



**Budget Tracker**  
**Highly Customizable Budgeting Mobile Application**

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## ABSTRACT

The dissertation focuses on the significance of managing incomes and expenses in our vastly growing day by day life. Long gone are the days when you needed to take a seat with a notepad and a sky-high stack of bills and receipts to figure out your salary, costs, and general budgetary plan. Nowadays there are a wide range of spreadsheets and projects that are intended to make your financial planning that are meant to make a lot easier and more proficient. This study aims to address the complexity of tracking income and expenses by introducing budget tracking application developed as native mobile application using powerful cross platform library React Native for high performance. Based on a literature review on money management applications and questionnaire was conducted to potential foreign and local individuals across the Colombo. Analysis of responses demonstrated the difficulty of budget tracking. The result indicated the need of mobile solution to ease the task. Budget tracking native mobile application with interactive user interface and with handy features would be one of the ideal solutions for the current problem. User centered applications require user feedback by delivering prototype version to the real users. Therefore, Agile Scrum software development methodology is practiced by considering it would be good fit for the application requirements. Native mobile applications are known for its performance, reliability and user friendliness. The author has chosen React Native library in order to develop the proposed system. React Native is cross-platform library that enables developers to implement native mobile applications with advanced user interface while promising native performance and reliability. The mobile application is developed for two main mobile operating systems Android and iOS and the application will be totally free. The author believes solution will make positive impact on people's day to day life by making use of the budget tracking application's promising features. Further research may be needed in order to identify other factors that could strengthen the effectiveness of this study.

**Keywords:** Budgeting, Finance, Savings, Income, Expense, Native Mobile Applications, React Native

## DECLARATION

This dissertation is my original work and has not been submitted previously for a degree at this or any other university/institute. To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

Name of the Student: .....

Signature of the Student: .....

Date: .....

## **CERTIFICATION**

I hereby recommend that this research project report was prepared under my supervision by ..... in partial fulfillment of the Master of Information Technology degree.

Academic Supervisor

Signature : .....

Name : .....

Designation : .....

Date : .....

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# Chapter 1

## Introduction

With the increased sales in smartphones over the recent few years, individuals are utilizing mobile applications to complete their work, which makes their lives easier. Mobile applications include different diverse classifications, for example, Entertainment, Sports, Lifestyle, Training, Games, Food and Drink, Health and Fitness, Finance, and so forth. This Budget Tracking application falls in the Finance Category and serves the critical motivation behind managing finances which is a vital part of one's life. A survey was conducted of 50-100 random people to understand the importance of tracking the budget. The study was conducted for individuals who work and study in Colombo. The study illustrated that both students and workers had a serious issue in tracking their income and expenses. Individuals were questioned on how much money they spent per month on their needs and requirements, and it came to light that individuals couldn't provide an exact answer. Thus, they were unaware of where their money was going.

### 1.1 Motivation

The idea of the Budget Tracking mobile application was highly appreciated and encouraged by individuals from the surveys as it makes them to be more organized and their lives easier in the long run. Likewise, the author has researched on the personal financing applications for both mobile and computer in order to gain more knowledge and understanding why people do not use the existing applications, lack of functionalities on the current applications, further improvement and enhancement that could be made on the existing applications, and understand the functional and nonfunctional requirement of individuals. Whilst conducting the research, the author stumbled upon a few major problems with the existing applications. Firstly, the application is not free-of-charge, it's vital to pay to use the service. Its impractical as it has come to know that mostly the types of users who would prefer to use this application would be students or individuals who are already facing financial trouble. Secondly, most of the personal financing applications are desktop application. Again, its impractical to carry your laptop or desktop everywhere you go. Another significant issue which discourages using those personal finance applications are the expenses cannot be customized, users need to stick with default expense categories. It would be ideal to have customizable mobile application so each user can have their own categories that they are comfortable.

## 1.2 Aim

Design and develop native mobile application for both Android and iOS platforms that solves users' finance tracking issues with simple and user friendly display keeping it impactful and functional.

## 1.3 Objectives

The vision of the Mobile Application is to earn the trust and respect of app users and consistently deliver high quality, reliable performance in tracking income and expenses. The author believes solutions given in the app will have steady growth in financial tracking while users can stop worrying about money and may enjoy all the things in life that are more important. The mobile application aims to possess below functionalities.

- App should be effective and efficient to the users, and be available at all times.
- The budget tracker needs to be native mobile application.
- Rather than tracking everything consistently, app should be built of simple menu items for quick and effective personal finance track-down.
- It should have two main section Incomes and Expenses divisible to N number of categories according to user customization.
- Users should be able open custom accounts Cash or Card and can switch between them.
- App will contain multiple expense categories with the possibility to add their own custom expense categories.
- The budget tracker app need to have the solution, extra advantages and address the current issues with existing apps.
- App will be free of charge and be available for both Android and iOS.
- Budget Controller helps in monitoring deposits and expenses daily, weekly, monthly and to help you in making your financial plan to distinguish inefficient uses, adjusts rapidly as your financial situation changes, and help you to achieve your financial goals.
- One can utilize this planning process to prioritize your spending and concentrate your cash on the things that are most vital to you.
- Budget tracker app is the ideal solution for managing your finances.

- You can organize your income, costs and financial balances in a single place.
- Diagrams and charts empower to envision spending pattern.

## **1.4 Scope**

The system developed as native mobile application and possess high performance considering availability, speed, reliability and user interface. Users will be given guidance to use the app with the help of handy swipe menu introducing features of the app when they on boarded first time. The application will have user friendly dashboard and drawer for quick and easy start. The dashboard has drawer button for navigation, current accounts list displaying the balances, list of deposits and expenses for current day with the extended functionality of viewing daily and monthly transactions. Users can view the spending pattern as graph by navigation to trends. The application currency will be Lankan Rupees by default with other selection of US dollars. Users can create n number of accounts, expense or income categories or customize default categories. Using the app user also can switch between accounts and deposit money to one account to another. Expenses can be viewed for a given day, week, month, 6 months and a year. The native application will be available for both Android and iOS platforms.

# Chapter 2

## Background

### Introduction

This section gives a description of the research findings of related web and/or mobile apps. The reason for this section is to comprehend the discoveries of different authors and utilize the knowledge in the finding for this research project. This section has been arranged where every classification talks around a certain point with connection to diverse authors. This section gives reviews on the disadvantages of the Expense Tracker and the advantages of implementing an Expense tracker. The mobile phone is one of the fastest to adopt innovations in human history. As smart phones drop in price, we see a rapid shifting how mobile phones are valued: from basic communication gadgets to broadly useful versatile computers.

The mobile phone is one of the fastest to adopt innovations in human history. As smart phones drop in price, we see a rapid shifting how mobile phones are valued: from basic communication gadgets to broadly useful versatile computers. The Apple iPhone and Google Android have just started to popularize this paradigm shift. Currently, even low end mobile phones are deployed with quick processors, long battery life, and rich detecting abilities, (for example, GPS, accelerometer, infrared light, and so forth.). Furthermore, in contrast to their desktop counterparts, mobile phones have the unique property of continually being available, a near constant companion of their users. Along these lines, the mobile phone will turn into a kind of computerized augmentation of the user, detecting context as the user moves about the world. Here are the related mobile and/or web app to the **Budget Tracker: Highly Customizable Budgeting Mobile Application**.

## 2.1 Similar systems

### 2.1.1 Mint

provides one place to manage all your finances. Mint is money manager and financial tracker app. It has an option to keep multiple type of accounts like bank accounts, credit cards, bills and investments so you know where you stand. You can keep track of your credit score to help you be smart about it. The app itself is very impressive, but about the widget can't say it is impressive. It doesn't update with most up to date data. And very slow while hitting the refresh icon, just ending up opening the app. The app is no longer broken but stale would be the word to describe it. Fundamentally nothing has been added in years. No new charts, no new functionality other than minor things. It does do what you need out of the app. Both mobile and web app are slow especially, mobile app doesn't give user a feeling of native app. Web and mobile are not integrated well as it cannot login from mobile while you can login from web. Overall app has becoming outdated as it has no new features or updates are made. [1]



### **2.1.2 YNAB (You Need a Budget: App for getting out of debt)**

The application helps you break the paycheck to paycheck cycle, get out of debt. YNAB is mainly focuses on how to get out of debt since budgeting is a powerful tool to help you spend your money on the things that are most important to you and it happens to be key to getting out of debt. It is a reasonably good implementation of zero-budget system. Where it falls short are it's constant pushing of what they think is "right". UI changes are not great and hinder workflows, they implement because they thought it was a good idea. While the app has smooth dashboard, it lacks some features from their website version. App doesn't offer a way to create a passcode to lock the app. A major issue considering how sensitive the data already is.

YNAB has features like Real Time access to all your data, Debt Paydown—The tools and teaching you need to help you get out of debt for good, Reporting—Detailed, visual spending and trend reports help you measure progress and improve. While dealing with credit card payments it is super confusing, everything else is generally okay. There are some things that are just better to wait until you can do on the site. The app is not free while it tips on how to get out of debt. YNAB doesn't allow you to edit categories on the phone, and it hasn't added this feature for years even though users have asked for it. Also the app has compatibility issues with android version which needs to be fixed. YNAB is solid and functional app but UX and UI is outdated and it's falling behind the web version in terms of features. [2]

### **2.1.3 Wally**

Suitable for sort of person who'd love to be as organized with personal expense tracking as you are with your expense reports at work, you'll love the totally free Wally app. Instead of manually logging your expenses at the end of the day (or week or month), Wally lets you simply take a photo of your receipts. And if you use geolocation on your device, it even fills in that info, saving you several steps. Wally is a clean, streamlined app that's extremely convenient and easy to use. It's a great choice if you'd like more insight into where your money is going. The biggest negative of Wally is it's not particularly easy to navigate at first. It saves the locations where you shop often so you can enter them quickly in the future. Wally isn't as user-friendly as it could be. It took some digging through the user tips manual to figure out the app. You can assign recurring income and expenses. The review section for expense analysis is limited. You can take photos of receipts to store them. Wally doesn't link to your actual financial accounts. What your app says and the money you physically have in the bank may not match up if you forget to put an expense in. There's a review section where you get a very basic overview of your spending habits. Free version lacks essential features and interface is unnecessarily complicated and crowded with multiple redundant functions. [3]

### **2.1.4 Tycoon: App for models (and other freelancers)**

Tycoon is a personal finance tool that helps freelancers keep track of theirs gigs; it debuted last month. Users log in the specific job, the rate they'll be paid, when the job takes place, and when the payment is supposed to come through. The app then alerts them when a payment is late according to the due date entered — that way, a user can keep track of past, pending, and missing

payments in real time, and in one place. It's even color-coded, according to the status of each payment. While many features were designed with models in mind — like being able to enter multiple currencies to account for jobs all around the globe — Tycoon isn't just for the fashion set. There are also photographers, consultants, babysitters, graphic designers, personal trainers, and chauffeurs using the app, all of whom grapple with "a lag of time between when they perform a job and when they get paid," Perez says. Eventually, Tycoon will introduce a feature that allows users "to deduct commissions and estimated taxes from gross rates," which is helpful for anyone doing contract or freelance work who needs to know what their actual take-home pay will be. Tycoon lets users feel more in control of what they're raking in by closely tracking their jobs, encouraging follow-up when a payment is overdue. To wit: You can program the app to send pre-written messages to clients that owe money. Ultimately, Perez set out to demystify the process of making a living by modeling (or via other freelance pursuits "If you know how much money you're making, down to the cent, it empowers you to plan properly and make better financial decisions." [4]

