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CS 499: Computer Science Capstone

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# **CS 499 Milestone Three**

**Enhancement Two: Algorithms and Data Structure**

The artifact I selected is my *Travlr Getaways* project, a travel booking web application built using Node.js, Express, MongoDB, and Angular. For this milestone, I focused on strengthening how the application uses algorithms and data handling to improve functionality and security. My main enhancements included adding a smarter search feature, a rate-limiting system, and an event logging function.

I chose this artifact because it clearly demonstrates my ability to apply algorithms and structured data in a real web environment. The search enhancement allows users to find trips based on several fields in the database, like code, name, or resort, while handling partial matches efficiently. The rate limiter helps protect the application from repeated login attempts by enforcing timed request limits, which shows how algorithmic logic can improve security. I also built an event logging system that records actions such as logins and other user activity into a MongoDB collection, giving the application better tracking and accountability.

During development, I ran into challenges with tuning the filters and ensuring the rate limiter worked properly without interrupting normal user behavior. Getting the logging system to store consistent, readable data also took careful planning. These improvements helped me strengthen my understanding of how algorithms and data structures work behind the scenes to support both reliability and performance.

The recommendation feature for “similar trips” is still in testing and will be completed in a later update. Even so, this enhancement shows real progress toward applying algorithmic principles in a full-stack project and demonstrates how structured logic can make an application more efficient, secure, and user-friendly.