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EzBudget - The Financial Planning Application

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Abstract: Financial planning is not taught anywhere in an educational institution which can lead to a financial crisis for some. A financial plan can guide an individual for a lifetime of financial freedom. This project was conducted to find the best method for the user to plan and analyze their finances. Thus, the EzBudget mobile application is proposed. The EzBudget application will be designed using a structured approach and, on the Android mobile platform. Next, the application will be tested by users aged 13 years old and above. Furthermore, the System Development Life Cycle (SDLC) is chosen as the methodology, Android Studio as the authoring software, and Java programming language as the scripting language for this application. This application has 3 modules which are user authentication, budget setting, and budget analytics. The result of the alpha testing and beta testing have positive feedbacks which further proves the functionality of the application. The advantages and limitations of the application are discussed, and future works are listed for further improvement of the application.

Keywords: Financial Planning, Mobile Application, Android, System Development Life Cycle (SDLC)

1. Introduction

Financial planning is a step-by-step approach to achieving one's life goal. A well-made financial plan can guide an individual for a lifetime of financial freedom. [2] Thus, EzBudget application is proposed to allow the user to plan their finance thoroughly and effectively. The user can plan and analyze their budget for any desired period. Furthermore, the target platform of EzBudget application is the Android platform. This is because Android users are around triple as compared to IOS users until August 2021, which is 72.73% and 26.42% respectively. [1]

Unfortunately, financial planning is not taught systematically in educational institution. [19] Hence, most teenagers would have problems in the future regarding their finances. The financial crisis strikes everyone due to the Covid-19 pandemic because all expenses are increasing. Moreover, most people will ditch the budgeting habit because it is not feasible enough. Financial planning would not be so hard if there is a method to guide the user to do so. Therefore, EzBudget application aims to help user to plan

their finances. There are three objectives in the project. First, to design EzBudget application using the structured approach. Second, to develop EzBudget application on the Android platform. Third, to test the developed application to users aged 13 and above using alpha and beta testing. The target user for this project aged from 13 years old and above. The reason the target users are above 13 years old is the smartphone usage on younger users are proven to be detrimental to their mental, physique and emotions. [20]

The EzBudget application will be built entirely in the English language. The interface will be designed with simple icons representing the necessities for the user. The EzBudget application will be designed in the Android operating system with the minimum requirement being Android 4.0, Ice Cream Sandwich. Additionally, the EzBudget application will be developed using Android Studio software. The EzBudget consists of three modules which are user authentication, budget setting, and budget analytics. Thus, the users can plan and analyze their finances accordingly.

Furthermore, Section 2 in this report will discuss the literature review of this project, while Section 3 will explain the methodology used in this project. Next, Section 4 will discuss the analysis and design of the game application.

2. Related Work

2.1 Domain Case Study





A well-planned financial plan can act as a guide to control one's income, expenses, and spending at once to achieve financial freedom or life goals. A good financial plan can increase users' savings as users can track and eliminate unnecessary spending. Once the disciplines are reinforced, users can enjoy a better standard of living, be well prepared for emergencies and keep their sanity right. [4]

Financial planning started way back in 1963 by the Financial Services Corporation. However, the revolution started in Chicago. Loren Dunton was the one who set up the Society for Financial Counselling Ethics in 1969. [3] The revolution was initiated by the meeting of 13 individuals at Chicago's O'Hare Airport. Their purpose is to serve more investors who need more complex advice. Later, society gained momentum and caused a huge interest in disciplines in financial planning. Subsequently, it created a profession for it. Numbers of organizations were developed including the Financial Planning Association (FPA), the National Association of Personal Financial Advisors (NAPFA), and so on. Many years later, these disciplines of financial planning spread throughout the world, and eventually, Malaysia caught onto it too. However, financial planning disciplines and even professions are still new despite being introduced decades ago through Insurance Act 1996. Nevertheless, organizations such as the Registered Financial Planner (RFP) and Financial Planning Association of Malaysia (FPAM) are starting to gain momentum to educate society to excel in their finance.

2.2 Comparison of Related Applications

There are three existing applications chosen to be compared with the proposed application, EzBudget. The selected existing applications are Pocket Guard [5], Mobills [7] and YNAB [6]. In this section, the comparison is recorded and tabulated in Table 1. Table 1 shows the comparison based on several aspects, such as platform support, language used, internet connection requirement, etc.

