[CMSC 455] Assignment #4: DevOps

Due: End of Day, November 16th, 2023

The goal of this assignment is experiment with a few different techniques used in DevOps/Continuous Deployment. We won't implement an entire pipeline as we did in class, as that may be too time consuming, but we will use some of the popular constutuent pieces. Here are the requirements:

1. **Prerequisite:** Install Docker and Ansible on your machine
2. Using Flask, write the code for a REST endpoint called `shuffle` that (1) responds to HTTP GET requests; (2) accepts a list of integers in JSON with the key `list_of_ints`; (2) returns the shuffled list of integers in JSON with key `shuffled_list`
3. Write a `Dockerfile` that would build a Docker container out of the REST endpoint in the previous step. Build the container ensuring everything works up to this point. Make sure that the relevant port needed to talk to your endpoint is exposed from within the container, otherwise you won't be able to reach it.
4. Separately, write a single PyTest unit test that calls the REST endpoint, deployed on localhost, and confirms (i.e., asserts) that the order of the integers provided as input is not the same as the output. That is, that the endpoint actually shuffles the list. Make sure that the test works correctly.
5. Create a second, separate, Docker container, and `Dockerfile` that builds and runs the unit test from the previous step.
6. Write an Ansible playbook (or a Docker-Compose script) that automates the building and running of each of the two containers in order.
7. **Note #2:** Start early (i.e., now).

Submit: Submit a single zip file containing ALL of the application code required to run your application including source, tests and scripts via Canvas by the deadline.