QuickFin App

CSE 3310-002

Iteration #3

Money Masters: Group #6

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Jeffery Aguirre,
Oreolorun Akani,
Mohamad Nabih Alkhateeb,
Yahia Elsaad,
Dev Patel

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Application Description:

"QuickFin" is an app designed to make financial management simple and accessible for everyone. The app streamlines key financial tasks, such as calculating tips, estimating mortgage payments, converting currencies, projecting investment returns, applying discounts, and planning savings. Our goal is to provide an intuitive tool that saves time and reduces the complexity of everyday financial decisions, empowering users to manage their money more effectively.

The functions of this app include:

Function 1: **Menu:**

- Allow user to navigate the menu.
- Portray calculator options.

Function 2: **Tip Calculator:**

- Input Bill Amount: User enters the total bill amount
- Tip Percentage: User chooses a tip percentage (preset options like 15%, 18%, 20%, or a custom percentage).
- Calculate Tip: App calculates the tip based on the bill amount and selected tip percentage.
- Total Amount: App shows the total bill amount including the tip.

Function 3: **Mortgage Calculator:**

- Prompt user for Loan Amount and Down Payment: User inputs the loan amount and down payment to calculate the total loan amount.
- Interest Rate: User enters the annual interest rate (APR).
- Loan Term: User selects the loan term for a certain amount of years.
- Monthly Payment: App displays the monthly payment based on total loan amount (after deducting the down payment), interest rate, and loan term.

Function 4: **Currency Converter:**

- Input Amount: User inputs the amount they wish to convert.
- Select Currencies: User selects the currency they are converting from and the currency they want to convert to (for example, USD to EUR).
- Fetch Exchange Rate: The app uses the current exchange rate for the selected currencies to use the selected amount they want to convert (for example, 1 USD = 0.90 EUR in Sept 2024).
- Converted Amount: The app multiplies the input amount by the exchange rate to display the converted value.

Function 5: **Investment Return:**

- Initial Investment: User enters the starting amount they are investing.

- Expected Annual Return Rate: User enters expected annual return.
- Investment Duration: User chooses how long in years they plan to keep the investment.
- Calculate and Display Growth: App calculates and display the investment's future value using the compound interest formula

Function 6: **Discount Calculator:**

- Original Price: User input the original total price of the item they are purchasing.
- Discount Percentage: User inputs the discount percentage offered.
- Discount Amount: App calculates the discount amount by multiplying original price by the discount percentage.
- Final Price: App subtracts the discount amount from the original price and displays the final price after the discount.

Function 7: **Savings Advisor:**

- Monthly income: User inputs amount of monthly income.
- Monthly Savings Goal: User inputs the desired monthly savings goal.
- Expenses: User inputs the amount of expense, and it's description, then click "add expense" button. Expenses are shown to the user in a list format.
- Calculates Savings: After all expenses are added, the app allocates the expenses and determines whether the savings goal has been achieved or not. Based on that, the app display a recommendation message.

Our app will not be utilizing any other resources.

TEAM BIOS:

Ore Akani: I had an Android phone and tablet growing up, so I'm not new to Android software. However, in terms of experience with Android development, this would be my first project developing anything for Android or using any type of Android development software. I have experience coding in Java, though, as that was the first programming language I learned.

Mohamad Nabih Alkhateeb: I have been exposed to Android software through my academic career as a user, but not as a developer. Quite frankly, I don't have experience with developing apps in general. And, even though I do have coding experience with several languages, I don't exactly know how to utilize my coding skills in the sense of developing apps, especially when it comes to using IDE's like Android Studio. And that's what I plan on learning this semester.

Dev Patel: I also grew up using an Android tablet like Ore, which provided some

familiarity with the platform. However, I have no prior experience with Android development or app development in general. I have around one year of experience working with Java, which is a key language for Android development. Java will provide our group a good foundation for learning Android development, especially in terms of object-oriented programming and understanding how Java can be applied in Android environments and app development.

Yahia Elsaad: Regarding the programming language Java, I have intermediate experience with it and feel comfortable coding it. I've created a couple of projects using it and feel confident in my ability to use it. As for Android, I have experience with Androids considering the fact that I had an Android phone when I was younger. However, I have no experience with Android Studio so learning it will be a new adventure for me.

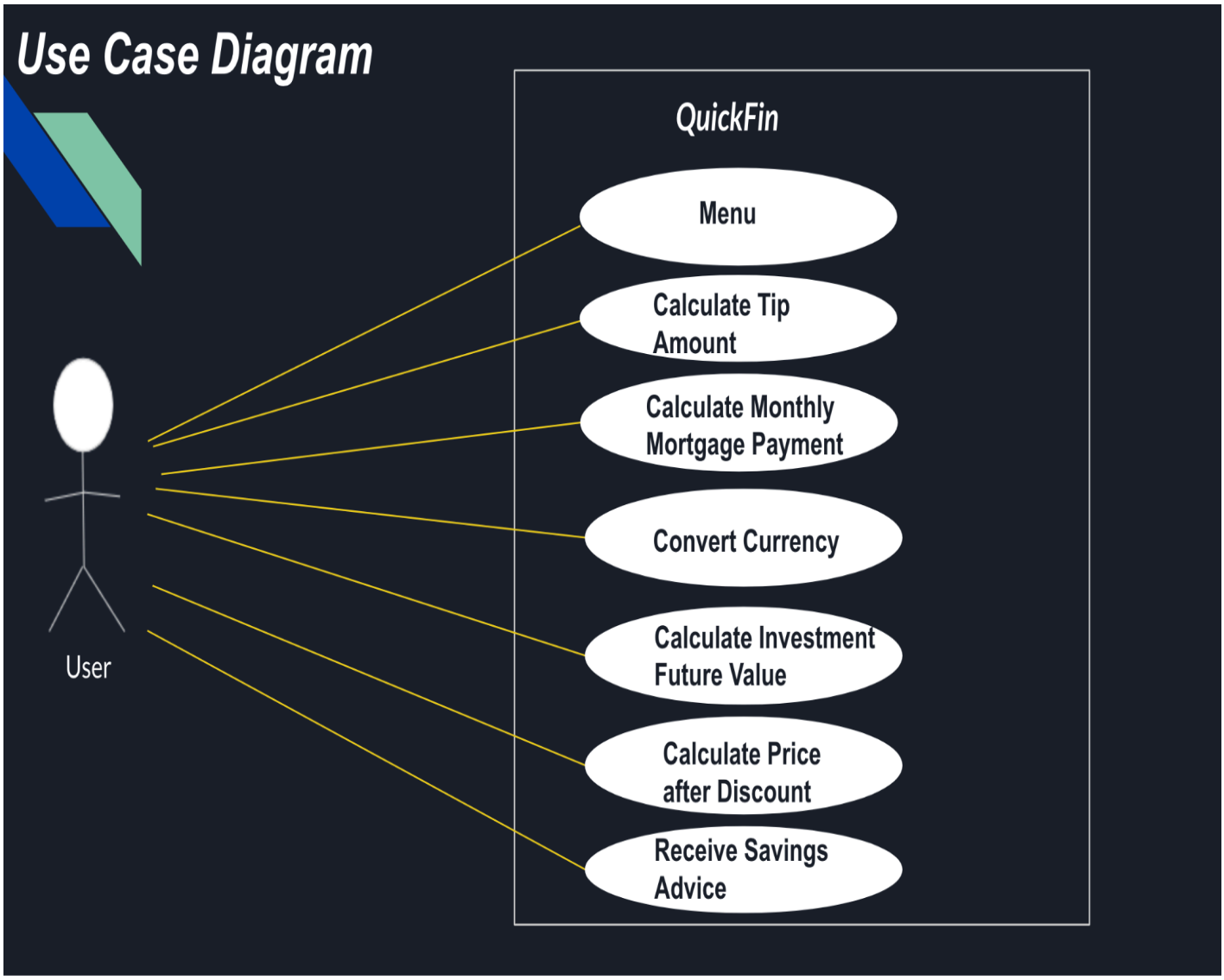
Jeffery Aguirre: I don't have any prior experience with Android development or Android software. However, I am familiar with Java and have completed several projects using it. I'm excited to start using Android Studio, as it will give me the opportunity to work with an IDE and build an app, which is a new challenge for me. I'm also excited to learn and apply new skills to create a functional and engaging application.

