

COSC2634 Final Report

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“Budgetly – Personal Finance Assistant”

Group SectionSG04_Team 11_Tuan

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1. Project Background

1.1. Topic Overview and Motivation

Personal financial planning is a process that involves creating and implementing a comprehensive strategy to achieve financial objectives, enhance financial well-being, and prepare for unforeseen financial circumstances (Bajtelsmit 2019). Recently, the importance of personal finance has surged, touching various sectors, from banking and government agencies to community groups, including university students, regular employees, and parents (Hira 2009). Typically, the majority of people have five main financial goals: optimizing income and assets, practicing efficient spending, attaining life fulfillment, securing financial stability, and accumulating wealth for retirement and inheritance. Effective management of personal finances is essential for successfully navigating life's challenges, responsibilities, and opportunities (Garman 1999). This growing need for assistance managing personal finances is the primary driving force behind "Budgetly."

1.2. Project Team Details

The success of any project is significantly influenced by its founding team, as they are responsible for setting the vision and steering the project towards its expected outcomes (Faster Capital 2023). Therefore, understanding the unique contributions and skills of each team member is crucial. Here's a brief description of the individuals involved in the project:

Phan Nhat Minh (s3978598) – Project Leader

- *Email:* s3978598@rmit.edu.vn
- *Relevant skills:* Project Management, Leadership, UI Design, Programming Fundamentals.
- *Interest in topic:* As a student, Minh Phan struggles with managing his personal finances, often overspending on unnecessary items and exhausting his budget by mid-month. Motivated by these challenges, he is now developing an application to aid in personal finance management.
- *Responsibilities:* Minh Phan oversees the team's overall progress, ensuring that all milestones and goals set by the team are met. He effectively manages tasks by allocating them to members and establishing project timelines. Minh also serves as an important communication bridge, especially since team members are not yet familiar with one another. He also takes on the critical responsibility of validating all team outputs, including content, code, and other deliverables. In terms of technical work, he is responsible for finalizing and refining the application's user interface, as well as conducting final testing.

Hoang Thai Phuc (s3978081) – Technical Leader

- *Email:* s3978081@rmit.edu.vn
- *Relevant skills:* Prior knowledge in developing multiple projects using different programming languages like Rust, JavaScript, Python and frameworks like React, Next.js, Tauri.
- *Interest in topic:* Phuc finds that everyone has problems with managing their finances. Traditional methods are inefficient so he wants to develop an application which can greatly assist us in having better control over how we spend our money.
- *Responsibilities:* He led the application's design and workflow planning with the team, overseeing progress to align with our timeline. He ensured code quality and maintainability, developed UI designs for the frontend, and crafted algorithm logic for the backend, particularly in database interactions.

Tran Manh Cuong (s3974735) – Full-Stack Developer

- *Email:* s3974735@rmit.edu.vn
- *Relevant skills:* Mobile Development with Flutter & Dart, Database Management with Firebase.
- *Interest in topic:* Cuong has seen many people wasting and overspending their money unreasonably in online shopping and entertainment and usually out of money at the end of the month, so he wants to build a useful app to help them track their expenses, income and create saving plans to achieve their future goals.
- *Responsibilities:* Cuong is in charge of building the user interface for the User Authentication feature, initializing, designing, and managing the database on Firebase, developing the backend system for the core features of the application, and fixing bugs and UI errors. Moreover, he is also responsible for preparing the scripts and recording the demonstration video.

Truong Quang Bao Loc (s3965528) – Full-Stack Developer

- *Email:* s3965528@rmit.edu.vn
- *Relevant skills:* Flutter & Dart, Firebase.
- *Interest in topic:* Loc is aware that money is indeed important in this modern world so implementing an application that can help everyone manage and track their income and outcome is Loc's desire.
- *Responsibilities:* Loc is responsible for implementing the backend system for most of the features of the application with Cuong. He was also involved in building some of the user interfaces and checking the consistency of the UI with the real data from the database.

