Savings Account Retirement Calculator: Design Document

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The Problem

Planning for retirement can be difficult for many young adults. They may struggle with computing the mathematical and financial calculations required to forecast their retirement savings and investments.

Description

This project, which will be text-based and coded in Python, will attempt to forecast their savings at the time of retirement using a future value of annuity. This function will assume that the user invests their income into a savings account at monthly periods using a compound interest formula. The inputs will be variables, which will be used to calculate the user's estimated net worth at the time of retirement. These inputs would include:

A. Current age
B. Current savings balance
C. Annual interest rate (The risk factor of higher interest rates will not be considered in this model. Additionally, interest rates will be capped at around 6-8% because most savings accounts won't offer higher rates than that.)
D. Monthly income (Savings will be estimated to be around 20% of their monthly income.)
E. Retirement age

These inputs will be used to calculate and estimate the user's net worth at the time of retirement. Note that variables outside of the model, such as inflation, fluctuations in market interest rates, risk of bankruptcy, taxes, periods of unemployment, changes in income, etc., will not be considered in this model.

User Description

The target marker will presumably be young adults in the United States who are English-speaking. Their age will vary between 16-35. These groups will primarily include Gen Z and Millennials. Due to time and resource constraints, accommodations may not be available for those who have disabilities that prevent them from using the product. In addition, non-English speaking persons may need a translator to use this product.

System Features

The model will attempt to calculate a time value of money problem in Python known as the future value of an annuity. The inputs mentioned above, A, B, C, D, and E, will be input by the user via text through the Python console. This formula was created in Excel and will be transferred to Python. The Excel formula goes as follows:

=[D5*(1+D6/12)^((D8-D4)*12)]

=[D7*((((1+(D6/12))^((D8-D4)*12))-1)/(D6/12))]

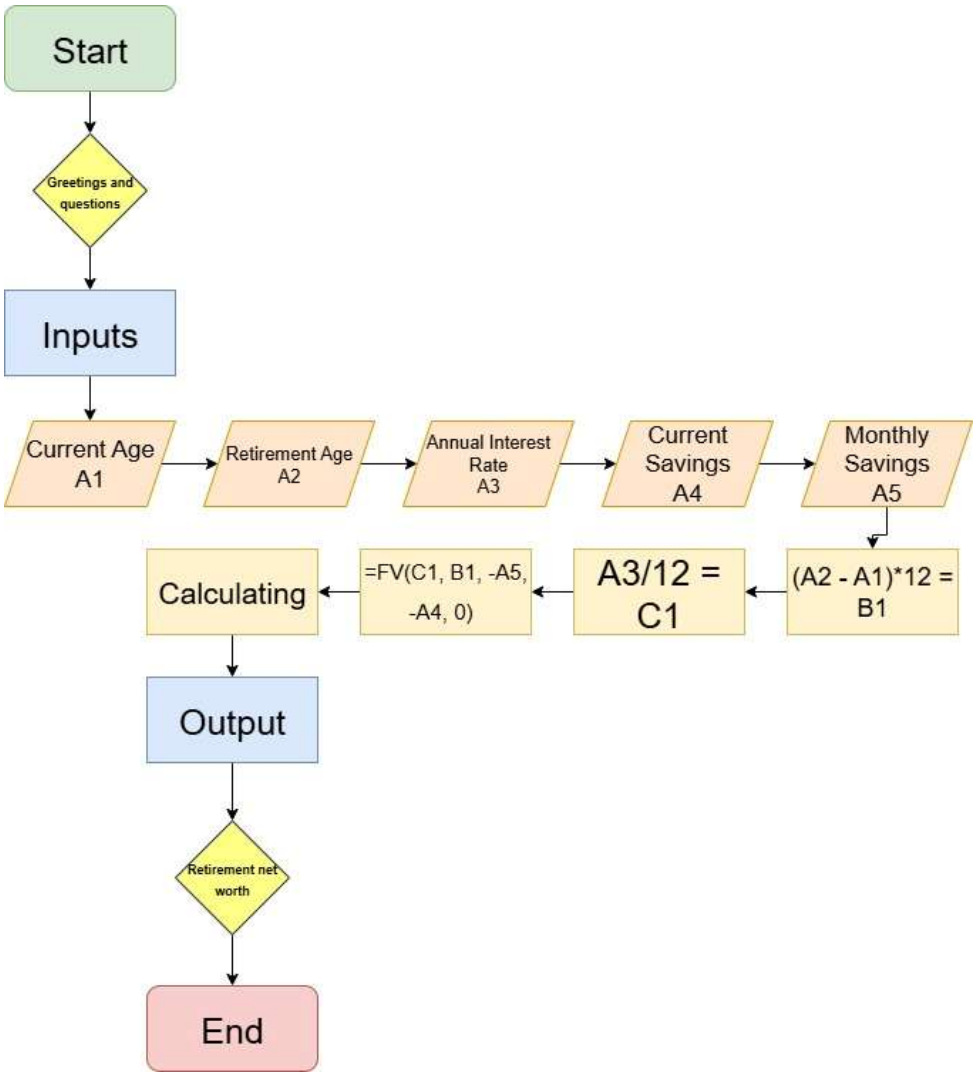
=(D11+D12)

Age in years:	20	*assume that today is your birthday*
Current Balance:	10000	*assume some balance (could be $0)*
Annual interest rate:	0.02	monthly int 0.001667
Monthly Payment:	1000	
Retirement Age:	70	*assume when you retire (e.g. 65 or 67)*
# of monthly payments:	600	*calculate based on the retirement and current*
Future Value	$1,056,772.23	*use the standard capitalization type*
FV of current balance	$ 27,160.20	
FV of annuity	$ 1,029,612.03	
Total FV	$ 1,056,772.23	

System Requirements

The model will be text-based and require a functioning computer with an internet connection to participate. General computing knowledge and how to browse the internet and run the Python code in the console will be required. Those without a functioning computer or stable internet connection may reach out to their local school or library for support.

Flowchart



Storyboard

User Interface I		
Graphical Display	Input	Output
Welcome to the world of finance. What is your name? Please type your name: Hello, <name>. I'm happy that you are interested in saving for your retirement. We are going to open you a savings account. I will now ask you a few questions. What is your current age? Please type your current age: What is your estimated retirement age? Please type your estimated retirement age: What is the annual interest rate that you wish to receive on your account? Please type the desired annual interest rate:	1. String: <name> 2. Integer: <current age> 3. Integer: <retirement age> 4. Float: <interest rate>	1. String: <name>
Navigation	linear progression via console input	

User Interface II		
Graphical Display	Input	Output
Do you have any current money saved up? If so, how much? Please type your current savings amount: How much money do you plan on saving each month? This amount should be about 20% of your monthly income. Please type your planned monthly savings: Congratulations, <name>. Your retirement savings will be <output> at the age of <retirement age>.	5. Integer: <current savings> 6. Integer: <monthly savings>	1. String: <name> 3. Integer: <retirement age> 7. Float: <output>
Navigation	linear progression via console input	