# CS 499 – Module One Journal: Initial Enhancement Plan

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## Self-Introduction:

I’ve been in the Computer Science program for several years now, and it’s been a mix of academic growth and applying those skills in real-world projects. Three of the most important concepts I’ve learned are:  
1. Building software with proper design patterns instead of just “making it work.”  
2. The importance of algorithms and data structures in writing efficient code.  
3. Working with databases to manage and query data in a way that supports scalability.  
  
For my enhancements in this capstone, I want to show that I can combine all three of these areas. The skills I plan to demonstrate—clean software engineering, optimized algorithms, and database design—align with my career goal of working as a software engineer with a focus on full-stack development. They also support my interest in AI engineering, since all three categories are foundational to that path.

## **ePortfolio Set Up:**

I have created my GitHub Pages site where the portfolio will be hosted. Below is a screen capture of my

ePortfolio homepage with the visible URL: https://shekharchaudhary.github.io/eportfolio/  
A screenshot of a computer

AI-generated content may be incorrect.

## **Enhancement Plan:**

## **Category One: Software Engineering and Design**

Artifact: Appoint Services from CS-360 (Software Development).  
  
Planned Enhancement: Improve the app’s modularity and add error handling, logging, and test coverage. I also plan to apply design patterns (MVC or observer pattern for updates).  
Pseudocode:  
function handleEvent(event):  
 if validate(event):  
 saveToDatabase(event)  
 notifyObservers(event)  
 else:  
 logError(event)  
  
**Skills Demonstrated:** Clear separation of concerns, design patterns, maintainability.  
**Course Outcome Alignment:** This aligns with the outcome: **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.**

### **Category Two: Algorithms and Data Structures**

Artifact: A sorting/searching program from CS-300 (Data Structures & Algorithms).  
Planned Enhancement: Optimize the program by implementing binary search trees (BST) and compare runtime efficiency between BST and hash maps. I’ll also improve the way the data is visualized to make complexity easier to see.  
Flowchart:  
Load dataset → Insert into BST → Search element → Compare result with Hash Map search → Output efficiency metrics  
  
**Skills Demonstrated:** Efficiency, problem-solving, and applying appropriate data structures.  
**Course Outcome Alignment:** This aligns with the 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. **Category Three: Databases**

Artifact: Database design from CS-340 (Client/Server Development).  
Planned Enhancement: Normalize the schema further and add stored procedures for common operations. I’ll also integrate security measures like role-based access control.  
Pseudocode:  
PROCEDURE AddUser(name, email, role):  
 IF role IN validRoles:  
 INSERT INTO Users VALUES (name, email, role)  
 ELSE:  
 RAISE ERROR "Invalid role"  
**Skills Demonstrated:** Database normalization, security, query optimization.  
**Course Outcome Alignment:** This aligns with the 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.**

**ePortfolio Overall Skill Set:**

If I follow through on these enhancements, my portfolio will show that I can:  
- Design software that is modular, maintainable, and reliable.  
- Apply algorithms and data structures to solve problems effectively.  
- Design and secure databases that support real-world applications.  
The code review section will highlight my ability to evaluate my own work and others’, while the narratives will show my thought process and growth. The professional self-assessment will tie everything together, showing how these experiences prepare me for my career path.

## Questions for Instructor

1. Do you think my chosen artifacts are strong enough to show growth in each category?
2. For the database section, would you recommend focusing more on optimization or on adding features like stored procedures?

# References

Rigby, P. C., & Bird, C. (2013). Convergent contemporary software peer review practices. Proceedings of the 2013 9th Joint Meeting on Foundations of Software Engineering, 202–212.   
Sommerville, I. (2016). Software Engineering (10th ed.). Pearson.  
Elmasri, R., & Navathe, S. (2016). Fundamentals of Database Systems (7th ed.). Pearson.