Tran Nguyen Anh Minh (s3979367) – Front-end Developer & Designer

- *Email:* s3979367@rmit.edu.vn
- *Relevant skills:* Flutter & Dart, Firebase.
- *Interest in topic:* People often find it difficult to manage their income while there are so many things that attract them. So, implementing an application which controls their money flow and sets the priority for each consideration is a must for everyone.
- *Responsibilities:* He oversaw the Figma design to establish basic UI concepts, facilitating a smoother development phase. Additionally, he developed both UI and key backend features, notably the "Add Expense/Income/Debt" function, streamlining its finalization.

1.3. Goal and Objectives

Our goal is to simplify and enhance financial management for those who face challenges with overspending and poor expense tracking. To realize this goal, we have established several key objectives:

- **Personalized Financial Advice:** We aim to foster responsible financial habits by providing individualized advice and recommendations, tailored to each user's spending trends.
- **Instantaneous Financial Insights:** Utilizing real-time analytics, we offer users immediate access to extensive information about their financial status. This approach assists in presenting a clear and current view of their financial health, aiding in better financial decision-making.
- **Cross-Platform Accessibility:** Our commitment extends to ensuring the app's availability across various platforms, including iOS and Android devices. By launching and maintaining the application on these popular mobile platforms, we aim to cater to a diverse range of users, enhancing overall accessibility and convenience.

1.4. Scope of the Project

1.4.1. In scope items:

- **User Authentication:** Enable users to log in to existing accounts or register new ones.
- **Expense Tracking:** Allow users to input and categorize their expenses.
- **Income Tracking:** Permit users to input and categorize their income.
- **Goal Setting:** Enable users to set financial goals for future dates, with the system providing budget management suggestions to achieve these goals.
- **Weekly Plan:** Users can create weekly expense plans.
- **Data Visualization:** Users can view their expenses through charts and graphs.
- **Information Management:** Users can manage their personal information within the app.

1.4.2. Out-of-Scope Items:

- **Financial Checkup:** Upon first login, new users are prompted to complete a financial checkup, which is optional.
- **Expense Analysis:** The system analyzes users' spending history, provides weekly reports on spending behavior, and offers budget management tips. It also alerts users when they are about to exceed their budget.
- **AI Chat-bot:** Integration of an AI chat-bot to aid users in making financial decisions and enhancing overall app experience.

2. Project Progress

2.1. Scope Adjustments and Challenges

According to our initial plan, we optimistically aimed to include advanced features like AI integration and interfaces that could be customizable. But as our discussions went on, there are several limitations that are the our road blockers to our prior goal.

Firstly, each of the team member was taking at least two other courses along with this course, which made things really challenging when it comes to handling the development of Budgetly in the team-week project timeframe with handling the workload from other courses.

On the other hand, it was our first time developing a mobile application so our unfamiliarity to the tech-stack and the process of producing a mobile application. Consequently, we spent approximately 3 to 4 weeks to learn about Dart, Flutter, Firebase, and other related technologies. This preparatory phase consumed a substantial portion of our project timeline, leaving us with limited time to work on the actual development of the final product.

When we saw these problems, we changed our focus to focus on Budgetly's most important features, especially those that is the foundation of a personal finance management app like expense tracking, expense breakdown, and set saving goals. This strategic prioritisation was very important for making sure we met the deadline for the submission without breaking the app's main functions.

Therefore, while we had high hopes for integrating distinct features that would differentiate our product from competitors, the time constraints and our learning curve meant that these could not be realized within the given

timeframe. It’s important to note that we had already designed the interfaces for these advanced features, and although they couldn’t be developed for this submission, they remain a part of our vision for Budgetly’s future enhancements.

