Budget Buddy Capstone Project

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Executive Summary

In the scope of this project, I aim to develop a solution for young adults to manage their finances. This is a critical skill to have in the scope of the world as it is today and young adults face many challenges when it comes to being financially stable and independent. Young adults today have the complex challenge of budgeting their daily expenses and planning for long-term financial goals. The consequences of overspending can lead to stress and debt as well as limiting the scope of long-term aspirations, for instance, buying a house or saving for retirement. I want to address this issue among the demographic by assisting in the issue of overspending as a result of poor money management. Through this project, I aim to provide young adults with the tools and resources necessary to improve their finance management and make informed financial decisions. As a result, they will have the necessary tools and resources to alleviate stress and work towards their financial goals.

My solution to this issue is to create a mobile app where they can easily and efficiently manage their finances. The overall scope of this project is to provide the user with a way to manage their finances easily. With this app, I aim to develop a user-friendly experience that allows the user to easily track and visualize their income and expenses in the hope that they will be able to track their spending habits. I created an app where the user can track their expenses as well as manage their savings. The app prompts the user to enter their income, expenses, and savings goals. The app also provides recommendations on how they can best divide their income among their expenses. I worked with Mercer University to create, modify, and deploy my mobile application, Budget Buddy. I studied human behavior and combined my findings with theory and skills in computer science, programming, and design. I applied user experience and interaction theories and tools to analyze user needs and developed my application in accordance. I modified

my app to create seamless user interfaces to meet the users' needs effectively. I designed and

developed the Budget Buddy app by applying user-centered system interface design principles.

The development of the app was data-driven and human-centered to measure efficiency and

effectiveness.

Acknowledgments

Background

According to The Currency, their clients believe that they should have begun investing earlier and frequently worry about their college-aged kids. They believe their kids should begin financial planning and investing as soon as possible. Approximately, 45% of undergrad students earn their first paycheck and are tempted to spend it all on whatever they want rather than planning for the future. When it comes to dividing your income among your expenses, The Currency suggests using the 50-30-20 rule. The 50-30-20 rule is allocating 50% of your income towards your needs such as housing, utilities, food, clothing, insurance, and transportation, 30% of your income towards wants such as entertainment, vacations, and recreation activities, and 20% of your income towards your savings for both short-term and long-term goals. In conclusion, tracking and categorizing your spending and creating a plan is the key to smart money management.

According to Smart Asset, saving and investing are both important to begin at an early age to get the most out of compound interest. For example, if you invest $150 from each paycheck starting at the age of 25 and have an annual return of 8% you will have approximately $1.1 million at the age of 65. On the other hand, if you do the same at 35 you will only have $490,000. They also recommend budgeting and keeping track of your spending. Doing this can reveal things such as unused subscriptions and help address unnecessary expenses. While financial planning can be difficult, it is also worth it because of the potential return and savings.

Investopedia also provides some insight into how young adults can get over financial hurdles. They recommend learning about and understanding personal finance before entering the workforce so you can get a handle on your finances early. The issue is that financial literacy is not typically taught in school. As a result, young adults can lack the knowledge of how to tackle

student loans and plan for retirement. Common mistakes made by many young adults are making

poor budgeting choices, lacking a savings or emergency fund, and acquiring high-interest credit

card debt. To reach a point of financial stability, young adults must overcome these challenges.

Project Planning and Management

Project Timeline

Week 1

In the first week, this is the initial timeline I developed. My goal was to complete my task by the

given dates.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	In Progress
Log In / Create Profile Function	11/01/23	11/07/23	
Check Balance Function	11/08/23	11/12/23	
Input Expenses Function	11/13/23	11/20/23	
Send Alert Function	11/21/23	11/27/23	
Usability Testing II	11/28/23	12/01/23	
Finalizing App	12/02/23	12/05/23	

Week 2

In the second week, I was meeting my target dates. This week, I created the front end and basic

navigation.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	Complete
Log In / Create Profile Function	11/01/23	11/07/23	In Progress
Check Balance Function	11/08/23	11/12/23	
Input Expenses Function	11/13/23	11/20/23	
Send Alert Function	11/21/23	11/27/23	
Usability Testing II	11/28/23	12/01/23	
Finalizing App	12/02/23	12/05/23	

Week 3

In the third week, I was still meeting my target dates. This week I created the register and login

function.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	Complete
Log In / Create Profile Function	11/01/23	11/07/23	Complete
Check Balance Function	11/08/23	11/12/23	In Progress
Input Expenses Function	11/13/23	11/20/23	
Send Alert Function	11/21/23	11/27/23	
Usability Testing II	11/28/23	12/01/23	
Finalizing App	12/02/23	12/05/23	

Week 4

This week, I continued working on backend features.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	Complete
Log In / Create Profile Function	11/01/23	11/07/23	Complete
Check Balance Function	11/08/23	11/12/23	Complete
Input Expenses Function	11/13/23	11/20/23	In Progress
Send Alert Function	11/21/23	11/27/23	
Usability Testing II	11/28/23	12/01/23	
Finalizing App	12/02/23	12/05/23	

Week 5

This week, I was still working on my UI design and backend.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	Complete
Log In / Create Profile Function	11/01/23	11/07/23	Complete
Check Balance Function	11/08/23	11/12/23	Complete
Input Expenses Function	11/13/23	11/20/23	Complete
Send Alert Function	11/21/23	11/27/23	In Progress
Usability Testing II	11/28/23	12/01/23	
Finalizing App	12/02/23	12/05/23	

Week 6

This week, I removed the alert function from my timeline. I concluded that I would not be able to implement this function in the allotted time.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	Complete
Log In / Create Profile Function	11/01/23	11/07/23	Complete
Check Balance Function	11/08/23	11/12/23	Complete
Input Expenses Function	11/13/23	11/20/23	Complete
Usability Testing II	11/28/23	12/01/23	In Progress
Finalizing App	12/02/23	12/05/23	

Week 7

This week, I worked on finalizing the app. I also fixed some bugs and added some functions that I could easily implement in a short amount of time.

	Start	Finish	Status
Task List	10/06/23	10/06/23	Complete
Storyboard	10/09/23	10/09/23	Complete
Persona	10/10/23	10/10/23	Complete
Prototype I	10/11/23	10/13/23	Complete
Front End	10/14/23	10/24/23	Complete
Usability Testing	10/25/23	10/31/23	Complete
Log In / Create Profile Function	11/01/23	11/07/23	Complete
Check Balance Function	11/08/23	11/12/23	Complete
Input Expenses Function	11/13/23	11/27/23	Complete
Usability Testing II	11/28/23	12/01/23	Complete
Finalizing App	12/02/23	12/05/23	Complete

Project Scope

Many young adults struggle with managing their finances. Therefore, the scope of the app is to create a mobile app built utilizing Flutter and Firebase that can allow the user to easily manage their finances. This app will be developed for, both, Android and iOS. The final project has to be developed and deployed within an 8-week time frame. As a result, I will have to prioritize the most important features that will allow me to complete the project in the allocated time frame.