Table 1: Comparison between the existing applications

Element	Pocket Guard	Mobills	YNAB	EzBudget
Icons				
Designed for	Beginner financial planner	Beginner financial planner	Advanced financial planner	Beginner financial planner
Module	Expenses, Calendar, Statistics, and Settings	Sign up, Dashboard, Budget, Transaction, Reports, and Options	Sign up, Budget, Bank Account, Reports, and Helps	Sign up, Budget, Analytics
Setting	Available	Available	Available	Available
Contact	Email developers	Message developers	Contact developers	Not available
Purchasing	Free to use	In-app purchasing	In-app purchasing	Free to use
Instructions	Presented in text	Presented in text	Presented in text	Presented in text
Platform	Android 4.1 and above	Android 4.1 and above	Android 4.1 and above	Android 4.1 and above
Internet connection	Not require	Require	Require	Require
Button	Consistent in placement and style	Consistent in placement and style	Consistent in placement and style	Consistent in placement and style
Response	Graphical response	Graphical response	Graphical response	Graphical response
Weaknesses	<ul style="list-style-type: none"> - Questionable options when adding transaction - Income and expenses are recorded in one list - Only shows weekly statistics - Limited currency 	<ul style="list-style-type: none"> - Plenty of pay-to-use features - Lag system - Limited for free users. - Some features can be confusing 	<ul style="list-style-type: none"> - Not beginner-friendly - Crowded interface - Complicated navigation for certain functions - Advanced financial terms - Compromises financial privacy - Limited days of a free trial 	<ul style="list-style-type: none"> - No currency options - Required account to save progress
Strengths	<ul style="list-style-type: none"> - Easy to use - Free to use - Simple navigation - Consistent and simple button 	<ul style="list-style-type: none"> - Useful features - Detailed financial planning features 	<ul style="list-style-type: none"> - Useful additional features - Detailed financial planning features 	<ul style="list-style-type: none"> - Easy to use - Free to use - Easy navigation - Consistent and simple buttons - Detailed financial planning

3. Methodology/Framework

The EzBudget used System Development Life Cycle (SDLC) as the methodology for this project. SDLC is a framework describing every task at each phase in the development process.[8] The SDLC model used is the Waterfall model.[18] SDLC has seven phases, which are Planning, Requirement Analysis, Design, Implementation, Testing, Deployment, and Maintenance as shown in Figure 1.[10]

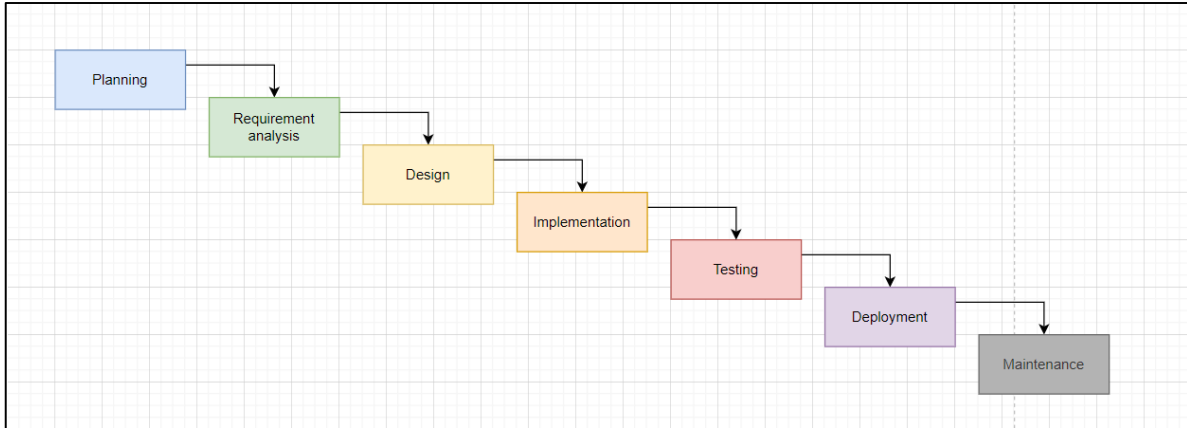


Figure 1: System Development Life Cycle Model

3.1 Planning

The planning phase is the most important phase of the SDLC methodology. All project elements are planned in this phase such as the scope, objectives, and even future problems. This phase requires the developer to decide on their end-user and gather all necessary information and requirement of the user. Therefore, the EzBudget application is aimed at users aged 13 years and above and its purpose is to provide a simple and structured method for users to plan their finances.

