**CS683 Project Assignment   
Little Drops of Techniques  
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# Overview

Over my career at Boston University, I have used the same project idea in several projects ranging from a relational database to AI modeling.

I have decided to name it “**Little Drops of Techniques**”.

For this project, I’d like to focus on the same idea. This idea would include an application that is a proposed baking application like no other. Instead of users coming on to search for baking recipes, they will come to this app to search and learn baking techniques. Take icing for example. What are the various consistencies of royal icing and how can I know if I am mixing them correctly? These are the types of questions that should be easy to answer with this application and allow users to not have to navigate the wide array of resources online. One great thing about this application is, while I have designed it in a web application sense, a database sense, and an AI modeling sense, I have not developed it as a mobile application. In this project, we will focus on how to develop such an involved application in the mobile world.

# Related Work

The beauty of this application is the uniqueness of the concept. If you were to search for “baking techniques” (in your browser), you will find a list of websites that provide various techniques, but no single application that provides all techniques.

A screenshot of a computer

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Figure 1 - Google search of "baking techniques"

The goal of this application has always been to be unique, however, there will be some similarities to other websites such as these listed in the above figure, where techniques will be showing in a way that could help a user visually understand how to perform the chosen technique.

The best type of visuals shall include like Menghini’s (2021) article where the user is given images and a video to help learn the techniques:

Text, letter

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Figure 2 - Visual Technique Example

However, this application shall also be flexible in developing ways to help users learn techniques that are not visual, such as with MasterClass (2022) and King Arthur Baking (2023).

In addition, I recognize that one goal would be to make this a mobile application. While this project idea has never really seemed fitting for a mobile application, there are ways to make this possible, like other baking and recipe application on the Google App Store today:

* <https://play.google.com/store/apps/details?id=com.andromo.dev494239.app739124&cjevent=cd2fcd421f7911ee83a0cdc20a82b821&pli=1>
* <https://play.google.com/store/apps/details?id=com.eduven.cc.desserts&cjevent=288677c01f7a11ee83a0cdc50a82b821>

