



**Gina Cody School of Engineering and Computer Science**

**Department of Electrical and Computer Engineering**

**COEN 6311 - Software Engineering**

**Mini Programming Project**

**Williams Family Wallet**

**Developed by**

**Nitish Sundarraj Balaji (40241817)**

## Williams Family Wallet

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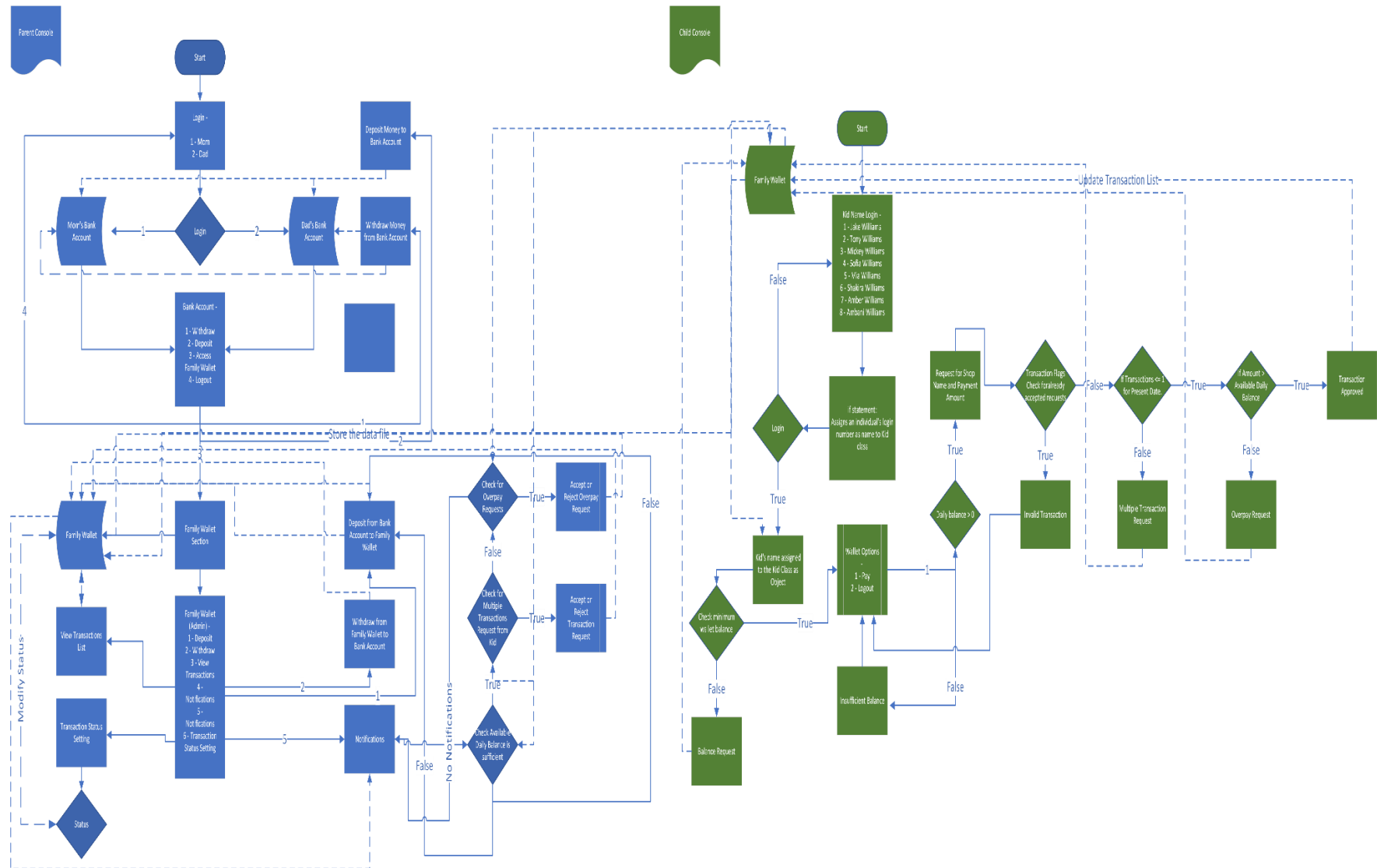
## Project Description

The "Williams Family Wallet" is a console-interfaced banking interaction for a family wallet of the Williams family, containing 10 members in total. The wallet program provides full control to the parent users (Dad and Mom), where Dad is the primary account holder and Mom is the secondary and provides minimum control to the other 8 kids in the family. The family wallet is a part of the same bank that parents have their personal banking accounts with. Parents can deposit or withdraw money from the wallet both to and from their personal banking accounts.

