Implementing Simplified MLops for a Machine Learning Project

Objective: The objective of this assignment is to set up a simplified MLops pipeline for a basic machine learning project using essential tools. You will demonstrate your ability to version control, automate testing, and deploy a model.

Requirements: You will need access to Git, Docker, and a cloud platform of your choice (AWS, Azure, or Google Cloud Platform). Use any Python-based machine learning library/framework (e.g., scikit-learn, TensorFlow, PyTorch).

Instructions:

Step 1: Version Control (15 points)

1. Create a new public GitHub repository for your MLops assignment.
2. Initialize the repository with a README file.
3. Write a simple Python script to train a machine learning model on a dataset of your choice.
4. Commit your code to the repository and push it to GitHub.

Step 2: Docker Containerization (15 points)

1. Write a Dockerfile to containerize your machine learning model and its dependencies.
2. Build a Docker image from the Dockerfile.
3. Document the Docker containerization process in your README.md file.
4. Push the Docker image to a container registry of your choice (e.g., Docker Hub).

Step 3: Cloud Deployment (15 points)

1. Deploy your Dockerized machine learning model to a cloud platform (AWS, Azure, or Google Cloud Platform).
2. Document the deployment process in your README.md file.
3. Provide the endpoint or URL where your model can be accessed (e.g., an AWS EC2 instance or an Azure App Service).

Step 4: Automated Testing (15 points)

1. Write simple unit tests for your machine learning code.
2. Set up a continuous integration (CI) pipeline using a service like Travis CI, GitLab CI, or CircleCI to run your tests automatically on every push.
3. Document the testing process and results in your README.md file.

Step 5: Monitoring and Logging (10 points)

1. Use Prometheus and Grafana for monitoring and visualizing the performance of your deployed model (optional).
2. If available, set up centralized logging using the ELK Stack and document it (optional).

Step 6: Final Submission (10 points)

1. Ensure that your GitHub repository is well-organized and contains all necessary documentation.
2. Submit the link to your GitHub repository to your instructor/evaluator for evaluation.