# Requirement Analysis and Testing

|  |  |
| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Searching Techniques by Name**(Essential) |
| *Description* | As a user, I want to search for techniques by name, so that I can see techniques of interest to me. |
| *Mockups* | ***A screenshot of a phone  Description automatically generated*** |
| *Acceptance tests* | 1. When user searches for a text, the display is updated to relevant techniques whose names match to the text entered. 2. User can scroll up and down. |
| *Test Results* | 1. Typing in text that is part of the name of the technique pulls up the applicable techniques. |
| *Status* | Iteration 1: Not started  Iteration 2: Completed functionality for entering text filters by name  Iteration 3: Potentially bug fixes |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Technique Thumbnails**(Essential) |
| *Description* | As a user, I want to see thumbnails of techniques in my search results and detail view, so that clicking on one is more appealing to me and gives me an idea of the technique. |
| *Mockups* | ***A screenshot of a phone  Description automatically generated*** |
| *Acceptance tests* | 1. User sees an image on all techniques in the search results. 2. User sees an image for the technique on the details page. 3. User sees a stock image if no image is available. |
| *Test Results* | 1) Loading application with techniques that have a thumbnail URL and one technique that doesn’t have a thumbnail URL. |
| *Status* | Iteration 1: Not started  Iteration 2: Completed changes to code to use the URL provided as the thumbnail otherwise uses placeholder image.  Iteration 3: **Nice to have** - Would like to also use same image in details page. |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Technique Thumbnail Clicked**(Essential) |
| *Description* | As a user, I want to be able to click on a thumbnail to see the technique, so that I can read and learn about the technique. |
| *Mockups* | ***A screenshot of a phone  Description automatically generated*** |
| *Acceptance tests* | 1. User can click on a technique’s thumbnail. 2. User is navigated to the technique page when thumbnail is clicked. 3. The user has a back button that returns them to the home page. |
| *Test Results* |  |
| *Status* | Iteration 1: UI “card” and Recycler view created for thumbnails. Navigation in place. Needs actual thumbnails still though.  Iteration 2: In progress – Thumbnail updates. Detail view shows but design needs to be implemented.  Iteration 3: |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Saved Technique**(Essential) |
| *Description* | As a user, I want to be able to save a technique, so that I can easily get back to some of my favorite techniques. |
| *Mockups* | ***A screenshot of a phone  Description automatically generated***A screenshot of a cell phone  Description automatically generated |
| *Acceptance tests* | 1. User can click on the “favorite icon” to save a technique. 2. User can click the “favorite icon” any number of times to toggle it on or off. 3. User will see a visible change on the “favorite icon” to indicate a change has occurred. 4. The system has a way to save the data locally. |
| *Test Results* |  |
| *Status* | Iteration 1: Placeholder icon created in UI. Click listening and binding created for favorite value. Visual changes occur upon clicking “on” and “off”  Iteration 2: In progress – implemented favorite to save to database |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Searching Techniques by Tag**(Desirable) |
| *Description* | As a user, I want to search for techniques by tags and other attribute, so that I can see techniques of interest to me. |
| *Mockups* | ***A screenshot of a phone  Description automatically generated*** |
| *Acceptance tests* | 1. When user searches for a text and clicks return, the display is updated to relevant techniques whose tag match to the text entered. 2. User can scroll up and down. |
| *Test Results* | 1. Typing in text that is part of the tag of the technique pulls up the applicable techniques. |
| *Status* | *Iteration 1: Not started*  *Iteration 2: Completed – entering text filters by tag*  *Iteration 3: Potentially bug fixes* |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Viewing Favorite Techniques**(Desirable) |
| *Description* | As a user, I want to easily see my favorite techniques, so that I can go back to them whenever I want. |
| *Mockups* | A screenshot of a cell phone  Description automatically generated |
| *Acceptance tests* | 1. User has a way to navigate to see their favorite techniques. 2. User can see their favorite techniques like the home page when the user navigates to the favorites page. 3. The user has a back button that returns them to the home page. |
| *Test Results* |  |
| *Status* | *Not started* |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Add Technique**(Optional) |
| *Description* | As a user, I want to be able to add a technique, so that I can contribute to the application. |
| *Mockups* | A screenshot of a cell phone  Description automatically generated |
| *Acceptance tests* | * + 1. User can see a way to add a technique.     2. User is taken to a new page for entering the data for a new technique.     3. User can submit or cancel. Submit will add it to the database. Cancel will cancel the action, and not add to the database.     4. User will return to home page after they exit the add page. |
| *Test Results* |  |
| *Status* | Iteration 1: Placeholder UI created (right now there is no menu), navigation setup, binding setup. Data saved locally.  Iteration 2: In progress – In order to save some time, I decided against a menu for now. If I am able to get to account management (which at this time seems unlikely), the I’ll move to the menu, but for now, this is **completed** with a **+** button on the home page.  Iteration 3: |

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| --- | --- |
| *Title (Essential/Desirable/Optional)* | **Account Management**(Optional) |
| *Description* | Description: As a user, I want to be able to have an account, so that I can save my preferences and the application can learn about me better. |
| *Mockups* | A screenshot of a cell phone  Description automatically generated |
| *Acceptance tests* | 1. System has a way to manage account data. 2. User has a way they can navigate to see their account data. 3. User can view account page when navigating to their account. 4. Account page will show their name, favorites, and preference. |
| *Test Results* |  |
| *Status* | *Not started* |

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| *Title (Essential/Desirable/Optional)* | **Account Preferences** *(Optional)* |
| *Description* | As a user, I want to be able to change preferences for the types of techniques shown to me. |
| *Mockups* | A screenshot of a cell phone  Description automatically generated |
| *Acceptance tests* | 1. User can navigate to preferences from their account page. 2. User can change the types of tags and correlated data they do not want to see.    1. Ex: maybe the user doesn’t want to see things about cakes. Or maybe the user only wants to see things about cookies. |
| *Test Results* |  |
| *Status* | *Not started* |

Wireframe Flows:

***A screenshot of a phone

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Figure 3 - Home page / Technique Page

A screenshot of a cell phone

Description automatically generated

Figure 4 - Account Menu – Favorites

A screenshot of a cell phone

Description automatically generated

Figure 5 - Contributing a new Technique.

