

Report on Software Engineering and Professional Practice Prototype

We reviewed each team member’s Engineering Design Review (EDR) and selected the Gamification of the SSH App as our prototype. This decision was influenced by several factors, including our team’s strong understanding of the proposed system, which aligns with the daily engagement features commonly found in modern apps. The goal was to enhance student interaction with the SSH App and ensure its relevance. Additionally, this EDR matched our team’s skills and available resources. We are proficient in JavaFX (with Java as our primary programming language) and SQL databases, which are integral to the system’s core design.

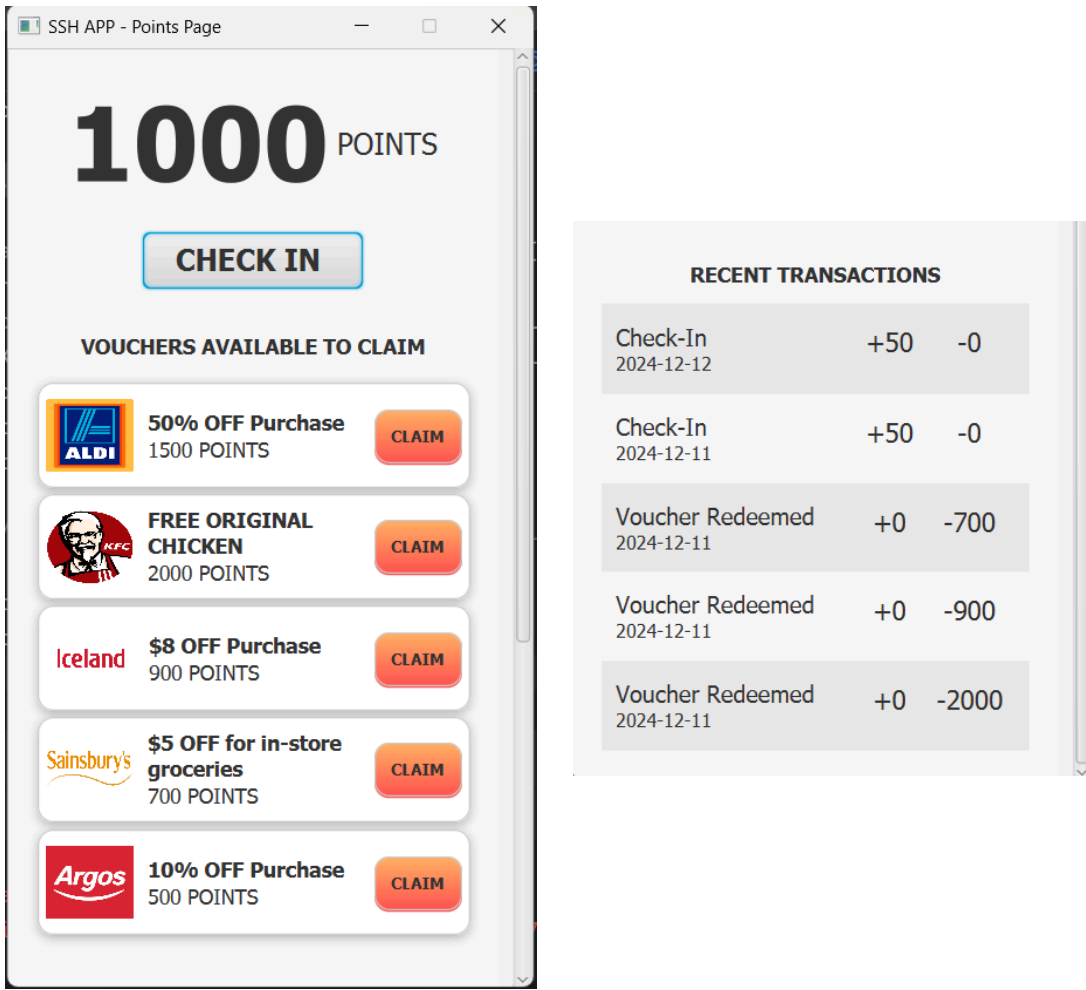


Diagram 1: The Points Page that have buttons to interact with

Our focus was on developing the system’s main page, adhering to the EDR’s guidelines. We made modifications to the database, adding tables, functions, and relationships to improve data collection and storage. The implementation emphasized JavaFX for the page’s design and Java functions for specific features, while establishing

a seamless connection to the database. All progress was meticulously documented in our GitHub repository, where updates and files were regularly uploaded. This effort resulted in the creation of the system's main page, featuring initial designs and user-friendly functionalities.