Project Deliverables

The project should have a login and create account feature. Each user should be assigned a unique ID upon creating an account. Also, every user's email should be unique. When creating an account the user should be prompted to enter information such as their recurring income, saving goals, recurring expenses, and how they would like to divide their income. When logged in to their account, the user should see their available balance and their expenses categorized. Also, they should have a visual representation of their spending. Furthermore, they should be able to edit their information such as their income, expenses, savings goals, income division, and password.

Success Measurements

My measurement for the success of my project is to successfully implement 90% of the features and functions of the app. The user should be able to navigate around the app without me intervening once I have explained the app. My final project also should perform well in peer review and testing. I have determined a task to be successful if 70% of the users can complete tasks in 10 or less seconds.

Project Management

Throughout the course of the project, I had to adjust my timeline. The app went under multiple rounds of user testing. Some tasks such as developing the User Interface and Backend took longer than expected to develop and had to be revisited and revised. For instance, I had to revise my UI by adding an edit button next to the user's expenses after peer testing revealed this would be more optimal. Therefore, I had to adjust the project timeline and abandon some features that I wanted to develop for the app due to time constraints.

<div align="center">

System Design

</div>

Stakeholders Map
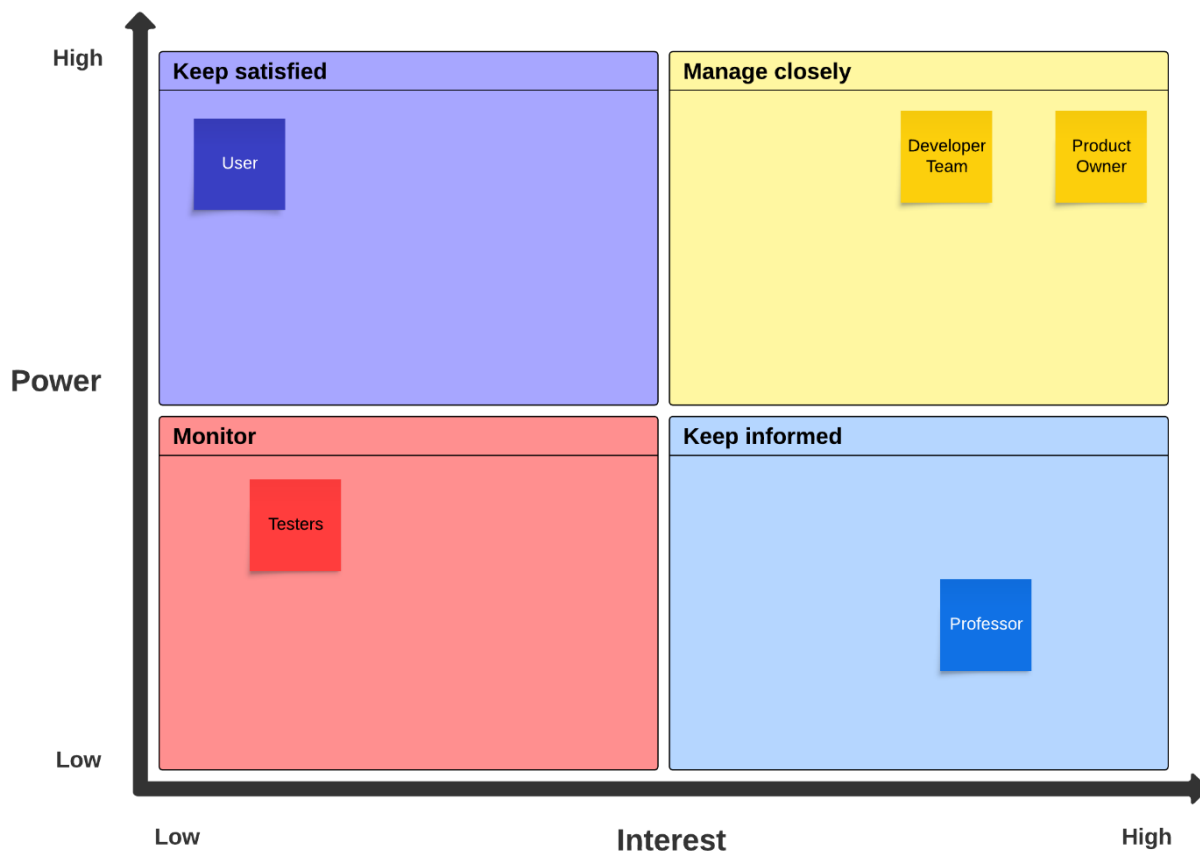
Interview

Script: Setup

Since this is the initial interview there may be a follow-up if more information is necessary, the focus will be on the Budget Buddy app. Items needed to ensure that no data is lost will be a notepad, a pen/pencil, a digital voice recorder (DVR) for a live meeting, and a laptop for a virtual meeting.

Script: Intro & Participant Background

Hello, my name is Amir Akins and I thank you for taking the time to meet with me today. First, I would like to know if it is okay for me to record this interview.

(If it is not ok to record) – That is perfectly fine. I really would like for you to be comfortable with this process. Please be aware that this might extend the interview a little.

(If it is ok to record) – Thank you for your permission to record this interview. This will help me in case I miss anything during this process.

Now that we have the formality out of the way, please give me some background into yourself that specifically deals with why we are here, such as your connection to this project, what you expect from doing this project, and how you see your influence affecting the final outcome of this project.

Thank you for answering. Now that I have some background information, would you mind if we start with the interview questions?

Interview Questions:

      1. How do you currently track your finances?

      2. Do you have any specific financial goals?

      3. How do you categorize your budget?

      4. Have you had any trouble in your personal life managing your finances, and if so, what do you find most difficult about it?

      5. Would you like financial advice based on spending patterns?

      6. How often do you use mobile apps?

      7. Do you currently use a finance management app, and if so, what are your current frustrations with the app?

      8. What are the most important features you like to see within the app?

      9. How often do you like to receive notifications?

      10. What is your preferred mobile device and Operating System (i.e. iOS, Android, etc.)?

Script: In Closing

Thank you for participating in this interview. I have just a couple more questions. Is there anything that I missed? Do you have anything else you would like to share? Well, I have a lot to consider and think about. Thank you again for your time. Have a great day!

User Analysis

The type of person who would find this app useful is someone who struggles to manage their

finances and save money. If you want to manage your finances, save money, or categorize your

expenses this app can be useful to you. Recent grads who are entering the workforce for the first

time and have no idea how they should manage their income can benefit a lot from using this

app. If you are in a scenario where you are having trouble tracking your spending habits and

want a place to track your income and expenses in one place, this app can be useful.

