PROJECT Design Documentation

Team Information

- Team name: Team 3 - we're better
- Team members
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  - Jayda Hutchinson
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Executive Summary

This project is a website that prompts the user to first login. If they give a user's username the user is presented a list of needs. They can search through this list of needs and add any to their basket. They can then go through a checkout process and "pay for the" needs in the basket. For every unique user to “pay” for the need a count of helpers is increased for that need. The user may also change their username or password on the settings page. Alternatively; if given an admin username, the admin is also presented with a list of needs they can search through. However, instead of adding them to a basket, the admin can edit, add, or remove any of the needs.

Purpose

The purpose of this project is to create a funding website for a tree planting organization that we’re calling “Arboreal Acquisitions”. The site will have a user side that allows users to help fund the organization and an admin side so that officials of the organization can manage what needs/areas show up to the users.

Glossary and Acronyms

> ***[Sprint 2 & 4]*** *Provide a table of terms and acronyms.*

Term	Definition
UI	User Interface
ID	Identification
Single-Responsibility Principle	A design principle where a module is assigned to just one section of a project
Information Expert Principle	A module should only have functionality for information it can access

Requirements

This section describes the features of the application.

User functionality:

- Add to a basket from a list of needs
- Search through a list of needs
- Checkout the basket of needs
- Remove from the basket of needs
- Create and Account
- Login
- See the number of helpers for each need
- Account Settings: Edit/Delete Account

Admin functionality:

- Edit any need
- Add any need
- Remove any need
- Can see number of helpers for each need

Other:

- Everything is saved to files

Definition of MVP

The project gives the user a list of needs that can be searched through and any need can be added to their basket. A basket that can be viewed and edited in the checkout page. Each user has the ability to "purchase" their basket. It also gives the admin a list of needs that can be edited, added to, or removed from.

MVP Features

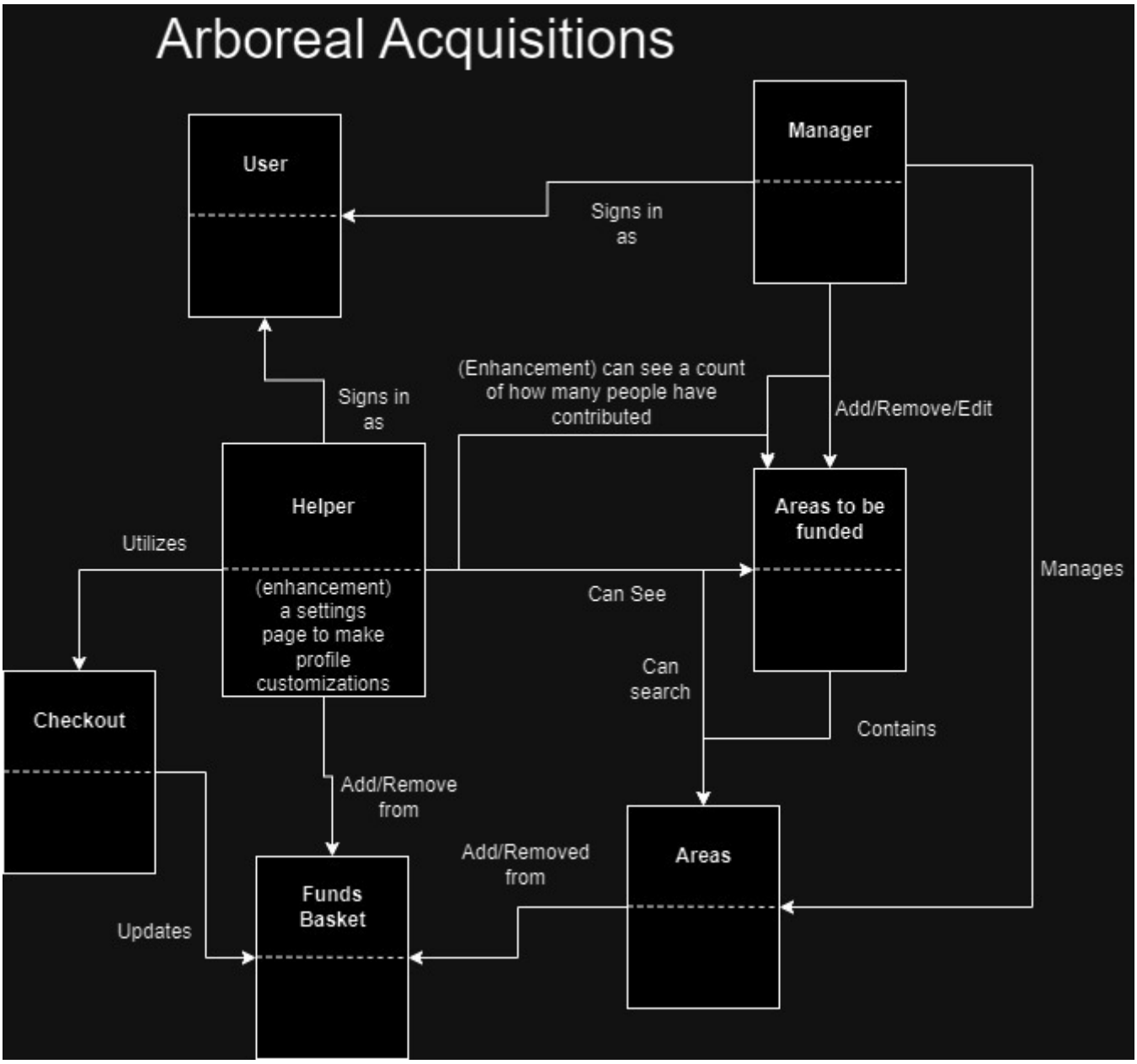
- Accounts/Authentication
- Cupboard For users to view/add needs to their cart
- Checkout basket that can be viewed, added to, or removed from
- A search bar for users and admins to search for specific needs
- Admin functionality: Edit/Add/Remove a need

Enhancements

- Login (User/Pass)
- Registering an account
- Account settings (change user/pass or remove account)
- A count for each need that shows how many users helped it

Application Domain

This section describes the application domain.



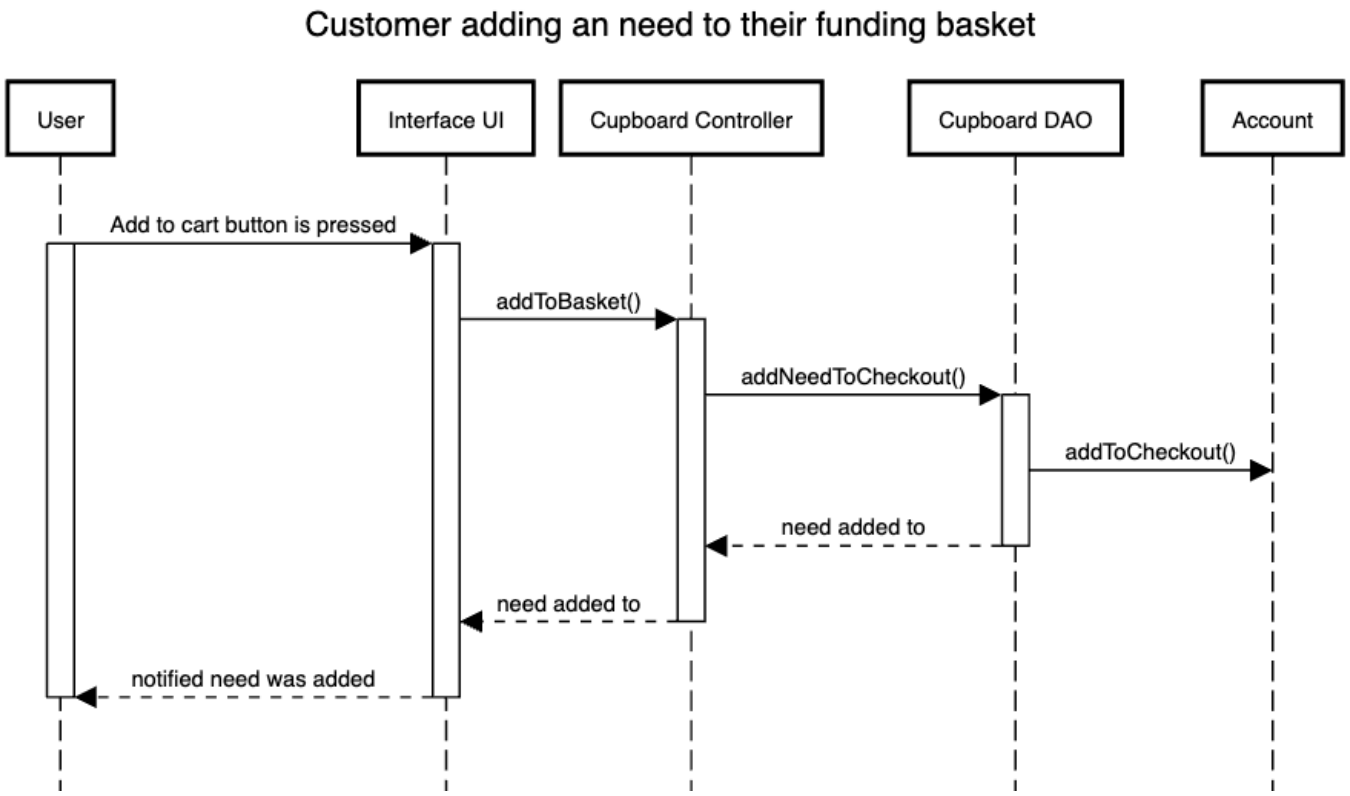
As seen in the diagram everything starts with either being an admin or a user. The user can use the checkout and basket, and see the list of needs. The manager can edit the list of needs and manage the areas.

