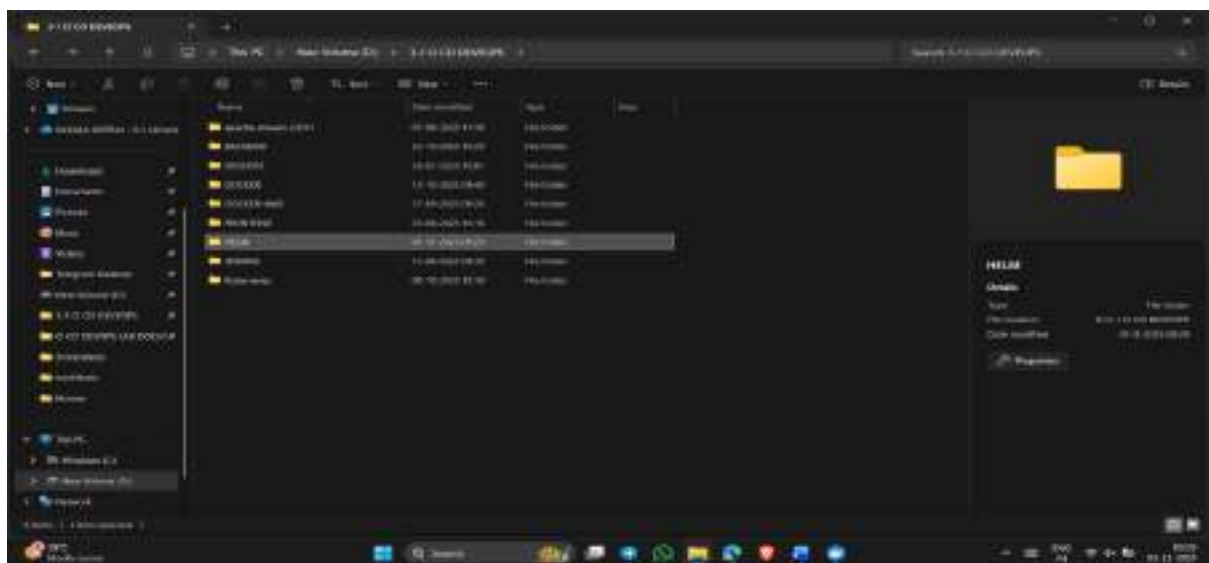
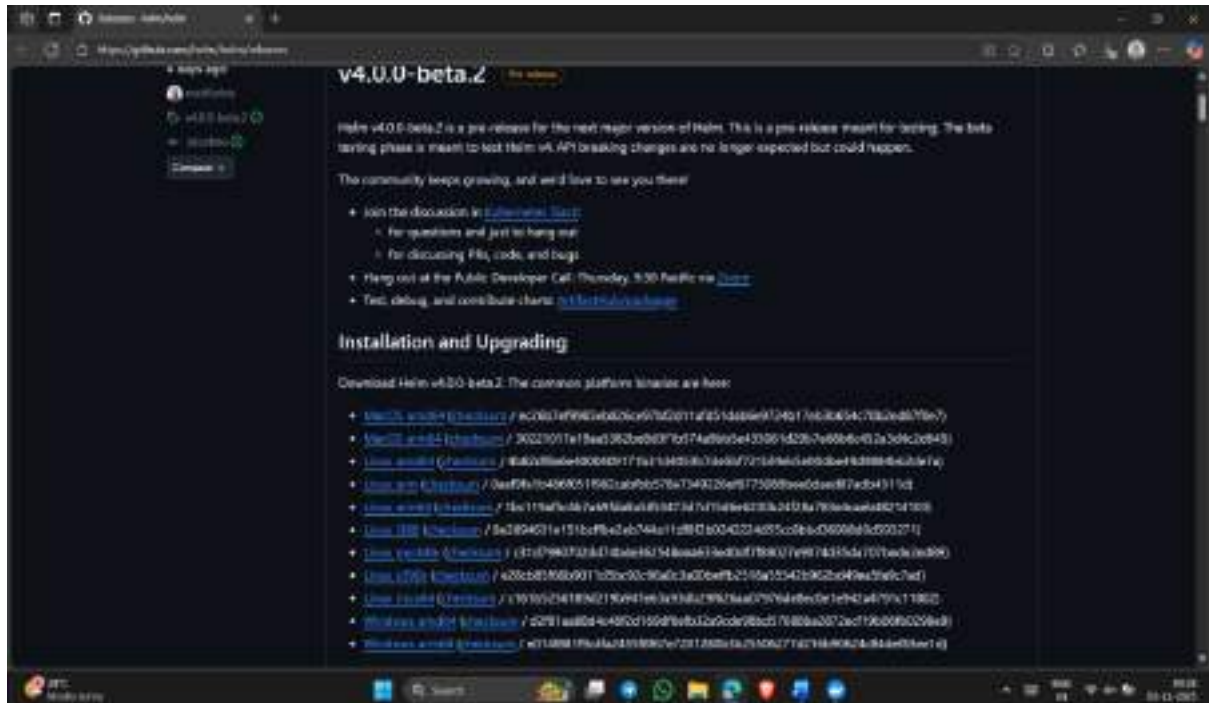
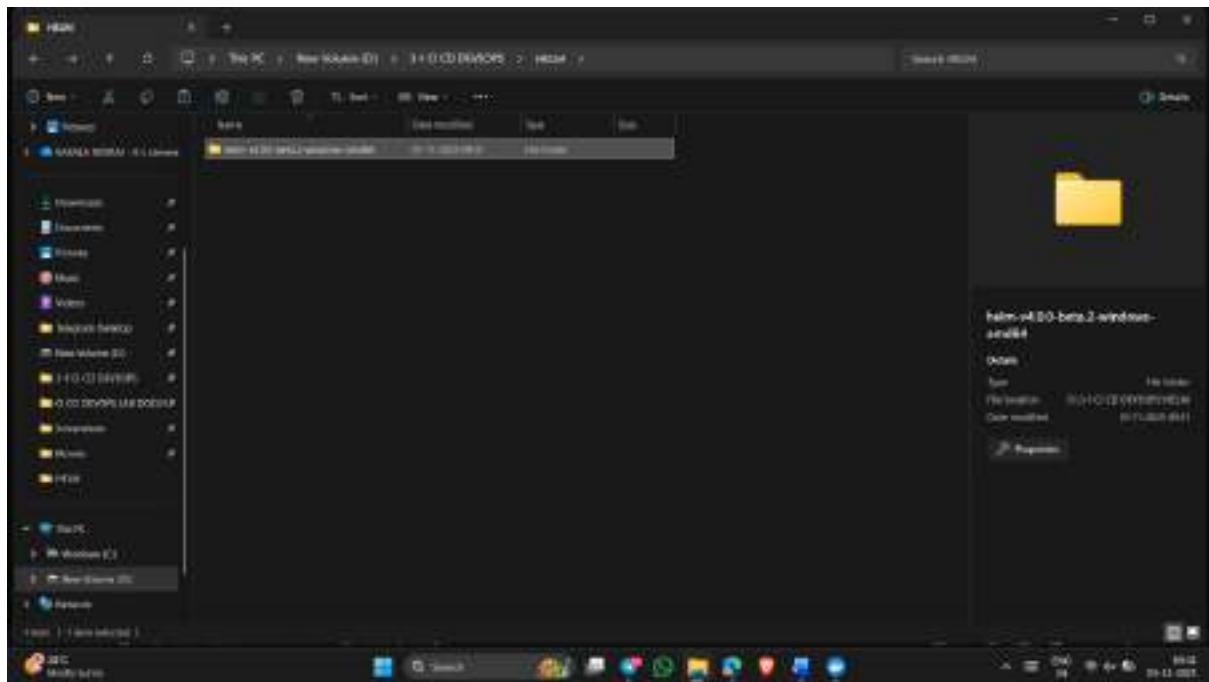


LAB 14

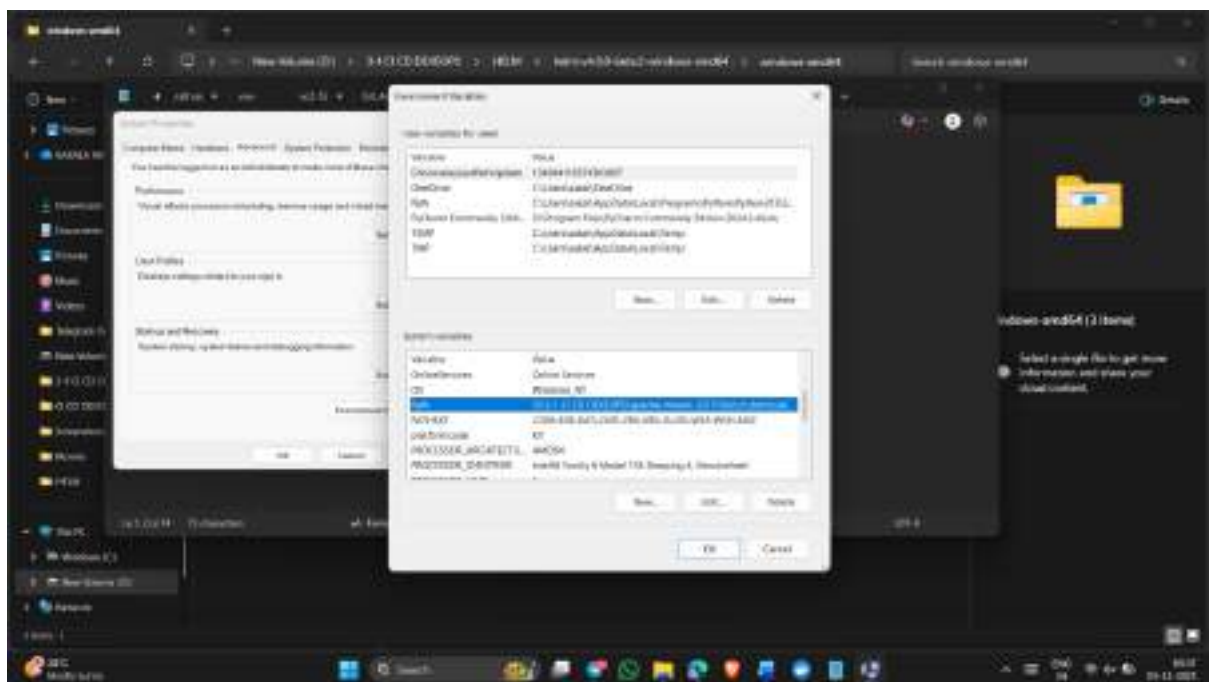
Kubernetes deployment using helm and ingress

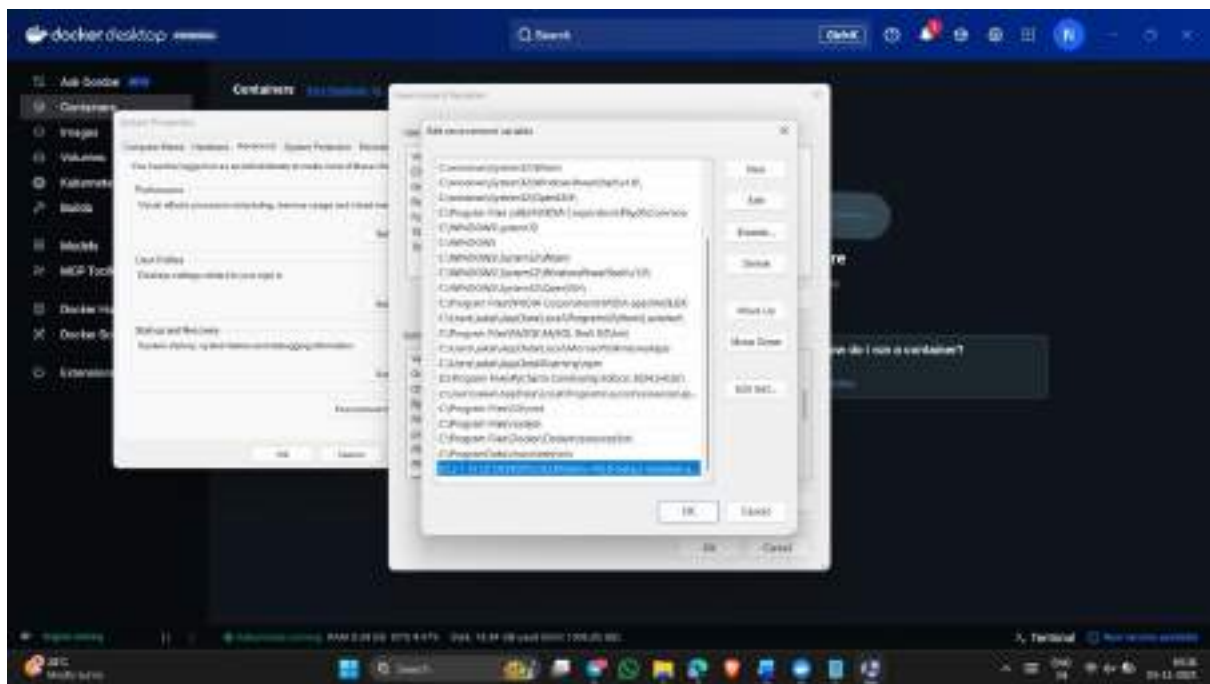
<https://github.com/helm/helm/releases>

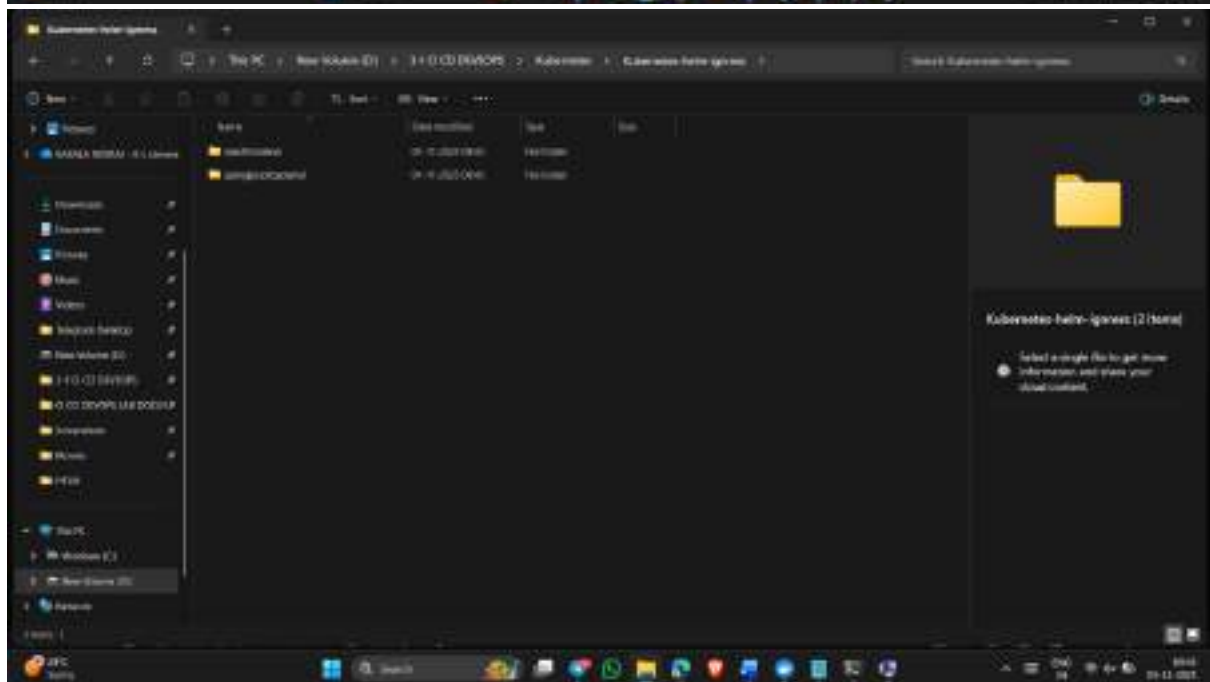
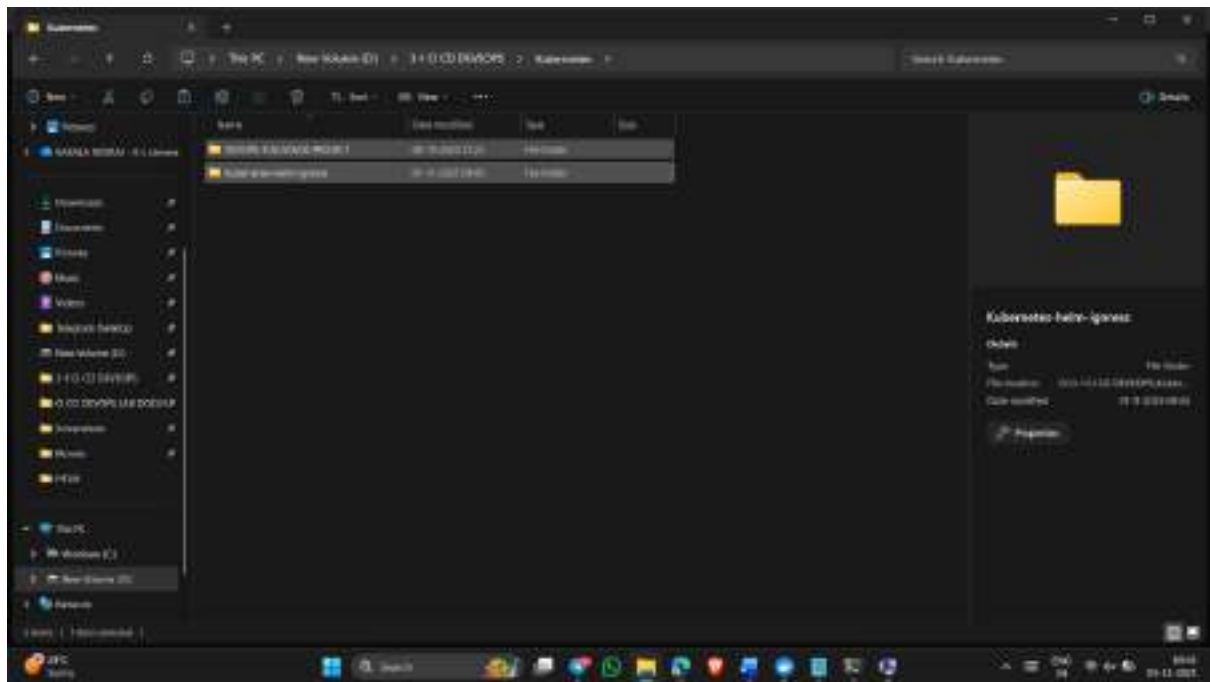