Requirements

Req ID	Requirement Description	Line Number
R1	The app shall allow the user to view the home menu which includes the function home	10 - 12
R2	The app shall allow the user to calculate their tip amount with total bill	13 - 19
R3	The app shall allow user to calculate monthly mortgage payment	20 - 27
R4	The app shall allow the user to convert from one currency to another	28 - 36
R5	The app shall allow the user to calculate their investment future value using compound interest formula	37 - 43
R6	The app shall allow user to determine their final price after discount	44 - 51
R7	The app shall user to receive savings advice based on their monthly income and expenses	52 - 60

High-Level Use Cases

- UC1: Menu
  - **TUCBW** the user has successfully opened the app.
  - **TUCEW** the user clicks one of the six functions from the main menu.
- UC2: Calculate Tip Amount
  - **TUCBW** the user clicks the “Tip Calculator” button from the main menu.
  - **TUCEW** the user clicks the “Calculate” button and displays the result derived from step 4.
- UC3: Calculate Monthly Mortgage Payment
  - **TUCBW** the user clicks the "Mortgage Calculator" button from the main menu.
  - **TUCEW** user clicks the "Calculate" button and displays the result derived from step 6.
- UC4: Convert Currency
  - **TUCBW** the user clicks the “Currency Converter” button from the main menu.
  - **TUCEW** the user clicks the “Convert” button and displays the result derived from step 4.
- UC5: Calculate Future Investment Value
  - **TUCBW** user clicks the “Investment Return Calculator” button from the main menu.
  - **TUCEW** user clicks the "Calculate" button to display the result derived from step 4.
- UC6: Calculate Price after Discount
  - **TUCBW** the user clicks the “Discount Calculator” button from the main menu.
  - **TUCEW** the user clicks the "Calculate" button to process the input
- UC7: Receive Savings Advice
  - **TUCBW** the user clicks the "Savings Advisor" button from the main menu
  - **TUCEW** the user clicks the "Calculate" button to receive savings advice and displays the respective message based on inputs.


Use Case Diagram
QuickFin
Menu
Calculate Tip Amount
Calculate Monthly Mortgage Payment
Convert Currency
Calculate Investment Future Value
Calculate Price after Discount
Receive Savings Advice
User

Requirements - Use Case Traceability Matrix

	Priority Weight	UC1	UC2	UC3	UC4	UC5	UC6	UC7
R1	1	X						
R2	2		X					
R3	4			X				
R4	4				X			
R5	3					X		
R6	2						X	
R7	3							X