Parents can view the list of all the transactions made in the wallet by their kids and have full control over their transaction status. Parents will receive a low balance request, an overpayment request, and a multiple transaction request from their kids when they initiate a request. Parents can take a decision to either approve or reject these requests. The primary account holder (Dad) can block a user when required. Kids have a daily limit of \$50 per day to make transactions.

Kids can enter the shop name and amount to make payment from the wallet. Kids can send a low balance request when the wallet balance is \$100 or less, or an overpay request if they want to make a transaction for more than \$50 in a day. Regardless of the amount of pay, every kid must request permission to use the wallet for every instance of another transaction. No one can pay through the wallet if there is no balance available in the wallet. Every action of this program is stored in a log file for recording and fixing error codes by the developer.

## Business Model Diagram



## User Stories

Epic	Who	What	Why	User Story
login	dad	login to my account	access the bank functions	as a dad I want to login to my account so that I can access the bank functions
login	mom	login to my account	access the bank functions	as a mom I want to login to my account so that I can access the bank functions
login	kid	login to my wallet	to access my wallet functions	as a kid I want to login to my account so that I can access the bank functions
Epic	Who	What	Why	User Story
withdraw (bank)	dad	withdraw from my bank	have money in hand	as a dad I want to withdraw from my bank so that I can have money in hand
withdraw (bank)	mom	withdraw from my bank	have money in hand	as a mom I want to withdraw from my bank so that I can have money in hand
withdraw (wallet)	dad	withdraw from my family wallet to the bank account	retrieve wallet money to my bank account	as a dad I want to withdraw from my family wallet to the bank account so that I can retrieve wallet money to my bank account
withdraw (wallet)	mom	withdraw from my family wallet to the bank	retrieve wallet money to my bank account	as a mom I want to withdraw from my family wallet to the bank account so that I can retrieve wallet money to my bank account
Epic	Who	What	Why	User Story
deposit - bank	dad	deposit money to my bank	have money in the bank account	as a dad I want to deposit money to my bank so that I can have money in the bank account
deposit - bank	mom	deposit money to my bank	have money in the bank account	as a mom I want to deposit money to my bank so that I can have money in the bank account
deposit - wallet	dad	deposit from my bank account to the family wallet	my family can use those funds	as a dad I want to deposit from my bank account to the family wallet so that my family can use those funds

deposit - wallet	mom	withdraw from my family wallet to the bank	my family can use those funds	as a mom I want to deposit from my bank account to the family wallet so that my family can use those funds
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Epic	Who	What	Why	User Story
view transactions	dad	view the entire transaction list	I can see where my kids spend their money	as a dad I want to view the entire transaction list so that I can see where my kids spend their money
view transactions	mom	view the entire transaction list	I can see where my kids spend their money	as a mom I want to view the entire transaction list so that I can see where my kids spend their money

Epic	Who	What	Why	User Story
notification - insufficient balance	dad	get notified about low balance in my family wallet	I can deposit money into the wallet for my kids purchases	as a dad I want to get notified about low balance in my family wallet so that I can deposit money into the wallet for my kids purchases
notification - insufficient balance	mom	get notified about low balance in my family wallet	I can deposit money into the wallet for my kids purchases	as a mom I want to get notified about low balance in my family wallet so that I can deposit money into the wallet for my kids purchases
notification - multiple transactions	dad	get notified about multiple transactions by my kid	I can keep my kid's transactions in check	as a dad I want to get notified about multiple transactions by my kid so that I can keep my kid's transactions in check
notification - multiple transactions	mom	get notified about multiple transactions by my kid	I can keep my kid's transactions in check	as a mom I want to get notified about multiple transactions by my kid so that I can keep my kid's transactions in check
notification - overpay request	mom	get notified of my kid's overpay request	I can decide on my kid's additional expense	as a mom I want to get notified of my kid's overpay request so that I can decide on my kid's additional expense
notification - overpay request	dad	get notified of overpay request transfer from mom	I can decide on my kid's additional expense on behalf of mom	as a dad I want to get notified of overpay request transfer from mom so that I can decide on my kid's additional expense on behalf of mom