Story Board

Mary is having a hard time tracking her finances

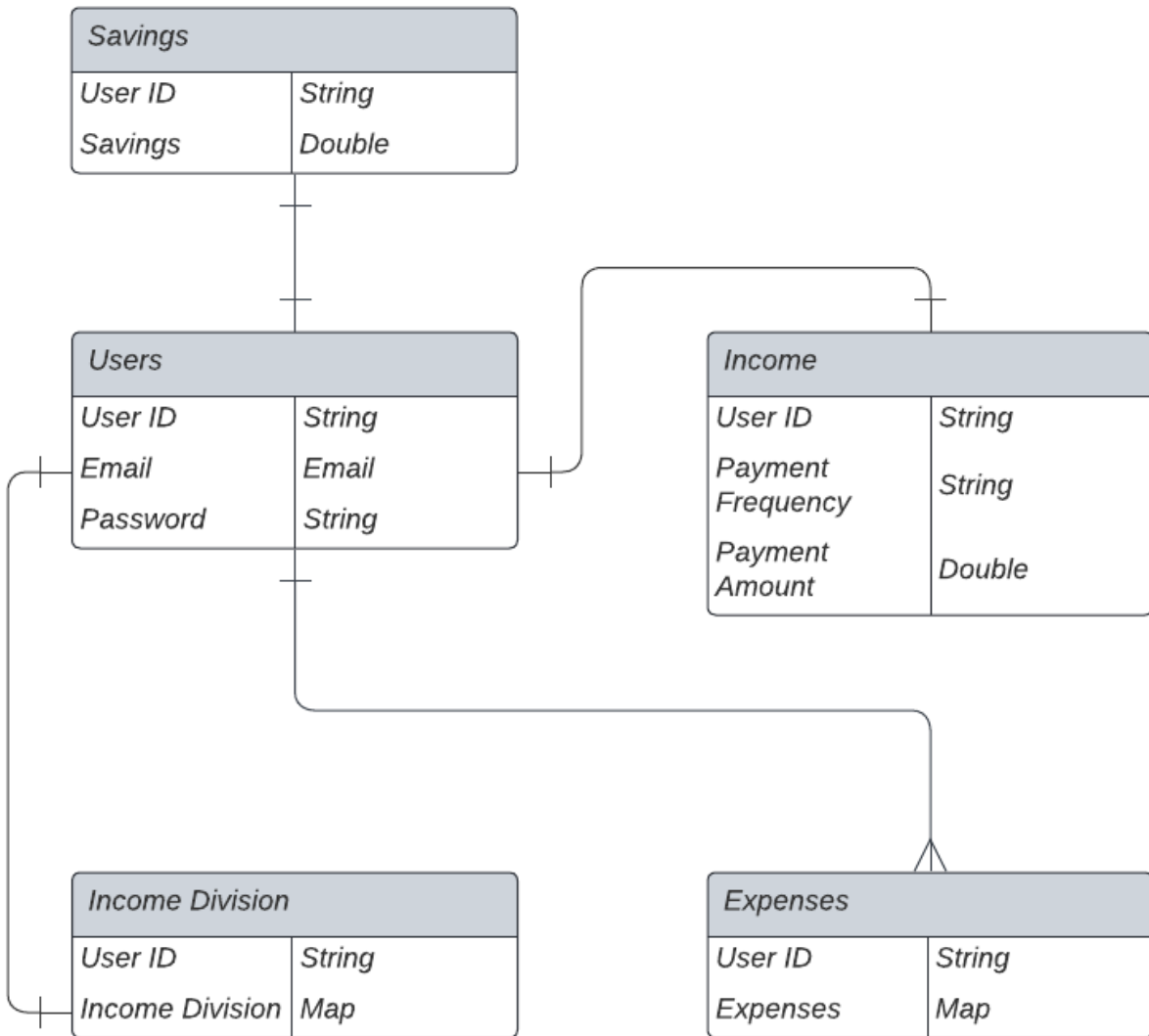She wants a way to track her income and expenses in one place

She downloads the Budget Buddy App

Now she can easily track her income and expenses with one app

ERD Database Design

Savings	
User ID	String
Savings	Double

Users	
User ID	String
Email	Email
Password	String

Income	
User ID	String
Payment Frequency	String
Payment Amount	Double

Income Division	
User ID	String
Income Division	Map

Expenses	
User ID	String
Expenses	Map

My database stores the user's email and password. They are also assigned a unique user ID upon registering an account. This unique user ID links to other tables which allows for user-specific data upon logging in. In the database, we store their monthly goal, their specified income division amongst expenses, their income amount, and a list of their expense into a map holding description, frequency, amount, and category. To calculate their monthly income, if they selected

their payment frequency as weekly, we multiply the payment amount by 4. If they selected their

payment frequency as bi-weekly, we multiply the payment amount by 2. We can leave the

payment amount as is if they select their payment frequency as monthly. I utilized a similar

method to calculate any recurring income inputted by the user upon registering an account.

Functions

Functions and features that have in mind for the app are creating an account, logging in, changing their password, setting a monthly saving goal, adding and editing their income, adding and editing their expenses, dividing their income among expenses, dividing their expenses into four categories (housing, transportation, food, and personal), and providing a visual representation of their spending habits in the form of a graph. The graph will turn red if the user goes over budget. I also want to add a function that allows the user to be notified when bills are due as well as when they are over the allotted budget.

User Task List

I create a list of tasks that a user can complete by utilizing the functions and features provided in the application.

      1. Mary wants to create an account

      2. Mary wants to log into her account

      3. Mary wants to add an expenses

      4. Mary wants to edit recurring income

      5. Mary wants to add/edit recurring expenses

      6. Mary wants suggestions on how to divide her expenses

      7. Mary wants to divide her expenses into different categories

      8. Mary wants to edit her income among expenses

      9. Mary wants to set a monthly saving goal

      10. Mary wants to change her monthly savings goal

Site Structure
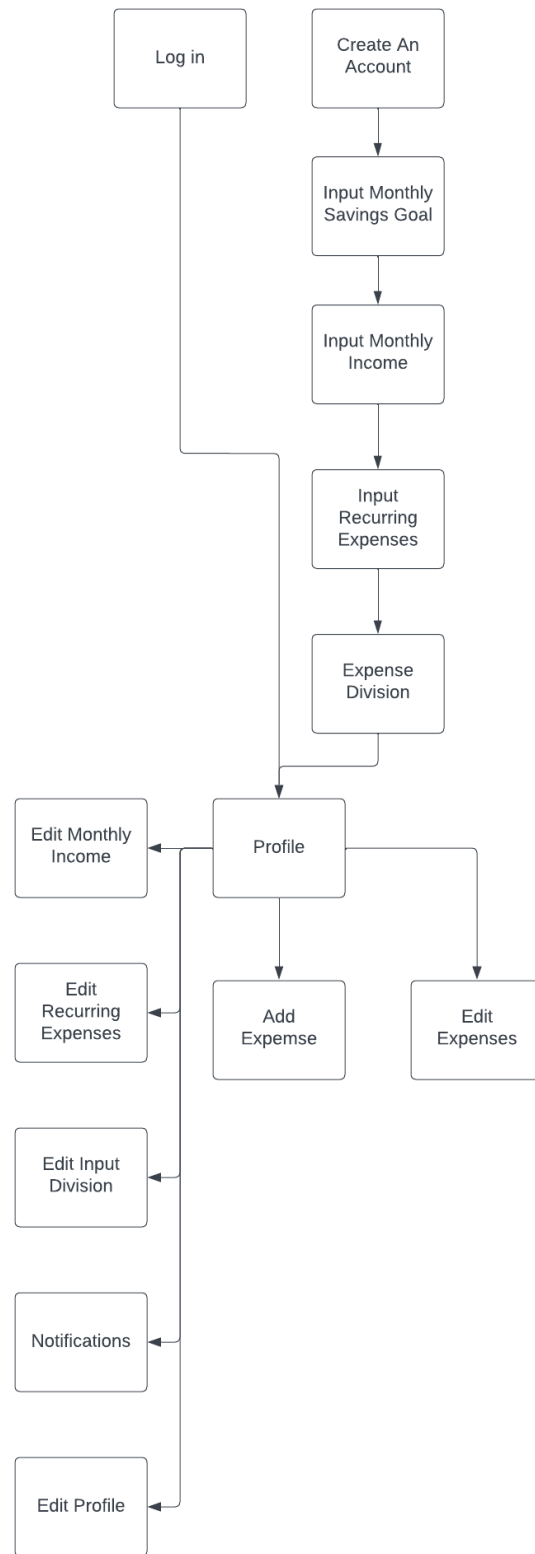
Prototype: Made with Adobe XD