Our initial step in developing this project was to determine the components to include in the prototype. We assumed that the feature would be integrated into the existing SSH App, leading us to focus solely on the gamification system. To start, we designed the layout for the Points Page, which serves as the feature's main interface. This page includes a check-in button, voucher with details about the offers, and a transaction history section displaying dates and the points added or deducted.

We also created a database to support the prototype, incorporating all necessary relationships. The database consists of several tables: **user_information** for storing logged-in user's details, **transactions** for storing records of transaction histories, **voucher**, and **user_points** which is unique to each user to track their current points.

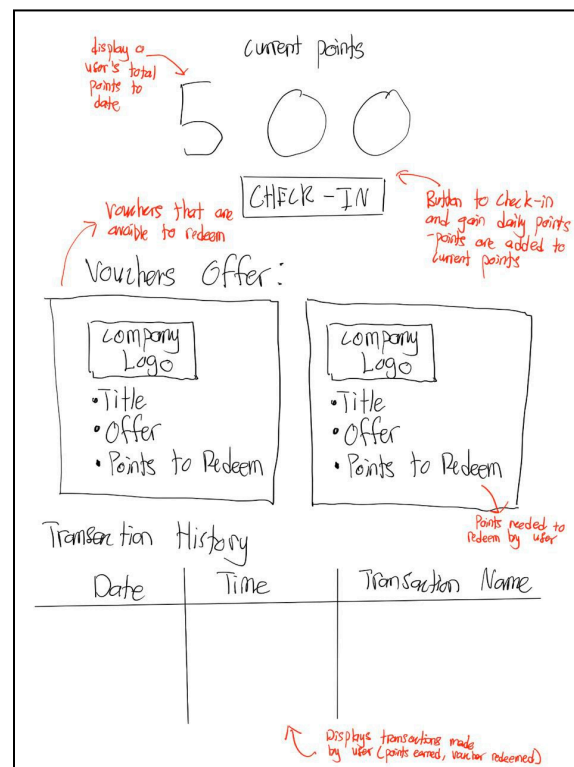


Diagram 2: Initial sketch of the design layout for the Points Page

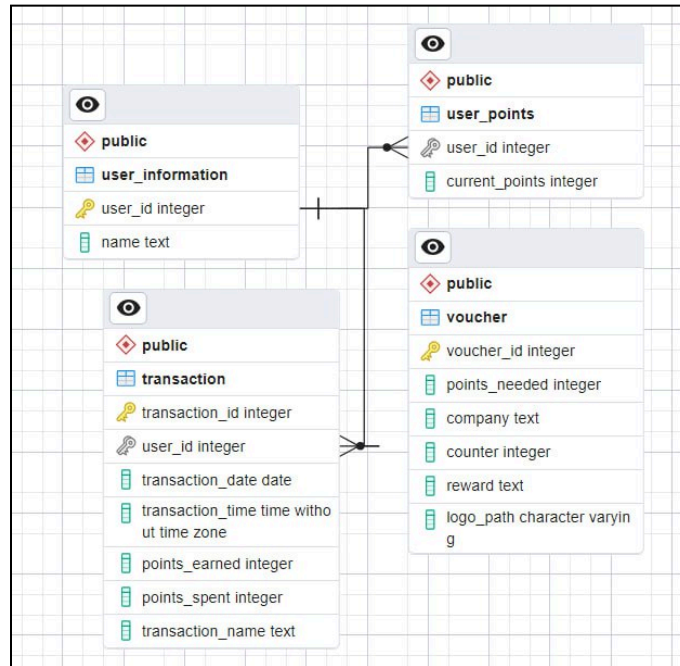


Diagram 3: The relationships between tables in the database with each keyfield

To ensure a seamless workflow we decided to use IntelliJ Idea as our integrated development environment (IDE). This decision is made as it is user friendly in terms of its interface and variety of features that enhances productivity. Moreover, IntelliJ provides robust integration with Maven as one of their build tools. By using Maven, we got to save time from manually doing repetitive tasks like cleaning, compiling and testing the code. Other than that, Maven also plays a huge role in handling all dependencies needed in the project. For example, since we were working with JavaFx to handle the interface and Postgresql to build our database, all the necessary dependencies were defined in the pom.xml file. This ensured consistent versions and libraries across the members, hence preventing version conflicts.