Score	1	2	4	4	3	2	3

Note: Priority is ranked 1-4 with 1 being the highest priority

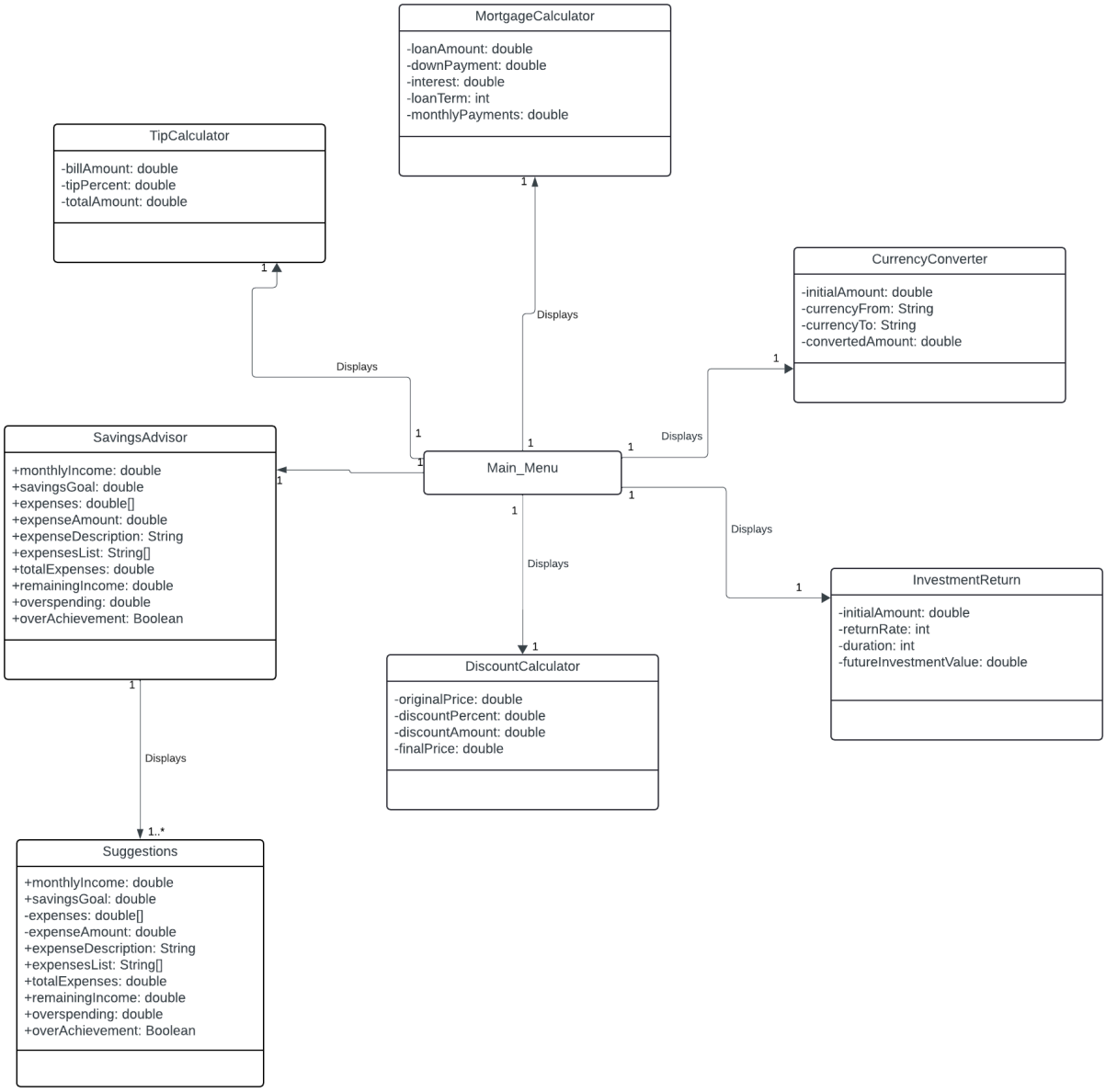
Increment Matrix

Use Cases	Priority	Effort (person-weeks)	Depends on	Assigned to	Iteration 1 (10/02/2024)	Iteration 2 (10/30/2024)	Iteration 3 (11/18/2024)
UC1	1	2	None	DP	2		
UC2	2	2	UC1	YE	1	1	
UC3	4	3	UC1	JA,OA	1	1	1
UC4	4	2	UC1	OA, DP		1	1
UC5	3	3	UC1	MA,YE	1	2	
UC6	2	2	UC1	MA		2	
UC7	3	2	UC1	MA,DP,YE			2
Total Effort		16			5	7	4

1 Person-Week = 5 hours

Team Members: Jeffery Aguirre, Oreolorun Akani, Mohamad Nabih Alkhateeb, Yahia Elsaad, Dev Patel

Domain Model Diagram

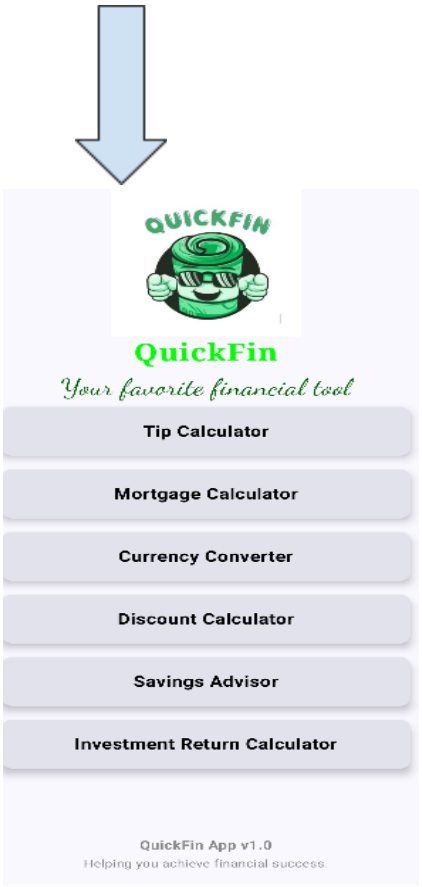


Expanded Use Cases

Step 2

EUC 1: Menu

Precondition: *The use case assumes that the user is able to and ready to open the app.*	
Actor: App User	System: QuickFin app
1) **TUCBW** the user has successfully opened the app. 3) **TUCEW** the user clicks one of the six functions from the main menu.	0) System is loading the application. 2) System displays the menu interface - 6 buttons, one for each key app function.
Postcondition: *The system navigates to the selected function page and is ready to execute the chosen operation.*	



EUC 2: Calculate Tip Amount

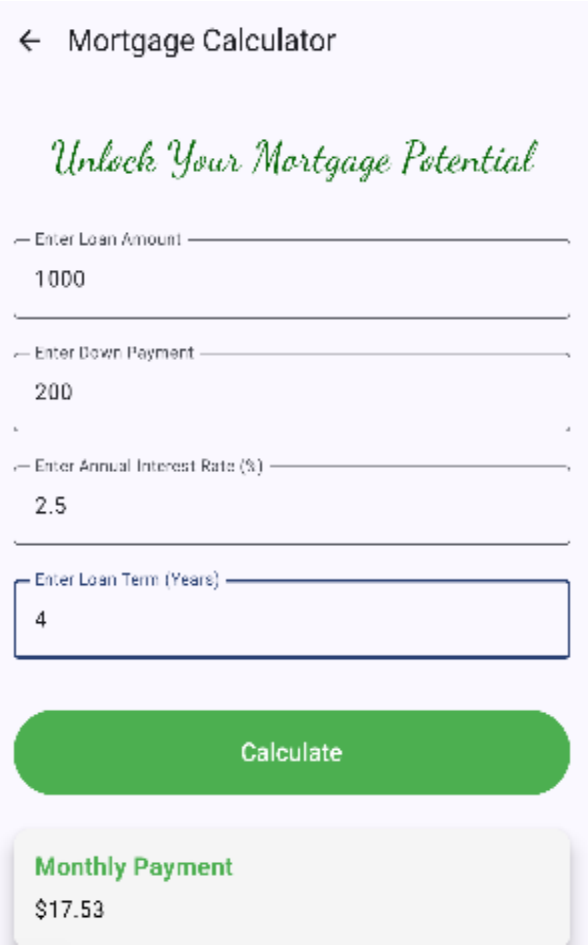
Precondition: This use case assumes that the user has opened the QuickFin app and is seeing the home menu.	
Actor: App User	System: QuickFin app
1. **TUCBW** the user clicks the “Tip Calculator” button from the main menu. 3. The user enters the total bill amount and their desired specific tip percentage. 5. **TUCEW** the user clicks the “Calculate” button and displays the result derived from step 4.	0. System displays the home menu with various options including the Tip Calculator. 2. System displays the Tip Calculator page with 3 recommended tip percentages, and 1 custom percentage button to calculate the bill total and total tip amount. 4. System validates the inputs and calculates the tip and the total bill with the tip included, then displays the result.
Postcondition: The calculated tip and total bill (with tip included) are displayed on the screen for the user.	

EUC 3: Calculate Monthly Mortgage Payment

Precondition: *The use case assumes the user has successfully launched the app which displays the main menu where the "Mortgage Calculator" function is available for selection.*

