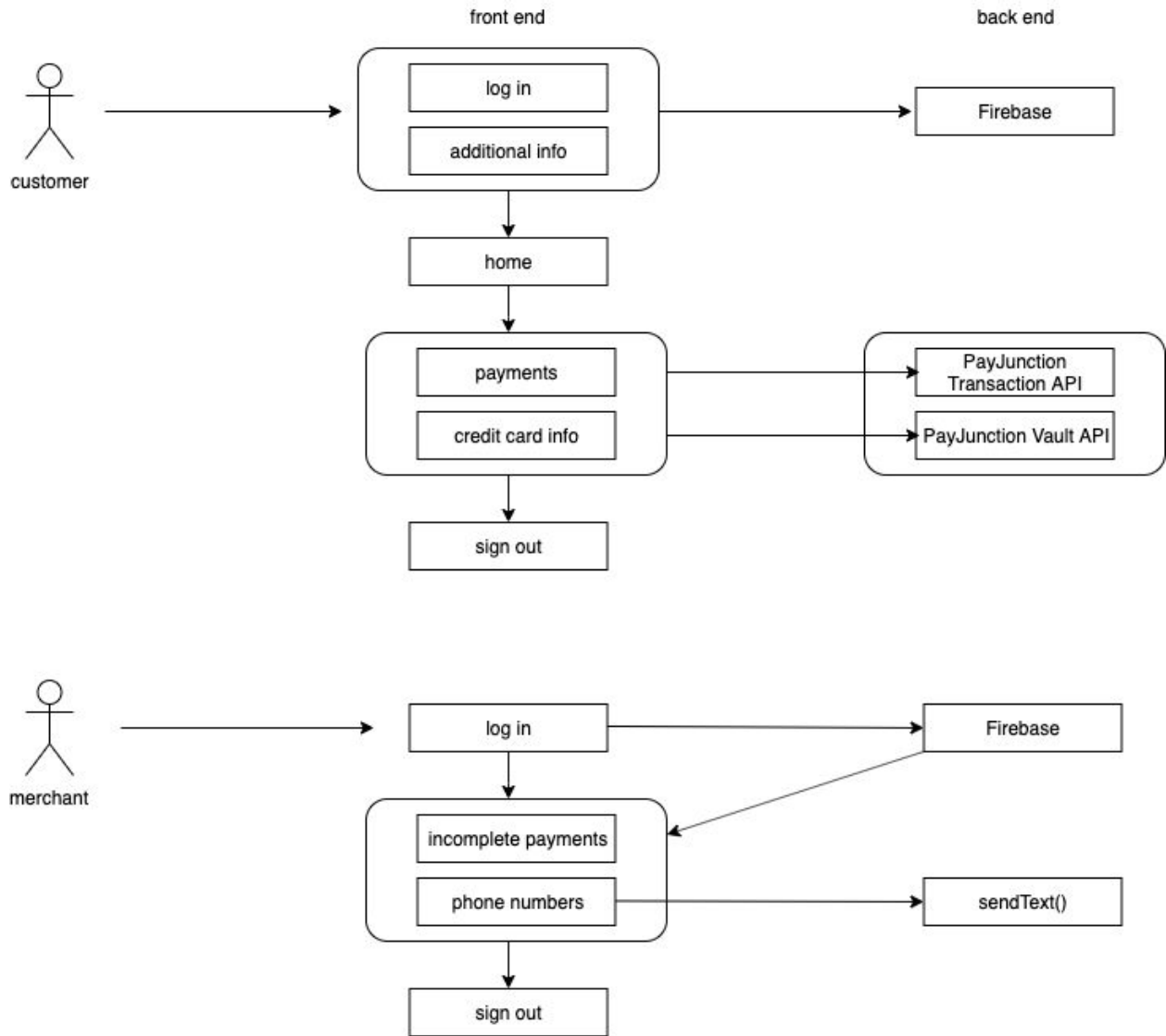
## User Interaction and Design:

## Login/Signup Page



## Home Page

# Payment Card Page



Woodstock's Pizza

@woodstockspizza requests $23.20 for 16" X-Large Cheese Pizza.

NO THANKS

PAY NOW

Think there was a mistake? Report your error

# Transaction/Payment Page
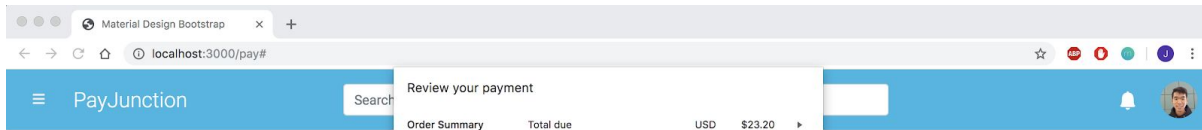


**Review your payment**

| Order Summary | Total due | | USD | $23.20 | ▸ |
| Payment | Mastercard •••• 4444 | | | | ▸ |
| | Bob Ross | | | | |

You can manage cards and addresses in Settings.

chrome

Cancel    Pay

@woodstockspizza requests $23.20 for 16" X-Large Cheese Pizza.

