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CS499 / 7-1 self-assessment

**Introduction**

This ePortfolio represents that journey. It shows how I grew as a developer through projects that strengthened my skills in software design, algorithms, data structures, databases, and system security.

The main artifact I chose is my Travlr Getaways web application, which I first built in CS 465 using the MEAN stack. It started as a simple project that allowed users to view and manage travel data through a Node.js and MongoDB setup. For my Capstone, I took that foundation and enhanced it in three key areas improving the overall design and structure, optimizing backend logic, and securing the database and user authentication system. Together, these updates show my ability to build scalable, efficient, and secure applications while following professional software development practices.

Throughout this program, I learned a lot of different technologies. My early courses focused on Python, C++, and Java, where I built a strong foundation in logic, problem-solving, and clean code organization. Later on, I developed front-end skills using HTML, CSS, and JavaScript to create user-friendly interfaces.

As I moved further into the program, I began working with Node.js, Express, and MongoDB, which helped me understand how to connect the front and back ends of an application. I also became confident in using REST APIs, Git and GitHub for version control, and Postman for API testing and debugging.

Building this ePortfolio was a big part of putting it all together. It let me organize my work, reflect on my progress, and present my skills in a way that shows how I think as a developer

**Enhancements**

1. **Software Design and Engineering**

For the first enhancement, I focused on improving the project’s structure and organization. The original codebase had very little structure, so I refactored it using a proper Model-View-Controller (MVC) pattern. I added Helmet and CORS for better security, dotenv for environment configuration, and global error handling to improve reliability.

On the front-end, I replaced static HTML with dynamic Handlebars (HBS) templates to make it modern and responsive. These changes made the project cleaner, easier to maintain, and visually consistent, directly aligning with Course Outcome 2, which focuses on professional-quality communication through design and functionality.

1. **Algorithms and Data Structures**

The second enhancement was all about performance and efficiency. I upgraded the backend logic to include pagination, filtering, and sorting, which made the app handle larger sets of data more efficiently. I used MongoDB query operators and indexes to optimize performance, so the system only returned relevant data instead of overloading the response.

This improved both speed and scalability while also giving users more control over how they interact with trip data. These updates align with Course Outcome 3, designing and evaluating computing solutions through algorithmic principles, and Course Outcome 4, applying innovative tools to improve performance.

1. **Databases and Security**

The third enhancement focused on protecting user data and securing system access. I added a full JWT-based authentication system with bcrypt password hashing to secure user logins. I also implemented role-based access control (RBAC) so that only admins can create, edit, or delete trips.

To go even further, I added rate limiting to prevent brute-force attacks and validated all incoming data to prevent injection and misuse. This enhancement ties directly to Course Outcome 5, which focuses on developing a strong security mindset and protecting data through proactive design.

**Reflection on the Enhancement Process**

Improving this project was challenging but incredibly rewarding. It pushed me to rethink how I write, test, and organize my code. The design updates taught me how much structure matters in long-term projects. The algorithm improvements showed how optimization can completely change user experience. The security enhancements reminded me why protecting data should always come first.

Testing everything through Postman and debugging the authentication logic took time, but it gave me a better understanding of how all parts of a full-stack system work together

**Professional Readiness and Career Goals**

This program helped me build the foundation I need to move into my career as a front-end or full-stack developer. My strongest skills are building responsive interfaces with HTML, CSS, Tailwind, and JavaScript, and developing secure backend systems using Node.js, Express, and MongoDB.

I also have experience with Java, C++, and Python, which gave me a strong understanding of problem-solving and object-oriented programming. I enjoy balancing design and functionality making sure that everything I build is not just secure and efficient but also looks and feels right to the user. Creating this ePortfolio helped me put everything into perspective.

This Capstone project marks a major milestone for me. Travlr Getaways started as a simple class project, but through each enhancement, it turned into a professional-grade full-stack web app that I’m proud of. Every change I made taught me something valuable. More importantly, it helped me realize that being in this industry isn’t just about writing code; it’s about understanding the purpose behind it, the people using it, and the systems it impacts.