Epic	Who	What	Why	User Story
access settings - block	dad	block a kid's access to the wallet	I can restrict my kid's access to the wallet	as a dad I want to block a kid's access to the wallet so that I can restrict my kid's access to the wallet
access settings - unblock	dad	unblock a kid's access to the wallet	I can allow my kid to access the wallet again	as a dad I want to unblock a kid's access to the wallet so that I can allow my kid to access the wallet again
Epic	Who	What	Why	User Story
transaction - payment	kid	make a transaction from the wallet	I can pay the merchant for purchases	as a kid I want to make a transaction from the wallet so that I can pay the merchant for purchases
transaction - payment information	kid	enter the shop name and amount	I can pay the right merchant for purchases	as a kid I want to enter the shop name and amount so that I can pay the right merchant for purchases
transaction - limit	kid	make payment under my daily transaction limit	I can directly pay the merchant without sending requests	as a kid I want to make payment under my daily transaction limit so that I can directly pay the merchant without sending requests
Epic	Who	What	Why	User Story
request - low balance	kid	request my parents for wallet balance	I have sufficient balance for my purchases	as a kid I want to request my parents for wallet balance so that I have sufficient balance for my purchases
request - wallet permission	kid	request my parents for every other transaction in the day	I can make a second transaction under my daily transaction limit	as a kid I want to request my parents for every other transaction in the day so that I can make a second transaction under my daily transaction limit
request - overpay	kid	request my parents for payment more than my daily transaction limit	I can make purchases more than my daily transaction limit	as a kid I want to request my parents for payment more than my daily transaction limit so that I can make purchases more than my daily transaction limit