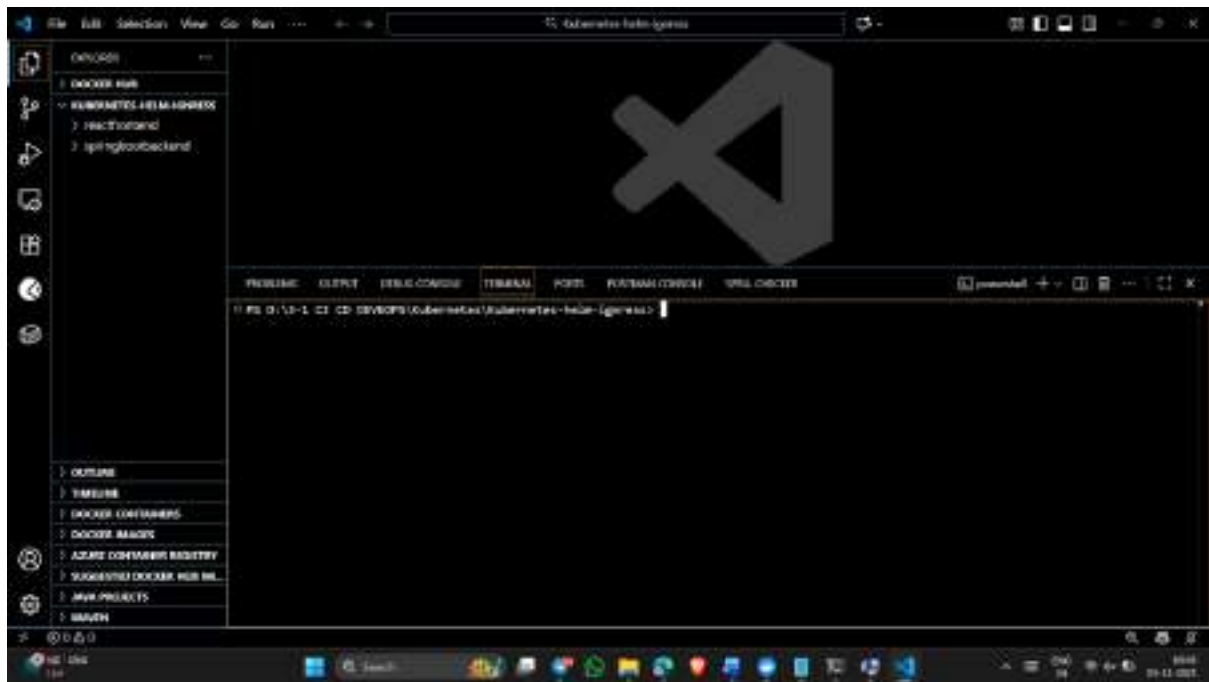


D:\3-1 CI CD DEVEOPS\HELM\helm-v4.0.0-beta.2-windows-amd64\windows-amd64

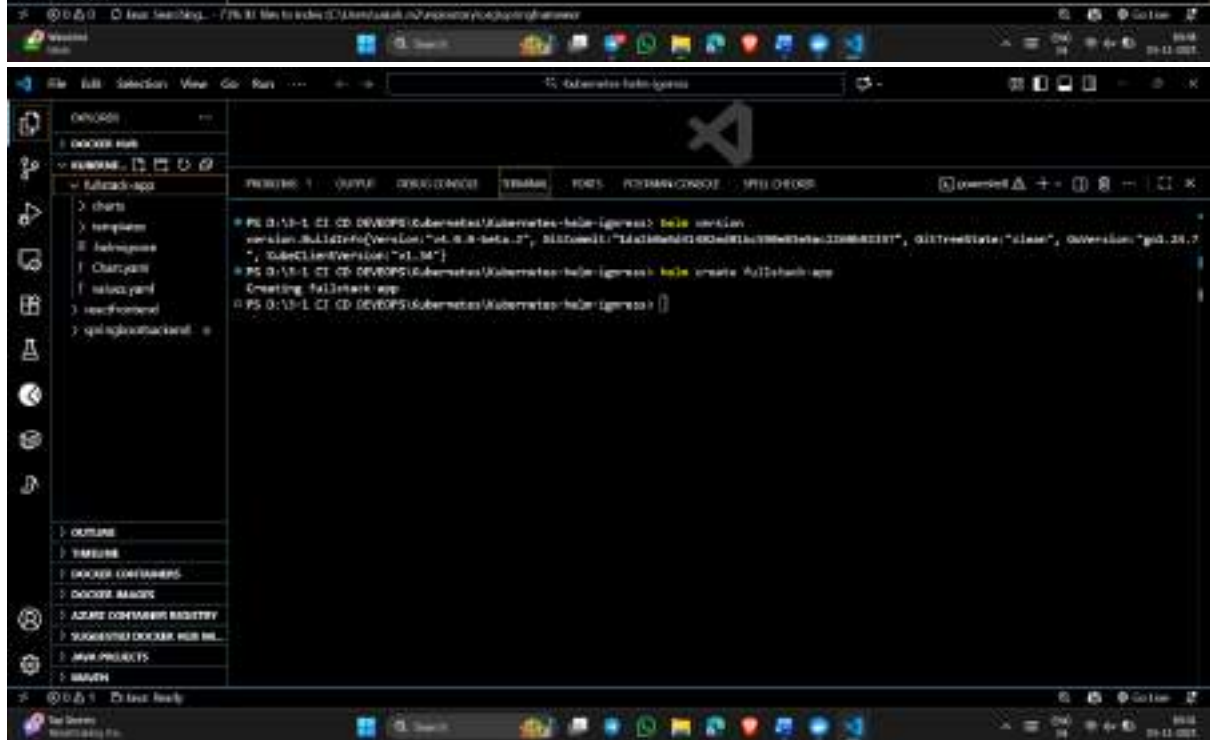




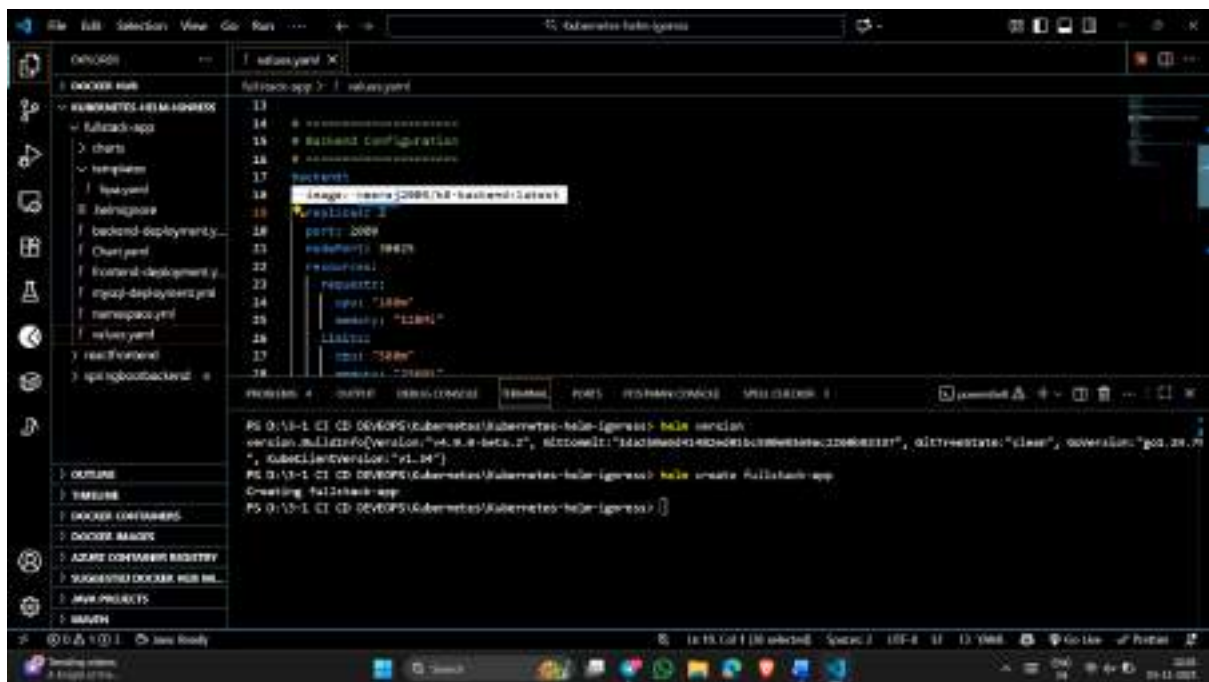




->Build docker images for both frontend and backend push them into docker hub







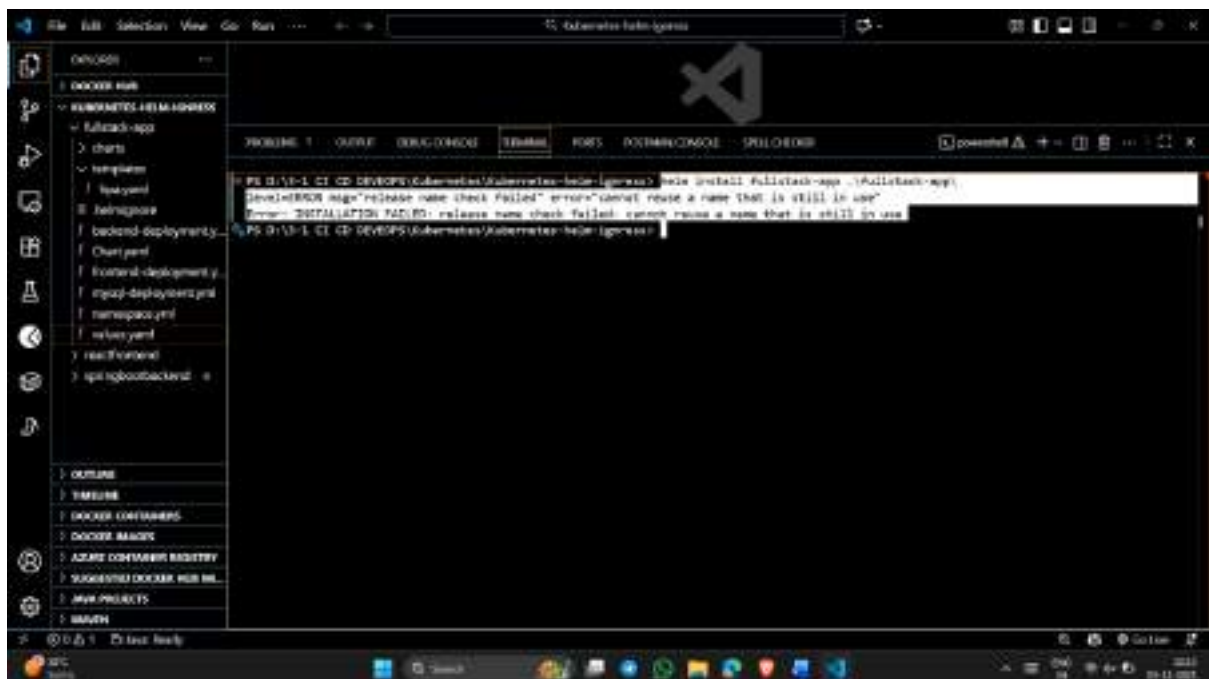
->helm install fullstack-app ./fullstack-app

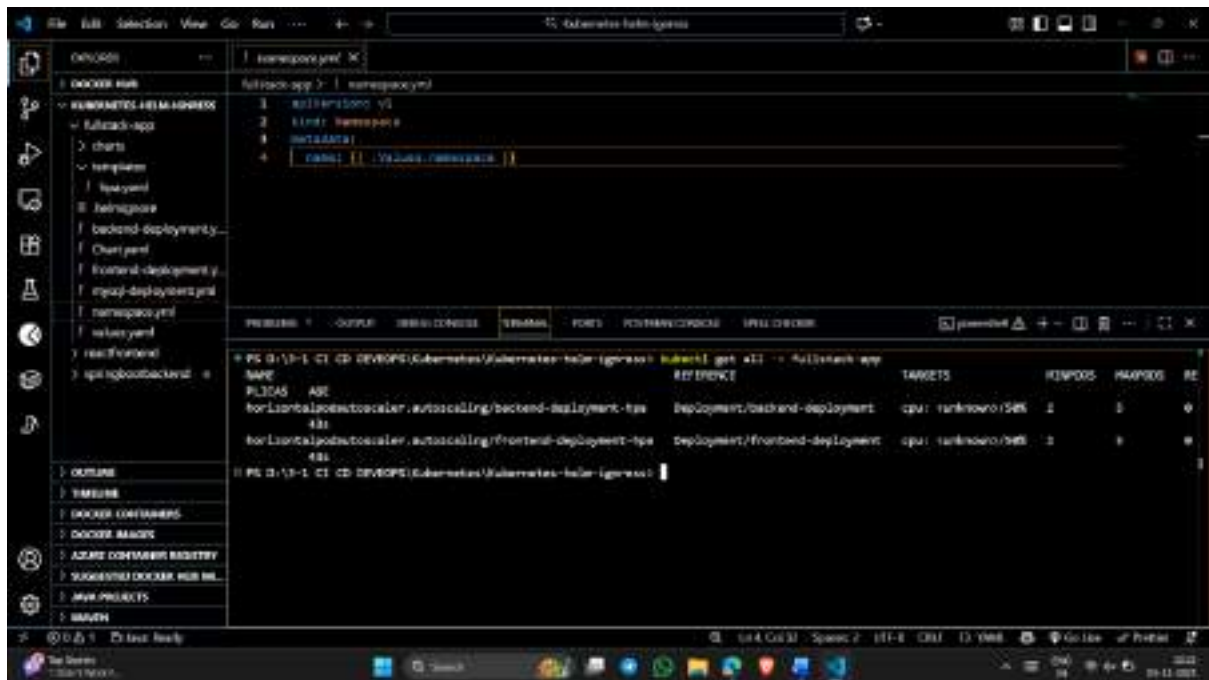
helm means cli tool

install means deploy a new release

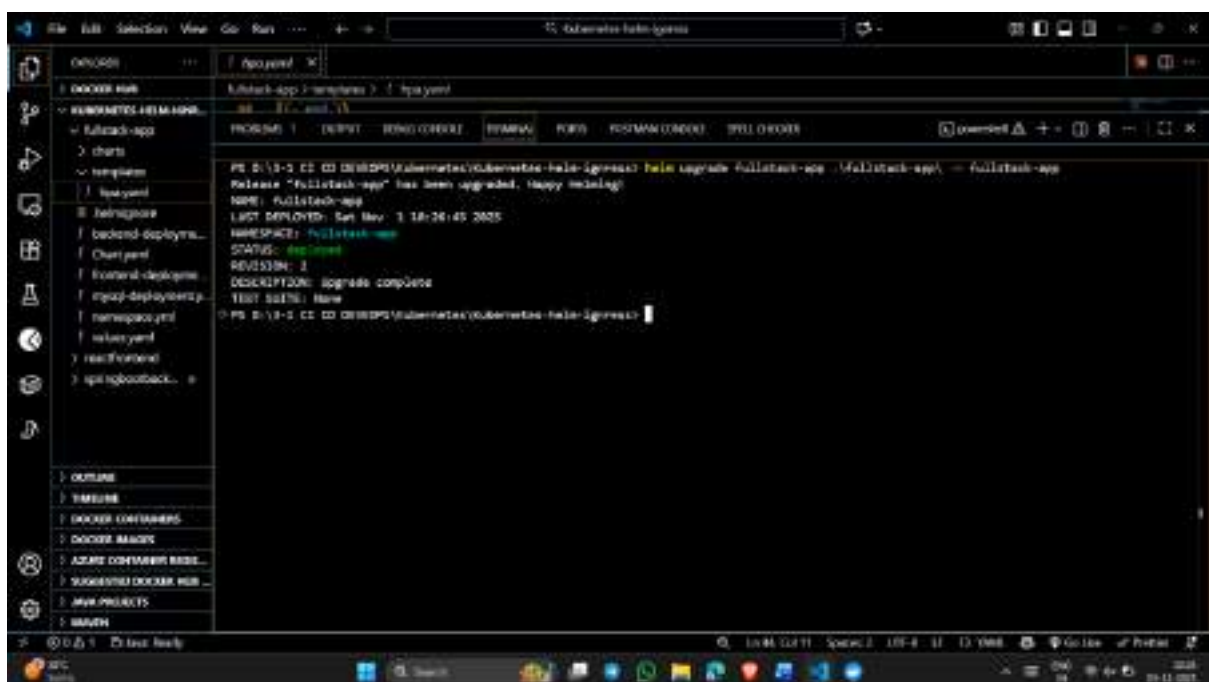
fullstack-app means name of the release name