### **2.1.5 Coinbase: App for trading Bitcoin**

Coinbase is cryptocurrency exchange and bitcoin wallet, used to buy and securely store bitcoin, bitcoin cash, ethereum, ethereum classic and litecoin, offering the most complete services for btc, bch, eth, etc and ltc on both web and mobile. Bitcoin is digital money used for secure and instant transfer of value anywhere in the world. There are many ways to earn bitcoin, such as from bitcoin mining, bitcoin games or bitcoin trading. Bitcoin price is the price at which you can buy bitcoin in your local currency and it changes based on the supply and demand of bitcoin. Ether is a digital currency used for operating smart contracts on the Ethereum network. Like Bitcoin, the Ethereum network and Ether tokens are not controlled or issued by any bank or government - instead it is an open network which is managed by its users. Smart contracts are applications that run exactly as programmed without any possibility of downtime, censorship, fraud, or third party interference - a smart contract will work exactly the same way every time it is used. Getting a bitcoin cash, ethereum, ethereum classic, litecoin and bitcoin wallet is the first step towards blockchain, bitcoin mining, bitcoin games, bitcoin cash games, ethereum games, litecoin games, or bitcoin trading. The app works great, but the fees are high. They need to emphasize the "withdraw to" and "deposit from" terms. Account instantly gets locked. It could have been avoided if they used a bold font at least. The app is not user centered so users have to spend time thinking what to do by being very careful. The current trade prices are not correct with other sites. There are few coins available in the platform. Relatively high fees and zero security in the funds themselves. Fee schedule is misleading and answers to questions about fees are also misleading. Fee to make purchase, international fees for the purchase fee to cash out fee for conversion, without funds being secured. There is a warning that comes up covering the screen about verification of the account but it won't go away and let you actually verify the account. There is no way to accept and dismiss the message. Overall app is okay way to get started in the cryptocurrency market [5]

### **2.1.5 Robinhood: Investing app for the 99%**

Robinhood is good for investing money without ever having to pay commissions. Maneuver the markets by trading stocks, options, and crypto. Robinhood helps you understand investing and lets you start trading the smart and simple way. Invest in ETFs, options, or stocks. Buy cryptocurrencies like Bitcoin (btc) and Ethereum (eth). Trade with no fees. Robinhood makes it easy to open a portfolio and take control of your money by investing and saving. Investing without fees means that Robinhood Financial LLC receives \$0 commissions on self-directed individual cash or margin brokerage accounts that trade U.S. listed securities via mobile app or online. Relevant SEC & FINRA or other fees may still apply. Robinhood Financial LLC and Robinhood Crypto, LLC are subsidiaries of Robinhood Markets, Inc. Equities and options are offered to self-directed customers by Robinhood Financial, member of FINRA and SIPC. Cryptocurrency trading is offered through Robinhood Crypto. Cryptocurrencies are not stocks. Any information about Robinhood Crypto on any Robinhood website, platform, emails or other communications, are for informational purposes only and not intended as a solicitation or advertising for Robinhood Crypto. Robinhood is Good starter app with free trades. The prices can be slow to update, the app lags switching from page to page, and front page with the portfolio is all glitched out and only shows the last two weeks trades. Slow process on requests which results on losing users. App is not user friendly for the uninitiated. Irrelevant notifications about the stocks makes feel the app is not integrated properly. The user has very limited info at their disposal. News updates infrequent and inconsistent. Cannot see incoming and outgoing ask prices or their share amounts. Built in charts suck, candlestick chart is a poorly executed. Only real bonus is free pre and post. Overall the app is doable but is not completely for a professional trading. However you can get some different apps as Investing to help you and checking at the news. But for beginners it is good. [6]

### **2.1.6 Acorns: App for painless saving**

The Acorns is investing app encourages you to invest your spare change using a system they call "round-ups." Acorns monitors your bank account and automatically invests the change from your daily purchases. Part of being an app means making the investing process as simple as possible. This app is operated by Acorns Advisers, LLC, an SEC Registered Investment Advisor. Brokerage services are provided to clients of Acorns by Acorns Securities, an SEC registered broker-dealer and member FINRA/SIPC. Investments are not FDIC insured and may lose value. Investing involves risk and investments may lose value, including the loss of principal. Please consider your objectives and Acorns fees before investing. Past performance does not guarantee future results. "Acorns", the Acorns logo and "Invest the Change" are registered trademarks of Acorns Grow Incorporated. The app is usable for beginners learning to save money for the long term. Not a stock trading app or a way to earn money quickly. I'm sure over time with more money invested you would see some returns in your life. Acorns is an awesome idea for those who are looking to invest that spend money using a credit/debit card. It takes very little to sign up (\$5) and you get so much out of doing it. The app has had a little mess up by withdrawing too much money from accounts.[7]

### **2.1.7 Venmo: Payment app for splitting the cost of a pizza with friends**

Venmo is the simple money app for sending cash quickly between friends and shopping at your favorite online stores. Split purchases to avoid awkward IOUs, share your new buys, and catch up on what your friends are doing on the feed. Send money to friends by simply linking your payment method. There's no transaction fee for sending money with your debit card or bank account. Use your Venmo balance for payments, or easily cash it out to your bank. Check out without your wallet. Use Venmo to pay in select mobile apps or at millions of retailers on mobile web—for free—so you can easily make, split, and share purchases with friends. The app is good but it reveals your profile to public which makes inconvenient to use. Acorns charges you every time you withdraw money. Sending and receiving money is great. However, attempting to use the venmo card is ridiculous. It is tested and each time waiting a day or two, updating the app, and still not fixed. Another issues with UI, it is quite difficult to search for people and with the option create multiple type of account it is cumbersome to switch account.[8]

### **2.1.8 The App for Amassing Wealth: Wealthfront**

Financial planning and investing with Wealthfront could be a great idea: app does it without the high fees. That's because it use technology to deliver the most comprehensive automated planning solution, powered by sophisticated, time-tested investment strategies developed by WealthFront world-class research team. Wealthfront Advisers LLC is an SEC registered investment adviser. This description was prepared to support the promotion of Wealthfront's investment services and products, and should not be construed as tax advice, a solicitation or offer, or recommendation, to buy or sell any security. Financial advisory services are only provided to investors who become Wealthfront clients. Tax Loss Harvesting: Takes advantage of movements in the market to capture investment losses, which can then be used to lower your tax bill. Stock-level Tax-Loss Harvesting: An enhanced form of Tax-Loss Harvesting that looks for movements in individual stocks to harvest more tax losses and lower your tax bill even more. Smart Beta: Improving on what's commonly called Smart Beta, this strategy increases your returns by weighting securities in your portfolio more intelligently using a range of factors. Easy to use and set up, and their bank transactions move pretty quickly, both depositing and withdrawing but also track other accounts. Even with a numeric PIN this app still logs user out every month need password manager always in phone in order to access account. There is no way to see profit percentage for the year. All the profit being displayed is based on the time from where the account was opened. Also the dividend reinvested should not be added to profit percentage. This will provide users with a clear picture of how well the portfolio is performing. Account linking stops working after the first few linked. Gives an immediate error when trying to add additional external accounts. Seems to be error happens so fast on both web and mobile. [9]

It is a free-to-use app that can help you save money, plan your budget, track your spending and expenses, keep tabs on your credit score, and manage your financial accounts in one easy place. Clarity Money can also help you: - Cancel unwanted monthly subscriptions. - Manage your budget and expenses. The key features of Clarity Money is Cancel unwanted monthly subscriptions to help save you money. Find credit card offers based on your spending habits. Manage your budget and expenses. Get started saving. Unlock your free

VantageScore Credit Score by Experian. Inspires and motivates to save more. Quotes from famous people who have made a difference in their lives as we all should. Giving an uplifting experience to eliminate things unused or need. It's a decent way of tracking some expenses. There is however one minor fault with the app, which is that it groups deposits into account with all the expenses drawn from the account, as if they were losses rather than gains. This can be fixed using the category options to make the app ignore. The app has linking issues to get this to work and to link anything to it and it's not working and there's nothing to tell you if your doing it wrong or how to do it correctly. Overall its neat. The concept is great but it leaves wanting more. Certain transactions, including BP gas count specific locations individually which make it impossible to track money spent on. It is not why it is impossible, it's because it doesn't even list each to select when track. [10]

### **2.1.9 Mvelopes**

Use the Mvelopes budget app to help make more informed budgeting decisions and future plans. Track your bank accounts and credit card balances alongside your budget to help pay off your debt and increase savings faster. Create a financial plan for the future and make it happen. Save time with the Mvelopes budget app, so you can focus on managing finances and not entering transactions. Secure with in-app security settings, a four-digit PIN or your Mvelopes username and password. Mvelopes key features are import your bank and credit card accounts and track your spending within Mvelopes. Unlimited envelopes and financial institutions can be used in your account. Use digital envelope budgeting system to organize and simplify your finances. Easily access or adjust your budget on the go. Categorized spending helps you make informed decisions when you shop. Inbox-style transactions make it easy to stay on top of your budget every day. All-in-one accounts screen lets you view your checking, savings and credit card balances in one place. Assign transactions to envelope categories, including splitting individual transactions into separate categories. Complete, real-time synchronization with the Mvelopes web app at Mvelopes.com. Money saving tips, ebooks, and videos inside the app. A decent way to manage finances using a budget and to track expenses if you use credit cards and have online accounts. No longer need to keep receipts unless you have to split amounts into different envelopes. Mobile app not stand-alone. Once your bank accounts are added, Mvelopes scans your transactions for deposits to suss out your income. This works best if you have a fixed income with a consistent deposit amount, such as when you receive a salary. If you're an hourly wage worker, it may be more problematic. For instance, Mvelopes correctly identified an individual's biweekly deposits as a regular paycheck but couldn't account for the fact that the deposit amounts varied. It arbitrarily grabbed one deposit amount—curiously not the most recent one—and populated the biweekly income field with that number. Not functional, or ready. That's fine but warn us about that. Does not demand money initially. No page with simple, at a glance info of what have left to spend. User need to add up categories and do math in my head. The author is not confident at all, as it does not alert you. Really need the ability to select multiple transactions at once and select the envelope. That bank accounts can't be fixed from phone. Also need the ability to add a transaction without so many required fields. [11]

### **2.1.10 Personal Capital**

Separate from its managed accounts service, Personal Capital also offers a slew of financial and investment planning tools that are completely free. Users can link their existing accounts and track spending, net worth, portfolio performance, retirement progress and fees. Personal Capital is the smart way to track and manage your financial life. It combines financial tools that provide unprecedented transparency into your finances with personal attention from registered financial planners. The result is a complete transformation in the way you understand, manage and grow your net worth. App can be used with confidence. Two-step remote authentication process builds in an extra measure of security to verify your identity and your device, so you can manage your money and finances knowing your data is safe. With Investment Checkup on tablet, you can compare your portfolio's allocation to the ideal target allocation and see how well your investments are doing. Uncover opportunities for diversification, minimize risk, and pinpoint hidden fees to fine-tune and improve performance. Personal Capital's registered financial advisors provide customized advice tailored specifically to your goals. Create and follow a budget. See if you're spending more than you're making. Monitor credit card balances. See detailed income and spending by category or payee. Review transactions in the last 24 hours with the Recent Transactions widget. Default page is now showed as notifications when it should be on net worth. Also it would be nice if the investment category under monitoring had a subdivision for retirement accounts. There a budget portion with a graph cannot figure out what each letter represents, without knowing that, the graph is pointless. It is however helpful at having all accounts in one place and helping me manage finances. For the most part, Mint doesn't offer any tools to manage your investments. While they do show portfolio values over time, there are no tools available to aid with retirement planning or analyzing asset allocation or fund expenses. Personal Capital shines in this area. You get access to projected portfolio values, retirement forecasting, possible variables that may affect your retirement goals, and a personal evaluation to see if you're on track. Mint, on the other hand, has no similar functionality. Good app. Still some pitfalls such as mistaking money transfers between savings and checking as income. [12]

### **2.1.11 Penny and CREDIT KARMA**

Penny was a personal finance app that helps you track your income and spending. Whenever you chatted with Penny, she shared important and fun information about your finances with you. Penny was acquired by Credit Karma, the company that gives 80 million people free access to their credit scores. Penny the app is no longer available, but Penny as a force for giving friendly, helpful financial advice lives on in Credit Karma. Credit Karma a real website with a solid reputation, but its services are also free to consumers, with no credit card required. Besides, the word "scam" connotes fraudulence, deception and financial swindling – none of which Credit Karma directly or intentionally partakes in. As a member, you can see your accounts, your last reported balances and what's affecting your credit scores. Learn what affects your credit scores and what you can do to improve them. See personalized recommendations for ways to use your credit more wisely. Excellent app if you want to on top of your money and be aware of what happens with your accounts so you can get credit offers hat match your score. Credit karma uses a different algorithm then the 3 credit reporting agencies therefore the scores range from 15 to 25 points higher or lower.

