

## CS 499 Module One Assignment Template

Complete this template by replacing the bracketed text with the relevant information.

### I. Self-Introduction: Address all of the following questions to introduce yourself.

- A. How long have you been in the Computer Science program?

**I have been in the Computer Science since March 2023.**

- B. What have you learned while in the program? List three of the most important concepts or skills you have learned.

**I learned so much since I joined the program, though I have professional experience in the software industry.**

**- Secure coding and software security were extremely helpful and eye-opening for the importance of applying a set of practices to ensure the quality of the code and free from vulnerability to use different tools.**

**- The linear algebra course allowed me to learn MATLAB and laid the foundations for understanding computer graphics. I discovered an enormous number of applications in software security and many other algorithms.**

**- MongoDB and Python were great skills under my belt. Since my experience are around Microsoft stack.**

- C. Discuss the specific skills you aim to demonstrate through your enhancements to reach each of the course outcomes.

**I aim to demonstrate full stack development skills through updating the artifacts.**

- D. How do the specific skills you will demonstrate align with your career plans related to your degree?

**As a software engineer who works mainly on web/desktop applications, leveraging new technologies is desirable as the market changes frequently.**

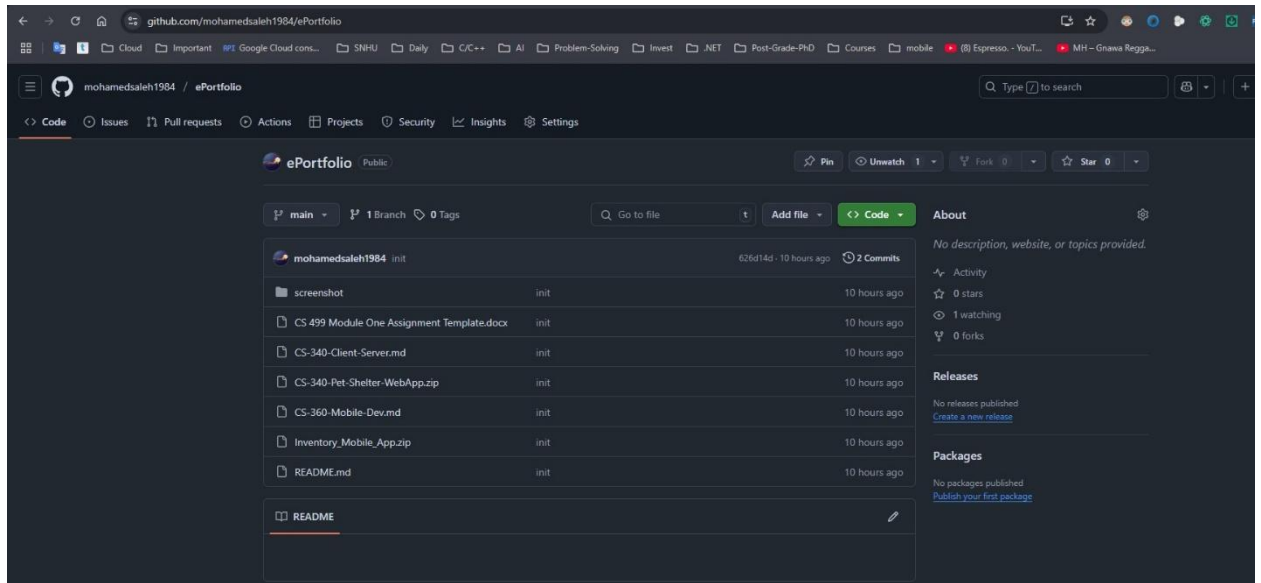
- E. How does this contribute to the specialization you are targeting for your career?

