# CS 499 Module One Assignment Template

1. **Self-Introduction:** Address all 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 since March of 2022.**

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

**There has been a plethora of different things that I have learned throughout the course of my program but the top three most important concepts or skills that I’ve learned and that have helped me succeed through it would be:**

**1) Self-reliance: With the program being 100% online, I had found early in the degree that I needed to teach myself the learning materials and had to figure out things myself. Albeit there were instructors that did respond to e-mails, I had many of them not respond for days at a time when I had assignments due.**

**2) Programming Language and standards: Without the knowledge of different languages (such as Python, SQL, and Java), I wouldn’t have been able to land my job as a Business Intelligence Analyst a year ago. Knowing the programming standards, or best practices, when coding, scripting, programming, or whatever you want to call it, has made my job easier because I know where I should start at when building a project, and how to test throughout the project so that the end solution is ready to deliver.**

**3) Data Structures: As an analyst and having taken Data Analysis as my concentration at school, knowledge of a vast variety of data structures is invaluable to me. Knowing not only how to use each type, be it an array, dictionary, linked list, tree, etc., but also when to use each one for the type of project you’re working on, is something that has helped me succeed on many work and school assignments.**

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

**The specific skills that I aim to demonstrate through my enhancements would be to demonstrate a proficiency in implementing and analyzing algorithms for sorting and searching, showcasing the ability to optimize existing algorithms for improved efficiency, and to apply data structures effectively to handle and manipulate data.**

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

**These specific skills I plan to demonstrate through this enhancement align closely with my career plans here in the computer science field. Refactoring and improving the software design of my selected project’s management system will showcase my commitment to producing clean and maintainable code. The focus on user interface improvement and exception handling will demonstrate my understanding of user experience and the importance of error-resistant application code. The integration of an improved database**

**component and the emphasis on data structures and algorithms align directly with my career as an analyst.**

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

**I use Power BI daily at work where I derive meaningful insights from extensive data sets. The enhancements related to data structures, databases, and algorithms will contribute to my specialization by reinforcing my ability to work with large datasets efficiently. The improvements to the user interface will align with a user-centric approach, making data more accessible and understandable for non-technical stakeholders. Refactoring and improving the software design will demonstrate an understanding of software maintenance and scalability. In my career, all these enhancements or improvements directly align with what I am already doing and will help strengthen my abilities.**

1. **ePortfolio Set Up:**
   1. Submit a **screen capture** of your ePortfolio 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 Homepage 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 the enhancement in the category of software engineering and design, I will be choosing the enhance and improve on my Driver.java class I developed for the Grazioso Project in IT-145.**

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

**I plan on enhancing the efficiency of the system by implementing a more optimized sorting algorithm to sort the list of animals based on specific criteria (e.g., age, eligibility, date of acquisition, or even alphabetically). This will contribute to improved performance when displaying lists, especially as the data grows. I will also refactor this code to break down complex methods into smaller, more modular functions. I will then implement an improved exception handling method to improve the resilience of the application against unexpected user inputs or system errors. Lastly, I will integrate a logging mechanism to record important events or errors to aid in debugging and future improvements.**

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.

**Two different specific skills I will demonstrate that align with the course outcome will be algorithmic efficiency and problem-solving. With algorithmic efficiency, I will implement an optimized sorting algorithm that demonstrates the ability to enhance the efficiency of code, a key still in algorithms and data structures. For problem-solving, I will identify the need for and implement a sorting enhancement to showcase problem-solving skills in optimizing my code for better performance.**

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

**Two from below that I would select for my enhancement will be design and evaluate computing solutions and to demonstrate an ability to use well-founded and innovative techniques. The planned enhancement will align with these outcomes by involving the design and implementation of an efficient sorting algorithm, considering trade-offs involved in design choices and optimizing the sorting algorithms to demonstrates the use of innovative techniques to improve the overall efficiency of the system.**

Course Outcomes:

* Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.
* Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.
* 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.
* 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.
* 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.
  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.

**For algorithms and data structures, I have chosen the Driver.java file from my IT-145 class. This file manages the application’s core functionality and interfaces with the Dog, Monkey, and RescueAnimal classes.**

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

**For this section, my plan is to implement sorting algorithms to arrange the list of animals based on specific criteria. I will then analyze the existing algorithms and identify opportunities for optimizing time or space complexity. Lastly, I will enhance the search functionality for the animals, allowing users to find them based on various criteria efficiently.**

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.

**Implementing a sorting algorithm requires a deep understanding of algorithmic efficiency and I will showcase my ability to choose and implement the most suitable sorting algorithm for the given criteria. Analyzing existing algorithms and optimizing them demonstrates proficiency in identifying bottlenecks and improving the overall efficiency of the code. Enhancing search functionality involves implementing effective search algorithms that will showcase my skills in data structures and algorithmic design.**

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

**These enhancements align seamlessly with key course outcomes, specifically in the realms of designing and assessing computing solutions and showcasing proficiency in employing both well-established and innovative techniques. The planned improvements focus on the redesign and implementation of more efficient sorting and searching algorithms, illustrating the adept utilization of inventive approaches to elevate the overall efficiency of the system.**

* 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.

**For the database category, I will be choosing, again, my final project from IT-145. Instead of using the existing Driver.java class, the best practice would be to create a new class specifically dedicated to database operation.**

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

**This practice adheres to the principles of modular and organized software design. For this new class, I will refer to it as AnimalRepository.java and will encapsulate all interactions with the database to promote a better separation of concerns. I will incorporate a MySQL database to persistently store and retrieve animal information. This will include implementing CRUS operation on the animal data and ensuring data validation mechanisms for data integrity and security.**

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.

**Implementing a dedicated class for the database will showcase proficiency in integration for java applications. Extending the repository class to support CRUD operations on this database will demonstrate skills in managing persistent data. Implementing data validation mechanisms within the repository aligns with security aspects related to database interactions.**

* + - 1. Select one or more of the course outcomes listed under Category One that your enhancement will align with.

**The enhancements algin with course outcomes, particularly design, develop, and deliver professional-quality oral, written, and visual communication by focusing on designing a more interactive and user-friendly database interface throughout the new AnimalRepository class and to demonstrate an ability to use well-founded and innovative techniques by implementing a dedicating repository class and incorporating CRUD operations that will demonstrate the use of innovative techniques in database management.**

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.

**In the code review, I will showcase proficiency in software engineering and design principles. This includes demonstrating a strong understanding of algorithms and data structures through the implementation of enhanced sorting and searching algorithms in the Driver.java class. Additionally, I will illustrate skills in effective data integration and management by creating the AnimalRespository class with advanced MySQL queries and CRUD operations.**

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

**In the narratives, I will emphasize my ability to communicate complex technical concepts in a clear and coherent manner. This will include detailing the rationale behind the chosen enhancements, explaining the practical implication of the improvements, and providing insights into the decision-making process during the enhancement planning. Effective communication is crucial for conveying the significance of the implemented enhancements to a diverse audience.**

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

**This professional self-assessment will highlight my reflection and self-awareness skills. I will assess my strengths and areas for improvement in a constructive manner. I will acknowledge the learning experiences gained throughout this enhancement process. This self-assessment will also demonstrate my ability to set goals for continuous improvement and showcase a proactive approach to professional development in the field of computer science.**