**Cyber Security Project Report**

**National University of Computer and Emerging Sciences**

**Password Manager**

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**Abstract**

This project presents a password manager that securely stores, manages, and analyzes passwords using MD5 and RSA encryption and decryption. The system features user registration, credential management, password analysis and generation.

**Problem Statement**

In today’s digitally connected world, passwords have become the primary defense mechanism for protecting our online identities. However, with the ever-increasing number of online accounts, managing passwords securely has become a daunting task. Weak passwords, passwords reuse, and inadequate password storage can lead to devastating consequences, including identity theft, financial loss, and compromised personal data.

**Project Overview**

The Secured Password Manager project aims to provide a comprehensive solution for managing passwords securely. The project involves designing and developing a software application that enables users to store, organize and analyze their passwords in a secure and efficient manner. The system will provide a robust and reliable solution for password management, addressing the growing need for secure password practices.

**System Architecture**

* Frontend: A user-friendly interface designed using a Tkinter (python library) for user registration, login and credential management.
* Backend: Secure password storage using advanced MD5 and RSA encryption and decryption algorithms implemented in Python.
* Database: JSON files are used as databases for storing user data and credentials.

**Proposed Solution**

To combat these threats, this project introduces a comprehensive Secure Password Manager designed to efficiently store, manage and analyze passwords. Leveraging advanced encryption techniques, including MD5 and RSA encryption/decryption algorithms, this system ensures the confidentiality and integrity of stored passwords. The primary objective of this project is to provide a robust and reliable solution for password management, mitigating the risks associated with password-related security breaches and promoting a safe online environment.

**Workflow**

1. **User Registration:** The user registers for the password manager system by providing a username and password.
2. **Password Hashing and Storage:** The user’s password is hashed using a secure hashing algorithm that is MD5 and stored in database.
3. **Password Encryption:** When the user adds a new password to the system, the password is encrypted using a secure encryption algorithm that is RSA.
4. **Password Storage:** The encrypted password is stored in the database, along with the user’s username and other relevant information.
5. **Password Retrieval:** When the user requests to receive a stored password, the system decrypts the password using the secure decryption algorithm that is RSA.
6. **Password Analysis:** The system analyzes the user’s passwords to identify potential security risks like weak passwords.
7. **Password Generation:** The system generates a strong, unique password for the user based on their preferred length.
8. **User Authentication:** The user is authenticated using their username and password, to ensure that only authorized users can access the system.

**Sources**

 **os**: Python standard library, used for interacting with the operating system (e.g., file and directory operations).  
Documentation: [os module](https://docs.python.org/3/library/os.html)

 **re**: Python standard library, used for regular expression matching and text processing.  
Documentation: [re module](https://docs.python.org/3/library/re.html)

 **struct**: Python standard library, used for handling binary data and packing/unpacking data into bytes.  
Documentation: [struct module](https://docs.python.org/3/library/struct.html)

 **json**: Python standard library, used for encoding and decoding JSON data.  
Documentation: [json module](https://docs.python.org/3/library/json.html)

 **tkinter**: Python standard library, used for creating graphical user interfaces.  
Documentation: [tkinter module](https://docs.python.org/3/library/tkinter.html)

 **math**: Python standard library, gcd function used for calculating the greatest common divisor of two numbers.  
Documentation: [math module](https://docs.python.org/3/library/math.html)

 **pyperclip**: Third-party library, used for accessing the system clipboard (e.g., copying and pasting text).  
Source: [pyperclip on PyPI](https://pypi.org/project/pyperclip/)

 **string**: Python standard library, used for common string operations (e.g., generating random passwords).  
Documentation: [string module](https://docs.python.org/3/library/string.html)

 **random**: Python standard library, used for generating random numbers and selecting random elements.  
Documentation: [random module](https://docs.python.org/3/library/random.html)

 **tkinter.simpledialog**: Python standard library, provides dialogs like askstring for input retrieval.  
Documentation: [simpledialog](https://docs.python.org/3/library/dialog.html)