Assignment - 4

Kubernetes / Docker

Assignment Date	11 November 2022
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Maximum Marks	2 Marks

Question-1:

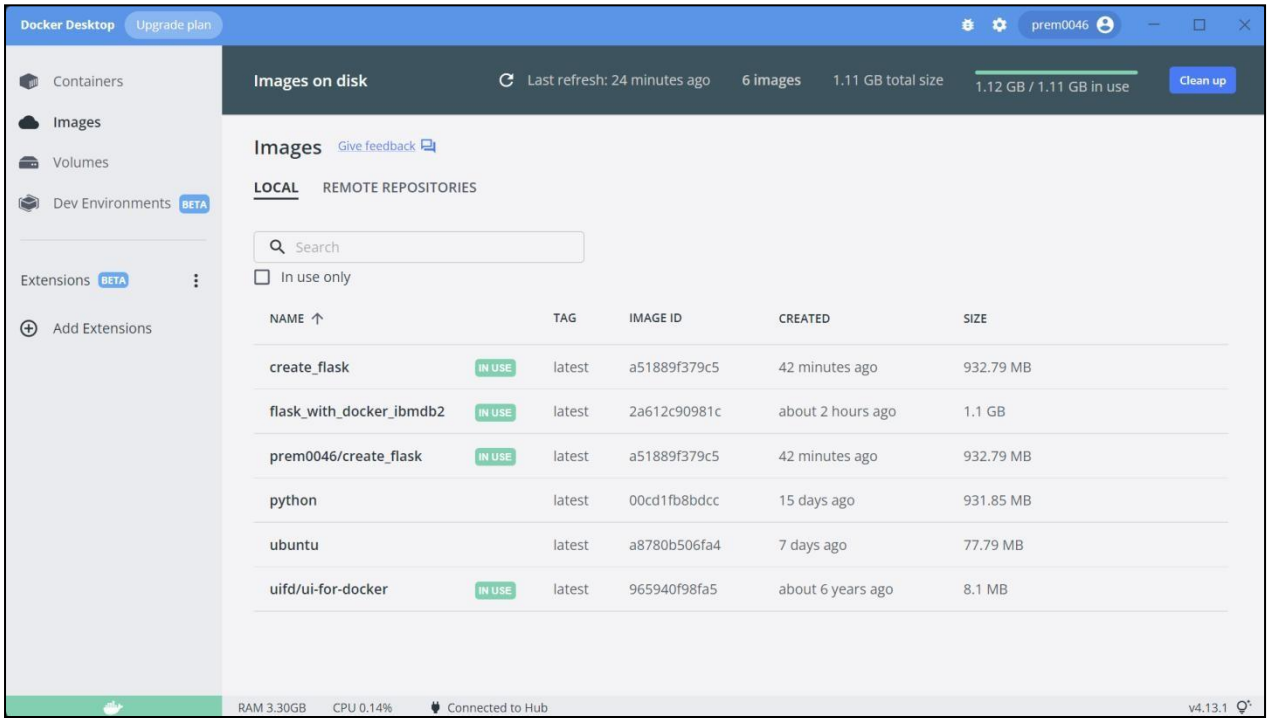
Pull an Image from docker hub and run it in docker playground.

Solution:

docker pull uifd/ui-for-docker - command is used to pull an image form docker hub using command prompt.

