

CSCI441_VA Software Engineering

Group 4

InvestME

[Github Repository](#)

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Customer Statement of Requirements

1.1 Problem Statement

Why do people spend their hard-earned money on frivolous things? After all, it is not like everyone is rich. Most of us have to worry about our finances and try with the best of intentions to increase our savings. For some reason, this simple concept is deceptively difficult to achieve. It takes a great deal of self-discipline to responsibly manage personal finances. We, like many others, spend money on frivolous items, which in hindsight shows us that we don't want to continue purchasing unnecessary goods and services. If we had a tool to help us save money or invest it properly, it would undoubtedly help with this problem. We hope for a software application that encourages people to stop spending money on unnecessary things and instead, save their money. We want to see our savings grow, and by doing so, we feel this will increase our financial wealth and freedom. As customers, we are asking developers to create such a software application.

Recent studies have shown how Americans, specifically, spend money on nonessential items. It is alarming to know this dollar amount gets up to tens of thousands a year (Backman, 2019). Typically, the average American does not have a lot of money in their savings accounts (Backman, 2018). Why does this problem exist? According to a report on The United States of Financial Waste, conducted by Hloom, going out to eat is the biggest contribution to spending money on nonessentials (Martin, 2019). Perhaps people simply grip to the joy of going out to eat with friends or family. Spending money on things that bring us joy is not necessarily a bad thing; however, we may often find ourselves doing this more than we should.

The report by Hloom shows millennials are the biggest contributors to overspending on nonessentials (an astonishing 72.36%). Not only this, but according to the report findings, there is a trend where the newer generation spends more on going out to eat than the previous generation, comparatively. Alcoholic drinks and coffee, for instance, often are considered nonessential expenses and quickly add up. Many of us love coffee and seemingly need to have a cup of it every morning. However, this daily consumption can quickly become a costly routine purchase. A [Starbucks latte can easily be just under \\$6](#). Now, imagine spending \$6 a day, 365 days a year; this equates to \$2190 annually on coffee alone! Buying expensive coffee is a great example of frivolous spending on unnecessary items. Spending money on nonessentials is a problem we wish to solve. We need to be reminded of how to better spend and budget money.

There should be a feasible way to encourage us to make better purchases. Conveniently being able to keep track of expenditures would be a logical start. Now, there are plenty of smartphone applications on the market that allow us to see where our money is going. However, we want the developers to produce something that offers more. Simply having this visibility is not enough. We need alternative options where we could spend our money, options such as stocks; displaying options would help us practice doing the right thing with finances, and at the very least, provide more awareness. For example, we often hear about people making money all the time by investing in the stock market. Who would not love to hitch a ride on this bandwagon; but where do we start? Some may know a little about the stock market, but often people would not know what to buy. Unfortunately, there is very little formal education we receive regarding investing. Moreover, people may find it difficult to break the habit of spending

money on nonessentials. For example, we know if our friends send a text message asking to go have a craft beer, or a video game we have been waiting to purchase is being released, it can be hard saying no. However, having an application show us an alternative that could possibly help us create savings by means of investing. It will help our users stay motivated to continuously make better financial decisions.

For security, time, and liability reasons, we do not want the application linked to any personal bank accounts. Therefore, a software application to help save money would require us to input financial transactions; something like this needs to be very quick, easy, and intuitive. If it is difficult, or too time consuming, we will most likely not do it for long. Inputting expenditures will be one of the most common functions we will use, so it is critical this function works. There should be a feature to help remind us to input expenditures. For example, when we walk into one of our favorite restaurants, the application should acknowledge our location. Then, the application will send a reminder to us to ensure the purchases were inputted. Of course, we would like to be able to turn these notifications off at any time. After we input an expenditure, the application should show the various stocks we could have purchased instead.

Being able to view the overall history of our spending would be essential. What would be even better is if we could view our spending history during a specific date range. This would allow us to break down our spending habits and provide a better understanding about our finances. Another function we would like the software application to have is to provide a summary of potential gains. For example, imagine we enter a specified date range for the expenditures in that timeframe. The application will display the total dollars spent while breaking down each transaction. At the same time, the application should display how much we could have earned if we invested in actual stocks! As users, this would be extremely motivating. Ostensibly, the point of this application is to educate us on the stock market. It would be great then if we were able to search for a stock using its ticker symbol.

Providing us with a summary of potential earnings would be one of the greatest features of the software application. Let's say the application showed we spent \$500 on going out to eat last month. If we saw that \$500 could be increased to \$900 just from investing, it would be shocking. More money is a great motivator for self-improvement, and seeing this data would help us stay focused on our goals. Additionally, having a timestamp for each logged expenditure would also be a necessary feature for the application. This will allow for the total amount spent in a specific range of time. We would also like the developers to provide a feature where the application furnishes a link to a brokerage such as Robinhood, or TD Ameritrade. This way, if we wanted to actually purchase the stocks being presented, we could. To help with this feature, we would like it if the user can search for more information about the stocks being presented to them. For the application to provide accurate stock proposals, it will need to automatically update historical, and existing stock data.

After we input data, we should be able to clear history, edit, or delete previous expenditures. This process needs to be easy and intuitive. Upon creating a new account, we should be able to use our email as a username. This will allow a sense of convenience. Additionally, we could have the option to sign in with a valid social media account, or public email account. We want the account creation process to feel intuitive. There are also many applications and websites who offer these services, and so should this application.

There are some standards in information security we would like the application to adopt. For example, upon creating a new account, we would like to have common security features such as only allowing a password to contain no less than eight characters, have at least one uppercase letter, and include a special character. This is a standard practice for creating a secure password. Additionally, we want to be able to change our password anytime. This criteria for password management will help our accounts stay secure. Deleting our accounts should also be a convenient process, and it will help in securing our information. We would like the software developers to implement user accounts referencing a unique user identification number. If we should choose to delete an account, the application will completely delete all data associated with that specific account ID.

We would like all our data from the application saved to the cloud. This includes the saved data from expenditure inputs, as well as user profile information. Cloud computing is becoming increasingly popular, and we have come to expect it in software applications. There is a fun feature we would like the developers to implement, and that is having a badge or trophy function. Obtaining badges in the application will allow us to compete with friends and give a sense of fun in making better financial decisions. For example, a simple badge could be earned when we create a new account or for our first expenditure input. We want the developers to have fun with this feature, and be creative with the various achievements or goals.

Having daily notifications is common in current applications. This application should be no different - meaning it will provide daily notifications to us. Again, this feature will be optional. To help make sure we use the application properly, we ask the developers to please implement a tutorial. As a new user, imagine downloading this application and have no idea clue about investing; please make sure we have a guide to ease us into the process. The tutorial will recognize us as a new user and give us the assistance we need.

Overall, data shows spending money on nonessentials is an increasing trend, and is a problem, specifically, for Americans. Having a tool to remind us how we could better spend our money is a way to help remedy this issue. We are asking the developers to implement this tool as a software application for smartphones. The application, along with all of its intuitive features, will help us make better financial decisions, and increase our financial freedom.

1.2 Glossary of Terms

API: A set of functions and procedures allowing the creation of applications that access the features or data of an operating system, application, or other service.

Backend: Part of a computer system or application not accessed directly by the user, typically responsible for data storage and manipulation.

Better purchase: An expenditure that is not defined as unnecessary or frivolous. Specifically, a type of investment.

Brokerage: A business that acts as a “middleman” between a buyer and seller of stocks.

Cross Platform: Application that is able to be used on different types of devices.

Expenditure (financial transactions): Any money spent.

Finances: The management of a person's money.

Financial Decision: A choice of where a person chooses to invest his/her income.

Financial Wealth: The total sum of all of a person's assets, savings, and investments.

Flutter: Google's open-source* mobile application development framework. It is used to create Android and iOS apps and is the main technique of generating Google Fuchsia apps.

Frivolous Item (nonessential item): Purchases that are unnecessary or irrelevant to a person's goals in life / self-indulgent expenditures.

Frontend: The computer system component or application that the user directly interacts with.

Invest: Put money aside with the intent of achieving a profit through financial designs and arrangements.

Life Cycle: A structure followed by a development team. It consists of a detailed plan that describes how to develop, maintain and replace specific software components.

Open-source:

Overspend: A person spending more than his/her budget allows, or spending an amount equal to or over his/her total income without regard to savings.

Retention: After establishing a ‘churn time’, find out how often users are using the application.

Savings: Money put aside for future expenditures or retirement.

Savings Account: An account to put money designated for future expenses in.

Share: The equity of a company divided into units, so that a percentage of a firm can be owned by multiple people.

Stock: An investment that gives the holder a fraction of ownership of a specified company.

Security: The ability of someone to protect his/her financial privacy and income.

Spending habit: An individual's pattern of expenditures.

Stock (Ticker) Symbol: A symbol that is a unique series of letters assigned to a company for trading purposes.

Timestamp: A digital record of a specific event's moment of occurrence.

System Requirements

2.1 User Stories

In a user story, the setting is a world in which the user interacts with the software. The story is written from the user's point of view and talks about things from the perspective of the user. The user perspective is very important because our principles and values in agile say that we are going to define our progress based on giving the user the ability to do something valuable with the software that they were not able to do before.

The user stories written below show specific cases and specifications for program functionality, as well as a weight to assess the relative time expected to take of each requirement. These features are unordered and are merely a list of the criteria of end user story and comparative weighted significance. It is essential to note that in future iterations of this report, these instances will be further discussed. From the user's point of view, the following is told as a <who> I want a <what> so that I can <why>, with the intention of fully encapsulating what the user should expect when opening and using the referenced software.

Identifier	User Story	Weight
ST-1	As a user, I want to use my email or sign in with a social media account to sign-up, so I can create an account.	9 points
ST-2	As a registered user, I want to change my password so I can keep my account secure.	4 points
ST-3	As a registered user, I want to reset my password so I can keep my account secure or if I forget my log-in information.	4 point
ST-4	As a registered user, I want to delete my account so I can keep my information secure.	4 points
ST-5	As a registered user, I want to view the terms and conditions so I can see how my data is being used.	2 points
ST-6	InvestME should give badges upon certain criteria met, e.g. creating an account, inputting first expenditure, looking at stock market data, comparing stock market data.	6 points
ST-7	As a registered user, I want to view a tutorial so I can understand how to input an expenditure.	4 points
ST-8	As a registered user, I want to add, edit, and delete the amount, the location, and a personal note on InvestME, so that my information remains up-to-date.	4 points

ST-9	As a registered user, I want to save all my data to the cloud so I can access it from another device.	6 points
ST-10	As a registered user, I want to view a tutorial so I can understand how and why I should track my previous expenditures.	2 points
ST-11	As a registered user, I want to track my previous frivolous expenditures on InvestME, so I can see which investments would benefit me.	3 points
ST-12	The application should automatically update specific historical and real-time stock market data.	5 points
ST-13	As a registered user, I want to view a tutorial so I can understand how to view and analyze historical and real-time data and apply it to my entries..	3 points
ST-14	As a registered user, I want to view historical and real-time stock market data of any registered company on the application, so I can apply that information to my data.	7 points
ST-15	As a registered user, I want to view a tutorial so I can understand how to search stocks by their ticker symbol or registered company name.	2 points
ST-16	As a registered user, I want to search for various stocks by their stock (ticker) symbol or registered company name, so I can find the companies easily.	3 points
ST-17	As a registered user, I want to view a tutorial so I can understand how to compare a given date range to specific stock prices.	4 points
ST-18	As a registered user, I want to compare a given date range of my previous frivolous expenditures, with specific stock prices given that range, so that I can see what I would have made.	9 points
ST-19	As a registered user, I want to view a tutorial so I can see how I am able to purchase stocks outside of InvestME.	2 points
ST-20	As a registered user, I want to request more information on how to purchase the stocks I have compared, so that I may consider purchasing them outside the application.	4 points

ST-21	As a registered user, I want to view the amount of money I could have earned over a specific time frame if I compare it to a stock had I invested instead of spending the money on something else.	8 points
ST-22	As a registered user, I want to choose to receive a notification to remind me to log my expenditures when I enter a common location where I may spend money frivolously.	5 points
ST-23	As a registered user, I want to choose to receive daily notifications, so I may be reminded to input frivolous expenditures.	2 points

2.2 Non-functional Requirements

A non-functional requirement is described as a requirement that sets out criteria that can be used to judge a system's operation rather than its specific behaviors.

2.2.1 Functionality

To assist the user with signing up for an account in the InvestME the user will be allowed to sign in using their existing social media accounts or public email address, without divulging their credentials to the InvestME app.

If the user would rather create a user account instead of signing in with their social media or public email address, an account can be created with a signup process. The user would need to enter their name, email address, and a password that meets a specific set of guidelines to secure the account. I

2.2.2 Usability

The application should focus on providing the user with a clean, intuitive, and visually appealing interface. This will be made possible by using Flutter as the development platform. Flutter allows for the creation of widget interfaces that allow for the same experience regardless of the device being used.

2.2.3 Reliability

To maintain reliability the user will receive a confirmation message whenever a stock is added to or removed from their list. If an error occurs, the user will receive a notification with an error message and timestamp of the event. On the backend, the database will be replicated to ensure that data is recoverable in the event of corruption or errors.

2.2.4 Performance

In order to maintain optimal performance across multiple platforms, the application will need to be as lightweight as possible. During the development of the application Flutter should be used as a development platform, this allows for cross platform compatibility. Rather than using platform specific functions and buttons, Flutter uses widgets on top of the hardware to make designing the application more efficient and lightweight.

For the application to be efficient, all tasks initiated by the user should be completed in a timely manner. The user should be able to sign in, as well as retrieve their account data from the database in a timely manner. The database should be able to serve several users without delay or corruption.

2.2.5 Supportability

The frontend of the InvestME app will support mobile devices such as Android and iOS, as well as have a web interface for use in a browser. A user will be able to manage their account from the available interfaces. From the interface the user will have the ability to change and securely delete their account from the database.

2.2.6 Data Integrity

To ensure accurate and up to date data, an API that provides real-time and historical data for the various companies on the stock exchange should be used. By having accurate data, this will allow the user to make an educated decision on which companies to follow on the stock exchange. The investment app will not modify any of the data received or processed by the API queries.

2.2.7 Maintainability

Software maintainability is defined as the degree to which an application is understood, repaired, or enhanced. Over the course of the development life cycle the development team will perform maintenance on new deployments or enhancements of the InvestME app. The maintenance performed is required to keep the source code readable and to allow for proper documentation.