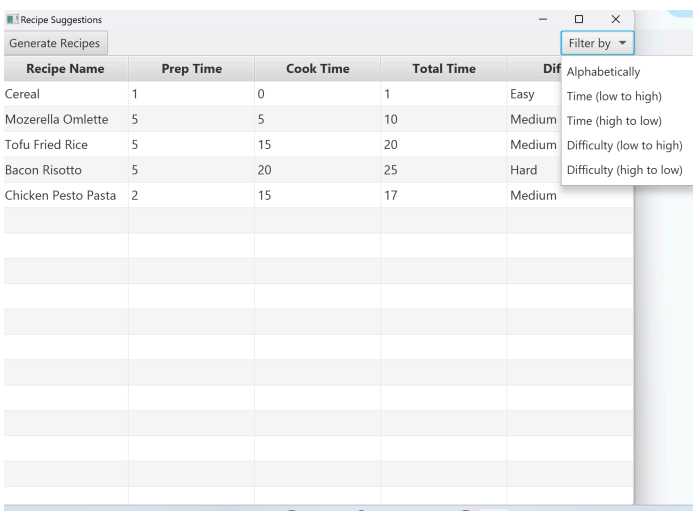
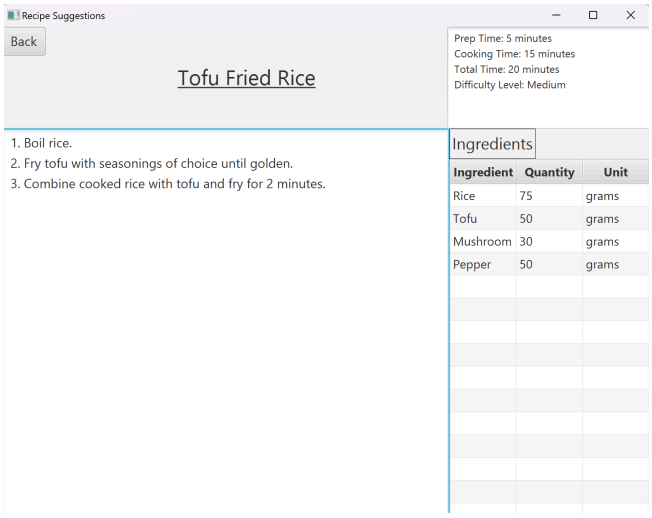
The Report

What Was Accomplished

In this team project, we developed a fully functional prototype of the application described in Jessica Greene's EDR, showing that the design is viable. The overall technical accomplishment of our project was the implementation of a multi-threaded client-server application to provide a user with a list of suggested recipes. The prototype integrates an in-memory database using H2, a backend using Java, and a user-friendly interface built using JavaFX.

To evaluate the viability of our design, we considered both the EDR goals and the design's technical feasibility. The main aim of the design is to display a list of recipes, ordered by how well they match the ingredients available in the fridge. Additionally, clicking on any recipe displays further information, such as instructions and ingredients. An extension to the main goal is adding the ability to filter by user preferences. As shown below, our prototype demonstrates these essential features, therefore meeting the outlined goals. Furthermore, the prototype demonstrates the feasibility of the technologies described within the EDR, alongside additional technologies we added to enhance the functionality. Therefore, we believe that we have successfully implemented a prototype of the chosen design.



