# CS 499 Module One Assignment

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 about a year and a half.**

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

**Three of the most important concepts I have learned are apply mobile development principles and best practices to develop mobile applications using user-centered design principles and industry standards, how to apply database systems concepts and principles to develop client/server applications that interface client-side code with databases and develop code as well as use non-coding development methodologies in algorithmic design and problem solving. Students will use advanced algorithmic designs to evaluate complex data structures to aid in problem solving.**

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

**The specific skills I aim to demonstrate in software design and engineering in software design and engineering are reverse engineering skills by adapting code from an android application to a Windows operating system. Designing and developing the application can also lead to working with different teams to improve the useability of the software. Checking for user authentication and input validation ensures data security. The skills that will be demonstrated in the first artifact will align with the course outcomes. In addition, specific skills I aim to demonstrate in algorithm data structure are knowing how to increase efficiency from understanding different data structures and analyzing it. Translating a flowchart to code, documentation, creating structured code, and debugging align with the course outcomes for the second artifact. Lastly the skills I will demonstrate in databases are data mining techniques such as clustering, designing, and evaluating data, and making the program user friendly will be in the third artifact and aligns with the course outcomes.**

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

**These skills align with my career plans by preparing in different positions I may take in the future such as a software developer, user interface design, or database management. It also demonstrates the process of enhancing different projects.**

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

**It contributes to the specialization I am targeting for my career by giving me insight of things I may experience, improve my problem-solving skills, how to make a professional delivery to different audiences, and get a deeper understanding. In this case I was leaning more towards software development and have reverse engineering skills is beneficial to have.**

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.

**The artifact I chose is an event planning application created for my CS 360: Mobile Architecture and Technologies. The purpose of the application is to track the dates and times of upcoming events. The application was designed and coded using Android studio. The requirements include: a database with at least two tables, one to store the event details and one to store user logins and passwords, a screen for logging into the app it should also be used to create a login if the user has never logged in before, a screen, with a grid, that displays all upcoming events, a mechanism by which the user can add and remove events from the database, a mechanism by which the user can enter the time and general information of a specific event, and a mechanism by which the application will notify the user on the day that an event has been scheduled. This app is meant to address users' needs in terms of having an application to remind them when there is an upcoming event.**

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

**The enhancement chosen for this artifact is reverse engineering a piece of software for a different operating system. The first thing to do is examine the code, structure, and functionality of the application. Select a different operating system to reverse engineer which will be a Windows Operating System. The coding language and user interface is then selected. Then adapt the code from an Android operating system to Windows. Create well-commented code. Finally, the application is tested. When testing each functionality is checked that it correctly works such as login/registration, event listing, addition, deletion, and editing.**

**A diagram of a program

Description automatically generated**

* + 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.

**The specific skills I will demonstrate are reverse engineering skills which will show an understanding of the software architecture. Web development skills by creating a Windows application and database management skills by using CRUD operations. By designing and developing the application it also helps with possibly working with different teams in the future by sharing input on the application which brings collaboration skills.**

**Some other skills are coding by being able to adapt the current code to a different operating system, creating a flowchart for that code, and checking for usability. This aligns with the course outcomes by designing, developing, and delivering professional-quality written and visual communications.**

**In addition, including methods such as storing and retrieving user login and registration ensures data security and prevent unauthorized access. Having input validation to prevent any attacks also contributes to developing a security mindset to enhance the security of the user’s data.**

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

**• 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.**

**• 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.

**The artifact I selected for Algorithms and Data Structures is a program that prints a list of all the Computer Science courses in alphanumerical order and for a given course prints out the title and prerequisites. This artifact originates from my work for CS 300: Data Structures and Algorithms: Analysis and Design. This problem was solved by creating pseudocode using different data structures (vector, hash table, and tree) and investigating which one is best suited to solve this problem. Memory and run-time analysis is performed and then based on the pseudocode one can code using the chosen data structure. Data structures are important to understand because by knowing which data structure is the right one, one can write code that performs better and is efficient.**

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

**The enhancement that will be done on this artifact is improving efficiency. To improve the efficiency of the program I will examine the code and functionality of the program. Then research how to improve the efficiency which I found changing the data structure to hash tables will improve the efficiency. Then adapting the code to utilize hash tables will be done instead of using vectors. Then I will test the code to make sure each component works as it is supposed to.**