In addition to dependency management, Maven's seamless integration with JUnit testing enhanced quality assurance. For example, we wrote a basic test to ensure that the function of redeeming vouchers correctly updated a user's current points. By automating these tests, we will preserve the functionality of the codes even after applying updates. In the future, more thorough and parameterized tests definitely should be considered to verify the robustness of the functions. When designing the layout, we made sure to use specific dimensions to mimic the typical screen size of mobile phones. As for the layout, we relied fully on an FXML file.

To get a better visualization of the interface and simplify the process we use SceneBuilder to build the overall layout. This helped us to achieve the desired output quicker. We also centralized database operations into a single class called DbFunction for better maintainability and consistency. To handle potential errors, we implemented try-catch blocks in methods that interacted with the database, ensuring the application remained stable even if unexpected issues arose. For better observability, components such as metrics and logging definitely should be implemented when the complete system is launched.

After setting up the base code for JavaFX and the initial functions, we created a GitHub repository to track the project's progress and ensure all code updates were synchronized. This allowed team members to work on different components simultaneously. For example, adding database files while developing the user interface. This allows us to maximize the use of our time. Each commit included a brief description of the updates, ensuring everyone stayed informed about changes. GitHub streamlined collaboration by detecting and managing code conflicts before merges were approved. It also allowed us to track all code changes efficiently. On one occasion, we encountered conflicting errors due to simultaneous commits. However, GitHub's conflict detection tools helped us identify and resolve the issue smoothly.