3.2 Requirement Analysis

The developer needs to analyze the application’s requirements and features to meet the user’s expectations. The functional and non-functional requirements of the application will be documented as well to ensure the EzBudget application is realistic and practical for both developers and users. The flowchart, content structure and navigation structure are attached in Appendix A.

Table 2: User Requirement Analysis

Stakeholder Category	Role in Product	Design Implication	Action Needed
Target User	End-user of the application	Easy to navigate	<ul style="list-style-type: none"> • Contains My Budget, Daily, Weekly, Monthly expenses, Daily, Weekly, Monthly analytics, and history. • Use simple and short text throughout the application.
		Simpler user interface design	<ul style="list-style-type: none"> • Use eye-friendly colors for the interface. • Use icon-based buttons with simple and short labels. • All the sizes and shapes of buttons shall be consistent. • All layouts of the application must be consistent.

Table 2: (cont).

Stakeholder Category	Role in Product	Design Implication	Action Needed
Target User	End-user of the application	Easy to read	<ul style="list-style-type: none"> • Use simple and short English throughout the game. • Use consistent font type and size that are easy for the users to read. • Instruction shall be short, clear, and easy to understand.
		Quick response to users	<ul style="list-style-type: none"> • Display quick hints for the user whenever the user missed out on certain credentials. • Display simple hints when the users mistakenly enter the wrong input.
		Track user's spending	<ul style="list-style-type: none"> • Display necessary and exact outputs only. • Display simple hints when the users mistakenly enter the wrong input.
		Provide real-time updates	<ul style="list-style-type: none"> • Show the updated information as soon as possible.

The functional requirement is arranged in Table 3 and non-functional requirement is arranged in Table 4. The software and hardware requirement are tabulated in Table 5.

Table 3: Functional Requirement

Functional Requirement	Module	Description
Autonomous System Activities	Weekly expenses, Monthly Expenses in the Budget Setting module.	<ul style="list-style-type: none"> • The system shall automatically accumulate the total expenses for the week and month based on the amount from daily expenses.
	Budget Analytics module	<ul style="list-style-type: none"> • The system shall automatically calculate the spending quota for daily, weekly, and monthly spending. • The system shall calculate the used percentage of the spending quota based on the number of expenses. • The system shall display a pie chart based on the used percentage of the spending quota. • The system shall retrieve all the spending history based on the chosen date.
User Interaction Support	Budget Setting module	<ul style="list-style-type: none"> • User shall add, update and delete their budget item and expenses item. • User shall review their accumulated weekly and monthly expenses.

Table 3: (cont)

Functional Requirement	Module	Description
User Interaction Support	Budget Analytics module	<ul style="list-style-type: none"> • User can see their used percentage of the calculated spending quota. • User shall be able to see the pie chart recording the used percentage of the spending quota. • User shall review their spending history based on the selected date.
	Options	<ul style="list-style-type: none"> • User can view their account after creating one by clicking the My Account button. • User shall know more about the application by clicking the About App button.

Table 4: Non-functional Requirement

Non-functional Requirement	Description
Usability	<ul style="list-style-type: none"> • The user shall be able to access the application anytime and anywhere. • The user shall find the application is easy to use, easy to learn, and with an enjoyable user experience.
Implementation	<ul style="list-style-type: none"> • The application shall be able to run on Android devices with a minimum Android 4.1 operating system.
Performance	<ul style="list-style-type: none"> • The system shall display the necessary output within 1 second if users click the correct input. • The system needs an internet connection for user authentication.
Cultural	<ul style="list-style-type: none"> • The application uses simple English language. • No complicated financial terms.

Table 5: Software and Hardware Requirements

Software	Description
Android Studio	<ul style="list-style-type: none"> • Allow the developer to build an Android-compatible application. • Easy integration between Firebase and Android studio.
Photoshop	<ul style="list-style-type: none"> • Able to design simple and clear icons for the application. • Easy to use and render icons, logo, and other graphics for the application.
Hardware	Description
Laptop	Main hardware to develop the application.
Android phone	<ul style="list-style-type: none"> • Allow USB debugging for faster simulation. • Save storage space on the laptop.

