**Link to GitHub:**

**https://github.com/TeslaSkeels/CS499-Capstone**

**Professional Self-Assessment:**

A.

Over the course of earning my BS in Computer Science, I’ve learned a lot about many different aspects of coding.  Encompassing technical aspects in terms of algorithms, databases, languages, etc, but also processes around security, code check-ins, design, etc.

By completing this ePortifolio, I’ve been able to showcase an actual usable application on a mobile device. It’s a simple inventory application, but the core principles are all included.

In the class where the original artifact was created, I was given acceptance criteria of what I should build, and I built an app to reflect that. That’s similar to communicating to stakeholders, as the stakeholders were both myself and the professor. In addition, I’ve learned about proper commenting along with good commit messages which both tie back into how to collaborate with a team environment.

This capstone project asked me to expand my capabilities of working with data structures, algorithms, software engineering and databases. The original set of features was an app that a user would log in with, they could create an inventory item, and those items would display on a grid. In addition, a user could update the items in the grid or delete them. There was some additional logic of sending text messages if the number of items got low. Finally, to store all this information of both the inventory and the user information, they are stored in a database which the application would interact with.

For this milestone, I updated the code to include the ability to modify their passwords, choose a category for the inventory items, and finally have those inventory items be shown on another page grouped by category. The items would be counted if they had a quantity greater than 0. These new features would require some updates to the database as well. All these enhancements fit the requirements that the stakeholders communicated with and agreed upon.

B.

There is only one artifact that was used. It encompasses all three areas of Software Design and Engineering, Algorithms and Data Structures, and Databases.  It’s a mobile web app that is a lightweight inventory management system. It allows a user to login, view their current inventory, create new inventory items with different categories, modify and delete the inventory items on a grid view, and finally see the number of inventory items by category.  There are also some smaller functional pieces as well.

It uses a database to store all the information between sessions.  By using the front end to interact with the database, a user can accomplish various tasks.  There are some design components such as having each class handle a single page or encompassing a single feature.  Keeping the code concise as well as extensible.  There are various algorithms used to gather the information from the database and display the information. In addition to rules and logic to stop users from putting in bad information into the system.

**Category One: Software Design and Engineering**

A. Briefly describe the artifact. What is it? When was it created?

There were two primary pieces that were discussed for the Software Engineering/Design section of the code. The first was the ability to change the user’s password, and the second was adding the category to the inventory item.

I created a page on the mobile application that allows a user to change their password. It has a password field, followed by a duplicate password field to make sure they match. Along with a save and cancel button.

The current functionality is that it checks to make sure both fields are filled out. It gives a toast message if they are not. Then it checks to make sure that they both match and provides a toast message if they don’t. Finally, I designed the code to “save” the passwords to the database, clear the fields, provide a toast message stating the passwords have been saved, and finally redirecting the user back to the GridView page.  In addition, it does check to make sure the app has access to the Database, and if it doesn’t, it requests it.

B. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and

abilities in software development? How was the artifact improved?

I selected the mobile app, because it’s a cohesive project that provides a more tangible feel to a user interaction. In addition, it easily incorporated all three major aspects of the capstone. It also helps that with more functionality and features, it could be something I could provide a potential employer to show off my skills in all 3 required categories.

The navigation and logic to move around the application really helped show off these skills. As did the mindfulness around permissions and security.

The artifact was improved by adding in a change password page, which is a common feature for applications.

Skills Demonstrated:

Object Oriented Programming

Clean Code

UI Friendliness in terms of Responsiveness

C. Reflect on the process of enhancing and/or modifying the artifact. What did you learn as you were creating it and improving it? What challenges did

you face?

I learned that the UI can be a little fiddly and making sure all the objects align on the page correctly can be a little hard.  In addition, making the code work is more of it works or it doesn’t. Looking at the UI, it can feel wrong, but it’s a less binary choice on what the correct outcome should be.

Another challenge was simply forgetting to include the new page into the AndroidManifest. This just called the app to continue to crash when I attempted to navigate to the page.

Files Update:

ProfilePage added

Profile\_page.xml added

AndroidManfiest.xml updated (to include the file)

Gridview updated  (updated to include clicking on button to take user to ProfilePage)

Activity\_grid\_view.xml (updated to include new button)

**Category Two: Algorithms and Data Structure:**

A. Briefly describe the artifact. What is it? When was it created?

There were two primary pieces that were discussed for the Algorithms and Data Structures section of the code. The first was the updating of the create item page to include a category, with the second enhancement being to add in a new page that will group all the inventory items by category.

I worked on adding the category field on the create inventory item page.  The options there are pulled from the database. When a user clicks on save, it saves that category, in addition to the other fields to the database.

The current functionality requires that a name and quantity are provided when the save button is hit. Then once that is done, the inventory item is saved to the database, and the user is returned to the Grid View.

