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CS-499 Computer Science Capstone

Instructor: Professor Kraya

3/30/2025

**Narrative Two: Algorithms and Data Structures**

1. **Briefly describe the artifact. What is it? When was it created?**

The artifact is an Events tracking app that was created in the CS-360 course Mobile Architecture and Programming in Android Studio using Java code. The goal of the application is to track events that are logged by the user to a calendar on the user’s mobile phone. The user can add, delete, or update existing events in the SQLite database. When the event is approaching its start time, an SMS notification will be sent to the user to notify them of the upcoming event as a reminder. This artifact was created in April of 2024.

1. **Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in algorithms and data structure? How was the artifact improved?**

The reason why I chose this artifact was again this app was not fully developed and functioning, and trying to fix the areas that were not functioning and adding new functionality would highlight my abilities to apply the enhancements that are outlined in this course. The specific components that showcase my skills and abilities in algorithms and data structures are in the Event database, DateUtils class files, and Date\_event\_controls.xml. In the date\_event\_controls xml. I rewrote this code because initially there wasn’t much to this page. I implemented a date and time picker to show a calendar and clock for the user to choose the date and time of the event. I added an Edit text field for the title of the event and description, and buttons to submit or cancel the event. The Event Database allows users and events to be added, updated, deleted, and retrieved. For user management, it allows user authentication, registration, and retrieval. For event management, there is data consistency through caching, foreign key constraints and logging errors. I created a DateUtil class to make it easier to handle date logic. This makes sure it is in one place and avoids code being repeated in other parts of my application. Also, the class can be reused in parts where date operations are needed. Overall, it is just a better organization of my code. The artifact was improved by the separation of concerns (ardalis. (n.d.), meaning that I was able to separate the data handling logic. Where the Event database focuses on events and user management, cache and database interactions. The cache helps to reduce the database queries by storing regularly accessed data in memory, which improves the performance when retrieving users or events. I also implemented an Event Database Unit test that uses a mock database to test the add event method using Mockito to help ensure that the cache is working an intended.

1. **Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?**

Although I could not pass the test, I am still working on fixing this. I believe that I am closer to meeting the outcome that I planned to meet, by optimizing an algorithmic design that meets the requirements and tradeoffs for space vs time which will align with 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 tradeoffs involved in the design choice. I also realized that Cache was a part of my enhancement three implementation, and somehow, I got turned around and did this for my enhancement two implementations. However, since, cache and hash table can be used for both algorithms and data structures as well as databases in my enhancement three, I will be implementing the hash table for the password.

1. **Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?**

What I learned while enhancing the artifact and modifying it is that when caching, I do not want to cache sensitive information. This can cause security issues. So, I kept it to event info. I commented out the cache for user info after realizing it could cause security concerns. The challenge I am facing is getting my add events functionality to work. I can't seem to figure out why the buttons are not clickable. I believe It may be in the layout.

**References**

ardalis. (n.d.). *Architectural principles*. Learn.microsoft.com. https://learn.microsoft.com/en-us/dotnet/architecture/modern-web-apps-azure/architectural-principles

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