2.2. Progress

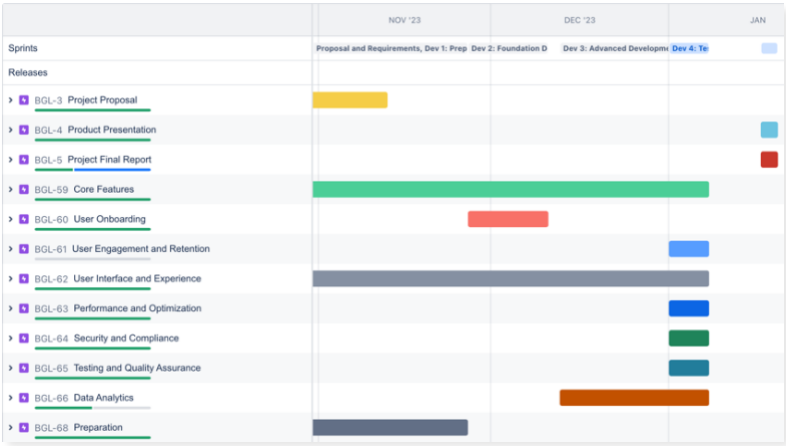


Figure 1. Project Timeline on Jira

There was a minor adjustment on our timeline reflects the changes in our project scope is the push back the advanced features and take that extra time for the core features. Besides, the integration of the front-end elements with the back-end server caused several technical issues, requiring an additional three to four days for bug-fixing and issue resolution.

Despite the challenges, our commitment to the project timeline and adaptability to unexpected changes ensured that Budgetly's development remained largely on schedule, with only minor deviations.

2.3. Testing

During our project, we followed the SCRUM methodology, which meant we tested features regularly as soon as they were ready or when a minimum viable product was released (Linz 2014). This approach helped us catch and fix minor bugs early on, ensuring they were addressed before the beta release.

Our testing strategy involved all team members, except the developer of the feature, reviewing each function carefully. The project leader then conducted the final check. We focused on realistic user interactions by using user stories and acceptance criteria, helping us spot issues both in the system and user experience.

In short, our thorough testing process was key to making Budgetly work smoothly and remain bug-free. This led to a refined, high-performing app. Below is a table summarizing the features we tested, their expected outcomes, and the results, highlighting the effectiveness of our testing approach.

As can be seen from the timeline, we had focused on the core features for most of the time as this is the most important objective of the whole project. While there have been instances of missed deadlines, typically on by a few days, the development of Budgetly has largely stayed on track, with all the in-scope items and deliverables finalized before the product pitch. This disciplined approach was pivotal in maintaining productivity and ensuring the project’s timely progression.

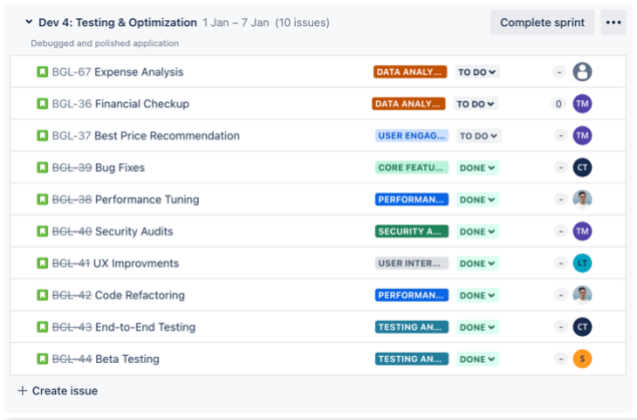


Figure 2. Final Development Sprint

| Feature | Testing Conducted | Outcome |
|-------------------------------|--|--|
| User Authentication | Tested login and registration functionality for accuracy and security. | User can successfully sign in, sign up, and login with Google Account. |
| Expense Tracking | Input and categorization of expenses were checked for correctness. | Accurate tracking and categorization. |
| Income Tracking | Tested for accurate input and categorization of income data. | Reliable income data recording. |
| Goal Setting | Validated system's ability to set and update budget plans for goals. | Goal setting and progress are accurate. |
| Weekly Plan | Assessed creation and modification of weekly expense plans. | User-friendly weekly planning. |
| Data Visualization | Tested clarity and accuracy of charts and graphs for expense data. | Clear and precise data representation. |
| Information Management | Verified secure and efficient management of personal information. | Secure and user-friendly info management. |

