

DE LA SALLE UNIVERSITY - MANILA

SmartSaving

A Term Project

Presented to Mr. Ramon Stephen L. Ruiz

In Partial Fulfillment of the

by

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I. INTRODUCTION

According to Vien (2015), 57% of 751 potential undergraduates indicated it had great or outstanding capacity for financial management in a poll. The capacity for handling money, nonetheless usually not as effective, might be believed. This demonstrates that, before starting college, many students are lacking the necessary expertise to maintain their resources.

Additionally, given how far technology has come in recent years, impulse spending has increased more rapidly since online purchasing and payments are so convenient. Moreover, Individuals can reduce expenses and enjoy the convenience of having things delivered to their homes when they purchase online. As a result, people prefer to shop online because it takes only a light tap of the search key to bring up the corresponding items. Additionally, vouchers for discounts, marketing strategies, and attractive visuals frequently influence individuals to make impulse purchases in a short period of time, which may lead individuals to not think carefully before making a decision (Diamond Valley FCU, n.d.). As a result, educating kids on how to handle their funds wisely and comprehend the responsibility of money management is critical.

Therefore, to address these issues, an application for calculating the total savings and expenses is quite important. With this application, students don't need to waste a lot of time calculating their current monthly savings. The SmartSaving application can help individuals calculate their savings in a visual way by asking the users to input the month and the corresponding income and expenses, which can let the application generate a graph of the savings growth over time using the equation $\text{Savings} = \text{Income} - \text{Expenses}$ to calculate the savings. Moreover, knowing what their expenses are by adding them and entering the categories of their expenses will let them have a better understanding of where the students spent their

money. In addition, this feature can help users when it comes to successful financial management, setting priorities for spending, identifying savings possibilities, and accomplishing financial objectives. Furthermore, this application also has a feature that can help generate a monthly expense report, letting them know if their total expenses per month exceeded the total expenses limit that they had set, which can give them a better understanding of their money management abilities.

The additional features of the application are that it can also help users calculate their compound interest by simply entering the principal amount, interest rate, and period of time in months by using the equation : $A = P * (1 + r/n) ^ (n*t)$. According to Behune and Behune (2023), Early investing encourages fiscal responsibility and allows students to earn money through saving. Moreover, making a PiggyBank demonstration is also one of our features. The piggy bank demonstration is essential to conveying to adolescents in a tangible and interesting way the importance of preserving money as well as other concepts.

A. Background of the Study

Money management is the practice of managing one's own funds wisely, whether from a budget, savings, or other sources. Its emergence has the potential to effectively assist adolescents in better managing financial problems and avoiding issues such as a lack of finances. Its significance lies in having the capacity to make knowledgeable short- and long-term financial decisions. The ability to handle and organize one's financial resources is particularly essential (Jlancaster, 2023).

Moreover, proper money management is essential for every individual, especially adolescents. Since having knowledge about finances can let them be more responsible about how to earn, spend, and allocate money wisely. Many things start to progressively change for individuals as they enter college, including their goal of financial independence. At this age, teenagers frequently prefer to manage their own finances. Therefore, it is crucial for college students in particular to have the appropriate financial mindset. Educating them about the knowledge of money management before they enter society allows them to learn from mistakes and failures. Teaching adolescents how to use

budgeting tools and procedures is also a cornerstone of financial management (Western & Southern Financial Group, 2023).

Students can better manage their costs associated with college expenses through the use of an appropriate money management application. For instance, how to divide their living expenses, transportation charges, and other costs which might effectively prevent adolescents from making impulsive purchases is an important consideration. Therefore, it is crucial that young people understand the best ways to efficiently manage their financial futures, how to make savings goals, how to have an emergency fund, and most importantly, what things are absolutely necessary, or identifying what their needs and wants are (Money Management for Teenagers, 2023b).

Additionally, having a practical money management tool for students might help them have more control over their funds. For instance, only entering their monthly budgetary allowance can help them monitor whether they have gone over it or not. Students can also better comprehend their financial flow by detailing their monthly expenses and where they have spent their earnings. Furthermore, keeping track of how much money they have saved will help students determine their entire savings.

B. Problem Statement

Impulsive Spending and a lack of financial management knowledge are the issues that students are dealing with nowadays. Thus, students must consider all options carefully, balance the benefits and drawbacks, and choose wisely when making decisions.

According to a study, about 84% of buyers bought things on impulse (Saleh, 2022). Moreover, one of the most prevalent issues with money for college students is the absence of a basic budget. Without a spending plan, it might be difficult to keep expenses in line. In addition to lacking understanding of the distinction between desires and necessities, individuals living in the age of technology are prone to purchasing things that they seldom need (Western & Southern Financial Group, 2023).

Therefore, our team is planning to make an application called SmartSaving, which aims to help students visualize their savings over a certain period of time, and know their financial management skills at this point in time. Moreover, this can also help students keep track of their expenses.

C. Objectives

The research objectives of this project are as follows:

1. Modified and enhanced based on one's own circumstances and preferences.
2. Letting students make revisions in order to ensure that financial goals conform to fluctuating lifestyles.
3. Promoting students in the future to minimize the financial burden of unforeseen expenses, as well as allowing them to better anticipate being able to live without assistance once they complete their studies (Marquit, 2023).
4. Decreases impoverishment along with monetary disparities.
5. Improves thinking-through abilities.

By achieving the above mentioned goals, this application aims to give the students a better knowledge of money management by letting them know what their expenses are each month, if they exceed their target monthly expenses limit, and their savings over a certain period of time. In addition, they can somehow let the user do critical thinking before buying a singular object.

D. Significance of the Projects

SmartSaving is a program that helps others calculate savings over time and track their monthly savings by simply entering their monthly income, and monthly expenses. It then calculates and displays the graph after the specified number of months. Furthermore, by entering the user's expenses, the program will categorize them and look at their spending habits so that the user can know their daily expenses.

A reason why this program is important is because of the immense inflation we have experienced in the past year. It is also relevant due to the growing market for online

shopping. So helping the user manage their budget and spending habits will be very beneficial in this case. Moreover, Having financial control may lower stress and make you feel safer. Money management enables this and reduces individuals' stress to a certain extent (Managing Money and Budgeting, 2023).

The goal is to help the user manage their money. Since online commerce has been growing for the past decade, more and more people are buying online. However, without knowledge of managing money, it is very easy for one to get carried away and spend more than they need to. Therefore, by guiding the user over time, they can learn to manage their money properly by showing them the information they need.

II. RELATED WORK

According to Brooks (2020), the point of money management is to have complete control over one's own financial decisions. It also helps clarify their spending habits and how they impact their financial situation. Additionally, having a savings plan can help one adjust their lifestyle to meet their long term financial goals. There are apps for e-wallets and bank accounts that have some money management features, like GCash and Unionbank. However, those apps are hands off when it comes to encouraging the user to manage their spending habits. These apps still push out promos like a discount for subscription services like Disney+, making the user more likely to spend rather than save. (CNN Philippines, 2022)

A. Effects of Impulse Purchases on Consumers' Affective States

The article by Gardner and Rook (1988) explores the link between consumers' impulse buying behavior and the affective states that follow their impulsive purchases. The study highlights the importance of emotions and moods in influencing consumer decisions. Impulse buying is a prevalent phenomenon in the American marketplace, but its dynamics remain relatively unexplored. The researchers conducted an exploratory study to gain insights into the specific affective states that arise after impulse purchases.

Using a questionnaire called "CONSUMER BUYING SURVEY," data was collected from 155 respondents representing a diverse adult population. The findings indicate that after making impulsive purchases, a majority of consumers reported feeling "better." They attributed this improvement to various factors, such as product benefits, mood alteration, novelty, and a sense of accomplishment. Impulse buying seemed to serve as a coping mechanism for breaking out of negative mood states, such as depression, frustration, or boredom.

The study also revealed that impulse buying is associated with positive affective states, such as pleasure and excitement. Many respondents described the joy of acquiring something new and the thrill of owning the purchased item. However, other people reported ambiguous sentiments, such as shame and worry, probably as a result of concerns about overspending or deviating from planned purchases.

Even if the study offers valuable insights, there are some limitations like how other people reported having conflicting emotions, such as guilt and worry, which may have resulted from worries about going over budget or deviating from planned purchases.

B. Importance of investing in adolescence from a developmental science perspective

This article by Dahl et. al. (2018) emphasizes the significance of investing in adolescence from a developmental science perspective. While early childhood has been recognized as a sensitive period for growth and brain maturation, recent scientific advances highlight adolescence as a second period of rapid growth and foundational learning, marked by distinct neural-maturational changes. Given the increasing number of adolescents worldwide, understanding and supporting this pivotal life stage becomes crucial, especially in the face of revolutionary changes in technology and global challenges.

Developmental science offers insights into the patterns and processes of biological, cognitive, and behavioral changes during adolescence, which can inform intervention and policy. Adolescence is a time of enhanced growth and sensitivity to learning, particularly related to social experiences, identity development, and exploration.

Pubertal hormones may play a role in driving social learning, status, and identity development during this period.

The article highlights the importance of strategic investments in adolescents to positively impact health, education, and social and economic success across their lifespan. Understanding and supporting adolescents during this developmental phase can lead to meaningful contributions and the development of heartfelt goals and priorities. Integrating insights from developmental science into public policy becomes more compelling in light of current global changes, technological advancements, and the need to address critical issues such as climate change and social inequalities.

Investing in adolescents not only benefits their future as leaders in adult society but also has implications for the next generation they will eventually parent. Strategic and developmentally informed investments in adolescents can contribute to achieving the United Nations Sustainable Development Goals, fostering sustainable growth, and creating a positive impact on society as a whole.

C. Financial Literacy Among Children: The Role of Involvement in Saving Money

The article by Te'eni-Harari (2016) addresses the growing need for financial literacy among children in today's media-marketing environment, which promotes materialism and consumerism. As children face an overwhelming amount of marketing stimuli, financial education becomes crucial in enabling them to make informed financial decisions. The study emphasizes the importance of saving money as a fundamental financial skill and explores the development of saving behavior among young individuals. Family, peers, culture, and education are identified as influential factors in shaping children's financial literacy.

The article underscores the importance of the involvement variable in understanding information processing among young people. Involvement refers to the subjective perception of importance, interest, and relevance given to an object in one's surroundings. Previous studies have shown a positive correlation between involvement

and attitudes in information processing, making it a relevant factor to explore in financial literacy processes.