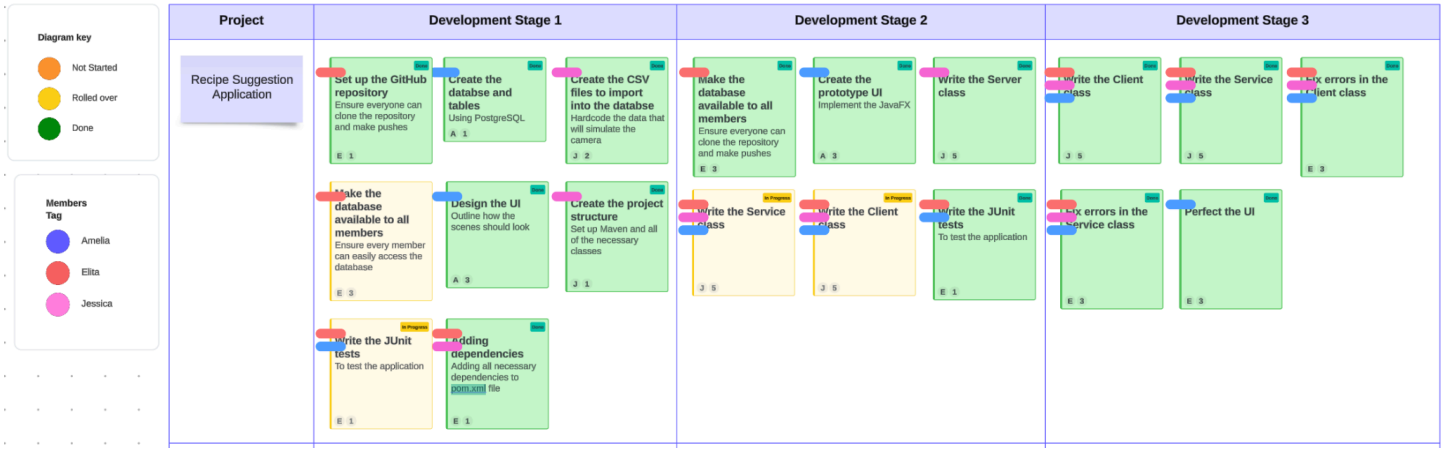


How it Was Accomplished

During our first group meeting, we discussed which methodology would be most suitable for our project. While we considered Agile methodologies, given their widespread use in project development, we ultimately decided to use the Waterfall methodology. We chose this based on the fact that the requirements were clearly laid out in the EDR and unlikely to change, paired with the small scale of the prototype, making Waterfall a better fit for this project.

Our planning stage started with an analysis of the design in the EDR, to create a product specification with clear requirements using the MoSCoW technique. Using this specification, we divided the project into distinct and manageable tasks, which were organised into three week-long development stages and assigned to team

members. We displayed this in a diagram, allowing us to easily update our individual task progress, and view the project's overall progression. While we aimed to follow these stages as much as possible, if a task was not completed, it was carried over to the next week.



During the development stages, we held regular group meetings to provide detailed updates about our individual tasks and discuss if any changes needed to be made to the plan. We tracked these updates in a shared document, which we later transferred to the issues section in our GitHub repository. At the end of each development stage, we held longer group meetings to review our work from that week and amend our development cycles accordingly. For instance, when we were not able to complete our JUnit tests in time, we rolled this over to the next stage.

As for our project structure, we decided to use Maven as our build automation tool. Not only was it the build tool that we were most familiar with, but it also aided us with automating dependency management. This was especially useful when integrating multiple dependencies such as JavaFX, H2, and JUnit.

Using features such as branching and branch protection rules, we were able to develop together at ease without jeopardising the master branch. Specifically, we made it so that a pull request had to be reviewed and accepted by all members before it could be merged with the master. Implementing Continuous Integration prevented individual branches from significantly diverting away from the master branch, as each member integrated their changes multiple times a day. Using GitHub Actions, we ensured that before a pull request could be merged with the master, it was also required to pass integration testing to confirm the project worked as a whole.

We initially decided on using JUnit to test the functionality of individual methods, however, it proved difficult to separate the Client and Server components to allow for individual unit testing. As a result of this we made JUnit tests to check methods that could be easily isolated, such as Service attending the Client request, and testing the connection to our H2 database. Due to the limited number of JUnit tests we could write, we ultimately carried out the majority of our tests manually. This allowed us to perform thorough tests where we compared the actual and expected outputs from the database as well as comparing the features implemented in the prototype with those detailed in the EDR. This ensured that we met all of the test requirements before moving on with any related code.

