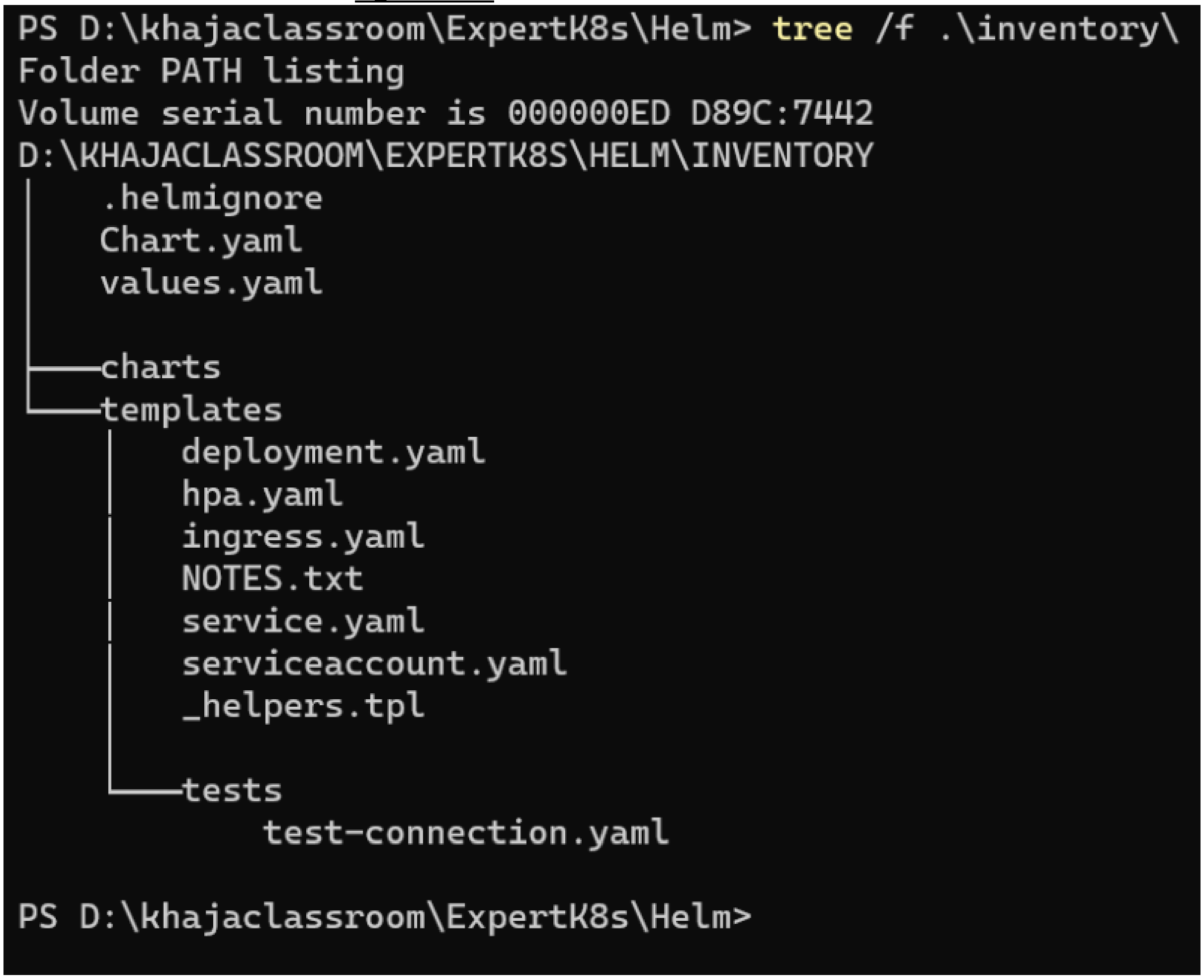
Helm Chart Creation Command

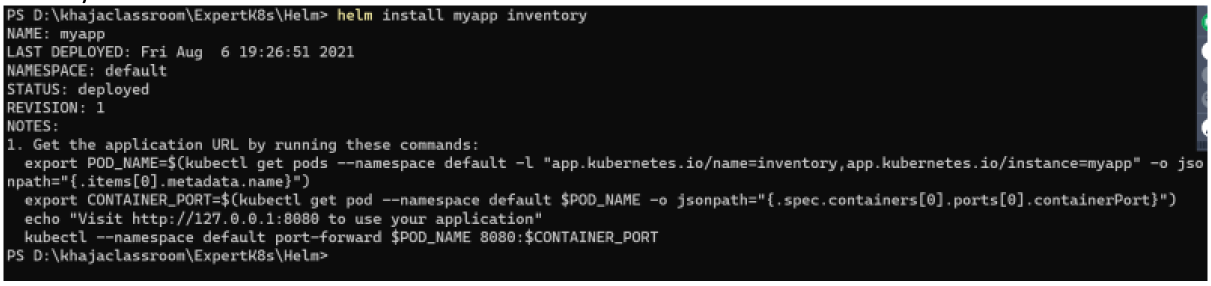
- Helm includes create command to make it easy for us to create charts
- This command creates a new **Nginx chart** with name of our choice



```
PS D:\khajaclassroom\ExpertK8s\Helm> tree /f .\inventory\
Folder PATH listing
Volume serial number is 000000ED D89C:7442
D:\KHAJACLASSROOM\EXPERTK8S\HELM\INVENTORY
│   .helmignore
│   Chart.yaml
│   values.yaml
│
├───charts
└───templates
    │   deployment.yaml
    │   hpa.yaml
    │   ingress.yaml
    │   NOTES.txt
    │   service.yaml
    │   serviceaccount.yaml
    │   _helpers.tpl
    │
    └───tests
            test-connection.yaml

PS D:\khajaclassroom\ExpertK8s\Helm>
```

- Lets try to install the chart which we have create



```
PS D:\khajaclassroom\ExpertK8s\Helm> helm install myapp inventory
NAME: myapp
LAST DEPLOYED: Fri Aug  6 19:26:51 2021
NAMESPACE: default
STATUS: deployed
REVISION: 1
NOTES:
1. Get the application URL by running these commands:
  export POD_NAME=$(kubectl get pods --namespace default -l "app.kubernetes.io/name=inventory,app.kubernetes.io/instance=myapp" -o jso
npath="{.items[0].metadata.name}")
  export CONTAINER_PORT=$(kubectl get pod --namespace default $POD_NAME -o jsonpath="{.spec.containers[0].ports[0].containerPort}")
  echo "Visit http://127.0.0.1:8080 to use your application"
  kubectl --namespace default port-forward $POD_NAME 8080:$CONTAINER_PORT
PS D:\khajaclassroom\ExpertK8s\Helm>
```

- The output from the command is

NAME: myapp
LAST DEPLOYED: Fri Aug 6 19:26:51 2021
NAMESPACE: default
STATUS: deployed
REVISION: 1

helm install [NAME] [CHART]

NOTES:
1. Get the application URL by running these commands:
  export POD_NAME=$(kubectl get pods --namespace default -l "app.kubernetes.io/name=inventory,app.kubernetes.io/instance=myapp" -o jsonpath="{.items[0].metadata.name}")
  export CONTAINER_PORT=$(kubectl get pod --namespace default $POD_NAME -o jsonpath="{.spec.containers[0].ports[0].containerPort}")
  echo "Visit http://127.0.0.1:8080 to use your application"
  kubectl --namespace default port-forward $POD_NAME 8080:$CONTAINER_PORT

