# 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?

My name is Robert Lowrey, and I have been a student in the Computer Science program here at Southern New Hampshire University for two years.

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

While in the program here I have learned a lot about different languages such as Java, C++, C, and Python. Within these languages, I have gained many important skills, such as learning how to create and manage databases, create secure applications, and create uniform data structures.

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

A specific skill that I aim to demonstrate is ensuring that my applications will work on multiple Integrated Development Environments (IDEs). I will also demonstrate professionalism in my code overview video by discussing the core statements and delivering a professional and technically sound presentation that is adapted to specific audiences. Another skill that I am going to demonstrate will be to enhance my applications by solving issues with algorithmic principles and implementing standardized practices that are appropriate to the solution that will be derived. Lastly, I will implement the Defense in Depth strategy to minimize exploitations, reduce vulnerabilities, and mitigate design flaws within the applications to ensure that privacy is maintained.

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

The skills that I will demonstrate align with my career plans by allowing me to showcase what I can do to achieve excellence within the professional world. As of right now, I plan on going into the data analysis realm of computer science. Therefore, I will utilize this project to better hone my skills as a data analyst and become a better candidate for future job opportunities that arise.

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

This project will contribute to the specialization I am targeting by showing that I have a firm understanding of agile methodologies as well as a strong understanding of data analysis in order to derive a well-rounded conclusion of the data that is being analyzed.

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 aspect of the enhancement plan I will choose an artifact from the CS 250: Software Development Lifecycle course. This artifact shows a list of top 5 travel destinations. When the application is run, it shows a list of top 5 destinations with a picture and description. Upon clicking the destination, you can see that the background changes, and the text is easier to read for the specific listing to show that you are selecting.

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.

A diagram of a computer code

Description automatically generated with medium confidence

An enhancement I would like to implement to this artifact is to port this Java program to a Python language program. When porting this project to Python, I plan to design the program to be easier to read, rather than having a dark grey background with black text. I also plan to add more information about the destinations to inform the user where they are located, and the best times to go to those destinations.

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.

When transferring the application to Python programming language, this will demonstrate the knowledge of frameworks with the comprehension of core Python concepts. It will also demonstrate the skills of implementing efficient Python libraries. Another skill I will demonstrate is the ability to write readable code with inline comments to show proper documentation of the application. Lastly, it would show that I understand core Python concepts to derive a solution of this program being ported to a new language.

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

The planned enhancements for this artifact will align with course outcome number four, to show that I can demonstrate the ability to use well founded skills, techniques, and tools for the solution that will deliver value and fulfill industry specific goals. Also, the transferring of languages will align with course outcome number three to show that I can achieve computing solutions that solve a problem using principles and computer science practices that are appropriate for the language.

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.
   1. **Category Two:** Algorithms and Data Structures
6. **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 this category of enhancements, I would also like to work on the CS 250: Software Development Lifecycle. Again, this application shows the top 5 best travel destinations, and when the user selects (clicks on) a destination of their liking, the description would become easier to read as well as highlight the listing.

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

A diagram of a diagram

Description automatically generated

I would like to implement a security feature to have the user login to the system to view the destinations that are provided. Another enhancement I would implement is to add more travel destinations, so the users have a variety upon entering the program. Also, I would like to implement a search bar to allow the users to search for specific destinations and/or keywords. This would enable the user to search for destinations that they would be interested in. The search bar would add a linear search to the application’s algorithmic logic to make the best case time complexity of O(1), and an average case of O(N). Reorganizing the applications structure would enable optimization of the application and decrease the overall time complexity of the program. Also, the application would be more readable along with versatile when transferring it to the Python language.

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.

The skills that I want to demonstrate are developing collaborative solutions and implementing innovative techniques. For the login feature, this would allow me to demonstrate a firm understanding of user authentication and framework specific knowledge. It would also enable me to demonstrate best practices when it comes to the overall security of the application. When implementing a search bar, I would demonstrate the skills of implementing and improving search logic within the code. It would also demonstrate that I was able to build the search feature using data structures to handle search requests from the user.

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

The enhancement of adding a security feature would coincide with developing a security mindset when it comes to implementing a login feature to the application. The addition of a search bar would align with the use of algorithmic principles to solve given problems. Also, adding more destinations to the application along with reorganizing the data structures to optimize runtime and memory allocation align with the demonstration of using well-founded innovative techniques, skills, and tools for the purpose of implementing computer solutions. Lastly, the redesigning of the algorithmic structure aligns with the strategies for building collaborative environments.

* 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 this aspect of the enhancement plan I will choose an artifact from the CS 250: Software Development Lifecycle course. This artifact shows a list of the top five travel destinations. When the application is run, it shows a list of top 5 destinations with a picture and description. When the user clicks on a destination, the row is highlighted a different color to identify that the user has selected a destination and description.

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

A diagram of a flowchart

Description automatically generated

The plan of enhancement for this artifact is to implement a NoSQL database to store the usernames and passwords that the user sets to log in. With a NoSQL database we can ensure the safety of the user’s password by utilizing a salted hash of the password rather than the just password itself. The primary key would be each of the unique ID’s that are stored when the user creates the account. The database would be created in MongoDB and implemented into the artifact using import statements along with using a class to maintain the connection to MongoDB.

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.

One of the specific skills that I will demonstrate with this artifact enhancement includes implementing and maintaining a NoSQL database of usernames and passwords that a new user will utilize when logging into the system to view travel destinations. It would also allow me to demonstrate the optimization of authentication factors within the database feature implemented.

Another demonstrated skill of implementing a NoSQL database would be the firm understanding of maintaining a MongoDB database to store this information. Another skill that it would demonstrate is the ability to store salted hash values of the user’s password for an extra layer of security. Also, the enhancement would demonstrate technical proficiency in data modeling with tools that are utilized upon implementing the database to the artifact.

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

The enhancement of implementing a functional NoSQL database aligns with the course outcomes by way of using well-founded innovative techniques that deliver value and accomplish industry-specific goals. It also coincides with the ability to employ strategies for building collaborative environments that enable diverse audiences to support organizational decision making. This is met by the utilization of MongoDB. Since MongoDB is scalable and flexible, it will enable future developers to jump in and contribute to new implementations (if desired). It can also enable multiple users to work on the same project to analyze the database and collectively determine a better implementation of such updates to the database.

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

The code review will allow me to professionally present the enhancements that are going to take place within the previous projects. The enhancements for the search bar will illustrate my knowledge of implementing new features to existing code that will enable the user to have a better experience. Also, the addition of the security feature will illustrate that I designed the application with the user’s private information in mind. Next, the implementation of better data structures and uniformity will optimize the application and decrease the runtime complexity of the application overall. Thus, making it a better experience for the user while looking for more travel destinations. Lastly, the database enhancement will allow the application to store information, such as, usernames and salted hashes for the password aspect for an extra layer of security.

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

There are several skills and outcomes I plan to illustrate in the narrative. The first being that I will demonstrate a security mindset when implementing these enhancements to my existing artifacts. I will also deliver professional-quality communication while designing collaborative computing solutions that solve a problem using algorithmic principles. Finally, I will demonstrate the ability to use well-founded techniques which will allow me to discuss this topic with non-technical individuals.

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

In the professional self-assessment, I plan to demonstrate my ability to collaborate with other individuals, work under pressure from stakeholders, and upper management while implementing secure algorithms that enhance security features of any given project.