# Design and Implementation

For this project, I will focus on developing this project using the software development lifecycle to ensure project success. The assumption, with the use cases above, is that there will be using some architecture related to Android, like use of the content provider APIs, the use of the Wi-Fi, use of shared memory, among other typical system usage. I have some data that I may use from previous school projects (like SQL database data). However, I would need to understand how best to translate that into data on the mobile device data storage but can assume some backend functionality is needed (services). There will be some UI components, so I’ll have to work on some activities as well and ensuring the permissions of the apps are set in the manifest file. Finally, this code will need some level of algorithmic solving to determine how the data fits the needs of the user search, so there will be a bit of logic needed and perhaps determining best way to search the data.

This will all be done with use cases and testing in mind, so that it’s like a test-driven development type approach while also maintaining user satisfaction.

# Project Structure

### Iteration 1

Since Little Drops of Techniques is very similar to the labs for this course, my first action for Iteration 1 was to create the same basic structure as Lab3, which creates a couple activities/views, coordinates the navigation between pages and creates bindings for the appropriate pages. I have started with the Techniques List as the home page, an Add Technique and Technique Detail page.

In summary, the home page and the details technique are all included below:

A screenshot of a computer program

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A screenshot of a phone

Description automatically generated A screenshot of a phone

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### Iteration 2

In iteration 2, the project structure remained relatively the same and I focused on getting started on the main function of this application: The search.

Firstly, I applied the lab concepts once again, such that the code uses a local database for the data. At this point in time, to complete the functionality, I am using local database capabilities to store the techniques. In reality though, the techniques would be stored outside of the application database such that all users can see the same techniques. In addition, there are many other objects besides the “Technique” like “Ingredients”, “Steps”, “Tags”, etc. Right now, all this data is stored in the form of List<Strings> and translated using a Type converter (*Technique.kt*) for the database. The key goal though was to ensure persistence with the data which was accomplished.

Secondly, both name and tag searching capabilities have the same code changes and thus were both applied together withing the *RecyclerViewListFragment.kt*:

A screen shot of a computer program

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A screen shot of a computer program

Description automatically generated

The adapter is immediately notified of the change so that the view updates in real time:

A screenshot of a computer program

Description automatically generated

Thirdly, changes were made to ensure the thumbnails were applied to the list view. This required a bit more research. I found an article on TutorialsPoint (2020) in which it provides a solution for how to stream an image from a URL and use it in the ImageView component. I altered this approach to utilize the holder from the adapter so that I could also adjust the image to a smaller size (Stack Overflow, 2016). See below:

A screen shot of a computer code

Description automatically generated

A screen shot of a computer program

Description automatically generated

This resulted in the need for the application to access the internet, thus I needed to provide permissions via the manifest file (Java Hungry, 2020).

Lastly, additional changes were made to make the UI appear more user friendly, which included changes to a heart shape for the favorite icon (currently only in the details page) and other details page changes.

See Iteration 2 results below:

*A screen shot of a phone

Description automatically generated* *A cell phone with a keyboard

Description automatically generated* A screenshot of a phone

Description automatically generated

# Timeline

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| --- | --- | --- |
| **Iteration** | **Application Requirements**  **(Essential/Desirable/Optional)** | **Android Components and Features to be used** |
| 1 | Technique Thumbnail Clicked Saved Technique  Add Technique | Activities (UI components)  Intent (component communication between pages) |
| 2 | Technique Thumbnails  Searching Techniques by Name  Searching Techniques by Tag | Additional activities  Basic services (backend)  Manifest file changes (for permissions, if needed) |
| 3 | Viewing Favorite Techniques  Code/UI Cleanup  Bug fixes  Most likely will not happen:  Account Management  Account Preferences | Additional components and features, as needed. |

1. References

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