# CS 499 Module One Assignment Template

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

1. **Self-Introduction:** Address all of the following questions to introduce yourself.
   1. How long have you been in the Computer Science program?

**I have been in the Computer Science program for 2 ½ years.**

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

**Troubleshooting, Researching, and Programming**

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

**I aim to reach advanced problem-solving skills, proficiency in modern programming languages, and the ability to apply software engineering principles effectively.**

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

**They align with my career plans since I want to become a software engineer. I will need to be profiecnet in debugging issues or expanding programs, Enhancing my algorithm and problem solving skills would prove useful in my career plan.**

* 1. How does this contribute to the specialization you are targeting for your career?

**My goal as a software engiiner, where to the ability to troubleshoot complex issues, research and apply new technologies, and write clean and efficient code are essential. Enhancing all these skills will help me contribute effectively to development teams.**

1. **ePortfolio Set Up:**
   1. Submit a **screen capture** of your ePortfolio GitHub Pages home page that clearly shows your URL.
      1. 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.
   2. Use the GitHub Pages link in the Resource section for directions on:
      1. How to create your GitHub website and publish code to GitHub Pages
      2. Issues, such as adding links to other sites
   3. Paste a screenshot of your GitHub Pages home page with your URL clearly showing in the space below.

**A screenshot of a computer

Description automatically generated**

1. **Enhancement Plan:** 
   1. **Category One:** Software Engineering and Design
      1. **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.

**For this category, I have selected a project from CS 320: Software Testing, Automation, and Quality Assurance. The artifact is a unit testing suite for a software application. I chose this because it demonstrates the principles of software testing and the application of design patterns for improving code reliability.**

****

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
  + 1. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

**PSUEDOCODE:**

**1. Review `Contact` class methods for adherence to single responsibility principle**

**2. Refactor methods if they are too complex or do not handle edge cases properly**

**3. Ensure that all validation logic is clear and contributes to the robustness of the class**

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.

* + 1. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
       1. Identify and describe the specific skills you will demonstrate that align with the course outcome.

**Adherence to SRP: Refactoring methods to ensure each performs a single responsibility.**

**Complexity Management: Simplifying complex methods and handling edge cases.**

**Validation Logic: Improving and centralizing validation logic for robustness**.

* + - 1. Select one or more of the course outcomes below that your enhancement will align with.

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.

**I selected number 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**.**)**

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

1. **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.

**This artifact involves a basic implementation of a binary tree, which is a fundamental data structure used in various applications such as maintaining sorted data, enabling efficient searching, and supporting hierarchical structures.**

****

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

**Enhance the user interaction and file handling capabilities of the binary tree-based course planner. The enhancements will include adding a search feature to find courses by their ID, improving the error handling for file operations, and refining the menu for better user experience.**

**PSEUDOCODE:**

**FUNCTION searchCourse(Node\* root, STRING courseId) RETURNS Node\*:**

**IF root is NULL OR root.courseId == courseId:**

**RETURN root**

**IF courseId < root.courseId:**

**RETURN searchCourse(root.left, courseId)**

**ELSE:**

**RETURN searchCourse(root.right, courseId)**

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.

1. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
   1. Identify and describe the specific skills you will demonstrate to align with the course outcome.
      * 1. **Enhanced search functionality**
        2. **Improve Error Handling**
   2. Select one or more of the course outcomes listed under Category One that your enhancement will align with.

**CS 250 Software Development Lifecycle**

**IT 315 Object-Oriented Analysis and Design**

* 1. **Category Three: Databases**
     1. **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.

**This artifact is a DBHelper class used in an Android mobile application. It manages two SQLite database tables: one for user credentials and another for daily weight data. The DBHelper class handles creating, updating, and managing the database schema, as well as performing CRUD (Create, Read, Update, Delete) operations for both tables.**

****

* + 1. **Describe** a practical, well-illustrated **plan** for enhancement in alignment with the category, including a pseudocode or flowchart that illustrates the planned enhancement.

**Integrate the Room Persistence Library for easier database management, add data validation to ensure the correctness of user and weight data, and establish a migration strategy to handle schema updates effectively.**

**PSUEODCODE:**

**FUNCTION validateUser(username, password):**

**IF username.isEmpty() OR password.length() < 6:**

**RETURN false**

**RETURN true**

**FUNCTION validateWeightEntry(weight, date):**

**IF weight <= 0 OR date.isEmpty():**

**RETURN false**

**RETURN true**

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.

* + 1. Explain how the planned enhancement will **demonstrate** specific **skills** and align with course outcomes.
       1. Identify and describe the specific skills you will demonstrate that align with the course outcome.

1. **Database Management**
2. **Data validation**
3. **Application Architecture**
   * + 1. Select one or more of the course outcomes listed under Category One that your enhancement will align with.

**CS 320 Software Testing, Automation, and Quality Assurance**

**CS 350 Emerging System Architectures and Technologies**

1. **ePortfolio Overall Skill Set**
   1. Accurately describe the **skill set** to be illustrated by the **ePortfolio** **overall**.
      1. Skills and outcomes planned to be illustrated in the code review

**Data Integrity**

**Proficiency in database management**

* + 1. Skills and outcomes planned to be illustrated in the narratives

**Advanced programming techniques**

**Error handling**

**Application Design**

* + 1. Skills and outcomes planned to be illustrated in the professional self-assessment

**Problem Solving**

**Application Development Best Practices**