Brianna De La Riva

Professor Krupa

Computer Science Capstone (CS-499)

29 September 2024

Narrative Artifact Two

**What is it?**

The artifact chosen for the DSA topic is a Python script created in IT-145 intro to scripting course to calculate the season of a given date based on the month and day inputted by the user.

**When was it created?**

The script was created for an IT-145 Intro to Scripting course at Southern New Hampshire University last year in June 2023. It was initially developed using a straightforward approach with multiple if-else statements riddled throughout.

**Why did you select this item?**

I selected this item because it was from one of the courses listed to be able to select a project/artifact from, and because I felt it demonstrates fundamental scripting skills and had the opportunity to enhance and optimize code with a data structures and algorithms approach instead of the if/else approach previously done. The initial version of the script used repetitive conditional statements, while the enhanced version employs more sophisticated data structures and algorithms to achieve the same result more efficiently and decrease the runtime of the project.

**What specific components of the artifact showcase your skills and abilities in software development?**

The enhanced artifact showcases several key skill areas within data structures and algorithms. For example, I showcase my skills for using dictionaries and tuples to manage season criterias and month-day validation which demonstrates an understanding of how to organize and access data efficiently. Instead of keeping the repetitive if-else statements, it has been replaced with a more efficient solution involving loops and conditional checks, showcasing algorithmic thinking and problem-solving skills. Lastly, this overall increased the code optimization, decreased runtime complexity, and improved code readability.

**How was the artifact improved?**

The artifact was improved by reducing the amount of if-else statements with dictionaries and tuples for validation and season calculation. This approach reduces code redundancy and enhances code readability, and decreases lines of code. It has been enhanced by implementing a loop to check which season the date falls into, and handling year-end transitions more efficiently.

**Meeting Course Outcomes**

**Did you meet the course outcomes you planned to meet with this enhancement in Module One?**

The enhancement to Artifact Two meets several course outcomes so far, such as algorithmic principles and design and evaluation.

Algorithmic Principles: The script now takes advantage of better algorithmic principles by using data structures to manage date ranges and seasons, rather than relying on the heavily repetitive if/else statements for the code.

Design and Evaluation**:** The enhanced artifact demonstrates an ability to design and evaluate a computing solution using appropriate data structures and algorithms. By being able to completely replace the if/else statements with a data structures and algorithms approach, it helps show efficient design and timely computing solutions.

**Do you have any updates to your outcome-coverage plans?**

Currently, I do not have significant updates in mind as the code performs the enhancements I had in mind. The enhancements also align well with the planned outcomes of using data structures and algorithms to solve a given problem.

**Reflection on the Enhancement Process**

**What did you learn as you were creating it and improving it?**

I learned the importance of implementing appropriate data structures and algorithms to make code more efficient and maintainable. Not only does it help with code readability and runtime, but it can be more easily maintained when any new additions or changes that need to be added. Using dictionaries for month-day validation and tuples for season criterias significantly simplified the problem-solving process.

**What challenges did you face?**

The main challenges were involved with the year-end transitions and the input validations.

Handling Year-End Transitions: The challenge was with the seasons spanning the end of the year (like Winter) and making sure they were handled correctly and required careful consideration of date ranges and comparisons.

Input Validation: Validating user inputs of dates effectively without over thinking and complicating the code was challenging but crucial for ensuring that the script works as intended.

**Meeting with Computer Science Program Outcomes**

Some of the course outcomes that were met with this artifact were:

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

The artifact focuses on coding skills rather than collaborative environments. However, improving the script demonstrates a systematic approach that can be useful in collaborative projects by enhancing code quality and efficiency.

**Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts:**

The script showcases the ability to develop a technically enhanced solution and communicate it effectively through clean, well-documented code with the inclusion of in line comments. The enhancements make the script more concise, efficient, and maintainable.

**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)**

The enhanced artifact successfully demonstrates the application of algorithmic principles and data structures to improve the original code. The use of dictionaries and tuples reflects an understanding of data structures applications for solving the problem efficiently and timely.

By enhancing this artifact, I have demonstrated the ability to use data structures and algorithms to create efficient code, aligned with the program’s outcomes and showcased skills in software development for the DSA topic.