# AnimalShelter CRUD Python Module — CS 340 Module Four Milestone

## About the Project

This project delivers a **Python module** enabling robust **Create** and **Read** operations for the Austin Animal Center (AAC) animal outcomes dataset, leveraging MongoDB for persistent storage. It is engineered to meet the requirements of the Module Four Milestone, with an eye toward future extensibility as CRUD functionality expands.

### Motivation

The aim:

* To streamline access and management of animal records using efficient Python code
* To gain practical experience in database-backed CRUD application development
* To demonstrate the ability to import, validate, and interact with real-world datasets using industry-standard tools

## Installation

### Tools & Libraries

* **Python 3.10+** Chosen for compatibility and modern syntax.
* **PyMongo** The de facto Python library for MongoDB, providing a clean API for database operations.
* **MongoDB (local or remote instance)** Used for its flexibility with document-based storage and strong community support.

### Rationale

* **PyMongo** was selected for seamless integration with MongoDB and direct support for CRUD operations.
* **MongoDB** is a natural fit for heterogeneous data and rapid prototyping.

## Getting Started

### 1. Database & User Authentication (from Module 3)

* Database: AAC
* Collection: animals
* Credentials: Set via .env file or directly in your environment (see below)
* For Apporto users: Connection details are pre-configured

### 2. Setup & Dependencies

# Clone the repo and enter the project directory  
cd m4  
  
# (Optional) Create and activate a virtual environment  
python -m venv .venv  
source .venv/bin/activate # Windows: .venv\Scripts\activate  
  
# Install required packages  
pip install --upgrade pip  
pip install -r requirements.txt

### 3. Importing Data

Data import can be done via:

* **Command Line (mongoimport)** (for direct, bulk ingestion of the CSV)
* **Python Script** (for validation, deduplication, and extensibility)

**Example (mongoimport):**

mongoimport --host <host> --port <port> --username <user> --password <pass> --db AAC --collection animals --file ./assets/aac\_shelter\_outcomes.csv --type csv --headerline --authenticationDatabase admin

**Example (Python):**

python import\_aac\_data.py

## Usage

### 1. Module Import & Connection

from animal\_shelter import AnimalShelter  
  
shelter = AnimalShelter() # Establish connection to AAC database

### 2. Creating an Animal Record

animal\_data = {  
 "animal\_id": "A202312",  
 "name": "Sarge",  
 "animal\_type": "Dog",  
 "breed": "Labrador Retriever"  
}  
result = shelter.create(animal\_data)  
print(result)

**Output:**

{'inserted\_id': ObjectId('655d2a...')}

### 3. Reading Records

#### Read All

all\_animals = shelter.read()  
print(f"Total records: {len(all\_animals)}")

**Output:**

Total records: 9866

#### Read with Filter

dogs = shelter.read({"animal\_type": "Dog"})  
print(f"Dog records: {len(dogs)}")

**Output:**

Dog records: 5410

### 4. Closing the Connection

shelter.close\_connection()

## Challenges & Solutions

* **Challenge:** Handling CSV import with potential duplicates **Solution:** Python importer implements duplicate detection using animal\_id as a unique key.
* **Challenge:** Querying large collections efficiently **Solution:** Added optional filters and batch processing for memory efficiency.

## Requirements Implementation Status

* **Create Function:** Implemented with validation and error handling
* **Read Function:** Implemented with flexible query/filtering
* **Testing:** Jupyter notebook and pytest script validate core CRUD functionality

## Environment Variables

* AAC\_USER / AAC\_PASS: MongoDB credentials
* MONGODB\_HOST / MONGODB\_PORT: MongoDB host and port
* AAC\_DATABASE / AAC\_COLLECTION: Defaults to AAC/animals

cp env.example .env # Copy template and set credentials as needed

## Reproduction Summary

1. **Install Python & dependencies**
2. **Configure environment variables**
3. **Import dataset (mongoimport or Python)**
4. **Run Python CRUD module to Create/Read records**
5. **Validate with provided test scripts**

## Contact

Questions? Complaints about CSV importers? Reach out to the developer, or just grumble into your terminal like the rest of us.

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