Credit karma I guess you can say is a decent purpose on monitoring but you're better off just getting true scores straightforward. The actual reporting agencies. [13]

### 2.1.12 TOSHL FINANCE

Toshl Finance links up with your financial accounts and lets you track all your cards and cash in one place. With Toshl, start by making an emergency fund, then create a budget to make sure you'll have extra cash at the end of the month. It'll tell you how much money have left for spending after adhering to your budget and following through on your saving goals. You can track things like food and bills either automatically (by linking your bank account, credit card, PayPal and other services) or manually. You can then see where you're spending too much, get warnings when you're approaching your budget limits and receive reminders about upcoming bills. Convenient is that, like Mint, you can set up budgets for specific categories you might want to cut back on, like food or clothing (areas I could use a little more control). If you don't stick to the budget, Toshl will ping you about going overboard. Track all your credit cards, bank accounts and cash in one place. Toshl Finance helps people keep track of their personal finances. It is quick and easy manual expense entry in only 4 taps. Tip calculator included. Add rich data to entries: multiple tags, financial account, location, description, repeats, bill reminders with notifications, photos. Photos are great for keeping receipts, warranty info and expense reporting. Big picture overview of how your money flows each month, how much you have left to spend this month while maintaining your budget goals, pie charts, bubble graphs, expense locations map, budgets for all expenses or filtered by categories, tags or accounts, budget for any time period, optional rollover to the next budget period, notifications warn you when you approach your budget limits [14]

### 2.1.13 Table- Literature Review

Projects	UI Engineering (User Interface)	Native Mobile Based App	Web Based App	User Centered	Free Or Open Source	Highly Customizable
Mint money manager [1]	V	V	V	X	X	X
You Need a Budget: App for getting out of debt [2]	V	V	X	X	X	X

Wally: App for tracking expenses [3]	V	V	X	X	X	X
Tycoon: App for models (and other freelancers) [4].	X	V	X	X	X	X
Coinbase: App for trading Bitcoin[5]	X	V	X	X	X	X
Robinhood: Investing app for the [6]	X	V	X	X	X	X
Acorns: App for painless saving [7]	X	V	X	X	X	X
Venmo: Payment app for splitting the cost of a pizza with friends [8]	V	V	X	X	X	X
The App for Amassing Wealth: Wealth: Wealthfront[9]	V	V	X	X	X	X
Clarity Money [10]	V	V	X	X	X	X
<u>Mvelopes</u> [11]	X	V	X	X	X	X
Personal Capital [12]	V	V	V	V	X	X



<u>Penny</u> and CREDIT KARMA [13]	X	V	V	X	X	X
TOSHL FINANCE[14]	V	V	X	V	X	X
<b>Budget Tracker: Highly Customizable Budget Tracking Mobile App</b> [15]	V	V	X	V	V	V

*Table 1: List of similar systems*

## 2.2 Money Management

Research by Center for Personal Financial Education, on “Effective Strategies for Personal Money Management, 2004” has demonstrated that if individuals are having financial knowledge, they can do better financial planning. On the issue of Consumer Behavior Fuels Battle, Personal Finance Management Tools conducted a survey of in excess of 2,000 buyers in August which expresses that clients’ needs to see all their accounts in a single place continuously, track and analyze their spending, and accomplish their financial goals. Personal Budgeting which researched on ‘Basic Principles for Maximizing Your Cash Flow’ make sense of that the genuine adequacy of cash money management relies upon the individual's method for living and his objective setting. Streamlining the planning process in most organizations requests technological tools equipped for supporting a faster, more flexible, more adaptable, and versatile way to deal with planning. Matt in his paper “How to make a money management plan”, in 2009 justified that personal financial plan is the key for money management solutions. As per him a financial plan gives an individual an exact idea of from where the cash is coming and where it is going and what has been left with him. He gives the depiction of cash management tools like accounting, Income statement, balance sheet and planning. Mississippi State University Extension Service in their article titled “Manage Money Successfully” accentuated the need to comprehend the different sorts of expenses and keep an exhaustive tracking of the same. As per them, figuring one's costs precisely is essential for the improvement of workable financial plan. As per Adaptive Planning, in their paper “Best Practices for Budgeting, Forecasting and Reporting” in 2005 expressed that the planning is the basic and valuable element in family unit also in changing business condition. Laurence Barkley, in his paper “How to save money and create value in a tough economy” concentrated on the factors to be considered while spending budget. An examination was led by the Missouri Council on Economic Education, and the results were introduced in a record entitled ‘Towards Economic and Financial Literacy: A Final Report’. The report concluded that one can fabricate a more stable financial future for himself and his family by making financial plan. According to the paper “Why Personal Finance Software?” a financial plan can be as basic as a piece of paper with headings for income and expenses composed on it. Most individual spending plans are computed month to month. You needn't bother with a detailed spending plan. By keeping things basic, you will have the capacity to take after your spending all the more effectively. agree to accept a class that will show you how

to manage your money. Classes, for example, personal finance and basic accounting teach you how to compose a check, balance a checkbook, and comprehend credit card interest and fees. According to it budgeting is the most ideal approach to check how much monetarily dependable you are. The paper “How to Set up a Family Budget” gives us the knowledge of need, constituents, benefits and preferences of a family spending plan.

### **2.2.1 Money Management of Students**

Numerous studies address money management as feature of financial aid (Coomes, 1992; Dennis, 1983; Hira and Brinkman, 1992; Holland and Healy, 1989; McDougal, 1983; Moreland, 1986). Other research reviews the relationship between money management and credit ("Planting the seeds," 1992; Broebeck, 1992; McEldowney, 1994; Murdy, 1995; Rush, 1995). A third body of research perceives money management as a major aspect of the larger issue of consumerism (Garman and Bach, 1995; Glade, 1991; Herrmann, 1982). These investigations deliver valued knowledge about money management in connection to other finance related administration skills. One money management, has been inspected in connection to university students (Anderson et al, 1993; Archer and Lamnin, 1985; Danes and Hira, 1987; Heckroth, 1993; Ingalls, 1990; Jackson and Pogue, 1983; Murphy and Archer, 1996). These investigations offer bits of knowledge about undergrads' needs, states of mind, and knowledge on money management.

### **2.2.2 Money Management Needs of Students**

Some research particularly addressed money management needs (Archer and Lamnin, 1985; Jackson and Pogue, 1983; Murphy and Archer, 1996). In an investigation about understudy expense budgets, male and female understudies described distinctive money related requirements at various occasions in their university careers. For instance, senior women spend more cash in lease than senior men. This dissimilarity was attributed to a preference. Ladies are probably going to pay more cash for a more pleasant apartment. The researchers claimed that more knowledge about understudy expenses would help in making reasonable budgeting seminar (Jackson and Pogue, 1983). Related studies about money management needs were addressed to as far as individual and academic stressors (Archer and Lamnin, 1985; Murphy and Archer, 1996). In one study, a random sample of understudies at a substantial Southeastern university were administered a survey which comprised of seven demographic factors, and two open-ended inquiries. Understudies were asked to quickly depict two conditions or circumstances which they found to be the most upsetting in both personal and academic categories. Of the respondents, 7% recorded issues with funds as their first or second academically-related stressor, while 27% recorded issues with funds as their first or second personally-related stressor. Black understudies, and understudies age 22 and older listed financial stressors more frequently than different gatherings of understudies, and understudies who lived in the residence halls listed financial stressors less regularly than all different groups (Archer and Lamnin, 1985). After eight years, a similar report was rehashed, and 3% of respondents recorded issues with funds as an academic stressor, while 31% recorded issues with funds as a personal stressor. Issues with funds again were accounted for additional as often as possible by older understudies, and those living off campus. Also, issues with funds were accounted more frequently by those students in fraternities and sororities.

Researchers concluded that money related concerns are not tended to viably on campus (Murphy and Archer, 1996). Understudies' money management needs do not clarify what attitudes they may have about money management. Subsequently, information about understudies' attitudes toward money management are applicable to the present study.

### **2.2.3 Money Management Attitudes of Students**

One college professor surveyed understudies about their money management attitudes in prior to teaching class, and utilized the outcomes from the survey to guide discussions all through the semester. During one year, 70 understudies in two segments of the spring semester class, and 40 understudies in one section of the fall semester class, were surveyed. A five-point Likert scale, extending from strongly agree to strongly disagree, was utilized to respond to 16 statements on money management. The statements which inspired the best level of contradiction among respondents turned into the focal point of the class discussions. Over 75% of the understudies likewise rated statements about how to keep the economy up, what money management segments were known sectors of married life, how to save, how to make family choices with respect to cash, and how to profit.

The larger part of understudies felt that communication about money ought to happen with all individuals from the family, saving ought to be a need, and advertising energizes individuals to spend money to keep the economy up. Not exactly 50% of the members conceded to statements which addressed issues about allowance for adolescents, children who live at home after graduation, and children who know the measure of family salary. Understudies held distinctive thoughts about whether young people ought to be given an allowance, regardless of whether children should pay lease if living at home after graduation, and when youths ought to be informed of the measure of family income. Despite the fact that understudies concurred most on issues about saving and communication, they contrasted most about family issues of money management. These findings show understudies originate from diverse family backgrounds, however have comparative social background.

Another study given more thorough information about understudies' attitudes toward money management. Understudies enlisted in two general training courses at a Northern college gave an advantageous example. A two-part questionnaire, which incorporated the Money Attitude Scale and a demographic segment, was administered to explore four attitudes: power-prestige; complaining-doubting; retention-time, and compulsive-compensatory. Understudies feel low levels of power and prestige when they have restricted financial resources. Understudies who get require need-based scholarships and different sorts of non-determined pay will probably have doubts and questions about their monetary circumstances, perhaps because individuals who have minimal expenditure will probably scrutinize their budgetary transactions and money management experience. Results additionally revealed that understudies spending plan and spare less for recent developments as they move from freshman to senior status. The researchers argued that college students view money management in manners which mirror an absence of training. This examination about money management attitudes focuses to an absence of information about money management. Particular examinations about undergrads' information of money management issues help to make a clearer picture about this issue.

## **2.2.4 Cash Management Knowledge of Students**

One part of money management is understanding the social security system. A researcher reviewed understudies' information about the social security system. Twenty-five "true or false" things were incorporated into a survey which was directed to representative sample of understudies at an enormous, Midwestern college. The questions identified to specific types of social security benefits, for example, retirement, incapacity, and survivor benefits. The normal number of correct response was 12/25. Male scored higher than females, as did respondents over the age of 21. Scores expanded gradually from reactions given by freshmen to reactions given by seniors. Thirty-five percent of the questions were effectively replied by the respondents, driving the researchers to presume that understudies were not exceptionally proficient about the social security system. A more recent and comprehensive study portrayed the money management information of undergrads, and recognized qualities that assistance clarify the contrasts in understudies' knowledge. The researchers managed an instrument which included five categories of money management knowledge: credit cards; insurance; personal loans; record keeping; and, overall financial management. Understudies accurately addressed 81.8% of the inquiries in the record keeping sector, 73.0% of the inquiries in the personal loan section, 57.4% of those in the credit card section, and 48.8% of the inquiries in the insurance segment. 66% of the overall financial management segment questions were accurately replied. The findings recommend a requirement for education on specific money management territories, as understudies were more knowledgeable about general realities identified with money administration than they were in the other four regions inspected.