PAYJUNCTION BALANCE:

$573.29

CONFIRM PAYMENT

**Payment Complete Page**
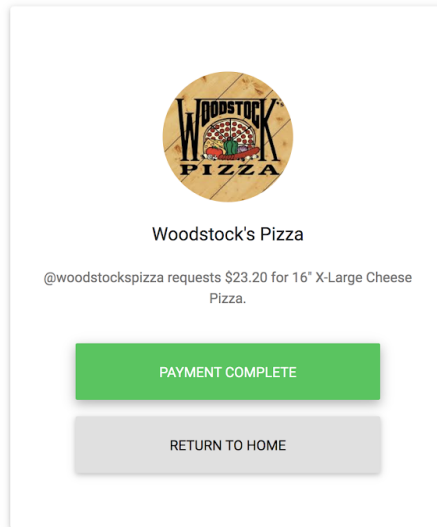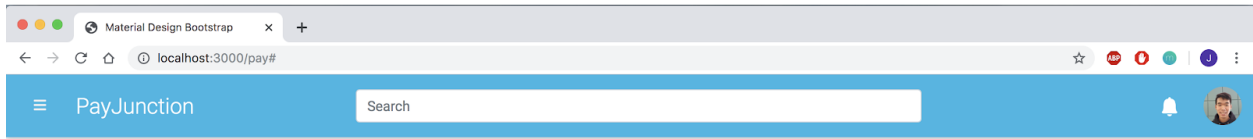


**User Stories/Use Cases:**

| Title: | Description: | Scenario: |
|---|---|---|
| 1. Login | As a business consumer, I want to be able to have a login and password to securely send payment information between the business and me. | Scenario 1: New User<br>Given I have not created an account before<br>And I would like to have a PayJunction account<br>When I click Get Started<br>Then I enter my first name, last name, email, and phone number<br>And I receive an email or text to create a password<br>Scenario 2: Returning User<br>Given I have created an account<br>And want to login |

| | | |
|---|---|---|
| | | When I put in my email and correct password<br>Then businesses can send me payment requests to my phone number<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/login.html<br>https://trello.com/c/NoulW9Gs/14-authentication-sign-in-on-login-logout-4-days |
| 2. Logout | As a customer, I want to be able to log out of the website when I am done. | Acceptance Test: After clicking the logout button, the customer should be redirected back to the login/signup page and should not have access to any internal pages.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/home.html<br>https://trello.com/c/NoulW9Gs/14-authentication-sign-in-on-login-logout-4-days |
| 3. Request Payment | As a merchant I am able to request a payment from a customer so that I can complete a transaction for whatever product or service I provide. | *Payment Request:* Given that the customer has provided the merchant with their phone number, when the customer has made a purchase or received a service, the merchant is able to send a payment request via SMS to the customer. This request will contain a hyperlink to the consumer-end of the web app where the consumer will be able to make the payment.<br>*Acceptance Test:* Merchant is able to send a unique and secure link to the right customer and the link successfully takes the customer to the payment processing page.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/master/index.js<br>https://trello.com/c/yFYMifMy/2-implement-api-requests-through-nodejs-5-days |

| 4. Incomplete Request Page | As a merchant, I can check my incomplete request page so that I can see what payments are still in queue. | *Scenario*: Merchant has provided service for x different customers<br>Given the merchant has already sent out request texts<br>And some of the customers have not paid yet<br>When the payment is due soon<br>Then the merchant can see who hasn't completed the payment<br>And send the customer another notification.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/home.html<br>https://trello.com/c/bKQntFmt/9-make-an-incomplete-payment-page-for-merchant-side-3-days |
|---|---|---|
| 5. Completing a Payment Request | As a customer, I am able to complete a payment request by clicking on the request link and after signing in and selecting a payment option, complete the payment, so that customers will be able to pay through a text link. | *Scenario*: Merchant has obtained a customer's username, phone number, or email.<br>Merchant makes request through web app to send request link through text<br>Customer receives text and clicks on link containing request information<br>Customer is sent to web app, signs in and selects a payment option<br>Customer clicks pay to complete payment<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/pay.html<br>https://trello.com/c/l8rKH0SA/17-create-pay-a-request-page-2-days |
| 6. Payment History | As a customer, I am able to check my payment history so that I can see my completed payments. | Precondition: Customer is logged in.<br>Scenario:<br>1. Customer is currently logged into their portal (webapp customer page)<br>2. Customer clicks on payment history<br>3. Page should pop-up showing their past payments to specific businesses based on account database.<br>Postcondition: Payment history is displayed to the customer.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/home.html |