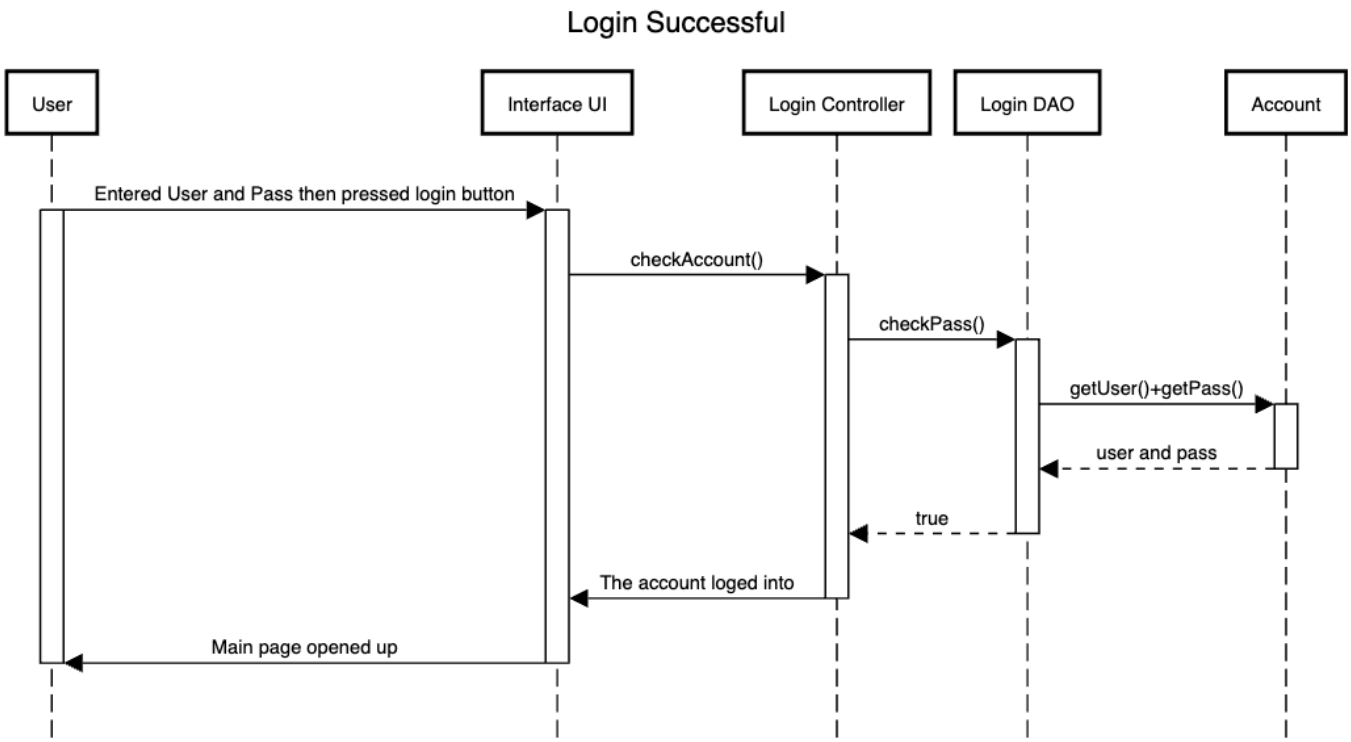
Architecture and Design

This section describes the application architecture.

Summary

The following Tiers/Layers model shows a high-level view of the webapp's architecture.





The web application, is built using the Model–View–ViewModel (MVVM) architecture pattern.

The Model stores the application data objects including any functionality to provide persistance.

The View is the client-side SPA built with Angular utilizing HTML, CSS and TypeScript. The ViewModel provides RESTful APIs to the client (View) as well as any logic required to manipulate the data objects from the Model.

Both the ViewModel and Model are built using Java and Spring Framework. Details of the components within these tiers are supplied below.

Overview of User Interface

This section describes the web interface flow; this is how the user views and interacts with the web application.

The user will first be greated with a login page. There they can login if they already have an accout or regester an account. Once done so, they will be brought to the main page of the website that displays the list of needs, a checkout button, a search bar to search through the needs, and a logout button. After they have added some needs to their basket, they can then go to the checkout page and checkout the needs. Afterwards they will see changes to each of the needs purchased. They can also go to their settings page where they can edit/delete their account.

View Tier

The view consists of a bunch of different components that work together to make everything work. There is an admin component that holds all of the admin ui functionality, a login/authentication component for the login ui. A need component for all the need ui functionality. A cupboard for the cupboard ui. A registration component for the registration ui. Finally, a user settings component for the user settings ui.

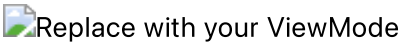
> ***[Sprint 4]*** *You must provide at least **2 sequence diagrams** as is relevant to a particular aspects of the design that you are describing. (**For example**, in a shopping experience application you might create a sequence diagram of a customer searching for an item and adding to their cart.) As these can span multiple tiers, be sure to include an relevant HTTP requests from the client-side to the server-side to help illustrate the end-to-end flow.*

> ***[Sprint 4]*** *To adequately show your system, you will need to present the **class diagrams** where relevant in your design. Some additional tips:*
>
> - *Class diagrams only apply to the **ViewModel** and **Model** Tier*
> - *A single class diagram of the entire system will not be effective. You may start with one, but will be need to break it down into smaller sections to account for requirements of each of the Tier static models below.*
> - *Correct labeling of relationships with proper notation for the relationship type, multiplicities, and navigation information will be important.*
> - *Include other details such as attributes and method signatures that you think are needed to support the level of detail in your discussion.*

ViewModel Tier

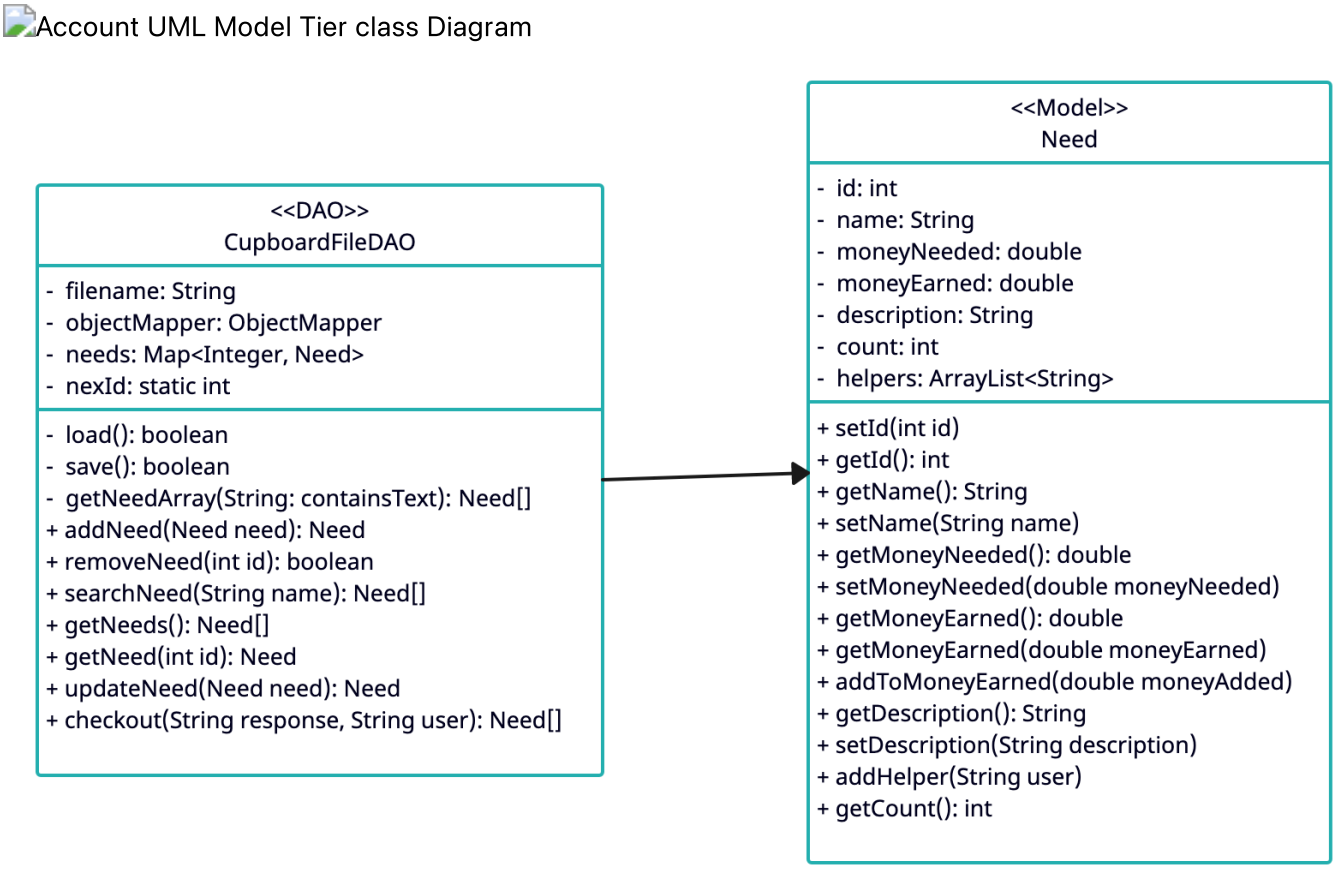
This is the controller component that connects the front end to the backend. In the backend there are two main files: the Account Controller and Cupboard Controller. They each call on their respective DAO file for the functionality and then return responses. Then the front end service files for a few of the componentes call on those functions from the controller to receive the backend responses.

> *At appropriate places as part of this narrative provide **one** or more updated and **properly labeled** static models (UML class diagrams) with some details such as critical attributes and methods.*


Replace with your ViewModel Tier class diagram 1, etc.

Model Tier

There are two main files with the functionality, the Account DAO and the Cupboard DAO. The Account DAO covers all functionality for accounts; like login, create account, edit the account, and delete an account. The Cupboard DAO covers everything else; adding a need, getting the list of needs, editing a need, deleting a need, searching for a need, and checking out. Each DAO uses the model classes



OO Design Principles

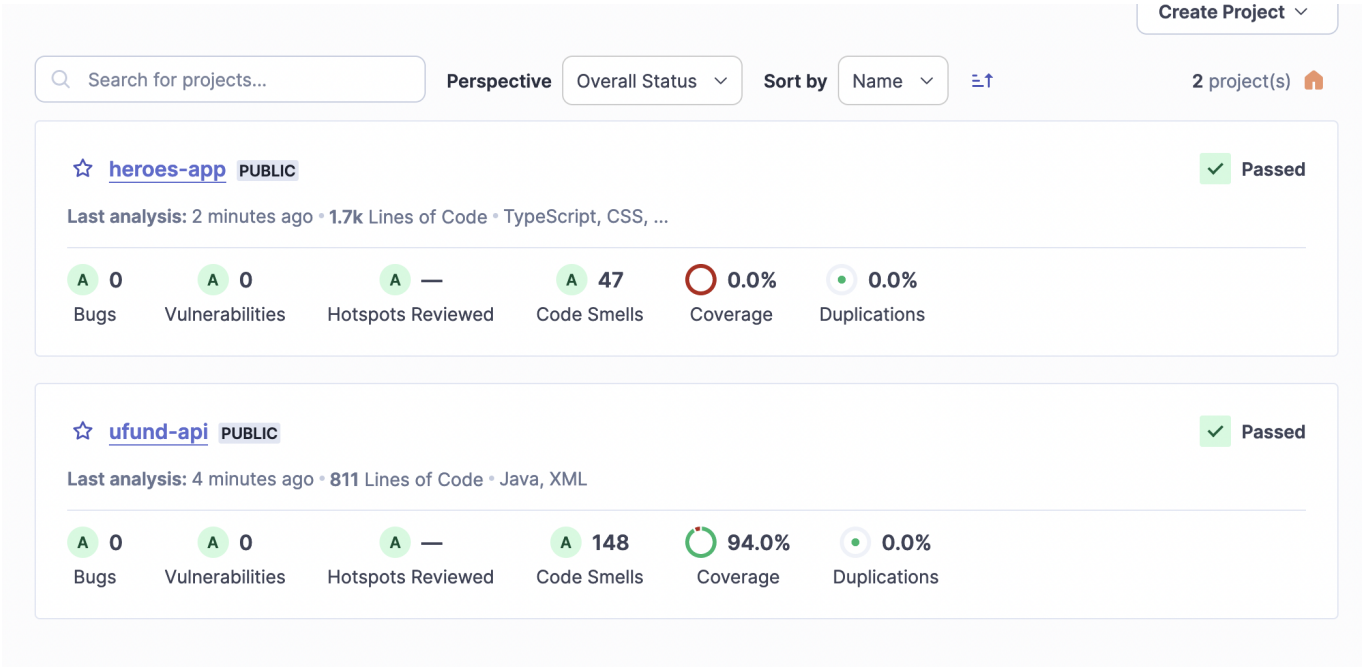
1. We used the **Single-Responsibility Principle** as seen in the model tier of our system. We have two models, an Account and a Need model. Each with their own specific functionality. And then the Cupboard DAO and Account DAO implements the functionality for both models. (See Model Tier for diagrams)