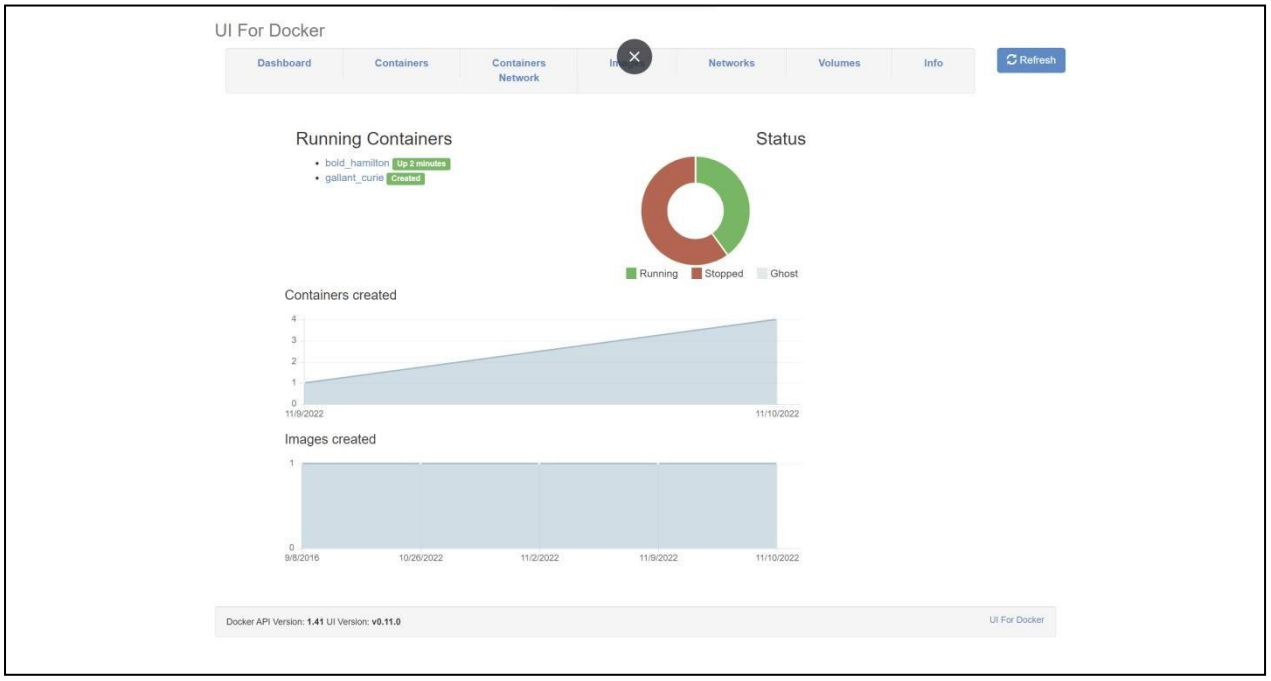
```
C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\
create_flask>docker pull uifd/ui-for-docker
Using default tag: latest
latest: Pulling from uifd/ui-for-docker
841194d080c8: Pull complete
Digest: sha256:fe371ff5a69549269b24073a5ab1244dd4c0b834cbadf244870572150b1cb749
Status: Downloaded newer image for uifd/ui-for-docker:latest
docker.io/uifd/ui-for-docker:latest

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\
create_flask>
```