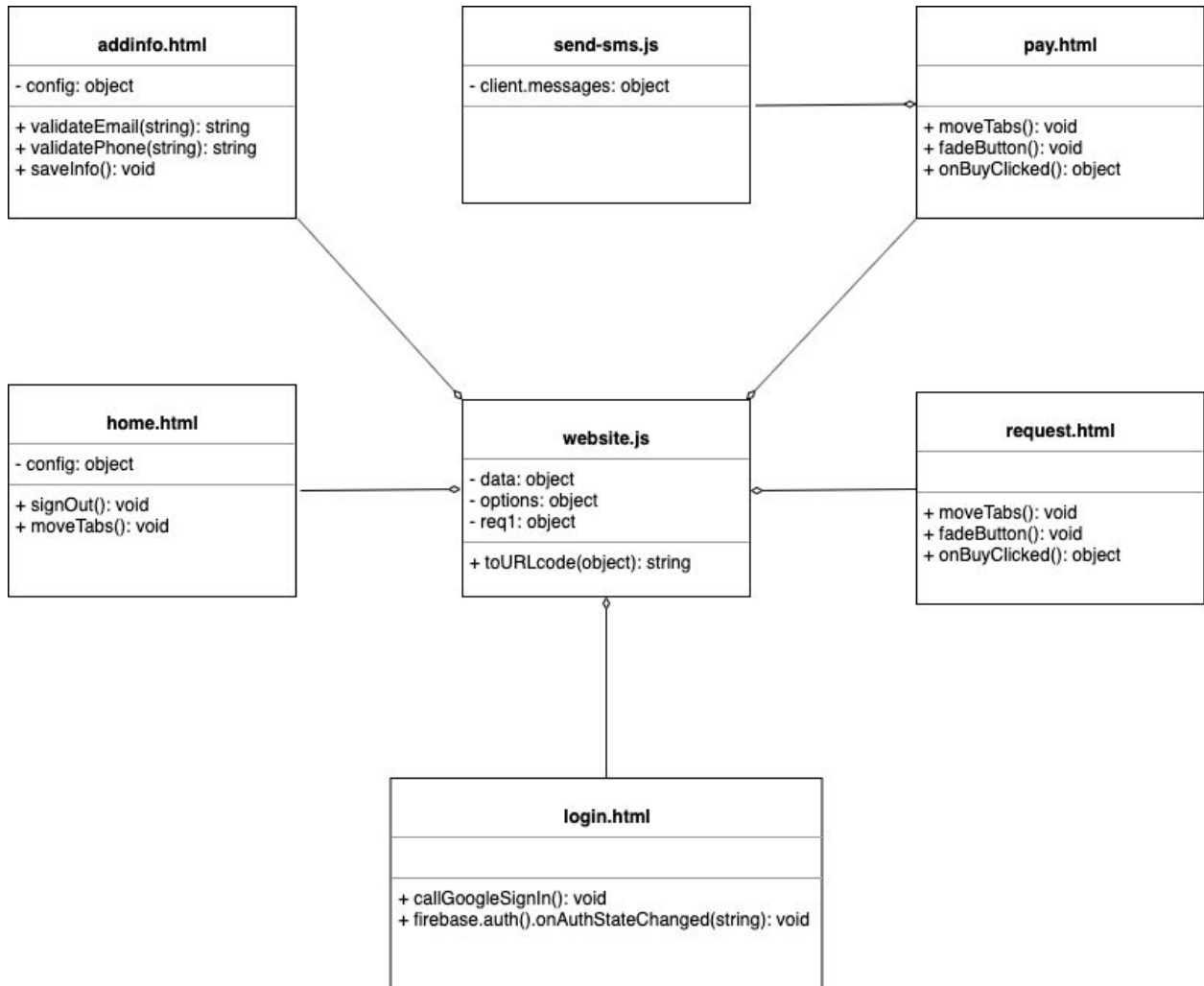| | | https://trello.com/c/H3hzWk0Q/7-mockup-ui-for-the-consumer-side-app-time-3-days |
|---|---|---|
| 7. Customer Payments | As a merchant, I am able to check the payments made from my customers so that I can see all of the payments that have been processed for my business. | Precondition: Merchant is logged in.<br>Scenario:<br>1. Merchant is currently logged into their portal (business page)<br>2. Merchant clicks on payment history<br>3. Page should pop-up showing past payments by their customers based on account database.<br>Postcondition: Payment history is displayed to the merchant.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/master/MDB/test.html<br>https://trello.com/c/JOztugoB/8-mockup-ui-for-merchant-business-side-app-time-3-days |
| 8. Forgot Password | As a PayJunction Text2Pay user, I can reset my password so that if I forget my password I can still access the application. | Scenario: Password needs to be reset<br>1. Given the user has forgotten the password<br>2. And they would like to access their account on the application<br>3. When the user clicks "Forgot Password?"<br>4. Then a request for the user's username and email associated with the account will appear<br>5. And an email with the reset password link will be sent to the user<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/forgotpw.html<br>https://trello.com/c/NoulW9Gs/14-authentication-sign-in-on-login-logout-4-days |
| 9. Cancel Transaction | As a customer, I can cancel a transaction so that if a merchant has mistakenly sent a payment request I can cancel the transaction. | Precondition: Transaction needs to be cancelled<br>Scenario:<br>1. Given the merchant has sent a payment request to the wrong customer<br>2. And the customer would like to void this transaction<br>3. When the user clicks "Invalid Transaction" |

| | | 4. The user can verify that the transaction is not theirs and void the transaction<br>Postcondition: Invalid transaction has been cancelled<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/pay.html<br>https://trello.com/c/V6XbwiYf/11-add-a-cancel-option-on-the-payment-card |
|---|---|---|
| 10. Add Bank Account | As a customer, I can add my bank account information so that I can pay for a service. | Merchant sends out payment request<br>Given the request is sent to the correct customer<br>And the customer doesn't have a credit card<br>When the customer wants to pay<br>Then they can use their checking account information<br>And complete the transaction.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/website.js<br>https://trello.com/c/75qTFESD/9-add-profile-information-page-first-name-last-name-phone-number-card-information-optional |
| 11. Add credit/debit card | As a customer, I can add my credit/debit card so I can complete my transactions. | After typing in their credit/debit card once, a customer should have the option to save their card information so they don't have to retype it everytime.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/website.js<br>https://trello.com/c/75qTFESD/9-add-profile-information-page-first-name-last-name-phone-number-card-information-optional |
| 12. Ask for Review of a Request | As a customer, I am able to ask for a review of a business request if the customer thinks the request is wrong, so that mistyped requests can be cleared up and fixed. | Business accidently request more than the amount the customer was supposed to pay. Customer clicks on button to ask for a review from the business. Business sees request, reviews the request and sees that an error was made. Business sends out a new fixed version of the request to customer.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/LiuBranch/MDB/pay.html<br>https://trello.com/c/Rd5mNpgL/10-link-the-review-of-reques |

