Combined Narrative

CS-499

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Software Engineering/Design Narrative

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

The artifact for the Software Engineering/Design category is the IT 145: Foundation in Application Development project made in 2021. This artifact is a Java program for rescue animals that allows users to add animal information to the system, show the animals in the system, and set them as reserved if needed. The artifact is used for dogs and monkeys as of right now and gathers information like name, animal type, training status, in service country, and more.

- **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 software development? How was the artifact improved?**

The decision to include this artifact within my ePortfolio was made easy as this work can show many programming skills and abilities while not being overly complex. The use of classes and inheritance in my code shows skills and understanding in object-oriented design. My ability in working with collections in Java is shown by my use of Array Lists. The use of a "Scanner" object shows my knowledge in user input and handling. Code readability is apparent in the entirety of my code as it's organized with classes and methods. All of these skills I have used show an understanding in software development. I have improved this code as of right now by enhancing the overall logic in many areas like the "reserveAnimal" method, "printAnimal" methods, and "RescueAnimal" class. The syntax in these areas was also improved. I have also

ensured the code has correct indentation, comments, and follows proper coding standards. Left over and commented out code was removed and the variables in the code were corrected for spelling and usage like static or instance. Error handling was included in the code as well. All of this was done to improve the overall readability, maintainability, and functionality while showcasing my skills in software development as mentioned in my Code Review.

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

I have successfully met the course objectives I planned on meeting already with this enhancement as I have met the outcome of showcasing the ability to innovative techniques, skills, and tools in this code by transferring the language from Java to Python and enhancing the overall logic in many areas like the "reserveAnimal" method, "printAnimal" methods, and "RescueAnimal" class.

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

The process of enhancing the artifact allowed me to realize the amount of coding skills I have learned since making this artifact in 2021 as I could instantly see some of the errors within it. I was able to fix many of the mistakes and areas of improvement with my current knowledge in Java programming; yet some aspects regarding the logic I had no choice but to do research. Websites like "Stack Overflow" allowed me to see how others tackled similar issues and how

they were able to fix it. Using that information and altering it for my case usage I was able to

successfully fix some of the challenges in the code.

<p align="center">**Algorithms and Data Structure Narrative**</p>

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

The artifact for the Algorithms and Data Structure category is the IT 145: Foundation in Application Development project made in 2021. This artifact is a Java program for rescue animals that allows users to add animal information to the system, show the animals in the system, and set them as reserved if needed. The artifact is used for dogs and monkeys as of right now and gathers information like name, animal type, training status, in service country, and more.

- **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 decision to include this artifact within my ePortfolio was made easy as this work can show many programming skills and abilities while not being overly complex. Many components of the artifact showcase my abilities and skills in algorithms and data structure. For example, my replacement of lists for dictionaries in the code shows skills in improving time-complexity as it optimized the operations in the system and resulted in increased data management. The use of input validation in the "reserve" method demonstrates knowledge in implementing algorithmic logic and making the system more efficient as it prevents errors forming in the system from incorrect information. By using object initialization in the code instead of combining everything under one python file it ensures better data management, maintainability, readability, and overall

shows an understanding of data structures optimization. The artifact was improved by adding

dictionary functions which use hash tables to optimize the system and time-complexity. Another

improvement was the addition of input validation in the system to handle any invalid inputs as

without it errors could occur and lead to bigger problems that reduce the efficiency of the code.

Moreover, the code has since then been successfully transferred to Python.