Image has been pulled for docker hub

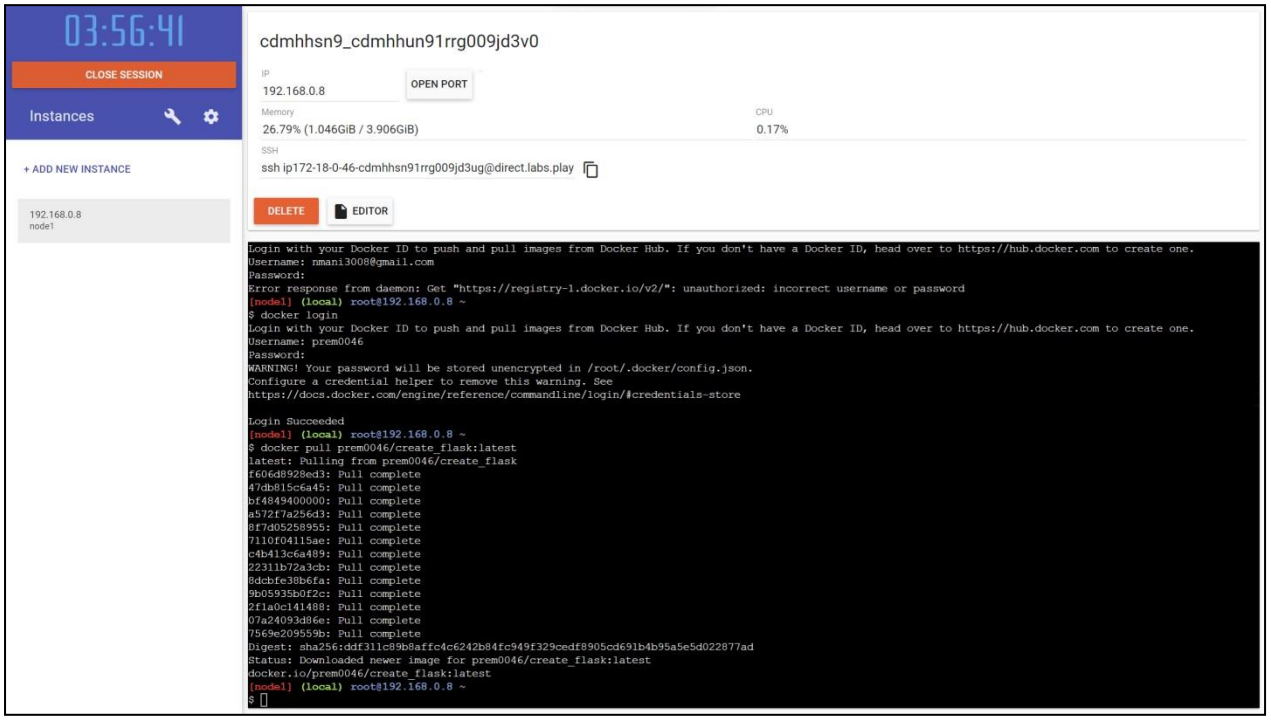


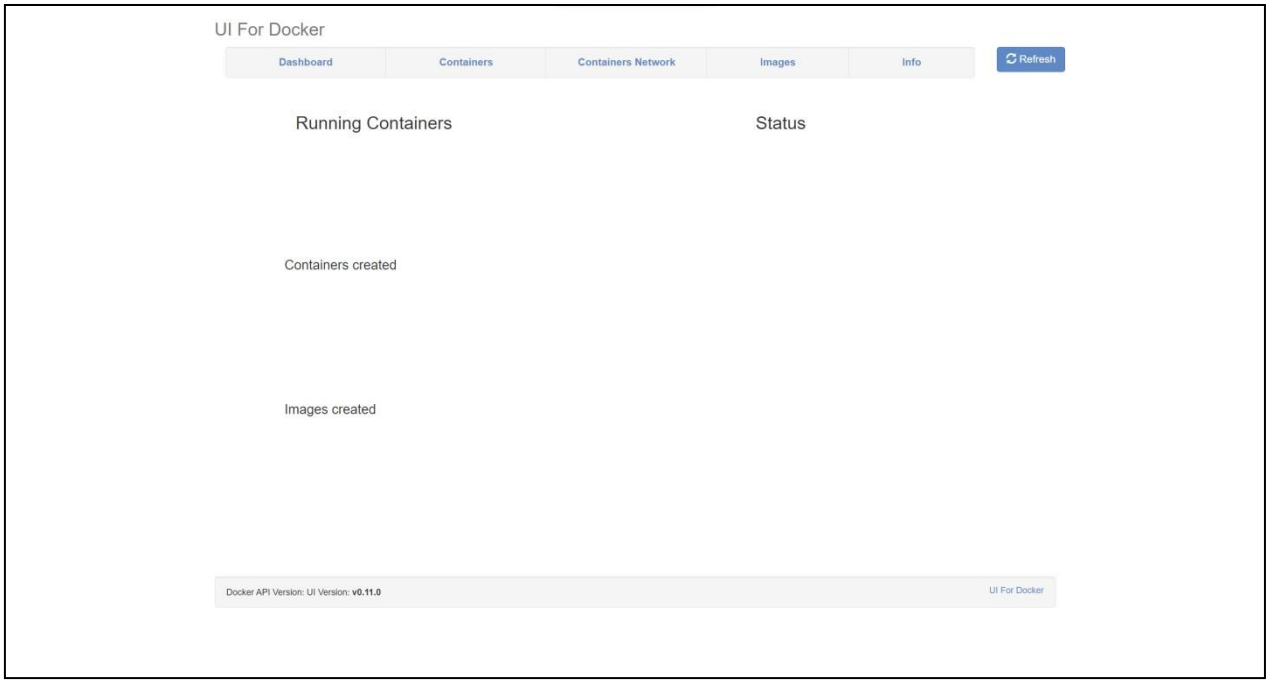
docker run -d -p 9000:9000 --privileged -v /var/run/docker.sock:/var/run/docker.sock uifd/ui-for-docker - command is used to run an image form docker hub using command prompt.

```
C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\create_flask>docker run
 -d -p 9000:9000 --privileged -v /var/run/docker.sock:/var/run/docker.sock uifd/ui-for-docker
10057d78e25d63b899f8d7e99d4a1a800e70b204a47073e218401656fd625ef6

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\create_flask>
```