3.3 Design

The design phase will transpire after the requirement phase is done. Developers will start to design the application's architecture, user interfaces, network, databases, and security to satisfy the documented requirements. Furthermore, this phase requires a storyboard or a wireframe of the EzBudget application to test its functionality. Therefore, a Data Flow Diagram (DFD) will be designed to illustrate the data flow of the application from screen to screen. All the interfaces of EzBudget application will be designed in this Design Phase. All related figures will be attached in the Appendix.

3.4 Implementation

The implementation phase is where the real development and programming of the application begins. The Java programming language will be the main scripting language when developing the EzBudget application. The IDE (Integrated Development Environment) for the proposed application will be Android Studio. The database software for this application is Firebase because it can support a real-time database.

3.5 Testing

Throughout the project's planning and execution, testing was carried out. During testing, the button is tested to ensure that the application functions properly. The table below summarizes the result of the testing conducted on the EzBudget application.

Table 6: Result of Testing

Modules	Test	Expected Result	Actual Result	Correct Action
User Login & Registration	Login button	Login successful and the main menu is shown.	Successful.	None.
	Sign Up button	Navigates to Sign Up interface.	Successful.	None.
	Register button	Navigate to the main menu.	Successful.	None.
	My Account button	Navigate to the user's account details interface.	Successful.	None.
Budget Setting & Tracking	My Budget button	Navigate to the monthly budget setting interface.	Successful.	None.
	Add button	Open the budget setting interface.	Empty input is not accepted	Empty input is not accepted.
	Update button	Saved the recently edited data.	Successful.	None.
	Delete button	Deleted the selected data.	Successful.	None.
	Today button	Navigate to the daily expenses interface.	Successful.	None.
	Week button	Navigate to the weekly expenses interface.	Successful.	None.
	Month button	Navigate to the monthly expenses interface.	Successful.	None.

Table 6: (cont).

Modules	Test	Expected Result	Actual Result	Correct Action
	Tips n' Tricks button	Navigate to the tutorial video	Successful.	None.
Budget Analytics	Daily button	Navigate to the daily analytics interface.	Successful.	None.
	Weekly button	Navigate to the weekly analytics interface.	Successful.	None.
	Monthly button	Navigate to the monthly analytics interface.	Successful.	None.
	History button	Navigate to the spending history interface.	Successful.	None.
	Search button	Pop out a calendar to select a date.	Successful.	None.

3.6 Deployment

The deployment phase is done after the EzBudget application passed the testing phase. The EzBudget application will be built in .apk format from Android Studio. Then, it is installed in an Android device shown in Figure 2.

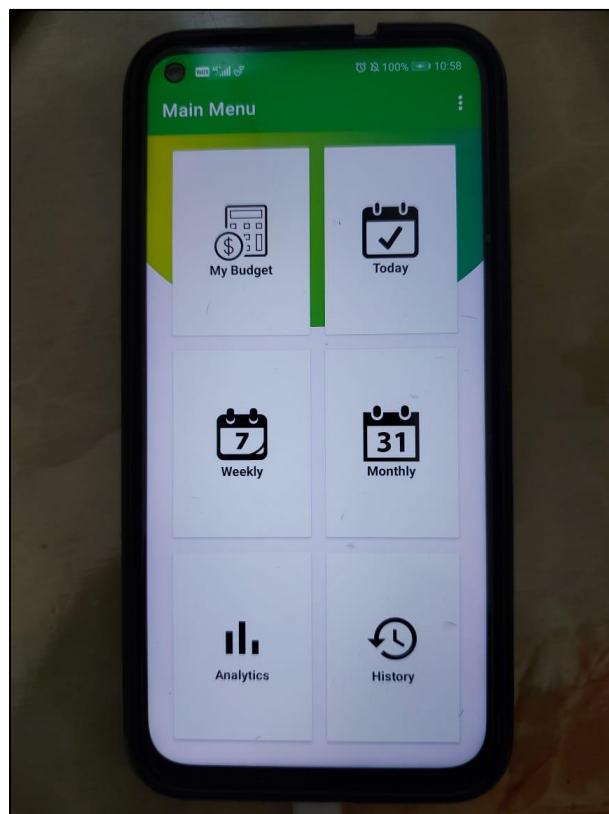


Figure 2: EzBudget installed on Android device.