**As a software engineer, I always learn new skills and languages. Focusing on enhancing the code quality and improve the performance and deliver a reliable product.**

### II. ePortfolio Set Up:

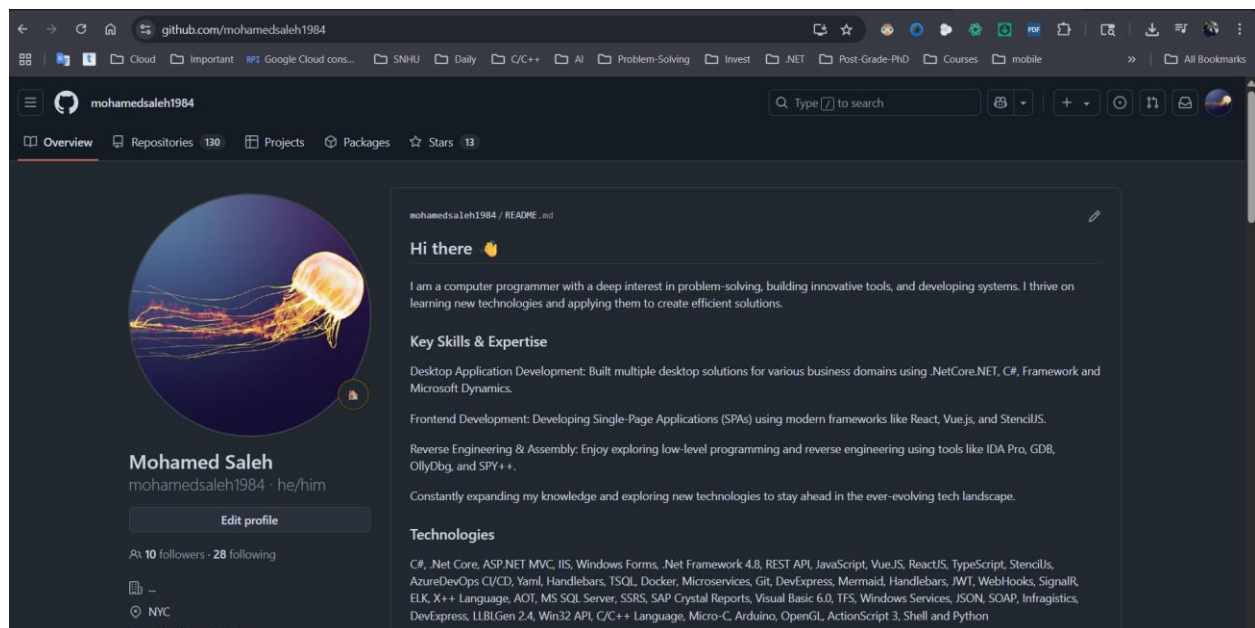
- A. Submit a **screen capture** of your ePortfolio GitHub Pages home page that clearly shows your URL.

**<https://github.com/mohamedsaleh1984/ePortfolio>**



III.

- i. You already have a repository in GitHub where you uploaded projects in previous courses. Your ePortfolio will reside in GitHub but can link to work at other sites, such as Bitbucket.
- B. Use the GitHub Pages link in the Resource section for directions on:
  - i. How to create your GitHub website and publish code to GitHub Pages
  - ii. Issues, such as adding links to other sites
- C. Paste a screenshot of your GitHub Pages home page with your URL clearly showing in the space below.



