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**Milestone Two Narrative**

The artifact I chose for the category Software Design and Engineering is a Java program that allows users to input animals into a rescue animal system, data about the animals, view a list of animals that have been taken in, and to reserve animals. The program is only partially complete and in its current state only accepts dogs and monkeys. I created this program in my IT 145 class in order to learn about Java development and best coding practices in Java. Since then, I have learned more about the Java coding language as well as other programming languages including C++. I have included this artifact in my ePortfolio as it demonstrates my proficiency in developing functioning code and meeting software requirements to solve a problem with Java. I planned on enhancing this program and further demonstrating my software design and engineering skills by recreating the program with C++. By reengineering and designing the original Java program into one written with C++, I demonstrated my understanding of software design and structure and my ability to engineer a C++ program using the Java program as a reference point. The artifact was improved in being translated to C++ as the language provides greater speed and efficiency over Java as well as a higher level of control over object and memory management. Additionally, by using C++ user input methods in place of the scanner objects used in the Java original, I have addressed the potential security risks related to the lack of input validation present in the original version of the program.

With this code translation, I have met the following course outcomes as planned:

* Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.
* 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.
* Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.

Challenges I faced while enhancing this project included finding ways to translate Java-exclusive functionality like case-insensitive string comparison to C++ and redesigning Java functions into C++ headers and class files. After having enhanced and modified the artifact, I learned that the user input reception methods of the original Java program were insecure and in need of addressing. By recreating the project in C++ and redesigning it in order to do so, I was able to address the security design flaw present in the original and create a more efficient and capable version of the Rescue Animal program.