- Now refer the charts.yaml https://helm.sh/docs/topics/charts/ for the offical docs
- In this charts.yaml lets try to focus on some name value pairs
    - apiVersion: v2: This tells helm what structure of chart we are using. An apiVersion of v2 is designed for Helm3
    - name: inventory: The name used to identify the chart
    - version: 0.1.0: Charts can have many versions. Helm uses the version information to order and identify charts
- Charts.yaml also contain descriptive information
    - home: URL of chart or projects
    - icon: an image in the form of URL
    - maintainers: contains list of maintainers
    - keywords: can hold list of keyworkds about the project
    - sources: list of URLs for the source code for project or chart
- Refer below for the sample chart.yaml

```yaml
annotations:
  category: Database
apiVersion: v2
appVersion: 8.0.27
dependencies:
  - name: common
    repository: https://charts.bitnami.com/bitnami
    tags:
      - bitnami-common
    version: 1.x.x
description: Chart to create a Highly available MySQL cluster
engine: gotpl
home: https://github.com/bitnami/charts/tree/master/bitnami/mysql
icon: https://bitnami.com/assets/stacks/mysql/img/mysql-stack-220x234.png
keywords:
  - mysql
  - database
```

Link: https://github.com/bitnami/charts/blob/master/bitnami/mysql/Chart.yaml

Modifying Templates

- Helm is written in Go programming language and Go includes template packages. Helm leverages the text template package as the foundation for its templates Refer https://pkg.go.dev/text/template
- {{ and }} are the opening and closing brackets to enter and exit the template logic
- Sample

product: {{ .Values.product | default "kubernetes" | quote }}

- There are three parts to the template logic seperarted by a |. This is called as pipeline and works exactly in the sameway as pipeline in Unix/Linux Based system. The value or output of a function on the left is passed as a last argument to the next item in pipeline.
- .Values.product This comes for the data passed in when the templates are rendered
- This value is passed as last argument to the default function
- The default is the helm function and output of default is passed to the quoted
- The . at the start .Values.production is considered as root object in the current scope

Developing Templates

- Helm uses the Go text template engine provided as part of standard Go Libarary
- Actions:
  - Logic, control structures and data evaluations are wrapped by {{ and }}. These are called as actions.
  - Anything outside of actions is copied to output
  - When the curly braces are used to start and stop actions they can be accompanies by a – to remove leading or trailing white spaces.
- {{ "Hello" -}}, {{- "World" }}, {{- "of Helm" -}}
- # generated Output Hello,World,of Helm

Information Helm Passes to Templates

- When Helm renders a template it passes a single data object to the template with information you can access.
- Inside the template that object is representeed as . (i.e period)
- The properties on .values are specific to each chart based entirely on values in values.yaml
- What values should be present in values.yaml have no specific structure or schema.
- In addition to values, information about the release can be access as properties of .Release. This information includes
  - .Release.Name: name of the release
  - .Release.Namespace: Contains the namespace the chart is being released to
  - .Release.IsInstall: Set to true when relase is workload being installed
  - .Release.IsUpgrade: Set to true when the release is upgrade or rollback
  - .Release.Service: Lists the Service performing the release. when Helm installs a chart this value would be Helm
- The information in Chart.yaml can alos be found the data object at .Chart
  - .Chart.Name
  - .Chart.Version
  - .Chart.AppVersion
  - .Chart.Annotations

- Note the Names differ as names in Charts.yaml start with lowercase but Start with Uppercase later when they properties of .Chart object
- If you want to pass the custom information from the Chart.yaml to the template, you need to use annotations
- Helm also provides some data about the capabilities of the K8s cluster as properties of .Capabilities.
    - .Capabilities.ApiVersions: Contains the API Versions and resource types available in your cluster
    - .Capabilities.KubeVersion.Version: Full Kubernetes Version
    - .Capabilities.KubeVersion.Major: Contains major K8s version
    - .Capabilities.KubeVersion.Minor: The minor version of K8s being used in cluster
- The final piece of data passed into the template is details about the current template being executed.
    - .Template.Name: Contains the namespaced filepath to the template (inventory/templates/deployment.yaml)
    - .Template.BasePath: Contains the namespaced Path of Templates directory (inventory/templates)