#### IV. Enhancement Plan:

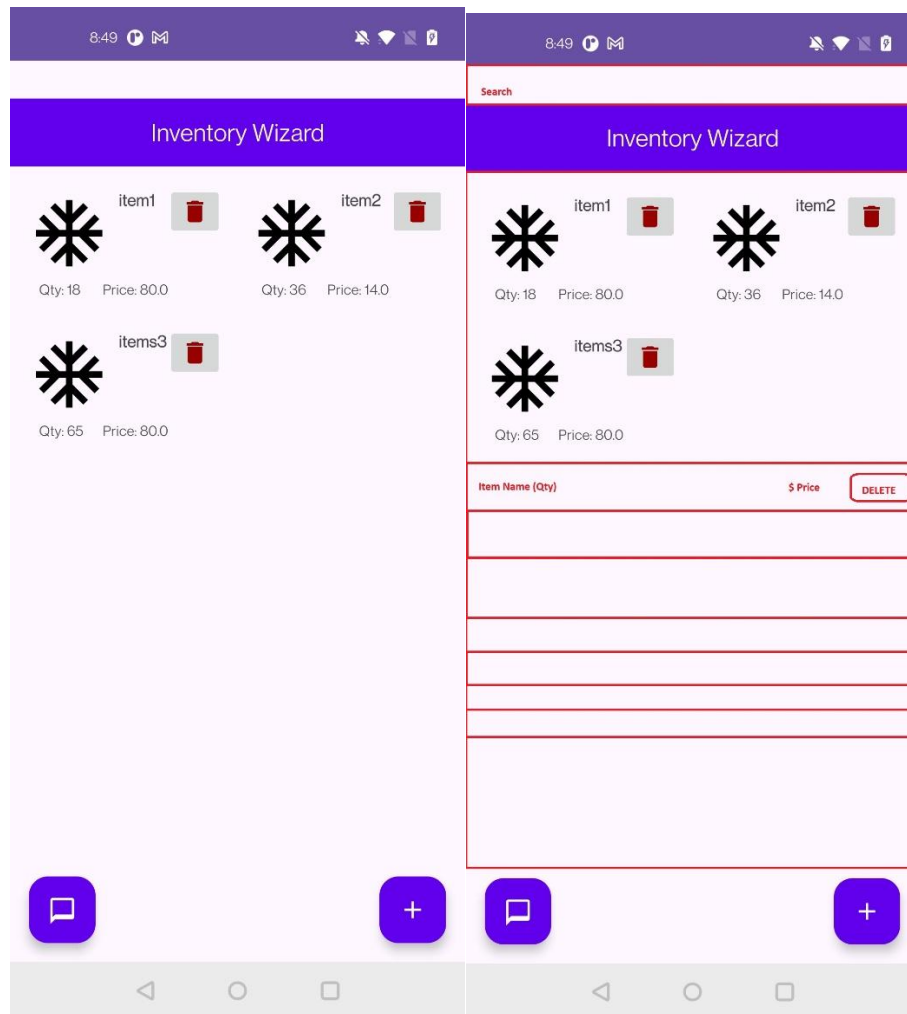
##### A. **Category One:** Software Engineering and Design

- i. **Select an artifact** that is **aligned with the** software engineering and design **category** and explain its origin. Submit a file containing the code for the artifact you choose with your enhancement plan.

**The artifact I chose is the Inventory App I built during the CS 360 Mobile Architectures and Programming.**

Note: Your artifact may be work from the following courses:

- IT 145: Foundation in Application Development
  - CS 250: Software Development Lifecycle
  - CS 260: Data Structures and Algorithms
  - IT 315: Object Oriented Analysis and Design
  - CS 320: Software Testing, Automation, and Quality Assurance
  - CS 330: Computational Graphics and Visualization
  - CS 340: Advanced Programming Concepts
  - CS 350: Emerging Systems Architectures and Technologies
  - CS 360: Mobile Architecture and Programming
  - IT 365: Operating Environments
  - IT 380: Cybersecurity and Information Assurance
  - CS 405: Secure Coding
  - CS 410: Reverse Software engineering
  - IT 340: Network and Telecommunication Management
  - IT 380: Cybersecurity and Information Assurance
- ii. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.  
**I want to migrate the app from MySQL to Firebase database to make the app accessible for multiple users. I want to add search functionality with auto complete for items page. I want to change the Items Activity layout from Grid to List for better UI/UX experience.**



For this category of enhancement, consider improving a piece of software, transferring a project into a different language, reverse engineering a piece of software for a different operating system, or expanding a project's complexity. These are just recommendations. Consider being creative and proposing an alternative enhancement to your instructor.