3.7 Maintenance

The maintenance phase will initiate after the deployment phase. The developer will update the application by adding or changing the features and functions of the system in the EzBudget application. This approach is necessary to make the EzBudget application better and satisfying for the users.

4. Results and Discussion

The EzBudget application was tested by ten target users to improve the user experience. A questionnaire is prepared for users to provide input, and the application's merits and weaknesses are evaluated. The results of the user acceptance testing will be attached in Appendix. The testing phase aims to measure the usability and effectiveness of EzBudget for the target users.

The first question is about the age of users that are using the mobile application to ensure all users from different age group can use this EzBudget application. There are 2 out of 10 respondent (20%) are aged from 13 years old to 20 years old which is secondary school level user. There are 4 respondents (40%) whose age is between 21 years old to 30 years old which is college or university level users, and 2 respondent (20%) for each 31 years old to 40 years old user and 41 years old to 50 years old user who participated in this testing.

The second part of questionnaire is about the usability of the application. All respondents think this application can help people plan their budget more effectively. Additionally, all of them agreed that they can record their spending effectively as they can record extra details about the items. There are 10 out of 10 respondents (100%) agreed that the analytics feature aid people in analyzing their finance effectively which helps with overall financial planning. All of them also agreed that the tutorial videos can help kickstart beginners to plan their finance. Table 7 shows the tabulated results of the questionnaire.

Table 7: User Acceptance Test result 1

Question	Yes	No	Result
Do you think this application can help people plan their budget more effectively?	10/10	0/10	100% Yes
Do you think this application help people record their spent items effectively?	10/10	0/10	100% Yes
Do you think the analytic features help people analyze their spending properly and help with overall finance planning?	10/10	0/10	100% Yes
Are the tutorial videos helpful in aiding people to plan their finance?	10/10	0/10	100% Yes

The third part of the questionnaire is about the overall satisfaction of the application. There are 6 respondents (60%) who are satisfied with the user interface (UI) design of the application. However, the other 4 respondents (40%) felt neutral about the UI design. Next, all respondents are satisfied with the budget planning feature of the application to plan their budget. In addition, all respondents are satisfied with the daily, weekly and monthly spending records feature of this application as well as the spending analytics feature of the application. There are 8 out of 10 respondents (80%) who are satisfied with the spending history feature of the application and only 2 respondent (20%) felt neutral about the spending history feature. There are 6 respondents (60%) are satisfied with the availability of the tutorial videos in the application. However, there 4 respondents (40%) felt neutral about it. Finally, all respondents are satisfied with the overall functionality of the application. Overall, the design of this application is simple and easy to use. However, some users also have given some suggestions that the application can make some improvements. For example, this application can have different colors for the different item types. Table 8 shows the tabulated results of the questionnaire.

Table 8: User Acceptance Test result 2

Statement	Dissatisfied	Neutral	Satisfied	Results
The overall user interface (UI) design of the application	0/10	4/10	6/10	60% Satisfied, 40% Neutral
The budget planning feature of the application	0/10	0/10	10/10	100% Satisfied
The daily, weekly and monthly spending records feature of the application	0/10	0/10	10/10	100% Satisfied
The spending analytics feature of the application	0/10	0/10	10/10	100% Satisfied
The spending history feature of the application	0/10	2/10	8/10	80% Satisfied, 20% Neutral
The tutorial videos in the application	0/10	4/10	6/10	60% Satisfied, 40% Neutral
The overall functionality of this application	0/10	0/10	10/10	100% Satisfied