Table 1. Tested Features with Expected Outcome

2.4. Deployment

Regarding deployment, our application wasn't published on platforms like Google Play or the App Store due to its incomplete functionality, as some features were not developed in time. Instead, we released a beta version by converting the app into an APK format for Android devices. We also considered using TestFlight for beta deployment on iOS devices. However, this was not feasible due to the requirement of an Apple Developer Account, which incurs an annual cost of about \$99, a figure beyond our allocated budget.

For the Android APK deployment, please refer to the following link: <https://bit.ly/budgetly-beta-release>

2.5. Tools and Technologies

We used various technologies to support us in developing Budgetly. In summary, we used:

- Android SDK-Manager (for Android Simulator)
- Android Studio (for Android Simulator)
- Figma (for designing UI and wireframe)
- Flutter (for deploying both front-end and back-end on mobile application)
- GitHub (coding collaboration platform)
- Google Firebase - Firestore (database)
- Google Login API
- Jira (for team management)
- Visual Studio Code (main coding environment)
- XCode (for iOS Simulator)

3. Project Outcomes

3.1. Overview of Achieved Outcomes

Our application's main goal is to deliver to users a user-friendly interface, easy-to-use features to minimize all human errors and simplify complex tasks while still maintaining all core work of tracking our budget. While many of the core features have already been implemented seamlessly into our system for the past two months, some features' progress is still being out of track, mainly because of the limited development time we have and some of them took longer than what we estimated during the planning phase.

The sketches of Budgetly's UI is available on Figma at: <http://bit.ly/budgetly-figma>

To view our source code, please visit our GitHub repository at: <https://bit.ly/budgetly-sourcecode>

For a live demonstration of Budgetly in action, check out our video at: <https://bit.ly/budgetly-livedemo>

3.2. Dropped Features

In the development process, we decided to drop some features that were within the scope of the project due to a shortage of time, knowledge, and budget.

The first feature was called "Financial Checkup," which would give new users personalized advice on how to manage their finances and act as initial data for the system based on how they answered a series of questions. This feature relied on a complex analysis of expenses, incomes, and users' financial objectives, so it was complicated to develop this feature on time.

Secondly, we planned to develop Budgetly as a widget-based layout application to make it flexible, customizable, and improve the user experience overall by making the interface cleaner and more tailored to their needs. Making features into draggable widgets is really complicated, as we have to manage the communication between widgets and how the system processes the data, resulting in the elimination of the feature.

Lastly, adding an AI chatbot was another ambitious feature we thought about adding. This would assist the user in making financial decisions and using Budgetly more effectively. The issue was that implementing AI is costly and requires highly technical knowledge.

These features could have made Budgetly much better, but we chose to focus on the most important ones because we were short on time and resources and wanted to make sure the app's main functions worked well.

3.3. Non-Functional Outcomes

The code quality was emphasized in our project. We made sure that all members' code was well-commented, logical, and easy to extend by carefully going over it all before merging. This helps with smooth maintenance by keeping code and functions from getting jumbled (Huang et al. 2020).

To improve the user experience, performance and speed were given top priority (Sasha 2022). We focused on improving functions to cut down on bugs and lag and make the experience easy for users. Even though our team doesn't have a lot of experience with advanced code optimization, we think the application works well enough for users right now.

Because we use Flutter, Budgetly works on multiple platforms. With this framework, we can turn a single code base into binaries that work on many platforms, such as iOS and Android. We can ensure a seamless user experience because of this wide range of compatibility (WeTest 2023).

