Southern New Hampshire University

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 enrolled at SNHU at the end of 2023 upon completing my Associates at my local community college.

B. What have you learned while in the program? List three of the most important concepts or skills you have learned.
How to design and work with databases. In particular using CRUD operations and connecting them to applications.

Programming skills in Python and Java, prior to SNHU I had very little knowledge of these languages.

Software development principles like modular design, problem-solving, and testing.

C. Discuss the specific skills you aim to demonstrate through your enhancements to reach each of the course outcomes.
Strong problem-solving skills by improving database searches and improving dashboard functionality.

Software design and development skills by using modular programming and code reusability to my projects.

Data analysis and visualization skills that I will show by refining the dashboard that clients will interact with.

D. How do the specific skills you will demonstrate align with your career plans related to your degree?
These skills align with my goal of becoming a data analyst. The ability to manage databases, build applications that interact with data, and portray findings through visualizations will be important for on the job scenarios and showing results.

E. How does this contribute to the specialization you are targeting for your career?
This contributes to my specialization by improving both knowledge in computer science and my practical skills in data analysis. Having both programming experience, database management, and visualization, I am building a versatile portfolio that I will not only serve as a valuable asset in one field, but many fields like retail and healthcare which will set me up for success in many career paths.

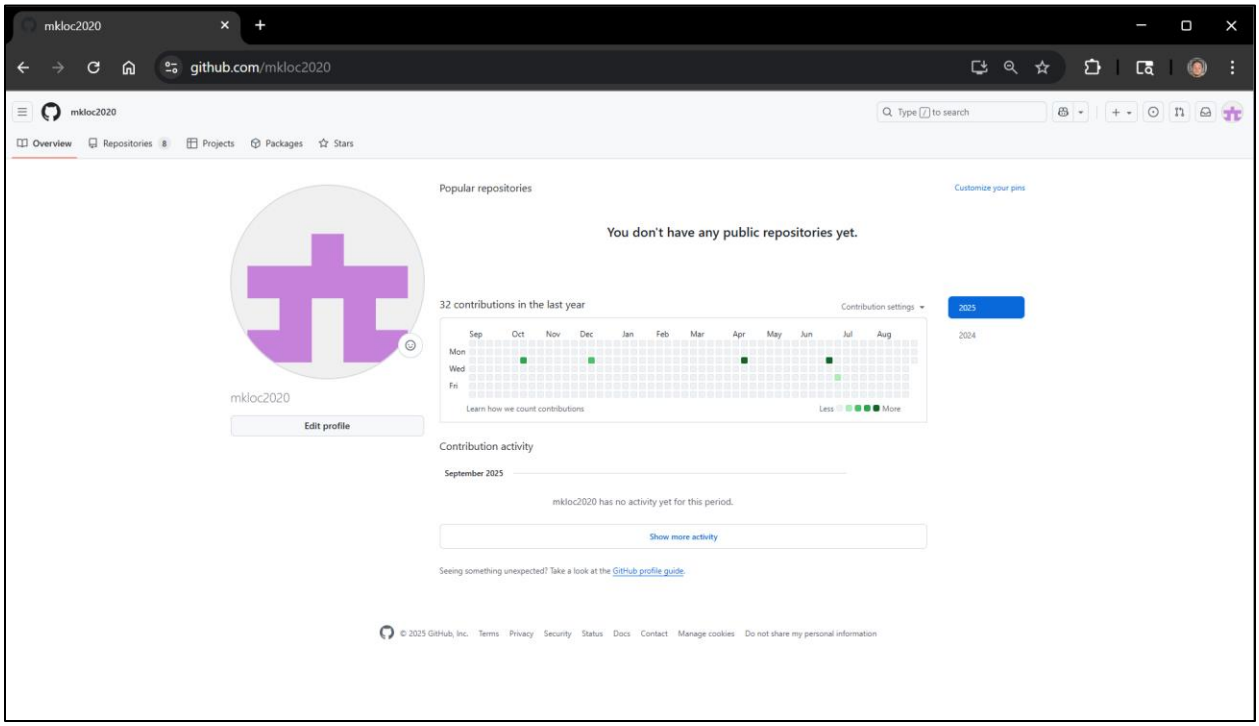
II. **ePortfolio Set Up:**

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

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.



III. 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.

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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.

Refactor the trip listing into a reusable Angular component (TripCard). This change improves modularity, readability, and scalability of the code, aligning with modern software engineering best practices.

```
Component TripCard {
  Input: trip (object)
  Render trip details (name, length, start date, resort, cost, image)
}
Main Trip List {
  For each trip in trips[] -> render <TripCard trip=trip>
}
```

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.

Breaking down a large feature into smaller reusable parts.

Writing clean and organized code that is easier to update in the future.

Using Angular to build components that work together in a full-stack application.

I will refactor the trip listing into a reusable Angular component (TripCard). Right now the code that shows trips is mixed up with the other parts of the page. This can make things a little messy and less organized. Using the TripCard component will help the trips be displayed with the same formatting, and will help me keep my code organized.

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

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.

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.

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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 will add a client-side search and filter functionality for trips. Right now you can only scroll through the list of trips. When there are a lot of trips planned it can be time consuming trying to find the exact one you want. Adding search and filter options is something that every good website should have.

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.

Applying basic algorithms to search through and filter data.

Using efficient data handling methods like loops, conditionals, and array functions.

Providing a better experience using the website by making the program respond quickly to input.

These skills show that I can apply algorithmic principles to solve real-world problems in a practical way.

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

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.

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.

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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 will add schema validation and indexing to the MongoDB. The database I am using right now doesn't have good rules which lets users add trips no matter what they input (like missing information or the same trip code). The end result will show the data being cleaner and more reliable.

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.

Creating strong database schemas that enforce rules and prevent errors.

Using indexing to make database lookups faster and more efficient.

Building validation to improve security and data quality.

These changes will make the database more secure and organized. They show that I can design a database that avoids mistakes and runs more efficiently.

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

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.

IV. 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

For my code review I will show how I can write clean and organized code. I will show my knowledge by demonstrating my plans for modular design with Angular components, applying algorithms to handle data, and building secure database schemas. The outcomes shown will be making and gauging solutions, using my knowledge to improve the performance of the artifacts and developing a security mindset when working with the software and databases.

ii. Skills and outcomes planned to be illustrated in the narratives

The naratives will explain how my Travlr Getaways project improves the software it is using and why those changes were beneficial, whether client side or backend. I will make sure my work is related to the course outcomes by explaining how modular design, algorithms, and database improvements make the project better. The outcomes will show my knowledge of technical skills and demonstrating how I can implement them.

iii. Skills and outcomes planned to be illustrated in the professional self-assessment

For my professional self assessment I will discuss how I grew as a student and how my skills show that I am ready to take on real world problems. I will reflect on my strengths in software design, algorithms, and database work. The outcomes shown will be reflecting on my learning, understanding trade-offs in design choices, and planning how these skills support my future career.