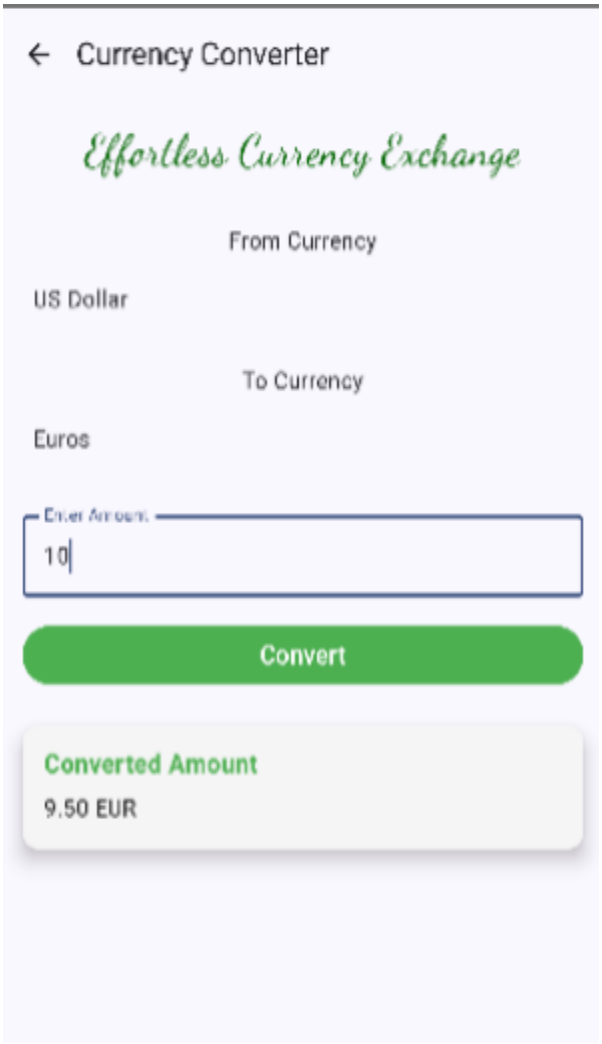
Actor: App User	System: QuickFin app
1. **TUCBW** the user clicks the "Mortgage Calculator" button from the main menu.	0. System displays the main menu with available options, including the 'Mortgage Calculator' function - user is now able to select this option to proceed.
	2) System displays the Mortgage Calculator function - available input fields for loan amount, down payment, annual interest rate (APR), and loan term, as well as a "Calculate" button.
3. The user enters the loan amount and down payment in the input fields.	
	4. System calculates the total loan amount by subtracting the down payment from the loan amount.
5. The user enters the annual interest rate (APR), and loan term (in years) in their respective input fields.	
	6. System receives and validates the loan amount, down payment, interest rate, and loan term entered by the user. System calculates the monthly payment based on the total loan amount, interest rate, and loan term using the appropriate mortgage payment formula.
7. **TUCEW** user clicks the "Calculate" button and displays the result derived from step 6.	

Postcondition: The system successfully displays the calculated monthly mortgage. The user is able to review or modify the inputs if needed or return to the main menu to select from the six available functions again.



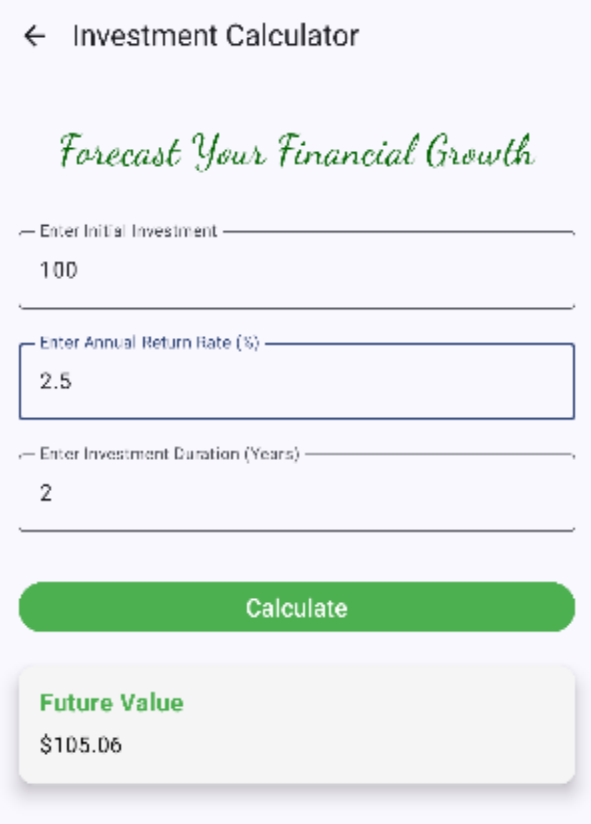
EUC 4: Convert Between Two Currencies

Precondition: *This use case assumes that the user has opened the QuickFin app and is seeing the home menu.*	
Actor: User	System: QuickFin App
1. **TUCBW** the user clicks the “Currency Converter” button from the main menu. 3. The user selects the currency they want to convert from and the currency they want to convert to, and enters the amount. **5. TUCEW** the user clicks the “Convert” button and displays the result derived from step 4.	0. System displays the home menu with various options including the Currency Converter. 2. System displays the Currency Converter page with options to choose the currencies and input the amount. 4. System calculates the converted amount based on the real-time exchange rate.
Postcondition: The converted amount is displayed on the screen for the user in the desired currency.	



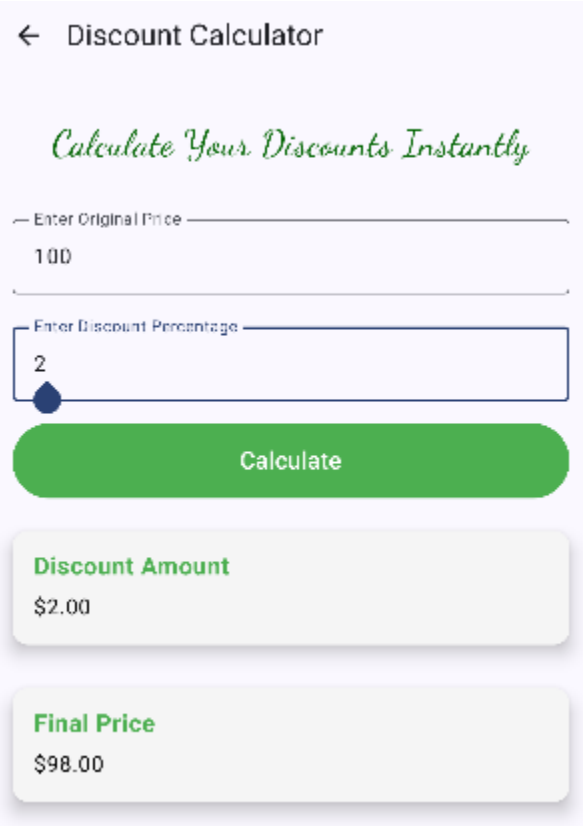
EUC 5: Calculate Investment Future Value

Precondition: *The use case assumes the user has successfully launched the app which displays the main menu where the "Investment Return Calculator" function is available for selection.*	
Actor: User	System: QuickFin app
1. TUCBW user clicks the “Investment Return Calculator” button from the main menu. 3. The user enters the initial investment amount, expected annual rate, investment duration (in years) in their respective input fields. 5. **TUCEW** user clicks the "Calculate" button to display the result derived from step 4.	0. System displays the main menu with available options, including the 'Investment Return Calculator' function - user is now able to select this option to proceed. 2. System displays the "Investment Return Calculator" function - with input fields for the initial investment amount, expected annual return rate, and investment duration, along with a "Calculate" button. 4. System receives and validates the inputs for initial investment, annual return rate, and investment duration entered by the user. System applies a general investment formula (such as the compound interest formula) to calculate the future value of the investment.
Postcondition: The system successfully displays the future value of an investment. The user is able to review or modify the inputs if needed or return to the main menu to select from the six available functions again.	



