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CS-499 Computer Science Capstone 2026 C-1

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2/6/2026

Databases Enhancement Narrative

The artifact selected for the Databases category is the Mortgage Calculator web application. This project was originally developed as a console-based C# application in late 2025 during my participation in the Microsoft Software and Systems Academy (MSSA). It was later refactored into an ASP.NET Core MVC application as part of my Software Design and Engineering enhancement. For the database enhancement, I extended the application to support persistent storage so users can save and view past mortgage calculations.

I chose this artifact for the Databases category because adding a database significantly changed how the application works and how users interact with it. Before this enhancement, the app only performed one-time calculations. By introducing data persistence, the application now supports saving results, viewing calculation history, and associating data with individual users. This made the project feel much closer to a real-world application instead of a standalone academic exercise.

This enhancement demonstrates my skills through the design and implementation of a structured database using Entity Framework Core. I created a database schema to store mortgage calculation snapshots and used Entity Framework Core to manage data access and migrations. Using an ORM allowed me to work with strongly typed models while avoiding direct SQL queries, which reduces the risk of common database issues such as SQL injection. Input

validation is performed before data is saved to help maintain data integrity and prevent invalid values from being stored.

While working on this enhancement, I focused on applying a security-aware mindset. Stored records are tied to authenticated users, which prevents unauthorized access to other users' data. Validation rules and controlled persistence logic help ensure that only valid and expected data is written to the database. Integrating the database layer also required coordinating models, controllers, and services, reinforcing how database design affects the entire application.

This enhancement met the course outcomes I planned to address in Module One. Most directly, it demonstrates Course Outcome 5 by emphasizing secure data handling, validation, and user-specific access to stored information. It also supports Course Outcome 4 by using modern tools and techniques, such as Entity Framework Core and relational database design, to implement a solution that adds real value to the application. At this stage, no changes are needed to my outcome-coverage plan for this category.

Working on the database enhancement helped me better understand how important data design is to application behavior. One of the biggest lessons I learned was that adding persistence affects much more than just storage. I had to think carefully about how data flows through the application, how it is validated, and how it is retrieved later. Designing the database schema required balancing simplicity with flexibility for future features.

The most challenging part of this enhancement was making sure the database design aligned with the existing application structure. Since the project had already been refactored into an MVC architecture, I needed to ensure the database layer fit cleanly without introducing unnecessary complexity. Working through these challenges improved my confidence in building

database-backed applications and reinforced the importance of planning data persistence early in the development process.