Project Title: Secure Local Password Manager Using Python
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Platform / Context: Cybersecurity / Secure Software Development Project (Kali Linux)

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1. Project Overview

This project is a **local password manager** developed using **Python 3 on Kali Linux**. It allows users to securely store, retrieve, delete, and search credentials while ensuring that all sensitive information is **encrypted before being saved to disk**.

The application uses **strong symmetric encryption (AES)** and protects all data using a **master password**.
No data is stored in plaintext, and no cloud services are used.

2. Project Objectives

- Securely store passwords on a **Kali Linux system**
- Prevent plaintext credential storage
- Use strong encryption techniques
- Implement basic password management operations
- Protect access using a master password

3. Project Requirements

The project satisfies the following requirements:

- Encrypted local storage of credentials
- Strong symmetric encryption (AES)
- Secure key handling
- Add, retrieve, delete, and search password entries
- Master password authentication
- Secure local storage format (encrypted JSON)

4. Tools and Technologies Used

Component	Description
Operating System	**Kali Linux**
Programming Language	Python 3

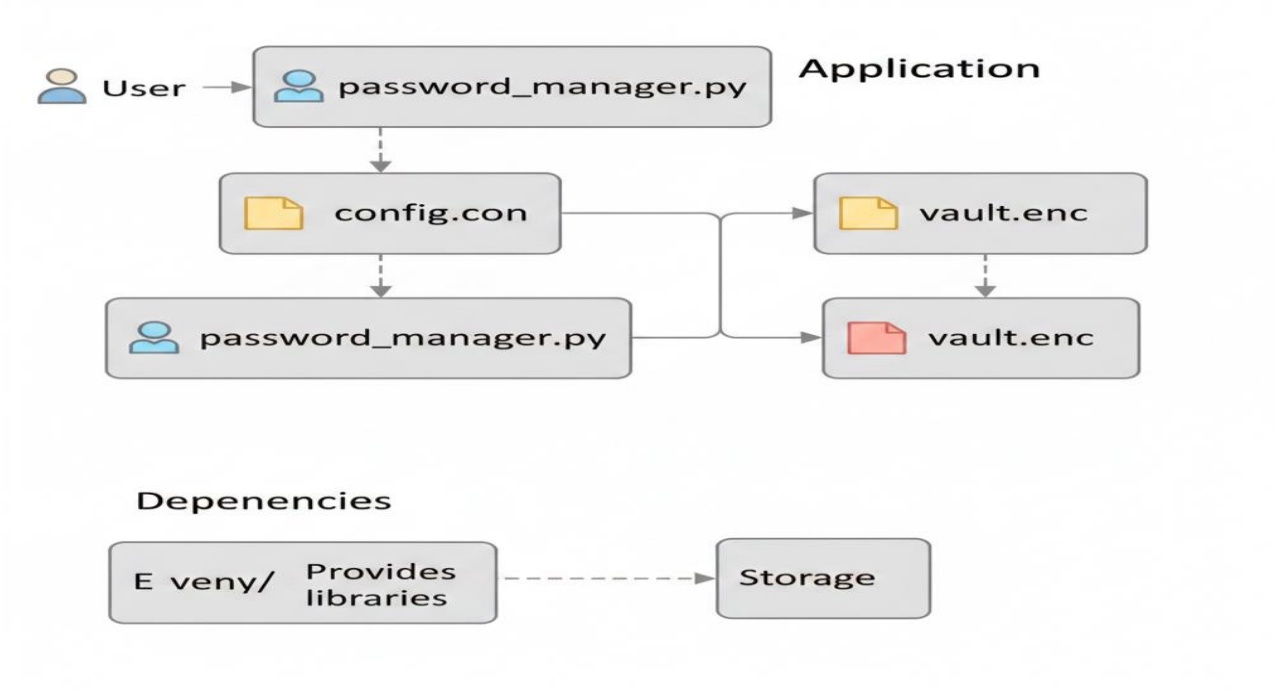
Component	Description
Encryption	AES (Fernet)
Key Derivation	PBKDF2
Library	cryptography
Storage	Encrypted file (vault.enc)
Environment	Python Virtual Environment (venv)

5. Project Directory Structure

password_manager/

- password_manager.py → Main application
- config.json → Encryption configuration
- vault.enc → Encrypted password vault
- venv/ → Python virtual environment

Project Setup (Kali Linux)



6. System Design and Security

6.1 Master Password

- Created during first execution
- Required every time the application runs
- Never stored on disk

