Home Assignment: Working with Helm

Objective:

The goal of this assignment is to reinforce your understanding of Helm, its components, and how to use it for managing Kubernetes applications by completing practical tasks and answering conceptual questions.

Part 1: Conceptual Questions

1. **Explain Helm's role in Kubernetes.**
    - Why is Helm preferred over managing plain Kubernetes YAML files?
    - List and describe the key components of a Helm chart.
2. **Environment-specific Configurations:**
   How does Helm handle environment-specific configurations? Provide an example.
3. **Helm Chart Repositories:**
   What is a Helm chart repository, and how can it be hosted? List at least three hosting options.
4. **CI/CD Integration:**
   How can Helm be integrated into a CI/CD pipeline? Explain the typical steps involved.

Part 2: Practical Tasks

1. **Helm Installation:**
   Follow the steps provided in the presentation to install Helm on your local environment.
2. **Creating a Helm Chart:**
    - Use the `helm create` command to generate a new chart named `mychart`.
    - Review and modify the default `values.yaml` file to set the following:
        - `replicaCount`: 2
        - `image.repository`: `nginx`
        - `image.tag`: `latest`
3. **Deploying a Helm Chart:**
    - Deploy the `mychart` Helm chart to your Kubernetes cluster using `helm install`.
    - Verify the deployment by listing the running pods with `kubectl get pods`.
4. **Helm Upgrade:**
    - Update the `values.yaml` file to change the `replicaCount` to 3.

- Use the `helm upgrade` command to apply the changes to the existing deployment.
- Verify the updated deployment.

Part 3: Advanced Task (Optional)

Creating and Hosting a Helm Chart Repository:

- Package your chart using the `helm package` command.
- Create a simple Helm chart repository using GitHub Pages and follow the steps from the presentation to automate chart deployment with GitHub Actions.
- Provide the link to your Helm repository.

Submission Instructions:

1. Submit a document (PDF or Word) with your answers to the conceptual questions.
2. Include screenshots of each step completed in the practical tasks.
3. If you choose to complete the advanced task, include the repository link and relevant workflow files.