CS-499 4-1 Journal

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Part One: Journal Entry: Career Choice and Artifact Update

Have you changed your career plans?

Since enrolling in the Computer Science Program, I have not changed my career goals significantly. I initially wanted to move into a software engineering and development role. This is still my main focus. My interests have grown to include specialized fields such as algorithm optimization and embedded systems. The practical projects and experiences I gained in courses such as CS 350 and CS 499 exposed me to these disciplines.

How has your thinking about your career evolved?

Over the course of the program, my thinking about my career has evolved to prioritize skills that offer flexibility and long-term relevance. Initially, I viewed my career path as a linear progression toward a specific job title, such as software engineer. Now, I understand the value of cultivating a broad skill set that includes problem-solving, communication, and leadership. I also recognize the importance of staying adaptable in a rapidly evolving field, which has motivated me to continuously learn and refine my technical and professional skills.

Have you completed any research about your choice of career?

I have researched different roles in the field of Computer Science, focusing on embedded systems, Software Engineering, and Data-driven Design. In addition to reading industry reports and job descriptions, I also networked with professionals from these fields. This research has confirmed that the career I chose is in line with my interests as well as industry demands for software design, algorithms, and data management. In order to enhance my skills, I have also begun looking at certifications like AWS Certified Developer.

Course Outcomes Achieved and Remaining

I have made substantial progress in achieving the course outcomes:

Outcome 3 (Design and evaluate computing solutions): Achieved through the design of efficient task schedulers and modular systems in my embedded thermostat project.

Outcome 4 (Use innovative techniques and tools): Demonstrated by integrating a priority queue and database interaction for real-world systems.

Outcome 2 (Professional communication): Reflected in my ability to create clear, concise documentation and articulate the purpose and functionality of my projects.

The outcomes that remain are:

Outcome 1 (Build collaborative environments): While I have worked on projects individually, I plan to strengthen this outcome through future collaborative efforts and showcasing teamwork on larger projects.

Outcome 5 (Develop a security mindset): I intend to address this in my remaining enhancements by adding error handling and security considerations to my projects.

Part Two: Status Checkpoints for All Categories

Status Checkpoints Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Checkpoint** | **Software Design and Engineering** | **Algorithms and Data Structures** | **Databases** |
| **Name of Artifact Used** | Embedded Thermostat System | Embedded Thermostat System | Embedded Thermostat System |
| **Status of Initial Enhancement** | Completed modularization of code, replaced magic numbers with constants, and implemented error handling for UART and I2C initialization | Completed priority-based scheduler with optimized task execution | Started integrating MongoDB for logging temperature and set-point data; created API endpoints for data access |
| **Submission Status** | Submitted for instructor feedback | Submitted for instructor feedback | Not Submitted |
| **Status of Final Enhancement** | Final review underway based on instructor feedback | Final adjustments and testing in progress | Refining database queries, adding error handling, and testing API endpoints |
| **Uploaded to ePortfolio** | Project Link and Code Review video uploaded. | Not yet uploaded | Not yet uploaded |
| **Status of Finalized ePortfolio** | In progress | In progress | In progress |

Progress Update

Software Design and Engineering

This category's initial enhancement has been completed. Modularized code has been added to the artifact for better readability and maintenance. The code is more adaptable because magic numbers have been replaced by named constants. The system is now more robust because of error handling for UART initialization and I2C. The artifact was submitted to the instructor for feedback, and I am now making final adjustments on feedback received. After the final review.

Data Structures and Algorithms

The enhancements for the category of algorithms and data structures focused on the implementation of a task scheduler based on priority. The original static loop-based execution of tasks was replaced by this, which improved efficiency and responsiveness. The tasks are now managed dynamically based on priority. This demonstrates my ability to design advanced algorithms and implement them in embedded systems. The enhancement was submitted for feedback, and I am currently fine-tuning scheduler logic to ensure optimal performances.

Databases

A MongoDB will be integrated into the database category to record temperature readings and changes in set-points. To allow external systems access to this data and support potential dashboard or monitoring apps, REST API endpoints have been created. Initial development has begun.