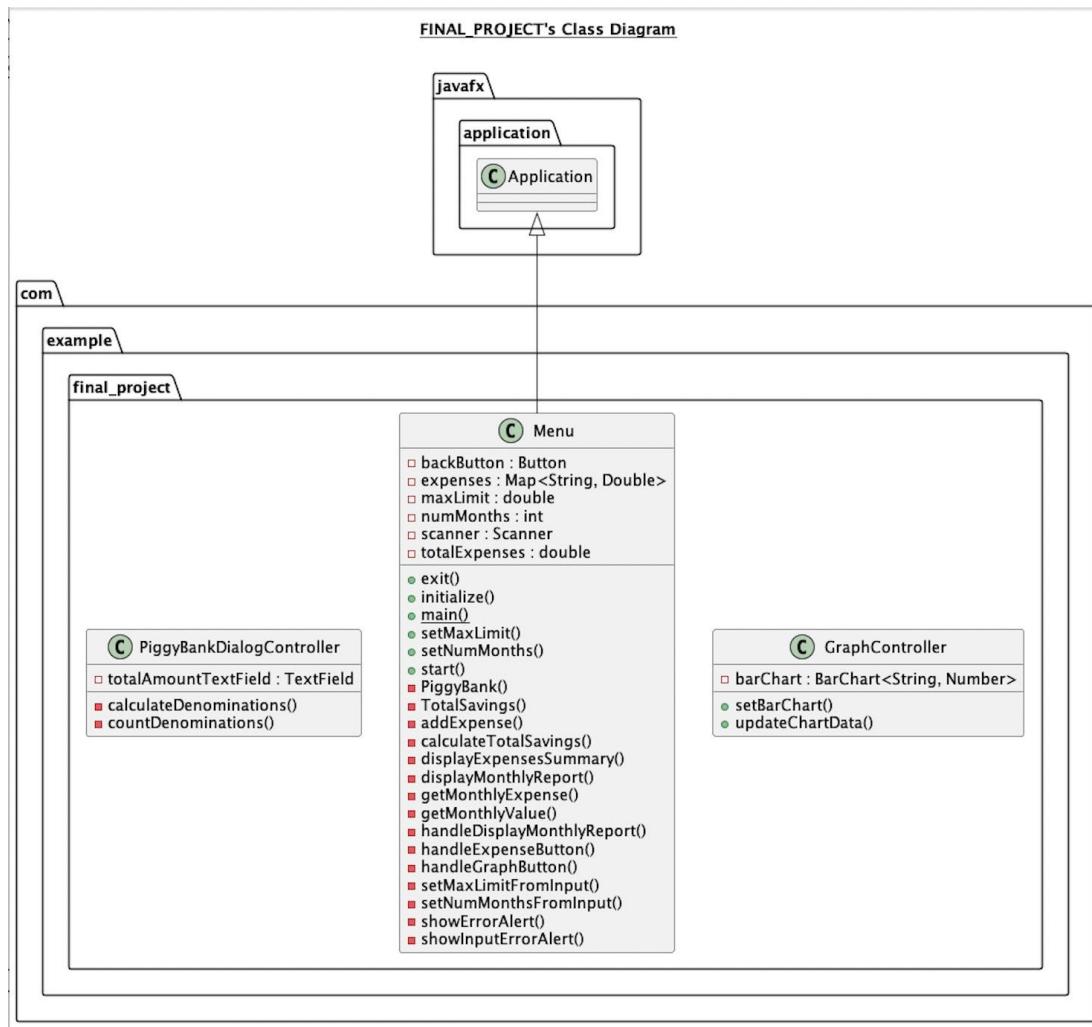
The study posits several hypotheses concerning the relationship between ISM and financial outcomes among children. The findings support the hypotheses and demonstrate that children with high levels of ISM display more positive attitudes toward saving and exhibit more positive saving behavior. The perceived importance of parental and peer attitudes toward saving money, as well as the child's access to money, play significant roles in determining the level of ISM.

The article highlights the implications of the study's findings for financial education and policy. Financial education programs need to consider different levels of ISM among children and go beyond imparting knowledge alone. Involving parents in financial education is essential, as their attitudes and behaviors significantly influence children's ISM. Decision-makers in government, legislation, and regulation should recognize the importance of ISM in improving saving indices among the population. Moreover, the study suggests using parents and pocket money as tools to increase saving behavior among children, promoting economic and financial stability.

The article acknowledges that this is an initial study on ISM among children, and further research is recommended. Future studies could investigate ISM among different age groups and children in various cultural contexts. A qualitative research approach could provide additional insights into the involvement variable. Additionally, examining ISM in the context of finance-related learning programs could shed light on their effectiveness among different students.

III. METHODOLOGY

A. UML Diagram:



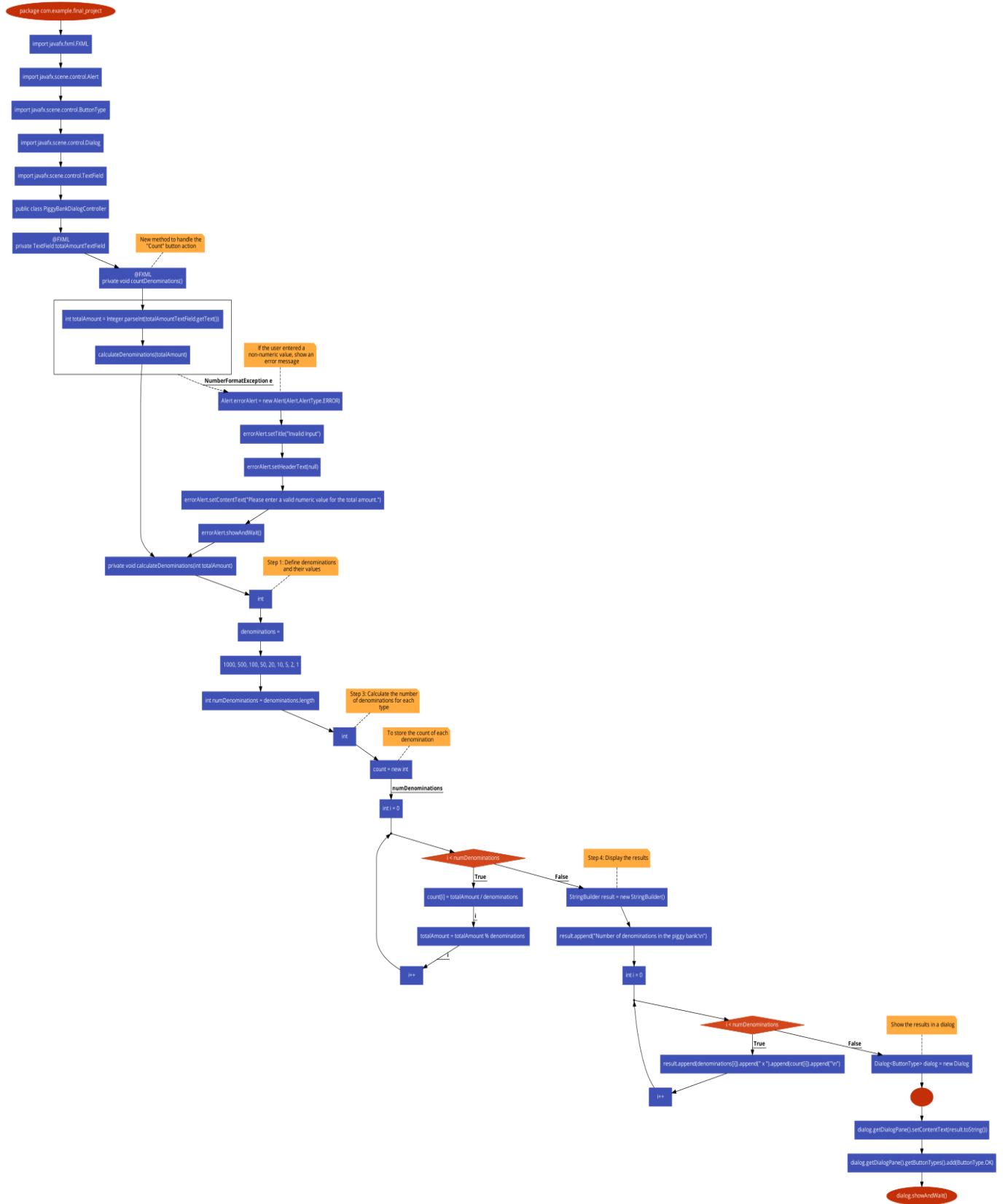
B. IPO TABLE

INPUT	PROCESSES	OUTPUT
<ul style="list-style-type: none"> input for principal amount input for interest rate input for time period input for monthly 	<ul style="list-style-type: none"> .set() method this. Method calculateTotalSavings() addExpense() displayExpensesSummary() 	<ul style="list-style-type: none"> total money earned (in TotalMoney()) monthly expenses summary (in displayExpenses)

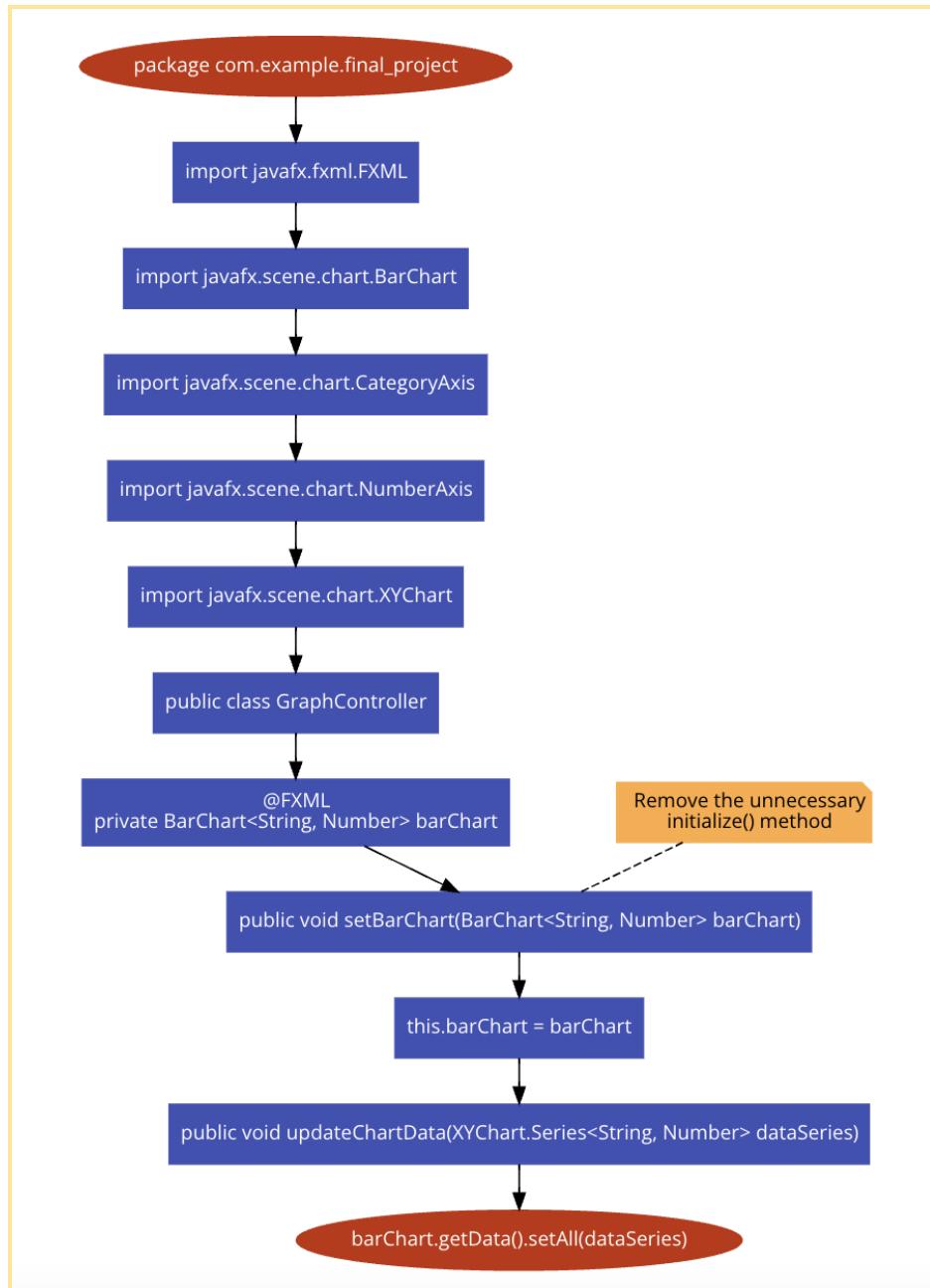
<p>income and expenses (in the handleGraphButton() method)</p> <ul style="list-style-type: none"> ● input for the total amount in the PiggyBank (in PiggyBankDialogController) 	<ul style="list-style-type: none"> ● handleDisplayMonthlyReport() ● getMonthlyExpenses() ● getMonthlyValue() ● countDenominations() ● calculateDenominations() ● 	<p>Summary()</p> <ul style="list-style-type: none"> ● monthly report (in handleDisplayMonthlyReport()) ● graph (in handleGraphButton()) ● count of denominations in the PiggyBank (in calculateDenominations())
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C. FLOWCHART

