SEN125-Introduction to Software Engineering

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Password MnG

Students

Nima Vakiliazar,
Mohammad Abdulmajeed,
Ahmed Bakrsedqi,
Dicle Yıldız,
Imaad Khan

What is `Password MnG`?

The *Password MnG* is a CLI based application oriented towards users who are currently students or users who don't want to spend money on other solutions that are subscription based. It is open-sourced and available to anyone with the know-how to make their own version.

It features a modular design, integrating secure PIN-based authentication to protect access to the manager module. The application allows users to add, edit, delete, and view password entries, stored securely in an encrypted format. Additionally, the built-in password generator creates strong passwords based on user-defined criteria such as length and character types. The program employs modern cryptographic practices to ensure the confidentiality of PINs and passwords.

Project Breakdown & Responsibilities

The project was divided into several stages that were worked on in parallel using the "Agile" methodology, specifically "Scrum". With each stage handled by a team member or a few. Depending on the task, we put more or less people on it.

After making our small backlog for the product's features, we got to work from most important to less important features and polish. This helped us to move forward fast, while giving us the ability to shift the requirements and the implementation based on the problems faced and needs, which did happen several times and thankfully we managed to pull through and finish the project and polish it to a decent degree.

The following are some examples of the responsibilities given to each member during the cycles:

- **Mohammad**: Mohammed worked on the authentication system, which is the first interaction users have with the program. If a user's ID and password are correct, they are granted access to the program; otherwise, access is denied. Mohammed also took on the responsibility of documenting the entire project, ensuring that every step and decision was recorded in detail.

- **Imaad**: Imaad focused on the password generation feature. This section allows users to generate a new, unpredictable password with a single click, offering convenience and enhanced security. He ensured the functionality was robust and met user expectations.

- **Dicle:** Dicle was responsible for designing the user interface, a critical aspect of the project that has an impact on the user experience. She worked on the layout and design of each page and section, ensuring the program was visually appealing and intuitive to navigate. Additionally, she developed personas and user stories to better understand and address user needs.

- **Ahmed:** Ahmed's primary responsibility was implementing AES encryption for secure password storage and retrieval. He also played a pivotal role in integrating the code from various team members into the main program, debugging, and ensuring seamless functionality. The final stages of polishing and refactoring the code were also handled by him.

- **Nima (Leader):** As the group leader, Nima established the GitHub repository and structured the project. He contributed to writing the base code with assistance from Ahmed and Imaad and continuously updated and refined the source code. Nima ensured the application functioned correctly, resolving minor bugs along the way. Also, the final polishing and confirmation after each cycle of work was done by him.

Challenges Faced

Throughout the development, we encountered several challenges and issues. Some examples of these issues and challenges are:

1. **Skill Disparity**: Three members of the team were first-semester students with limited experience. They had to quickly learn new concepts, such as Java programming and object-oriented principles, to contribute effectively.

2. **Knowledge Sharing**: The more experienced members took on the responsibility of mentoring and teaching the newer members.

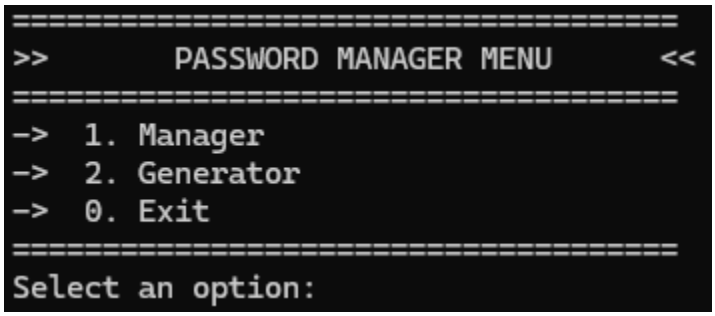
3. **Code Integration**: Combining code from different team members into a cohesive application was a complex process that required careful planning and execution. It caused a big amount of headache to the team, especially to the group leader.

4. **Regular Meetings**: Weekly meetings were essential for tracking progress, addressing issues, and planning solutions. These discussions helped keep the project aligned with our goals. With that being said, having students from different semesters meant we ran into timing issues too.

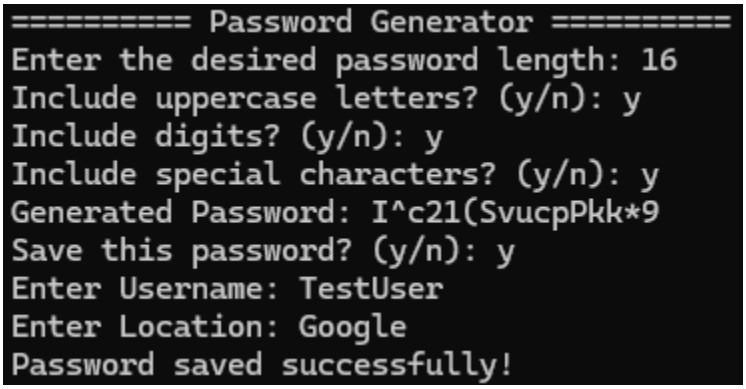
Application Introduction

The application, as mentioned above, is a CLI based app. Easy to use and understand. Just following the prompts should be enough for the user to be able to navigate the app. In anycase, we will still include a small tutorial for the app. To get the app, you must first download the executable file from our Github repository, which will be linked at the end of this document. After downloading the app, there is no need for any kind of installation. It is a portable app and fully standalone.