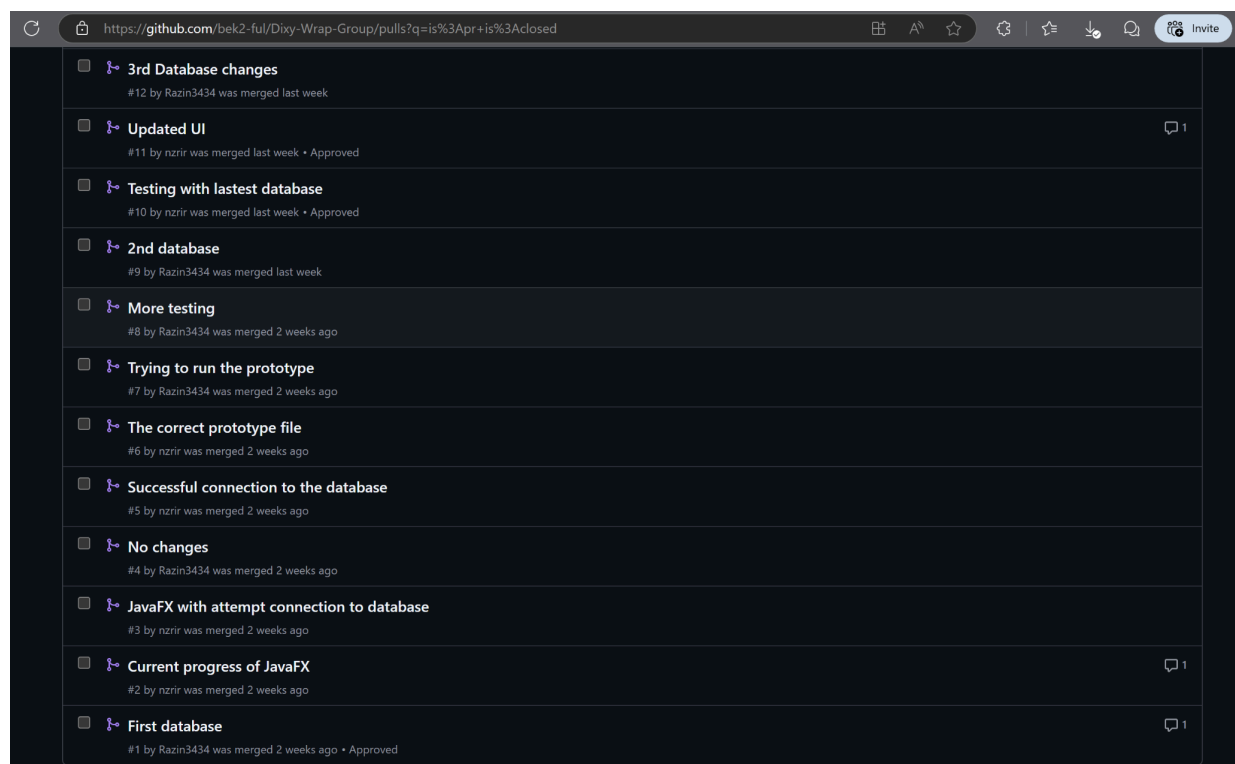


Diagram 4: Examples of pull requests in our project using GitHub

Throughout the development of the prototype, we primarily relied on manual testing, as the system was designed to focus on a single user. Each time the code was updated, we tested the page to ensure that all buttons worked correctly. Using an IDE with built-in Maven made it easier to run the code directly within the development environment. Though we also embedded a basic JUnit testing but real-world testing is more challenging and this could be added in the future. Working with a database connected via JDBC also presented challenges. We needed to manually download the SQL file and copy it to our devices, which was time-consuming and occasionally confusing. Despite these limitations, a small-scale local database was sufficient for this prototype.

The user interface (UI) created is a basic version, with foundational features such as functional buttons and updated displays. It serves as a starting point, leaving significant room for future enhancements. Potential improvements include:

- **Implementing a cloud-based database** for easier and more centralized access.
- **Adding a reminder feature** to encourage users to check in daily and maximize benefits.
- **Incorporating a daily streak system** to reward users with increasing benefits for consecutive daily check-ins.

Reflections on other group members:

Razin's Reflection on Naylea

My time working with Naylea on this project was a worthwhile experience. One of Naylea's strongest qualities is her well-developed technical skills, especially in coding. She is confident in her coding skills and even offered herself to take the lead on the Java coding aspects. Even when fails occurred during running the code, she is determined to fix it, as seen during our struggles to ensure the connection between the main page and the database. Other than that, Naylea displayed her collaborative attitude during this whole project. I saw this especially during group discussions, where she constantly asked Zulaikha and I's perspectives on how to approach the system. She prioritised our comfortability with the tasks divided and incorporated valuable feedback on them. As an example, when I mentioned my comfortability in handling the SQL database, she took that into consideration and gave me the responsibility to handle it. She also gave me feedback on how I could tackle certain functions to calculate user data, so that she can write effective codes to work with it.

That being said, Naylea could improve on her prioritization on tasks and time management. During the development of the system, she took a certain amount of time to develop all the functions required, which resulted in delays to start manual testing. She could improve by prioritizing tasks that need to be achieved in a required time first, maybe by setting goals in order of priority. Overall, Naylea had a crucial role in the project which led to the success of it. I am happy and looking forward to working with her again for future projects.

Razin's Reflection on Zulaikha

Working with Zulaikha during this project was a valuable experience, since it was her EDR that was chosen. From the start, Zulaikha has shown her high diligence and great attention during group discussions. During our first discussion, Zulaikha kept note of every idea and notes Naylea and I gave, which she wrote down in a shared Google Document she created. This benefited the group as we always went back to it for reference during tasks. Zulaikha also provided a checklist of tasks that need to be done, such as when to prepare certain parts of the system and when to start manual testing. This made our project more organised and well thought out.

That being said, one area of improvement is effective verbal communication within groups. I noticed during discussions, Zulaikha does share her input, but not as effective for me to fully understand it. Some of her design ideas for the main page were not explained effectively, which confused me at times when needing to ensure what is required in the SQL database. However, her notes in the Google Document provided

were detailed enough for me to carry out my tasks. I believe being able to verbally explain her ideas in person is important to showcase her confidence in them.