The second enhancement that I worked on was adding in the new page that showed Inventory items by category. It pulls all the inventory items out of the database. It checks to see if they have a quantity greater than 0. If it does, then it either adds it to the total list or it increments the current counter by 1.

B. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and

abilities in software development? How was the artifact improved?

I selected the mobile app, because it’s a cohesive project that provides a more tangible feel to a user interaction. In addition it easily incorporated all three major aspects of the capstone. It also helps that with more functionality and features, it could be something I could provide a potential employer to show off my skills.

The navigation and logic to move around the application really helped show off these skills. As did the mindfulness around permissions and security.

The artifact was improved by adding a category field to the inventory page, as it gives the user more information on those items.

In addition, a new page was added that to show the inventory items by grouping by category, since it could be useful to a user to know the unique number of items that they have in stock.

Skills Demonstrated:

Interfacing between the Database and Front End as a user interacts with it.

Ability to correlate data and display it in a different and useful way to the User.

Allowing users flexibility in how they use the app, by including a change password feature.

C. Reflect on the process of enhancing and/or modifying the artifact. What did you learn as you were creating it and improving it? What challenges did

you face?

I learned about what a spinner is in Android in terms of dropdowns. In addition, how to populate those fields.  I hadn’t done it before so, it was a learning experience.

Files Update:

GroupByCategory added

group\_by\_category.xml added

AndroidManfiest.xml updated (to include the file)

Gridview updated  (updated to include clicking on button to take the user to the new page)

Activity\_grid\_view.xml (updated to include new button)

Add\_inventory\_item.xml (updated to include the spinner)

AddNewInventoryItem (updated to include the spinner button logic)

**Category Three: Databases**

A. Briefly describe the artifact. What is it? When was it created?

There were three primary pieces that were discussed for the Databases section.  The first was the updating inventory items to include a category. The second was to be able to pull those values back out to display on a new view, of number of unique items by category. The third was having the user update their password.

I created a new table in the DB, called CategoryTable, which holds some saved values. Once that was done, I had those values be shown on the creation of a new inventory items.  When an item is saved, I had to update the call to save that value back into the DB.

Finally with the Password Update, I had to make a call to update the user’s password saved in the database with the new password.

B. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and

abilities in software development? How was the artifact improved?

I selected the mobile app, because it’s a cohesive project that provides a more tangible feel to a user interaction. In addition, it easily incorporated all three major aspects of the keystone. It also helps that with more functionality and features, it could be something I could provide a potential employer to show off my skills.

The navigation and logic to move around the application really helped show off these skills. As did the mindfulness around permissions and security.

The artifact was improved by adding a category field to the inventory page, as it gives the user more information on those items.

In addition, a new page was added that to show the inventory items by grouping by category, since it could be useful to a user to know the unique number of items that they have in stock.

Skills Demonstrated:

Skills in Sql in terms of Table Creation, Select, Update and Delete statements

Ability to Query the Database and correlate the information to show to the user.

C. Reflect on the process of enhancing and/or modifying the artifact. What did you learn as you were creating it and improving it? What challenges did

you face?

I learned that the debugger can be a little weird to work with. It wasn’t stopping when I expected it to, but Google helped me troubleshoot some issues. In addition, I ran into a little trouble with the creation of a new table, since I couldn’t entirely remember how to reconstruct the db. I did find a way around it, and it worked.

Files Update:

ProfilePage, updated the code to call the DB to update the user’s name

LoginPage, had it save the logged in user, so I knew who to update.

GroupByCategory, (updated as it had to call the DB. In addition, finished the algorithm to display the correct values)

AddNewInventoryItem (updated the call to pull all the categories and display them correctly)

InventoryItem (added in the category field)

DBHandler (added in some new methods to get the categories, save the inventory items with the category, along with saving of the user’s password.)

**Category Four: Security**

Security was shown in this project in how the application verified and asked for permissions, verifying user logins, and restricting some of the user input for safe use for the database.

The primary security feature in this project was having the application verify that it had access to various features on the phone before taking those actions. In addition, if it didn’t have access, it would request access. If access was denied for some features, such as the SMS messaging, then the app would continue to work, just with that feature off. In addition, when the application is updated, or the permissions modified while the app is running, then it would revalidate if the application could use those permissions.  This is all important for not only stopping the application from unwanted actions, but also in building trust with the user that the application is safe to use.

Since this is a light-weight inventory application, I didn’t need to build a fully robust login system, but there is a check for the username and login to make sure that people can’t log in with valid users with invalid passwords. With the addition of the change password page, it allows users to update their passwords when they deem it required. In addition, the login page respects those changes.

Finally, for some of the front-end fields that only require a numerical input, I used the front-end UI elements to restrict what input it would expect. This helps prevent various sql attacks in addition to helping the user understand what is required to fill out those fields.