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**Milestone Four Narrative**

For this milestone, I used the same artifact I used for the previous two milestones. This artifact is the Java Rescue Animal Program that lets users submit dogs and monkeys into an intake system. These animals were originally stored in Array-List objects which could be printed for the user to see a list of all animals in the system. I chose this artifact for my database enhancement because the original Java program was ripe with opportunity to expand its functionality through the use of a database.

While the original Java Rescue Animal program stored dog and monkey data objects in Array-Lists managed and access within the system, the new modified version of the program created for this milestone utilizes a database structure to store information about multiple kinds of animals. The different animal objects have been removed and replaced with an SQLite database in which animal types including dogs, monkeys, cats, and others can be managed. The program now solely consists of a C++ main class that displays a menu giving users the option to intake a new animal, print a list of all dogs, print a list of all monkeys, and print a list of all animals in the system. This enhancement showcases my ability to configure and integrate database functionality into this C++ program in order to securely and efficiently store and manage data. While modifying this artifact, I discovered the importance of input validation in order to prevent SQL injection when dealing with a database. To combat this issue, I employed prepared statements and placeholders when constructing SQL queries to make sure animal data submitted into the program by users couldn't be used by those with malicious intent to compromise the system.

This enhancement of the original Rescue Animal program and the expansion of its functionality through the implementation of a database enabled me to meet the following course outcomes as planned:

* 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.
* Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources.