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CS 499

1-2 Capstone Plan

# 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?

**I started in the Computer Science program during the Fall of 2022.**

* 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 I think one of the most important things I have learned is seting a schedule and following it. This has helped to meet deadlines and complete my work without rushing. Another skill I have learned is how to communicate effectively with others. Discussion posts and group work helped improved my communication skills. Directly related to Computer Science, I have improved my coding ability. Learning industry standards and best practices has helped me improve my ability to write clean code.**

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

**With my enhancements, I will demonstrate my ability to develop software, use algorithmic thinking, and object-oriented programming. I will also show my ability to work with databases and data structures. My goal is to apply these skills in real-world scenarios that highlight my understanding of computational theory, software testing, and collaborative development.**

* 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 providing a strong foundation for a role in software development or game programming. The ability to write efficient, scalable code and collaborate in team-based environments is essential in the tech industry. Demonstrating these skills shows that I am ready and capable of working within a development team.**

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

**My focus is on developing interactive software and potentially working in game design or development. The skills I’ve learned and plan to demonstrate, such as software devleopment, data structures and algorithm analysis, and client/server development, are directly applicable to this specialization. They will help me create reliable, engaging, and optimized applications, which is critical in this competitive industry.**

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.

**[Paste the screenshot here of your GitHub Pages home page.]** A screenshot of a computer

AI-generated content may be incorrect.

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 have chosen for to enhance for this section is the Travlr Getaways web application developed during CS 465. This application utilizes Node.js, Express, MongoDB, and Angular to provide a travel booking platform. The current implementation includes both server-rendered views using Handlebars and a Single Page Application (SPA) built with Angular.**

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.

**The plan to enhance the web application is to transition the serverrender Handlebars views to React. This would align the application with modern development practices and improve the maintainability of the application. The enhancement will convert the mixed architecture into a fully consistent SPA structure.**

**A diagram of a software development process

AI-generated content may be incorrect.**

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.

**The skills I will demonstrate with my enhancements are implementing a modern SPA architecture using React. I will show my ability to design a component based frontend and my use of the RESTful API. This will show how I am able to structure a project and deploy enhancements.**

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

**The enhancements that I plan to implement align with the course outcomes 1, 2, 3, and 4. These outcomes relate to supporting organizational needs, design, evaluatating solutions, and implementing innovative techniques.**

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 section I will also be using the artifact mentioned in category one, the Travlr Getaways application. I will be specifically focused on the trip filtering logic operating on the backend. RESTful API endpoints are used to retrieve trip data from MongoDB.**

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 planned enhancement is the implementation of an advanced fuzzy search algorithm for the trip search functionality. This algorithm will support partial matches, enabling users to find trips even with incomplete or misspelled input.**

**A diagram of a program

AI-generated content may be incorrect.**

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 will be demonstrated by my enhancements will be algorithm implementation by using fuzzy matching. I will show my ability to optimize search by accounting for text. This will show my ability to manipulate data structures.**

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

**The enhancements I plan to implement align with outcomes 3 and 4. These outcomes relate to solving problems with algorthims and using innovative techniques for computing solutions**

* 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 section I will also be using the artifact mentioned in category one, the Travlr Getaways application. Specifically, I will be enhancing the MongoDB schema and seed data integration. This will improve the the data persistence for travel trips.**

* + 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 proposed enhancement is the implementation of a user booking system. This includes a new Mongoose schema for bookings, user association, and API routes to retrieve booking history and validate availability.**

A diagram of a software system

AI-generated content may be incorrect.

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.

**The skills that will be demonstrated by my enhancements will be relational modeling with NoSQL. I will show my ability to design and implement backend API. This will show my ability to provide secure and efficient data handling.**

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

**The enhancements I plan to implement align with the outcomes 3, 4, and 5. These outcomes relate to evaluating compute solutions, using different techniques and tools for solutions, and anticipating exploits to ensure data 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

**During the code review I plan to show my ability to write clean efficient code. My code should follow industry standards and best practices. I will demonstrate my ability to enable object-oriented programming, use modular design techniques, and debug code will improving performance. I will use systems for version control as well as use proper naming conventions and provide comments.**

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

**My ability to think critically, solve problems, and communicate effectively will be shown by the narratives. They will provide an area of reflection for the development process , any challenges faced, and how I was able to overcome them. Using the narratives I will be able to show how I am able to learn from feeback, practically apply concepts, and show my ability to implement different programming techniques.**

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

**I will use the professional self-assessment to show my growth during my time in the Computer Science program. I will put an emphasis on how I was able to stay motivated, manage time, and stay focused on continuing my education. I will look back on my experiences and how the have prepared me to enter into the tech industry. I will be able to show how I am willing to continue to learn and improve my skills. This will also give me the opportunity to share my awareness of the ethics and responsibilities I, as a Computer Science major, am required to follow. How I am committed to staying up to date with technology and trends.**