We are aware, though, that our app's security has some holes. Our team doesn't have a lot of experience making applications that are very secure, which could put data at risk. To make up for this, we've connected some parts of our system to Google services for managing databases and authenticating logins. This adds an extra layer of security and makes the app safer for user data.

3.4. Functional Outcomes

After a dedicated 10-week development period, our team is pleased to announce the successful completion of Budgetly. We were able to incorporate all of the important features we had planned, but there are still certain aspects we'd like to improve when we get the time. The project has reached several important milestones.

Our team has worked hard to finalize important features like User Authentication, Tracking Expenses, Tracking Income, Tracking Debt, Managing Weekly Plans, and Setting Saving Goals. We've even gone one step further and added Data Visualization, a more advanced feature that makes the experience better for users.

It is simple to use Budgetly. People must first sign in to their account. After logging in, they are taken to an easy-to-use homepage. Here, it's easy for them to see their budget information and do things like add new transactions, change their weekly plans, or set savings goals.

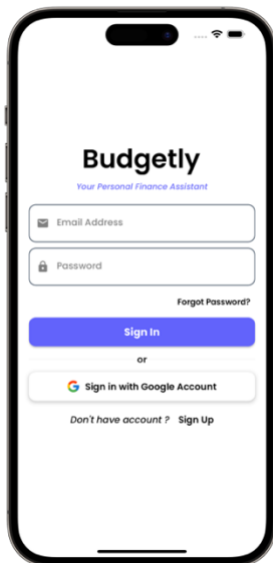


Figure 3. Sign in Screen

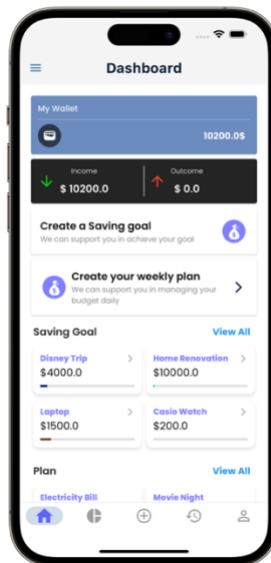


Figure 4. Homepage

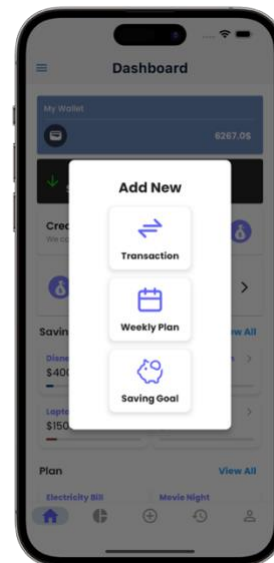


Figure 5. Action Button

It's simple to add a new transaction. Users only need to enter the necessary information, and as soon as it is added successfully, the budget details are updated automatically. After that, these transactions are shown on the page for transaction history. Also, the app smartly looks at how much money users have spent in the past and shows this information in an easy-to-understand way on the Data Visualization page.