In a similar report, understudies' socio-demographic attributes were also analyzed, and the outcomes recommended that money administration training may best be directed toward particular understudy population. Class status (e.g., freshman, sophomore) was emphatically identified with learning in each section. Freshmen scored lower in all zones, provoking the researchers to recommend that money administration instruction be coordinated at the first year understudies' population. The researchers called for more research on the financial management practices and attitudes of understudies.

## **2.2.5 Difficulties in Android App Development**

Smart telephone is viewed as a basic progression which has changed human lives in a few edges. Android working structure is open source and wholeheartedly available to everybody. This paper features different difficulties challenged by fashioners in Android App Development. Android has made as the most generally utilized working structure in Smart Phones. On Android working designs, innumerable (app's) is accessible for need of preoccupation. With awful rivalry for different examinations, understudies have moved from standard method for the game plan and change of an Android based application named as iquiz that can help understudies in orchestrating of focused exams like UGC-NET, GATE and so forth while they are on the move.

'Mobile platforms and development environments', discusses the Mobile stage progress which has started late changed into an innovative one of a kind advancement, particularly in the PDA and tablet feature space. This Synthesis address is a manual for the most recent progressions of the key conservative stages that are trim the versatile stage industry. The book covers the three at present winning neighborhood stages - iOS, Android and Windows Phone - near to the gadget doubter HTML5 convenient web stage. Gathering of individuals who may get advantage by this include: -

1. UG understudies taking adaptable figuring classes or self-taking in the reduced stage programmability control
2. Instructive, mechanical specialists handling minimal handling
3. Flexible application originators for an extraordinary stage who might be excited about different stages;
4. Structure integrator advisors and firms worried with starting affiliations and taking applications
5. Association including man service, coordination, versatile workforce application, flexible exchange & portion systems and reduced pursue and business.

## **2.2.6 Data Collection**

The main method for data collection is surveys. A survey is a research tool containing a series of inquiries for the purpose of gathering information from individuals. Surveys are utilized to gather data from a substantial number of people moderately cheaply and it also helps dependability by promoting greater consistency. This is attained through eliminating the variety in addressing that can happen when a number of distinctive interviewers are utilized. It likewise diminishes the presentation of bias by eliminating the ability of interviewers to impact answers either purposefully or unintentionally. A face-to-face street interview questionnaire was run for no more than 15 minutes and achieved a population of 50-100 individuals (students). With research done on the most proficient method to create a good survey, this data collection technique is extremely valuable to obtain data from individuals on how they feel about implementing a new expense tracker. Most questions in the survey were replied in a scale of 1 to 5 where 1 is Strongly Disagree and 5 is Strongly Agree. The survey forms were created in Microsoft Word and distributed to the individuals randomly on the allocated spot. The results of the surveys were gathered and stored in a database for further analysis of the data. The questions below give a depiction of the questions asked from the individuals during the survey: This questionnaire is of three sections: Section A; Brief introduction on the student, Section B; how well they track their expenses, Section C; Preference on if they wish to have an expense tracker.

### 2.2.7 Table - Data collection questionnaire

Section A	Section B	Section C
Age	What is the amount you spend daily?	Do you prefer to have an expense tracker that would aid to track their daily expenses?
Gender	What is the amount you spend on fixed costs (rent, utilities, etc) each week/month?	
Level of Study	How often do you view your bank statement?	
Financial Aid	How often do you budget your expenses?	
Mode of Payment	Do you underestimate or overestimate your budget?	
	How often do you remember to pay your bills?	

*Table 2: Questionnaire*

# Chapter 3

## Methodology

### Introduction

This chapter clearly defines the research methods used to conduct the study also this chapter discusses the implementation of the system. Section 3.5 provides the technical information about the system, including the system and software design decisions taken, the activities, tools, sample code, images and components of the system. The researcher explains how the necessary data and information to address the research objectives and answers to questionnaire was collected, presented and analyzed. Reasons and justifications for the research design, research instruments, data sources, data collection techniques, data presentation techniques and analytical techniques used are given. The purpose for the study is to determine the allowance and the utilization of money management individual who study and work simultaneously. The objectives of this section is to portray the research methodology of this study. understand the sample selection and depict the method utilized in designing the instrument and gathering information data.

### 3.1 Research Design

#### 3.1.1 Research Method

In the event of gathering the essential data, the researcher utilized descriptive method. It incorporates methods that are utilized to summarize and describe numerical data to understand easily. A survey was conducted to 100 randomly selected understudies who are works and studies in Colombo. A survey is a non-exploratory, descriptive research method. It is an essential tool for gathering and analyzing data from selected individuals. It is generally acknowledged as a key tool for conducting and applying fundamental social science research approach. Accordingly, it very well may be valuable when an analyst needs to gather information phenomenon that cannot be directly observed.

#### 3.1.2 Research Instrument

The researcher structured a questionnaire survey instrument to survey the money management practices of local and foreigner individuals. As indicated by Paul Kenyon, there are diverse points of interest in utilizing a survey-questionnaire. In comparison to different strategies, questionnaires yield a more extensive scope of data. It is generally quicker and less expensive than interviews and direct observations. It is likewise vital to take note of that questionnaires give reliable information that are less complex to oversee, investigate, quote and interrelate. The analysts, hence, picked to utilize this sort of instrument considering the desire to obtain direct information from the respondents in order to formulate rationale for the study. The group have given a progression of

questions relating to the research and to decide each individual's way of life as per their expenditure.

### 3.2 Sampling Design and Respondents

#### 3.2.1 Sampling Design

The author conducted a survey-questionnaire aimed to know the administration practices of individual. It was intended to know how much the recompense of the respondents is in general, how and where they spend it to and how they spend it. These questions will then outline the qualities of the individuals towards money related issues and point out the difference of students and employees respective to their selected age and budgetary knowledge and practices.

The following is the sample questionnaire:

#### Salary/Allowance and Budget of individuals situated in Colombo

Instructions: Tick your respective answers for each question.

No	Question	Answer		
1	Age	18-25	26 - 35	36 above
2	Gender	Male		Female
3	Your average income per month	15k-50k	60k-150k	160 above
4	What is your daily spending?	200-100	110 - 3000	3000 above
5	Your job is part or full time?	Full time		Part time
6	Do you get your allowance in your salary?	Yes		No
7	How much money is spent on your food every day?	200-500	500-1000	1000-2000



8	How much money is spent on your transportation every day?	100-300	350-1000		1500-2000
9	What do you usually do in your leisure time?	Games	Hangout	Sports	Trip
10	How much money do spend your leisure time?	500-1000	1500-2000	2500-3000	3500 above
11	Do you create a budget plan?	Yes			No
12	If so, do you follow it (budget plan)?	Always	Often	Sometimes	Never
13	Do you always try to save money?	Yes			No
14	If so, how much can you usually save?	Always	Often	Sometimes	Never
15	Where do you think most of your salary go?	Food	Clothing	Entertainment	Transportation
16	Rank your priority in terms of spending in the following: (1 as the highest and 5 as lowest)	Food	Books	Transportation	Shopping

*Table 3: Questionnaire table*

### **3.2.2 Research Respondents**

The participants for this examination were 100 randomly selected understudies and employees living towards Colombo.

### **3.3 Research Procedure**

#### **3.3.1 Data Collection**

The author conducted the study through distributing the questionnaires. Recipients were asked to complete the survey and reminded of accomplishing the questionnaire every once in a while. After collecting the complete sample data, the author, then assess, interrelate and analyze the significant differences of data gathered.

### **3.3.2 Summary of Findings**

Average day to day expense of University Students respective to their courses:

Computer Science: 1264.85

Engineering: 1815.38

Business: 1237.5

Arts: 1266.67

Based on their respective courses, the Engineering understudies were found to have the highest average of daily allowance.

#### **Daily Expense of University Students:**

The Daily allowance of the majority of understudies has the sum extending from 650.00 to 1000.00 or a level of 37%.

#### **The average amount of allowance spent on transportation:**

In view of the research gathered, it was discovered that out of the total population of the understudies who took the survey, relatively 55% lives closer to university whilst 45% goes home each and every day. Students who responded that they go home on a daily basis spend 100.00 to 250.00.

#### **Amount of Money Spent in Food:**

It was discovered that the majority of 47% spends 650.00 to 1000.00 for their food while minority just spends 300.00 to 650.00.

#### **Majority of Amount of Money spent in Leisure Time:**

It was discovered that a majority of 41% understudies spends their everyday allowance on them leisure time with sum extending from 650.00 to 1000.00.

#### **Top Most Priority for Students with regards to Spending**

From the Engineering department, female understudies addressed that their priority is food, next are materials, and in conclusion, transportation. Same to the male understudies, they replied as their top need is materials, then food, and in conclusion, transportation. For both, transportation is minimal need from the best 3. The rest of the needs which are entertainment, and printing are seldom their real priority. Same with the Business Department, the student's top needs are food,

entertainment, and transportation. For the female understudies, their needs are organized beginning from food, to materials, to transportation. Whilst, the male understudies said that food is their best need, to materials, to transportation, to printing, lastly, to entertainment. Unmistakably that Advertising male and female has similar needs. In the Computer Science division, both male and females only needs are materials and food. For female, their first are materials, and second food. The male's answer is the other way around to what the females replied. Ultimately, from Arts division, the females addressed that their best needs are materials, food, transportation, and printing. The male understudies addressed that their needs are just food and materials.

### **3.3.3 Budget Plan**

- Female and male understudies were purposefully counted separate to observe and to know whether there is a distinction. Be that as it may, both majority of male and female was found that they make a budget plan consistently. The difference was majority 56% of male said yes and majority of 57% in females. There is just little contrast in terms of majority.
- Both female and male understudies pursue their spending plan and furthermore there is pretty much nothing contrast between the majorities that said yes. All of the understudies (97%) was discovered that they set aside some money each day and just almost no (3%) said no.
- Amount of Savings of understudies: Majority of understudies (38%) was discovered that they can set aside extra money running from 0.00 to 300.00. Pursued by 23% of understudies who can save amount extending from 300.00 to 650.00. Minority of the understudies saves 650.00 to 1000.00 from their allowance.

### **3.3.4 Proposed Software Life Cycle Method for Project**

A software lifecycle model is a standardized format for planning, organizing, and running a new development project. The proposed solution system development project for budget tracking was embraced by author. The project started on the 01.08.2018 and to be finished on the 05.01.2019 excluding the testing.

After a completely conducted feasibility study covering the technical, operational, political, legitimate and financial perspectives including cost-benefit analysis, the scrum agile software development methodology was decided to follow for this project over the likes of waterfall model and incremental model.

The system was very much designed with the utilization of use case specifications, mockup designs based on the initial necessities assembled. According to Scrum continuous delivery policy, a basic prototype of the mobile application was created at an early stage in the project.

### 3.3.5 Description of the Project

Test cases written beforehand were used to test the prototype. The following step is to correspond with the customers and addition input and move onto the following emphasis of the site according to Scrum models. The summary is given on how the scrum meeting was scheduled during the completion of this assignment.

- The author did 15 days' sprints
- The author did stand up every day at 9:30am
- The author did estimation every Wednesday from 10-11am
- The author did sprint planning the Thursday before the sprint starts from 1pm-4pm
- The author cut a release branch end of Friday before the sprint ends
- The author launched the release (result of the sprint) on Tuesday (the last sprint day)
- The author did retrospective the Thursday after the sprint ends from 11-noon

The author discuss below why he has utilized the scrum methodology in the project in terms of experienced during the development of the project.