Think about what additions to include to complete the enhancement criteria in this category. Since one example option is to port to a new language, that is the kind of scale that is expected. This does not mean you need to port to a new language but instead have an equivalent scale of enhancement. Underlying expectations of any enhancement include fixing errors, debugging, and cleaning up comments, but these are not enhancements themselves.

- iii. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
  - a. Identify and describe the specific skills you will demonstrate that align with the course outcome.

**The proposed improvement covers multiple skills as follows:**

- 1. Database Design through migrating the app to Firebase.**
- 2. UI/UX changes for better user experience.**
- 3. Adding search for items is important desirable for the users.**

- b. Select one or more of the course outcomes below that your enhancement will align with.

**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.**

**Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.**

Course Outcomes:

1. Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.
2. Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.
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.
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.
5. Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources.

**B. Category Two: Algorithms and Data Structures**

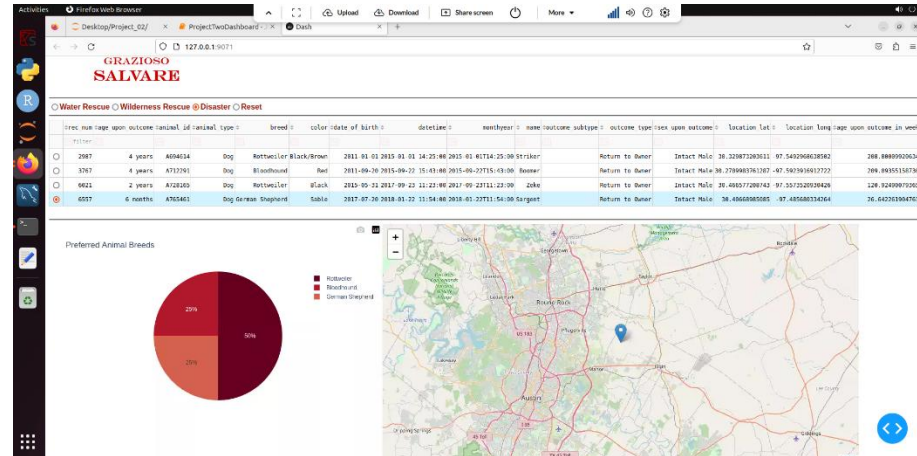
- i. **Select an artifact** that is **aligned with the** algorithms and data structures **category** and explain its origin. Submit a file containing the code for the artifact you choose with your enhancement plan. You may choose work from the courses listed under Category One.

**The artifact I chose is the Pet Shelter Website during the CS 340 Advanced Programming Concepts**

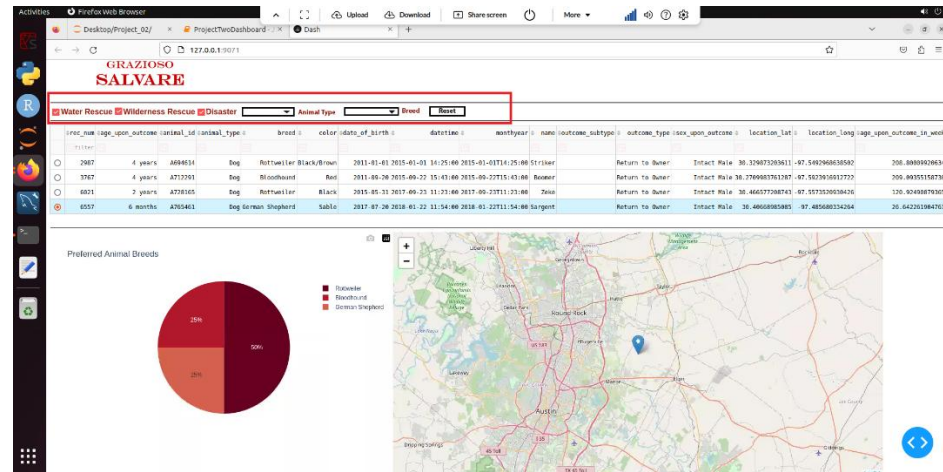
- ii. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

I want to change the current filter functionally, where users can combine multiple search criteria. I want to add animal type and Breed as well so it will improve the result set.