# Use Case Diagram

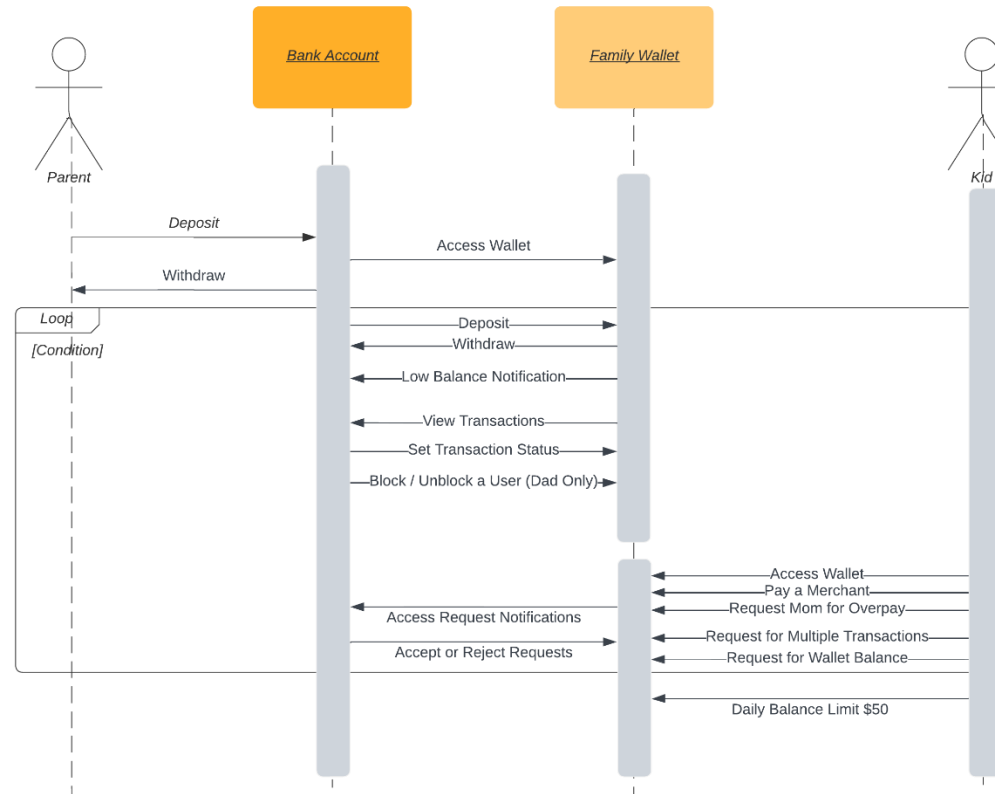




# Sequence Diagram

## Wallet Sequence Diagram

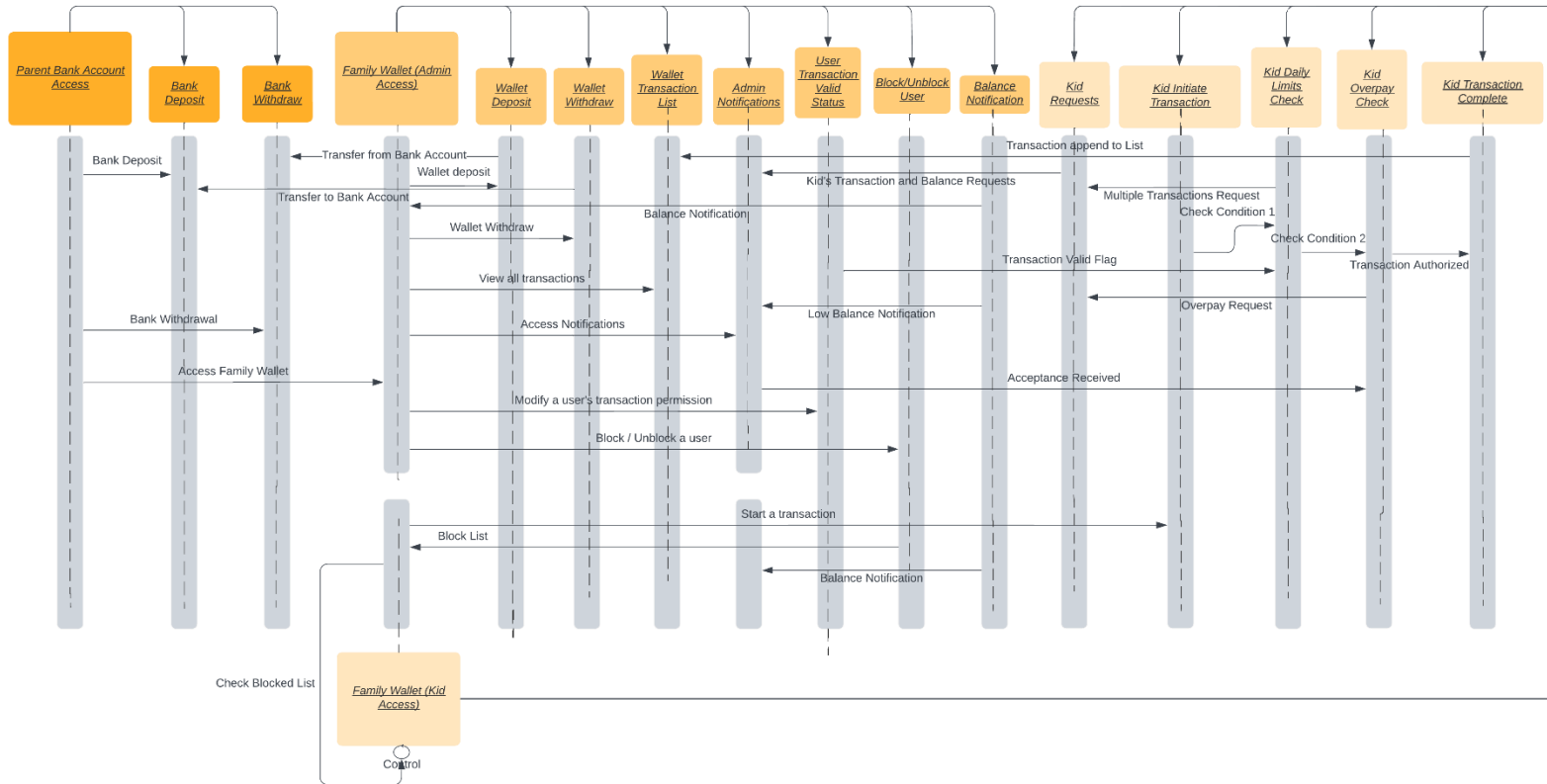
Nitish Sundarraj | October 18, 2022



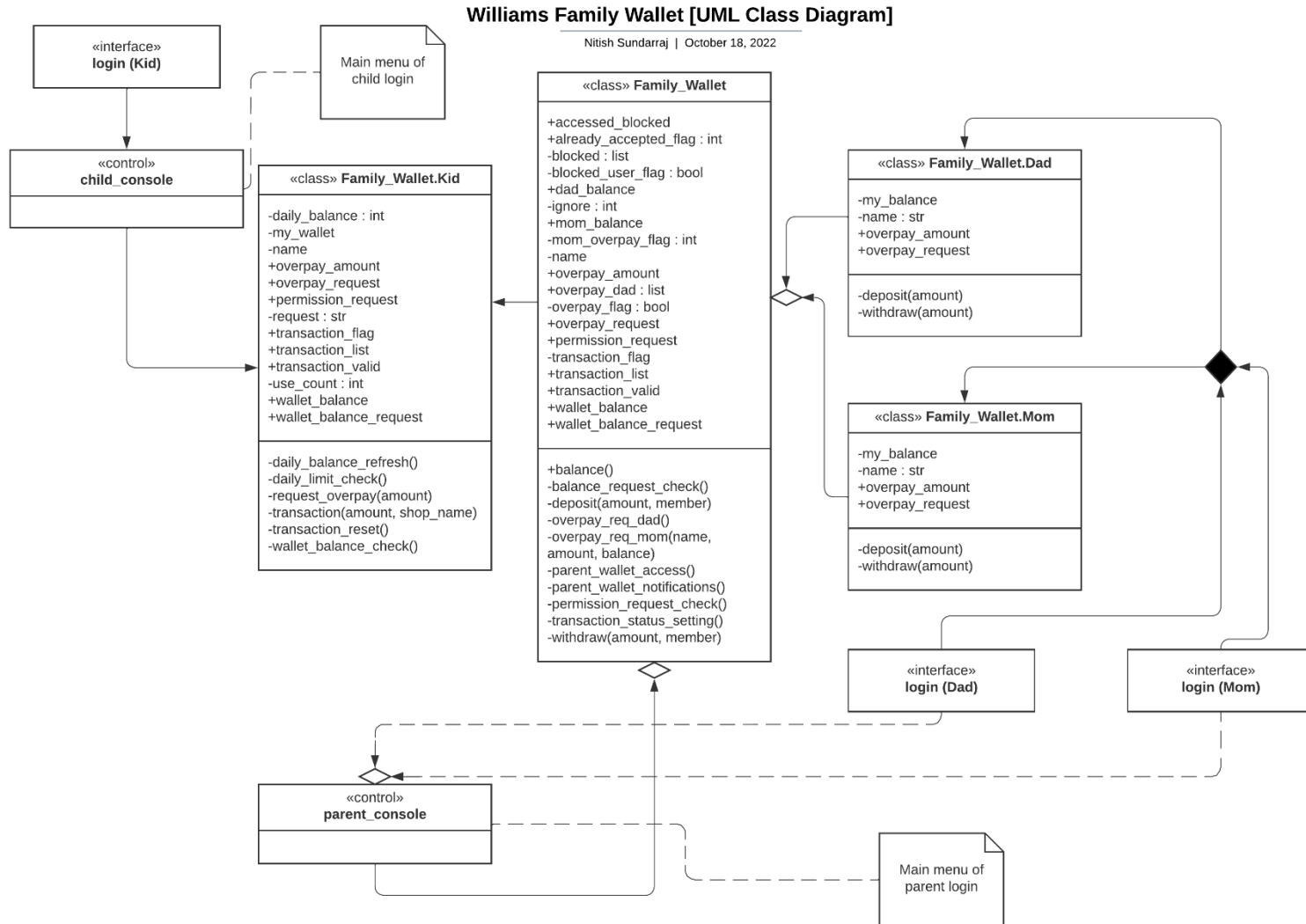
# Sequence Model Diagram

## Sequence Model Diagram

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# UML Class Diagram



## Console Interface

There are two console interfaces for this program, one for parents and another for the all the kid's access. The program was designed in such a way to ensure seamless interface for all the users of the wallet simultaneously similar to a real world scenario. As in real world, every person uses a device of their own. So keeping that in mind, the wallet is designed in a real-time file access methods for real-time data interface. The user input is requested as a number token for every function for easier navigation through the console.

### Parent Console Interface:

#### Login Screen

In this screen, either Mom or Dad can only login. The first login will have them access to their bank account section where they can deposit and withdraw money directly from their bank account. Through the bank account portal they can access their family wallet.

```
Welcome to the Family Bank Wallet (Admin Edition)!
Type the corresponding numbers for navigating the menu.