I created a prototype with Adobe XD to draft the layout and navigation of the app. I have not

settled on a color scheme at this point.

Email

Password

Login

Don't have account? Register here

Name

Email

Password

Password

Register

Payment Frequency   ▽

Amount

Next

Name   Category   Ocurance   Amount

Name   Category   Ocurance   Amount

Add Expense

Name

Category   ▽

Occurance   ▽

Amount

20/20/20/20/20   ▽

Savings   20% $200

Transportation   20% $200

Food   20% $200

Housing   20% $200

Personal   20% $200

Submit

Add

(+)   Next   (+)   Next

Profile   (/)   Log out   Profile   Log out   Profile   (/)   Log out

Savings $0/$200   Savings $0/$200

Add

Transportation $300/$200   Add Expense   Recurring Expenses

Add   Name   Recurring Income

Car Payment $200   Income Division
Insurance $100   Savings   ▽

Food $100/$200   Amount   Profile

Add   Notifications

Pizza $100

Housing $0/$200   Add

Add   Add

Personal $0/$200   Personal $0/$200

Add   Add

Add

Name   Category   Ocurance   Amount

Payment Frequency   ▽

Amount

Name

Email

Password

Save

Save

(+)   Save

20/20/20/20/20   ▽

Notify me when spending   ⬤   Savings   20% $200
too much

Transportation   20% $200

Food   20% $200

Housing   20% $200

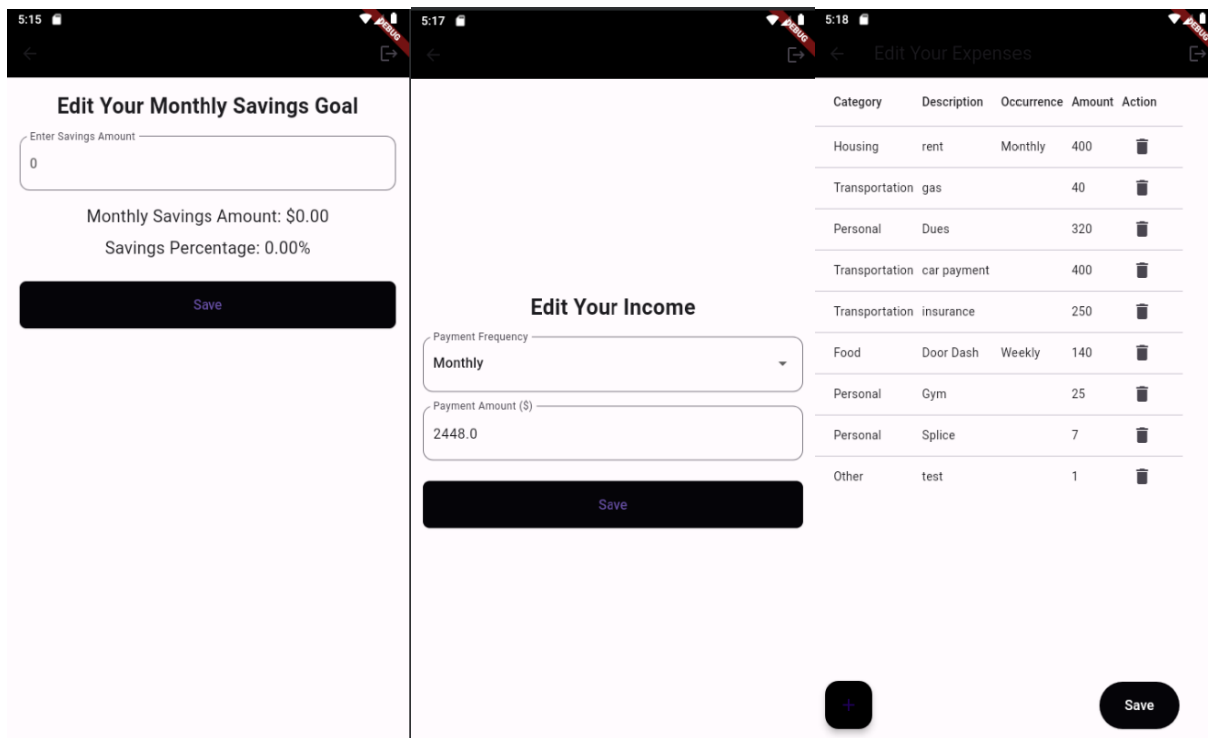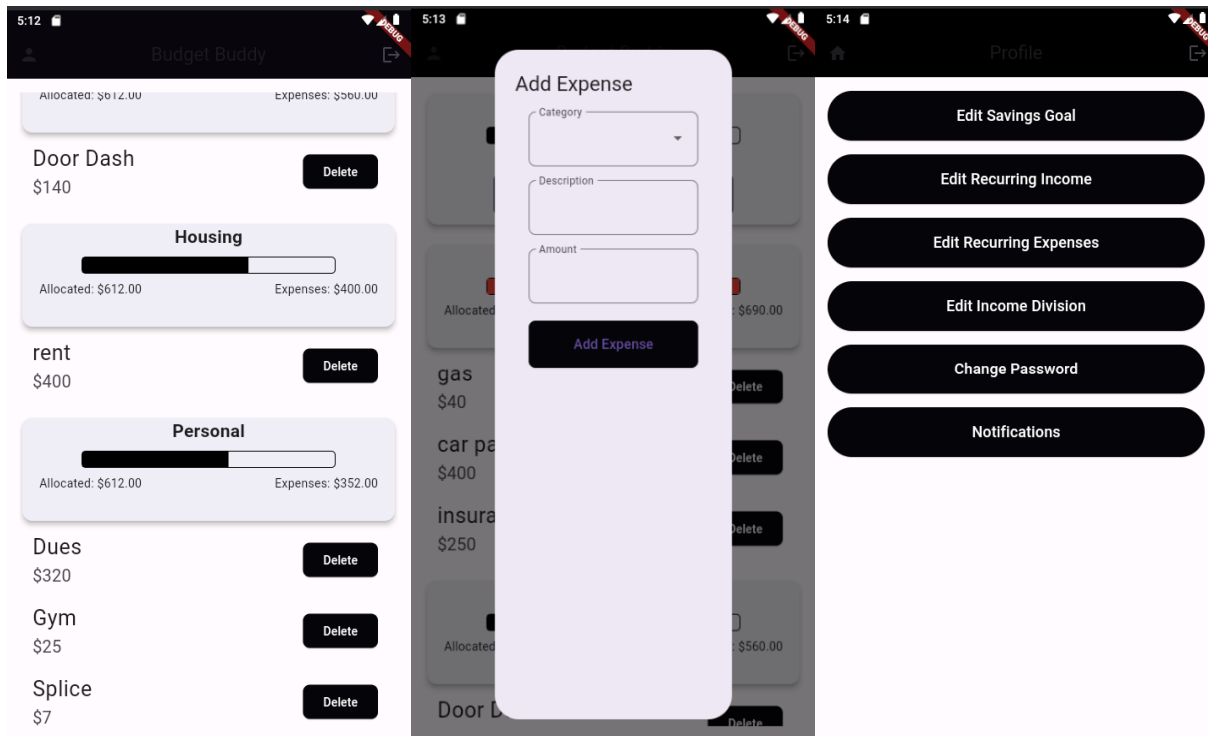Personal   20% $200