| | | |
|---|---|---|
| | | t-to-an-actual-customer-service-page-3-days |
| 13. Phone Text | As a customer, I can receive a text with a link to my Text2Pay transaction that I need to pay after a purchase. | Precondition: Customer has made a purchase.<br>Scenario:<br>   1.  Given the customer used Text2Pay to make purchase<br>   2.  And the customer has made an account<br>   3.  When the customer receives a text with a link<br>   4.  The customer can click the link to be redirected to the web app where they can pay for their purchases<br>Postcondition: Customer can see how much they need to pay.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/send-sms.js<br>https://trello.com/c/BlbobaT4/5-create-text-with-link-to-transaction-using-twilio-2-days |
| 14. Sign Up Customer | As a customer, I want to be able to sign up for a Text2Pay account for faster and easier payments. | Precondition: Customer does not have a Text2Pay account.<br>Scenario:<br>1. Given the customer is not logged in<br>2. And the customer wants to make an account<br>3. When the customer clicks sign up<br>4. The customer will be redirected to sign up page<br>Postcondition: Customer creates a Text2Pay account<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/master/MDB/signup.html<br>https://trello.com/c/Y5QKL2Xf/16-create-sign-up-page-2-days |
| 15. Add a customer user profile | As a customer, I am able to save my user ID, name, email, and phone number to the website | Precondition: Customer has never logged in before<br>Scenario:<br>   1.  The customer is directed to a page where they can add their profile information.<br>   2.  After clicking the save info button, they are redirected to the home page.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/addinfo.html |

| | | https://trello.com/c/75qTFESD/9-add-profile-information-page-first-name-last-name-phone-number-card-information-optional |
|---|---|---|
| 16. Add a merchant user profile | As a merchant, I am able to save my user ID, name, email, and phone number to the website. | Precondition: Merchant has never logged in before<br>Scenario:<br>1. The customer is directed to a page where they can add their profile information.<br>2. Merchant checks the box to mark that they are a merchant.<br>3. After clicking the save info button, they are redirected to the home page.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/addinfo.html<br>https://trello.com/c/75qTFESD/9-add-profile-information-page-first-name-last-name-phone-number-card-information-optional |
| 17. Sign Up Merchant | As a merchant, I want to be able to sign up for a Text2Pay account for faster and easier payments. | Precondition: Merchant does not have a Text2Pay account.<br>Scenario:<br>1. Given the merchant is not logged in<br>2. And the merchant wants to make an account<br>3. When the merchant clicks sign up<br>4. The merchant will be redirected to sign up page<br>Postcondition: Merchant creates a Text2Pay account<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/master/MDB/signup.html<br>https://trello.com/c/Y5QKL2Xf/16-create-sign-up-page-2-days |
| 18. Merchant transaction history | As a merchant I can view complete and incomplete transactions | Precondition: Merchant is logged in<br>1. Given the merchant has completed at least one transaction<br>2. And the merchant wants to view their transaction history<br>3. When the merchant clicks the transaction history tab |