When we first made the database locally, using PostgreSQL as outlined in the EDR, we planned to implement version control for the database through Liquibase. However, after facing challenges with Liquibase implementation causing us to fall behind on our timeline, we decided to re-evaluate our development priorities. This ultimately led to us using H2, due to its ease of implementation, reduction in latency, and cross-platform usability. Although this decision limited the scalability of our prototype, our main priority was to ensure we could test our application with the database. Upon reflection, making use of Docker with our original PostgreSQL database would have made our implementation more robust and scalable, particularly for handling a larger dataset.

This prototype proves that the basic project structure outlined in the EDR, alongside additional tools and techniques, such as Maven, produces a functional prototype. Although we made the change to switch to H2, this was purely for ease of implementation, and the proposed design using PostgreSQL is still achievable with the use of Docker. This prototype shows the design's technical feasibility, as well as the functionality of the proposed features and therefore validates that the overall design is viable.

Reflections on the Members

Jessica about Amelia
Amelia was not only extremely dedicated to her allocated tasks, but keen to help wherever else she could. Regularly throughout implementing our prototype, she offered her assistance and asked if there were any tasks she could help me with. Throughout her design and creation of the User Interface, she consulted me and Elita to confirm that we were happy with the layout and presentation. She also provided us with detailed updates on her progress multiple times a day to ensure we knew the most current status of the User Interface, which proved particularly useful when working on the Client and Service methods to return data from the database to be printed to the User Interface. Amelia accomplished a fully-functioning User Interface to a high standard that met all of the requirements. She surpassed the initial requirements, constantly using her initiative to try different layouts and add additional features.

Towards the end of the project, I had fallen behind on one of my tasks due to unforeseen issues. Amelia willingly stepped up and helped me to debug my code, whilst also fixing one of our JUnit tests. This further showed me the value that she added to the team and I would definitely highlight teamwork and communication as two of her main strengths. In any further projects that she takes on she should continue to make use of these particular strengths, however I would encourage her to take care of herself and not take on an overwhelming workload by over offering her help to others.

Jessica about Elita
Elita proved herself to be an extremely valuable member of the team. She was eager to find new technologies, such as Liquibase and H2, to aid the progress of our prototype, especially when we ran into difficulties. She was extremely dedicated to her work and completed every one of her allocated tasks to the highest standard possible in the time available. Despite running into multiple issues, she always remained resilient and maintained a positive attitude. She spent multiple days integrating the new technologies into our project, and although this caused her to fall behind on one of her tasks, the work she carried out was vital in ensuring our prototype ran seamlessly.

Throughout the project, Elita was vocal about her progress and spoke up when she ran into any significant issues. After falling behind on one of her tasks, she immediately communicated this to the group, allowing us to decide together the next best possible route of action.

She explained in detail each of the new technologies she was researching to the team so that we could best understand the progression of the project as a whole and offer our assistance. I really appreciated this from her as I felt that I was constantly up to date with her current work. She should continue to do this in her future projects as it will be greatly appreciated by her colleagues. Although it is evident that Elita enjoyed researching the new software engineering techniques, I would encourage her to share this workload more so that she does not fall under unnecessary stress.

Amelia about Jessica

During this project, Jessica showed time and again her dedication to completing our project to a high standard. She continuously exceeded expectations and went the extra mile to ensure that we were on track with our plan, often putting long hours into finishing her assigned tasks. Jessica never had to be asked to complete her tasks, and would often complete them before necessary, which helped the other members of the team to get started on tasks that relied on other aspects of the prototype. One of Jessica's main responsibilities was implementing the client-server architecture for the server. Her fast completion of this task aided me in my creation of different methods in the client class that relied on the output of the server to print to the UI. Another one of Jessica's strengths that she showed in this project is her positivity. She was able to consistently keep spirits high, even if we were dealing with frustrating bugs and difficult errors which kept our team's productivity at a high level. Jessica also showed great flexibility during this project, always willing to take feedback from us and implement it effectively and also

Amelia about Elita

During our team project, Elita was a vital member of our team. She was extremely proactive in researching technologies beyond those we were comfortable with and implemented them effectively despite having no previous experience. Her vigilance in researching and adding these useful technologies to our project, such as H2, was extremely valuable and aided our development greatly.