./fullstack-app/ means helm directory

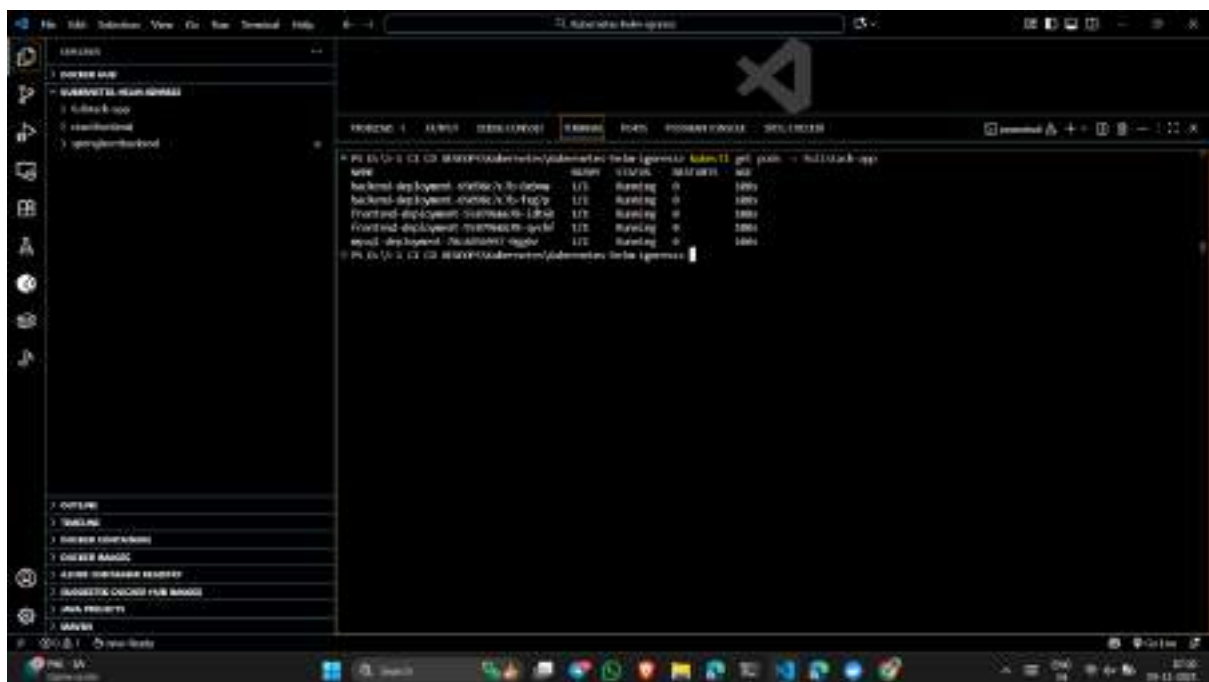


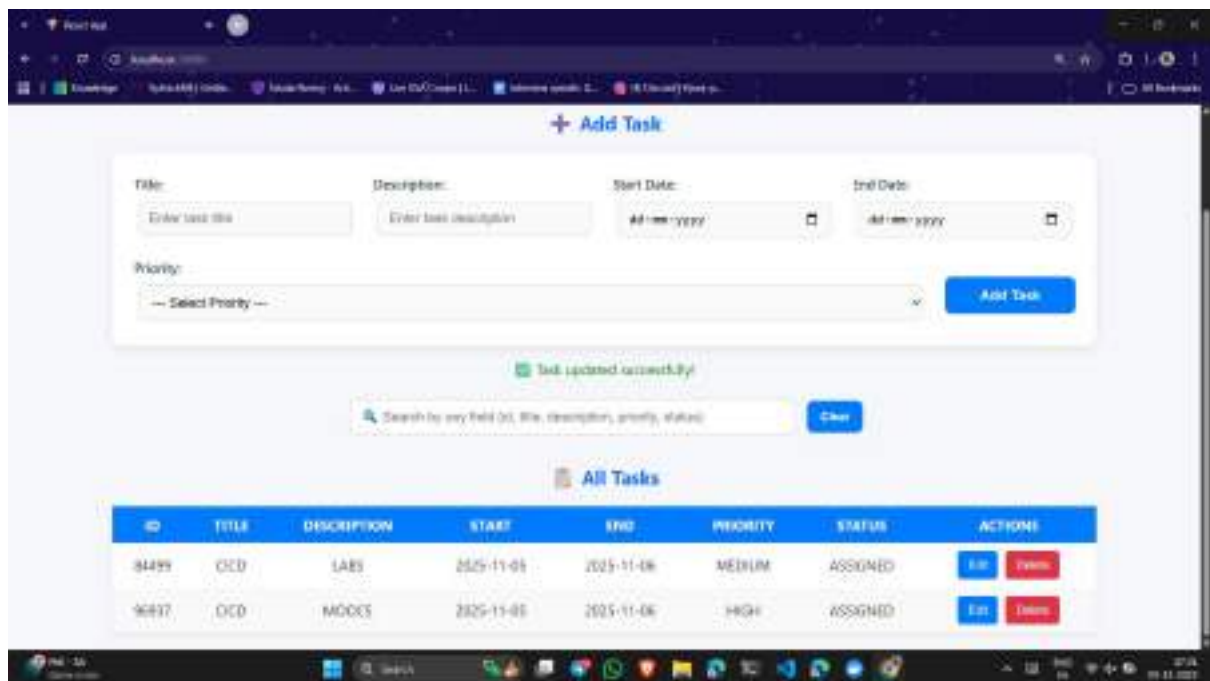
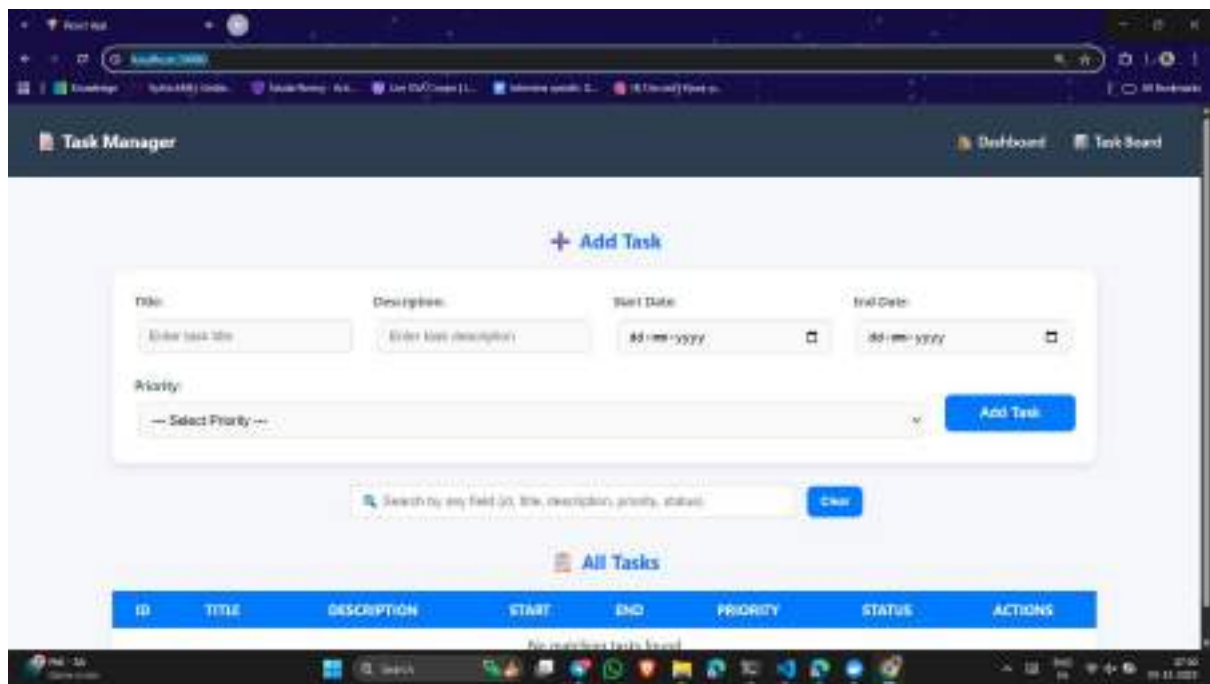


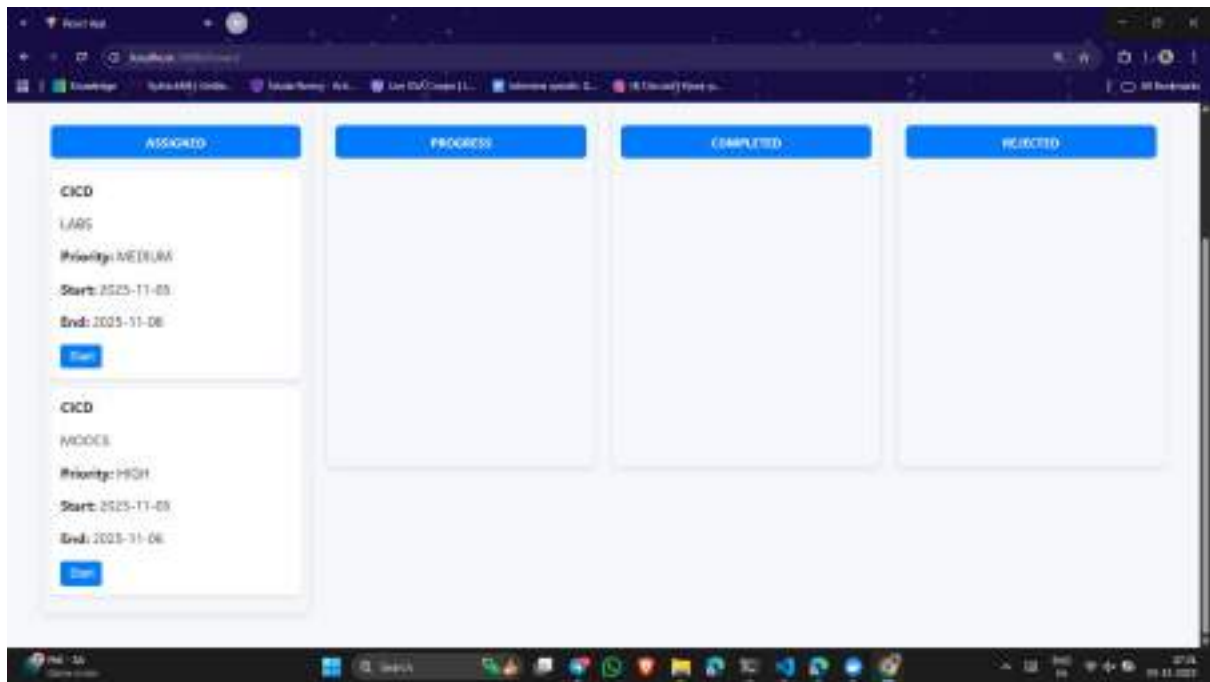
helm upgrade fullstack-app .\fullstack-app\



