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?
With SNHU I've been in it since 2022.

B. What have you learned while in the program? List three of the most important concepts or skills you have learned.
In this program, I have gotten better at expanding my ideas when it comes to programming as a whole. I know this may sound far-fectched, but this was the biggest issue I've had when it comes to while I've learned to code, I wanted to also learn to think of ideas for myself (which plays into my future career trajectory of wanting to consult and design software based on needs of others). I strengthened my programming skills especially by learning Data Structures and Algorithms from CS 260 and different security techniques for use within a website from CS405 and CS 410.

C. Discuss the specific skills you aim to demonstrate through your enhancements to reach each of the course outcomes.
With the software design/engineering portion, I aim to demonstrate a system that will ensure that doctors/nurses/administrative staff are the only ones who have access to the appropriate medical data. It will be based on role access control. If anyone is outside of this role, the system will decline them, for it would violate HIPAA laws.

On the data structure/algorithm side, I can show a scheduling algorithm based on priority and availability. Within the healthcare system, a lot of complaints from the patient side is that it's hard to schedule an appointment with a doctor or that it takes a long time to see them. This will help in minimizing wait times and improving throughput.

On the database side, I would like to implement a notification system via triggers and stored procedures. These triggers will alert patients to their upcoming appointments and changes within their medical records.

D. How do the specific skills you will demonstrate align with your career plans related to your degree?
The specific skills align with the fact that I do work in Healthcare IT, but within the Cybersecurity sector, so this will help broaden my knowledge on both ends of the programming side and also the cybersecurity side. I eventually want to start my own cybersecurity healthcare consulting company and create software for healthcare corporations.

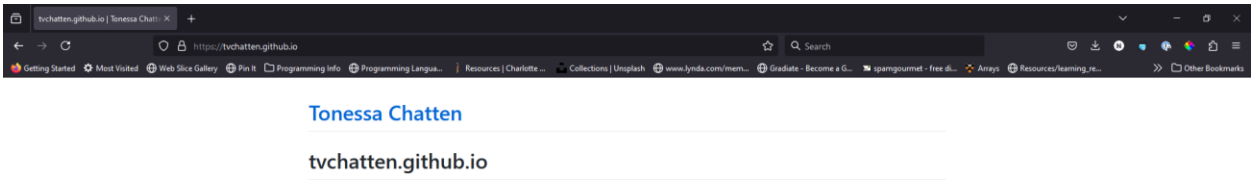
E. How does this contribute to the specialization you are targeting for your career?
Technically, I'm already in the career field, but this will help expand it by ensuring that I evaluated code with the focus of both security and the end-goal.

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.

My artifact (for all three plan ideas) will be a Healthcare EMR (electronic medical record). The EMR has the framework from IT 145 (Python), CS 340 Advanced Programming Concepts, and CS 405 Secure Coding (combined with CS 320 for Security Software Testing). The Healthcare EMR idea came from course CS 319 with the dementia app idea. While my capstone is not an app, I do want to site this course as well as inspiration as to the fact I took ideas from different courses to create this.

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.

My plan is to showcase integrating roles to ensure data access is strictly governed. This will also showcase the ability of each person to do only what's allowed for their specific role. Doctors will be able to view the patient files, add notes, view notes, and schedule appointments. Nurses will only be able to view the patient file and add notes. The admin will be able to add a user, modify a user, or remove a user from the database.

I have the pseudocode for this in the "PseudocodeCapstone.pdf" document as it's way too big to be copied in here.

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.

This will demonstrate the planning of how different components of the system interact with each other and also the usage of user-access controls for designated roles.

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

The course outcomes this would demonstrate would be: Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of

computer science & 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.

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.

My artifact (for all three plan ideas) will be a Healthcare EMR (electronic medical record). The EMR has the framework from IT 145 (Python), CS 340 Advanced Programming Concepts, and CS 405 Secure Coding (combined with CS 320 for Security Software Testing). The Healthcare EMR idea came from course CS 319 with the dementia app idea. While my capstone is not an app, I do want to site this course as well as inspiration as to the fact I took ideas from different courses to create this.

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

For this section, my detailed plan is to: initiate an appointment request – which will be done by the user. Then the system will immediately take that information and query into the database to grab some good available time slots. From this it'll evaluate the slot priority and calculate a penalty for each slow. The penalty score just assesses how far the slot deviates from the patient's preference. After everything is evaluated, an optimal time slot is given based on the algorithm. From this, it'll either book an appointment for the user/patient or notify them that there aren't any suitable slots.

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.

This will demonstrate creating an algorithm and structure that helps solve the complex issue with the doctor's availability, patient's preferences, and the patient's priority.

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

The course outcome this aligns with is: 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.

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.

My artifact (for all three plan ideas) will be a Healthcare EMR (electronic medical record). The EMR has the framework from IT 145 (Python), CS 340 Advanced Programming Concepts, and CS 405 Secure Coding (combined with CS 320 for Security Software Testing). The Healthcare EMR idea came from course CS 319 with the dementia app idea. While my capstone is not an app, I do want to site this course as well as inspiration as to the fact I took ideas from different courses to create this.

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

The fun part is that I'm using the Python Django framework. As far as enhancing the database category, I would love to migrate it away from SQLite and towards a HIPAA-compliant database. I believe MongoDB would be the best for this, using PyMongo, a driver that provides functionality for database actions. Here's a link to show that MongoDB is HiTrust approved – which is important within the healthcare industry: **https://www.mongodb.com/products/platform/trust/hitrust.**

I have the pseudocode for this in the "PseudocodeCapstone.pdf" document as it's way too big to be copied in here.

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.

With MongoDB being HIPAA compliant & HiTrust certified, it can handle pertinent data such as patient records, treatment histories, and even medical images. It also supports security features such as encryption at rest, access control mechanisms, and has detailed auditing capabilities. With this, I'd be demonstrating the secure form of handling (and protecting) patient data.

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

This aligns with the course outcome: 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

The code review will illustrate my ability to write clean and secure code – which will also entail showing my attention to detail.

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

Within my narratives, I'll be able to articulate complex technical jargon into understandable language for the system geared towards the stakeholders that may not be as technically savvy.

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

The professional self-assessment will illustrate my reflective thinking, ability to evaluate personal growth within the coding realm, and strategic planning for future career advancements.