# CS-499-11429 Professor Brooke Goggin Mark Irwin 9/3/2024

# CS 499 Module One Assignment

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 computer science journey started many years ago. I completed my associate degree from Hudson Valley Community College when I was 22. I then unfortunately had to take a few years off to help my dad during his fight with cancer. After many years I was inspired to go back to finish my degree by my now fiancé, I joined The University of Albany with the hopes of getting my bachelor’s degree in computer science. When covid struck my aunt also was diagnosed with cancer and due to her having no immune system and could not risk catching covid I requested if I would be able to finish my computer science degree online and was told by the university it would be better if I withdrew from the university. I was still determined to continue my education and learned about South New Hampshire University and applied and was able to transfer with most of my credits, I have now been at SNHU for almost 2 years and expected to receive my bachelor's degree by the end of this year.**

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

**During my time in the computer science program, I have learned and experienced so much. I would say the most valuable and important concepts / skills I have learned would involve patience, perseverance, and the concept of how to approach a problem / find a solution. Having patience has been extremely valuable during my time at SNHU, the process of programming is time consuming and complicated. Perseverance to continue and not give up when encountering difficulties has helped me learn and progress so much in the field of computer science and ensuring I did not give up has allowed me to reach goals I did not think was previously possible. The concept of how to approach a problem and work through a solution has been extremely beneficial. It has changed how I approach problems in life and within programming. Taking time to break down and understand the problem so you can work on solving the problem has been one of the most beneficial concepts to my success that I have learned while in the computer science program.**

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

**I aim to enhance my IT140 text-based game Spaceship Escape! I initially coded the game in python. I plan to enhance it by bringing it to Android Studio, adding a new time-based system, and adding a leaderboard that will utilize a database. With this enhancement I hope to demonstrate my ability to problem solve, ability to adapt, design strengths, algorithm adaptation, and finally demonstrate my ability to utilize databases.**

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

**I plan to demonstrate my ability of software design and engineering, algorithms and data structures, and databases. Although I am choosing the game, I developed in IT140 – Spaceship Escape! I am utilizing multiple other courses to help develop a text-based game in a mobile environment and help showcase mobile development skills and game development skills.**

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

**This helps contribute to my game and mobile specialization by helping me grow my understanding of mobile development while also showcasing my skill improvement and dedication.**

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

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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.

**Artifact – IT140 – Spaceship Escape Text-Based Adventure Game. I developed this text-based adventure in IT140 and the goal was to create a game with four rooms and a boss room. The goal was to collect items from the rooms that would unlock the boss room. I decided to take a different approach and create a text-based adventure based on a spaceship that was damaged and the player needed to find items of survival to escape the ship. So instead of a boss room, I decided to go with an escape pod that would lead to safety. I really liked this idea and my professor at the time really enjoyed the direction I took the assignment. For the software engineering and design enhancement I decided it would be interesting if I enhanced one of my first ever programming assignments, making it more professional and utilizing all the skills I have learned during my degree program. My goal is to convert the original python code to Java and utilize Android Studio to allow for mobile integration.**

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.

**My enhancement plan for Spaceship Escape in alignment with the software engineering and design category involves converting the game from python to java and utilize the android studio environment to better improve the application. I plan to enhance the text-based aspect of this game to incorporate a main menu, pictures of each room, and mobile functionality. With the goal of transitioning to the Android Studio environment I plan to utilize scene transitions and pictures of each room and item. I also plan to utilize Android Studio to allow mobile functionality to my text-based adventure.**

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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.

**I will showcase my skills to port an application to a new language and change the scope of the application. Initially the application is within python and features text only. My goals with the transition to java is to utilize Android Studio and allow transitions and picture functionality to work on a mobile application.**

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

**The course outcomes I feel my enhancement will align with include “Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science. “and “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.
   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.

**Artifact – IT140 – Spaceship Escape Text-Based Adventure Game. I developed this text-based adventure in IT140 and the goal was to create a game with four rooms and a boss room. The goal was to collect items from the rooms that would unlock the boss room. I decided to take a different approach and create a text-based adventure based on a spaceship that was damaged and the player needed to find items of survival to escape the ship. So instead of a boss room, I decided to go with an escape pod that would lead to safety. For the Algorithms and Data Structures enhancement I decided it would be interesting if I enhanced one of my first ever programming assignments, making it more professional and utilizing all the skills I have learned during my degree program. My goal is to enhance the application to have an active timer and ship randomness to the game which will add more severity and added atmosphere to the game. The goal of this change is to improve the user experience while also showcasing my enhancement with algorithms and data 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.