EUC 6: Calculate Price after Discount

Precondition: *The use case assumes the user has successfully launched the app which displays the main menu where the "Discount Calculator" function is available for selection.*	
Actor: User	System: QuickFin App
1. **TUCBW** the user clicks the “Discount Calculator” button from the main menu. 3. The user enters the original price of the item in the input fields. 5. The user enters their desired discount percentage in the input field. 7. **TUCEW** the user clicks the "Calculate" button to process the input.	0. System displays the main menu with available options, including the 'Investment Discount Calculator' function - users are now able to select this option to proceed. 2. System displays the "Discount Calculator" function with input fields for the original price and discount percentage, as well as a "Calculate" button. 4. System receives and validates the original price of the item entered by the user. 6. System receives and validates the discount percentage entered by the user. System calculates the discount amount based on the original price and the discount percentage provided by the user. System calculates the final price by subtracting the discount amount from the original price.
Postcondition: The system successfully displays the discount amount and the final price after applying the discount. The user is able to review or modify the inputs if needed or return to the main menu to select from the six available functions again.	

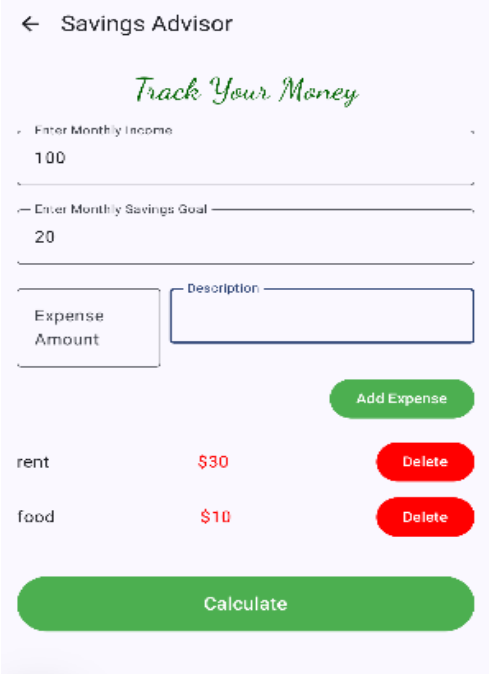


EUC 7: Receive Savings Advice

Precondition: The use case assumes the user has successfully launched the app, which displays the main menu where the "Savings Advisor" function is available for selection.

Actor: App User	System: QuickFin App
1. **TUCBW** the user clicks the "Savings Advisor" button from the main menu. 3. The user enters their amounts of monthly income, savings goal, expenses along with their description (e.g., rent, mortgage, insurance) in the input fields. 5. **TUCEW** the user clicks the "Calculate" button to receive savings advice and displays the respective message based off inputs along with the subtracted amount (message and subtracted amount is described in step 4).	0. The system displays the main menu with available options, including the 'Savings Advisor' function - user is now able to select this option to proceed. 2. The system displays the "Savings Advisor" interface with an input field for monthly income, monthly savings goal, and an input for entering expenses as well as a "Calculate" button. 4. The system receives and validates all inputs for income, savings goal, and expenses provided by the user. The system calculates the total expenses by summing all the expenses entered by the user. The system determines whether or not the total expenses the user input exceeds or doesn't exceed the total income subtracted by the monthly savings goal. Based on this number, the system generates a message: - If the total amount of expenses exceeds the total income subtracted by the monthly savings goal: System will print a message printing " Underachieved! Try saving more next time. - If the total amount of expenses doesn't exceed the total income subtracted by the monthly savings goal: System will print a message printing " Well done! You achieved your savings goal! You exceeded your goal by $%d " (%d representing how much money you saved based off your income and savings goal)

Postcondition: The system successfully displays the calculated monthly savings and provides personalized financial advice. The user is able to review or modify the inputs if needed or return to the main menu to select from the six available functions again.



Non-Trivial Step

EUC 2: Tip Calculation

Step 4 - While the step itself may not yield varied responses for different users based solely on the user's role, it's context-sensitive.
- For example, if the system allows users to set preferences for tip percentages based on past behavior or demographics (e.g., a user who regularly tips more might have that preference saved), then the output could vary based on these settings.
Depending on the implementation, this could involve background processing (e.g., validating inputs, handling potential errors like non-numeric values, and possibly persisting data for future calculations).

Precondition: This use case assumes that the user has opened the QuickFin app and is seeing the home menu.	
Actor: App User	System: QuickFin app
1. **TUCBW** the user clicks the "Tip Calculator" button from the main menu. 3. The user enters the total bill amount and their desired specific tip percentage. 5. **TUCEW** the user clicks the "Calculate" button and displays the result derived from step 4.	0. System displays the home menu with various options including the Tip Calculator. 2. System displays the Tip Calculator page with 3 recommended tip percentages, and 1 custom percentage button to calculate the bill total and total tip amount. 4.* System validates the inputs and calculates the tip and the total bill with the tip included, then displays the result.
Postcondition: The calculated tip and total bill (with tip included) are displayed on the screen for the user.	

Non Trivial Step

EUC 3: Calculate Monthly Mortgage Payment

Step 6 - Before this calculation can take place, the system must ensure that the loan amount and down payment are valid (e.g., the down payment should not exceed the loan amount). This necessitates the processing of inputs and might involve checks or interactions with other components or functions that validate or manipulate the data before this step.

<table>
<tr><td colspan="2">Precondition: The use case assumes the user has successfully launched the app which displays the main menu where the "Mortgage Calculator" function is available for selection.</td></tr>
<tr><td>Actor: App User</td><td>System: QuickFin app</td></tr>
<tr><td>1. TUCBW the user clicks the "Mortgage Calculator" button from the main menu.

3. The user enters the loan amount and down payment in the input fields.

5. The user enters the annual interest rate (APR), and loan term (in years) in their respective input fields.

7. TUCEW user clicks the "Calculate" button and displays the result derived from step 6.</td><td>0. System displays the main menu with available options, including the 'Mortgage Calculator' function - user is now able to select this option to proceed.

2) System displays the Mortgage Calculator function - available input fields for loan amount, down payment, annual interest rate (APR), and loan term, as well as a "Calculate" button.

4. System calculates the total loan amount by subtracting the down payment from the loan amount.

6.* System receives and validates the loan amount, down payment, interest rate, and loan term entered by the user. System calculates the monthly payment based on the total loan amount, interest rate, and loan term using the appropriate mortgage payment formula.</td></tr>
<tr><td colspan="2">Postcondition: The system successfully displays the calculated monthly mortgage. The user is able to review or modify the inputs if needed or return to the main menu to select from the six available functions again.</td></tr>
</table>