Save   Save

Version 1

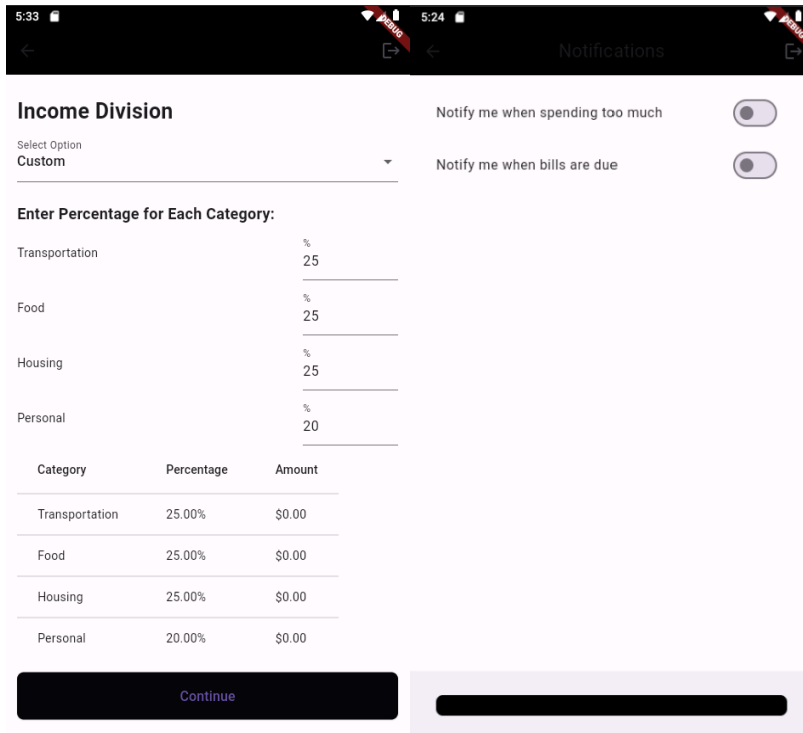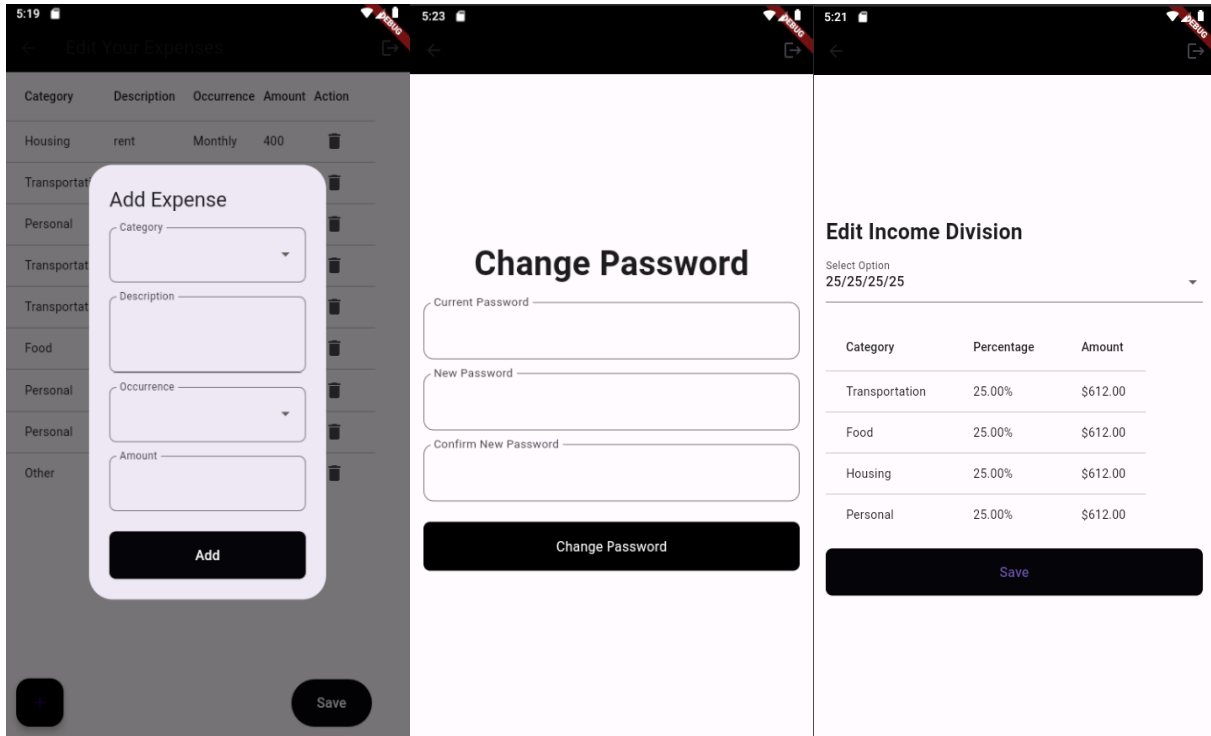This is version 1 of the Budget Buddy app. This version of the app will undergo user testing, so I can find ways to improve it.