kubectl get all -n fullstack-app

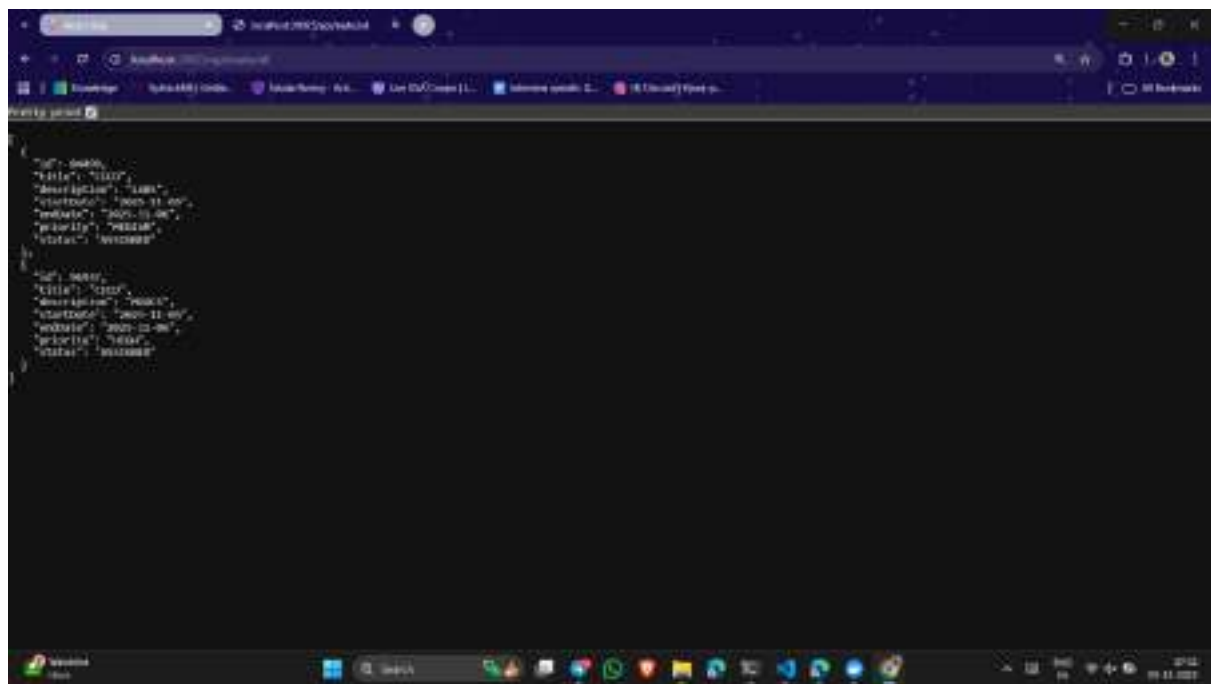


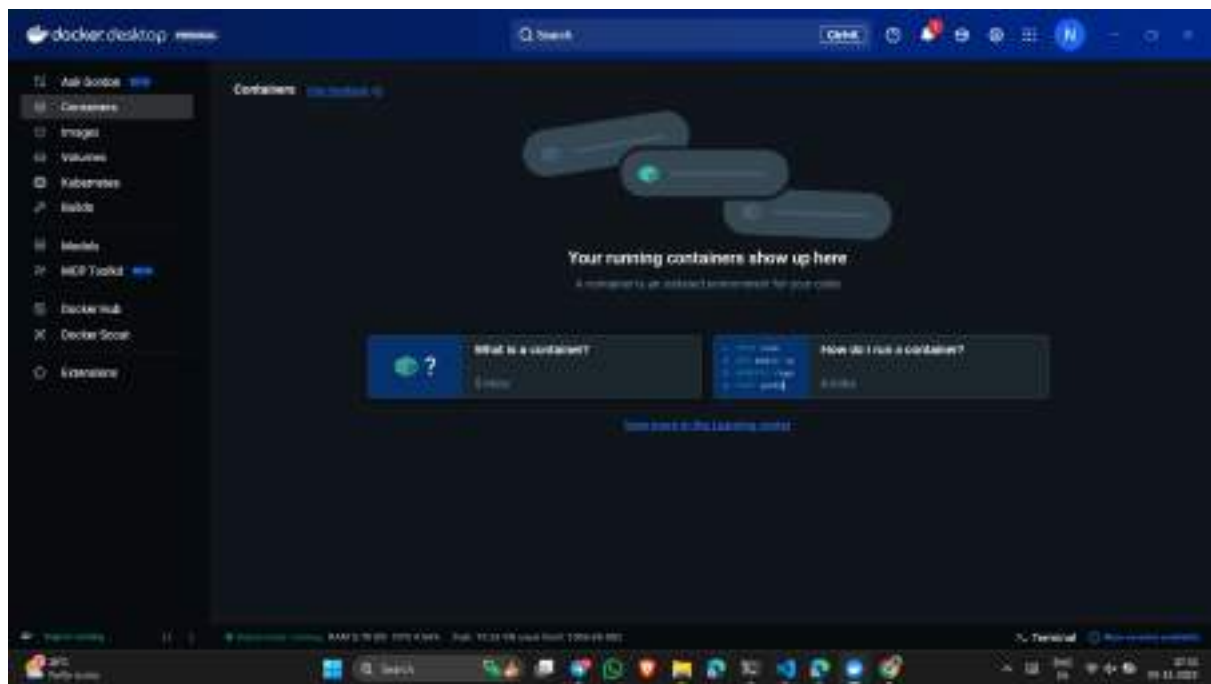


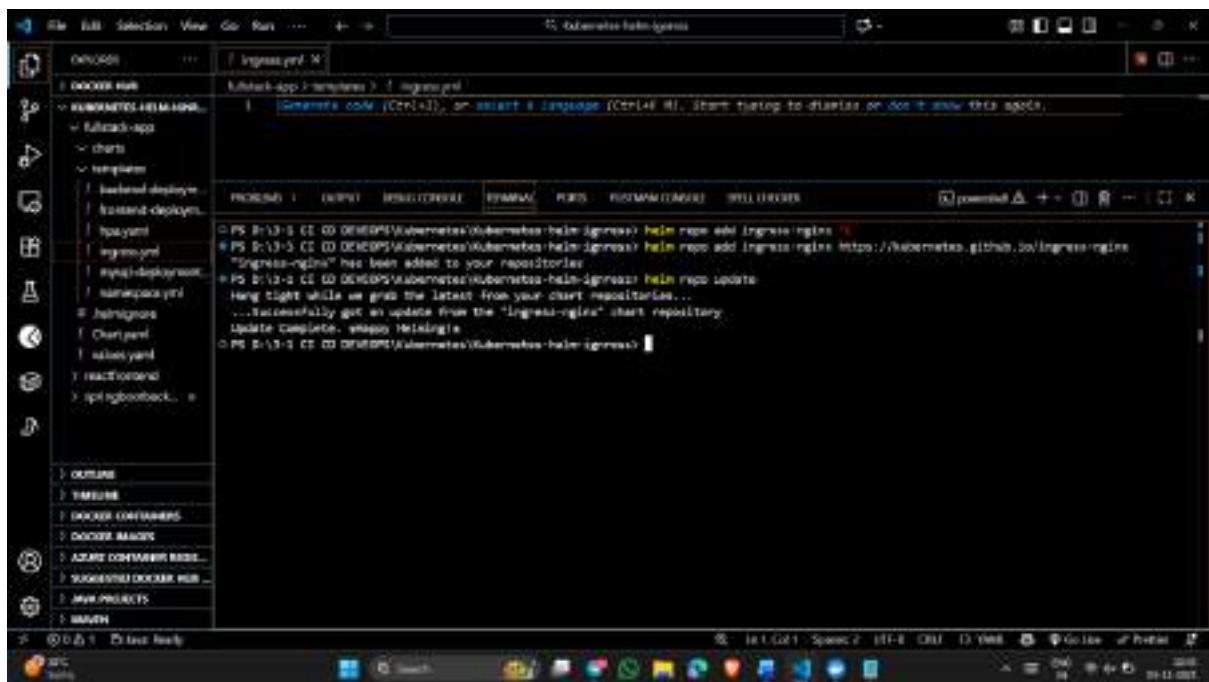


Task API Done

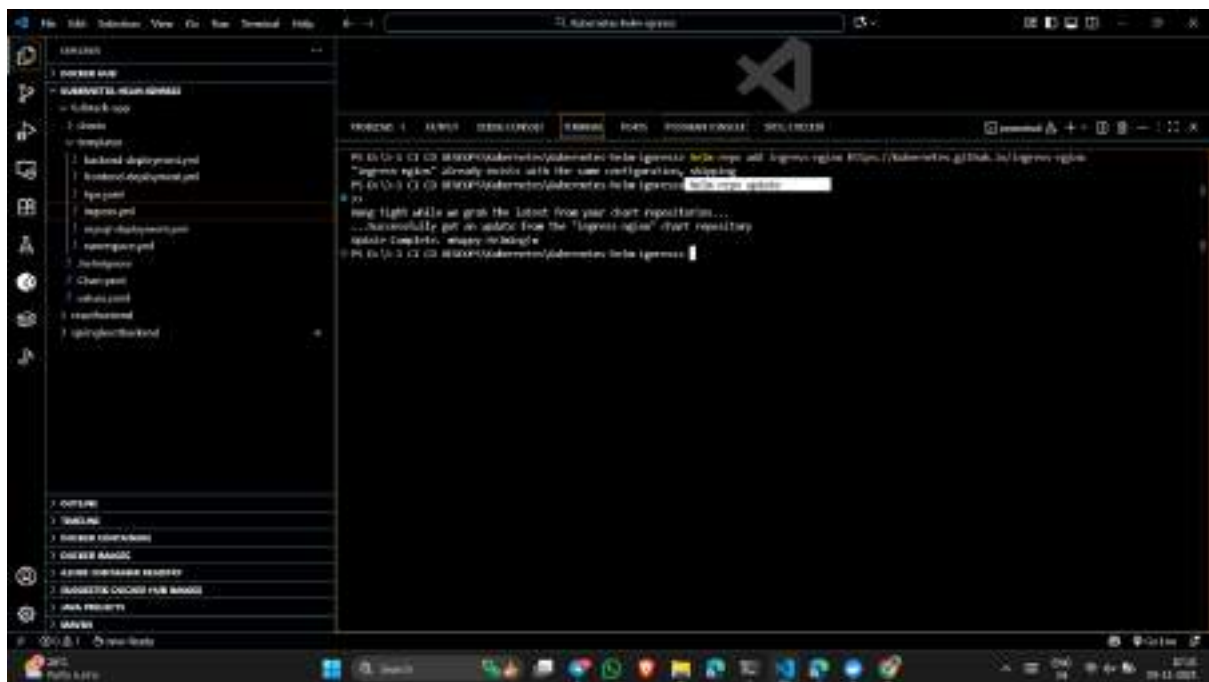


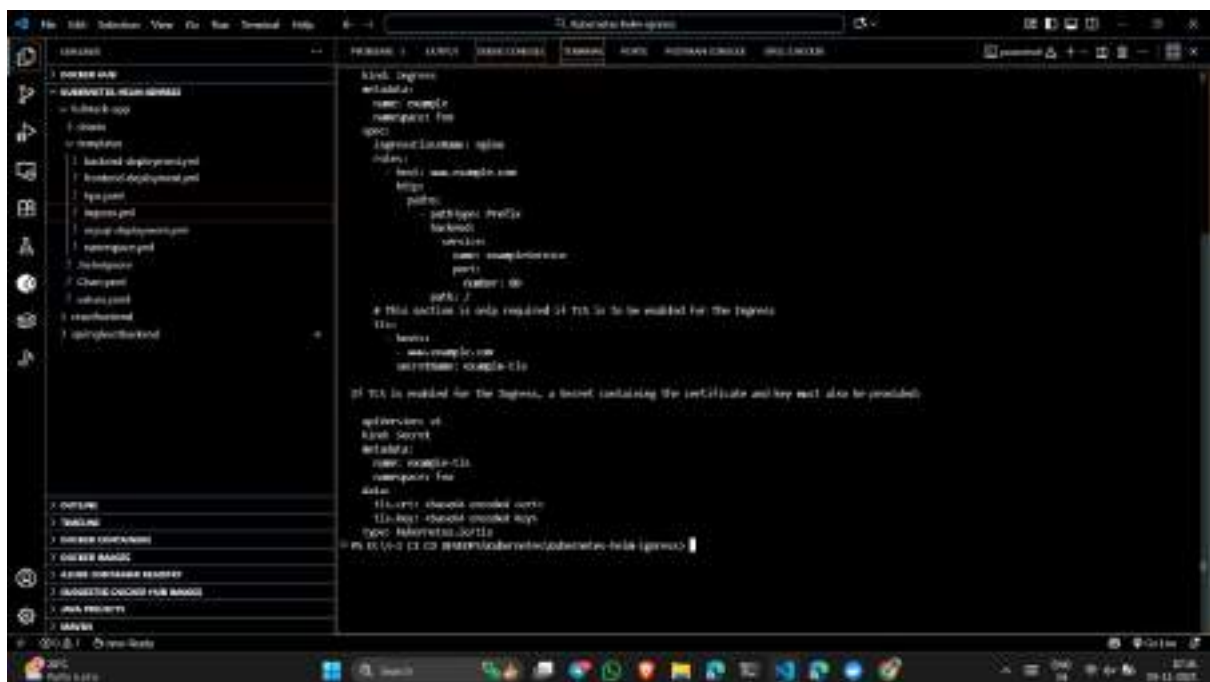
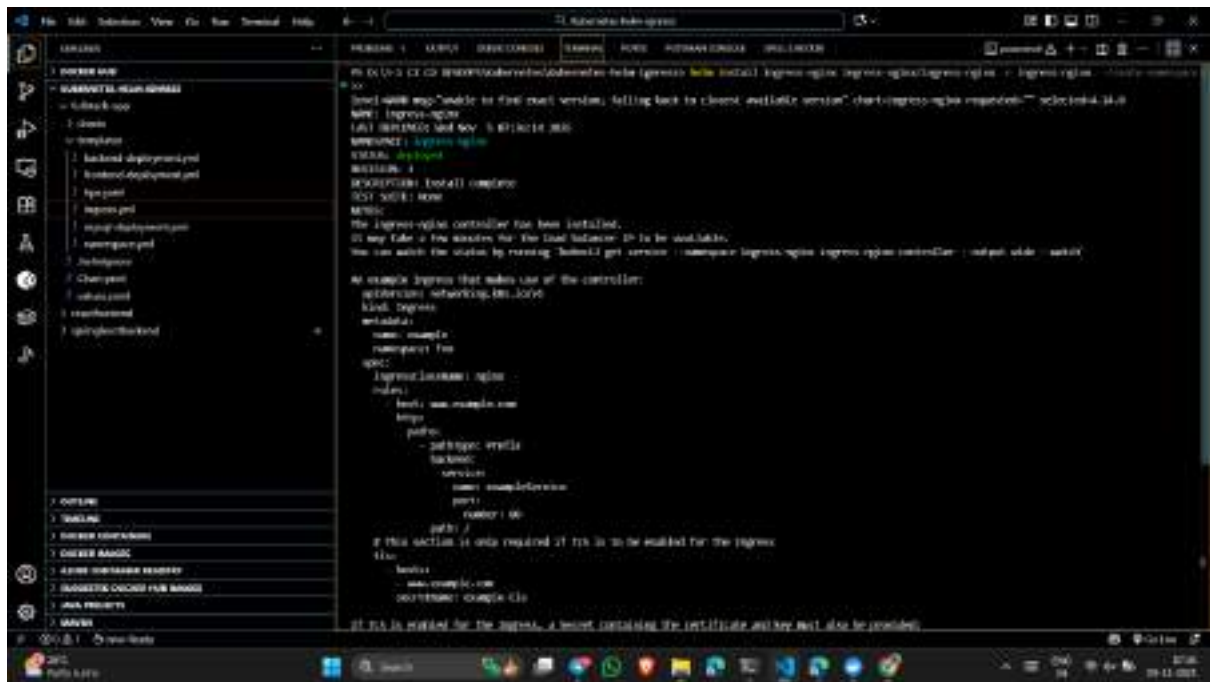


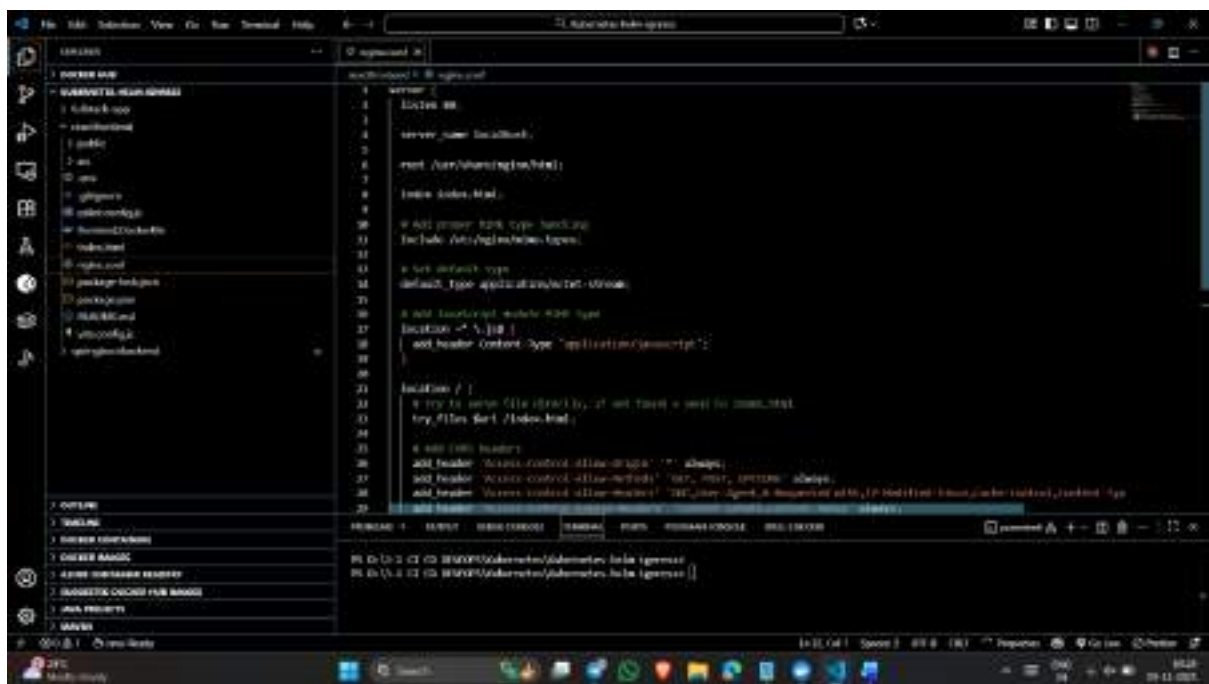


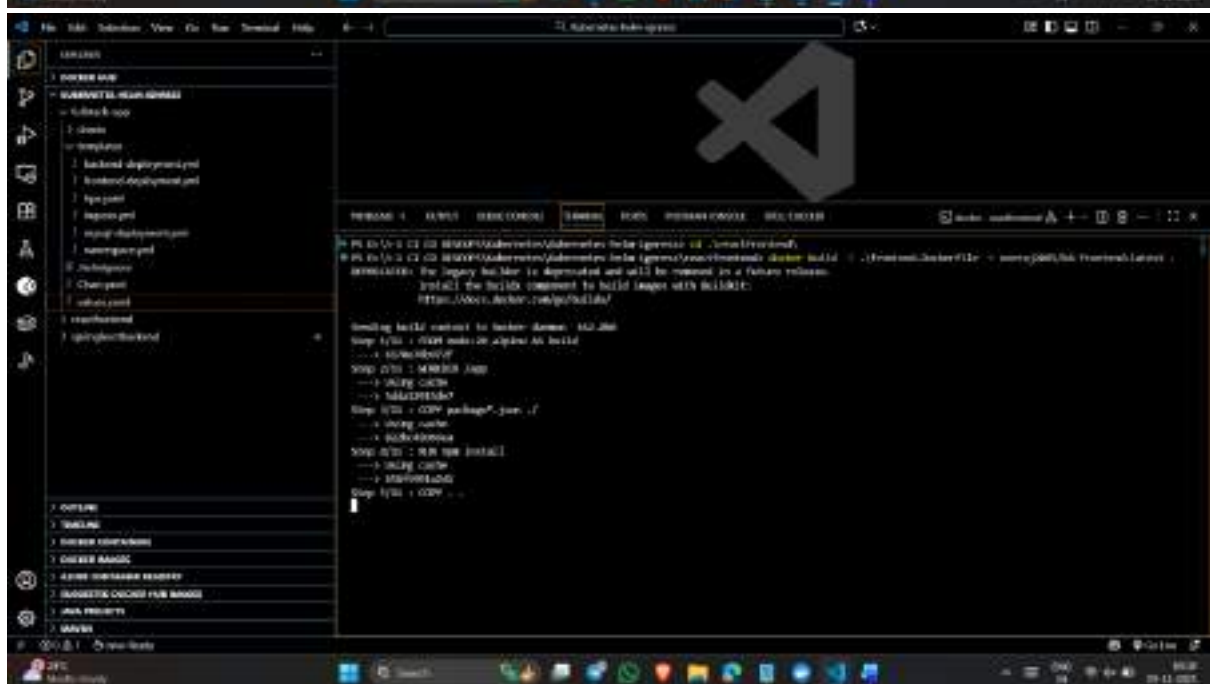
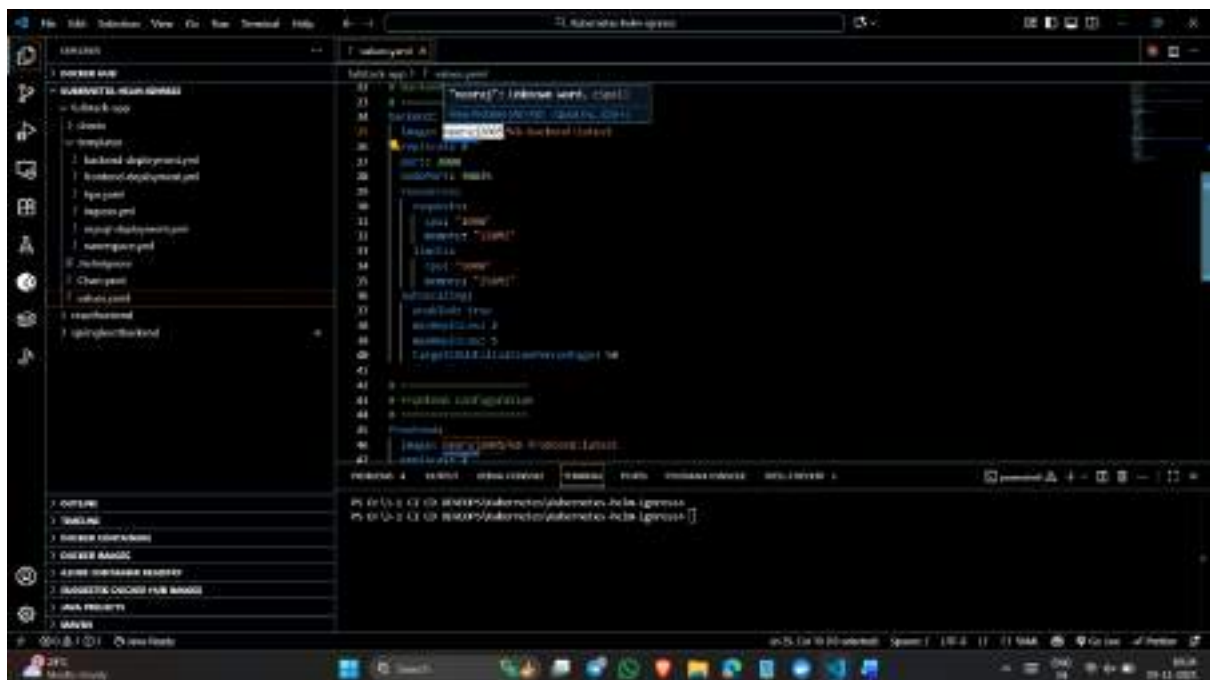