Type your name number below for Login:
1. Sarah Williams (Mom)
2. Williams Hemisphere (Dad).
Your choice:
```

#### Login Menu

```
You account balance is $ 3100
Choose any option below:
1. Withdraw (Bank)
2. Deposit (Bank)
3. Family Wallet
4. Logout
Your choice:
```

## Bank Withdraw

```
Choose any option below:
1. Withdraw (Bank)
2. Deposit (Bank)
3. Family Wallet
4. Logout
Your choice: 1
How much would you like to withdraw? $ 100
Your account balance is $3000
You have withdrawn $ 100
Press Enter to go back to the menu
```

## Bank Deposit

```
Choose any option below:
1. Withdraw (Bank)
2. Deposit (Bank)
3. Family Wallet
4. Logout
Your choice: 2
How much would you like to deposit? $ 100
You have deposited $ 100
Your account balance is $3100
Press Enter to go back to the menu_
```

## Family Wallet Access Menu

The family wallet access menu shows a wide range of settings that provides the admin user full access to the wallet.

```
Available Balance = $3565
You have accessed the family wallet section:
Please type any of the options below:
1. Deposit
2. Withdraw
3. View Transactions
4. Notifications
6. Transaction Status Setting
7. Main Menu_
```

## Family Wallet Deposit

When an admin deposits in the family wallet, the equivalent amount will be deducted from their bank account and funds will be added in the wallet.

```
Available Balance = $3565
You have accessed the family wallet section:
Please type any of the options below:
1. Deposit
2. Withdraw
3. View Transactions
4. Notifications
6. Transaction Status Setting
7. Main Menu1
How much would you like to deposit? $10

You have deposited $ 10

Your bank account balance is $3090
Press Enter to go back to the menu_
```

```
Available Balance = $3575
You have accessed the family wallet section:
Please type any of the options below:
1. Deposit
2. Withdraw
3. View Transactions
4. Notifications
6. Transaction Status Setting
7. Main Menu
```

### Family Wallet Withdraw

Similar to deposit, when an admin withdraws from the family wallet, the equivalent amount will be added to the logged in admin's bank account.

```
Available Balance = $3575
You have accessed the family wallet section:
Please type any of the options below:
1. Deposit
2. Withdraw
3. View Transactions
4. Notifications
6. Transaction Status Setting
7. Main Menu2
How much would you like to withdraw? $10
You have withdrawn $ 10

Your bank account balance is $3100
Press Enter to go back to the menu
```

```
Available Balance = $3565
You have accessed the family wallet section:
Please type any of the options below:
1. Deposit
2. Withdraw
3. View Transactions
4. Notifications
6. Transaction Status Setting
7. Main Menu
```