For the “PiggyBankDialogController.class”

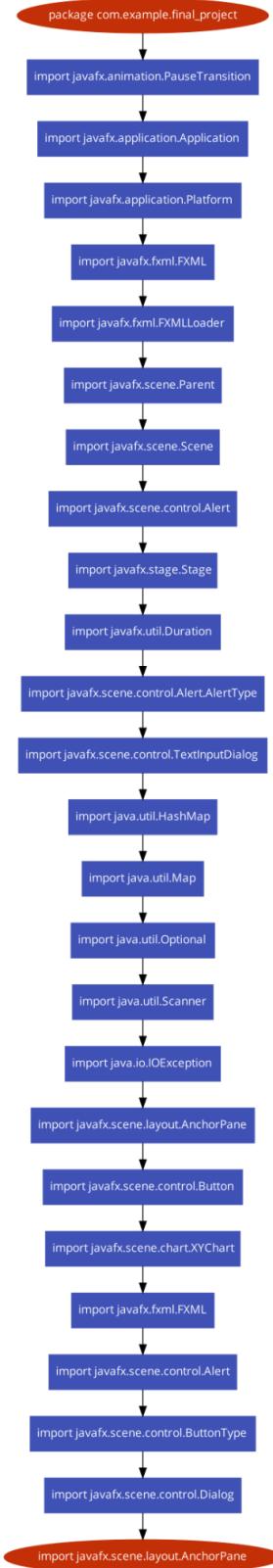


For the “GraphController.class”

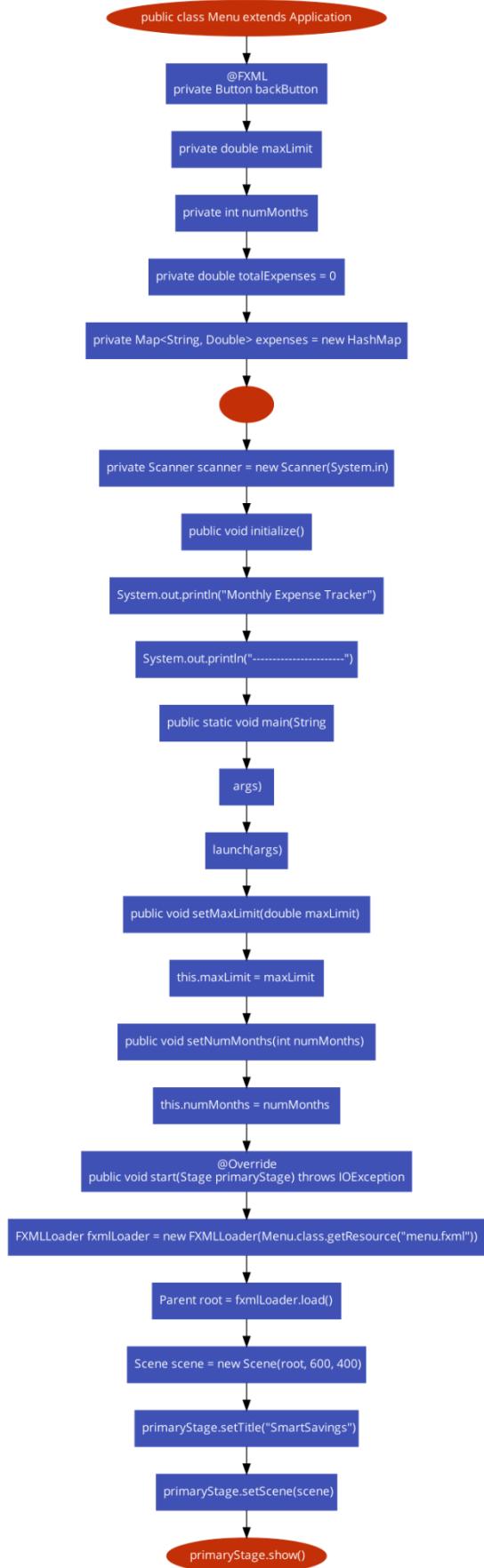


For the “Menu.class”

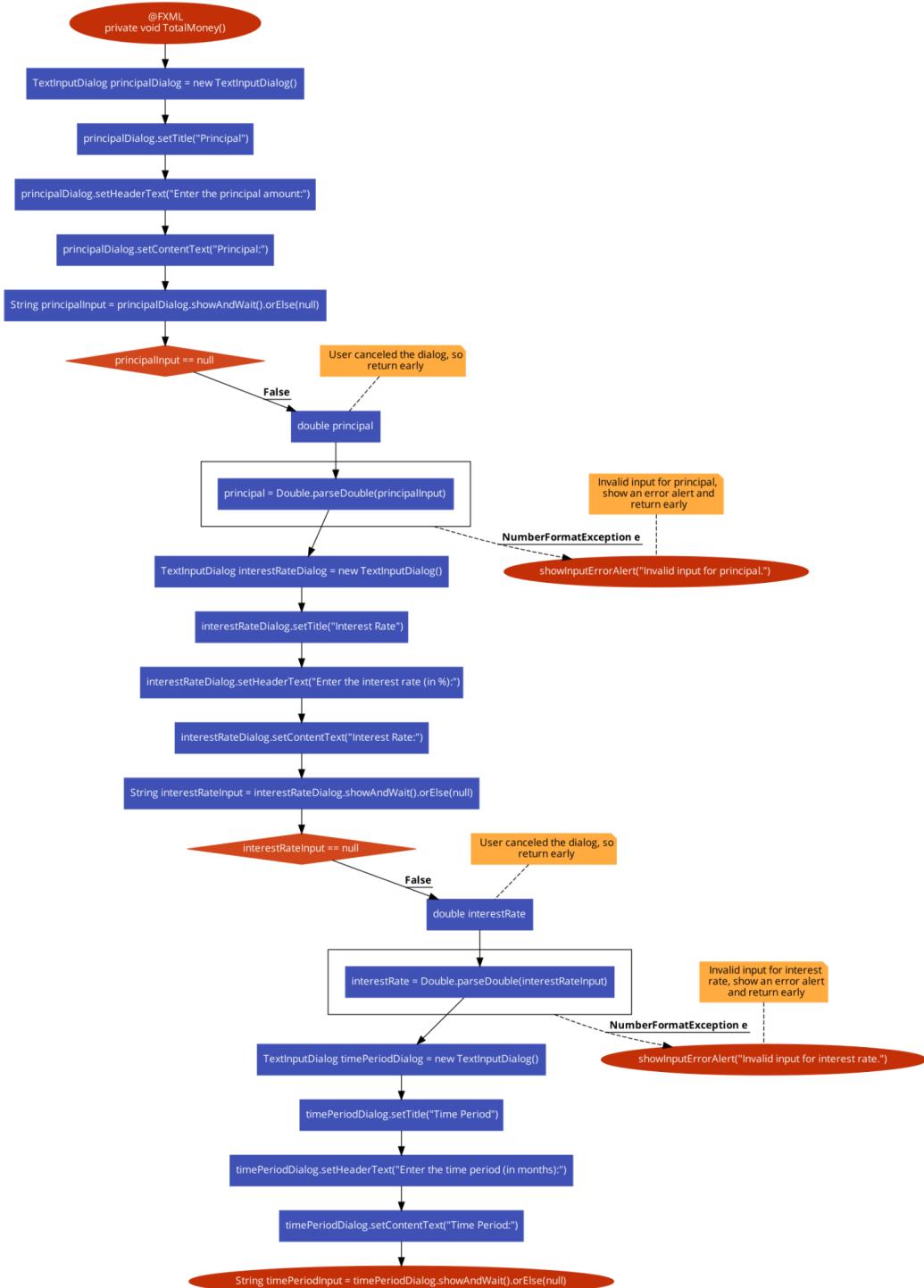
For the implementation of the libraries and packages:

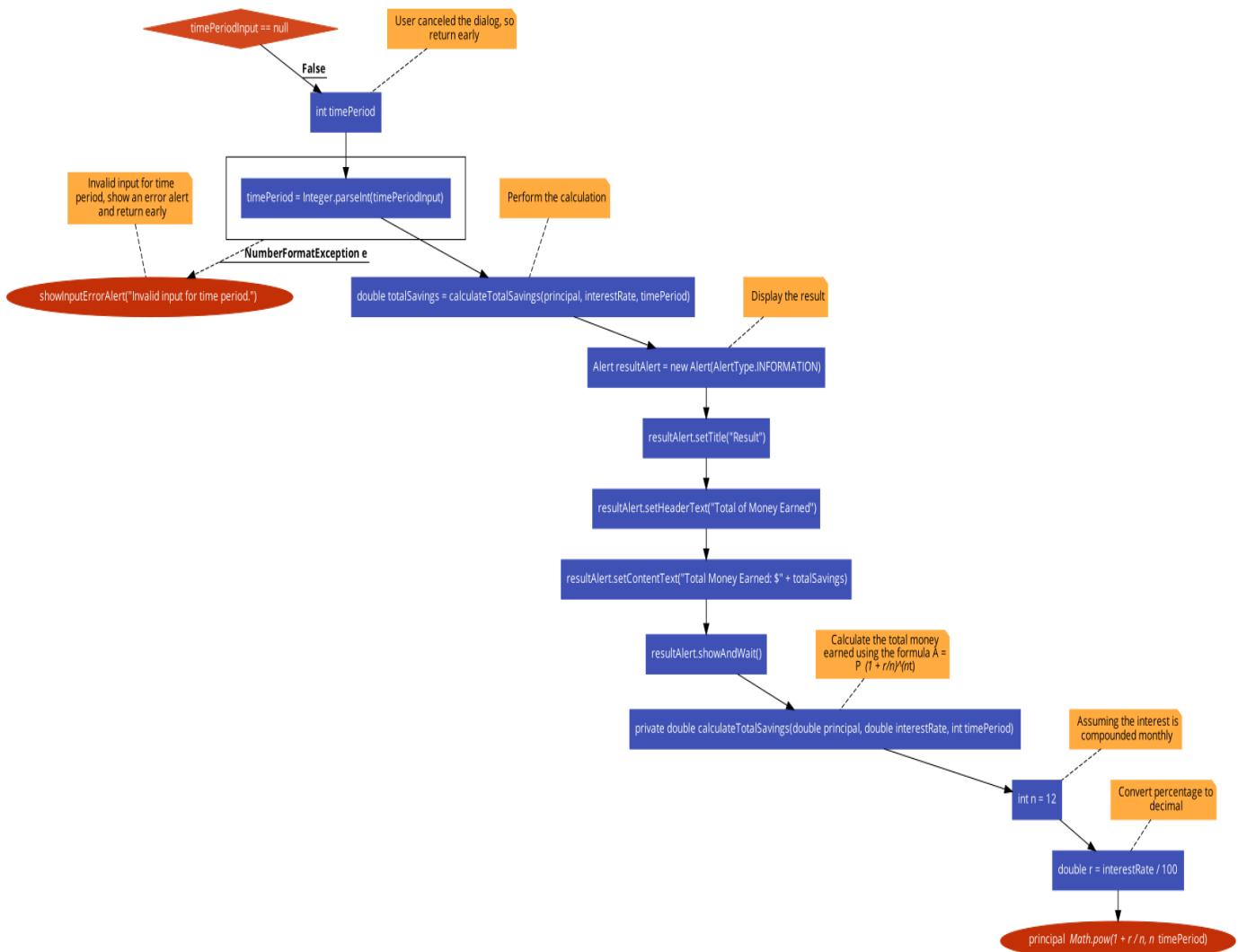


For the menu controller:

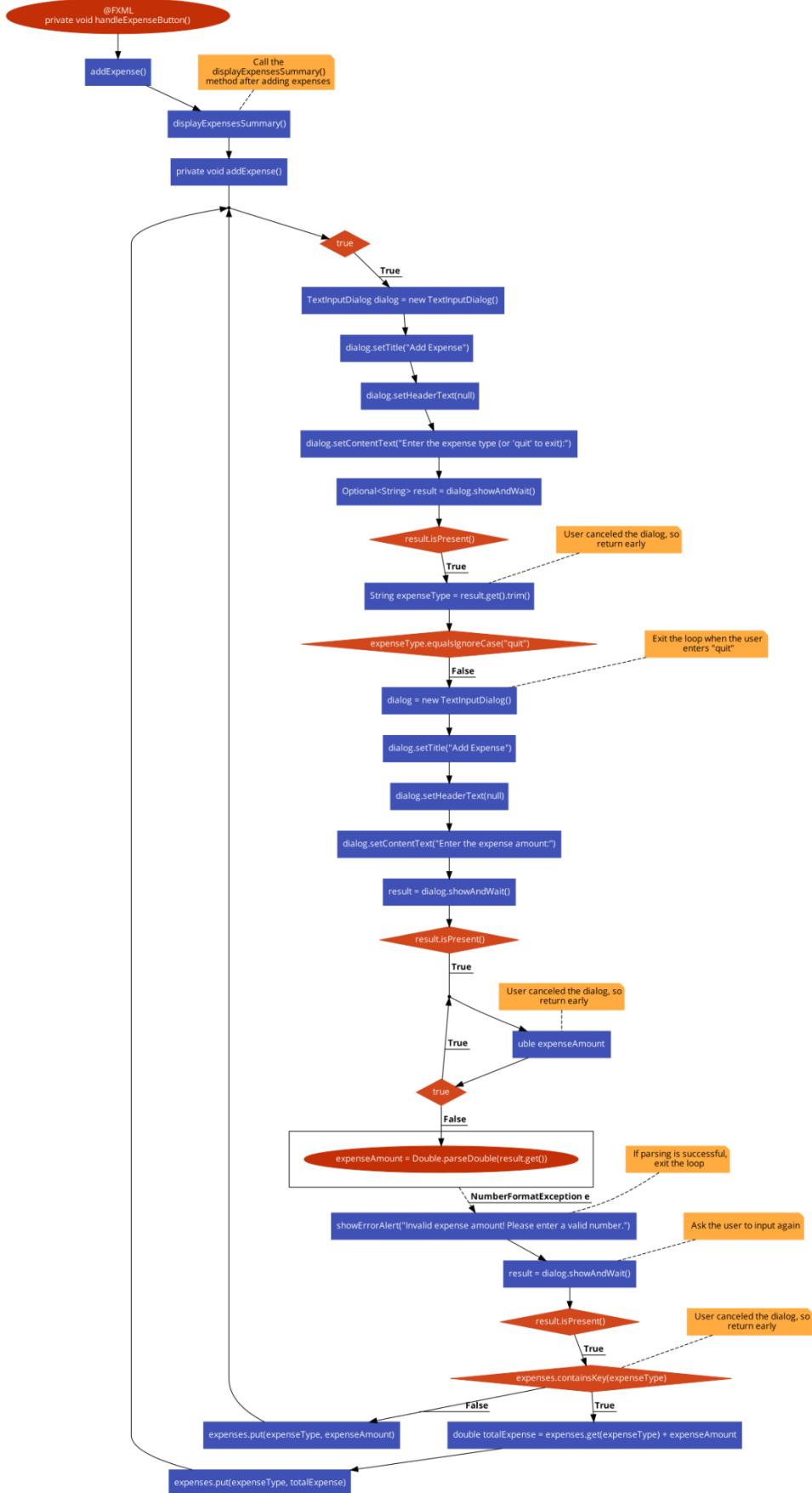


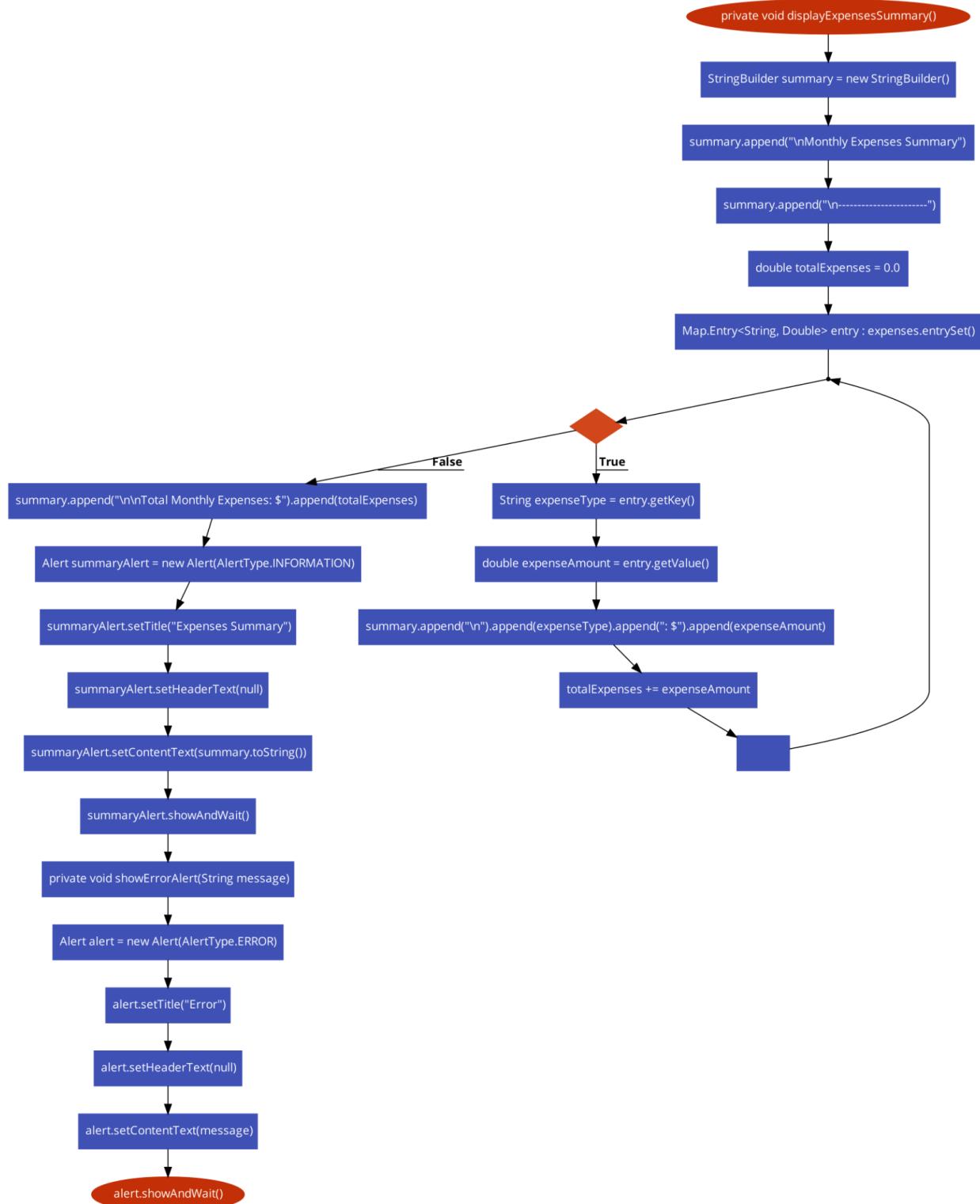
For the calculation of compound interest function:



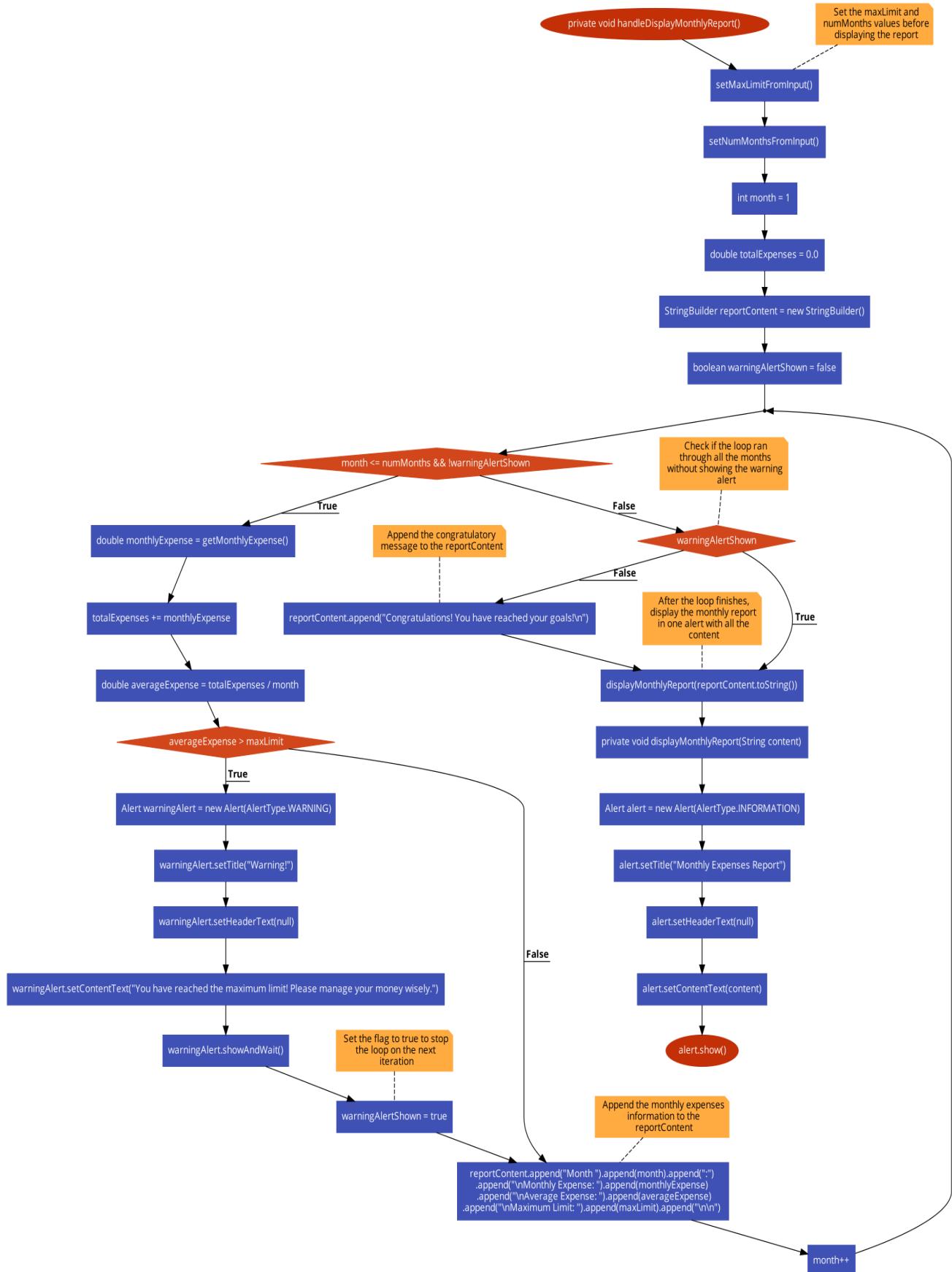


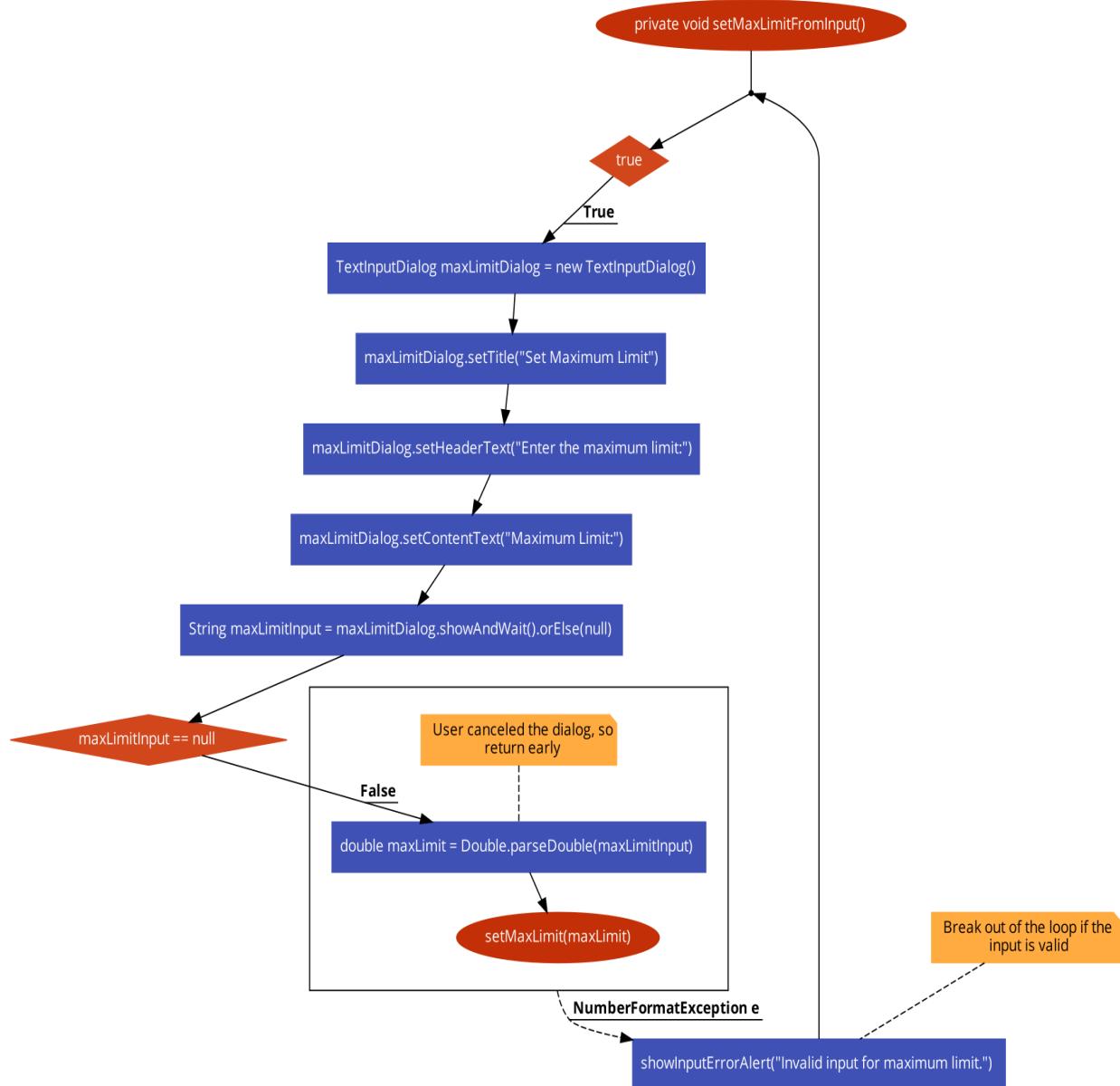
For the adding expenses function flowchart:

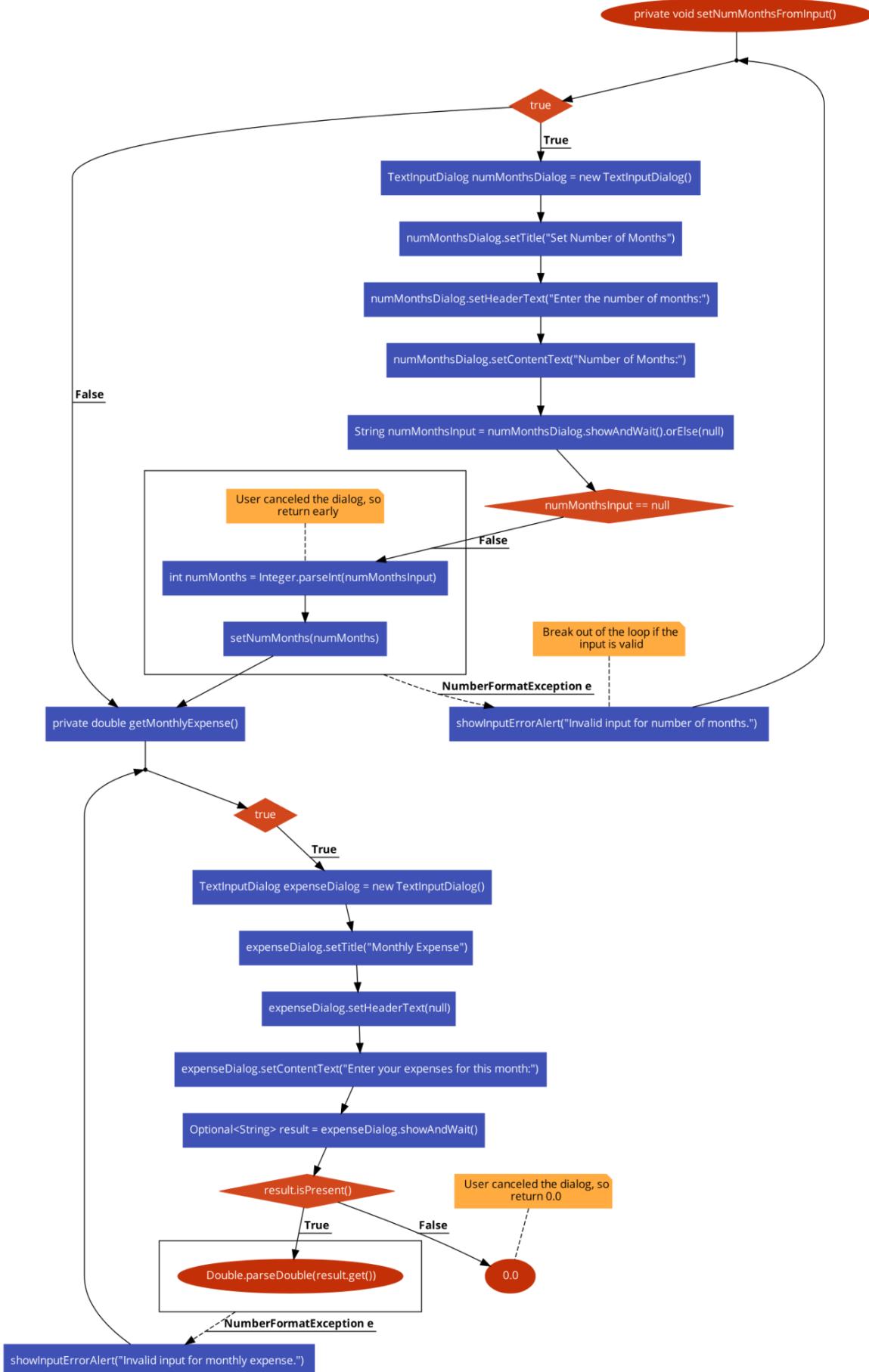




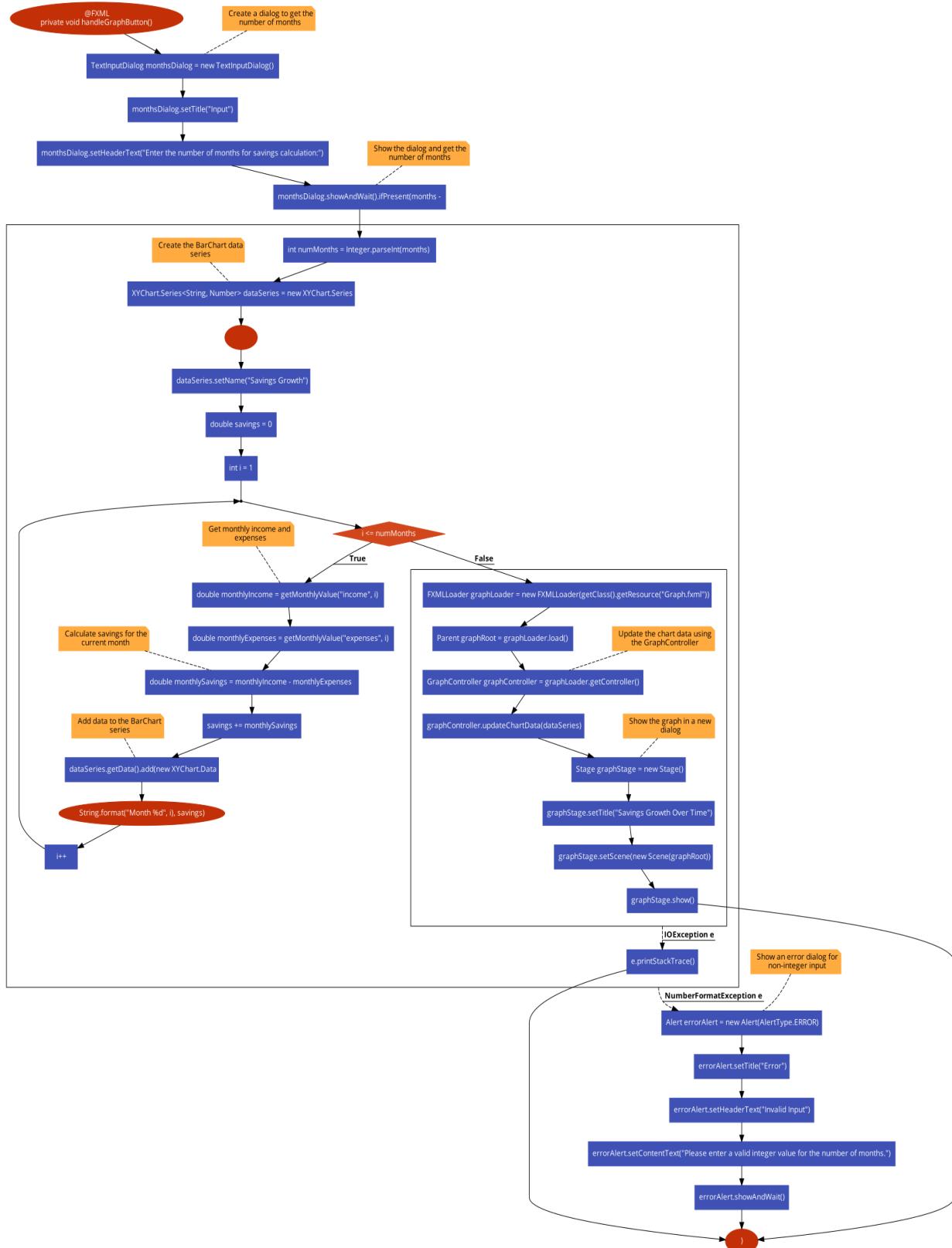
For the Display savings growth flowchart :