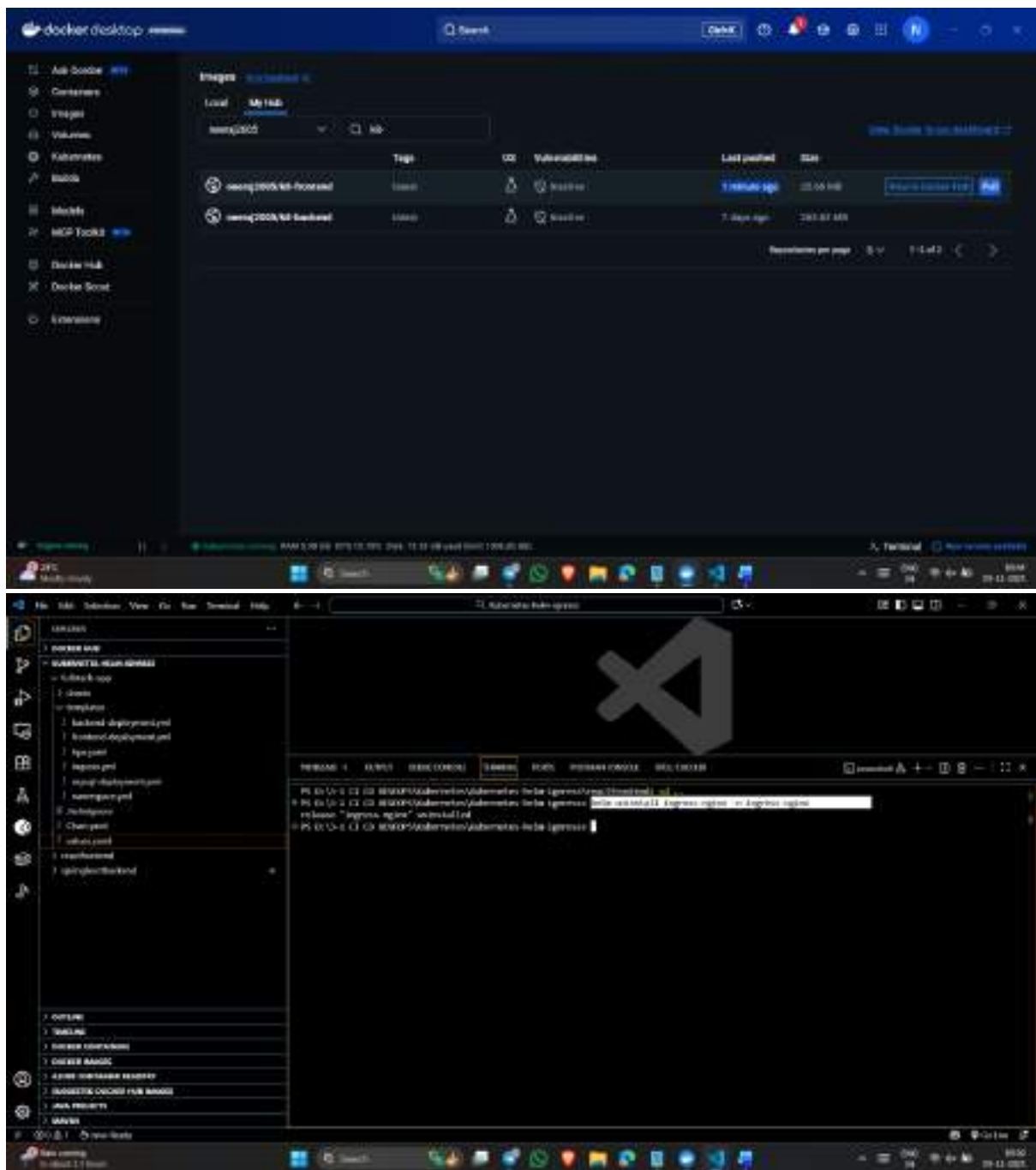
Helm with ingress

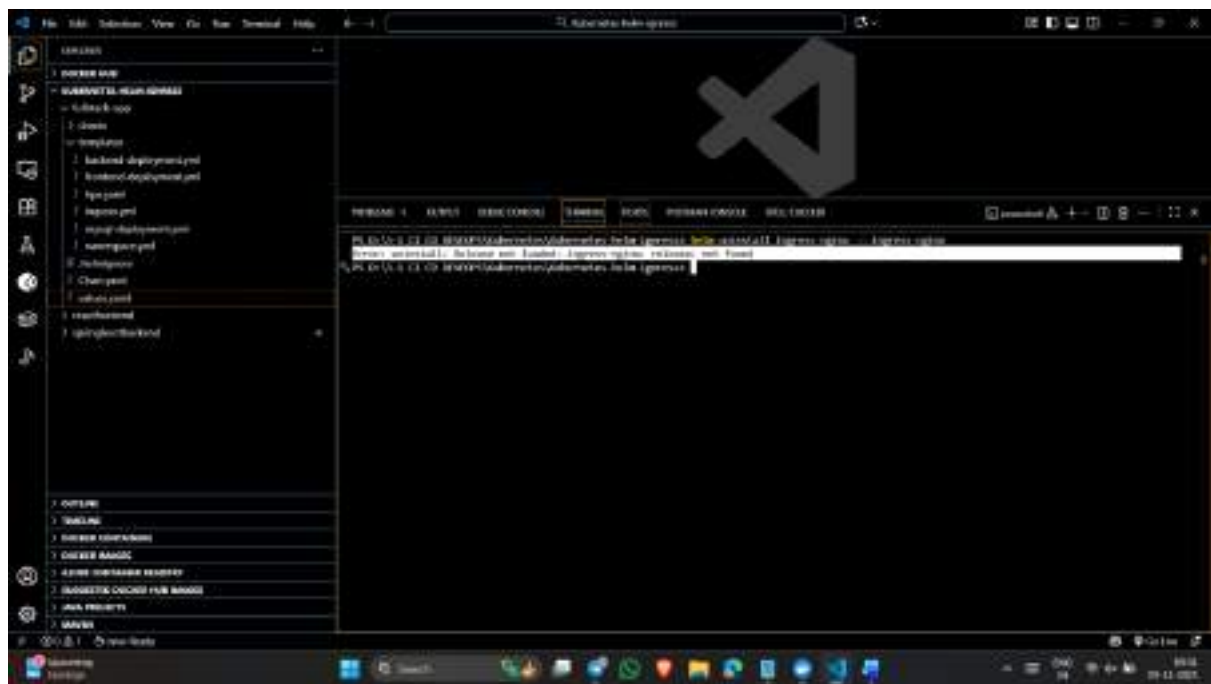


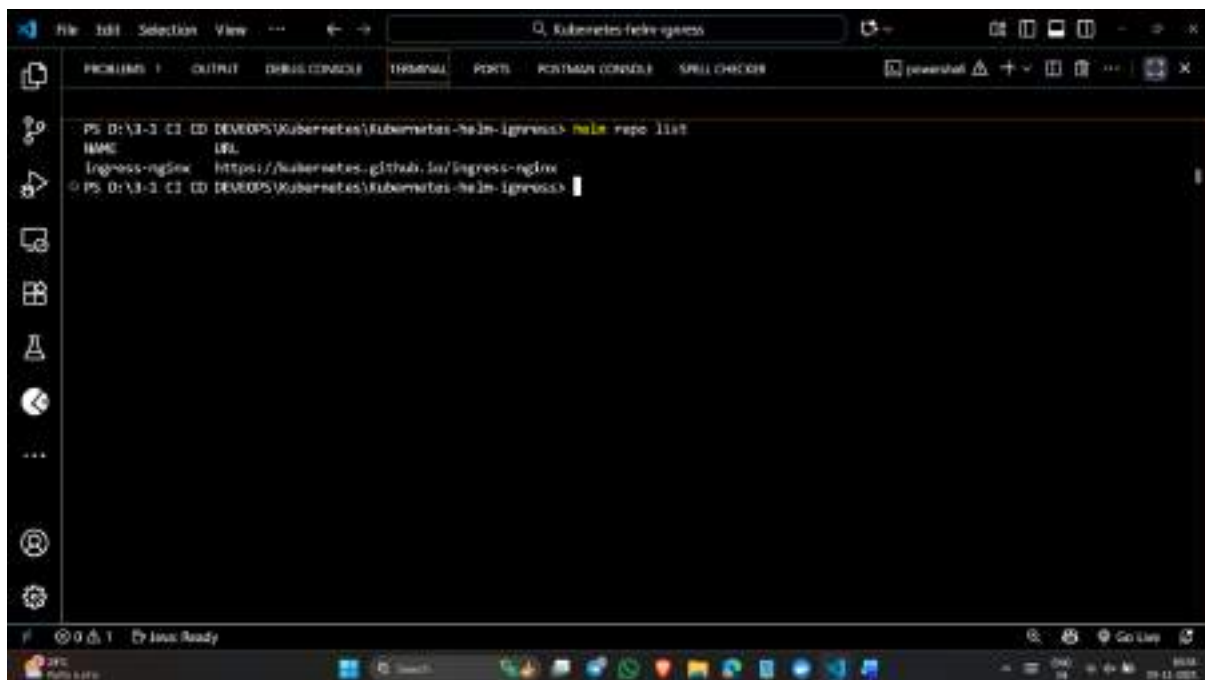






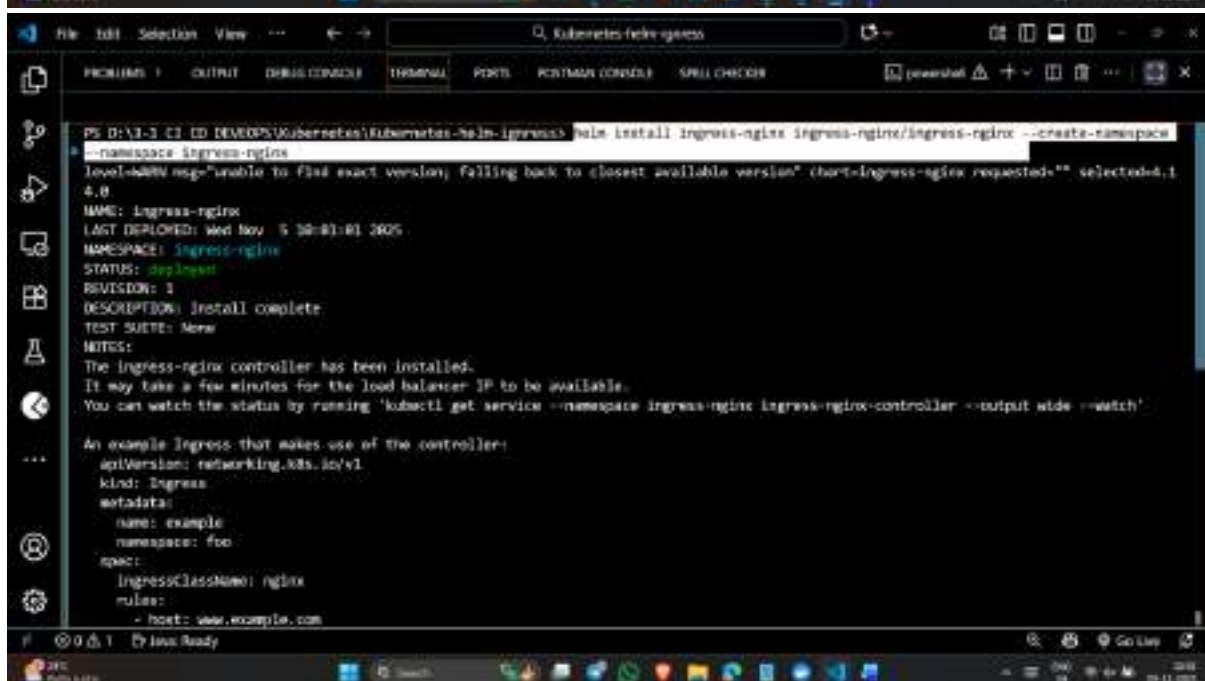






The image shows a Visual Studio Code window with a terminal open. The terminal is running the command `helm repo list` in a PowerShell session. The output shows a table with two columns: NAME and URL. The only entry is `ingress-nginx` with the URL `https://kubernetes.github.io/ingress-nginx`.

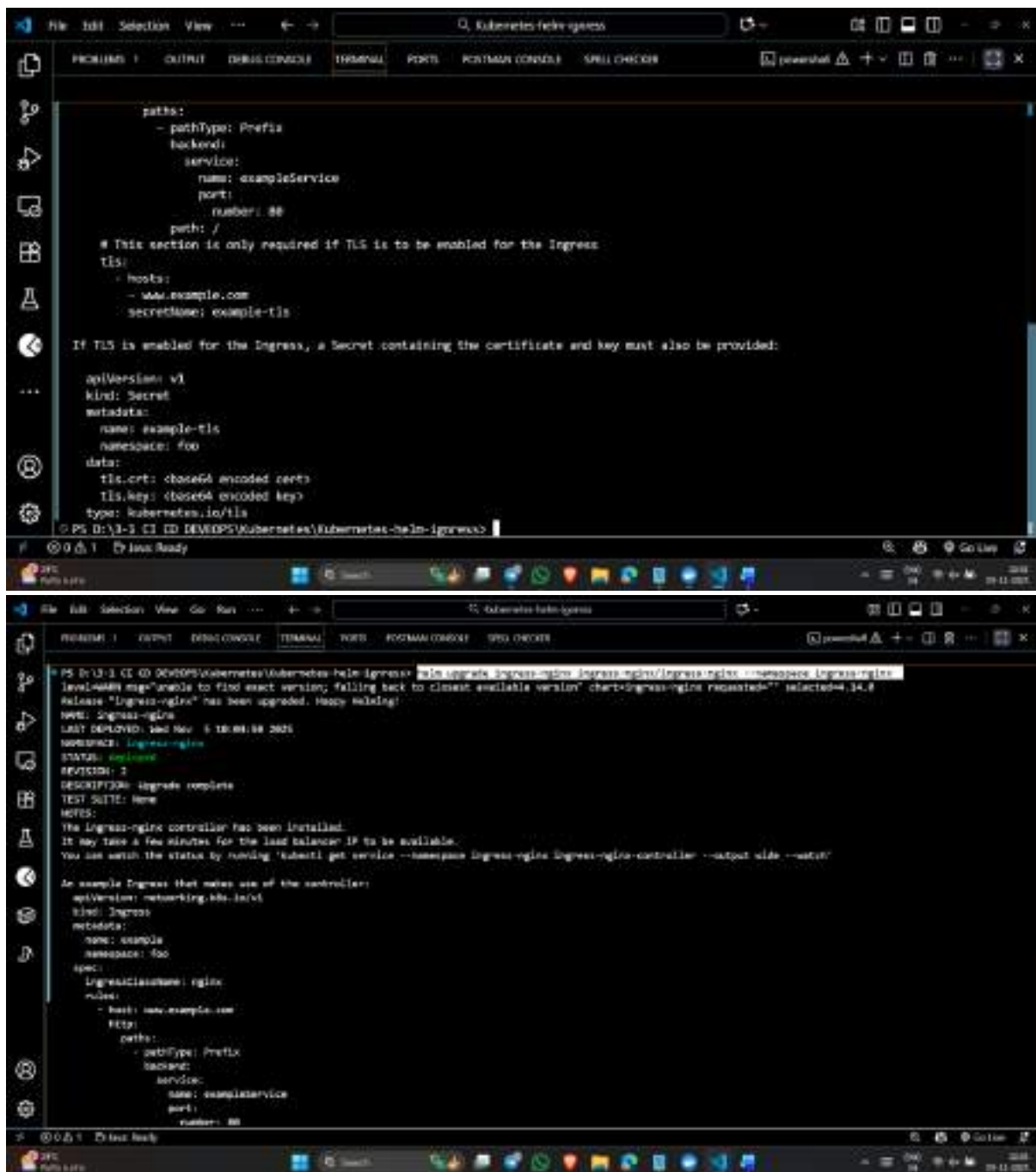
```
PS D:\3-3 C3 ED DEVOPS\Kubernetes\Kubernetes-helm-ingress> helm repo list
NAME      URL
ingress-nginx  https://kubernetes.github.io/ingress-nginx
PS D:\3-3 C3 ED DEVOPS\Kubernetes\Kubernetes-helm-ingress>
```

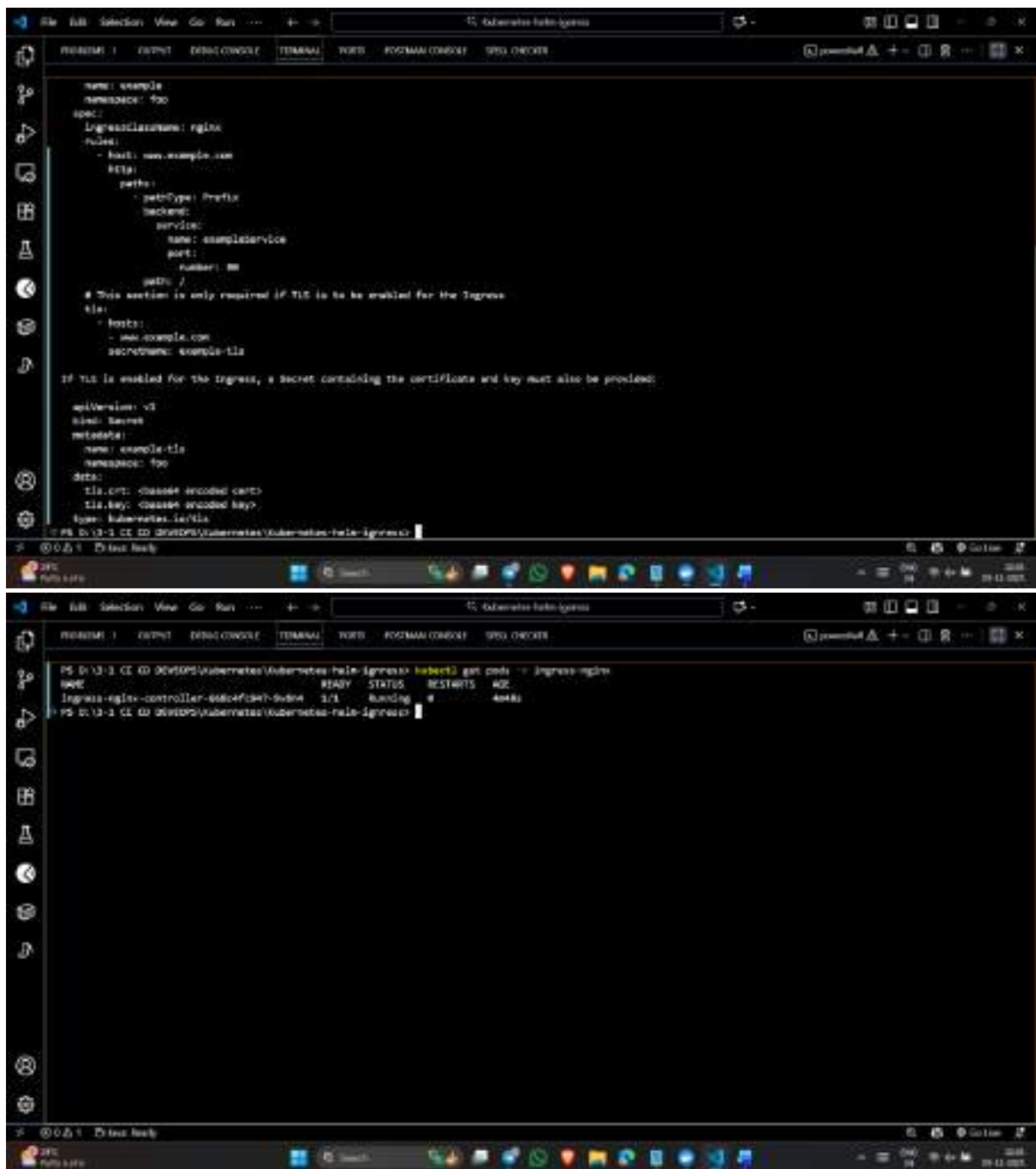


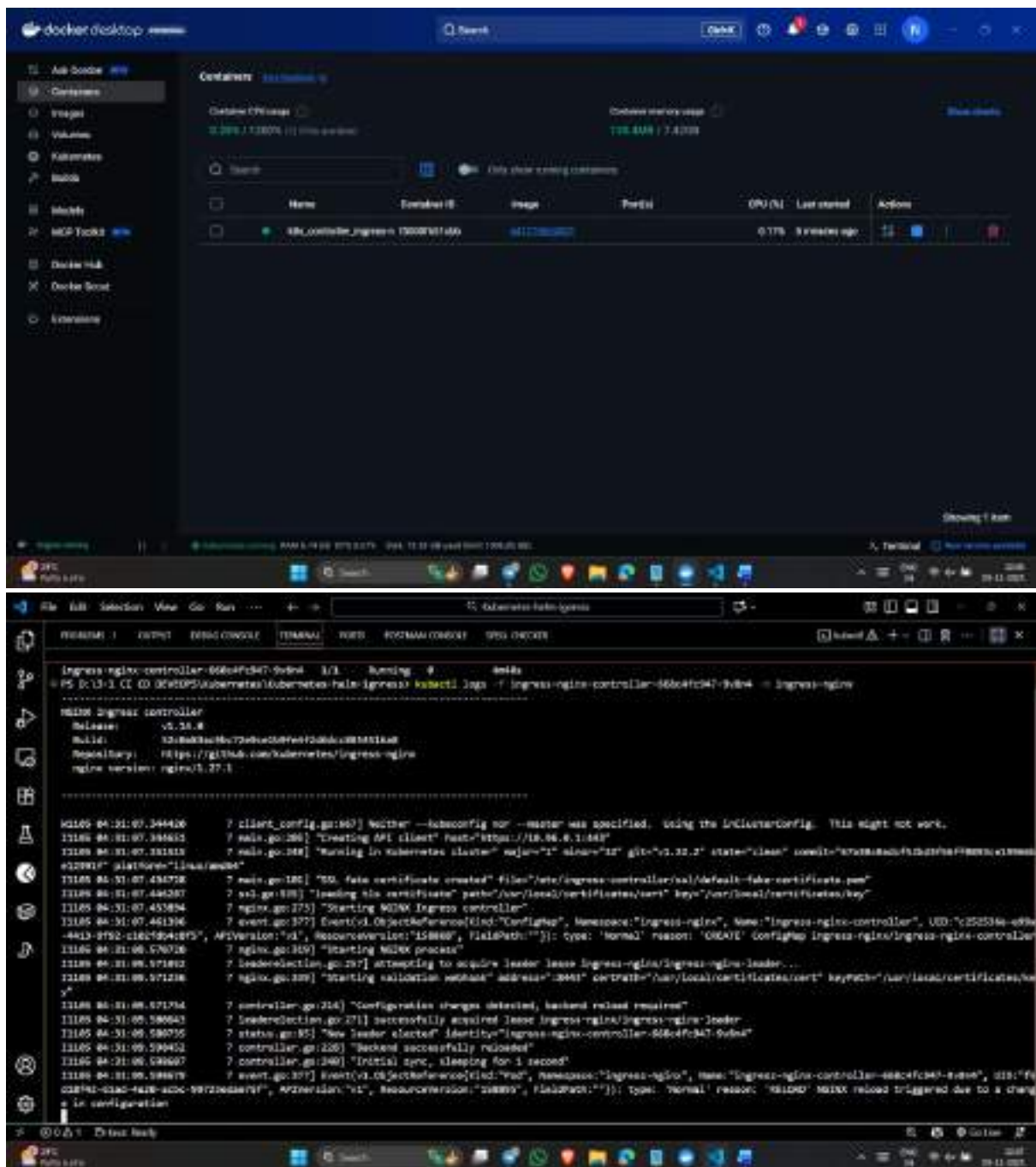
The image shows a Visual Studio Code window with a terminal open. The terminal is running the command `helm install ingress-nginx ingress-nginx/ingress-nginx --create-namespace`. The output shows the installation details for the `ingress-nginx` chart, including the namespace, last deployed time, status, revision, and description. It also provides instructions on how to watch the status and an example Ingress resource.

```
PS D:\3-3 C3 ED DEVOPS\Kubernetes\Kubernetes-helm-ingress> helm install ingress-nginx ingress-nginx/ingress-nginx --create-namespace
--namespace ingress-nginx
level=warn msg="unable to find exact version, falling back to closest available version" chart=ingress-nginx requested="" selected=4.1
4.0
NAME: ingress-nginx
LAST DEPLOYED: Wed Nov 5 10:41:41 2025
NAMESPACE: ingress-nginx
STATUS: deployed
REVISION: 1
DESCRIPTION: Install complete
TEST SUITE: None
NOTES:
The Ingress-nginx controller has been installed.
It may take a few minutes for the load balancer IP to be available.
You can watch the status by running 'kubectl get service --namespace ingress-nginx ingress-nginx-controller --output wide --watch'.

An example Ingress that makes use of the controller:
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: example
  namespace: foo
spec:
  ingressClassName: nginx
  rules:
  - host: www.example.com
```

