Program Logic Explanation

This document explains the logic used in the provided Python program, which integrates data analysis, visualization, a Flask API, and a Streamlit dashboard to analyze family financial data and provide insights.

1. Data Loading and Cleaning

The program starts by loading a dataset named 'family_financial_and_transactions_data.csv' using pandas. The column names are standardized by converting them to lowercase and stripping any unnecessary spaces. Missing values in critical columns (income, monthly expenses, savings) are handled by dropping rows with null values.

2. Data Aggregation

The dataset is grouped by the 'family id' column, and the following aggregates are calculated:

- Total income and monthly expenses for each family.

- Total savings, computed as the sum of savings.

- Credit card spending, aggregated as a breakdown of spending categories.

3 . Correlation Analysis

A correlation matrix is generated to examine relationships between income, monthly expenses, and savings. A heatmap visualization is created using the Seaborn library to provide a graphical representation of the correlations.

4. Financial Score Calculation

The financial score is computed for each family using a custom function. The function considers various metrics, such as the savings-to-income ratio, monthly expenses as a percentage of income, and other parameters. Weighted scores are assigned to each metric to derive a comprehensive financial score.

5. Flask API

A Flask web API is created to process financial data and calculate the financial score. The API accepts POST requests with financial data in JSON format, processes the data, and returns the computed score along with insights.

6. Streamlit Dashboard

The program includes a Streamlit dashboard that displays financial scores and insights. Users can interact with the dashboard to view their financial standing and suggestions for improvement.

Visualizations and metrics are dynamically updated.

7. Installation and Execution

The program requires the following Python libraries: pandas, seaborn, matplotlib, Flask, and

Streamlit. Install these dependencies using pip:

pip install pandas seaborn matplotlib flask

streamlit

To run the program:

- Use Flask for the API by executing the script with the Flask app section.

- Launch the Streamlit dashboard with: streamlit run <script_name>.py.

This program provides a robust framework for analyzing financial data and delivering actionable insights.