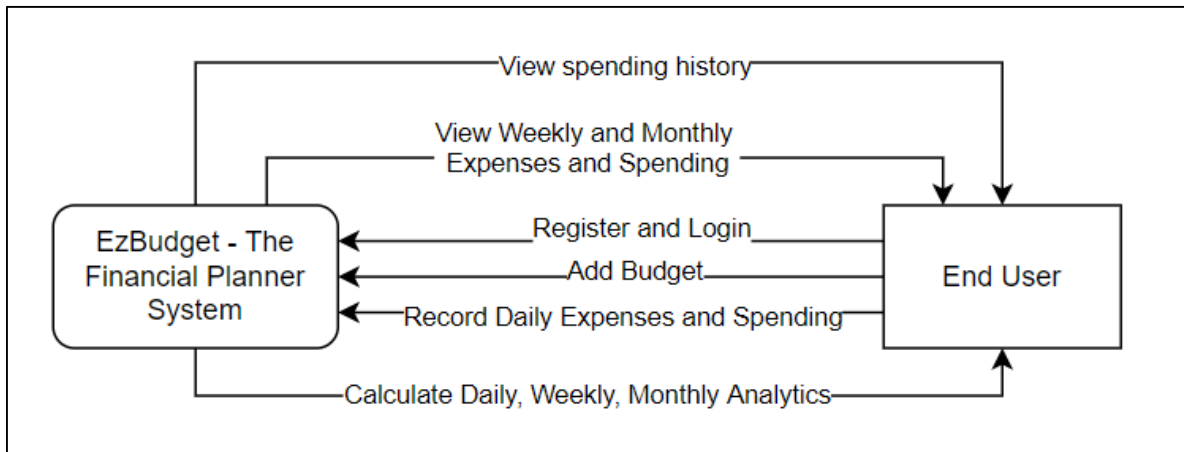
5. Conclusion

To conclude, EzBudget – The Financial Planning application is suitable for any users aged 13 and above to plan their budget and track their expenses throughout the month. Additionally, the EzBudget application provides thorough analytics to track and adjust their expenses according to their budget. Users can access the tutorial videos if they have trouble setting up their budget for the month. The objectives of this project have been achieved. However, EzBudget application has its limitation too. This application requires users to take note of their spending details manually. Thus, users may feel lazy to do so. Furthermore, this application does not have real-time location service to provide quick options for spent items. Therefore, users can quickly tap on it to add in the spent items. Besides, there is no notification when users overspent the recommended quota. Users would have enjoyed the application even more if there are enough automation in the application. Perhaps, EzBudget could be improved in the future according to its limitation and user feedbacks.

