CS499 Module 5 Journal

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Trend 1: Artificial Intelligence

AI is a huge topic at the moment and is shaping how people interact with technology. From being more of a niche topic in computer science, even people I know with basic computer skills are interested in AI, how they can use it effectively and what the implications might eb for humanity. AI is fascinating because it can learn from data and improve over time. Instead of just following rules like traditional code, it adapts. AI is already changing how software is built, especially with tools like machine learning and automation. For regular people, it’s showing up in things like smart assistants, recommendations, and even self-driving cars. For me personally, since I’m leaning into software engineering and backend systems, I could definitely see myself working on apps that use AI under the hood. There are I couple I have in mind, so maybe I should plan them out a bit more and design what that might look like!

Trend 2: Quantum Computing

Another topic that is entering more and more into publich conversation is quantum computing. The thing that baffles me is how it uses quantum physics to solve problems that normal computers can’t touch. That’s going to totally change areas like encryption, scientific simulations, and even optimization. For everyday users, this might not show up right away, but in the long run, it could impact everything from medicine to finance. While I don’t see myself working directly in quantum computing, I do think it’s important to stay aware of it, especially if I ever work on apps that deal with secure data. It’s also just cool, almost sci-fi status. All these exciting (and somewhat worrisome?) trends make me want to stay sharp and keep learning even after I finish this degree!

So far, the course outcomes I have achieved are:

*“Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.”* This was accomplished by creating the code review documentation, presentation video and voice that was submitted in module two. This is also an ongoing outcome as each module has needed documentation for improvements.

*“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 (software engineering/design/database)”* This is an outcome in multiple phases as the initial codebase. So far, the transition from Java to Python has been completed and the solutions I planned have been fleshed out in the codebase. The database is now up and running and I'm very happy with it so far! Still needs a bit of testing and cleaning up of the UI just to put on the finishing touches, but the app is fully functional.

*"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 (data structures and algorithms)"*

In module 3 I have added sort, search and a full working menu in a clean, modular and scalable way. In this final enhancement, these have taken their final form through a working SQLite database with CRUD operations. All of the functions on the menu are fully functional and tested as well as logged in the app.log doc, including intended failure messages!

*"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"*

This has now been implemented with the addition of the SQLite database. The program is designed to protect the database from the most common forms of SQL injection attacks by santizing the data before it calls the database.

*"Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision making in the field of computer science"*

While this outcome is a bit harder on a solo project, I do aim to design and implement code in a way that is user friendly across all who might interact with the program. I do consider my professor as a collaborator, since he is helping guide me in this project, providing meaningful feedback and monitoring my overall progress.

**Artifact Progress Update:**

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| --- | --- | --- | --- |
| **Checkpoint** | **Software Design and Engineering** | **Algorithms and Data Structures** | **Databases** |
| **Name of Artifact Used** | CS145 Animal Shelter | CS145 Animal Shelter | CS145 Animal Shelter |
| **Status of Initial Enhancement** | Completed port to Python. Full program with dog, monkey, main and rescue\_animal class created. All working logic and functional program. Logging logic created and functional. The try/except blocks help to prevent crashes from invalid user input. SQL injection attack prevention has been implemented into the input paramateres. Need to clean up menu/output for user-friendliness. | Implemented dictionary for faster lookups. Implemented ability to search for animal by name, availability, breed and country. Added option for sorting animals alphabetically by name or country. Some of the sorting methods need to be fixed, current bugs.  The database is created through SQLite, and all function calls adjusted to interact with database | The SQLite database has been created. CRUD operation: User is able to add animal to database, read the database through print functions, update the record by reserving an animal, and delete and animal record. |
| **Submission Status** | Submitted Initial enhancement. | Submitted Final enhancement. | Submitted Final enhancement. |
| **Status of Final Enhancement** | Not Finished | Finished | Finished |
| **Uploaded to ePortfolio** | No | No | No |
| **Status of Finalized ePortfolio** | Not Finished | Not Finished | Not Finished |