- Scrum approach enables project's the place the business necessities documentation is difficult to evaluate to be effectively developed.
- Fast moving, cutting edge developments can be immediately coded and tested utilizing this strategy, as a mistake can be effortlessly corrected.
- It is a lightly controlled method which demands on frequent updating of the development in work through fixed meetings. In this manner there is clear visibility of the project development.
- Like whatever other agile methodology, this is also iterative in nature. It needs constant feedback from the user.
- Because of short sprints and constant feedback, it gets to be less demanding to adapt to the progression.
- Daily meetings make it conceivable to measure individual productivity. This prompts the change in the productivity of each of the colleagues.
- Issues are distinguished well ahead of time through the daily meetings and henceforth can be determined in speedily
- It is less demanding to convey a quality product in a planned time. Agile Scrum can work with any innovation/programming language yet is especially valuable for fast moving web 2.0 or new media projects.
- The overhead cost as far as procedure and management is insignificant along these lines prompting a quicker, less expensive result.

### **3.3.6 Conclusion**

Based on the findings obtained from this investigation, the conclusion that is drawn is as follows:

- Discoveries demonstrated that based on their respective courses, the Engineering understudies were found to have the highest average of everyday allowance, second is Business, followed by Computer Science, and Arts as last.
- The courses compare on their allowances, since the discoveries demonstrates the distinction on their allowance dependent on their courses. It can be derived that the Engineering understudies has the highest expenditures among all understudies. The average amount of all the understudies ranges from 650.00 to 1000.00. The majority of their stipend go to food, transportation and materials.
- The greater part of the understudies lives in away from university hence making a huge contrast on their transportation costs.
- Understudies who go home regular spends a great deal of cash for transportation and greater part of 44% goes through 250.00 to 400.00 every day and minority goes through 100.00 to 250.00 per day. The costs on transportation is very enormous. That is most likely one of the elements why more than half of the understudies want to live in residences.
- Most understudies spend through 650.00 to 1000.00 on their food and minority spends through 300.00 to 650.00.
- Understudies prioritizes their school needs and prerequisites since they perceive food and materials as their need rather than entertainment.
- Understudies vary in their positioning of needs dependent on their course and sexual orientation.
- All understudies are sufficiently responsible to endeavor to set aside extra cash and make a budget plan, and will in general tail it. Both female and male understudies comprehend that setting aside some cash is essential.

For the most part, after gathering the research, the author has concluded understudies from the universities spend a great deal dependent on the information and on which need they are following. The author additionally conclude that the Engineering department is the course with understudies spending huge measure of cash on their needs which is either food or materials. All in all, female understudies spend incredible measure of money on food also, materials while then again on the other hand, male understudies have distinctive sort of needs.

## **3.4 Technical Information**

In this section the author will be discussing technologies, database, hardware, software and tools used in order to implement the system.

### **3.4.1 Technologies**

React Native, Expo, Redux, Recompose, Ramda

### **3.4.2 Database**

AsyncStorage (Global memory of the device)

### 3.4.3 Software

Visual Studio Code, Android Studio.

### 3.4.4 Hardware

Dell Inspire (Intel core i7, 8GB Ram, 4GB VGA)

### 3.4.5 Reusable Components

The main reason behind the React Native's popularity is reusable components after the favorite code once deploy anywhere phrase. The components meant to be a reusable piece of software. In order to achieve this, certain design guidelines were borne in mind. Individually reusable components (e.g. the date picker) were exported and imported into individual screens. For example, date picker and header components was implemented and exported and used along in every page that contains button or date picker. There are at least two JS files for each screen one is index.js which contains main items and another file is style.js which contains style of those items

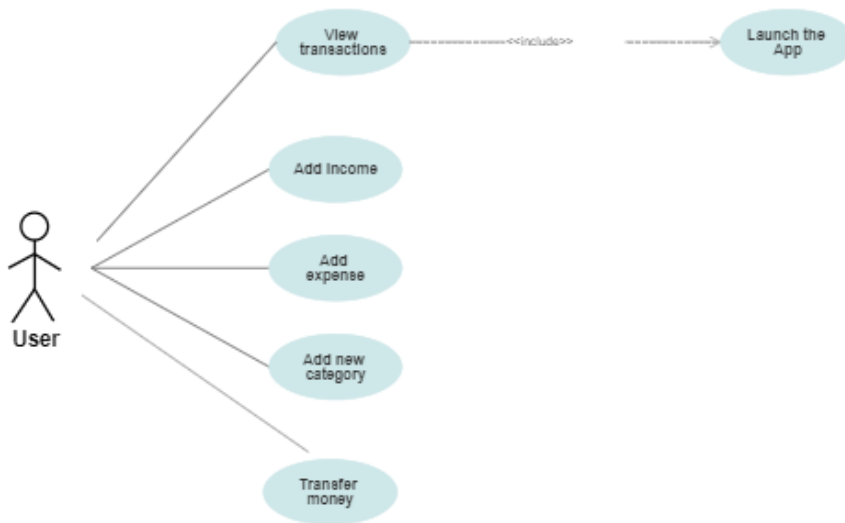


Figure 3.1- Use Case Diagram

### 3.4.6 System folder structure

At the root level system contains:

- Assets
- Styles
- Components
- Screens
- Navigation
- Constants
- Modules

Below picture is screenshot of system structure

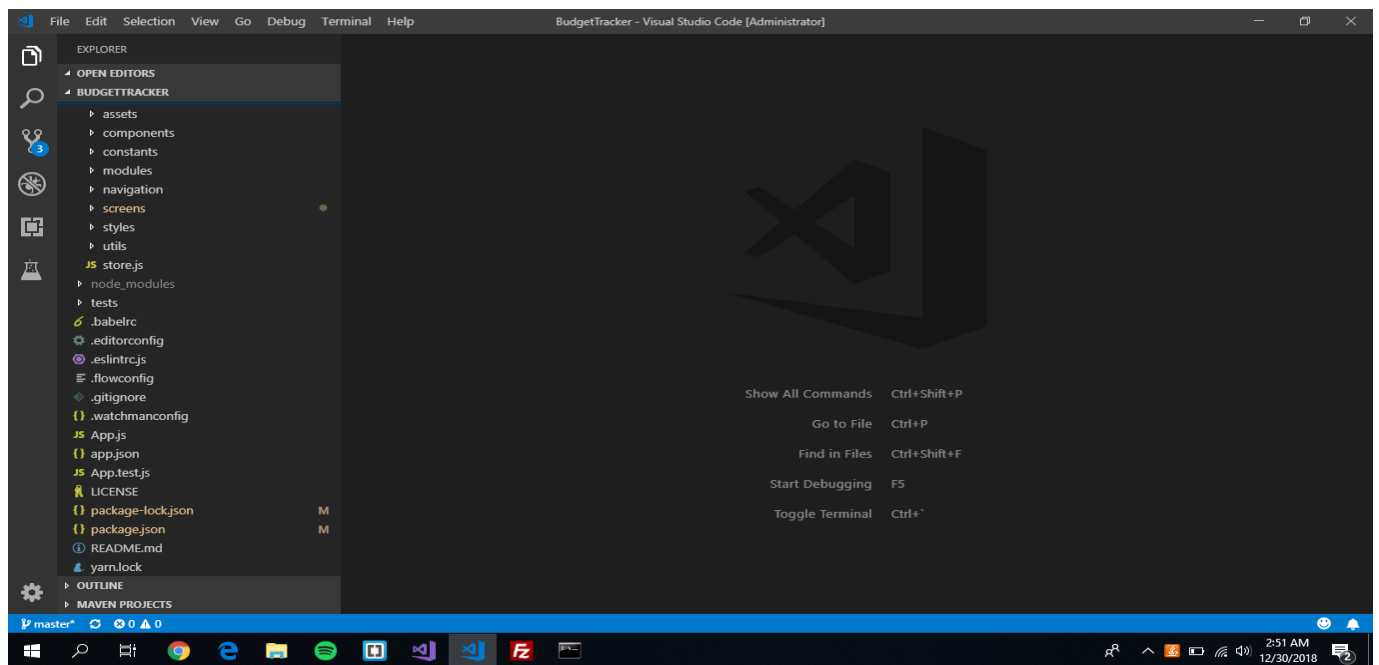


Figure 3.2- Project folder structure

### 3.4.7 Sample code

*App.js (Entry point of the app)*

```
import React from 'react';
import { StatusBar, View } from 'react-native';
import { MenuProvider } from 'react-native-popup-menu';
```

```

import { PersistGate } from 'redux-persist/es/integration/react';
import { Provider } from 'react-redux';
import { lifecycle } from 'recompose';
import { store, persistor } from './app/store';
import Navigator from './app/navigation/NavigatorContainer';
import styles from './app/styles/AppStyles';
import colors from './app/styles/colors';
import { appOperations } from './app/modules/app';

console.ignoredYellowBox = ['MenuContext', 'Deprecation warning'];

const App = () => (
  <MenuProvider>
    <View style={styles.rootStyle}>
      <StatusBar
        barStyle="dark-content"
        backgroundColor={colors.white}
      />
      <Provider store={store}>
        <PersistGate persistor={persistor}>
          <Navigator />
        </PersistGate>
      </Provider>
    </View>
  </MenuProvider>
);

const enhance = lifecycle({
  componentDidMount() {
    store.dispatch(appOperations.loadAssets());
  },
});

export default enhance(App);

```

Figure 3.3 – App.js



*store.js (store file where applications whole state stored)*

```
import { persistStore } from 'redux-persist';
import { createStore, compose, applyMiddleware } from 'redux';
import thunk from 'redux-thunk';
import devToolsEnhancer from 'remote-redux-devtools';
import reducer from './modules';

const enhancer = compose(
  applyMiddleware(thunk),
  devToolsEnhancer({ realtime: true }),
);

const configureStore = () => {
  const store = createStore(
    reducer,
    undefined,
    enhancer,
  );

  const persistor = persistStore(store);
  // persistor.purge();
  return { persistor, store };
};

export const { persistor, store } = configureStore();
```

*Figure 3.4– Application store*

### **3.4.7 Sample Unit Tests (Unit Test for adding, removing and updating transactions)**

```
import R from 'ramda';
import reducer from '../app/reducers/transactionsReducer';
import actionTypes from '../app/constants/actionTypes';

describe('Transactions reducer', () => {
  const initialState = reducer(undefined, {});

  const testTransactionProps = {
    value: 100,
    account: 'someAccountId',
    category: 'someCategoryId',
    date: new Date(),
    note: 'someNoteId',
```

```

};

const getNewTransactionId = (prevState, newState) => R.keys(
  R.omit(R.keys(prevState.byId), newState.byId),
)[0];

it('should return the initial state', () => {
  expect(initialState).toEqual({});
});

it('should add new transaction', () => {
  const state = reducer(initialState, {
    type: actionTypes.CREATE_TRANSACTION,
    payload: testTransactionProps,
  });

  expect(R.values(state.byId)).toHaveLength(1);
  expect(R.values(state.ids)).toHaveLength(1);

  const newTransactionId = getNewTransactionId(initialState, state);

  expect(R.omit(['id'],
state.byId[newTransactionId])).toEqual(testTransactionProps);
  expect(state.ids).toContain(newTransactionId);
});

it('should update the transaction', () => {
  const newTransactionProps = {
    value: 200,
    account: 'newAccountId',
    category: 'newCategoryId',
    date: new Date(),
    note: 'newNoteId',
  };

  const state = reducer(initialState, {
    type: actionTypes.CREATE_TRANSACTION,
    payload: testTransactionProps,
  });

  const newTransactionId = getNewTransactionId(initialState, state);

  const updatedState = reducer(state, {
    type: actionTypes.UPDATE_TRANSACTION,
    payload: { id: newTransactionId, ...newTransactionProps },
  });

```

```

});

expect(R.values(updatedState.byId)).toHaveLength(1);
expect(updatedState.ids).toHaveLength(1);
expect(R.omit(['id'],
updatedState.byId[newTransactionId])).toEqual(newTransactionProps);
expect(updatedState.ids).toContain(newTransactionId);
});

it('should delete the transaction', () => {
  const state = reducer(initialState, {
    type: actionTypes.CREATE_TRANSACTION,
    payload: testTransactionProps,
  });

  const newTransactionId = getNewTransactionId(initialState, state);

  const updatedState = reducer(state, {
    type: actionTypes.DELETE_TRANSACTION,
    payload: newTransactionId,
  });

  expect(R.values(updatedState.byId)).toHaveLength(0);
  expect(updatedState.ids).not.toContain(newTransactionId);
});
});

```

*Figure 3.5 – Application unit test*

# Chapter IV

## Evaluation

The testing of application was carried out by giving the prototype version of the application to the real users. Below results are generated based on real users' feedback.