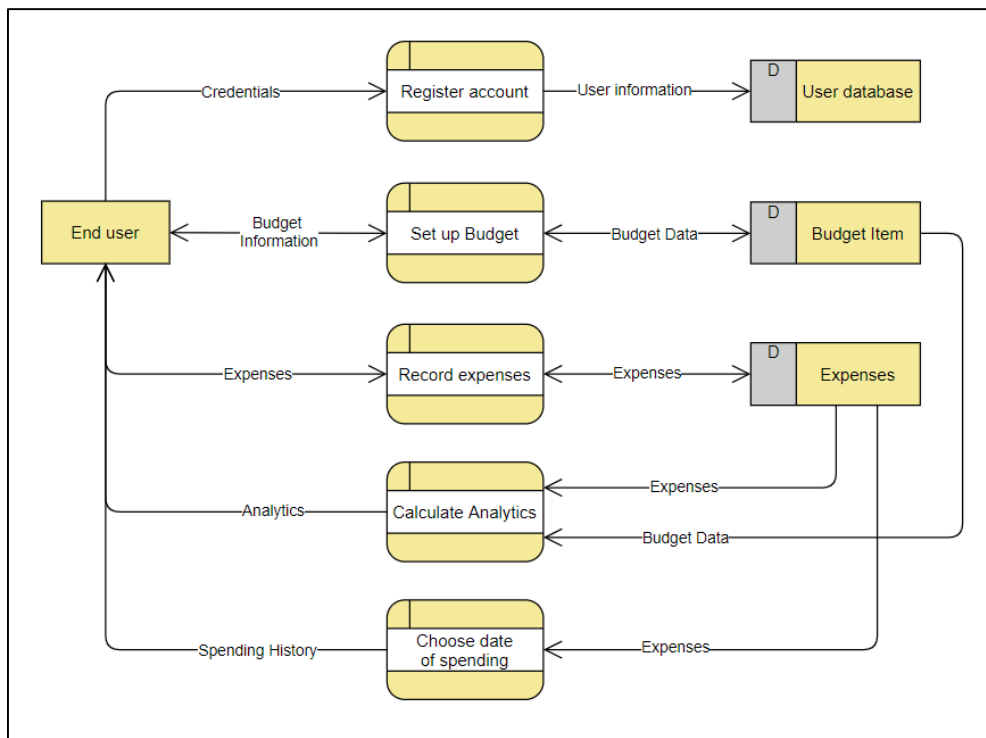
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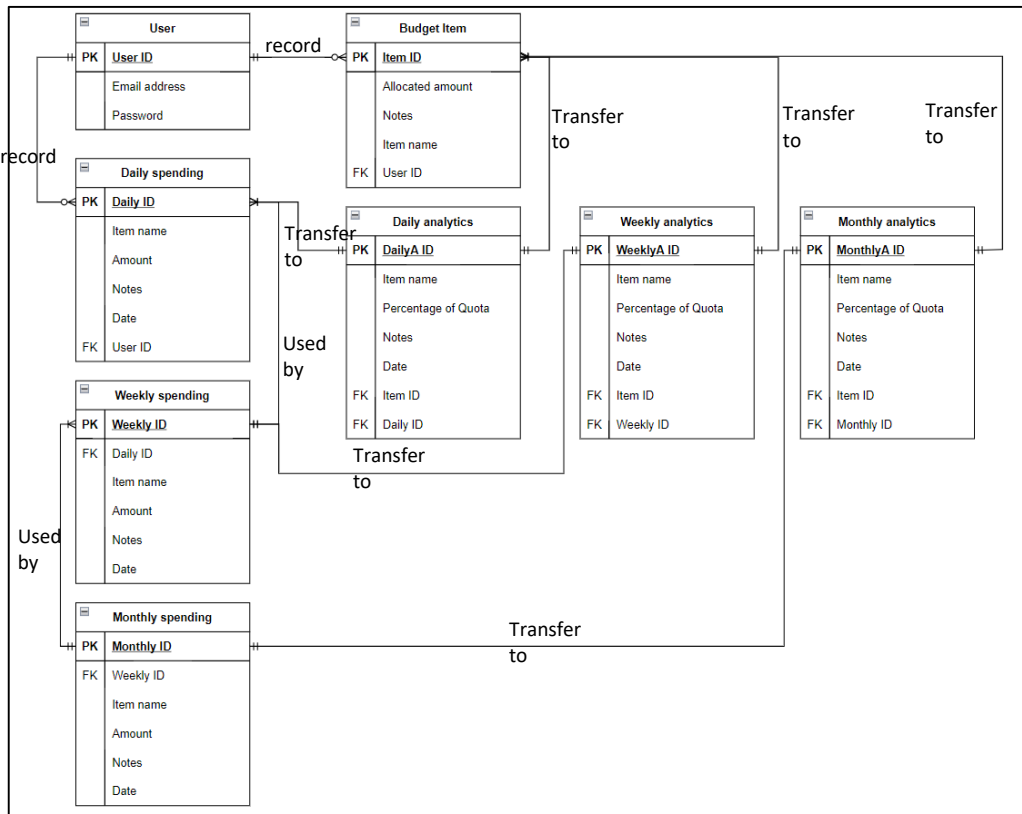
Appendix A: Context Diagram