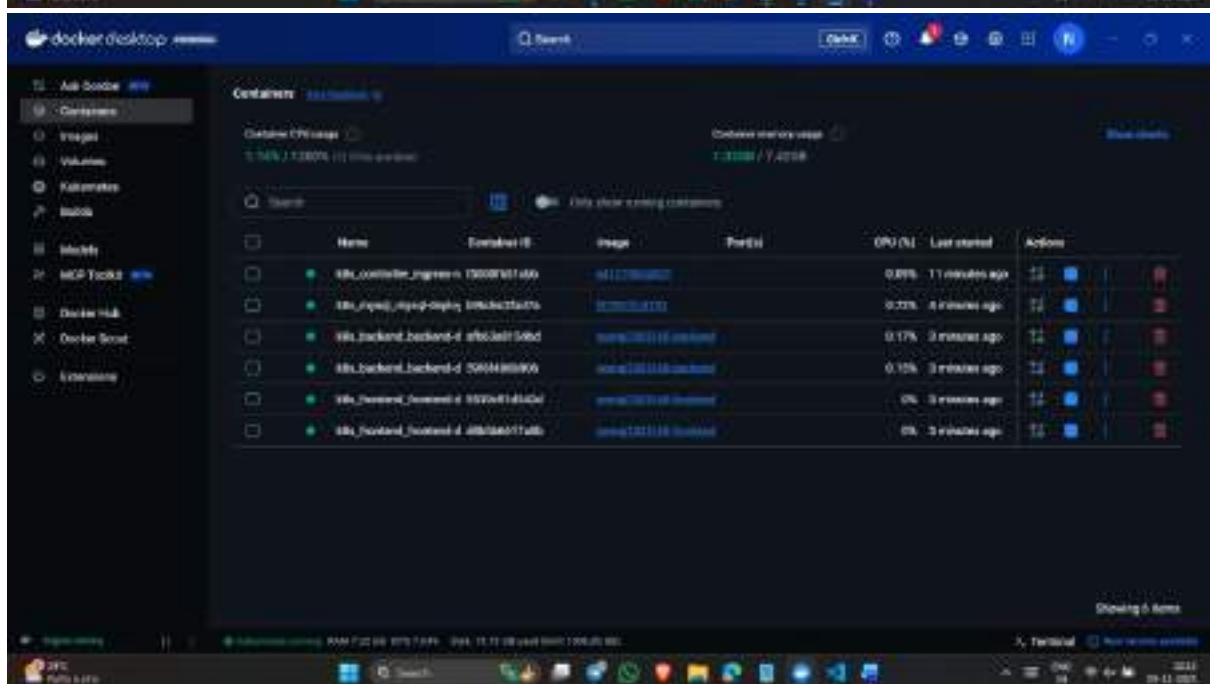
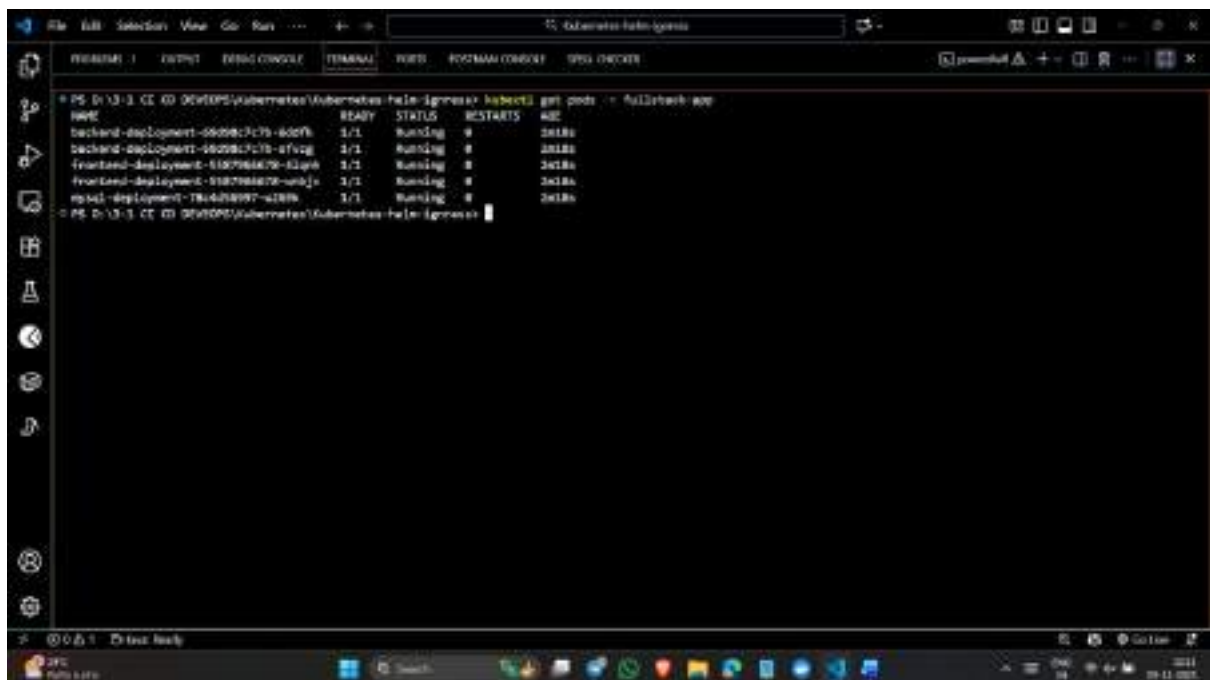






```
File Edit Selection View Go Run ... + - C:\Users\hain\Documents\kubernetes-helm-ignores
TERMINAL PORTS PODMAN CONSOLE SPO ORDER
+ PS D:\U-3-CE @ DEVOPS\kubernetes\kubernetes-helm-ignores> helm install fullstack-app ./fullstack-app --create-namespace --namespace fullstack-app
NAME: fullstack-app
LAST DEPLOYED: Wed Nov 5 16:06:38 2025
NAMESPACE: fullstack-app
STATUS: deployed
REVISION: 1
DESCRIPTION: Install complete
TEST SUITE: None
+ PS D:\U-3-CE @ DEVOPS\kubernetes\kubernetes-helm-ignores>
```

```
File Edit Selection View Go Run ... + - C:\Users\hain\Documents\kubernetes-helm-ignores
TERMINAL PORTS PODMAN CONSOLE SPO ORDER
+ PS D:\U-3-CE @ DEVOPS\kubernetes\kubernetes-helm-ignores> helm install fullstack-app ./fullstack-app --create-namespace --namespace fullstack-app
NAME: fullstack-app
LAST DEPLOYED: Wed Nov 5 16:06:38 2025
NAMESPACE: fullstack-app
STATUS: deployed
REVISION: 1
DESCRIPTION: Install complete
TEST SUITE: None
+ PS D:\U-3-CE @ DEVOPS\kubernetes\kubernetes-helm-ignores> helm upgrade fullstack-app ./fullstack-app --namespace fullstack-app
Release "fullstack-app" has been upgraded. Happy Helming!
NAME: fullstack-app
LAST DEPLOYED: Wed Nov 5 16:09:44 2025
NAMESPACE: fullstack-app
STATUS: deployed
REVISION: 2
DESCRIPTION: Upgrade complete
TEST SUITE: None
+ PS D:\U-3-CE @ DEVOPS\kubernetes\kubernetes-helm-ignores>
```


```
File Edit Selection View Go Run ... 15 Kubernetes helm-ignores
[TERMINAL] PORTS POSTMAN/CONSOLE SUDO CRUISE
READY STATUS RESTARTS AGE
mysql-deployment-78c4d8997-4209w 1/1 Running 0 3m16s
PS D:\13-1 CI CD 3050105\kubernetes\kubernetes-helm-ignores\kubert1 logs -f backend-deployment-69c9fc7cb-6d9ff -- fullstack-app

:: Spring Boot ::
(3.5.8)

2025-11-05T04:36:58.022Z INFO 1 --- [springbootbacked] [
main] o.k.jef.dev.SpringbootbackedApplication : Starting SpringbootbackedApplication v0.0.1-SN
APPSHOT using Java 21.0.4 with PID 1 (/app/app.jar started by root in /app)
2025-11-05T04:36:58.090Z INFO 1 --- [springbootbacked] [
main] o.k.jef.dev.SpringbootbackedApplication : No active profile set, falling back to 1 default
+ profile: "default"
2025-11-05T04:36:58.193Z INFO 1 --- [springbootbacked] [
main] o.s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data JPA repositories in D
EFAULT mode.
2025-11-05T04:36:58.481Z INFO 1 --- [springbootbacked] [
main] o.s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 298
ms. Found 1 JPA repository interfaces.
2025-11-05T04:36:57.612Z INFO 1 --- [springbootbacked] [
main] o.s.s.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 3000 (http)
2025-11-05T04:36:57.896Z INFO 1 --- [springbootbacked] [
main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-11-05T04:36:57.896Z INFO 1 --- [springbootbacked] [
main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.40]
2025-11-05T04:36:58.475Z INFO 1 --- [springbootbacked] [
main] o.s.s.w.embedded.tomcat.TomcatWebServer : Initializing Spring embedded WebApplicationContext
2025-11-05T04:36:58.696Z INFO 1 --- [springbootbacked] [
main] o.s.s.w.ServletWebServerApplicationContext : Root WebApplicationContext: initialization com
pleted in 7853 ms
2025-11-05T04:36:58.702Z INFO 1 --- [springbootbacked] [
main] o.hibermate.jpa.internal.util.LogHelper : H4000004: Processing PersistenceUnitInfo [name
: default]
2025-11-05T04:36:58.983Z INFO 1 --- [springbootbacked] [
main] org.hibernate.version : H4000012: Hibernate ORM core version 6.5.29.Final
2025-11-05T04:36:59.798Z INFO 1 --- [springbootbacked] [
main] o.h.h.internal.RegionFactoryInitiator : H4000016: Second-level cache disabled

PS D:\13-1 CI CD 3050105\kubernetes\kubernetes-helm-ignores\kubert1 logs -f backend-deployment-69c9fc7cb-6d9ff -- fullstack-app
at org.springframework.boot.SpringApplication.run(SpringApplication.java:1181) ~[spring-boot-3.5.8.jar!/:3.5.8]
at org.springframework.boot.SpringApplication.run(SpringApplication.java:1190) ~[spring-boot-3.5.8.jar!/:3.5.8]
at o.k.jef.dev.SpringbootbackedApplication.main(SpringbootbackedApplication.java:11) ~[/:0.0.1-SNAPSHOT]
at java.base/jdk.internal.reflect.DirectMethodHandleAccessor.invoke(DirectMethodHandleAccessor.java:163) ~[na]
at java.base/jdk.internal.reflect.Method.invoke(Method.java:588) ~[na]
at org.springframework.boot.loader.launch.Launcher.launch(Launcher.java:181) ~[app.jar-0.0.1-SNAPSHOT]
at org.springframework.boot.loader.launch.Launcher.launch(Launcher.java:64) ~[app.jar-0.0.1-SNAPSHOT]
at org.springframework.boot.loader.launch.Launcher.main(Launcher.java:44) ~[app.jar-0.0.1-SNAPSHOT]
Caused by: java.sql.SQLException: Table 'task table' already exists
at com.mysql.cj.jdbc.exceptions.SQLExceptionor.createdatabase(SQLException.java:115) ~[mysql-connector-j-9.4.0.jar!/:9.4.0]
at com.mysql.cj.jdbc.exceptions.SQLExceptionorMapping.transaction(SQLExceptionorMapping.java:116) ~[mysql-connector-j-9.4.0.jar!/:9.4.0]
at com.mysql.cj.jdbc.StatementImpl.executeInternal(StatementImpl.java:837) ~[mysql-connector-j-9.4.0.jar!/:9.4.0]
at com.mysql.cj.jdbc.StatementImpl.execute(StatementImpl.java:880) ~[mysql-connector-j-9.4.0.jar!/:9.4.0]
at com.zaxxer.hikari.pool.ProxyStatement.execute(ProxyStatement.java:98) ~[HikariCP-6.3.0.jar!/:na]
at com.zaxxer.hikari.pool.HikariProxyStatement.execute(HikariProxyStatement.java:98) ~[HikariCP-6.3.0.jar!/:na]
at org.hibernate.tool.schema.internal.exec.GenerationTargetToDatabase.accept(GenerationTargetToDatabase.java:60) ~[hibernate-core-6.5.29.Final.jar!/:6.5.29.F
inal]
... 42 common frames omitted
2025-11-05T04:36:58.985Z INFO 1 --- [springbootbacked] [
main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persis
tence unit 'default'
2025-11-05T04:36:59.12.895Z WARN 1 --- [springbootbacked] [
main] jpaasacconfiguration.jpaasacconfiguration : spring.jpa.open-in-view is enabled by default.
Therefore, database queries may be performed during view rendering.
Explicitly configure spring.jpa.open-in-view to disable this warning
2025-11-05T04:36:59.296Z INFO 1 --- [springbootbacked] [
main] o.s.s.w.OptionsValidatorFactoryBean : Failed to set up a Bean Validation provider: Ja
akarta.validation.spi.ProviderException: Unable to create a Configuration, because no Jakarta Bean Validation provider could be found. Add a provider like Hibernate
or Validator (RI) to your classpath.
2025-11-05T04:36:59.403Z INFO 1 --- [springbootbacked] [
main] o.s.s.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 3000 (http) with context
path '/'
2025-11-05T04:36:59.134Z INFO 1 --- [springbootbacked] [
main] o.k.jef.dev.SpringbootbackedApplication : Started SpringbootbackedApplication in 27.3ss
seconds (process running for 28.97s)
Project Backend is Running Successfully ....
```

```
File Edit Selection View Go Run ... Kubernetes helm-ignores
TERMINAL
PS D:\3-3 CI @ 2025/05/05/Vubernetes/Vubernetes-helm-ignores> helm list --n fullstack-app
NAME          NAMESPACE      REVISION      UPDATED              STATUS      CHART              APP VERSION
fullstack-app  fullstack-app    2             2025-11-15 10:49:44.5417961 +0530 IST  deployed   fullstack-app-1.0.0  1.0

PS D:\3-3 CI @ 2025/05/05/Vubernetes/Vubernetes-helm-ignores>
```

```
File Edit Selection View Go Run ... Kubernetes helm-ignores
TERMINAL
PS D:\3-3 CI @ 2025/05/05/Vubernetes/Vubernetes-helm-ignores> helm list --n fullstack-app
NAME          NAMESPACE      REVISION      UPDATED              STATUS      CHART              APP VERSION
fullstack-app  fullstack-app    2             2025-11-15 10:49:44.5417961 +0530 IST  deployed   fullstack-app-1.0.0  1.0

PS D:\3-3 CI @ 2025/05/05/Vubernetes/Vubernetes-helm-ignores> kubectl get svc -n fullstack-app
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)
backend-deployment-service  NodePort      10.10.183.118    <none>           3000:3002/TCP    8080s
frontend-deployment-service NodePort      10.100.250.113   <none>           80:3000/TCP      8080s
mysql-service    ClusterIP      10.10.3.3        <none>           3306/TCP          8080s

PS D:\3-3 CI @ 2025/05/05/Vubernetes/Vubernetes-helm-ignores>
```

```
File Edit Selection View Go Run ... kubernetes helm ingress
TERMINAL
kubernetes helm ingress
PS D:\3-3-CE-00\00105\kubernetes\kubernetes-helm-ingress> helm status fullstack-app -- fullstack-app
NAME: fullstack-app
LAST DEPLOYED: Wed Nov 5 16:49:44 2025
NAMESPACE: fullstack-app
STATUS: deployed
REVISION: 1
DESCRIPTION: upgrade complete
RESOURCE:
=== v1/Namespace
NAME          STATUS    AGE
fullstack-app Active    18m

=== v1/Service
NAME                                TYPE        CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
backend-deployment-service NodePort    10.99.183.114    <none>            18080:18025/TCP  18m
frontend-deployment-service NodePort    10.99.242.153    <none>            80:18080/TCP     18m
mysql-service ClusterIP   10.98.3.3        <none>            3306/TCP         18m

=== v1/Deployment
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
backend-deployment  2/2     2             2           18m
frontend-deployment  2/2     2             2           18m
mysql-deployment  1/1     1             1           18m

=== v1/Pod(related)
NAME                                READY   STATUS    RESTARTS   AGE
backend-deployment-66d8c7c7b-6d6ff  1/1     Running   0           18m
backend-deployment-66d8c7c7b-afvqg  1/1     Running   0           18m
frontend-deployment-5187964c9-4jgnh  1/1     Running   0           18m
frontend-deployment-5187964c9-urojr  1/1     Running   0           18m
mysql-deployment-18c42889f-s18m6     1/1     Running   0           18m

=== v2/HorizontalPodAutoscaler
```

```

File Edit Selection View Go Run ... + - - Kubernetes helm-ignear
TERMINAL PORTS PODMAN CONSOLE SPO CHECKER
powerShell + - - - - - X

DESCRIPTION: Upgrade complete
RESOURCES:
--> v1/Namespace
NAME          STATUS    AGE
fullstack-app Active    10m

--> v1/Service
NAME                                TYPE        CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
backend-deployment-service NodePort    10.99.185.134    none            1800-18005/TCP   10m
frontend-deployment-service NodePort    10.99.242.153    none            80-18000/TCP     10m
mysql-service ClusterIP   10.99.3.3        none            3306/TCP         10m

--> v1/Deployment
NAME          READY    UP-TO-DATE    AVAILABLE    AGE
backend-deployment 2/2      2              2            10m
frontend-deployment 2/2      2              2            10m
mysql-deployment 1/1      1              1            10m

--> v1/Pod(related)
NAME                                READY    STATUS    RESTARTS    AGE
backend-deployment-66d8d7c7s-6d9fb 1/1      Running   0            10m
backend-deployment-66d8d7c7s-af0zg 1/1      Running   0            10m
frontend-deployment-5187966c7s-4lqk 1/1      Running   0            10m
frontend-deployment-5187966c7s-wnbj 1/1      Running   0            10m
mysql-deployment-78x4d8897-s28m     1/1      Running   0            10m

--> v1/HorizontalPodAutoscaler
NAME                                REFERENCE    TARGETS          CPU_USAGE    MINPODS    MAXPODS    SCALED    AGE
backend-deployment-hpa Deployment/backend-deployment rpa: unknown/G8 2            5            2            10m
frontend-deployment-hpa Deployment/frontend-deployment opa: unknown/G8 1            6            1            10m

--> v1/Ingress
NAME          CLASS    HOSTS          ADDRESS          PORTS          AGE
fullstack-app  <empty>  <empty>        <empty>          <empty>        10m

```

```

File Edit Selection View Go Run ... + - - Kubernetes helm-ignear
TERMINAL PORTS PODMAN CONSOLE SPO CHECKER
powerShell + - - - - - X

PS C:\k8s> cd C:\Users\user\Documents\Kubernetes\helm-ignear & helm get manifest fullstack-app --> fullstack-app
---
# Source: fullstack-app/templates/namespace.yml
apiVersion: v1
kind: Namespace
metadata:
  name: fullstack-app
---
# Source: fullstack-app/templates/backend-deployment.yml
apiVersion: v1
kind: Service
metadata:
  name: backend-deployment-service
  namespace: fullstack-app
spec:
  selector:
    app: backend-deployment
  ports:
    - protocol: TCP
      port: 18000
      targetPort: 18000
  type: NodePort
---
# Source: fullstack-app/templates/frontend-deployment.yml
apiVersion: v1
kind: Service
metadata:
  name: frontend-deployment-service
  namespace: fullstack-app
spec:
  selector:
    app: frontend-deployment

```

```
File Edit Selection View Go Run ... Kubernetes helm-ignores
README | OUTPUT | DEBUG CONSOLE | TERMINAL | PORTS | PODMAN CONSOLE | SPO CHECKER
powered by ...

PS D:\3-1-1-CE-00\Kubernetes\Kubernetes-helm-ignores> helm history fullstack-app --fullstack-app
REVISION    UPDATED                     STATUS      DWRIT     APP VERSION  DESCRIPTION
1           wed nov 5 18:08:38 2025    superseded fullstack-app-1.0.0  1.0          Install complete
2           wed nov 5 18:09:44 2025    deployed   fullstack-app-1.0.0  1.0          Upgrade complete

PS D:\3-1-1-CE-00\Kubernetes\Kubernetes-helm-ignores>
```

```
File Edit Selection View Go Run ... Kubernetes helm-ignores
README | OUTPUT | DEBUG CONSOLE | TERMINAL | PORTS | PODMAN CONSOLE | SPO CHECKER
powered by ...

PS D:\3-1-1-CE-00\Kubernetes\Kubernetes-helm-ignores> kubectl get hpa --fullstack-app
NAME                                REFERENCE                               TARGETS          PERCENTS   AVERAGE   AGE
backend-deployment-hpa             deployment/backend-deployment           cpu: unknown/80% 2          5          2          10s
frontend-deployment-hpa            deployment/frontend-deployment          cpu: unknown/80% 2          5          2          10s

PS D:\3-1-1-CE-00\Kubernetes\Kubernetes-helm-ignores>
```

Horizontal pod autoscaling

The image displays two screenshots of a terminal window running a Kubernetes cluster, showing the configuration and status of Horizontal Pod Autoscalers (HPAs) for a deployment named 'fullstack-app'.