### View Transactions

This option will display the whole transaction list showing the history of purchases by all the kids.

```
Transaction List
('name', 'shop_name', 'amount', 'date_time')
('jake', 'lol', '10', datetime.date(2022, 10, 15))
('jake', 'dollarama', '11', datetime.date(2022, 10, 15))
['mia', '1111', '11', datetime.date(2022, 10, 15)]
['shakira', 'Dollarama', '10', datetime.date(2022, 10, 16)]
['shakira', 'dish', '12', datetime.date(2022, 10, 16)]
['shakira', 'dollar', '11', datetime.date(2022, 10, 16)]
['shakira', '1111', '1', datetime.date(2022, 10, 16)]
['mia', 'lol', '11', datetime.date(2022, 10, 16)]
['mia', '11111', '1', datetime.date(2022, 10, 16)]
['ambani', 'dollare', '11', datetime.date(2022, 10, 16)]
['tony', 'dollar', '11', datetime.date(2022, 10, 16)]
['mickey', 'dollarama', '11', datetime.date(2022, 10, 16)]
['mickey', '111', '111', datetime.date(2022, 10, 16)]
['mickey', '111', '111', datetime.date(2022, 10, 16)]
['mickey', '111', '111', datetime.date(2022, 10, 16)]
['sofia', '11', '11', datetime.date(2022, 10, 16)]
['sofia', '111', '11', datetime.date(2022, 10, 16)]
['sofia', '111', '11', datetime.date(2022, 10, 16)]
```



```
['mickey', '11', '11', datetime.date(2022, 10, 18)]  
['sofia', 'lol', '11', datetime.date(2022, 10, 18)]  
['sofia', '11', '11', datetime.date(2022, 10, 18)]  
['tony', '11', '11', datetime.date(2022, 10, 18)]  
['jake', 'lol', '10', datetime.date(2022, 10, 18)]  
['jake', 'dollarama', '10', datetime.date(2022, 10, 18)]  
['jake', 'lol', '10', datetime.date(2022, 10, 18)]  
['jake', 'lol', '100', datetime.date(2022, 10, 18)]  
['tony', 'dollarama', '10', datetime.date(2022, 10, 18)]  
['tony', '10', '10', datetime.date(2022, 10, 18)]  
['tony', '19', '19', datetime.date(2022, 10, 18)]  
Press Enter to go back to the menu
```

## Notifications

Since any kid would have the option to request parents for wallet usage permission for different use cases, I have designed the program in such a way that a parent can access all the request notifications on a single page briefly. All the multiple transactions request, overpay request, and balance request will be displayed in this section and request parent to either approve, disapprove, and transfer requests based on the type of request received. Here are the examples of different request cases from kids in the notifications section.

If no requests:

```
Hello mom!, your family wallet balance is $3565  
No overpay requests  
Press Enter to go back to the menu
```

If requests:

Overpay Request:

```
Available Balance = $3565
You have accessed the family wallet section:
Please type any of the options below:
1. Deposit
2. Withdraw
3. View Transactions
4. Notifications
6. Transaction Status Setting
7. Main Menu4

Hello mom!, your family wallet balance is $3565
Do you want to accept overpay request of $100 for jake? Press (y/n). Press any other key to request Dad
```

Kid's Updated Balance (After Acceptance)

```
Welcome jake!
You daily balance is $100
What would you like to do?
1. Pay
2. Logout_
```

Low Balance Request:

```
mom, your family wallet balance is less than $100
Would you like to deposit some money? Type (y/n)
```

### Multiple Transactions Request:

```
Hello mom!, your family wallet balance is $65  
jake has used the wallet more than twice. Would you like to grant permission for his transaction? Type (y/n)
```

### Block Settings (Only Dad Access)

Block settings menu can only be accessed when the logged in admin is Dad. He can either block or unblock a user by entering the user's name.

```
Available Balance = $65  
You have accessed the family wallet section:  
Please type any of the options below:  
1. Deposit  
2. Withdraw  
3. View Transactions  
4. Notifications  
5. Block Settings  
6. Transaction Status Setting  
7. Main Menu5  
You have accessed the block section.  
Select one of the options below:  
1. Block  
2. Unblock1  
Enter the name of the person to be blocked: mia
```

### Blocked User Login

```
mia you dont have access to the wallet  
Press Enter to go back to the menu_
```

After Unblocked

```
Welcome mia!  
You daily balance is $50  
What would you like to do?  
1. Pay  
2. Logout_
```