Non Trivial Step

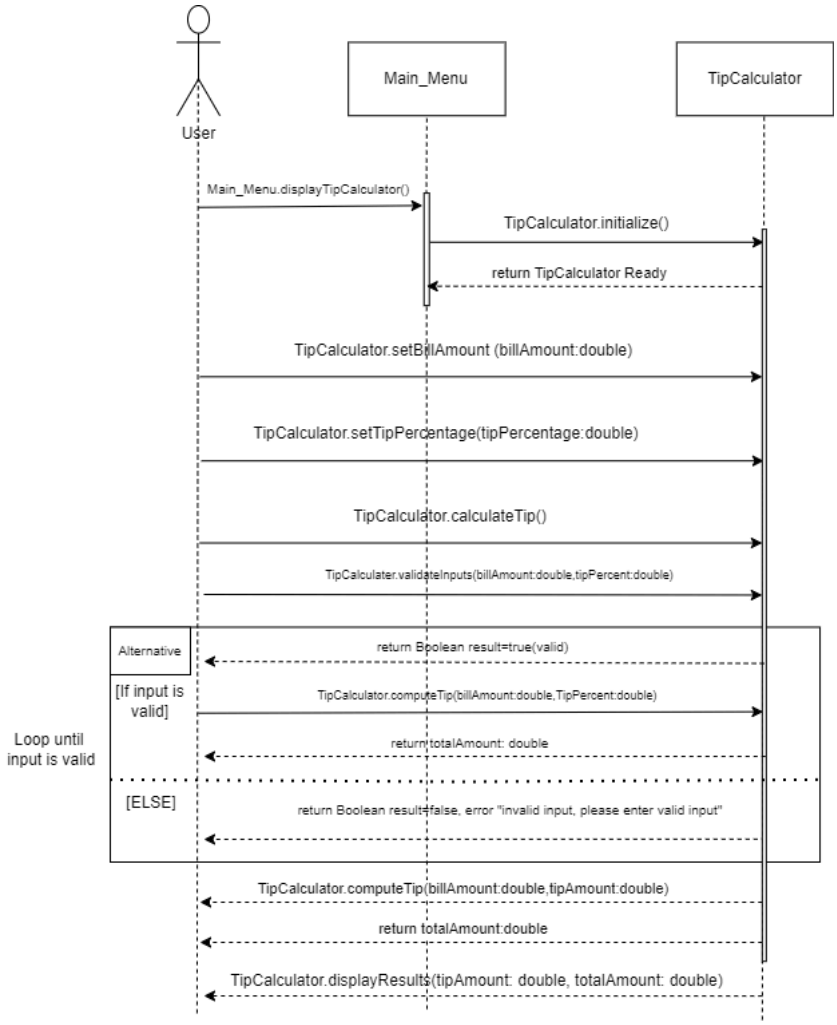
EUC 4: Convert Between Two Currencies

Step 4 - This step requires background processing to perform calculations and likely involves interaction between the currency conversion module and the user input data. The response could differ based on the currencies selected (e.g. if different conversion rates apply).

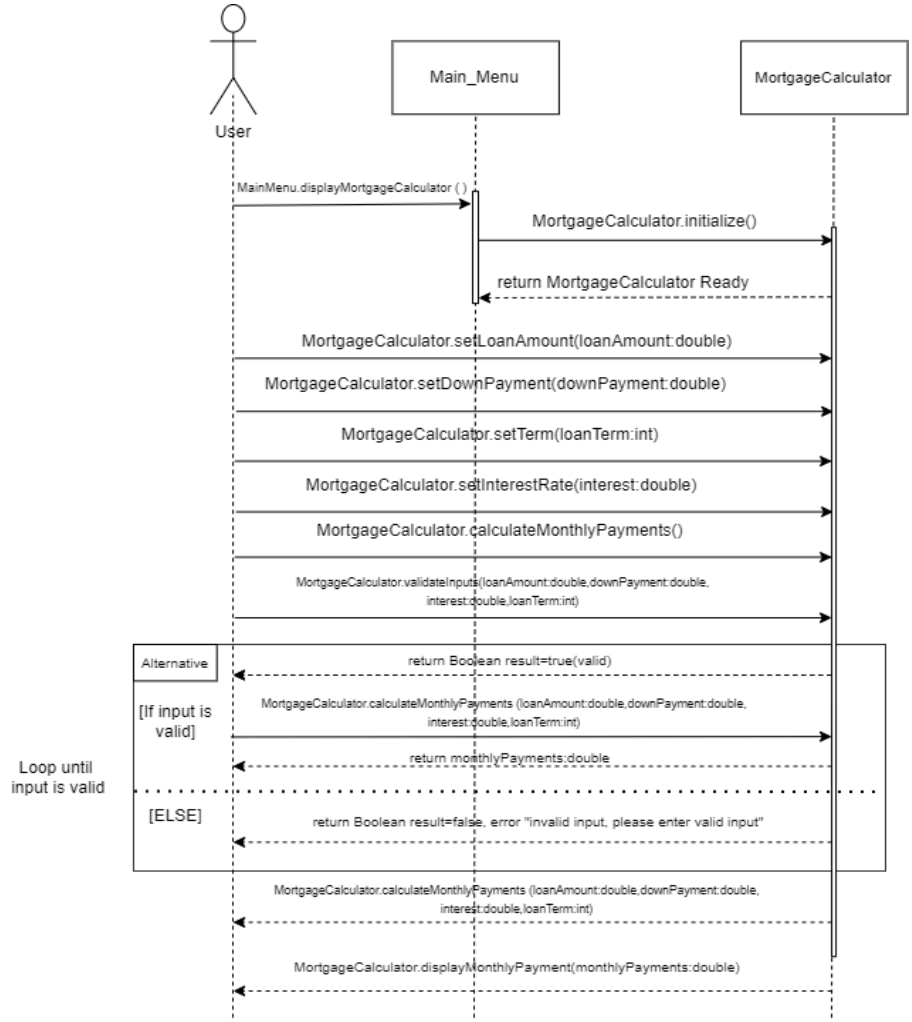
Precondition: *The use case assumes the user has successfully launched the app which displays the main menu where the "Currency Converter" function is available for selection.*	
Actor: User	System: QuickFin App
1. **TUCBW** the user clicks the “Currency Converter” button from the main menu. 3. The user selects the currency they want to convert from and the currency they want to convert to, and enters the amount. **5. TUCEW** the user clicks the “Convert” button and displays the result derived from step 4.	0. System displays the home menu with various options including the Currency Converter. 2. System displays the Currency Converter page with options to choose the currencies and input the amount. 4. System calculates the converted amount based on the real-time exchange rate.
Postcondition: The system successfully displays the converted amount. The user is able to review or modify the inputs if needed or return to the main menu to select from the six available functions again.	