Throughout the development of our prototype, Elita maintained strong and frequent communication. In one occasion, she communicated that it would not be possible to complete one of her allocated tasks for that week in the time remaining. By not leaving this to the last minute, we were then able to re-evaluate each member's tasks.
was not possible in the time left in that development stage. Because of this, we were able to successfully re-evaluate and shift around some tasks in order to get the task done. She also was always ready to give detailed and helpful reports about her progress at every team meeting. Additionally, she was excellent at explaining the technologies she implemented to Jessica and me, which allowed us to understand it much better and develop our knowledge too. In subsequent team projects, I would encourage Elita to keep the same high quality communication with her team as this is one of the most vital elements of a successful group project, and something that she did very efficiently. I would also encourage her to ?? We actually gave elita the name "debug queen" during our project as a result of the long hours she put into carefull debugging our issues. Thanks queen x -Strong knowledge of github

Elita about Jessica

Jessica was an integral part of the team. Her responsibilities lay in creating the file structure/ template for our application and also writing the Server, Service and Credentials classes. She also aided in the Client class, creating a template for Amelia to build the user interface upon. *ADD HER MAIN ACHIEVEMENT*. Add that she was skilled at developing…Throughout the development of this project, Jessica worked tirelessly, with incredible communication as to what task she was working on, and the timeline of our project. She was very good at taking initiative, particularly when we had fallen behind on a task in a development cycle, she would take on the responsibility of either ensuring that we could roll over the task to the next development cycle, or completing it in time. This helped massively with staying on track and keeping to our deadlines. One of Jessica's main strengths is her teamwork, demonstrated by how she always made sure to lend a hand on anyone else task and debug errors where necessary. Talk about how she was adaptable with the service, and made sure to integrate changes as the client and UI progressed, working well with Millie and ensuring that the changes reflected in her own tasks. She also kept out documentation up-to-date with the latest development stages, ensuring everything was accurate with what we were doing. These practices were incredibly helpful, and jessica should ensure that she carries these across into projects she completes in the future. - say which ones.

Jessica was an integral member of the team, playing a key role in the development of the prototype. She was responsible for creating the file structure for our application, as well as writing the Server, Service and Credentials classes. She also aided in the development of the Client class, alongside Amelia. Jessica demonstrated incredible development skills, particularly in her ability to adapt, managing to successfully integrate the Service class with the changing UI.

Elita about Amelia
Amelia was an important member of the team, showing initiative and resilience in managing a tough workload. She demonstrated these qualities throughout the development of the prototype, however they were particularly evident during the first development stage, in which she had an interview. She communicated this effectively with the rest of the team, and we were then able to rearrange our assigned tasks to allow for this. This showed her professionalism, communicating a potential issue that may have caused us to fall behind, and then as a result us adapting our timeline to account for this. Amelia balanced her workload effectively, developing the User Interface and made the conscious effort to go the extra mile and implement extra features. She completed the User Interface to a high standard, and ensured communication of any changes before they were made. Collaborated effectively with Jessica to implement the second scene in the Ui, and picked up some rolled-over tasks i had fallen behind on. She aided in the development of a JUnit test, even though she was unfamiliar with the software, however she remained resilient and completed it to a high standard. Millie showed skills of adaptability, collaboration and professionalism throughout this project, and she should take this forward and apply these skills in the future. I would encourage Amelia to remain…

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The structure of our code was taken from Assignment 3 of the the Full-Stack Application Development module. (2024)