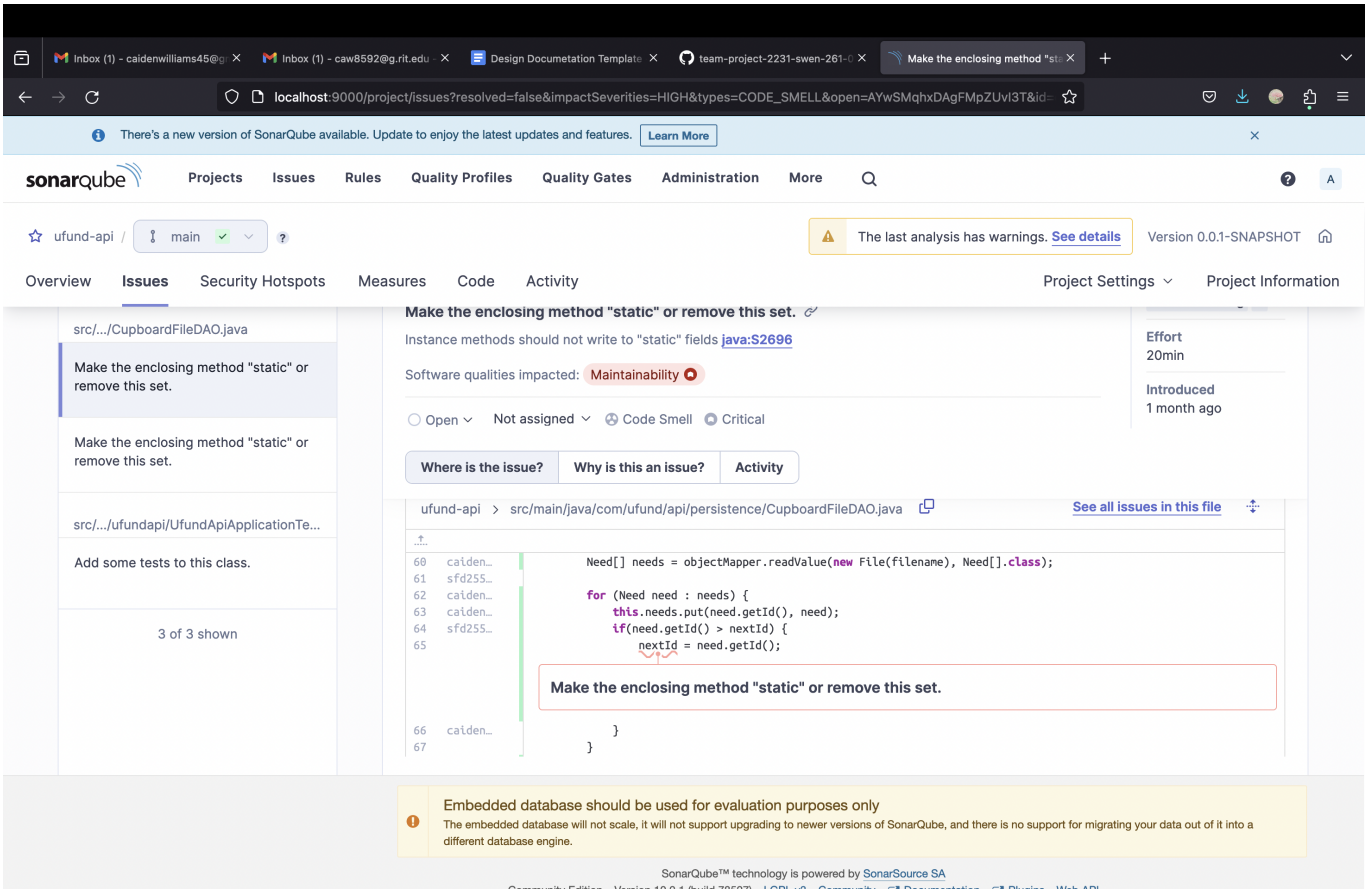
2. We used the **Information Expert Principle** as seen in our models and DAOs. Each model and DAO only implements functionality for information directly accessable to it. The model only sets and gets data set directly in each and the DAOs only inplement functionallity for each respective model. (See Model Tier for diagrams)

3. We used the **Controller Principle** by creating little connection between the frontend (ui) and backend (api) by creating a controller class that takes in all input, calls all functionallity from the backend, and then returning the output from the backend. (See ModelView Tier for diagrams) (to be done in sprint 4)