6.2 Encryption and Key Handling

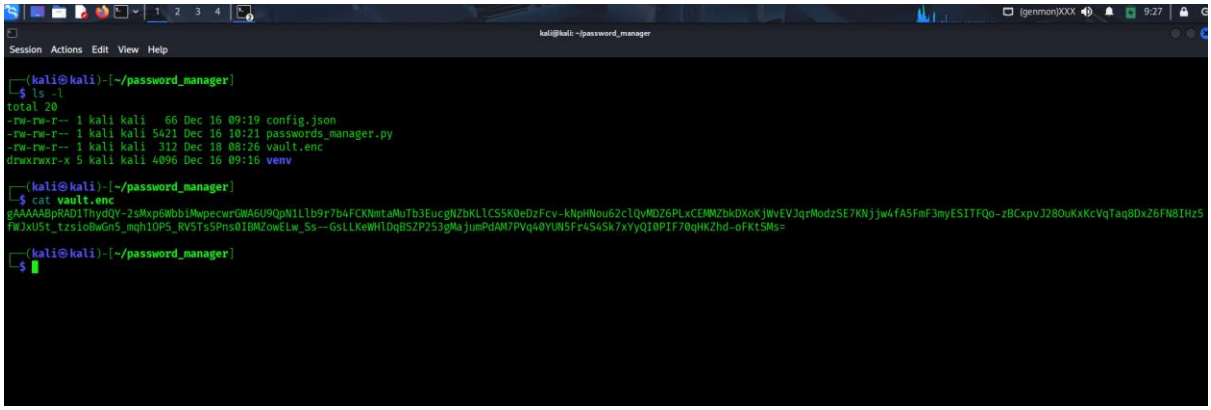
- AES encryption implemented using Fernet
- Encryption key derived from master password using PBKDF2
- Key exists only in memory during program execution

7. Secure Storage Format

- Credentials are stored as JSON in memory
- JSON data is encrypted before saving
- Disk contains only encrypted data

vault.enc → Encrypted and unreadable file

Encrypted Vault (Kali Linux)