First screen (5:12 - Budget Buddy):

Allocated: $612.00 — Expenses: $560.00

Door Dash
$140   Delete

Housing
Allocated: $612.00   Expenses: $400.00

rent
$400   Delete

Personal
Allocated: $612.00   Expenses: $352.00

Dues
$320   Delete

Gym
$25   Delete

Splice
$7   Delete

Second screen (5:13 - Add Expense):

Add Expense

Category

Description

Amount

Add Expense

gas
$40   Delete

car pa...
$400   Delete

insura...
$250   Delete

Allocated: $560.00

Door D...   Delete

Third screen (5:14 - Profile):

Edit Savings Goal

Edit Recurring Income

Edit Recurring Expenses

Edit Income Division

Change Password

Notifications

Fourth screen (5:15 - Edit Your Monthly Savings Goal):

Edit Your Monthly Savings Goal

Enter Savings Amount
0

Monthly Savings Amount: $0.00
Savings Percentage: 0.00%

Save

Fifth screen (5:17 - Edit Your Income):

Edit Your Income

Payment Frequency
Monthly

Payment Amount ($)
2448.0

Save

Sixth screen (5:18 - Edit Your Expenses):

Category	Description	Occurrence	Amount	Action
Housing	rent	Monthly	400	🗑
Transportation	gas		40	🗑
Personal	Dues		320	🗑
Transportation	car payment		400	🗑
Transportation	insurance		250	🗑
Food	Door Dash	Weekly	140	🗑
Personal	Gym		25	🗑
Personal	Splice		7	🗑
Other	test		1	🗑

Save

Add Expense

Category

Description

Occurrence

Amount

Add

Change Password

Current Password

New Password

Confirm New Password

Change Password

Edit Income Division

Select Option
25/25/25/25

Category	Percentage	Amount
Transportation	25.00%	$612.00
Food	25.00%	$612.00
Housing	25.00%	$612.00
Personal	25.00%	$612.00

Save

Income Division

Select Option
Custom

Enter Percentage for Each Category:

Transportation   % 25

Food   % 25

Housing   % 25

Personal   % 20

Category	Percentage	Amount
Transportation	25.00%	$0.00
Food	25.00%	$0.00
Housing	25.00%	$0.00
Personal	20.00%	$0.00

Continue

Notify me when spending too much

Notify me when bills are due

Usability Study Methodology

The methodology I used for testing is measuring the amount of time it takes for the user to complete a specified task. I was able to gather data on how efficient our solution is, it allows us to analyze user behavior, and help us identify potential usability issues. I also asked questions to the user to gauge their experience. This provides a deeper understanding of the user perspective and allows me to align my solution to meet the needs of the target user based on user feedback. In combination, these two methods provide a quantitative and qualitative research methodology that provides valuable data and perspectives as well as will assist in the development of the app.

After my usability study analysis, where I had users test my application and attempt to complete specified tasks as well as receive feedback on desired features, I noticed some bugs and some features that needed to be added to enhance the user's experience. First, I was made aware of a bug with the change password function. You could change the password without entering the correct current password. Also, the password could be blank. While it would not change the password to nothing, it would give the user a message stating the password was successfully changed. Second, I was informed some of the text was too small and hard to read so I increased the size of some of the text such as allocated and expenses underneath the bar displaying the user spending and the labels for the text box. Third, the app would allow the user to enter non-numeric values in sections where a numeric value was required if they used a physical keyboard rather than the virtual keyboard that is provided on mobile devices. This would result in the app crashing. This was an oversight by me because the app was intended to be used by mobile devices and the virtual keyboard that is provided by the phone. On the same note, I noticed that, on iOS devices, when entering a value into an input field that required the user to enter a dollar
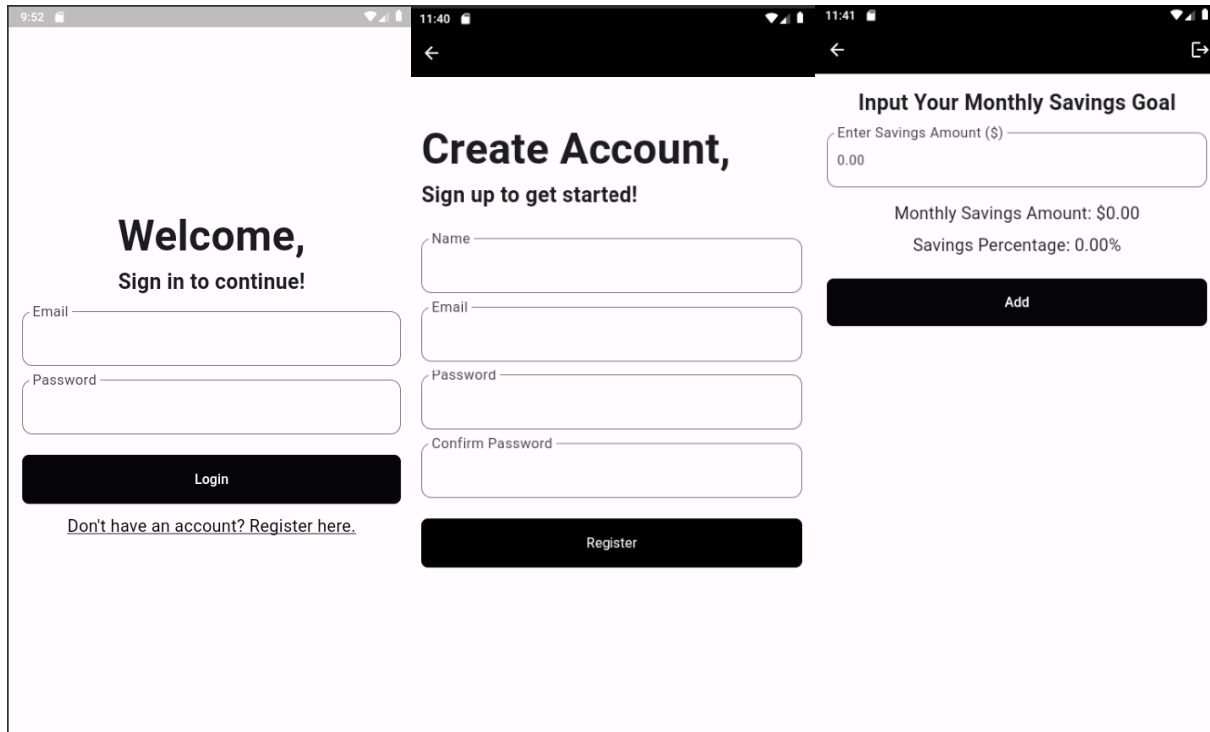
amount, the user was not able to enter decimals and was forced to use whole numbers. This was another oversight by me because I used an Android-based emulator to do my testing and this emulator did allow users to enter decimals. I also noticed the user was able to input up to more than the hundredth place when inputting a dollar amount. This did not crash the app, but we don't typically calculate past the hundredth place with dollar amounts. I also added a dollar sign to inputs where the user is expected to input a dollar amount. This made it easier for the user to realize what they are expected to input in the given field. There was also a bug when showing your income division. It would show your income as zero, thus, not displaying the proper calculations for your income division. This was a result of me forgetting to get the user's income from the database. In addition, I noticed that when inputting a custom income division the user could enter values that add up to greater than 100%. Another bug I noticed through testing is that when inputting an expense, the expense would be added, however, the pop-up window would not close. This resulted in the user not knowing that their expense was added and caused confusion. A feature that was not present but desired was an edit button next to their expenses. After implementing this feature, it was easier for the user to make changes if they made an error. I was able to add or correct all of these functions.
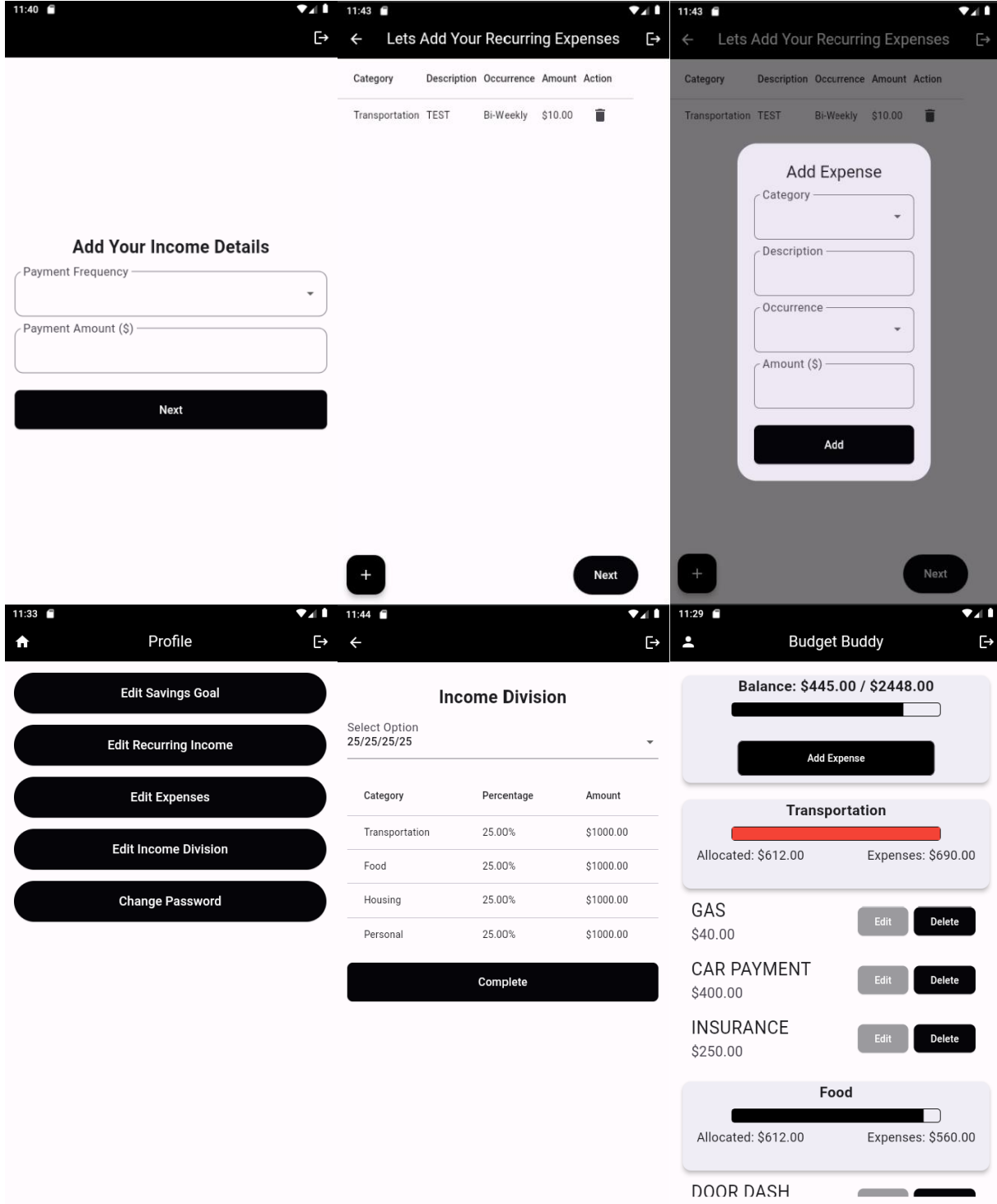
There were also some functions I would have liked to add, but unfortunately, did not have enough time to implement. For starters, I would have liked to add a suggestion for the user to save 20% of their income. Also, I would have liked to auto-calculate the final input when entering a custom income division making it easier for users to have their custom income division equal 100%. I also would have liked to add a way for the user to divide their income by dollar amount. I also would have liked to add a way for the user to enter multiple incomes. This was a feature requested by people living in a multiple-income household. A bug that I was