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

I have successfully met the course objectives I planned on meeting with this enhancement as I

demonstrated skills in optimization, data management, and enhancing time complexity. This was

done with my addition of dictionaries, input validation, and the other enhancements. This

enhancement focused on algorithmic principles and data structures to ensure efficiency at the

cost of affecting some code readability within the project. Specifically, I improved the time

complexity and optimization of adding, storing, and reserving new animals from $O(n)$ to $O(1)$

just by switching over from the list functionality to the dictionary functionality as it uses hash

tables which allows the system to do quick searches. I will be making changes to the printing

functions as the time complexity is $O(n)$ and I believe some improvements can be made. I have

also met the course outcome of designing computing solutions that solve a problem using

algorithmic principles and computer science standards appropriate to its solution, while

managing the trade-offs. The outcome of demonstrating an ability to use innovative skills in

computing practices for the purpose of implementing solutions that deliver value is also met. I

used algorithmic principles throughout the design of my code with my data structures such as the

dictionaries and algorithms in the feature of managing the dogs and monkeys to enhance the

project and solve issues like bad time-complexity and optimization. Best standard practices were used all throughout my work as I ensured everything was readable, maintainable, and consistent. Furthermore, I made sure to manage tradeoffs as previously mentioned by assessing what features may be negatively impacted by improving optimization like the code readability being worse than before by the implementation of input validations and more. I also demonstrated innovative skills with my understanding of data structure optimization with my implementation of object initialization, time-complexity with my list replacement for dictionaries, and algorithmic principles with my addition of input validation. As of right now there are no plans to update my outcome plans unless otherwise instructed.

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

The process of enhancing the artifact allowed me to realize the amount of coding skills I have learned since making this artifact in 2021 as I could instantly see some of the errors within it. I was able to fix many of the mistakes and areas of improvement with my current knowledge in Python programming; yet some aspects regarding the adding the implementation of HashMap's I had no choice but to do research. Websites like "Stack Overflow" allowed me to see how others tackled similar issues and how they were able to fix it. Using that information and altering it for my case usage I was able to successfully fix some of the challenges in the code.

<center>**Databases Narrative**</center>

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

The artifact for the Databases category is the DAD 220: Introduction to SQL project made sometime around 2022. It is a database that stores customer, order, and return information to allow a user to query or store data with it. This database is made with MySQL and is the first project I had made with this application.

- **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 software development? How was the artifact improved?**

This artifact will show a wide range of skills with databases in my ePortfolio and will allow others to get an idea of my knowledge. I chose this artifact as it was a great way to showcase my skills with my planned enhancements as when it was first made it had many flaws and was very simple. Many components of this database showcase my skills such as my knowledge in database design that is apparent with my creation of the tables customers, orders, and returns in the database. Skills in MySQL and querying are apparent as many of those skills are used within the database to get any needed information like the select statements used. Moreover, indexing and triggers in the work shows an understanding of database optimization and automation within the system. The indexing is in the customers, orders, and returns tables which allows for users to easily find information based on specific data like last name, state, and order ID. The triggers are apparent in the customers and orders table and allow for the database to automatically store the

time an update was made to an order or customer. Furthermore, the encrypted street address for the Customers table shows an understanding of security implementation within databases. The artifact was improved by the implementation of indexes, triggers, and encryption. These advanced concepts of SQL enhanced the overall efficiency of the database and allowed for a more secure environment.

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

I did meet the course objective I planned to meet in Module One with these enhancements as I implemented more advanced concepts of SQL into my database with indexes, triggers, and encryption. I also met the course outline of demonstrating the ability to use techniques or skills to deliver solutions of value and the outline of developing a security mindset with my enhancements to the database. I met these outlines as I demonstrated my skills with advanced SQL concepts like the indexing in multiple tables for improved efficiency with the ability to quickly search based on the criteria. The outline was also met with the triggers for the orders and customers table to have automatic functionality with the timestamps. Finally, the outline was further met with the security aspect of including encryption within the customer information. I have no Updates on my outcome plans as of right now.

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

While enhancing this database I learned that SQL has many advanced concepts I didn't know about and just how much I did not know about MySQL. I faced many challenges with not being able to add as many triggers as I would like due to the database version not allowing more than one trigger per table. This meant searching on Stack Overflow for long periods of time trying to find a way with no solution. I have accepted the triggers implemented in the tables as of right now and am going to try to create a more advanced trigger for the returns table for my ePortfolio.