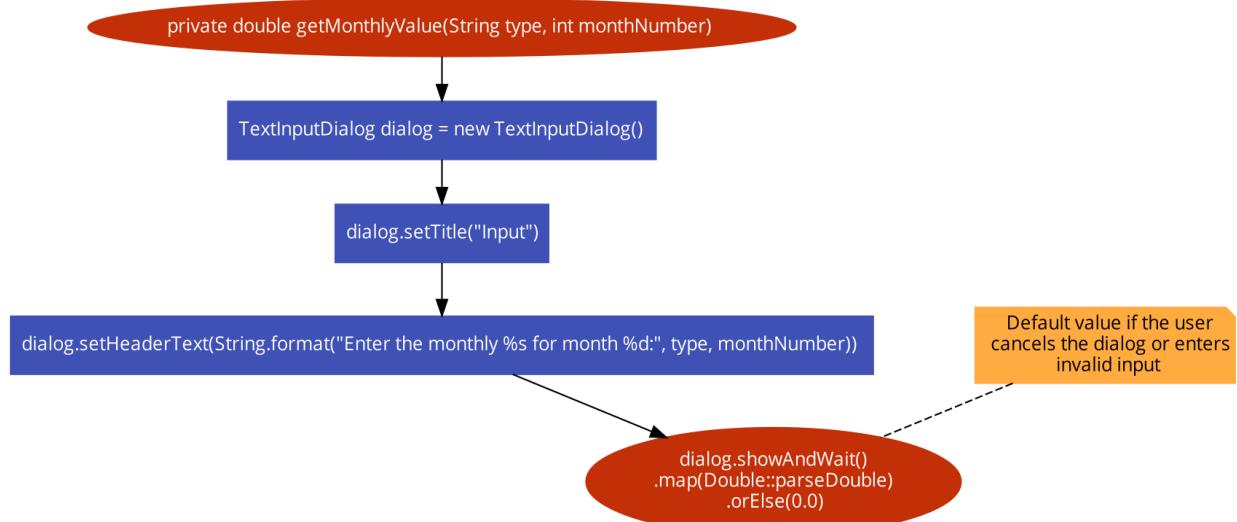




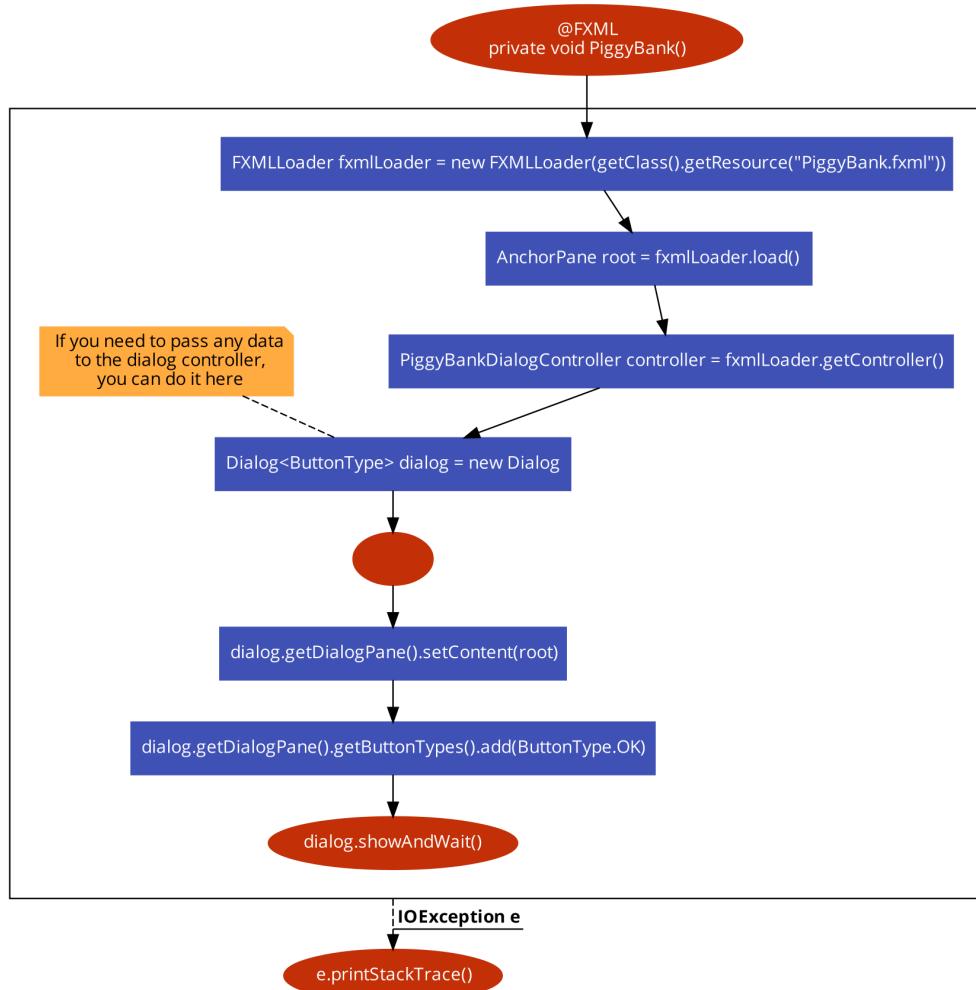


For the Display Monthly expenses report function:

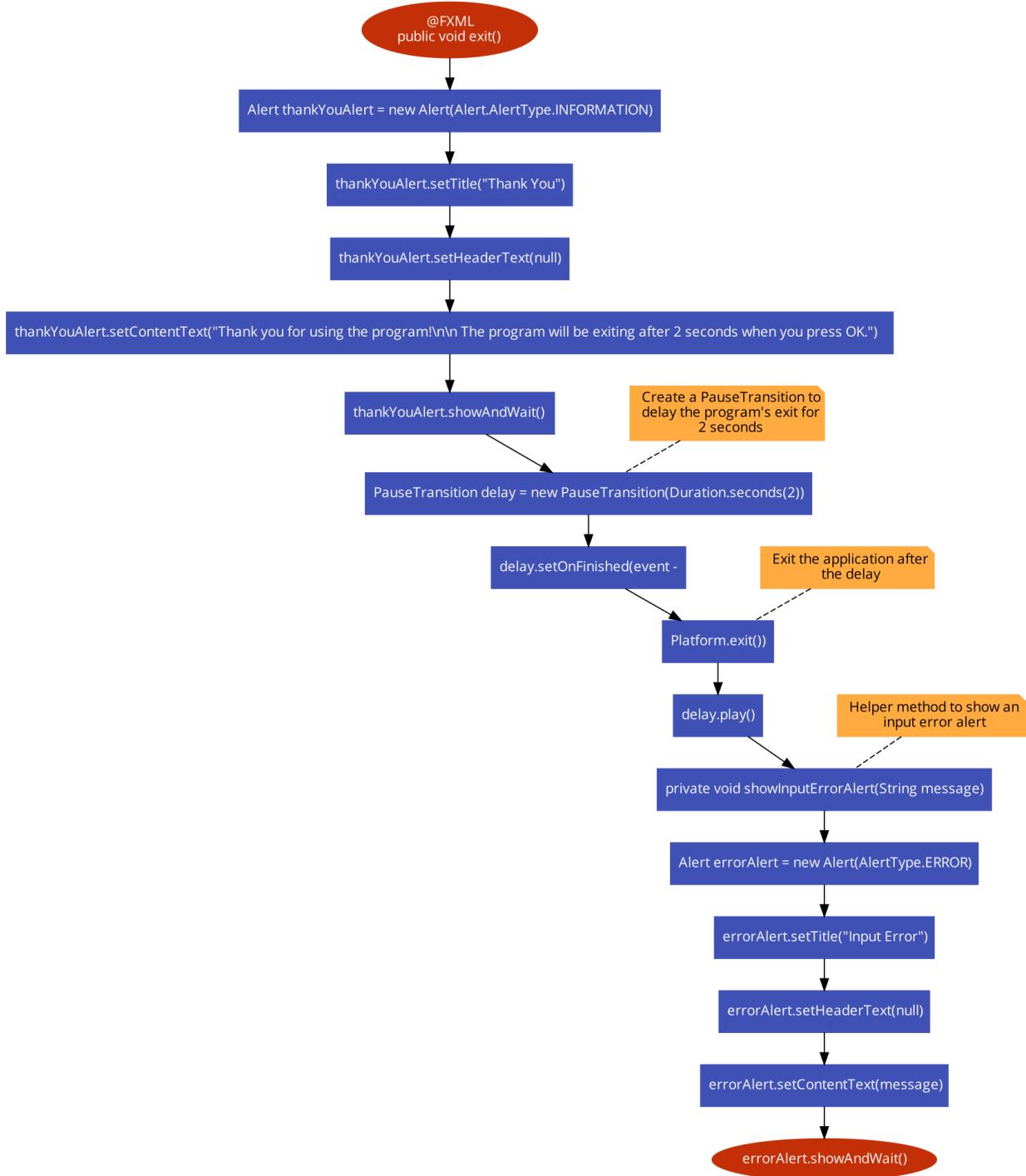




For the Piggy Bank function



For the exit button:



IV. PROPOSED APPLICATION

The materials needed to make this application are as follows:

Using IntelliJ is a crucial tool for us to begin building the program. Additionally, the scene builder allows me to further construct the user interface (UI) of our application. Additionally, using the library dependencies is another crucial tool for us while we develop this application. Importing the required libraries and packages is also critical for the development of this software. Additionally, using the UML diagram can help us understand and analyze our software better.

The application “SmartSavings” can serve as a preliminary cornerstone of financial management; it enables people to understand their own financial skills and gain a deeper insight into themselves before embarking on learning money management. It helps individuals assess whether they already possess good money management abilities. Furthermore, this application can also serve as a tool for students to better manage their money by monitoring their finances.

These aspects will be reflected in the following features.

1. Making a calculator for calculating the Compound interest of individuals.
2. Making an expense report that can prompt users to enter the products and the corresponding costs that they have made.
3. Making a graph of savings growth over time.
4. Allowing the users to demonstrate their money using a virtual piggy bank
5. Allowing users to view their expenses by entering the necessary values inside the dialog box.
6. Allowing users to set their maximum spending limits and keep tracking if the expenses they make every month have met or not met the limit that they have inputted.