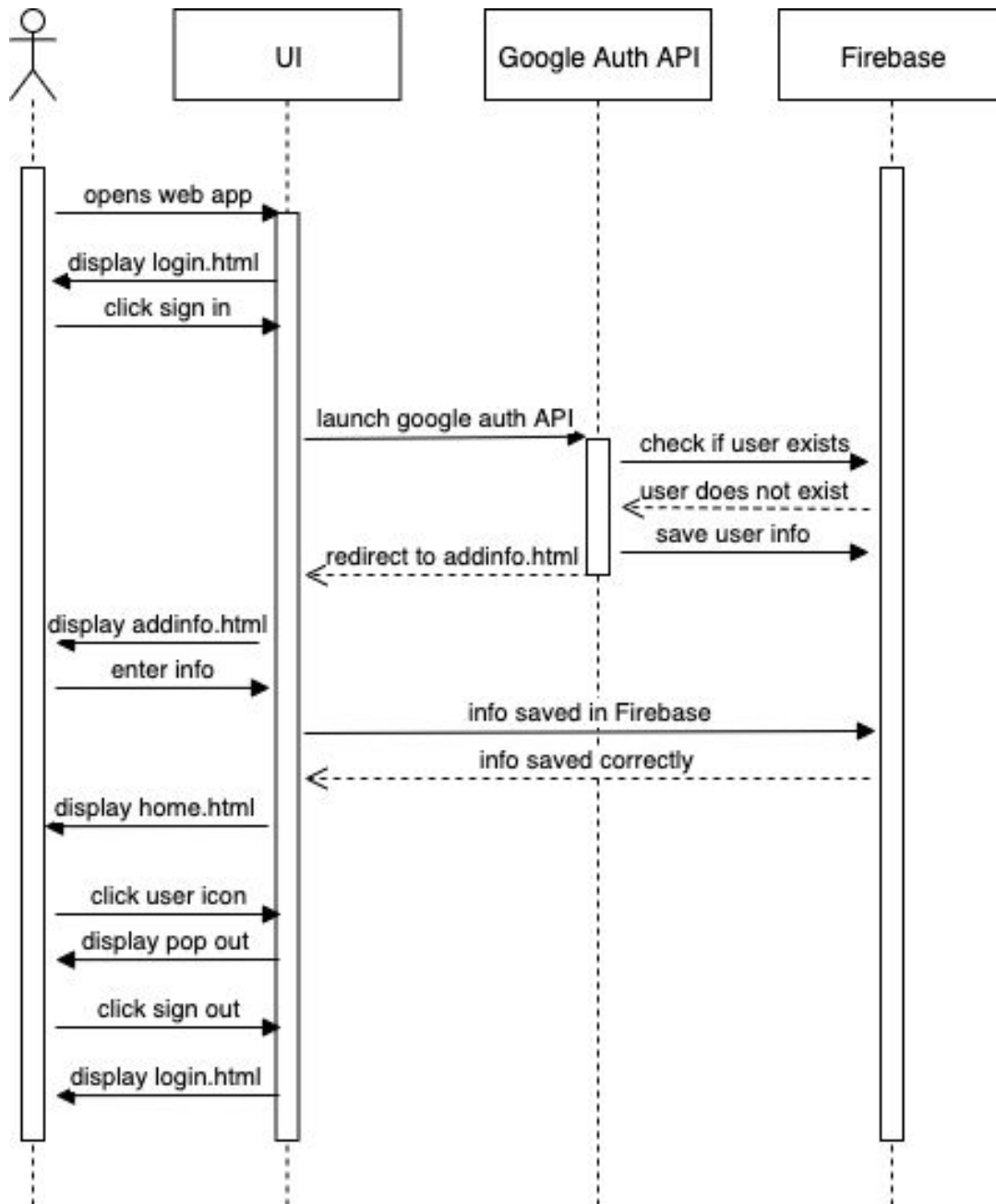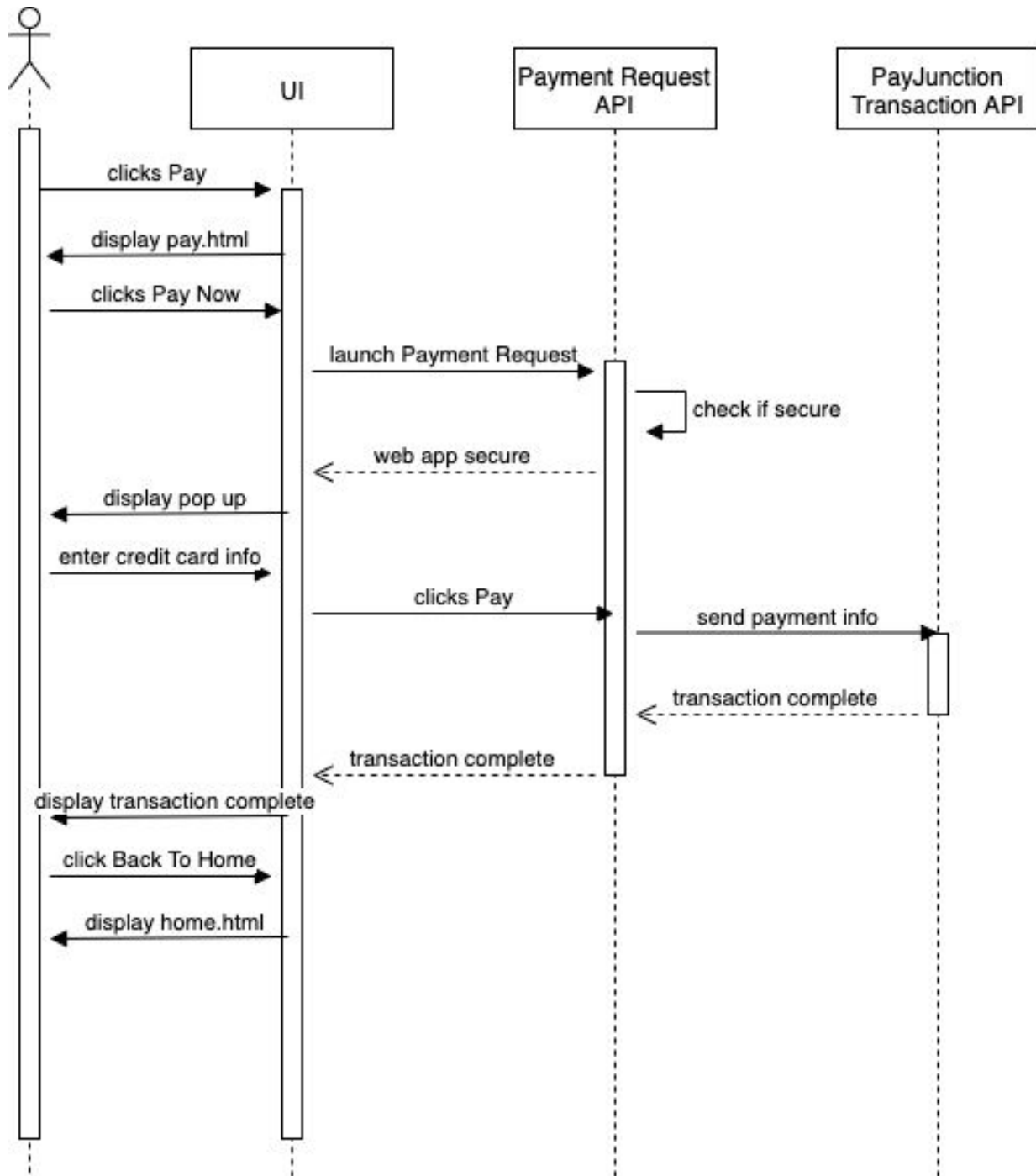| | | 4. The merchant can view a list of their completed transactions which will contain the date, amount, consumer name/phone number, and reason for the transaction<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/home.html<br>https://trello.com/c/pLXT0EMy/11-have-a-page-for-the-history-of-transactions-merchant-3-days |
|---|---|---|
| 19. View Account Profile | As either a merchant or consumer, I can view my profile information (name, email, phone number, username,etc) so I know what information is attached to my account. | Precondition: User is logged in<br>1. Given that the user is logged in and has previously saved his information before, he can click on his face on the top right and then "My Account"<br>2. This will open another page with all of his information including name, email, phone number, username etc.<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/howard_dev/MDB/home.html<br>https://trello.com/c/BpSvkcW1/12-ui-for-profile-page-3-days |
| 20. Transfer Balance | As either a merchant or consumer, I can transfer my balance back into my card so that my I can return payjunction balance into card balance. | Precondition : User is logged in<br>1. Given the user has payjunction balance, the user can select the amount he wishes to transfer as well as what card he wants to transfer the balance to.<br>2. Based on whether the user is willing to pay an extra 3% for instant transfer, the user will have money transferred back either within the next few days or immediately<br>https://github.com/PayJunction-Capstone/Text2Pay/blob/LiuBranch/MDB/pay.html<br>https://trello.com/c/0tFiIJSS/13-transferring-balance-from-account-to-card-4-days |