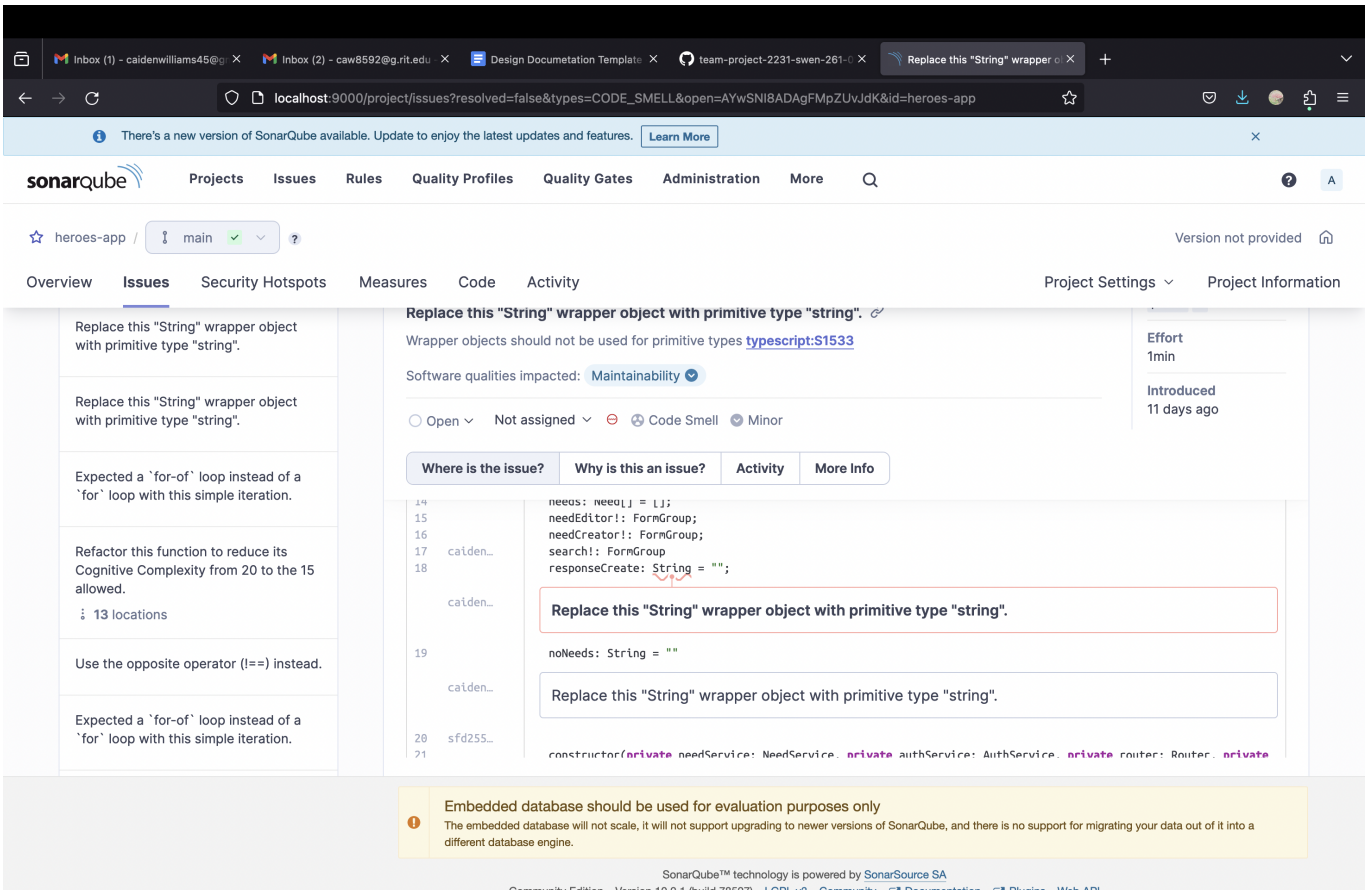
4. We used the **Open/Close Princible** by creating two seperate components for the manager needs and cupboard needs. If we didn't there would be a bunch of different extra, unnecessary lines of code that we avoided. This way, we could easily just create specific functionallity for each list instead of trying to create some abstract class for each. (See View Tier for diagrams) (to be done in sprint 4)

