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Southern New Hampshire University

CS-499-19649-M01 Computer Science Capstone 2025

3-2 Milestone Two: Enhancement One: Software Design and Engineering

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

Hello, my name is Pushpa Laxman, and I will review the code for Milestone Two of CS 499. As part of this document, I will review and enhance an artifact demonstrating my knowledge and skills in Software Engineering and Design. In this paper, I will describe how the code functions, identify areas for improvement, and explain how it has been enhanced to align with the course outcomes and be ready for my ePortfolio.

Selected Artifact: Weight tracking App (CS 360 Project)

This project demonstrates my ability to design and implement software solutions utilizing object-oriented principles.

A screen shot of a phone

AI-generated content may be incorrect.

For my final project capstone, I am presenting a mobile application named Weight Tracking App in the software design and engineering category. This app enables users to reach their weight goals easily. I planned, designed, and developed this artifact as part of the CS 360 Mobile Architecture and Programming course. This project's development and programming tool is called Android Studio IDE. The app was created using Android Studio, which serves as the official development environment for Android devices. The application is developed using the JAVA programming language and integrates with an SQLite database. Android Studio employs Gradle as a build system to run the apps on an Android emulator.

Q. 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?

This artifact was a good choice for my portfolio since it involved the entire software design and engineering process. In addition to the design of the user experience, it involves the user's interaction with the different screens and actions that the application includes. It gives use the exposure to understand how Activities (screens) and Fragments (reusable UI components) are structured and how they interact within your app. Also, you learn how to use Intents to navigate between Activities. It will broaden our concepts on how to design user interfaces using XML, defining the visual structure and layout of your app, apply Material Design principles for a modern, consistent, and user-friendly UI, create custom UI elements to meet specific design requirements and also teach how to create adaptable layouts for various screen sizes and resolutions. Through its industry-standard icons and symbols, it ensures intuitive usage of the application. In addition to their algorithms and data structure between the different classes and methods, and their layout and source code, it includes design and engineering considerations. A relational database is used to store the data generated, read, updated, and deleted by users of the application. The debugging tools in Android Studio will also enable you to identify and fix errors in your code. Different types of testing (unit, UI, integration) can be used to ensure your app is functional and stable, as well as Git and platforms like GitHub to manage your code, collaborate with others, and track changes.

However, some areas needed improvement:

A screen shot of a phone

AI-generated content may be incorrect.

A screenshot of a phone

AI-generated content may be incorrect.

A screen shot of a cell phone

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**Limitations**: I found that on the Login page, the first user who clicks the create account button does not get transitioned to a new screen for entering their personal details, which would provide a personalized, secure, and convenient method for users to engage with a website or platform.

**Plan**: To address this, I will develop an account creation page for users to enter their personal information, thereby demonstrating optimization of the mobile app by improving software design and development functionality. This allows users to manage their information, set preferences, track their activity, and access services easily

**Limitation**: Furthermore, suppose a user fails to input the correct login information in the username and password fields on the initial Login screen. In that case, there is a lack of comprehensive input validation, as it does not verify that the credentials are entered in an acceptable format leading to serious security vulnerabilities, data integrity problems, and potential system crashes..

**Plan**: By implementing input validation and exception handling , I will enhance data security, ensuring the protection of account information, along with accessibility, making the interface more user-friendly for everyone, both of which are important.

**Limitation**: On the weight info dashboard screen, I observed a lack of graphs or charts to help monitor weight changes, progress, and other data.

**Plan**: With the application, I intend to improve account management and login functions, as well as enhance the software engineering by adding features for visualizing charts that will enable users to track habits and identify areas for adjustment in their dietary or exercise routines.

Q. Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

This artifact has been improved in a way that aligns with the course outcomes I aimed to achieve.

[Course Outcomes: 3]:Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.

As a result of my understanding of website goals and requirements, design principles, and industry trends, I can implement software engineering principles in this weight tracking application to develop engaging and visually appealing interfaces.

Using modular components, I will enhance the design of the artifact and increase its efficiency, showcasing my capability to boost software performance.

[Course Outcomes: 4]: Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.

My outcome-coverage plans have not been updated in a significant way. My enhancements align with the intended learning outcomes, including improving my proficiency with designing the layout, user interface, and overall aesthetic appeal of web pages.

[Course Outcome 5]: "Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities."

While I am still working on implementing the enhancements, The transition includes user account setup and input validation for seamless system navigation, security protocols that safeguard account data, and accessibility features that allow all users to interact with the interface. Both aspects are crucial.

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

Modifying and improving the artifact was a valuable learning opportunity, allowing me to grow creatively and technically. The experience has significantly impacted my personal and professional goals. A good user interface and good design play a significant role in retaining users. Aside from learning different design principles, I also gained a better grasp of how to create consistent user experiences across different screens and activities. This capstone project gave me the opportunity to apply the theoretical knowledge I have gained throughout my course. In this transition, I gained experience optimizing app performance, addressing security vulnerabilities, and resolving performance issues.

My biggest challenge I faced during the enhancement process was that when deploying code changes to an API 35 device using 'Apply Changes & Restart Activity', the app fails to restart, which prevents the changes from taking effect, and trying to run the app leads to the error "loading build artifacts." Restarting the application will show the results of the code modifications. Another substantial challenge was optimizing the app's performance to guarantee fast and smooth loading while developing the account page and charts. Since the app was intended to be as user-friendly as possible, ensuring a consistent user experience across various screen sizes required meticulous planning and testing. The original project's lack of well-organized code posed a limitation. These improvements made the project more modular and easier to maintain through the creation of reusable components.

I have gained personal benefits from the artifact in areas such as research skills, critical thinking, and creativity. My technical skills, project management abilities, and teamwork proficiency have all improved as a result of this experience. Additionally, the project has given me a concrete product to showcase on my resume and portfolio, which will aid me in job interviews and applications. In the end, the artifact has played a significant role in achieving my personal and professional objectives by enhancing my skills, knowledge, and experiences. Moreover, it has provided me a platform to demonstrate these competencies in the real world.

**References**

*Known issues with Android Studio and Android Gradle plugin  :  android developers. Android Developers. (n.d.-b). https://developer.android.com/studio/known-issues*