**UML:**

```
┌─────────────────────────────────┐        ┌─────────────────────────────────┐        ┌─────────────────────────────────┐
│         addinfo.html            │        │         send-sms.js            │        │           pay.html              │
├─────────────────────────────────┤        ├─────────────────────────────────┤        ├─────────────────────────────────┤
│ - config: object                │        │ - client.messages: object      │        │                                 │
├─────────────────────────────────┤        └─────────────────────────────────┤        ├─────────────────────────────────┤
│ + validateEmail(string): string │                                                   │ + moveTabs(): void              │
│ + validatePhone(string): string │                                                   │ + fadeButton(): void            │
│ + saveInfo(): void              │                                                   │ + onBuyClicked(): object        │
└─────────────────────────────────┘                                                   └─────────────────────────────────┘


┌─────────────────────────────────┐        ┌─────────────────────────────────┐        ┌─────────────────────────────────┐
│          home.html              │        │          website.js             │        │          request.html           │
├─────────────────────────────────┤        ├─────────────────────────────────┤        ├─────────────────────────────────┤
│ - config: object                │        │ - data: object                  │        │                                 │
├─────────────────────────────────┤        │ - options: object               │        ├─────────────────────────────────┤
│ + signOut(): void               │        │ - req1: object                  │        │ + moveTabs(): void              │
│ + moveTabs(): void              │        ├─────────────────────────────────┤        │ + fadeButton(): void            │
└─────────────────────────────────┘        │ + toURLcode(object): string     │        │ + onBuyClicked(): object        │
                                           └─────────────────────────────────┘        └─────────────────────────────────┘


                            ┌─────────────────────────────────────────────┐
                            │                login.html                   │
                            ├─────────────────────────────────────────────┤
                            │                                             │
                            ├─────────────────────────────────────────────┤
                            │ + callGoogleSignIn(): void                  │
                            │ + firebase.auth().onAuthStateChanged(string): void │
                            └─────────────────────────────────────────────┘
```

*Database*



**Role**
MerchantOrConsumer

*Use*

**User_role**
PhoneNumber
Role

**User**
Email
FirstName
LastName
Email
PhoneNumber
UserName

**PaymentRequests**
PhoneNumber
PaymentRequestID
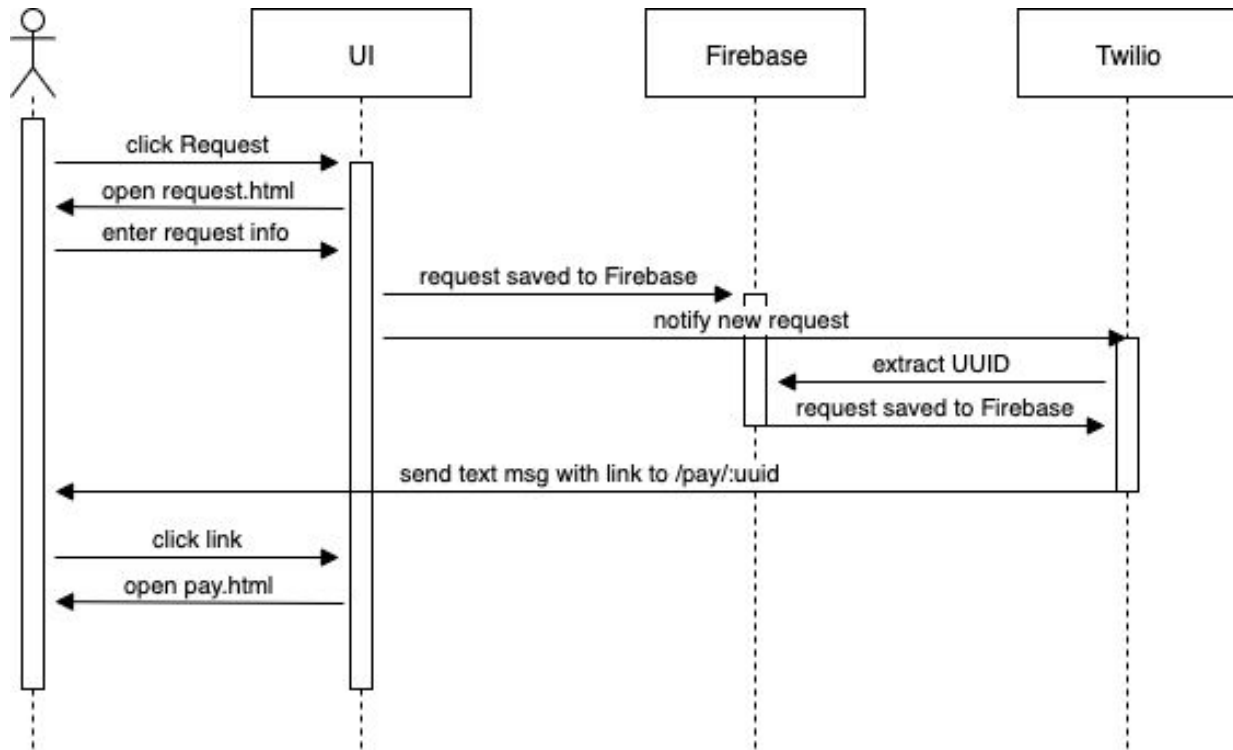PaymentAmount
RequestDescription