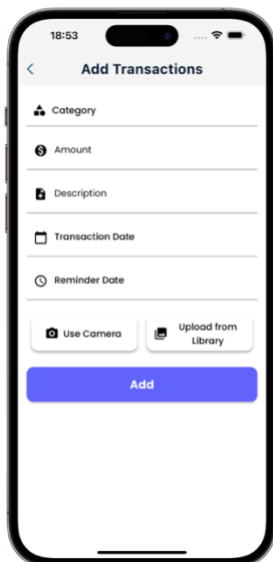


Figure 6. Add Transaction

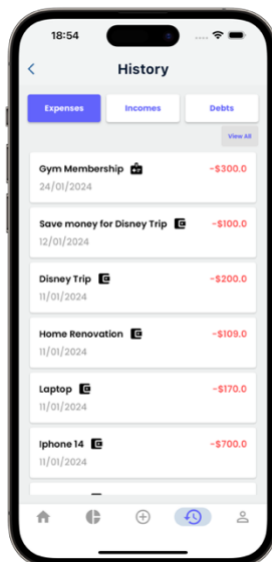


Figure 7. History

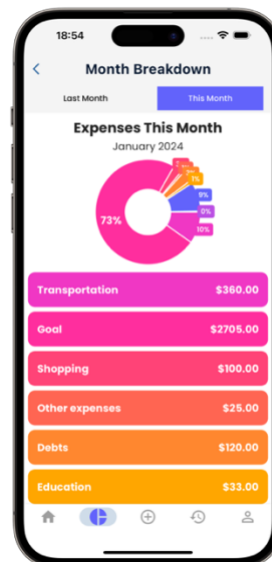


Figure 8. Month Breakdown

Our focus has been on making Budgetly not just functional but also easy to use, ensuring that managing personal finances is a smooth and hassle-free experience for our users.

3.5. Future Directions

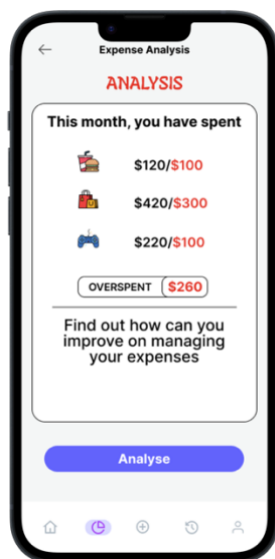


Figure 9. Expense Analysis



Figure 10. Financial Checkup

Our team has released the beta version of Budgetly and we all decided to continue developing this application to The beta release of Budgetly is something that our team is really looking forward to. We're committed to making this app better and better over time. Our main goal for the next two months is to improve the user experience as a whole. We'll work on making the app's navigation smoother and easier to understand so that users can go from page to page and access different features more quickly and easily.

We also know how important it is to make Budgetly available all over the world. In order to do this, we plan to add support for more than one language and currencies. This way, anyone in the world can easily use our app, no matter where they are or what currency they prefer.

We're also getting ready to release some of the more advanced features we've been working on. These include Expense Analysis, which helps users better understand how they spend their money; Financial Checkups, which give users regular updates on their financial health; Tips Suggestions, which give users personalized advice on how to budget and save; and Bank Account Linking, which lets users connect their bank accounts for a more streamlined financial management experience.

We believe these enhancements will make Budgetly not only more professional and useful but also a go-to app for anyone looking to manage their finances efficiently and effectively.

4. Lesson Learnt

During the development process, we faced many challenges and difficulties and gained lots of knowledge and experience by solving those issues. Firstly, our team members do not have experience in Mobile Development with Flutter, Dart, and Firebase, so this is the biggest challenge of our project. Although this problem was anticipated during the planning phase, we still decided to do it because it was a great opportunity for us to learn and practice new technology in a real project. To overcome this challenge, our team members have different ways to approach this issue. Some members took an online course about Flutter, Dart, and Firebase on Udemy, but others decided to research the official document and practice independently. It took us five weeks to get used to those technologies so the project was initialized quite late compared to other projects, but we had worked together to design an appropriate project timeline to develop our application in the last five weeks. Our second big challenge is that our schedules were not overlapping so we had to work remotely instead of working with each other in person. As a result, the productivity of the development process could have been higher, and we had to deal with many conflicts in the source code so many tasks were not completed before the predefined deadline. To address this challenge, our members organized their schedules and created offline meetings as many as we could to solve the conflict together, increase the productivity of the development process, and make sure the project timeline was still on track. Luckily, by working together under high pressure, we improved our project productivity significantly and completed the application development process before week 11.