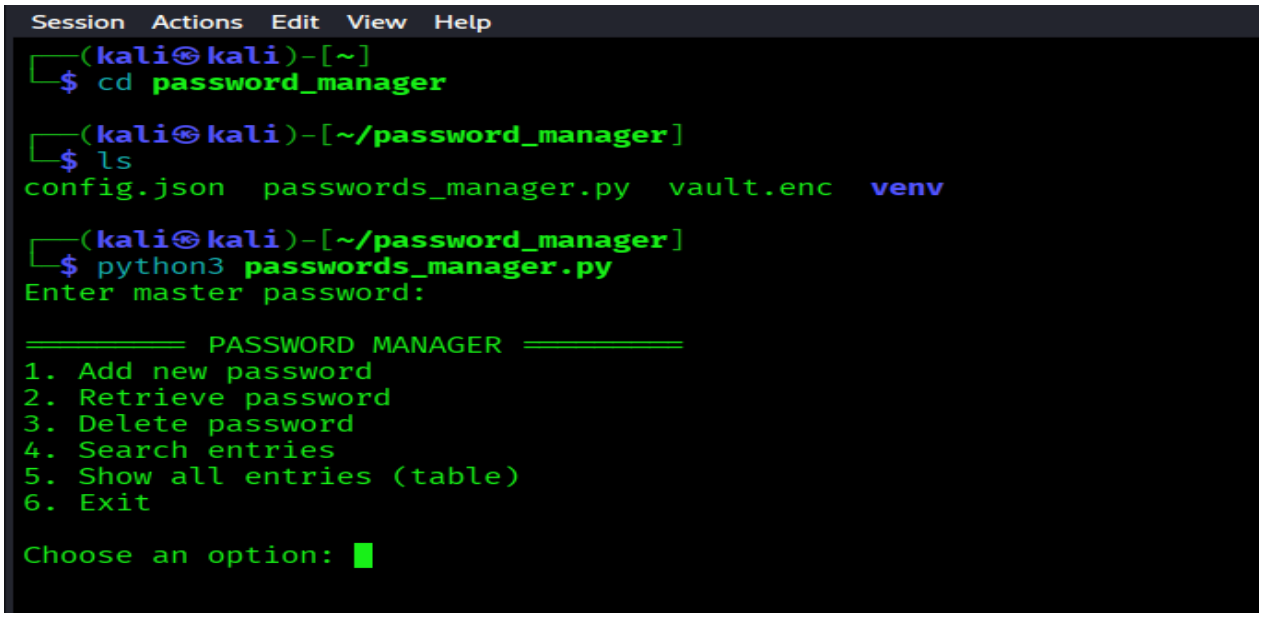
8. Features Implemented

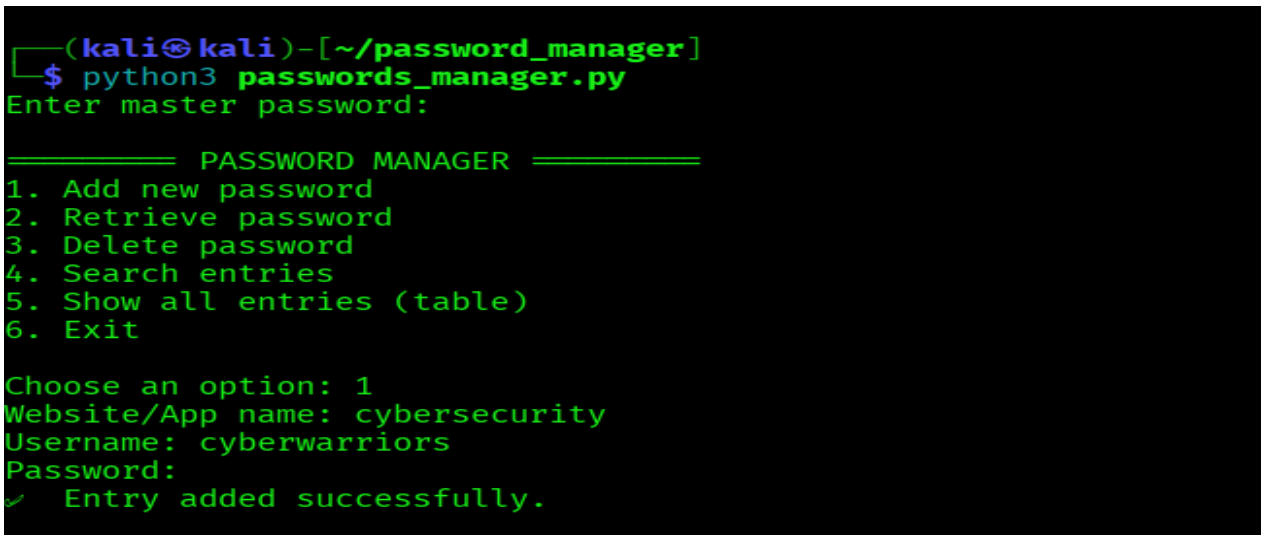
Feature	Description
Add Password	Save credentials securely
Retrieve Password	View stored credentials
Delete Password	Remove credentials
Search Password	Search by keyword
Auto Lock	Vault encrypted on exit

9. Program Execution Flow

1. User runs the program in Kali Linux terminal
2. Master password is requested
3. Encryption key is generated
4. Vault is decrypted in memory
5. User performs operations
6. Vault is re-encrypted
7. Program exits securely