unable to fix by the deadline was that on certain devices some elements go off screen. This is a bug I would have been able to catch earlier if I had tested on multiple devices early in development. In addition, I wanted a notification feature that would alert the user when they are overspending and when bills are due. I also wanted to provide the users with a way to view their spending habits and if they met their savings goal by the month. I also wanted to add mini descriptions of each category to make it more clear to the user what expenses belong in which category.
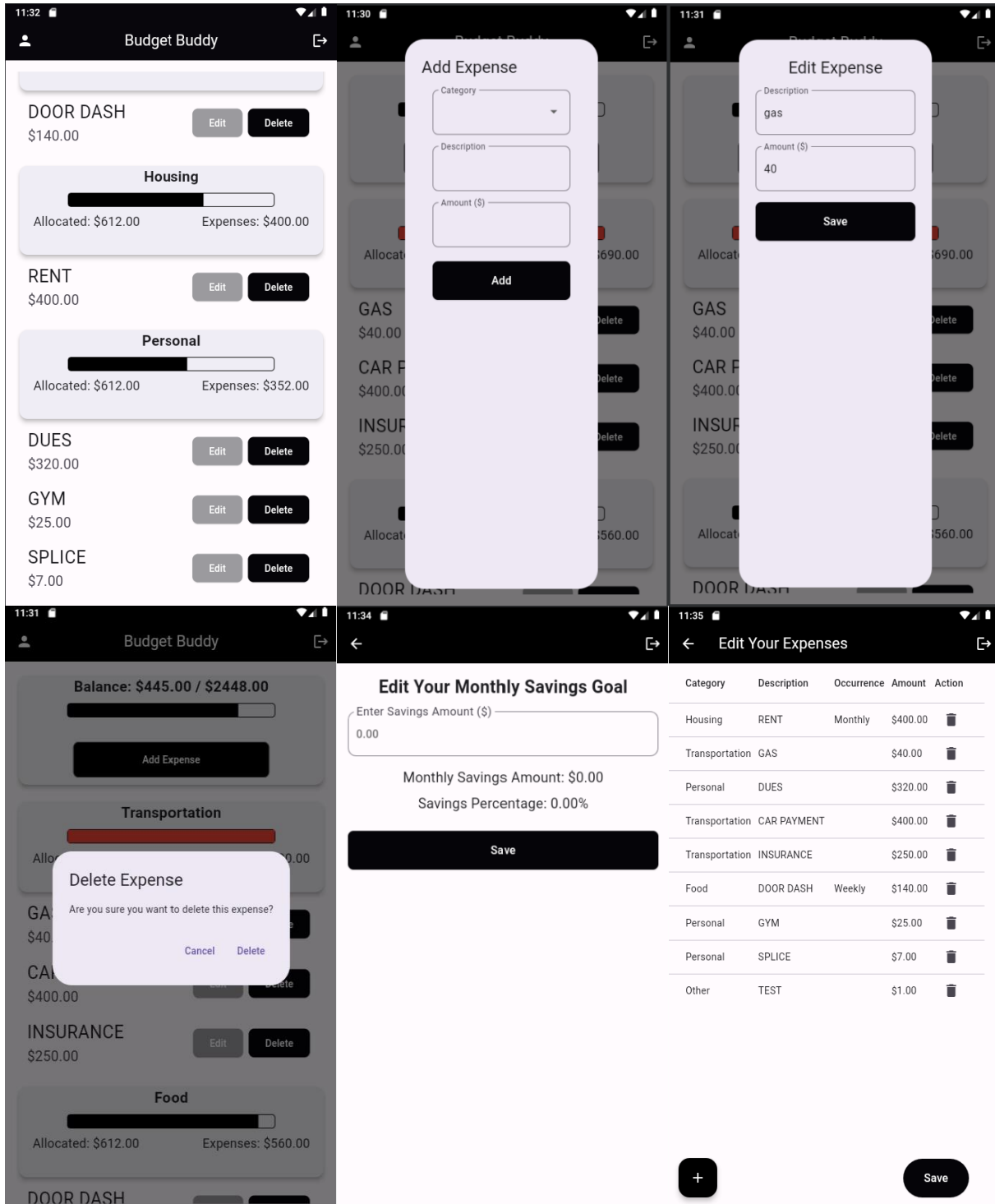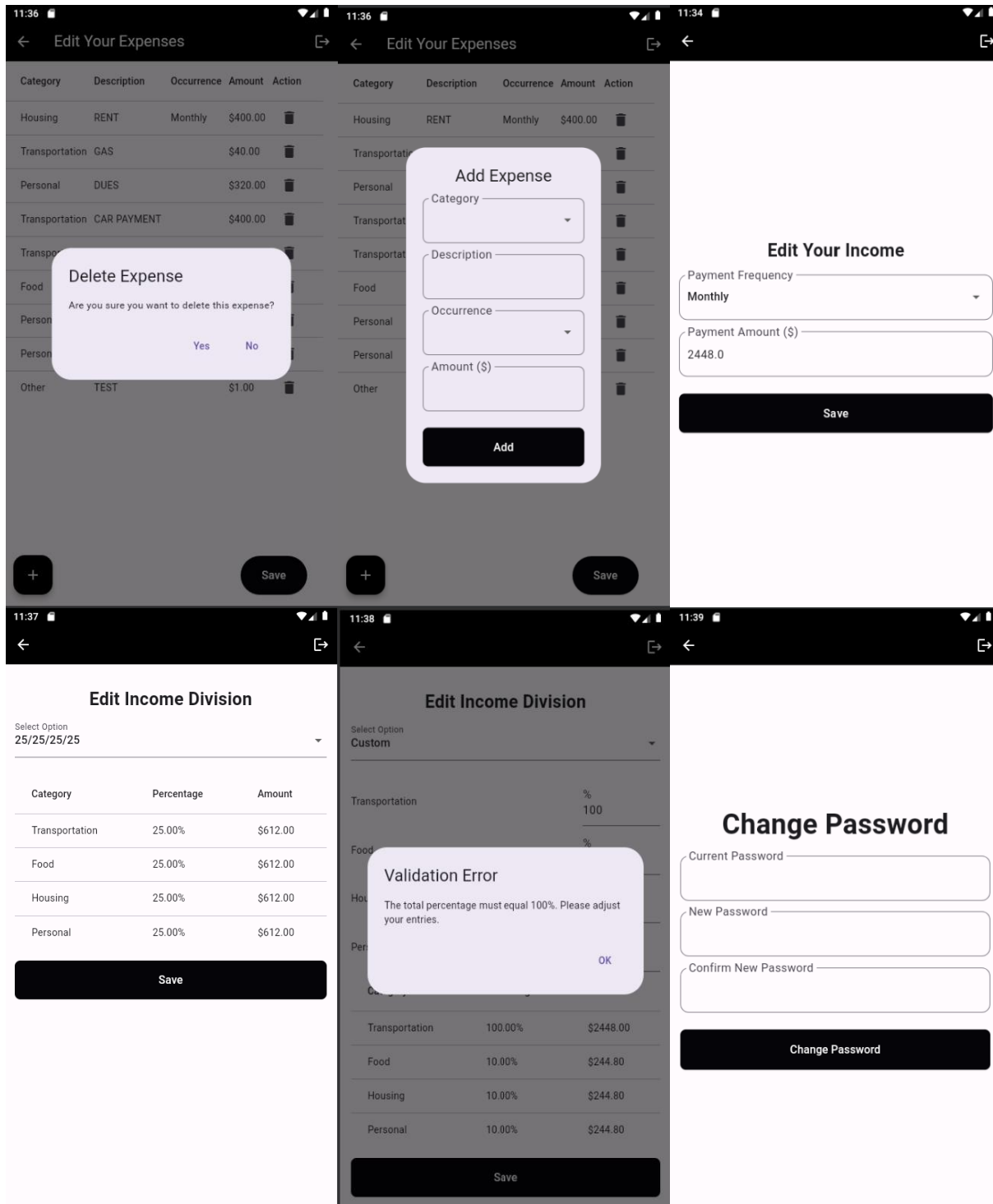
Version 2