Top Screenshot: Backend Deployment HPA

The terminal shows the command `kubectl describe hpa backend --fullstack-app` and its output. The HPA is named 'backend-deployment-hpa' and is configured to scale the 'fullstack-app' deployment based on CPU utilization. The target CPU utilization is 50%.

HPA Configuration Details:

- Name: backend-deployment-hpa
- Namespace: fullstack-app
- CreationTimestamp: Wed, 08 Nov 2023 18:08:38 +0530
- Reference: Deployment/backend-deployment
- Metrics: [current / target]
- resource cpu on pods (as a percentage of request): unknown / 50%
- Min replicas: 2
- Max replicas: 5
- Deployment pods: 2 current / 0 desired

Conditions:

| Type | Status | Reason | Message |
|---------------|--------|-------------------------|---|
| Available | True | SucceededGetScale | the HPA controller was able to get the target's current scale |
| ScalingActive | False | FailedGetResourceMetric | the HPA was unable to compute the replica count: failed to get cpu utilization: unable to get metrics for resource cpu: unable to fetch metrics from resource metrics API: the server could not find the requested resource [get pods.metrics.k8s.io] |

Events:

| Type | Reason | Age | From | Message |
|---------|------------------------------|--------------------|---------------------------|---|
| Warning | FailedComputeMetricsReplicas | 10s (x11 over 10s) | horizontal-pod-autoscaler | Invalid metrics (5 invalid out of 1), first error is: failed to get cpu resource metric value: failed to get cpu utilization: unable to get metrics for resource cpu: unable to fetch metrics from resource metrics API: the server could not find the requested resource [get pods.metrics.k8s.io] |
| Warning | FailedGetResourceMetric | 55s (x10 over 10s) | horizontal-pod-autoscaler | failed to get cpu utilization: unable to get metrics for resource cpu: unable to fetch metrics from resource metrics API: the server could not find the requested resource [get pods.metrics.k8s.io] |

Bottom Screenshot: Frontend Deployment HPA

The terminal shows the command `kubectl describe hpa frontend --fullstack-app` and its output. The HPA is named 'frontend-deployment-hpa' and is configured to scale the 'fullstack-app' deployment based on CPU utilization. The target CPU utilization is 50%.

HPA Configuration Details:

- Name: frontend-deployment-hpa
- Namespace: fullstack-app
- CreationTimestamp: Wed, 08 Nov 2023 18:08:38 +0530
- Reference: Deployment/frontend-deployment
- Metrics: [current / target]
- resource cpu on pods (as a percentage of request): unknown / 50%
- Min replicas: 2
- Max replicas: 5
- Deployment pods: 2 current / 0 desired

Conditions:

| Type | Status | Reason | Message |
|---------------|--------|-------------------------|---|
| Available | True | SucceededGetScale | the HPA controller was able to get the target's current scale |
| ScalingActive | False | FailedGetResourceMetric | the HPA was unable to compute the replica count: failed to get cpu utilization: unable to get metrics for resource cpu: unable to fetch metrics from resource metrics API: the server could not find the requested resource [get pods.metrics.k8s.io] |

Events:

| Type | Reason | Age | From | Message |
|---------|------------------------------|---------------------|---------------------------|---|
| Warning | FailedComputeMetricsReplicas | 10s (x11 over 10s) | horizontal-pod-autoscaler | Invalid metrics (5 invalid out of 1), first error is: failed to get cpu resource metric value: failed to get cpu utilization: unable to get metrics for resource cpu: unable to fetch metrics from resource metrics API: the server could not find the requested resource [get pods.metrics.k8s.io] |
| Warning | FailedGetResourceMetric | 260s (x10 over 10s) | horizontal-pod-autoscaler | failed to get cpu utilization: unable to get metrics for resource cpu: unable to fetch metrics from resource metrics API: the server could not find the requested resource [get pods.metrics.k8s.io] |

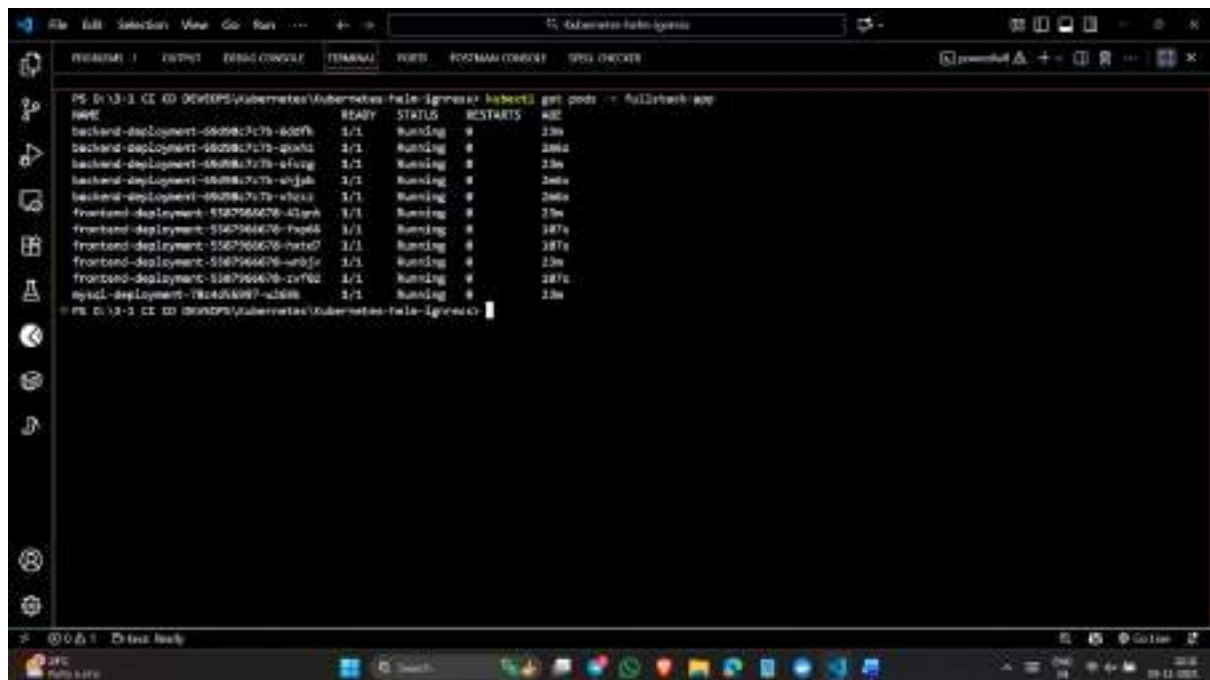

```
File Edit Selection View Go Run ... Kubernetes helm-igness
REPLACES | OUTPUT | DEBUG CONSOLE | TERMINAL | PORTS | PROGRAM CONSOLE | SPIN CHOCOLATE
Kubectl get hpa -- fullstack-app --
NAME REFERENCE TARGETS PODS AVAILABLE AGE
backend-deployment-hpa Deployment/backend-deployment cpu: rukonawen/50% 2 1 2 13m
frontend-deployment-hpa Deployment/frontend-deployment cpu: rukonawen/50% 2 1 2 13m
PS D:\13-1-1-1-1-1\Kubernetes\Kubernetes-helm-igness>
```

```
File Edit Selection View Go Run ... Kubernetes helm-igness
REPLACES | OUTPUT | DEBUG CONSOLE | TERMINAL | PORTS | PROGRAM CONSOLE | SPIN CHOCOLATE
Kubectl get hpa -- fullstack-app --
NAME REFERENCE TARGETS PODS AVAILABLE AGE
backend-deployment-hpa Deployment/backend-deployment cpu: rukonawen/50% 2 1 2 13m
frontend-deployment-hpa Deployment/frontend-deployment cpu: rukonawen/50% 2 1 2 13m
PS D:\13-1-1-1-1-1\Kubernetes\Kubernetes-helm-igness> Kubectl get pods -- fullstack-app
NAME READY STATUS RESTARTS AGE
backend-deployment-5b6b6c7f7b-4qf9k 1/1 Running 0 28s
backend-deployment-5b6b6c7f7b-4f9qg 1/1 Running 0 28s
frontend-deployment-55d756667b-4j9p8 1/1 Running 0 28s
frontend-deployment-55d756667b-4nqj8 1/1 Running 0 28s
mysql-deployment-78c4d88997-4d89k 1/1 Running 0 28s
PS D:\13-1-1-1-1-1\Kubernetes\Kubernetes-helm-igness>
```

```
File Edit Selection View Go Run ... Kubernetes helm-ignacio
TERMINAL
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl get hpa -- fullstack-app --
NAME REFERENCE TARGETS PODS AVAILABLE REPLICAS AGE
backend-deployment-hpa Deployment/backend-deployment cpu: nvidia.com/gpu 2 1 2 10m
frontend-deployment-hpa Deployment/frontend-deployment cpu: nvidia.com/gpu 2 1 2 10m
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl get pods -- fullstack-app
NAME READY STATUS RESTARTS AGE
backend-deployment-5b68b7f7s-4qpf 1/1 Running 0 20s
backend-deployment-5b68b7f7s-xfvg 1/1 Running 0 20s
frontend-deployment-55d7566676-4j9g 1/1 Running 0 20s
frontend-deployment-55d7566676-ndj3 1/1 Running 0 20s
mysql-deployment-78c4d8997-4396 1/1 Running 0 20s
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl scale deployment backend-deployment --replicas=1 -- fullstack-app
deployment.apps/backend-deployment scaled
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio>

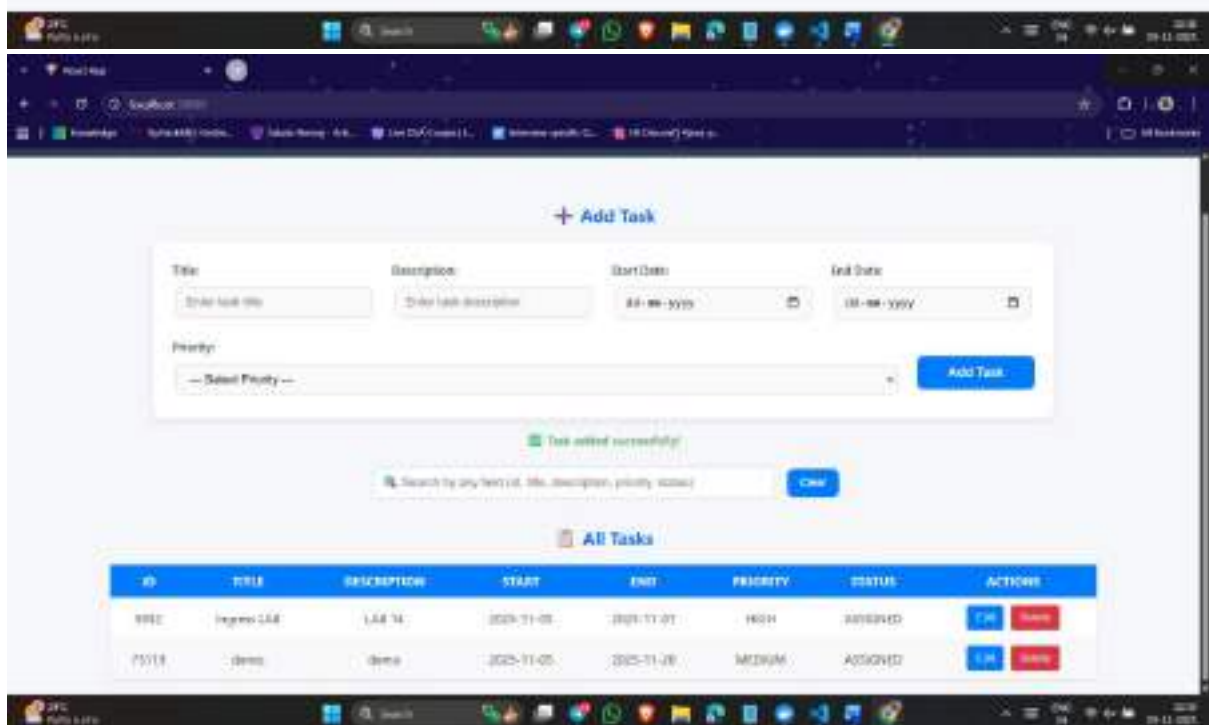
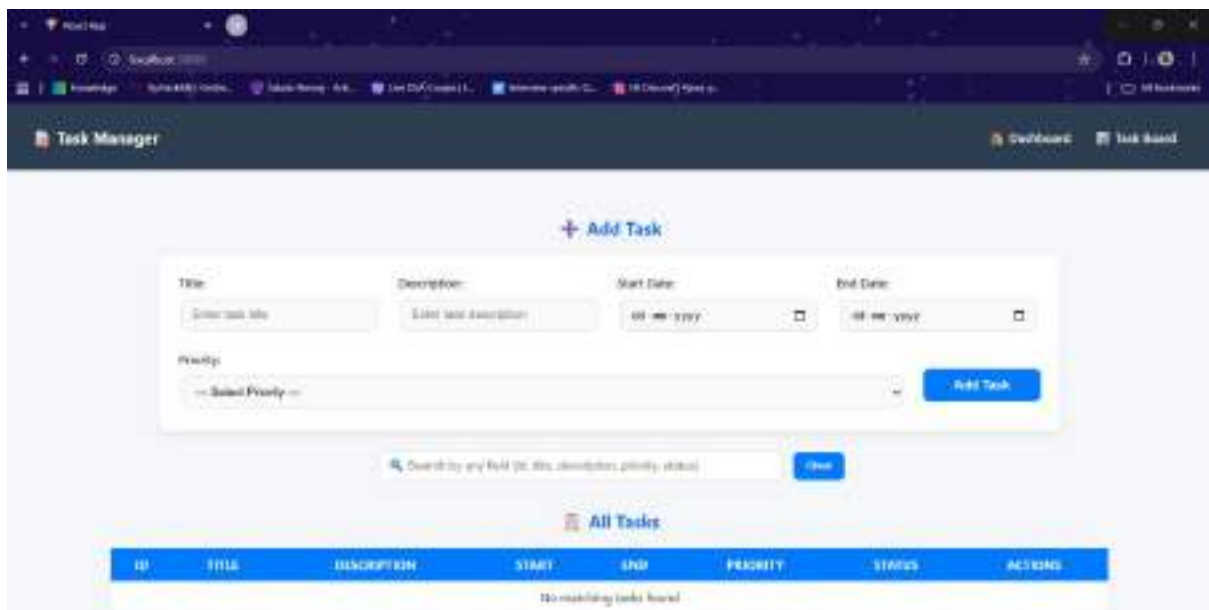
File Edit Selection View Go Run ... Kubernetes helm-ignacio
TERMINAL
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl get hpa -- fullstack-app --
NAME REFERENCE TARGETS PODS AVAILABLE REPLICAS AGE
backend-deployment-hpa Deployment/backend-deployment cpu: nvidia.com/gpu 2 1 2 10m
frontend-deployment-hpa Deployment/frontend-deployment cpu: nvidia.com/gpu 2 1 2 10m
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl get pods -- fullstack-app
NAME READY STATUS RESTARTS AGE
backend-deployment-5b68b7f7s-4qpf 1/1 Running 0 20s
backend-deployment-5b68b7f7s-xfvg 1/1 Running 0 20s
frontend-deployment-55d7566676-4j9g 1/1 Running 0 20s
frontend-deployment-55d7566676-ndj3 1/1 Running 0 20s
mysql-deployment-78c4d8997-4396 1/1 Running 0 20s
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl scale deployment backend-deployment --replicas=1 -- fullstack-app
deployment.apps/backend-deployment scaled
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio> kubectl scale deployment frontend-deployment --replicas=1 -- fullstack-app
deployment.apps/frontend-deployment scaled
PS D:\13-1 CE ID 06010PS\kubernetes\kubernetes-helm-ignacio>
```

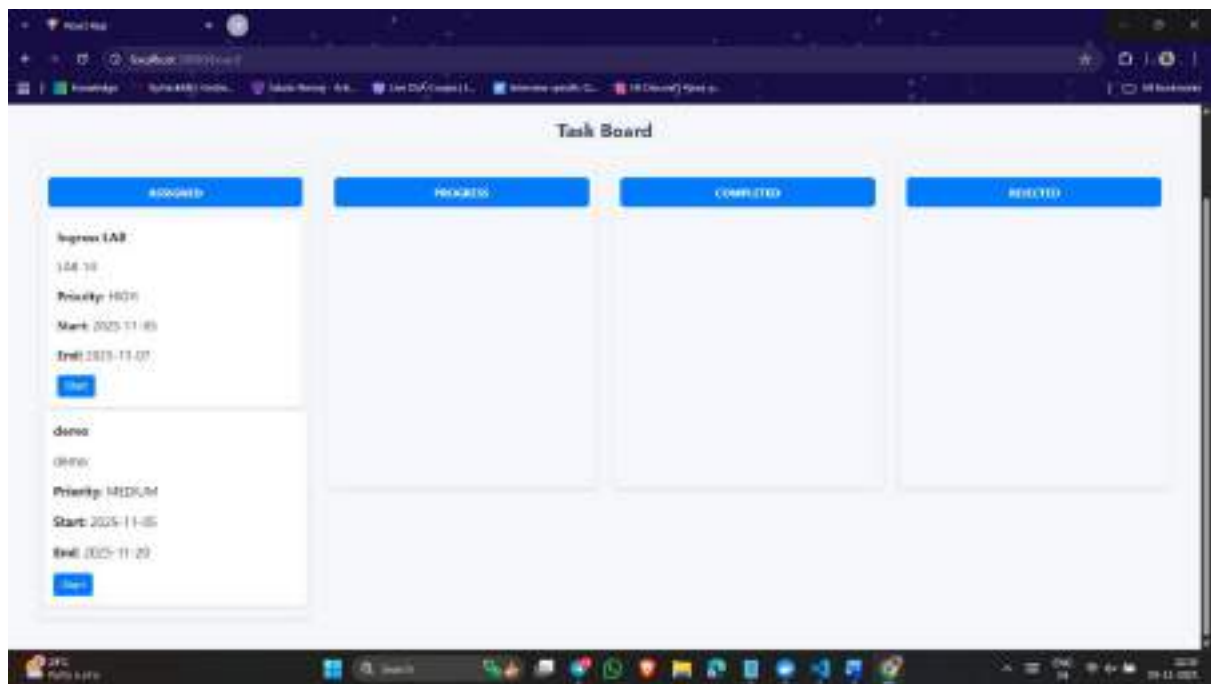

->If Image Pull back off there in the status make sure to run the command again and wait for running status