Static Code Analysis/Future Design Improvements

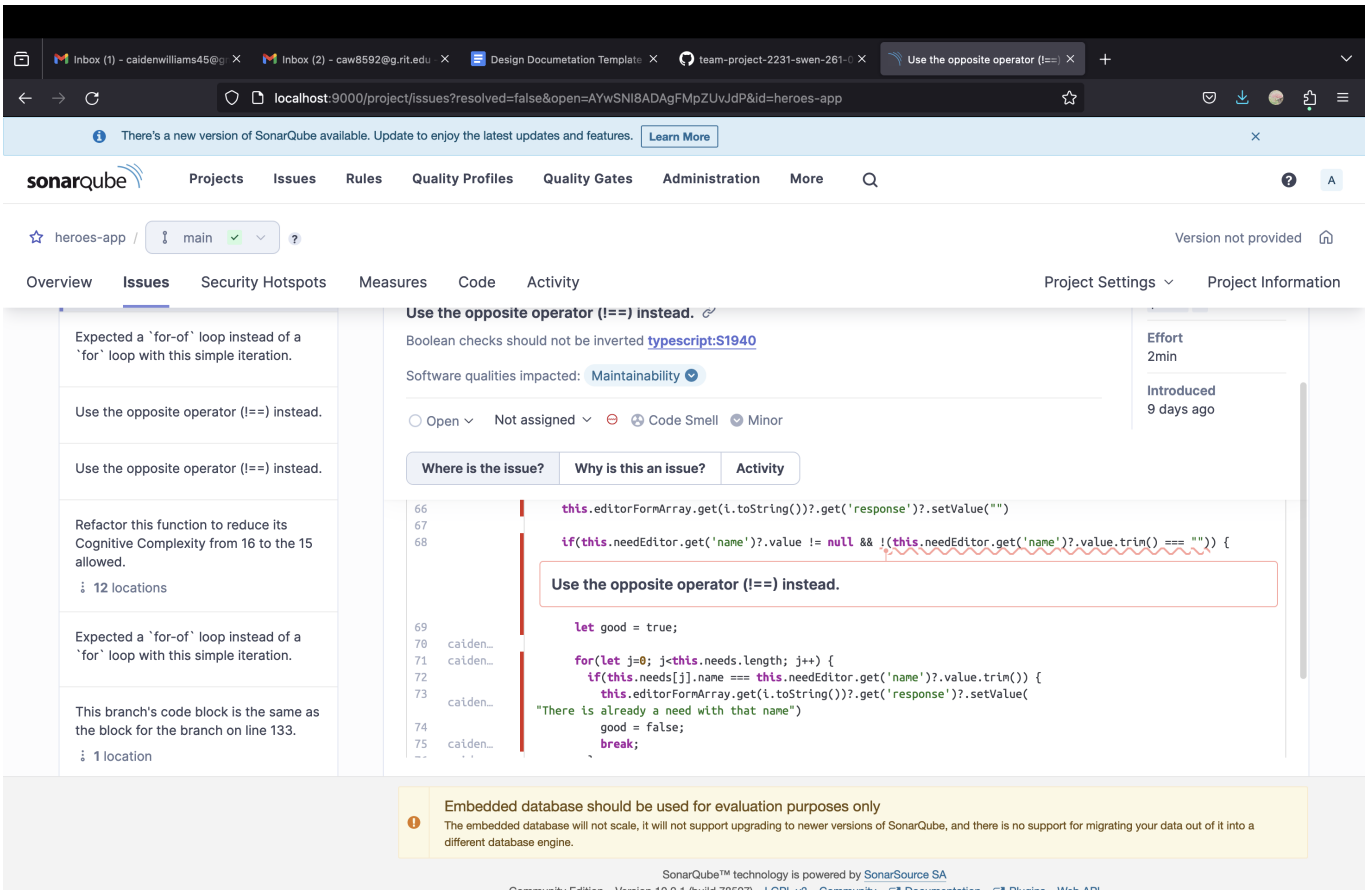




The issue shown here is that a static variable (nextId) is being set in a non-static method. This can be an issue because changing a static variable in a non-static method can cause bugs. To remedy this in the future or in future projects we believe that we could get around this happening by having a separate static set method for nextId. This way we are only changing the static variable in a static context without having to mess with our original method.



This is showing one of the many flags for our string variables. We used String which is a wrapper class but functionality wise we only really needed string. In the future we can easily change all of these to be string values instead



Here we just negate an entire statement like !(statement) instead of using the functionality for !==. We can

easily go through and change all of these occurrences to make the code easier to read and cause less bugs.

Testing

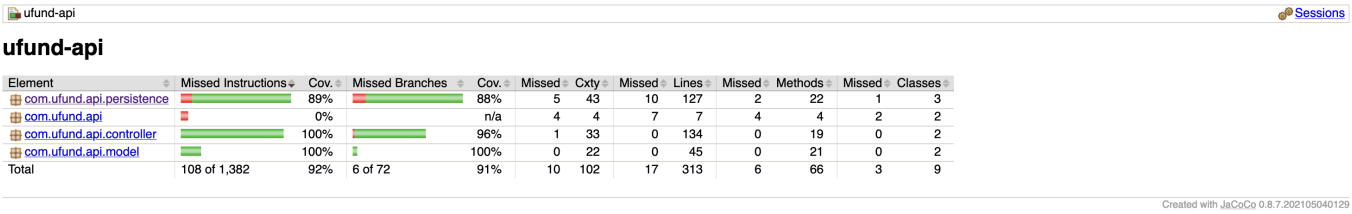
All testing preformed is in for the api. Every file has it's own tester file. Almost all functions and all functionallity for each function are tested. The model tests, test that things are set and got correctly. The DAO tests, test all functionality and if the function can fail and return null for false, the functionallity is tested. The controller tests, test all functionality, the failures (if applicible), and tests for any IOExceptions.

Acceptance Testing

All user stories passed their tests for Sprint 3 (forgot to do for Sprint 2). And all bugs found during acceptance criteria testing were fixed and now pass their tests too.

Unit Testing and Code Coverage

All testing preformed is in for the api. Every file has it's own tester file. Almost all functions and all functionallity for each function are tested (Read Testing Tab for more information on specifics). We achieved 92% coverage. We made our target 90% as that was the desired coverage for the project. We met the coverage and went 2% over. The only functions not tested were ones we couldn't figure out how to, but knew worked correctly through testing of the final product.


ufund-api

Sessions

ufund-api

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cxty	Missed	Lines	Missed	Methods	Missed	Classes
com.ufund.api.persistence		89%		88%	5	43	10	127	2	22	1	3
com.ufund.api		0%		n/a	4	4	7	7	4	4	2	2
com.ufund.api.controller		100%		96%	1	33	0	134	0	19	0	2
com.ufund.api.model		100%		100%	0	22	0	45	0	21	0	2
Total	108 of 1,382	92%	6 of 72	91%	10	102	17	313	6	66	3	9

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