Program Execution





10. File Description

password_manager.py

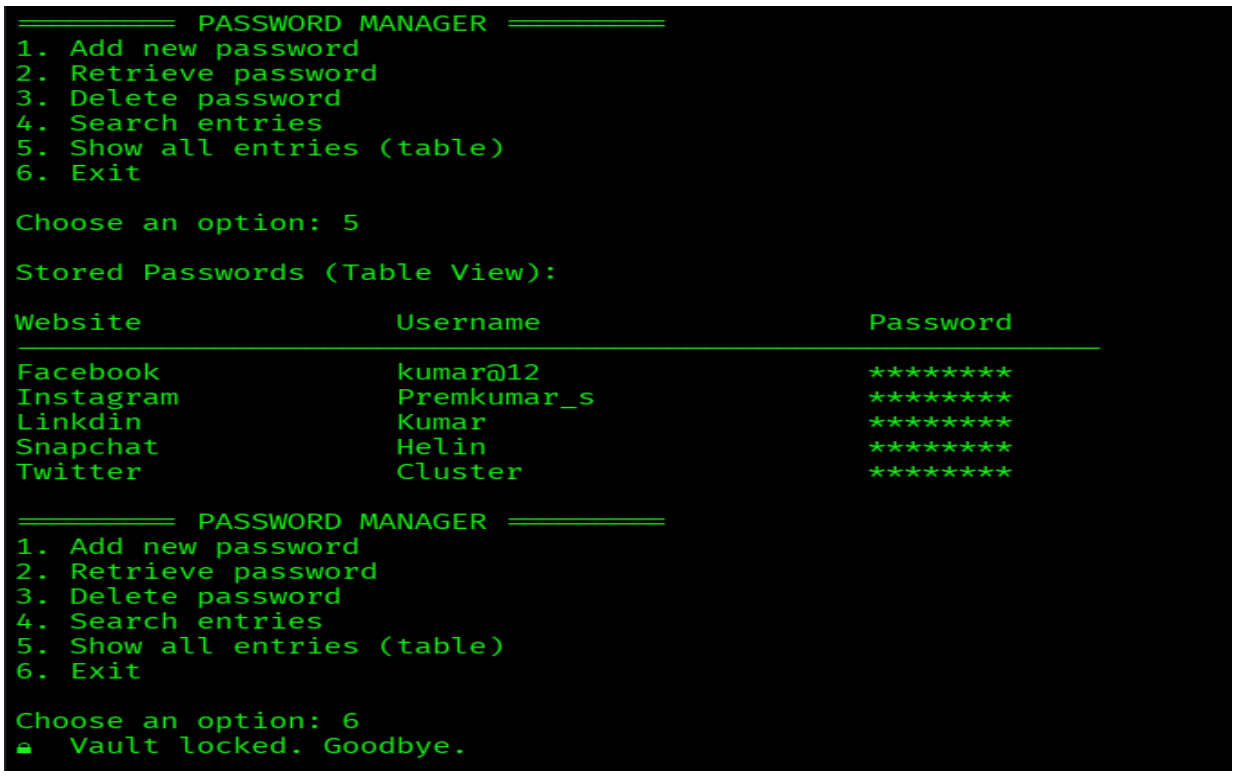
- Handles user input
- Performs encryption and decryption
- Implements all password operations

config.json

- Stores salt and encryption parameters
- Contains no passwords

vault.enc

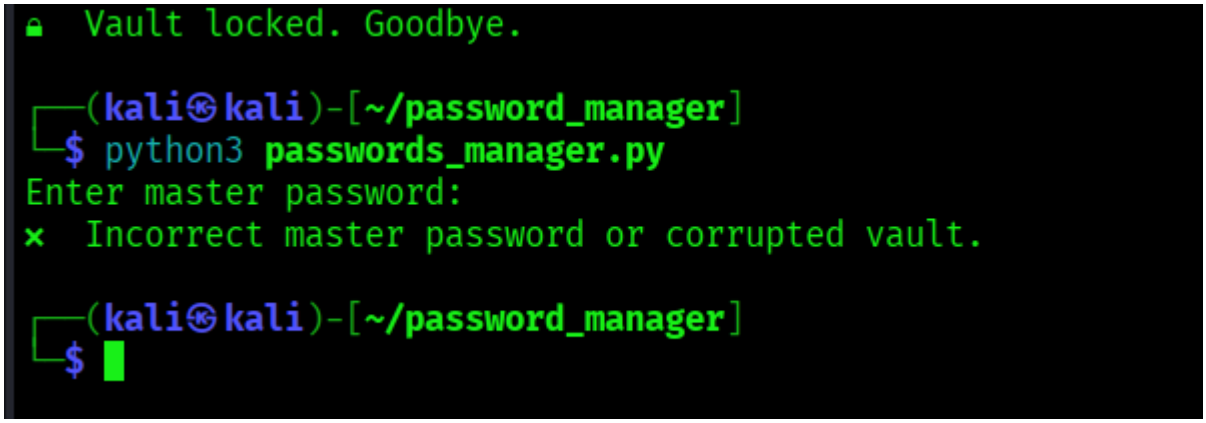
- Stores encrypted credentials
- Cannot be accessed without master password



11. Testing and Validation

- Tested on Kali Linux terminal
- Verified encrypted vault integrity
- Tested correct and incorrect master passwords
- Confirmed add, delete, and search operations

Security Testing



12. Advantages

- Strong encryption ensures data security
- Local storage provides full control
- No plaintext password storage
- Works fully on Kali Linux

13. GitHub Repository

The complete source code for this project is hosted on GitHub.
The repository includes:

- Full source code (password_manager.py)
- Encrypted vault file example
- Configuration file
- Documentation and screenshots
- Instructions to run the project on **Kali Linux**

Repository Link

https://github.com/Premkumar-pro/Syntecxhub_TCPportscanning_using_python/blob/main/syntecxhub_Password_manager.py

14. Conclusion

This project successfully implements a **secure local password manager on Kali Linux** using Python. By applying strong encryption, secure key handling, and master password protection, the system ensures safe storage and management of sensitive credentials.