Test Scenario Id	Test Scenario Description	Expected Result	Actual Result
TS_CNA_001	Create new account	User should be able to create or add new account	User is able to create new account
TS-CC_002	Customize categories	User should be able to customize categories	Categories are customizable
TS-CAC_003	Change application currency	User should be able to change currency	User is able to change currency from LKR to USD
TS-CCS_004	Create custom subcategories under main categories	User should be able to add subcategories with corresponding icons	User is able to add subcategories under main categories

TS-VRT_005	View recent transactions	Dashboard should contain recent transactions	Dashboard contain daily, weekly, monthly transactions
TS-TMF_006	Transfer money from Account A to B	Application need to have screen for transferring money	There is a screen for money transfer
TS-VIES_007	View income/expense statistics for a given day	There should be separate page for statistics	User is able to view income/expense statistics
TS-AIE_004	Add income or expense	User should be able to add income or expense easily	User is able to add income or expense with few clicks

Table 4: Test Cases

**Below screenshots are the actual result of the about test description.**

- **Scenario:** Create new account. Select drawer menu, choose accounts section, press create account place holder give account name and balance and press save.

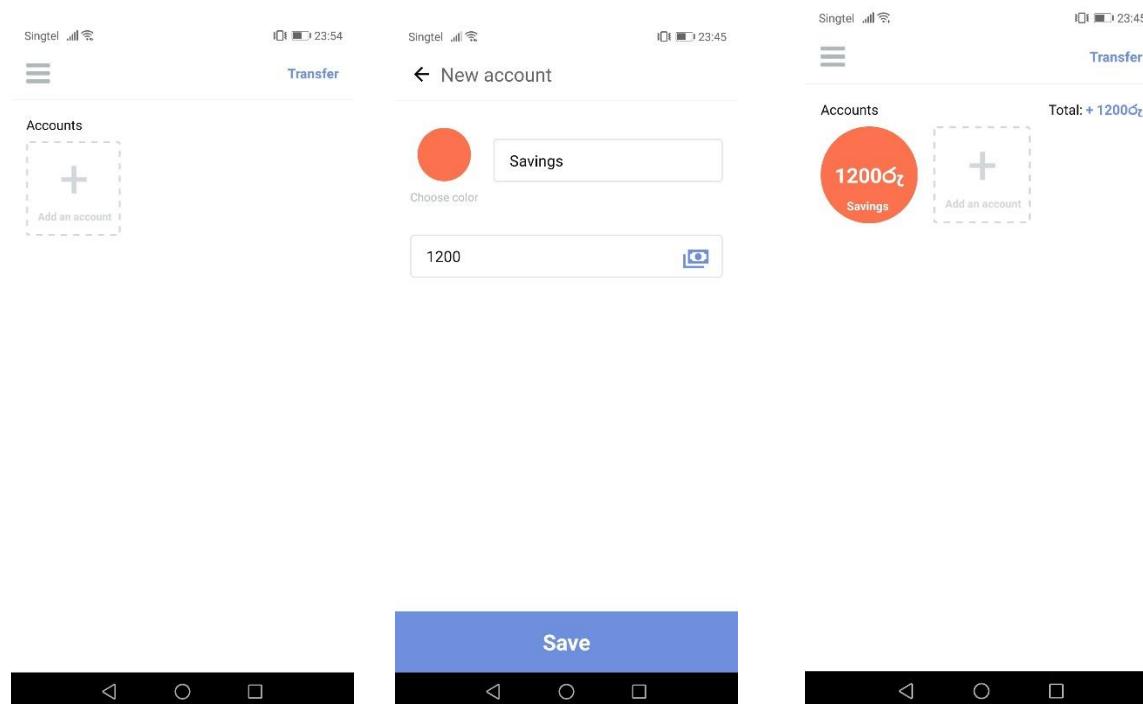


Figure 3.6-Create account

- **Scenario:** Change application currency. Select drawer menu, choose settings and change currency using currencies dropdown.

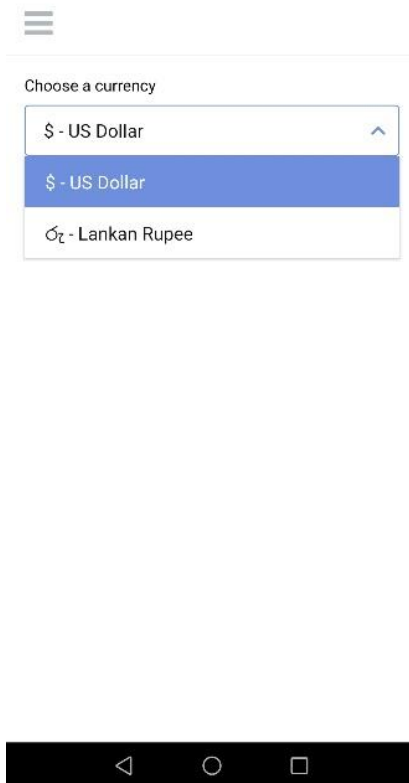
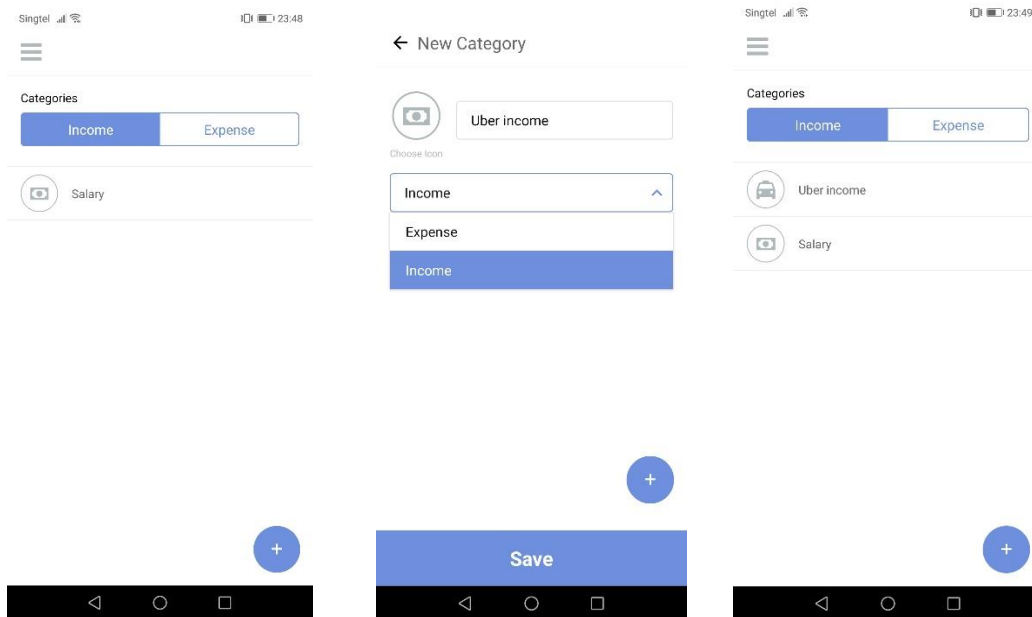


Figure 3.7-Change application's currency

- **Scenario:** Create custom subcategories under main categories. Click on drawer menu select categories then select either income or expense category and select subcategory under them by giving suitable name and icon.



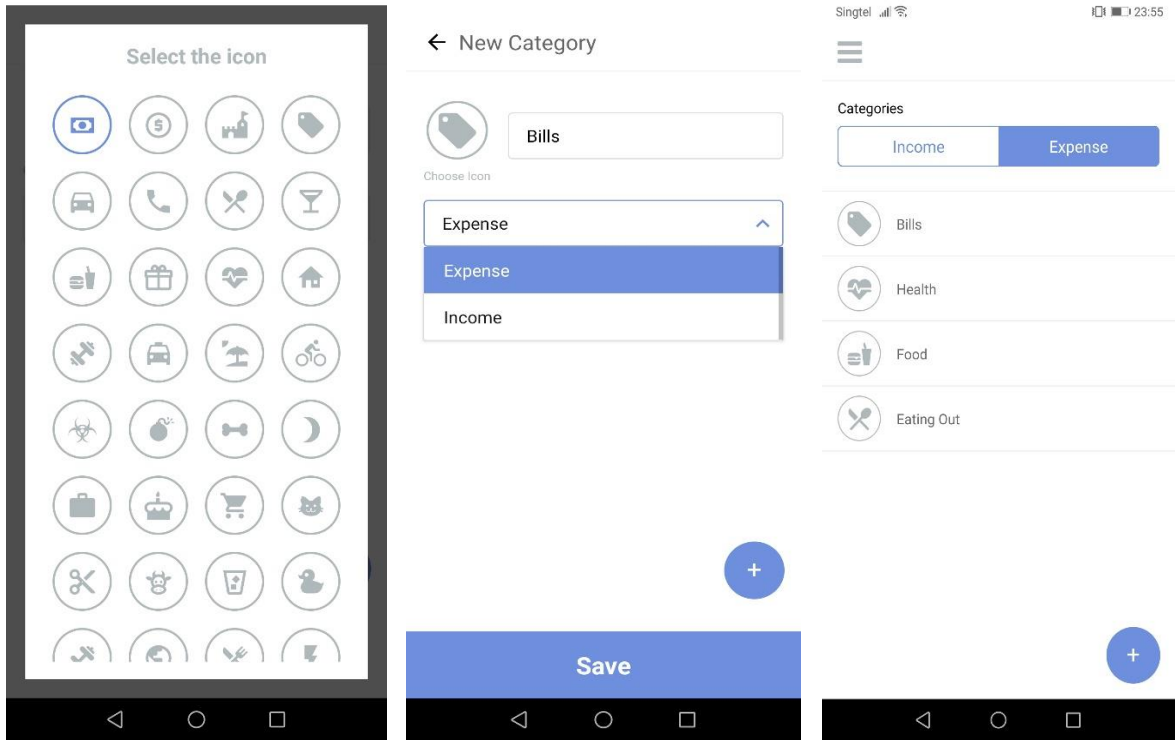


Figure 3.8- Create subcategory

- Scenario:** View recent transactions. Go to home page and user is able view recent transaction on dashboard itself.



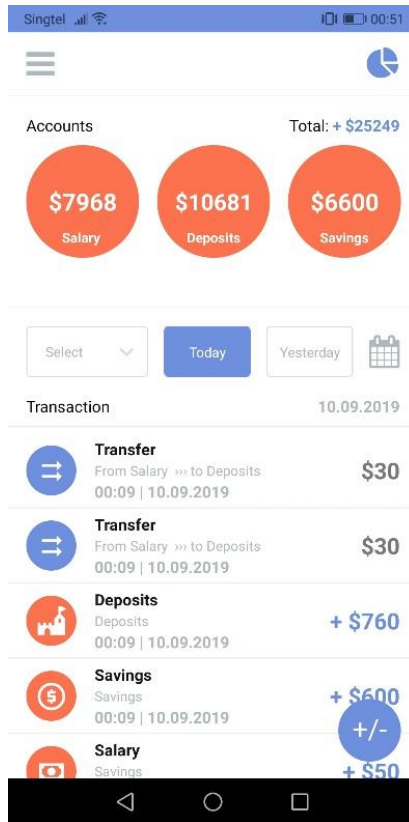


Figure 3.9-View recent transactions

- **Scenario:** Transfer money from Account A to B. Go to home page. Press drawer button and open drawer menu. Select Accounts section and land to accounts page. Press on “Transfer” label on top right corner. Land to “Transfer” page. Select the account which needs to be transferred from dropdown menu, type the amount to be transferred select the account to be transferred to. Type optional note. Press okay.