### Current Status



### Enhancement



For this category of enhancement, consider improving the efficiency of a project or expanding the complexity of the use of data structures and algorithms for your artifact. These are just recommendations. Consider being creative and proposing an alternative enhancement to your instructor. Note: You only need to choose one type of enhancement per category.

Think about what additions to include to complete the enhancement criteria in this category. Since one example option is to port to a new language, that is the kind of scale that is expected. Perhaps you might increase the efficiency and time complexity of an algorithm in an application and detail the logic of the increased time complexity. Remember, you do not need to port to a new language but instead have an equivalent scale of enhancement. Underlying expectations of any enhancement include fixing errors, debugging, and cleaning up comments, but these are not enhancements themselves.

- iii. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
  - a. Identify and describe the specific skills you will demonstrate to align with the course outcome.  
**The combined search functionally demonstrates backend, frontend and algorithms development. Where UI changes are needed to replace Radio buttons with Checkboxes, Dropdown list and changing the backend code to handle the combined selection.**
  - b. Select one or more of the course outcomes listed under Category One that your enhancement will align with.  
**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.**

#### C. Category Three: Databases

- i. **Select an artifact** that is **aligned with the databases category** and explain its origin. Submit a file containing the code for the artifact you choose with your enhancement plan. You may choose work from the courses listed under Category One.

**The artifact I chose is the Pet Shelter Website during the CS 340 Advanced Programming Concepts**

- ii. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

**Replace the current MongoDB with MySQL database. This change will involve a new database design and change the current MongoDB driver to MySQL and change the backend code to support the new database from NoSQL database to SQL.**

For this category of enhancement, consider adding more advanced concepts of MySQL, incorporating data mining, creating a MongoDB interface with HTML/JavaScript, or building a full stack with a different programming language for your artifact. These are just recommendations; consider being creative and proposing an alternative enhancement to your instructor. Note: You only need to choose one type of enhancement per category.

Think about what additions to include to complete the enhancement criteria in this category. Since one example option is to port to a new language, that is the kind of scale that is expected. Perhaps you might increase the efficiency and time complexity of an algorithm in an application and detail the logic of the increased time complexity. Remember, you do not need to port to a new language but instead have an equivalent scale of enhancement. Underlying expectations of any enhancement include fixing errors, debugging, and cleaning up comments, but these are not enhancements



themselves.

- iii. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
  - a. Identify and describe the specific skills you will demonstrate that align with the course outcome.

**Database design and backend development skills will be demonstrated.**

- b. Select one or more of the course outcomes listed under Category One that your enhancement will align with.

**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.**

## V. ePortfolio Overall Skill Set

- A. Accurately describe the **skill set** to be illustrated by the **ePortfolio overall**.
  - i. Skills and outcomes planned to be illustrated in the code review  
**Proposed enhancements involving code review and refactoring, both are playing a major part to ensure the correctness of the desired changes. Ensure the best practices and principles are applied like SOLID, YAGNI, DRY, useability, testability and delivering good quality code.**
  - ii. Skills and outcomes planned to be illustrated in the narratives  
**I will illustrate the proposed enhancements for both projects. As new enhancements require skills in database design for NoSQL (Firebase), SQL (MySQL), modify and refactor the current code bases through replacing the MongoDB dependencies and replace it with MySQL. Provide enhanced version of the search functionality for Pet Shelter.**
  - iii. Skills and outcomes planned to be illustrated in the professional self-assessment  
**The demonstrated skills through working on both projects improves the overall development skills. As the industry and products changes through clients' requirements. The proposed changes are aligned with actual changes on the ground. Applying new changes and replacing existing databases are highly important as the products scale to serve more users. The new changes might be challenging due to structural changes which requires attention to details and code management.**