Design Sequence Diagrams

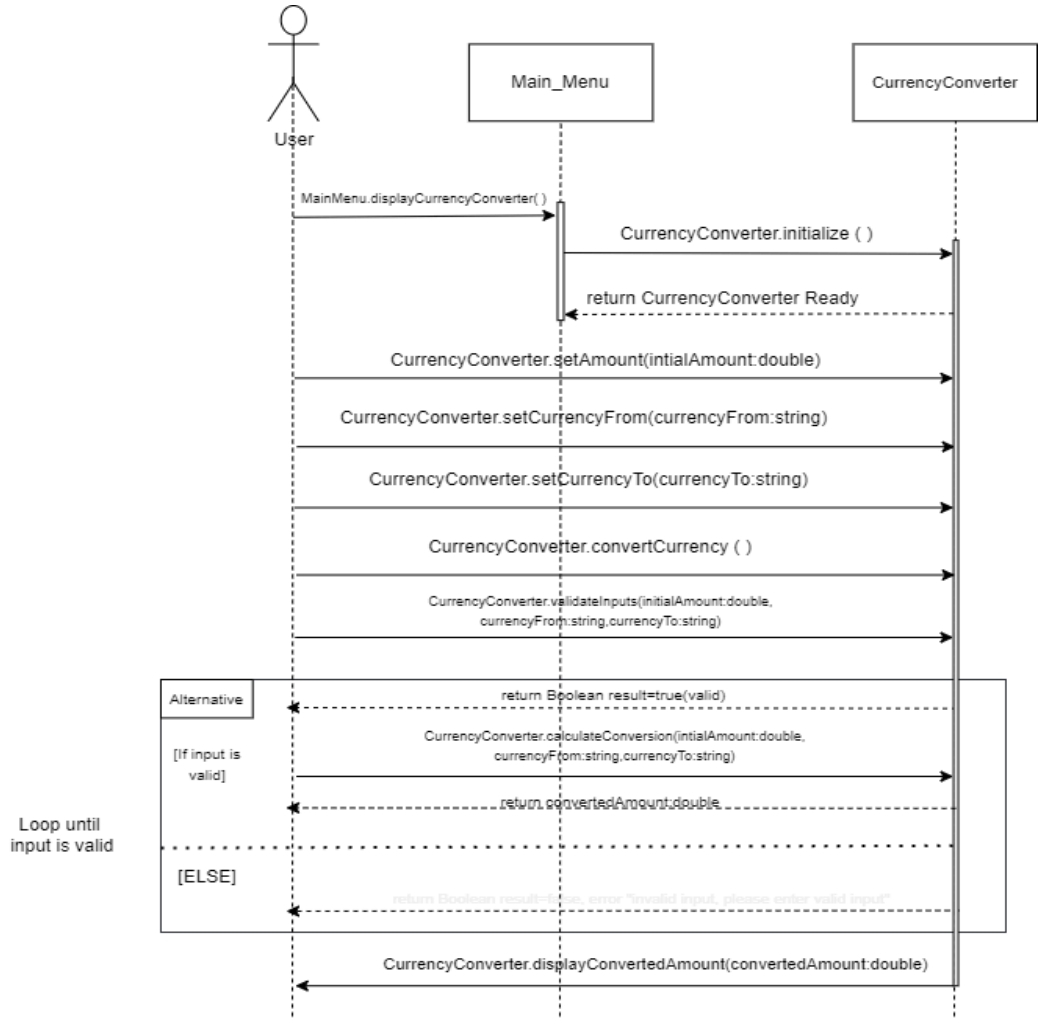
UC 2: Calculate Tip Amount



UC 3: Calculate Monthly Mortgage Payment

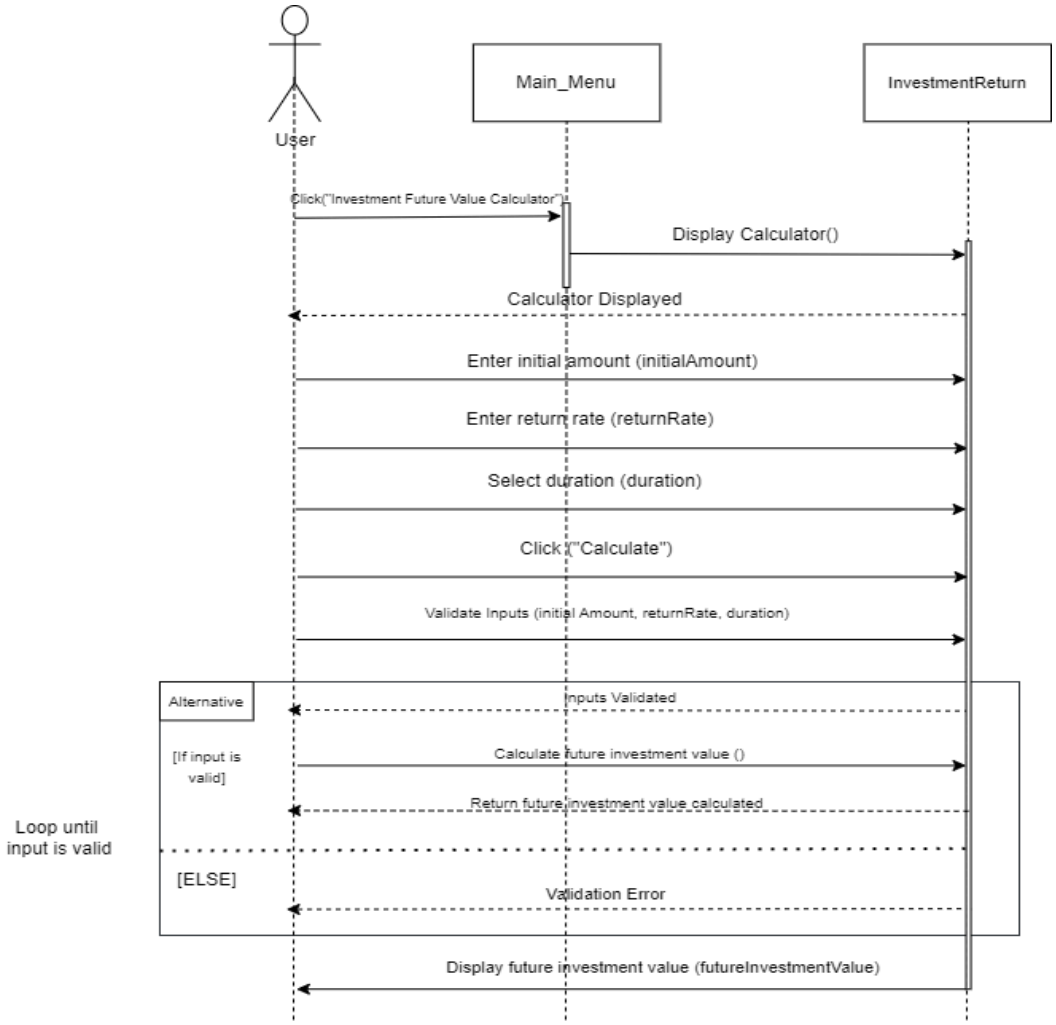


UC 4: Convert Currency

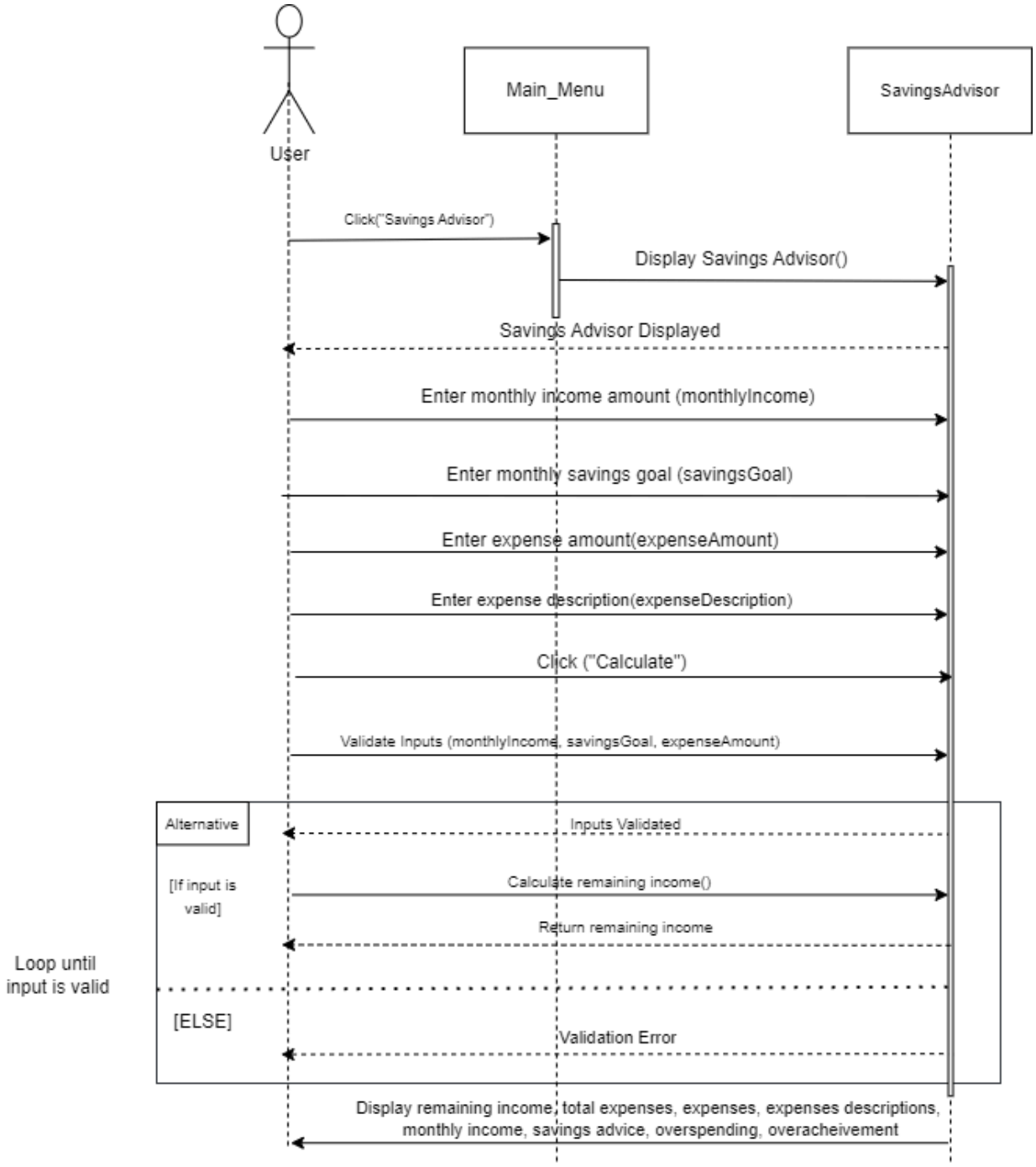