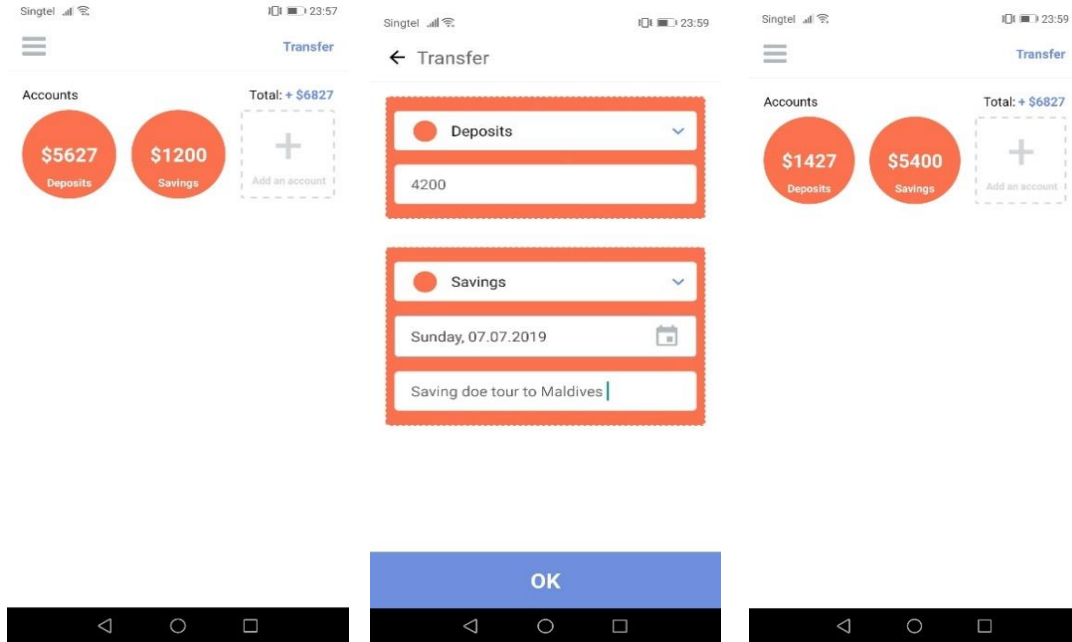


Figure 3.10-Money transfer

- Scenario:** View income/expense statistics for a given day. Go to home page and press on pie chart icon on top right corner and land to Statistics page to view income/expense statistics

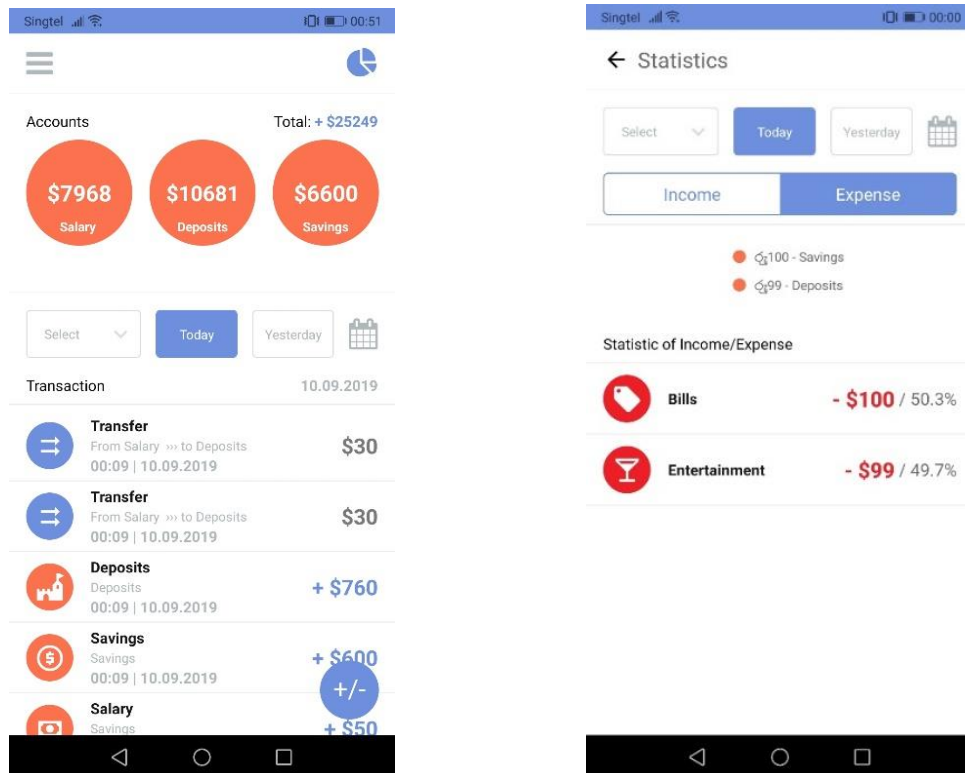


Figure 3.11-Income and Expense Statistics

- Scenario:** Add income or expense. Go to home page click the button on bottom right corner with +/- icon on it. Select + or – to add income or expense. (in this case expense) Get directed to Add Expense page and type the amount to be deducted then click okay and then selected the Account and the expense category from the dropdown, select the date and add optional note. Click save in order to save the changes.

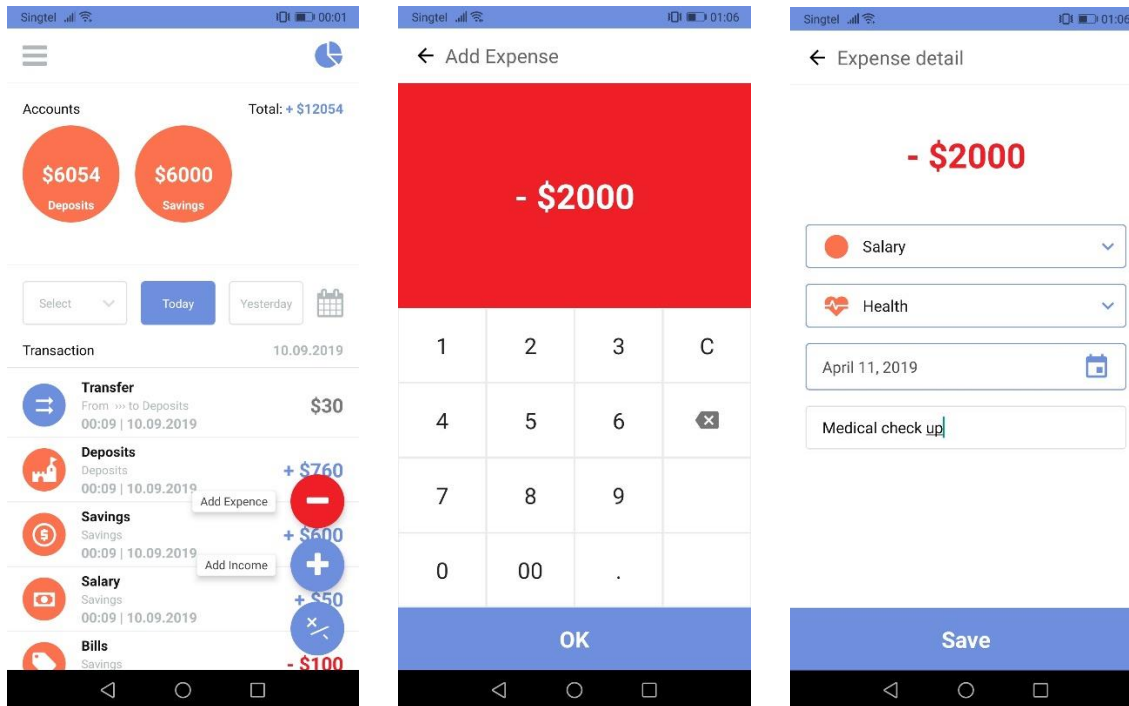


Figure 3.12-Add expense/income

## 4.1 Test Scope

The author conducted a usability assessment with the prototype. Each criterion will be rated with a severity rating based upon the following scale:

- 0 – Not seen as a usability problem
- 1 – Cosmetic problem
- 2 - Minor usability problem
- 3 – Major usability problem; needs fixing
- 4 – Catastrophe; imperative that it's fixed

### 4.1.1 User Control and Freedom

The system is designed to provide the required functionality of a budgeting application (therefore guiding the user) whilst permitting them sufficient freedom to customize their experience to their personal needs. Such freedoms include being able to add notes to any transaction they enter, being able to add their own category labels and setting reminders. **Severity Rating: 0**

### 4.1.2 Consistency and Standards

The circular aesthetic and iconography is maintained from the first of our first-generation prototypes and is used consistently throughout our second-generation prototype. Universal symbols – e.g. ‘+’ ‘-’ – are also maintained to reduce cognitive load upon the user. All menu functions are placed on and accessed via the slide-in menu. This is consistently adhered to so that the user is aware that all system settings are in one centralized location. Users are notified when a transaction is added as well as when a reminder is set, via a pop-up but not when a new category is added; for the sake of consistency and clarity pop-ups should be applied throughout the system. **Severity Rating: 2**

### 4.1.3 Error Prevention

The system design includes sufficient whitespace to ensure that the user can select touch-enabled buttons without risk of making a selection error. The ‘+’ and ‘-’ iconographies are used throughout the system to add transaction, add expense while it helps to prevent errors being made by the user; they are constantly aware of the relevant icon to look for to move forward with their task. **Severity Rating: 0**

### 4.1.4 Recognition rather than Recall

The system utilizes commonly used iconography – the menu icon symbol, happy and sad icon which the user will be immediately comfortable with which is recognizable rather than having to be learnt and recalled specific to our system. The system makes use of the user’s mobile phone keyboard which they will have used extensively for input (we chose not to make use of predefined keywords for data input as, while it might seem like a simpler option, it was not seen as offering the required flexibility). **Severity Rating: 0**

### 4.1.5 Flexibility and Efficiency Use

The system has its all sections and functionalities within the drawer menu. This focus allows the user to efficiently complete the core task process without being distracted by unwanted features. While the core tasks are designed to increase efficiency of use, further functionality is placed within the menu which provides required flexibility if the user requires it. The slide-in/slide-out menu permits the user the flexibility to access it from any location within the system. **Severity Rating: 0** The system allows the user to delete transactions by swiping once they have been confirmed which reduces the flexibility and efficiency of usage. **Severity Rating: 2**

### 4.1.6 Aesthetic and Minimalist Design

The system maintains a very minimalist aesthetic to enhance the usability of the system on touch-screens (where we imagine most of our target user to engage with our system). This aesthetic design increases usability (touch selections are easily made) as well as learnability. The core functionality of the system (transactions, categorization, reminders) is minimally displayed with additional functionality accessed via the drawer menu; this design choice helps to focus the user’s attention on the core tasks without unnecessary clutter. All pop-ups and notifications are rendered using a consistent aesthetic and design. Any input requests are placed in the bottom right corner throughout the system. **Severity Rating: 0**

Test Scope	Passed?(Yes/No)	Reasons for failure
User Control and Freedom	Yes	
Consistency and Standards	Yes	
Functionality testing	Yes	
Performance testing	Yes	
Error Prevention	Yes	
Recognition rather than Recall	Yes	
Aesthetic and Minimalist Design	Yes	

*Table 5: Testing*

### 4.2 Self-Criticism

Even though the author is able to implement a budget tracker mobile application successfully, there were certain limitations encountered during this project. Creating the questionnaires and survey were not easy to attain. Since the topic was budget/finance it was very difficult to find the open or willing candidates for the survey. The author spent little too much time on gathering the data and recording the gathered data. Finally developing the mobile application was very exciting as he had no experience in creating a finance tracking application. Choosing the appropriate platform, jar files, software and hardware was quite a challenge for me. Overall this research project helped the author gain some valuable skills which will be helpful in the future.

