**1 - Problem Presentation**

Personal financial management is a major challenge for many people, especially when it comes to effectively allocating their money among different needs and goals. Poor budget management can lead to financial difficulties, stress, and an inability to achieve long-term financial objectives. Moreover, without a clear record of past transactions, it becomes difficult to understand spending habits and adjust budgets accordingly. Therefore, it is essential to have a tool that facilitates the creation, management, and tracking of budgets while providing a clear view of transaction history.

**2 - Solution Presentation**

To address this issue, we propose developing a virtual wallet management application with two main features: budget management and transaction history display. This application will allow users to create sub-wallets dedicated to different financial goals, with maximum budgets allocated to each. Users will be able to easily add or withdraw money from their budgets and view the complete history of all their transactions. This solution will provide a clear and organized overview of their financial situation, enabling them to make informed decisions and better manage their personal finances.

**3 - Technological Solution Description**

The technological solution relies on a command-line interface (CLI) application developed in Python for business logic, with a PostgreSQL database to store information. The choice of PostgreSQL ensures robust and scalable data management. Users will interact with the application via command-line commands, making the application lightweight and easy to use without requiring a graphical interface. Python libraries such as `psycopg2` will be used for database interaction, and `argparse` for managing command-line commands.

**4 - Database Presentation**

The PostgreSQL database will be structured to facilitate the management of users, sub-wallets, and transactions. Here is an overview of the main tables:

- **users**: stores user information (id SERIAL PRIMARY KEY, name VARCHAR, email VARCHAR UNIQUE, password VARCHAR).

- **wallets**: stores sub-wallet information (id SERIAL PRIMARY KEY, user\_id INTEGER REFERENCES users(id), name VARCHAR, max\_budget DECIMAL, current\_balance DECIMAL).

- **transactions** : records all transactions (id SERIAL PRIMARY KEY, wallet\_id INTEGER REFERENCES wallets(id), amount DECIMAL, type VARCHAR, date TIMESTAMP, description TEXT).

These tables will be linked by foreign keys, ensuring data integrity and facilitating queries to retrieve and manipulate the necessary information.

**5 - Use Cases**

- **Creation of Sub-Wallets**: A user can create multiple sub-wallets for different financial goals, such as vacations, savings, daily expenses, etc.

- **Adding/Reducing Money**: The user can add or withdraw money from any sub-wallet, updating the current balance and adhering to the defined maximum budget.

- **Transaction History Consultation**: The user can view the complete history of all transactions for each sub-wallet, with details on the date, amount, type of transaction, and an optional description.

- **Budget Overrun Alerts**: The application can send alerts when transactions cause a sub-wallet to exceed its maximum budget.

**6 - Future Additions**

To further improve the application and meet additional needs, several future features can be considered:

- **Integration with Banking Services**: Automatic synchronization of transactions with bank accounts for real-time budget updates.

- **Financial Analysis and Reports**: Analysis tools to visualize spending trends and generate detailed financial reports.

- **Mobile Application** : Development of a mobile version of the application for financial management on the go.

- **Shared Sub-Wallets**: Feature allowing the sharing of sub-wallets with other users for collaborative financial management, such as for couples or roommates.

- **Advanced Budget Planning** : Tools to forecast future expenses and adjust budgets accordingly, based on past spending habits.