This project taught us many skills and experiences in project management, technologies, and tools. The most important aspect that we learned in project management is to apply Scrum methodology to real projects with the help of Jira. We gained a deeper knowledge of Scrum when we were reviewed by our lecturer every week about our products and the project management process. Furthermore, we also learned how to use Jira to apply the Scrum methodology and version control our product with Git. Thanks to this course, we could be more confident to apply Scrum in our future projects which is important in our future jobs but quite hard to practice. Another skill that we gained throughout this course was mobile development with Flutter, Dart, and Firebase. We found that Dart and Flutter provide many useful built-in widgets and support us in developing the application on various platforms and we can use many services in Firebase to develop the backend system of the product. Dart, Flutter, and Firebase are developed by Google so that they work smoothly together. Moreover, we had more experience in system design when we had to design the database and class diagram from scratch. We are new to mobile development so there are many tools that we get familiar with after this course such as Android Studio, Android Emulator, and Jira. We had to use those tools to run emulators for testing, developing, and using Jira for team management.

During the development process, we encountered inevitable changes that caused us to modify the plan to adapt to those problems. One of the first changes was the lack of time, our plan divided the development process into 2 phases core features and advanced features. When we were working on core features we realized that these features needed more time to implement and refine so we had to modify the plan to be a more appropriate approach. To be more specific, we had to postpone the implementation of the advanced features until the core features were done and it took us 2 more sprints. The result of this change is all the core features performed over our expected but there are only 1 advanced feature was implemented. The next change of our plan is to limit advanced features, after finishing the core feature, we still have time for advanced features such as recommending the best goal price, expense behavior, and automation updated goal but we did not anticipate that those features require many algorithms to complete. As a result, we had to limit the advanced features that would be implemented to meet the deadline. In terms of unanticipated events, our team faces some technical challenges

with technology in implementing the send notifications function when the necessary service on Firebase costs us too much money so we made a quick decision to focus on the next possible function. In short, we experienced many unanticipated events and inevitable changes that will improve our flexibility and problem-solving skills.

In terms of team communication, we decided to apply the Scrum methodology as much as we could in this aspect, so we tried to have at least 3 short meetings per sprint to update the current state of tasks, implement sprint review after every sprint, use Jira for updating and sharing the process, and we also have a common communication space to share concerns or ask for help. Because of this structured communication style, we could address many problems, prevent anticipated problems together, and ensure that all members can acknowledge other tasks.

To reflect on our work, we could improve our planning phase and designing phase if we were to start again. Firstly, we will put more effort into the planning phase so we can design an appropriate project scope. As a result, we can avoid sophisticated features that we cannot handle. Secondly, we recognise that our user interface design is not detailed enough so it slows down the implementation process. Finally, the most important aspect of this project is team communication since with good communication every phase of the project can be handled well.

5. Elevator Pitch

Introducing "Budgetly," a revolutionary mobile app designed to transform personal finance management. Aimed at a diverse audience, from tech-savvy individuals to busy multitaskers and traders seeking real-time financial insights, Budgetly is more than just a tool; it's a personal finance assistant at your fingertips.

At its core, Budgetly offers a suite of features tailored to simplify and enhance the financial management experience:

- **User-Friendly Interface:** Designed to act as an assistant, not just a calculator.
- **Customizable Widgets:** Tailor the app with widgets for each feature, organized as per user preference.
- **Core Functions:** Robust user authentication, expense and income tracking, goal setting, weekly planning, and data visualization.
- **Advanced Features:** Financial check-up, expense analysis, and an AI chat-bot to offer in-depth financial insights and decisions.

Budgetly simplifies managing personal finances and helps users achieve their financial goals, making it a must-have tool for anyone looking to streamline their financial life.

Currently, we've completed all core functions, such as tracking and visualization, and are progressing towards developing advanced features like analysis, financial check-ups, and AI integration. Our vision is to make Budgetly an essential aspect of every individual's financial journey.

We invite clients and customers to invest in Budgetly's future, and users to download and experience the transformative power of managing finances effortlessly with Budgetly. Join us in revolutionizing personal finance management.

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