This is version 2 of the Budget Buddy app. This version has all the changes I made after

receiving user feedback.

Add Your Income Details

Payment Frequency

Payment Amount ($)

Next

Lets Add Your Recurring Expenses

Category	Description	Occurrence	Amount	Action
Transportation	TEST	Bi-Weekly	$10.00	🗑

Next

Lets Add Your Recurring Expenses

Category	Description	Occurrence	Amount	Action
Transportation	TEST	Bi-Weekly	$10.00	🗑

Add Expense

Category

Description

Occurrence

Amount ($)

Add

Next

Profile

Edit Savings Goal

Edit Recurring Income

Edit Expenses

Edit Income Division

Change Password

Income Division

Select Option
25/25/25/25

Category	Percentage	Amount
Transportation	25.00%	$1000.00
Food	25.00%	$1000.00
Housing	25.00%	$1000.00
Personal	25.00%	$1000.00

Complete

Budget Buddy

Balance: $445.00 / $2448.00

Add Expense

Transportation

Allocated: $612.00   Expenses: $690.00

GAS
$40.00   Edit   Delete

CAR PAYMENT
$400.00   Edit   Delete

INSURANCE
$250.00   Edit   Delete

Food

Allocated: $612.00   Expenses: $560.00

DOOR DASH

Works Cited

Fontinelle, A. (2023, March 15). *The biggest financial hurdles young people face*. Investopedia.

https://www.investopedia.com/financial-edge/0712/the-biggest-financial-hurdles-young-

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