Docker playground:





Question-2:

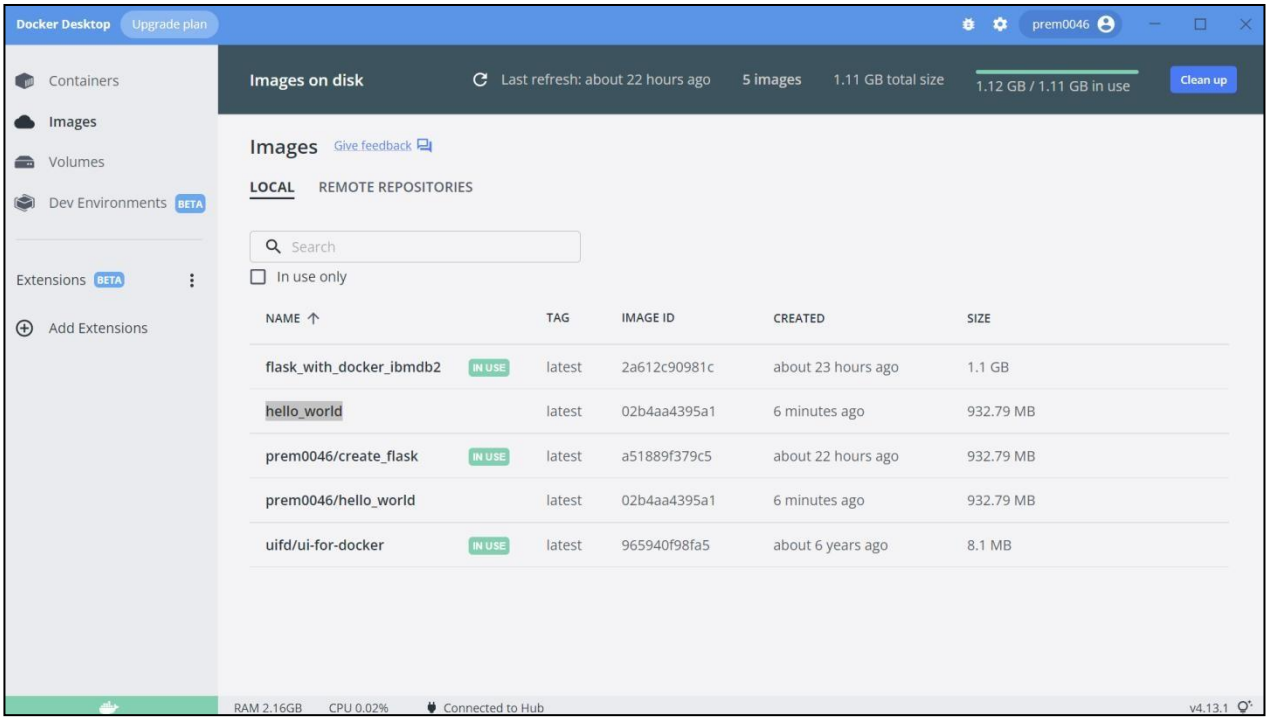
Create a docker file for the job portal application or helloworld app and deploy it in Docker desktop application.

