

# ES 26 MACHINE PROBLEM 2

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## PennyWise, Your Personal Budget and Expenses Tracker

### RATIONALE

Pandemic-era or not, personal budgeting has never been an easy feat. As a college student, I have no shortage of first-hand experiences with the “Save or Party?” dilemma, especially with the consequences every time I choose the former. For working adults, the looming amount of utility bills on top of rent and food expenses is just one among many scenarios that render the idea of saving the impossible.

Enter: PennyWise.

PennyWise is a simple automated budget tracker that aims to instill discipline to any user in the context of budgeting and allocation of money. While PennyWise may be considered a prototype relative to the more advanced budget trackers, it is a first step towards financial prudence and independence.

### RELEVANCE TO ECONOMICS

Personal budgeting is an important sub-concept in economics. Economics is essentially defined as the allocation of scarce resources, and a budget exemplifies the opportunities and/or goods foregone by a consumer in pursuit of better opportunities and/or goods in this allocation process. The course of giving up goods in exchange for presumably better goods is formally defined as a *trade-off*. In more complex situations, such as public finance and government appropriation, a budget development process is established to determine the overall economic outlook of a market, sector, or industry.

Because budgeting is normally done ex-ante, assumptions are established to account for flexible variables that may affect the budgeting process. For instance, an assumption in the basic personal budgeting may include the absence of a pandemic. But as we have witnessed the past year, prices have been unstable and stock prices more volatile than ever before. This extraordinary circumstance eroded the value of our money (because inflation implies we need more money now to buy the same goods we typically consume) and render our usual budget insufficient.

Hence, there are a few assumptions that the user must take note of when using PennyWise:

1. The tracker is best used to project a user's future budget based on future expenses and investments; NOT for current budget based on current expenses.
2. All income not invested and is not part of emergency savings is considered available cash, and will be used to finance the user's expenses.
3. Investment and savings allocations are in terms of percentage of gross income, e.g., stock investments are 10% of gross income and savings is 20% of gross income.
4. On investments
  - i. There is only 1 type of investment: stocks.

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- ii. All investments have a maturity of one year; all returns will be claimed after one year.

**PENNYWISE USER GUIDE**

List of prompts and responses (in order)

1. *"What would you like to do?"*
  - Update budget or Check budget
2. *"How much is your projected income?", "How much is your projected income tax?", "How much is your projected expenses?", "What is the current value of your stock investment?", "What is the forecasted value of the stock after one year?"*
  - Enter a numerical value.
  - The current value and future value of your stock will be asked only if you have an investment allocation of greater than 0.
3. *"What percentage of your income would you like to invest?", "What percentage of your income would you like to save?"*
  - Enter a portion of the gross income in percent terms.

Definition of terms

1. Gross income – The user's total income from all sources before taxes are deducted.
2. Income tax – Type of tax levied on the user's gross income.
3. Disposable income – The user's net income after taxes have been deducted.
4. Cash ratio – A financial ratio that shows a user's ability to cover their short-term expenses using cash and cash equivalents.

Test cases

Input	Output
#1 Update budget Gross income – 1000 Income tax – 200 Expenses – 300 Investments – 20% Current stock value – 45 Future stock value – 46 Savings – 10%	Disposable income – 800.0 Investments – 200.0 Potential investment returns – 2.22 Savings – 100.0  Budget status – You have budget surplus! Your cash ratio is: 2.67. You have 2.67 in income to cover each peso of your expenses.
#2 Update budget Gross income – 33455 Income tax – 21943 Expenses – 15934 Investments – 30% Current stock value – 50 Future stock value – 55 Savings – 0	Disposable income – 11512.0 Investments – 10036.5 Potential investment returns – 10.0 Savings – 0  Budget status: You have a budget deficit! Your cash ratio is: 0.72. You have 0.72 in income to cover each peso of your expenses.
#3 Update budget Gross income – 100 Income tax – 100 Expenses – 0 Investments – 0 Savings – 0	Disposable income – 0.0 Investments – 0.0 Savings – 0  Budget status: You have a breakeven! Your cash ratio is: 0. You have 0 in income to cover each peso of your expenses.

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Other notes

In theory, a negative income and income tax are possible

**AREAS FOR IMPROVEMENT**

- A. History feature – so the user can go back to their previous entries, even if they close the program.
- B. Data Visualizations
  - Pie chart of expenses and allocations to consumption, savings, and investment
  - Trend of expenses and allocations over time