Another strength she also displayed was her proactive attitude during tasks. Zulaikha straight away started working on JavaFX functions during the first discussion while also providing sketches of the main page. She also ensured all her tasks were completed efficiently and on time. She is a dependable team member due to her prompt turnaround and commitment to quality. All things considered, Zulaikha was important in our project's success, and I am eager to watch her develop in our future projects.

Zulaikha's reflection on Naylea

I am glad I got the opportunity to work with her. Throughout the project I believe she was the backbone of our group. From the start, she had taken the lead, guiding us through every meeting as we planned and set our vision. Moreover, her calm demeanor and positive mindset were significant in our journey of finishing the project. Since none of us had the experience of using GitHub, she not only took the initiative to explore it but also taught the rest of us. Because of that, she had been the one managing our repositories. Of course we tried to help where we could, but I could not deny the fact that she was definitely the one who solved most of the conflicts that arose when we all pushed and pulled the codes. Like I mentioned before she is a person with a very positive mindset. When we faced any issues, she would be the one reassuring us that we would make it through, which definitely helped me to reach the end. In the future I hope that she keeps sharing her positive mind with the world. I also believe she should take up every opportunity that she gets to lead as her leadership skills will make her the best leader out there.

Zulaikha's reflection on Razin

He definitely is a perfect example of a dependable person and a dedicated team member. As we already divided our task, he was responsible for working on the database by using Postgresql. Despite having completed the database within the first couple of weeks, he remained with us throughout all our meetings and discussions. As the project evolved and adjustments were required, he executed the changes without a single complaint or a second of hesitation. Moreover, he also portrayed himself as a proactive team member as he always conducted his own research to enhance our project. For example, he explored different ways to implement the trigger function in the database and contributed a lot in identifying the necessary functions for our system. His willingness to go above and beyond his role definitely made a huge difference in the overall achievement of our project. In the future, if I ever have the opportunity to work together with him I would gladly take the chance to. I hope that he will challenge himself

to work on various aspects of a project and take on new roles as he has the potential to achieve a whole lot more if he believes in himself and steps outside his comfort zone. His ability to adapt, learn and contribute leaves no doubt that he can excel even further.

Naylea's reflections on Zulaikha

Zulaikha is a very hard-working and diligent person, and I am truly glad to have had the opportunity to work with her. Her ideas in the EDR are fantastic, and I always look forward to hearing her input during discussions. She has a unique ability to think creatively and propose solutions that are very practical and innovative. Zulaikha's dedication to the project has been truly inspiring. I had complete trust in her JavaFX design work, as her skills and effort ensured that the interface she created was exceptional. Zulaikha should continue sharing her ideas as openly as she does, as her enthusiasm has the potential to inspire others to contribute more actively. She is also very supportive whenever we face difficulties. I recall a time when we were overwhelmed by code conflict errors during merging, but her encouragement and willingness to support my proposed solutions helped us navigate the issue successfully. I am confident that with her determination and passion, Zulaikha will continue to excel and make meaningful contributions to any team she joins. It has been an absolute pleasure working with her, and I eagerly look forward to seeing all the amazing things she will accomplish in the future.

Naylea's reflections on Razin

Razin is an incredibly dependable and enthusiastic individual, especially during the early stages of developing our prototype. He readily took on tasks and challenges, particularly in creating the database for the prototype. His eagerness to help became a significant strength for our team, as he managed to efficiently handle multiple tasks assigned to him. Razin's calm demeanor and confidence in expressing his ideas were invaluable. During moments of conflict or indecision, he often stepped in with well-thought suggestions that helped us refocus on what truly mattered. His ability to offer practical solutions in critical situations not only resolved disagreements but also kept the team moving forward effectively. Additionally, he is a quick learner as he can easily understand the implementation of code. I really appreciate his support throughout the project, as he was always ready to assist and encourage others. By nurturing this inclusive strength, Razin can continue to inspire the team and contribute to even more successful projects. His dedication, skills, and teamwork made a significant impact on the success of our project, and I am confident that his ability to adapt and excel will lead him to continued success in future endeavors. I'm truly grateful for the opportunity to work with Razin.