Weekly Progress Report

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Domain: Python

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Week Ending: 03

I. Overview

This week was focused on deepening understanding of secure data storage practices and contributing to the development of a password manager using Python. Key areas of attention included encryption integration, database management, and user interface logic through command-line interaction.

II. Achievements

1. Python Project Development – Encrypted Password Manager

- **Project Description: Built a command-line based password manager with functionality to store, encrypt, retrieve, and generate passwords.**
- **Key Features Implemented:**
  - **SQLite-based database setup and schema design.**
  - **AES-based encryption and decryption using cryptography.fernet.**
  - **Password generation functionality using random and string.**
  - **CRUD operations for password entries via CLI interface.**
- **Technologies Used: Python, SQLite, Cryptography (Fernet), OS handling.**

2. Python Skills Enhancement

- **Strengthened understanding of:**
  - **Database operations with sqlite3.**
  - **File handling for key storage.**
  - **String manipulation for secure password generation.**
  - **Exception handling and user input validation.**

III. Challenges

1. Encryption Integration

- **Faced initial difficulties with handling key persistence and ensuring secure key generation.**
- **Resolved issues related to key regeneration that would break existing encryption.**

2. Code Structure & Flow

- **Ensured proper modularity and flow between encryption, database interaction, and user inputs.**
- **Encountered edge cases such as duplicate entries or invalid password formats, which are still under refinement.**

IV. Learning Resources

1. Python Documentation & Tutorials

- **Referred to official Python docs for sqlite3, os, and random modules.**
- **Used YouTube tutorials and GitHub examples to understand cryptography library usage.**

2. Forums & Coding Communities

- **Actively participated in Stack Overflow and Reddit discussions around password manager design and best practices for encryption.**

V. Next Week's Goals

1. Feature Expansion

- **Add functionality for updating and deleting stored credentials.**
- **Implement master password protection for the application.**

2. Code Refactoring & Testing

- **Refactor the codebase for modularity and readability.**
- **Write unit tests for each major function using unittest.**

3. Security Review

- **Explore secure storage for the encryption key (outside the project directory).**
- **Evaluate hashing options for sensitive user inputs.**

VI. Additional Comments

This project has been a strong hands-on learning experience in building secure applications. It reinforced the importance of encryption, data persistence, and usability while coding for real-world needs. Future iterations will focus on enhancing security, adding GUI options, and possibly deploying the tool as a desktop app.