Analysis Sequence Diagrams

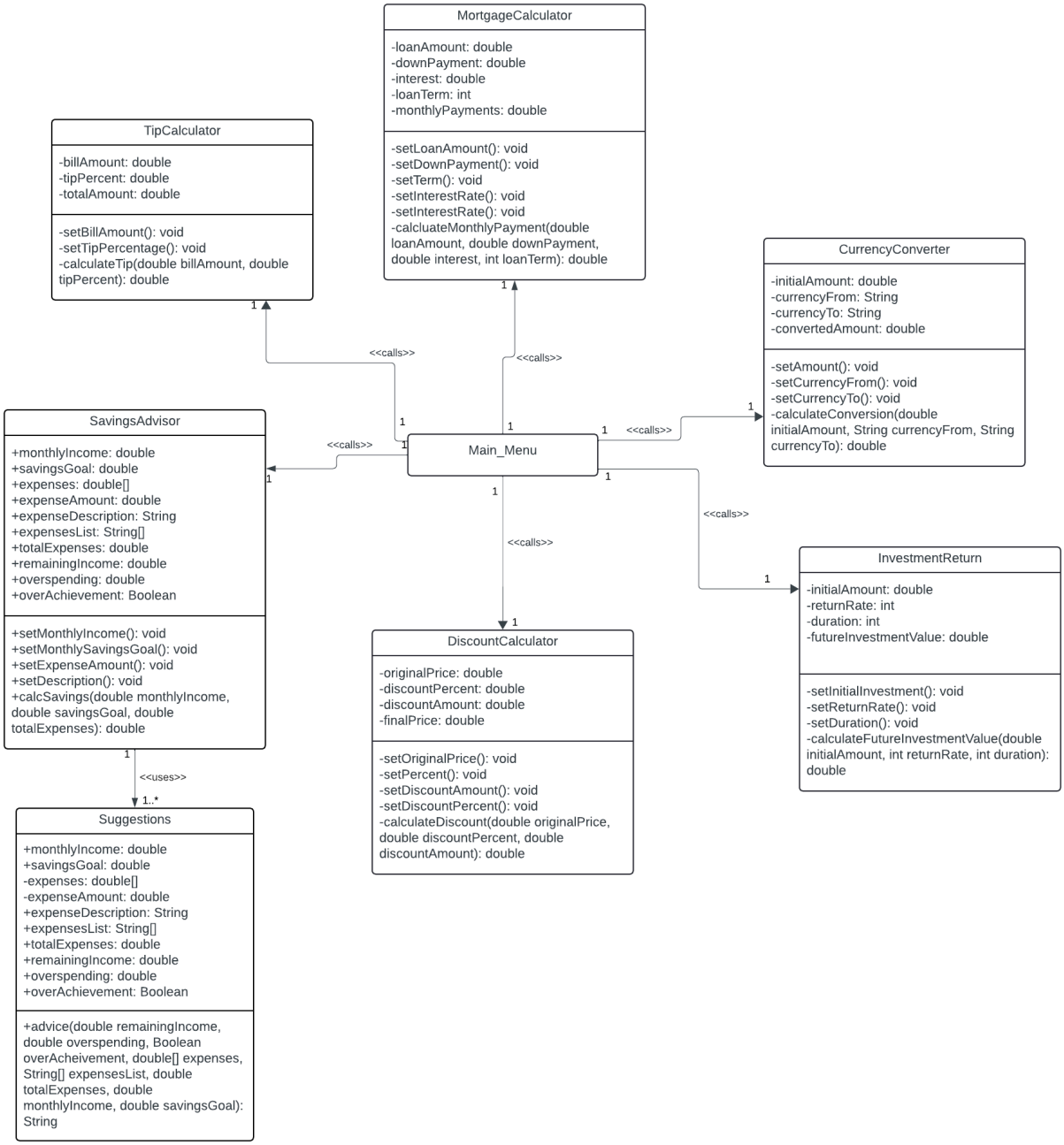
UC 5: Investment Return Calculator



UC 7: Receive Savings Advice



Design Class Diagram



Youtube App Demo

URL: https://youtu.be/_DCBa3raniM