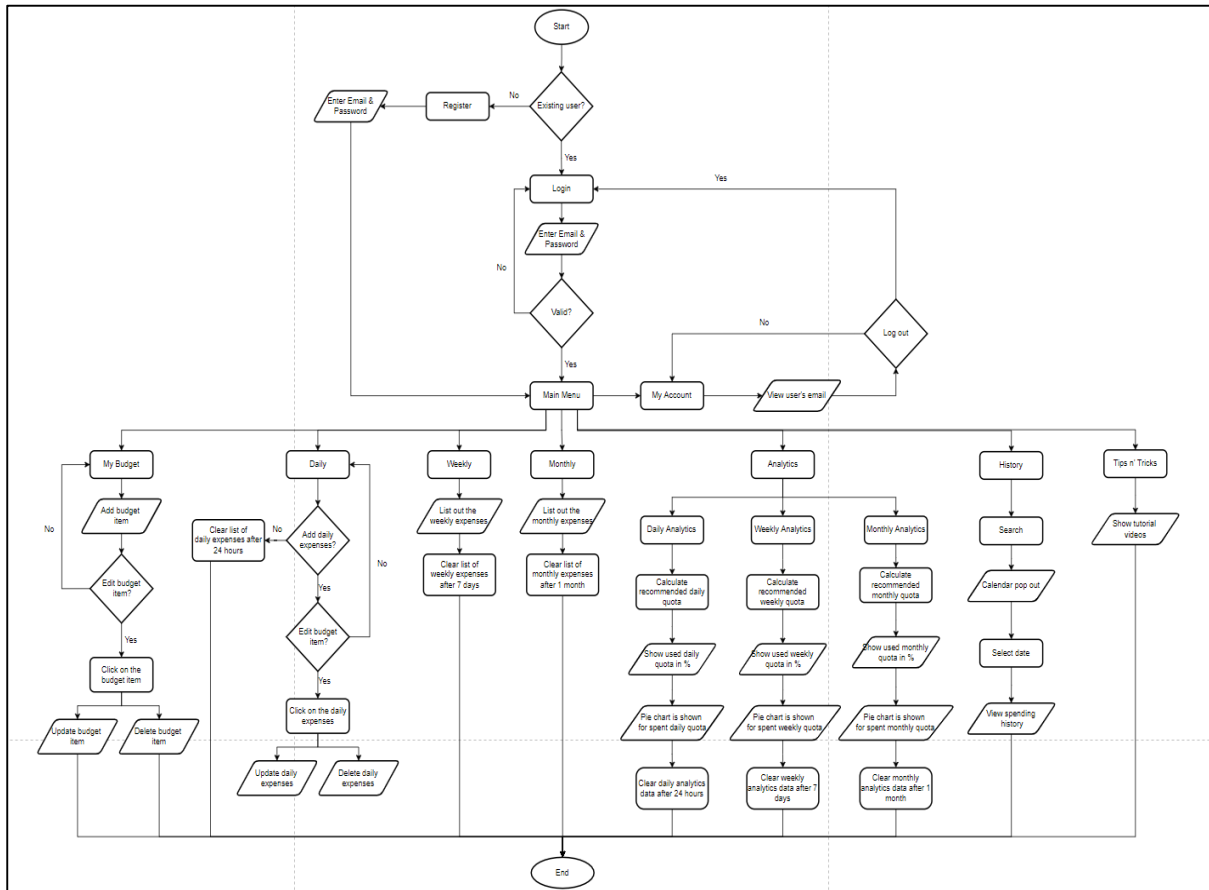
Appendix B: Level 0 Data Flow Diagram (DFD)



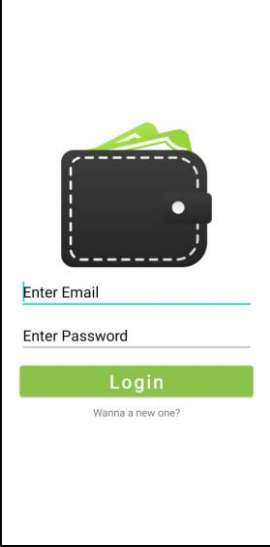

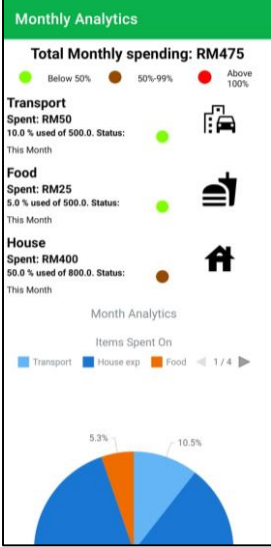
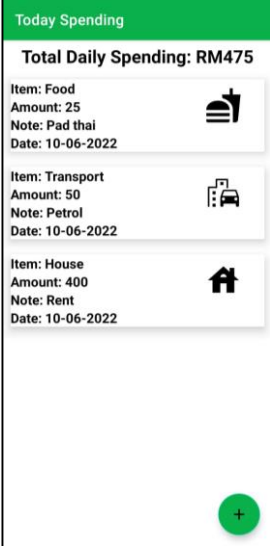

Appendix C: Entity Relationship Diagram



Appendix D: Flowchart



Appendix E: EzBudget – The Financial Planning application output interfaces

Interfaces	User Authentication Module	Budget Setting & Tracking Module	Budget Analytics Module
Output			
			

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