With all that being said, let's launch the app, shall we?

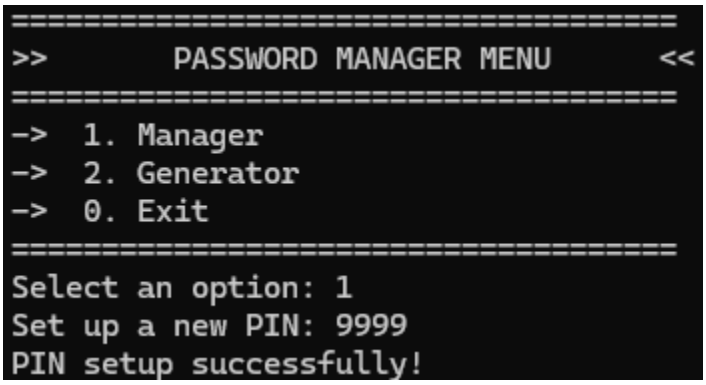


As you can see, the design is simple and clutter free. This is our main menu for the app, which was designed and refined by Dicle. Now, let's say you want to generate a password. You would have to select the second option on the menu, which will bring you to the Generator menu. The following is an example of a password generated using the user’s preferences:

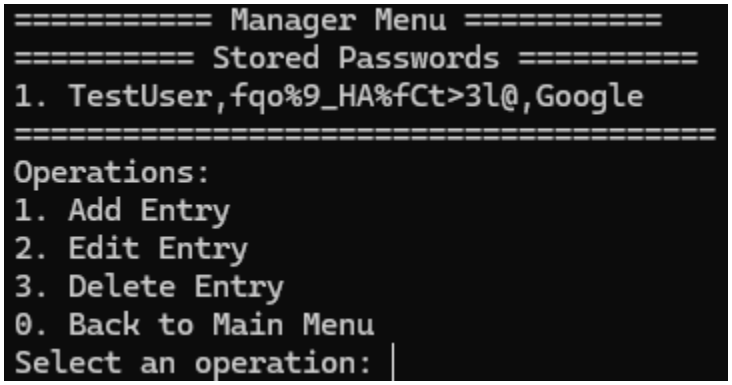


Now, let's say you want to see the password generated. We will take a look at that in the next page.

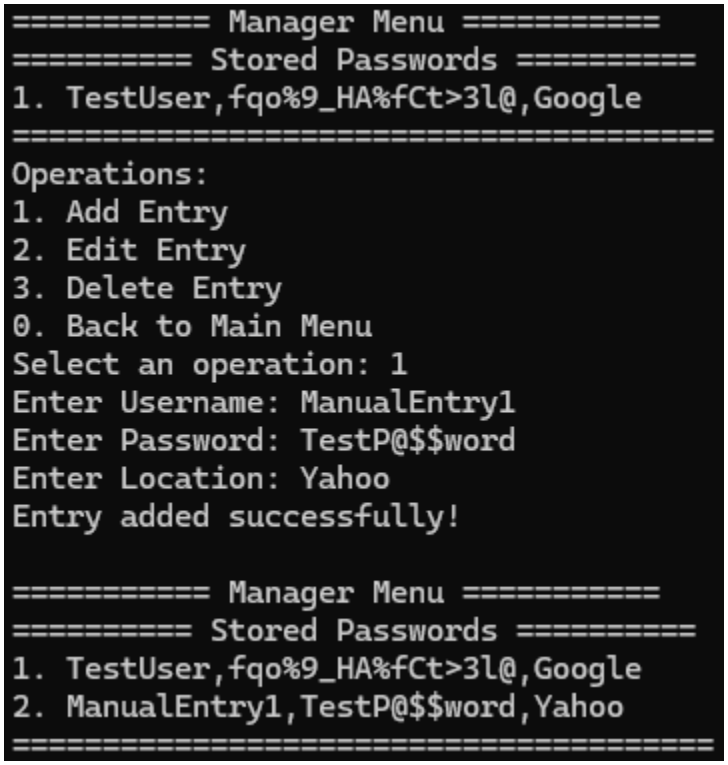
In the picture below, you will see the test user being prompted to make a pin. This pin prevents others from accessing the manager and displaying and editing the user's entries:



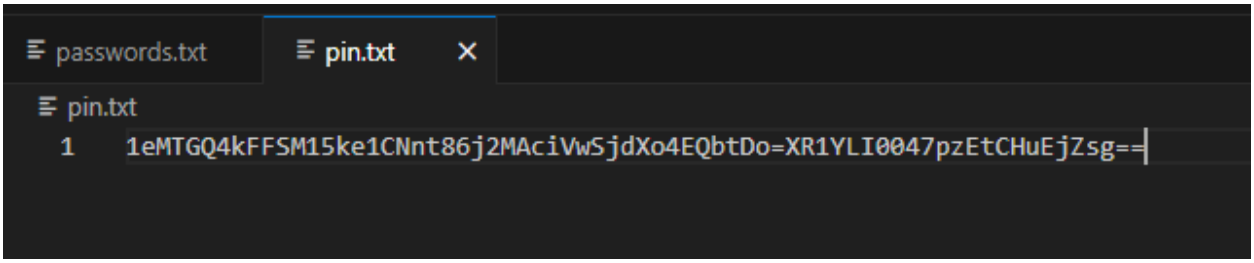
Then, we will have to go to manager again to display our first password saved in the app:

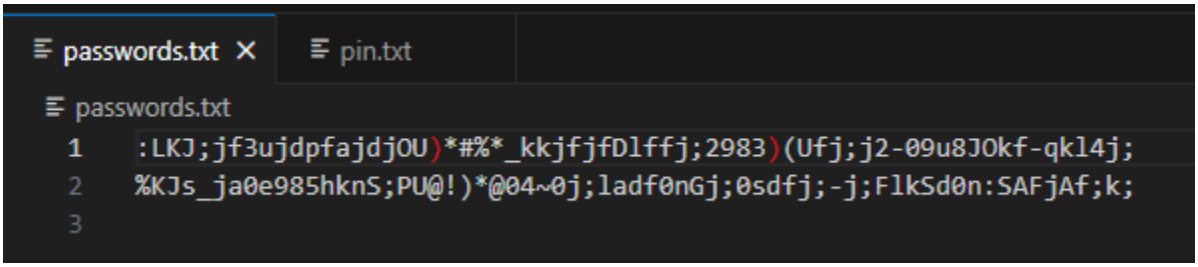


Here, let's say we wanted to add our own password manually:



The rest of the app is just as simple as the past pages demonstration. We also want to show what happens if someone tries to manually access the text files that have the pin and the password





Personas and User Stories

The personas and user stories that shaped this app were made, refined, and polished by Dicle. These persona's are as follows:

1. **Tech-Savvy Student**:
   - A 21-year-old Computer Science major who's great with technology. He needs a reliable and secure password manager for all their accounts, from GitHub to personal accounts. They change passwords often and prefer lightweight apps without extra clutter.

2. **Busy University Student**:
   - A 20-year-old Business Administration major who struggles to remember passwords for emails, courses, and tools. He isn't super into tech but wants a simple and secure way to manage passwords without too much hassle.

3. **Privacy-Conscious Student**:
   - A 22 year-old, studying Cybersecurity. With a high level of tech knowledge, he doesn't trust cloud-based solutions and prefers tools with encryption and offline storage. They're always testing tools to make sure they're secure.

4. **Forgetful Student**:
   - A 19-year-old Psychology student, often forgets passwords and finds creating strong ones a challenge. He's looking for a super simple app that can help recover forgotten passwords and create strong ones easily.

5. **Group Project Leader**:
   - A 23-year-old Engineering student, leads group projects and needs a way to securely share passwords with team members. Chris wants a tool for temporary password storage during projects, with the option to delete them afterward.

And here are our user stories:

1. **Adding and Managing Passwords**:
   - "I need a way to store all my passwords in one place so I don't lose track of them."

2. **Generating Strong Passwords**:
   - "I want to create strong passwords quickly to make sure my accounts are secure."

3. **Viewing Saved Passwords**:
   - "I'd like to easily see all my saved passwords so I can manage them better."

4. **Deleting Passwords**:
   - "I want to remove old or unused passwords to keep my list organized."

Lessons Learned

This project was an invaluable learning experience, preparing us for real-world scenarios where we might handle much larger projects with diverse teams. We gained hands-on experience in:

- Collaboration and teamwork.
- Applying programming concepts to solve real problems.
- Overcoming challenges through learning and persistence.

These experiences have equipped us with skills that will benefit us in future academic and professional endeavors.

Improvements for The Future

In the programming world, there is always room for improvement. One significant enhancement we discussed was providing an alternative way for users to regain access if they forget their password. Possible solutions include:

- Allowing users to reset their password through a secure verification process, like TC identification or equivalent.
- Offering the ability to retrieve the original password after confirming the user's identity.
- Implementing backup authentication methods, such as security questions or email verification.

These improvements would significantly enhance the user experience and make the program more versatile and user-friendly.

Remarks:

Thanks to all of the group members for their time and help that they provided during development, and we all hope to use these skills in a better way in the future.

PDF Writers & Editors: Mohammad, Nima