V. IMPLEMENTATION/OOP ASPECTS

To build up this application, the program will use the following OOP aspects:

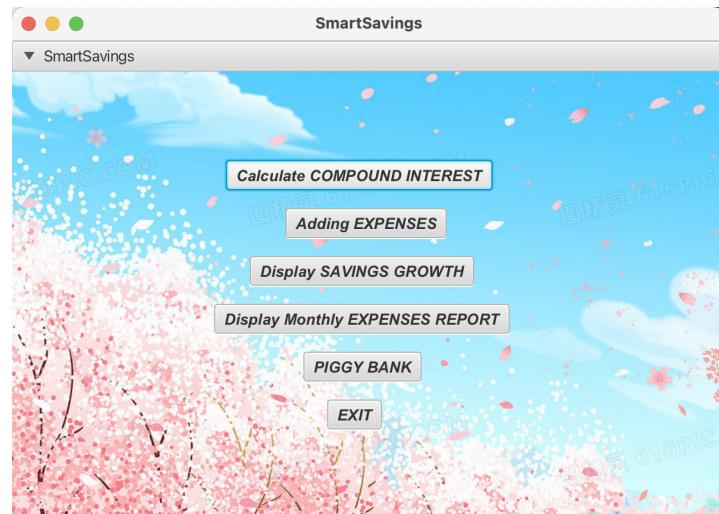
1. Inheritance: Since the Java class with the name “Menu.class” extends the Application class, which is a part of the JavaFX library, by using this aspect, the program is able to create a JavaFX application.
2. Abstraction: Since abstraction is the one that breaks down complex structures into smaller, more manageable components to make things simpler, it can be seen that the GUI components have become “fxml” files. Moreover, it can also be seen in the code where “Menu.class” contains methods like handleExpenseButton(), handleDisplayMonthlyReport(), and handleGraphButton().
3. Encapsulation: This can be seen at the class Menu, which also contains a variety of additional methods and attributes and handles the processing of expenses, savings calculations, alert displays, and GUI control for the monthly expenditure tracker program. Moreover, encapsulation can also be seen in private methods like setMaxLimit (double maxLimit) and setNumMonths (int numMonths). Moreover, the packaging has can also be counted.
4. Polymorphism - This OOP can be seen with the overriding of the start() method of the Application class for customizing the JavaFX application's starting behavior in the Menu class. Moreover, methods like handleExpenseButton(), handleDisplayMonthlyReport(), and handleGraphButton() are called by JavaFX when associated UI components are acted with.
5. Dynamic Graphs: By using the “bar chart” of the JavaFX application, the program can now be used to calculate the total savings per month of the user.
6. Data Structures: The piggy bank uses the “demonstration” array type variable, which is the part for making the demonstration of the virtual piggy bank. Moreover, the program also uses the “expenses” variable for holding the categories and the expenses that the users have bought.

VI. WALKTHROUGH/DATA/RESULTS (screenshots)

A. User's Manual

SmartSavings: This is an application that can help students have a better understanding of their skills in managing finances. Moreover, this application can also let users know what objects or categories they spent their money on. This application has the following features for users:

1. Calculate COMPOUND INTEREST
2. Adding Expenses
3. Display Saving Growths
4. Display Monthly Expenses Report
5. Piggy Bank
6. Exit



So the following will be discussed in detail about how to use the application.

- When the user entered the Smart Saving Application, there would be a menu displayed, letting the user choose which feature they liked. The features are Calculate COMPOUND INTEREST, Adding Expenses, Display Saving Growths, Display Monthly Expenses Report, and the Piggy Bank.

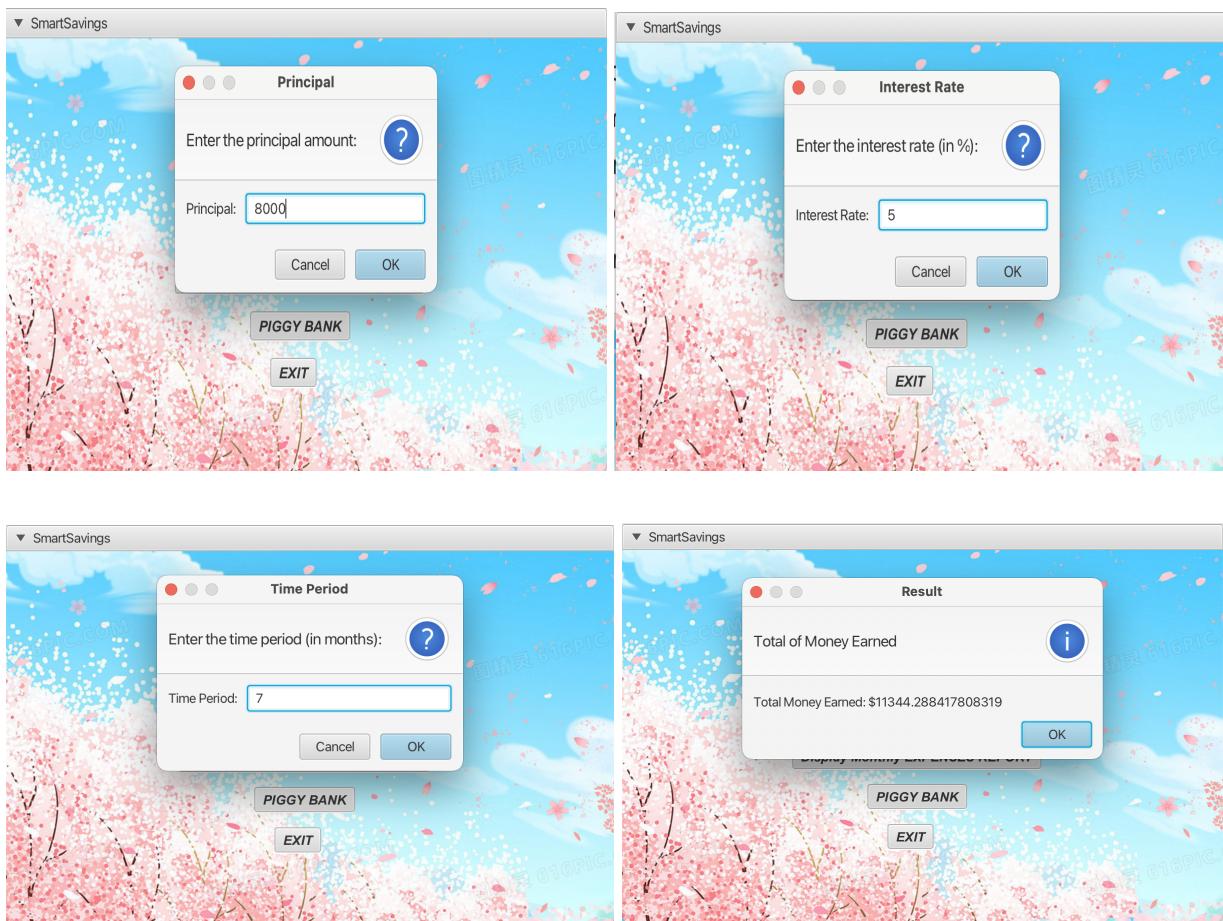
(For the Menu of the Program)

1. For the **Calculate COMPOUND INTEREST** - This is the calculation of the total amount of money earned by entering the following with the equation -> $A = P * (1 + r/n)^{(n*t)}$:
 - a. Entering the **Principal Amount** - This variable represents the original amount that the user had before investing.

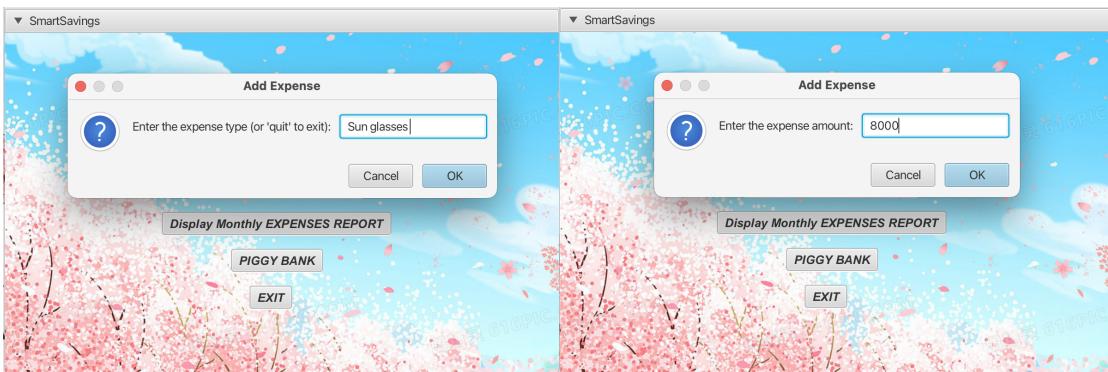
- b. Entering the **Interest rate in percent** - This variable represents the percentage of the Principal Amount
- c. Entering the **Time Period in Months** - This variable is for knowing the period of time by using the months as the unit.
- d. Displaying **Result** - This is for displaying the calculated amount to the user. Letting the user know what is the total money earned by the user after inputting the corresponding variables.

Moreover, if the user didn't input the integer type variable, the program will be exiting it, and the user should press the "Calculate COMPOUND INTEREST" button to restart entering the values inside the dialog.

The samples are shown below:



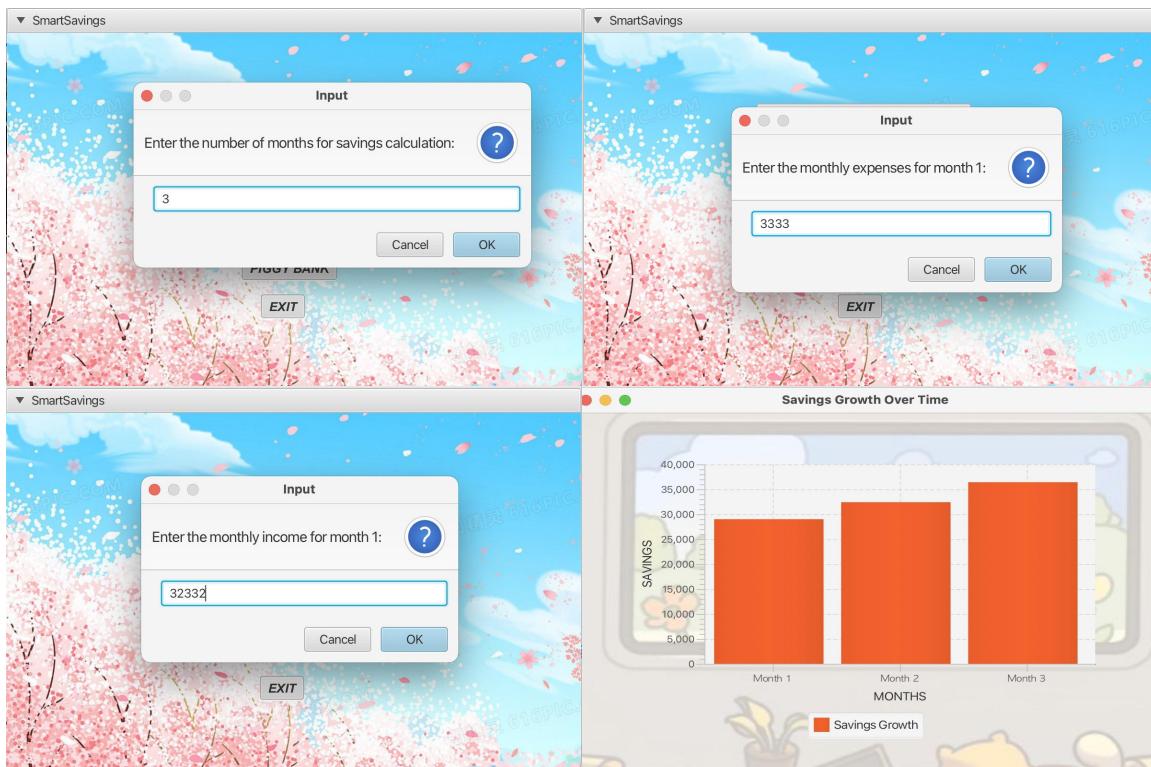
2. For Adding Expenses - This feature is for letting the users have a better understanding of where they have spent their money.
 - a. Entering the **type of Expense** : This is for asking the user to input what category they spend their money in. This program will ask the user to input the category and the cost until the user has inputted the word “quit”. Moreover, after entering the category type, the user can press the “ok” button or just simply press “enter” on their keyboard.
 - b. Entering the **Expense Amount** : This is for asking the user to input the amount of expenses that the individuals had spent on the corresponding category. This will also pop out an error message and let the user input their amount of expense again if the inputted value is not a number. Moreover, you can also simply click the “ok” button or press the “enter” on the keyboard to proceed to the next step.
 - c. This program will keep track of the expenses and categories until the user enters the word “quit”.
 - d. Displaying of the **Expenses Summary**: After the user enters the category and the amount of their expenses, the program will display the summary of expenses that the user has inputted and will also display the total monthly expenses.