Transaction Status Settings

Transaction Status: It is a flag that only updates when a kid's request of transaction is neither accepted or rejected but ignored. Parents have the flexibility to change the transaction status when necessary.

```
Transaction Status List:  
  
jake False  
tony True  
mickey True  
sofia True  
mia True  
shakira True  
amber True  
ambani True  
  
Enter the name of the person to change their transaction status: _
```

```
Enter the name of the person to change their transaction status: jake

Enter the transaction status. '1' for True and '2' for False: 1
Updated Transaction List:
jake True
tony True
mickey True
sofia True
mia True
shakira True
amber True
ambani True
Would you like to make any changes? Type (y/n)
```

## Kids Console

### Login Page

Similar to parent's login, a kid's login is also satisfied through number based token.

```
Welcome to the Family Bank Wallet (Kids Edition)!
Type the corresponding numbers for navigating the menu.

Type your name number below for Login:
1. Jake Williams
2. Tony Williams
3. Mickey Williams
4. Sofia Williams
5. Mia Williams
6. Shakira Williams
7. Amber Williams
8. Ambani Williams
Your choice:
```

After Login

```
Welcome jake!  
You daily balance is $100  
What would you like to do?  
1. Pay  
2. Logout_
```

Making First Transaction

The first transaction of the day has no restrictions other than the daily balance. Every transaction instance a kid makes will be directly added to the transaction list of family wallet.

```
Welcome amber!  
You daily balance is $50  
What would you like to do?  
1. Pay  
2. Logout1  
Enter the merchant name: dollarama  
Enter the amount: $10  
Your transaction is successful  
Welcome amber!  
You daily balance is $40  
What would you like to do?  
1. Pay  
2. Logout
```

## Making a Second Transaction

```
Welcome amber!  
You daily balance is $39  
What would you like to do?  
1. Pay  
2. Logout1  
Enter the merchant name: chicken  
Enter the amount: $2  
You have requested payment for more than once!  
Type '1' to request permission for wallet  
Press Enter to go back to the menu
```

## Overpay Request

When a kid wants to make a transaction for more than his daily limit provided that his wallet balance is not 0, kid can request for a overpay and make transaction for that amount upon acceptance.

```
Welcome amber!  
You daily balance is $39  
What would you like to do?  
1. Pay  
2. Logout1  
Enter the merchant name: club  
Enter the amount: $100  
Would you like to request Mom for overpay? Type (y/n)_
```

## Timesheet

Task	Estimated Time Taken	Actual Time Taken	Completion Date
Project Planning	1hr	1hr	September 6, 2022
Defining User Stories	2hrs	3hrs	September 9, 2022
Planning the overall console interface design to be user interactive	4hrs	5hrs	September 11, 2022
Designing the Parent Class	3hrs	6hrs	September 15, 2022
Developing Parent Class Constraints	2hrs	5hrs	September 17, 2022
Changing the Parent Class Design to Separate Bank Accounts	2hrs	3hrs	September 18, 2022
Designing the Family Wallet Class	6hrs	12hrs	September 22, 2022
Developing all the Family Wallet Constraints	4hrs	5hrs	September 24, 2022
Designing the Kid Class	4hrs	3hrs	September 26, 2022
Changing the Kid Class from planned to dedicating it to only make transactions	6hrs	11hrs	September 29, 2022
Designing the Request functionality of Kid Class	5hrs	16hrs	October 1, 2022
Implemented files accessing due to unable to source updated values into memory between two consoles	7hrs	10hrs	October 3, 2022
Changed the whole file accessing method in the whole project	4hrs	8hrs	October 4, 2022



Implemented logging function log down every transaction and functions in the program.	2hrs	3hrs	October 5, 2022
Designing the Transaction Constraints (multiple transactions check, overpay check etc.)	12hrs	20hrs	October 7, 2022
Testing and Validation	5hrs	14hrs	October 11, 2022
Bug Fixes	13hrs	20hrs	October, 18 2022
Report Creation	5hrs	12hrs	October 18, 2022
Total	87hrs	147hrs	October 18, 2022