**User Sequence Diagrams:**
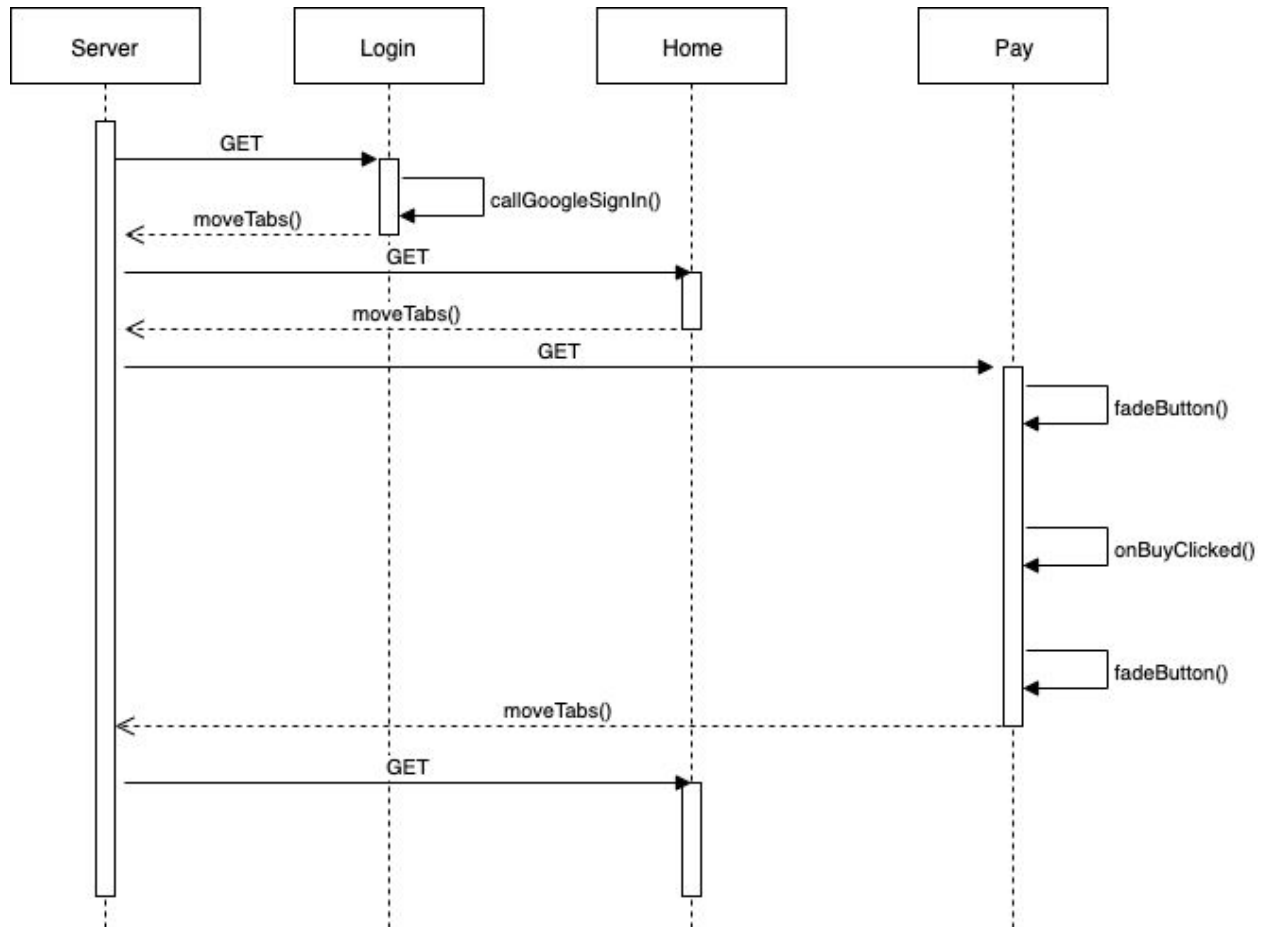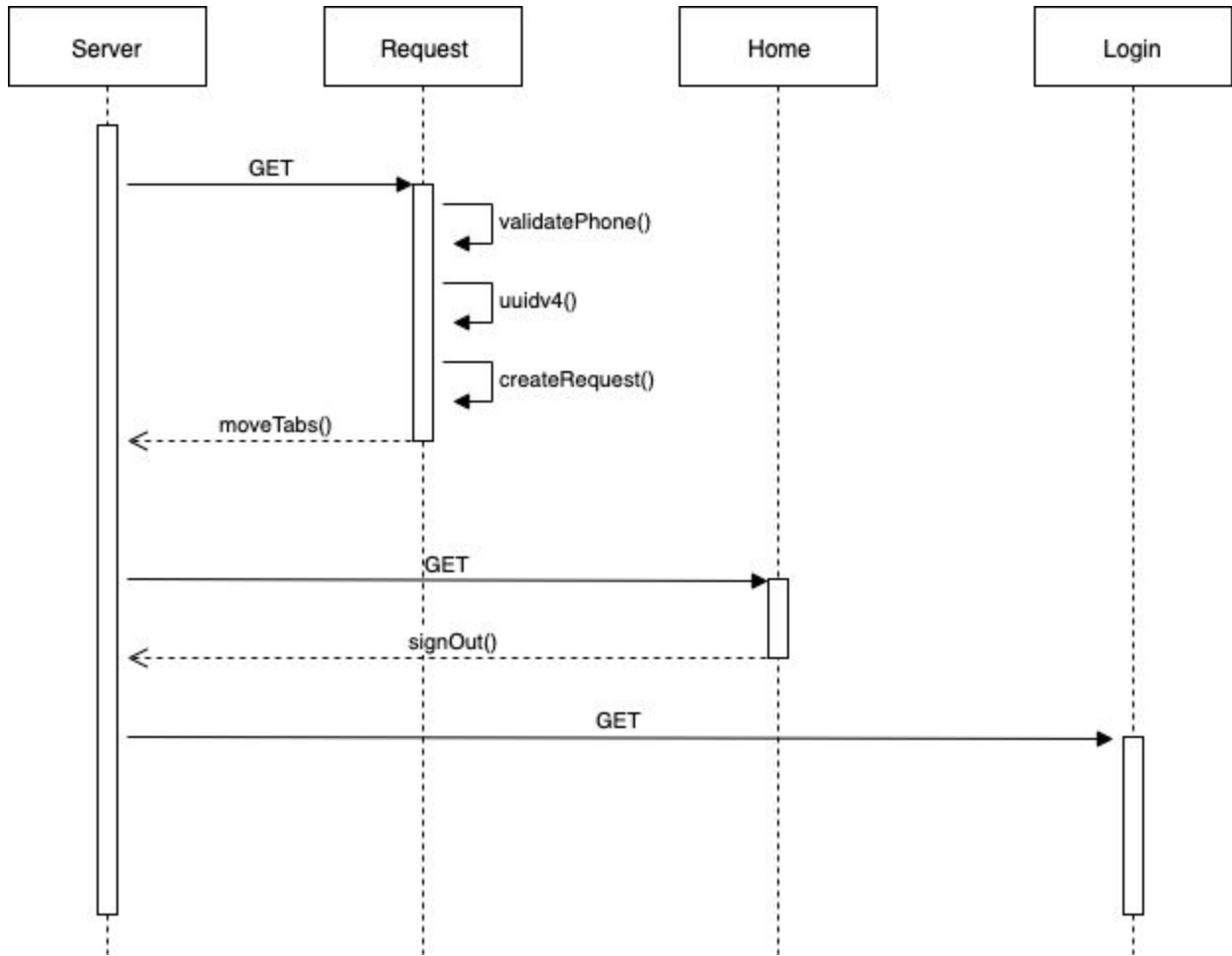
*Sign Up and Sign Out*