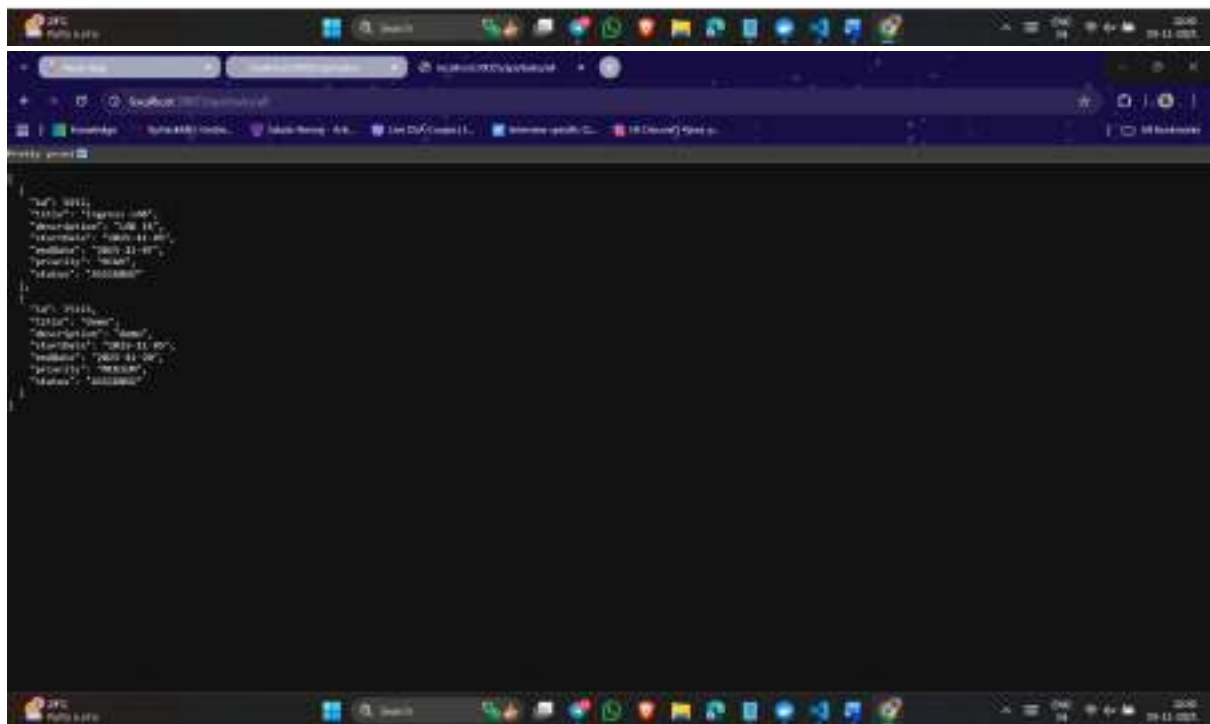


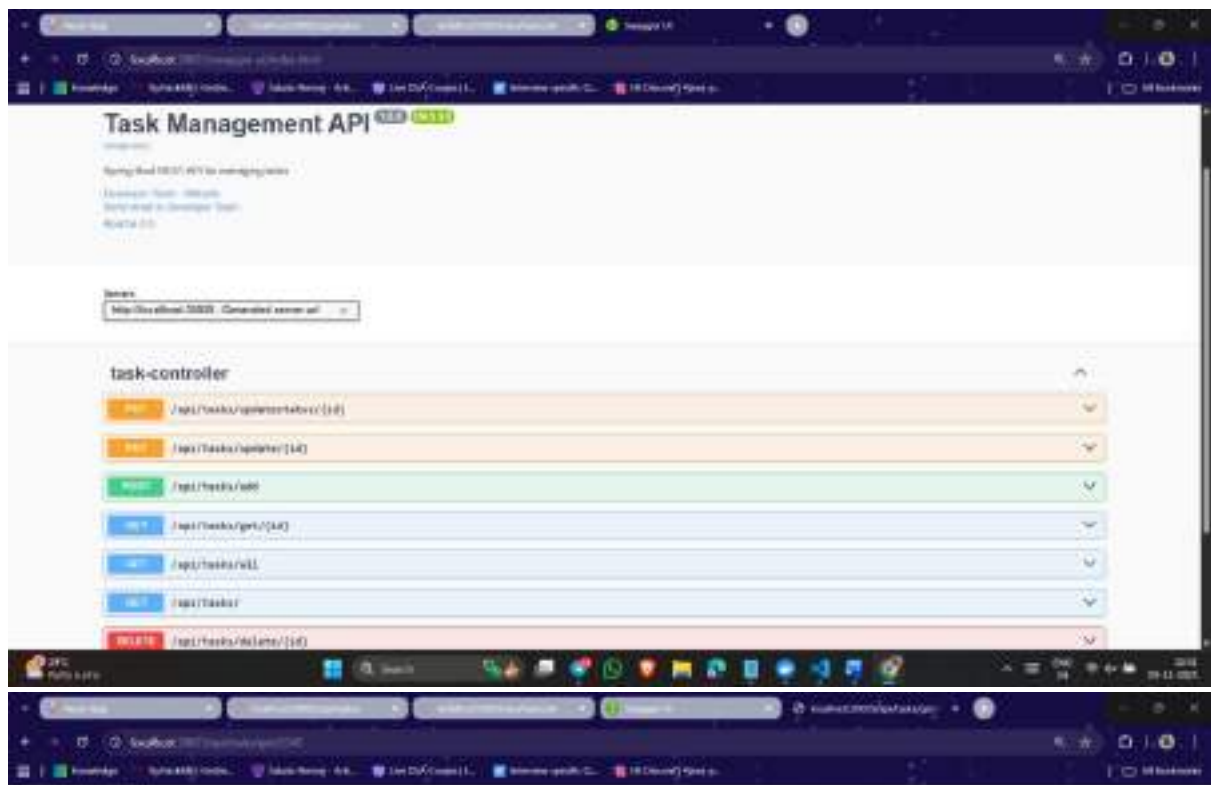
The screenshot shows a terminal window with the title "Kubernetes helm-gems". The terminal output displays the command `get pods -n fullstack-app` and its results. The results are organized into columns: NAME, READY, STATUS, RESTARTS, and AGE. The pods are categorized into backend and frontend deployments.

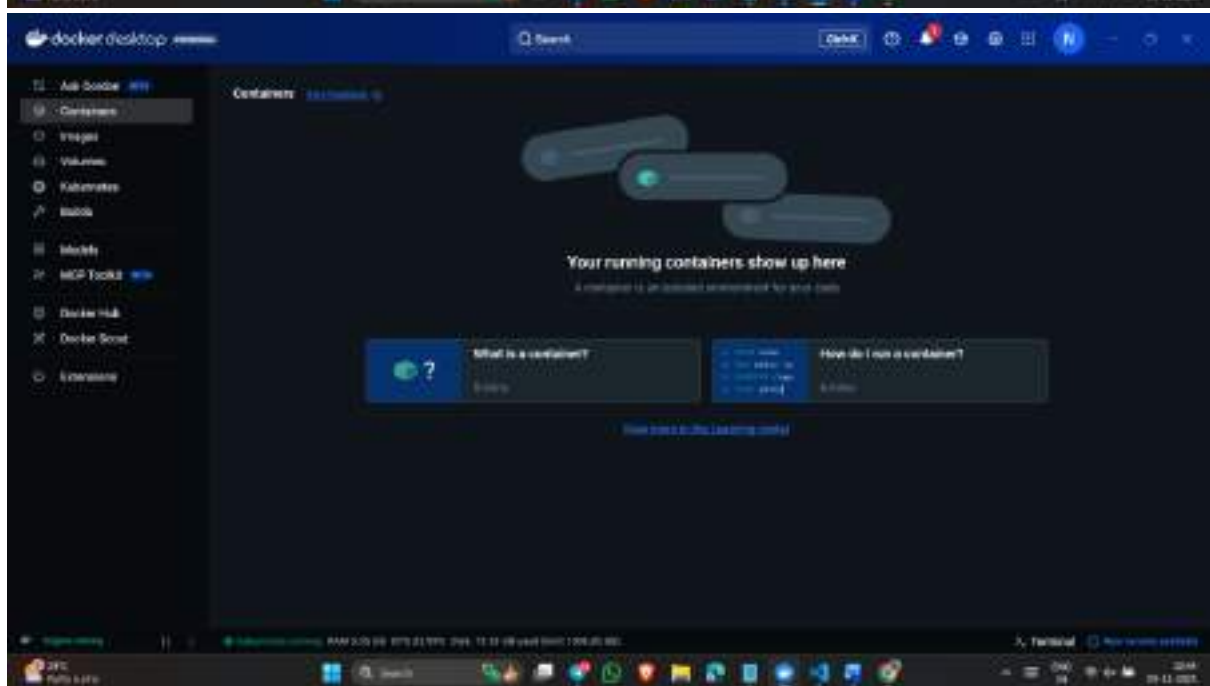
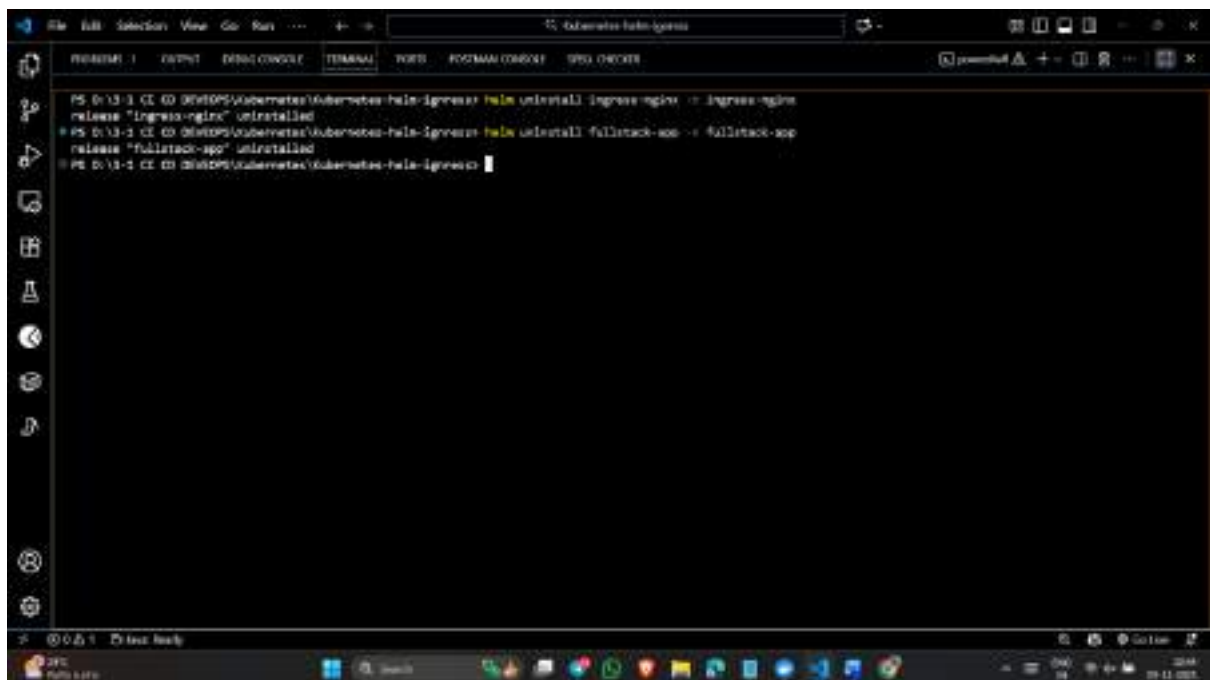
| NAME | READY | STATUS | RESTARTS | AGE |
|--------------------------------------|-------|---------|----------|-----|
| backend-deployment-66d98c7c7b-6d9fh | 1/1 | Running | 0 | 23m |
| backend-deployment-66d98c7c7b-6d9fh | 1/1 | Running | 0 | 23m |
| backend-deployment-66d98c7c7b-6d9fh | 1/1 | Running | 0 | 23m |
| backend-deployment-66d98c7c7b-6d9fh | 1/1 | Running | 0 | 23m |
| backend-deployment-66d98c7c7b-6d9fh | 1/1 | Running | 0 | 23m |
| frontend-deployment-55d7566676-429rk | 1/1 | Running | 0 | 23m |
| frontend-deployment-55d7566676-429rk | 1/1 | Running | 0 | 23m |
| frontend-deployment-55d7566676-429rk | 1/1 | Running | 0 | 23m |
| frontend-deployment-55d7566676-429rk | 1/1 | Running | 0 | 23m |
| frontend-deployment-55d7566676-429rk | 1/1 | Running | 0 | 23m |
| api-deployment-78c4d6887-c26m | 1/1 | Running | 0 | 23m |

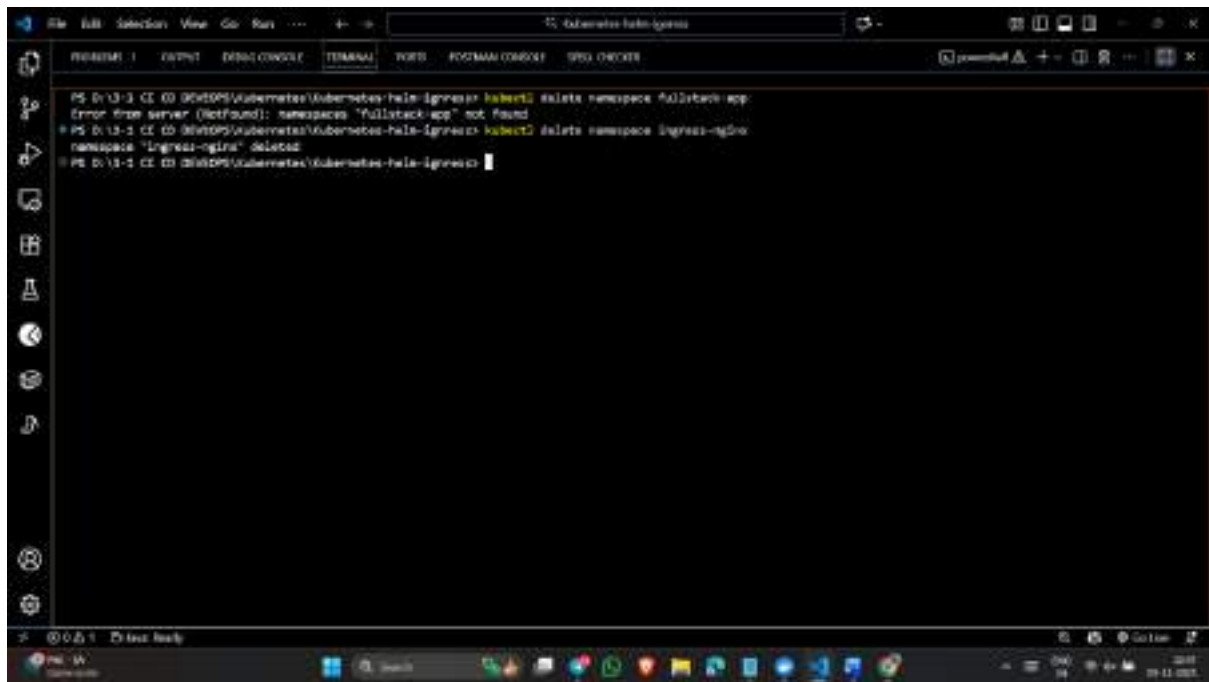












```
PS D:\3-3 CE ID 061019\kubernetes\kubernetes-helm-igns> kubectl delete namespace fullstack-app
Error from server (NotFound): namespaces "fullstack-app" not found
PS D:\3-3 CE ID 061019\kubernetes\kubernetes-helm-igns> kubectl delete namespace ingress-nginx
namespace "ingress-nginx" deleted
PS D:\3-3 CE ID 061019\kubernetes\kubernetes-helm-igns>
```

■ Step 1: helm create fullstack-app [This command for one time only]

This will generate a folder named fullstack-app/ with the following structure:

fullstack-app/

├─ charts/

├─ templates/

├─ Chart.yaml

└─ values.yaml

You can then modify values.yaml and templates as per your fullstack app (frontend, backend, MySQL, etc.).

■ Step 2: Add and Update Helm Repositories [These commands for first time only]

```
helm repo add ingress-nginx https://kubernetes.github.io/ingress-nginx
```

```
helm repo update
```

```
helm repo list
```

Step 3: Install NGINX Ingress Controller

First time (creates namespace)

```
helm install ingress-nginx ingress-nginx/ingress-nginx --create-namespace --  
namespace ingress-nginx
```

Next time (upgrade without creating namespace)

```
helm upgrade ingress-nginx ingress-nginx/ingress-nginx --namespace ingress-  
nginx
```

Check Ingress Controller Pods

```
kubectl get pods -n ingress-nginx
```

View Ingress Logs

```
kubectl logs -f <ingress-pod-name> -n ingress-nginx
```

Step 4: Install or Upgrade Your Fullstack App

First time (creates namespace)

```
helm install fullstack-app ./fullstack-app --create-namespace --namespace  
fullstack-app
```

Next time (upgrade without recreating namespace)

```
helm upgrade fullstack-app ./fullstack-app --namespace fullstack-app
```

Check Application Pods

```
kubectl get pods -n fullstack-app
```

View Application Logs

```
kubectl logs -f <backend-pod-name> -n fullstack-app [this one important]
```

```
kubectl logs -f <frontend-pod-name> -n fullstack-app
```

```
kubectl logs -f <mysql-pod-name> -n fullstack-app
```

Step 5: List Helm Releases

```
helm list -n fullstack-app
```

```
-----  
-----
```

Step 6: List the services (svc) in the namespace (fullstack-app)

```
kubectl get svc -n fullstack-app
```

```
-----  
-----
```

Step 7: Check Release Status

```
helm status fullstack-app -n fullstack-app
```

```
-----  
-----
```

Step 8: View Manifest

```
helm get manifest fullstack-app -n fullstack-app
```

Step 9: Check Release History

helm history fullstack-app -n fullstack-app

Step 10: Horizontal Pod Autoscaler (HPA)

Check All HPAs

kubectl get hpa -n fullstack-app

Describe a Specific HPA

kubectl describe hpa backend -n fullstack-app

kubectl describe hpa frontend -n fullstack-app

Watch Scaling in Real Time

kubectl get hpa -n fullstack-app -w

Check Current Pods and Resource Usage

```
kubectl get pods -n fullstack-app
```

Manually Scale (Optional)

```
kubectl scale deployment backend-deployment --replicas=5 -n fullstack-app
```

```
kubectl scale deployment frontend-deployment --replicas=5 -n fullstack-app
```

Monitor Logs During Scaling

```
kubectl logs -f <backend-pod-name> -n fullstack-app
```


Step 11: Monitor Pods and Scaling Activity

```
kubectl get pods -n fullstack-app -w
```


Step 12: Uninstall the Fullstack App

```
helm uninstall fullstack-app -n fullstack-app
```

Step 13: Uninstall NGINX Ingress Controller

```
helm uninstall ingress-nginx -n ingress-nginx
```

Step 14: Delete Namespaces (Cleanup)

```
kubectl delete namespace fullstack-app
```

```
kubectl delete namespace ingress-nginx
```