**A diagram of a flowchart

Description automatically generated**

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 specific skills that I will be demonstrating is my ability to design, develop, and deliver by ability to analyze algorithms and data structures for efficiency. Using optimization techniques to optimize to a better data structure. By knowing the different data structures, one understands the impact of the performance and functionality. My programming skills are demonstrated by being able to translate a flowchart or pseudocode into actual code. Documenting the process and providing rationale to the approach also provides an understanding of the data structure. These skills follow the course outcome of 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.**

**Some other skills that are demonstrated are analyzing the efficiency of each data structure to showcase one’s understanding of algorithmic structures, writing clean structured code, testing to make sure the functionalities work, debugging the code for any issues, and Documenting the enhancement are skills that align with the course out one 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.**

**Additional skills include problem solving to find the most efficient data structure and implementation by translating pseudocode/flowchart into code. This aligns with the course outcome 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. Select one or more of the course outcomes listed under Category One that your enhancement will align with.

**• 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.**

* 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.

**The artifact I selected for Algorithms and Data Structures is a client/server application in which the client-side code interfaces with databases. This artifact originates from my work in CS 340: Client/Server Development. Grazioso Salvare is seeking a software application that can work with existing data from animal shelters to identify and categorize available dogs. Global Rain has contracted for a full stack development of this application, including a database and a client-facing web application dashboard through which users at Grazioso Salvare will access the database. A database and a Python module enabling CRUD functionality for MongoDB, the dashboard and the database interface logic has been developed. This will include dashboard attributes. The dashboard must be a user-friendly, intuitive interface that will reduce user errors and training 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.

**The enhancement that will be done on this artifact is incorporating data mining. To incorporate data mining, first I will examine the current code and find ways to improve it. A technique to add is data clustering. This will group certain animals based on their type, age, breed, etc. The dashboard can then be enhanced to make it more interactive and filter data based on the options chosen. Adding additional filtering options apart from the type of rescue can be more helpful as well. Such as specifically finding dogs that are not adopted at the age of 3 to do water rescue. Or maybe even adding a search bar to look for a specific name. This will make the selection even easier and more efficient.**

A diagram of a diagram

Description automatically generated

* + 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.

**Through this enhancement some specific skills that I will demonstrate is data mining techniques such as clustering and modeling to categorize the animal data and make it better to analyze. This follows the course outcome of 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.**

**Design and evaluating the data by enhancing the dashboard through different filters and more data visualizations which follows along the course outcome of 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.**

**By improving the code and visualizations it also aligns with design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.**

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

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

* **Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.**
  + **Skills demonstrated: Design and develop oral, written, and visual forms of communication to demonstrate ideas and plans.**
* **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.**
  + **Skills demonstrated: The ability to design solutions to previous problems and provide enhancements.** 
    1. Skills and outcomes planned to be illustrated in the narratives
* **Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.**
  + **Skills demonstrated: Implement well-commented code, develop flowcharts to help understand and communicate the code.**
* **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.**
  + **Skills demonstrated: Reverse engineering skills to translate code from one operating system to another, adaptability, improve efficiency by having a more efficient data structure, incorporating data mining techniques, analysis and categorizing.**
* **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.**
  + **Skills demonstrated: User authentication and input validation.**
    1. Skills and outcomes planned to be illustrated in the professional self-assessment
* **Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.**
  + **Skills demonstrated: Implement well-commented code, develop flowcharts to help understand and communicate the code.**
* **Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.**
  + **Skills demonstrated: Design and develop oral, written, and visual forms of communication to demonstrate ideas and plans.**
* **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.**
  + **Skills demonstrated: The ability to design solutions to previous problems and provide enhancements.**
* **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.**
  + **Skills demonstrated: Reverse engineering skills to translate code from one operating system to another, adaptability, improve efficiency by having a more efficient data structure, incorporating data mining techniques, analysis and categorizing.**
* **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.**
  + **Skills demonstrated: User authentication and input validation.**

**Questions/Concerns:**

**I haven’t taken some of the courses in the course list. Are the artifacts I chose okay?**

**Each of the artifacts I chose has something wrong with it and haven’t had the time to fix it, will this affect my final project or moving forward to the next assignments?**

**Please let me know if I should fix anything in the document.**