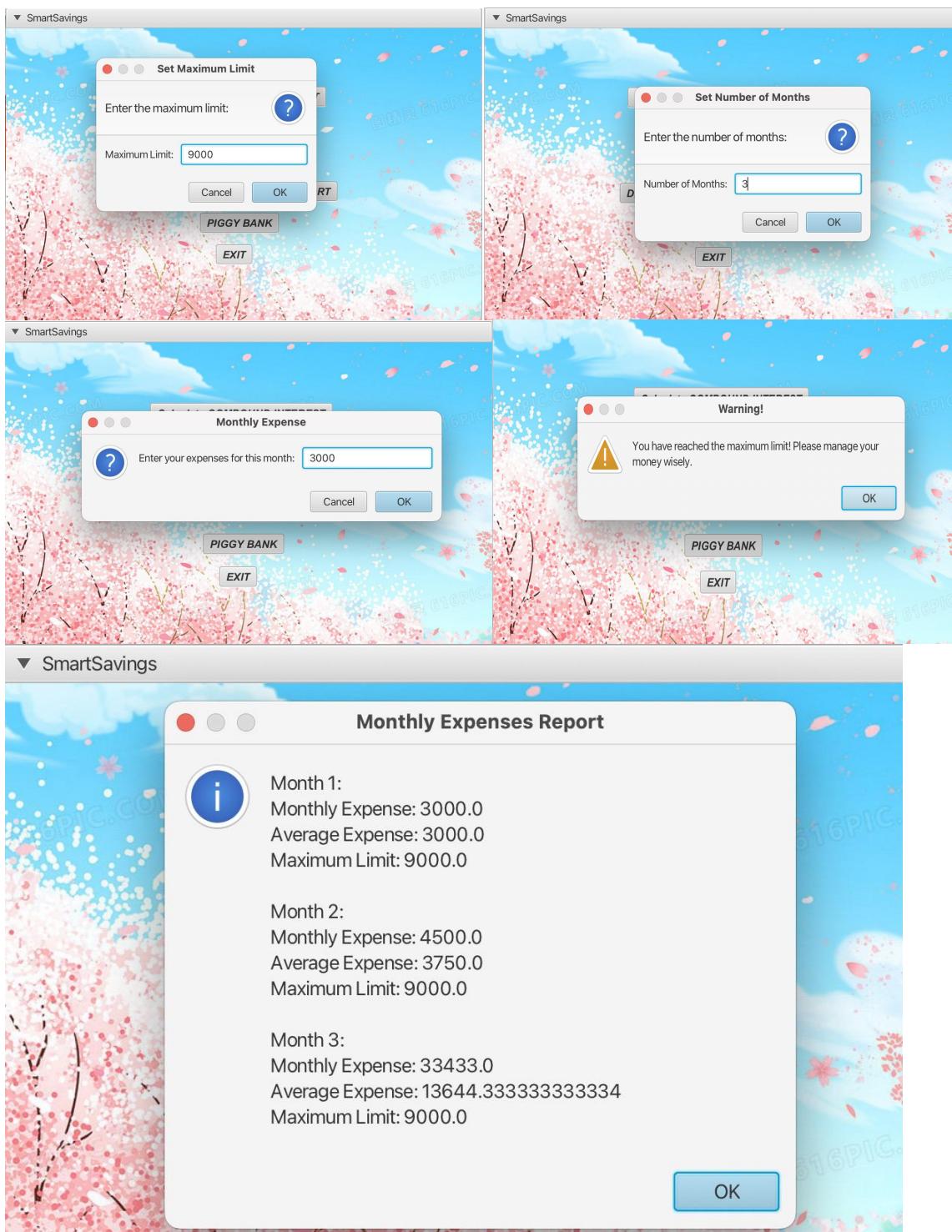
3. Display **Saving Growths** - This feature is for the user to have a better understanding of what their remaining money is each month.

Moreover, the users can select how many months they would like to know.

- a. Enter the **number of months for savings calculation**: -
Users need to first input the months that they would like to see.
- b. Enter the **monthly income for each month**. - User needs to input their monthly income inside this dialog box, and after that, the user can click the “ok” button or press the “enter” key on the keyboard to proceed to the next dialog.
- c. Enter the **monthly expenses for each month** - the user needs to input their expenses for that month.
- d. **Displaying graphs** - After calculating the savings, the program will be displayed by using the graph to show the user the savings in a visual way. If the graph is upside down, then this states that the user has spent money that is larger than his or her income; otherwise, it states that the user's income is greater than the expenses that he or she has made.



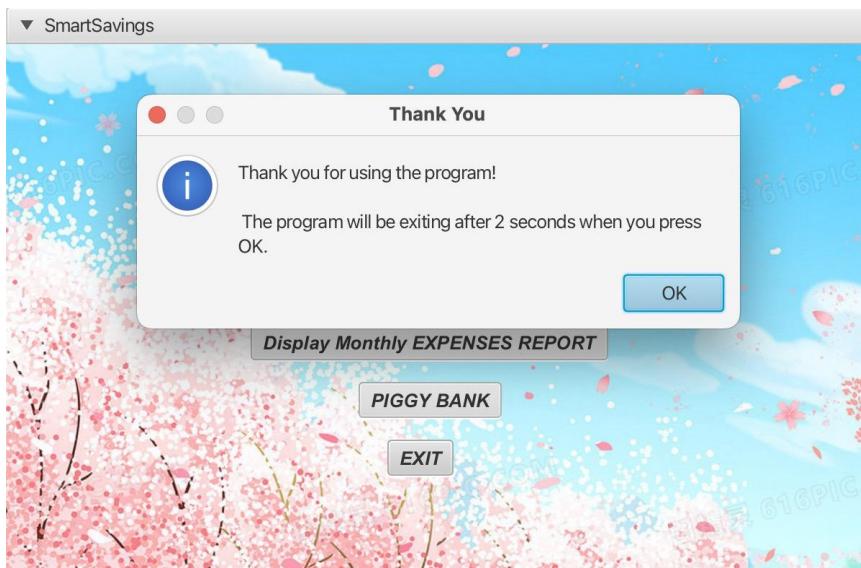
4. **Display Monthly Expenses Report** - This feature is for generating the expenses report by asking the user to first input their target spending limits, then enter the existing months that they have already spent. Then next, the program will ask the user to enter the expenses that they have made for each month, and then the program will keep tracking if the inputted expenses for the month have exceeded the target spending limit or not. If yes, then the program will have a warning dialog indicating that the expenses of the month have already exceeded the spending limit and will not continue asking the user to input the expenses for the month, even though the numbers of the month that the user had inputted. Moreover, at last, it will generate a report for the user to know what their expenses are for each month.



5. For Piggy Bank: This is a virtual piggy bank that can display the number of denominations in the piggy bank by inputting the total amount, and then the program will generate the denominations.



6. Exit - when the user clicks this button, the program will prompt out a dialog showing a thank you message and will tell the user that the program will be exiting two seconds after the user has pressed the “ok” button.



B. Results

After seeing the results, this program had met the objectives of knowing their spending habits by using the add expends features to know what things they had bought. Moreover,

by using encapsulation, the program can have data protection and simplify the complex methods that might be used in this program. Moreover, by calculating compound interest, which can assist students in deciding wisely while investing and conserving money, they will also be able to take into account a wider variety of long-term financial objectives. Most significantly, it develops students' capacity for decision-making, preventing them from potentially making incorrect investment assessments. Moreover, with the features of keeping track of the categories and the expenses that have been made, this can improve students' understanding of their finances and decision-making skills. They will become more conscious of their spending areas that take up a large percentage of their budget as a result, allowing them to lessen the potential for overspending. Furthermore, showcasing the savings increase over time has the same impact. Setting monthly spending limits and keeping track of expenditures additionally helps students become aware of what they are paying for, which may help them avoid making impulsive purchases because they will be able to decide what is essential against what is an elaborate scheme to draw them in with packages or sales promotion activities. Lastly, the denominations of the virtual piggy bank might encourage students to see savings as a positive thing. Additionally, it develops a sense of accountability for handling their money, pushing individuals to adopt more sensible and prudent spending practices and reducing inefficient expenditures. Furthermore, it instills a savings attitude that can have a long-term influence on their everyday lives, making them more aware of financial planning and future financial objectives.

VII. CONCLUSION AND FUTURE WORK

Money management is a vital life skill that every individual, irrespective of their professional path, should acquire. Beginning to learn about money management has the potential to have a big impact on students' economic security in their careers. Money management is not an officially mandated curriculum in the majority of educational institutions, nevertheless, it is critical for institutions to integrate knowledge of money within the curriculum (Entab, n.d.). Furthermore, in future works, money management will be a broad notion that alludes to the act of monitoring and arranging the utilization of financial resources by an individual or organization. Money management in both private and business finance often encompasses planning, spending, conserving, and speculating. It enables individuals to be preemptive with periodical or recurring budgeting, as well as adaptive to certain situations that do not require cognitive preparation ahead (CFI Team, 2023).

According to the overall information provided in this study, Money management is an essential and difficult profession that aims to maximize the use and distribution of funds in order to meet an individual's, business's, or company's financial targets. Future work will concentrate on the use of smart technology, the growth of fiscal technological advances, ethical investing, the consequences of financial markets behavior, and commerce concerns in order to continually enhance the efficacy and productivity of investing.

In conclusion, SmartSaving is an application that can help users clearly know what their expenses are and what savings they currently have. Moreover, this application can also let the students know if they have made proper management decisions or not.

VIII. CONTRIBUTIONS (Individual contributions)

Student Name	Task assigned	Percentage of Work
Chua, Hazel Melody Z.	<ul style="list-style-type: none">- Introduction- Conclusion and future works- Codes of the application PowerPoint- Poster- Conclusion- Proposed Application- Implementation / OOP Aspects- Walkthrough /- Data / Results- Methodology- Related Works	100%
EBORA, True C.	<ul style="list-style-type: none">- Related works	

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