*Payment*

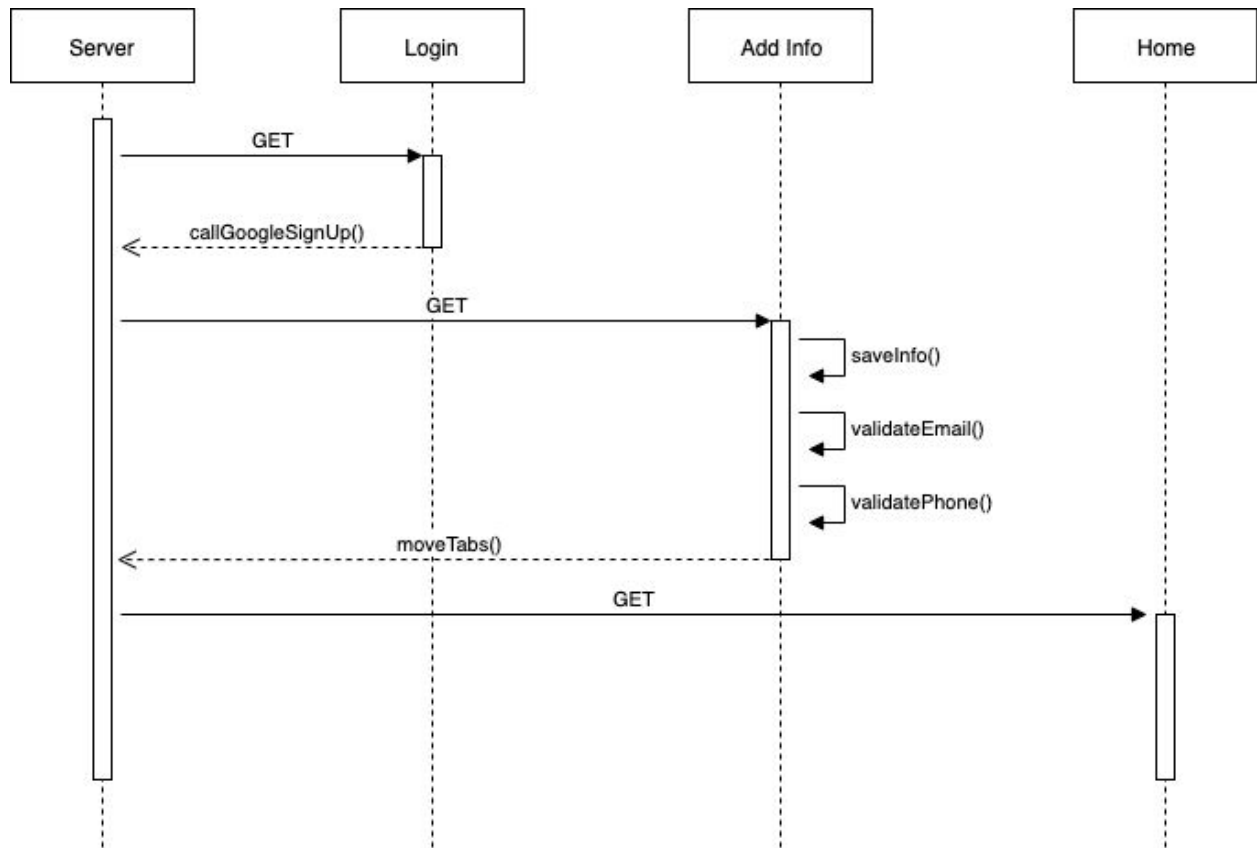*Request*

# Class Sequence Diagrams:

*Login and Pay*

*Request and Sign out*

*Sign up*



**Appendices/Technologies:**

- Node JS
- Bootstrap
- React
- React Native
- AWS
- Google OAuth API

- Docker
- Firebase
- PayJunction Transaction API
- PayJunction Vault API
- Express JS
- Payment Request API