**My plan for Algorithms and Data Structures is to enhance my Spaceship Escape adventure game into having a timer count down as the game starts. The timer will give the player 10 minutes to explore the ship, pick up all of the items, and escape before the game ends. The goal of the timer is to be able to keep track of how fast users are able to accomplish the game. While also ensuring the added timer, I also plan to add several different versions of the potential ships. Each ship will feature different rooms which will entail different room layouts and item pickups. The goal is to add randomness to the initial game launch while also being on a timer to add to the complexity.**

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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.

**With this enhancement I will demonstrate my ability to implement a countdown timer and randomization algorithm that will potentially change the way the game is played every time the start game button is pushed. This will showcase my ability to not only add to the potential complexity of the game but also showcase my ability to further improve on past work.**

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

**This 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.” My hope is that the timer would allow to change how my game is played and help introduce innovative techniques that will help with the user experience. With the timer, I also plan to incorporate randomization to the game allowing the user to experience multiple aspects of the game with each game launch. I also plan to ensure that I reach the expectations of “Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.” By ensuring that the randomization is understood by the user and the intention of the timer and gameplay change is clear and understandable.**

* 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.

**Artifact – IT140 – Spaceship Escape Text-Based Adventure Game. I developed this text-based adventure in IT140 and the goal was to create a game with four rooms and a boss room. The goal was to collect items from the rooms that would unlock the boss room. I decided to take a different approach and create a text-based adventure based on a spaceship that was damaged and the player needed to find items of survival to escape the ship. So instead of a boss room, I decided to go with an escape pod that would lead to safety. For the databased category I plan to add leaderboard functionality to the game. This would allow the user to record successful completions of the game and compare to previous completions. The goal of the database is to not only register the top scores of the user but also utilize sorting to show the fastest clear time of the game while also showcasing the users name next to the clear time.**

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

**My plan is to enhance my Spaceship Escape artifact with a database that will allow the player to record their name and the time it took to beat the game. My idea involves an option on the main menu below start game, named leaderboards or high scores. So, when the game starts a timer will count down from 10 minutes, after successfully completing the game, it will prompt you to add a name and then will add your name and how long it took you to finish the game in the leaderboard. The leaderboard will then sort based on fastest completion. Showcasing the top 10 times. The database will record the user’s name and completion time. In order to showcase this, I plan to utilize MongoDB hosted using MongoDB Atlas while working on the database with the help of MongoDB Compass. I plan to use MongoDB because its usage will showcase my experience with the system, and it provides the resources I will need to not only support the database I am planning on using for the game but also allows me to secure it. I am also planning to utilize Create, Read, Update, and Delete functionality although Update will not be directly required for my leaderboard. Since the Leaderboard will be based on time and player participation, ensuring the data is secure, protected, and not easily fabricated is extremely important. I plan to Validate inputs, while also utilizing error handling, and MongoDBs added encryption.**

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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.

**With this enhancement I plan to demonstrate my skills in database creation and management, database integration, usage and understanding of MongoDB, CRUD, proper and safe practices of code, and finally, secure coding and ensuring user data is protected and database is secure.**

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

**The outcomes my enhancement will align with will include “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”, and “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”. My enhancement will align with the above course outcomes by solving the leaderboard database issue by utilizing MongoDB, ensuring that aspects of MongoDB are being understood and utilized to the best of their ability, and ensuring the security is at the forefront of my programming to ensure the protection of user information and database security.**

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 skills and outcomes I plan to illustrate within the code review include properly breaking down my code functionality and provided a high level and detailed code analysis that allows all viewers to gain a high understanding of what my code does and why it works the way it does. I also plan to address the enhancements I plan to make to my artifact. With the code review I plan to showcase my skills of bringing code over to a different language from python to java, utilizing Android Studio, my understanding of my code and how to enhance it to meet the desired categories and finally my understanding of databases and how to utilize it within a program that did not have use for it before.**

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

**The skills I plan to be illustrated in my narrative of my chosen artifact is my ability to adapt to a new environment in this case from python to java, my ability to utilize databases to improve the aspect of the game, and my ability to enhance the game state and showcase another layer to the original application. My skills that will be illustrated will also include my security focused mindset, Clear comments and good coding practices, an understanding of database management through the use of MongoDB/MongoDB Atlas/MongoDB Compass, Android Studio, and finally the Python and Java Languages.**

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

**Within my professional self-assessment, I plan to be able to showcase all of my skills I utilized within the enhancements to show my expertise and understanding with multiple languages, varied programs, and creativity. While also being able to maintain strong coding standards and security procedures. It will also help to showcase the full range of my computer science talents and abilities.**

**Thank you so much for the feedback and the opportunity to fix my mistakes. I hope this better reaches your expectations and I am open to any and all feedback. Thank you so much again for taking the time to help me.**