### 4.3 Self-Reflection

Finding information, arranging and appropriately separating the data gathered are activities that are fundamental during composing a research paper. These activities served to gain the skill of prioritizing information and arrange composed presentation of work. Writing concisely is also a skill gained during the documentation of the project. The author gained experience in the following areas as well:

- **Management Skills:** The author gained more experience in the management skills during this project where he had to meet the allocated deadlines for each chapter and the project as a whole.
- **Communication Management:** The author developed his communication skills during discussions with project supervisor and students. Even though this is not a group project, teamwork is a skill that was further gained.
- **Critical Thinking Skills:** The author developed his critical thinking skills having to choose the most suitable strategies and implementing the mobile application to make it a success.
- **Finance Skills:** The author developed his finance skills in this project by selecting the free or the lowest cost to implement the tool.
- **Technical and Design Skills:** The author developed his technical skills by selecting the most suitable strategies to implement the mobile application.
- **Information Gathering Skills:** The author gained his information gathering skills by researching on more journals and websites for the research as a whole.
- **Business Analysis Skills:** The author gained his knowledge on how to utilize the most suitable tools and software to draw object oriented diagrams.

### 4.4 Future Work

All the limitations discussed ought to be addressed in the next version of the application so that it can be more enhanced and user friendly.

- Provision to include distinctive currencies will be included so that this application isn't simply constrained to Sri Lanka yet in addition can be utilized worldwide and the currency converters will be planned and included in order to convert the diverse currency rates.
- So as to make it more easy to use and less user intensive, when the client attempts to include a same category to an expense record, a duplicate alert will be presented showing the same category which the client entered already for some expense and then he can tap on it and the passages will be automatically filled for the present record. For instance: the client spends Rs 100 at Starbucks on beverages on a specific date and the following day he spends some money at a same place on a same classification, at that point when he attempts to compose that on the expense detail view, a copy spring up will be introduced. The client taps it and it automatically fills out the detail making the application less client intensive.
- Reminder function for upcoming payments is something which needed to the system. The addition will keep users tuned for upcoming payments and would be useful feature.
- The lack of any help/FAQ/documentation section reduces the ability of the user to learn how to system works and to correct any errors they might make.

- In future, the chart reports demonstrate the costs and pay diagrams independently in the present adaptation. Later on, a correlation between the salary made and expense will be indicated graphically giving the client more alternatives to perceive what they are making and what they are spending accordingly.
- A PDF highlight would be implemented so that the client can see the total expenses/incomes in a much simpler PDF format in one record.

## **4.5 Minutes of Meeting**

### **Appendix 1**

- Team# 1
- Minute No: 001
- Date:
- Time:
- Participant: Malik Hezretov
- Apologies: none
- Absent: none

### **Key Discussions**

The primary purpose of this discussion was to determine a focus area for the project. The author decided on the sub areas of the applications that are utilized in financial management and planning applications. Next he examined on the particular focal point of each of these areas and discussed the possible avenues he could explore which were perhaps neglected or not prevalent in the applications in existent finally, he discussed the deadlines and times by which choices should have been made.

### **Decisions**

The author concluded on the focus area for my project: Finance applications – budgeting, review spending or management. Using these focal point, he decided to look at each focus and determine which focus area included adequate research to back up design choices as well as an opportunity to design or build upon existing applications that are out there.

### **Actions**

1. Focus and concentrate on why he thinks it would be a useful area to explore
2. Carry out some research in terms of papers or research available on the area or competing applications which are available on the market

## **Appendix 2**

Team# 1

Date: 18/08/2018

Time: 10am

Participant: Malik Hezretov

Apologies: none

Absent: none

### **Key Discussions**

Firstly, the author examined on the primary point of action from the previous meeting which included coming up with a specific concentration and provided reasons for the following: The finance application was then examined which concentrated on explicit issue of students and employees financing and planning. Next, he chose to take a look at the existing applications which are available and took at reviewing these applications look at reviewing these applications. Finally, he chose to have a look at the methodologies and research which is available on budgeting

### **Decisions**

A decision was to go with the finance app focus yet explicitly taking a gander at the concentration from the perspective of a students and employees. He reviewed a couple of applications which are generally focused around budgeting and review them for their ability to address the problem and their strengths and weaknesses:

- o Sanjit – Moneylover / MoneyDashboard

- o Brian – Goodbudget / Pocket Expense Ben – OnTrees / Homebudget

A decision was taken to investigate on the two studies (research or generic guidelines) which identify to the areas to share next week.

### **Actions**

To review the definition of the issue and combine the definitions into a clear and unambiguous definition. To review on the two applications which are focused around budgeting and evaluate their strengths and weaknesses. To provide 2 studies (research or otherwise) which relate to budgeting and with a student and employees focus in particular.



### **Appendix 3**

Team# 1  
Date: 18/09/2018  
Time: 10am  
Participant: Malik Hezretov  
Apologies: none  
Absent: none

#### **Key Discussions**

Firstly, the author discussed on the lengthened meaning of the issue. Secondly, he discussed on the methodologies and principles. This was an area that individuals were battling with regarding research available on budgeting being focused on business budgeting. He decided to take a look at various strands of planning and create a literature review (Budgeting and technology).

#### **Actions**

Perform research on the articles of Budgeting for students and employees. Book meeting with tutor to discuss work completed so far.

### **Appendix 4**

Team# 1  
Date: 23/10/2018  
Time: 10am  
Participant: Malik Hezretov  
Apologies: none  
Absent: none

#### **Key Discussions**

Firstly, Professor gave the author feedback on his submitted section and the whole, there was a ton of research however it was inadequate as what he learned from the applications. The author should concentrate on the focal points and draw on their good and bad ideas. Secondly, he decided on the principles and methodologies. Thirdly, he discussed the personas and how these ought to be created. A mockup of a persona was given over by professor which was on the correct way. The author and the professor talked about the criticism given and chose to utilize an opportunity to finish the audit and research process just as total the personas and models. The author decided to use the time to complete the review and research process as well as complete the personas and prototypes.

#### **Actions**

Revisit reviews and tie these together with a summary of how he is going to use what he has learned from them in the author's design process.

# Chapter V

## Conclusion

The author present and talk over the constraints of the Budget Tracker application, challenged issues, and the solutions for those challenges. In this project, the author develops a mobile application that keeps track of an individual's personal expenses, maintaining monthly incomes, recurring and ad hoc payments. The application will remove the struggle of sticky note, spreadsheet and ledger. The general objective of Budget Tracker would be for the user to manage his expenses more effectively; deliver the user a great user interface and user experience. The first version of this application is only applicable to students and working individuals. As a part of research, the author considered to add certain features to the application make it more user-friendly to the user. Apart from this, the application is utilized to gather samples of data associated with user's expenses and use those sample data as parameters to evaluate patterns of expenditure. The Budget Tracker mobile application is the idea motivated from several other mobile applications dealing with budget tracking problems. Some of the applications that are inspired from would be financial calculators, personal expenses, and many more which are currently available in the android market. Certain issues were confronted while implementing this application. For instance, the UI is designed simple yet creative with the goal that the user doesn't confront any trouble in utilizing the application and the cost information is persisted on the gadget regardless of whether the user deletes the application from the memory background. AsyncStorage was chosen over other storages to persist the information which is valuable despite the fact that the information would reside on the device locally. The application does not have the feature of PDF by which the list of expenses and amount could have been shown in one file in PDF format making it effectively discernible for the clients. Notwithstanding of the referenced flaws, the application would work as a charm for tracking expenses and gives the client, the adaptability to see the reports in any configuration (PDF, Bar Graphs, Pie-outlines, summary and so on.). Section 5.1 talks about the different restrictions in the application and Section 5.2 examines the future work so as to fix the present issues.

### 5.1 Current limitations

The application is implemented and designed in a simple and straightforward way that the user faces no issues or difficulties in utilizing this application to track their expenses. Still the application experiences different constraints which doesn't make any impediment in the current version as such yet these constraints should be addressed in the next version of the application. The client can just enter the expense/income amount in Sri Lankan Currency and USD. Along these lines, this application would essentially be utilized in only Sri Lanka and can't be utilized everywhere throughout the world because that different monetary standards are not being addressed in this version. The expenses/income must be followed in Sri Lankan Currency in this manner. The application could have been more user friendly. For instance – if the client monitors the day by day costs and spends cash at Starbucks on a daily basis, he needs to enter all the data (merchant, date, sum and so on.) himself once more. Searching functionality is absent in the current version of the application. Assume the client needs to search and see the costs made for a specific

classification state "Drink - Starbucks" for as far back as 6 months, the client needs to look through the calendar given and see it. The reports as far as charts demonstrate a correlation of the expenses/incomes independently made on various classifications/subcategories. But the graph report doesn't display or evaluate income made v/s expense.

## **5.2 Future Work**

All the limitations discussed ought to be addressed in the next version of the application so that it can be more enhanced and user friendly.

- So as to make it more easy to use and less user intensive, when the client attempts to include a same category to an expense record, a duplicate alert will be presented showing the same category which the client entered already for some expense and then he can tap on it and the passages will be automatically filled for the present record. For instance: the client spends Rs 100 at Starbucks on beverages on a specific date and the following day he spends some money at a same place on a same classification, at that point when he attempts to compose that on the expense detail view, a copy spring up will be introduced. The client taps it and it automatically fills out the detail making the application less client intensive.
- Localization feature will be implemented where app will be available both in Sinhalese and Tamil Languages by default being in English.
- In future, the chart reports demonstrate the costs and pay diagrams independently in the present adaptation. Later on, a correlation between the salary made and expense will be indicated graphically giving the client more alternatives to perceive what they are making and what they are spending accordingly.
- Another tab named "Search" will be actualized so that if the client searches for any vendor, category or subcategory by name, he can see the costs made on that specific search in a table view list with the complete number of transactions made and the total expense amount for that search. This would give much greater adaptability to the clients to follow the specific costs on specific things.

## Appendix

### Salary/Allowance and Budget of individuals situated in Colombo

Instructions: Tick your respective answers for each question.

**Age:**

- 18-20
- 21-24
- 25-29
- 30 above

**Gender:**

- F
- M

**Your average income per month:**

- 15k-35k
- 40k-60k
- 70k-90k
- 100k-150k

**What is your daily spending?**

- 100-200
- 200-300
- 300-500
- 500 above

**Your job is part/full time?**

- Full time
- Part time

**Do you get your allowance in your salary?**

- Yes
- No

**How much money is spent on your transportation every day?**

- 0.00 to 100.00
- 100.00 to 250.00
- 250.00 to 400.00
- above 400.

**How much money is spent on your food every day?**

- 0.00 to 300.00
- 300.00 to 650.00
- 650.00 to 1000.00
- above 1000.

**What do you usually do on your leisure time?**

- computer
- hang outs
- sports
- food trip
- go home.

**How much money do you spend for your leisure time?**

- 0.00 to 300.00
- 300.00 to 650.00
- 650.00 to 1000.00
- above 1000.

**Where do you think does most of your salary/allowance go?**

- food
- Materials (paint, papers, boards, etc.)
- printing (for research papers, plate references, etc.)
- transportation
- entertainment (computer shops, shopping, etc.)

**Rank your priority in terms of spending in the following: (1 as the highest and 5 as lowest)**

- food
- Materials (paint, papers, boards, etc.)
- printing (for research papers, plate references, etc.)
- transportation
- entertainment (computer shops, shopping, etc.)

**Do you create a budget plan?**

- Always
- Often
- Sometimes
- No, Never

**If so, do you follow it (budget plan)?**

- Always
- Often
- Sometimes
- No, Never

**Do you always try to save money?**

- Always
- Often
- Sometimes
- No, Never

**If so, how much can you usually save?**

- 0.00 to 300.00
- 300.00 to 650.00
- 650.00 to 1000.00
- above 1000.

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