Building docker image: hello_world

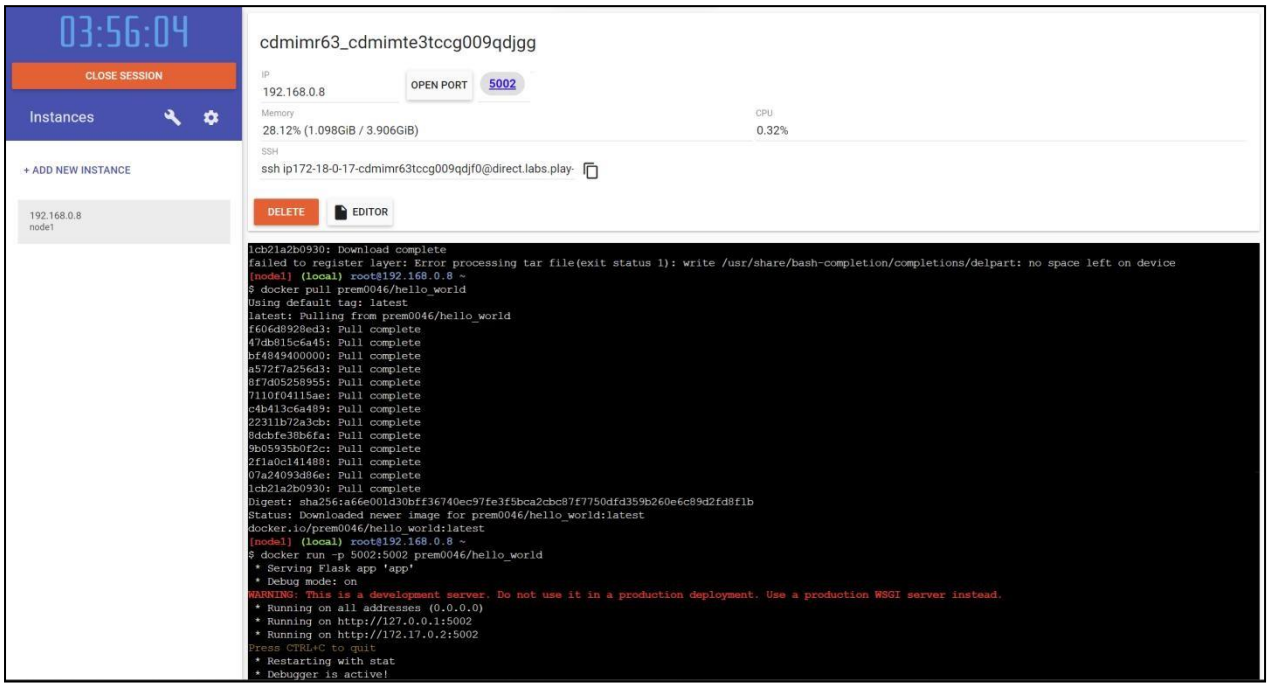
```
Microsoft Windows [Version 10.0.22623.885]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\hello_world>docker build -t hello_world .
[+] Building 2.8s (11/11) FINISHED
 => [internal] load build definition from Dockerfile                                                0.0s
 => => transferring dockerfile: 184B                                                                0.0s
 => [internal] load .dockerignore                                                                   0.0s
 => => transferring context: 2B                                                                     0.0s
 => [internal] load metadata for docker.io/library/python:3.10.7                                    2.7s
 => [auth] library/python:pull token for registry-1.docker.io                                       0.0s
 => [internal] load build context                                                                   0.0s
 => => transferring context: 545B                                                                   0.0s
 => [1/5] FROM docker.io/library/python:3.10.7@sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc  0.0s
 => CACHED [2/5] WORKDIR /app                                                                       0.0s
 => CACHED [3/5] COPY requirements.txt ./                                                           0.0s
 => CACHED [4/5] RUN pip install -r requirements.txt                                                0.0s
 => [5/5] COPY . .                                                                                  0.0s
 => exporting to image                                                                              0.0s
 => => exporting layers                                                                             0.0s
 => => writing image sha256:02b4aa4395a108417d48df9b218b540aa95f54c9fc72aa4aea2340c783c8cf1b        0.0s
 => => naming to docker.io/library/hello_world                                                      0.0s

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\hello_world>
```

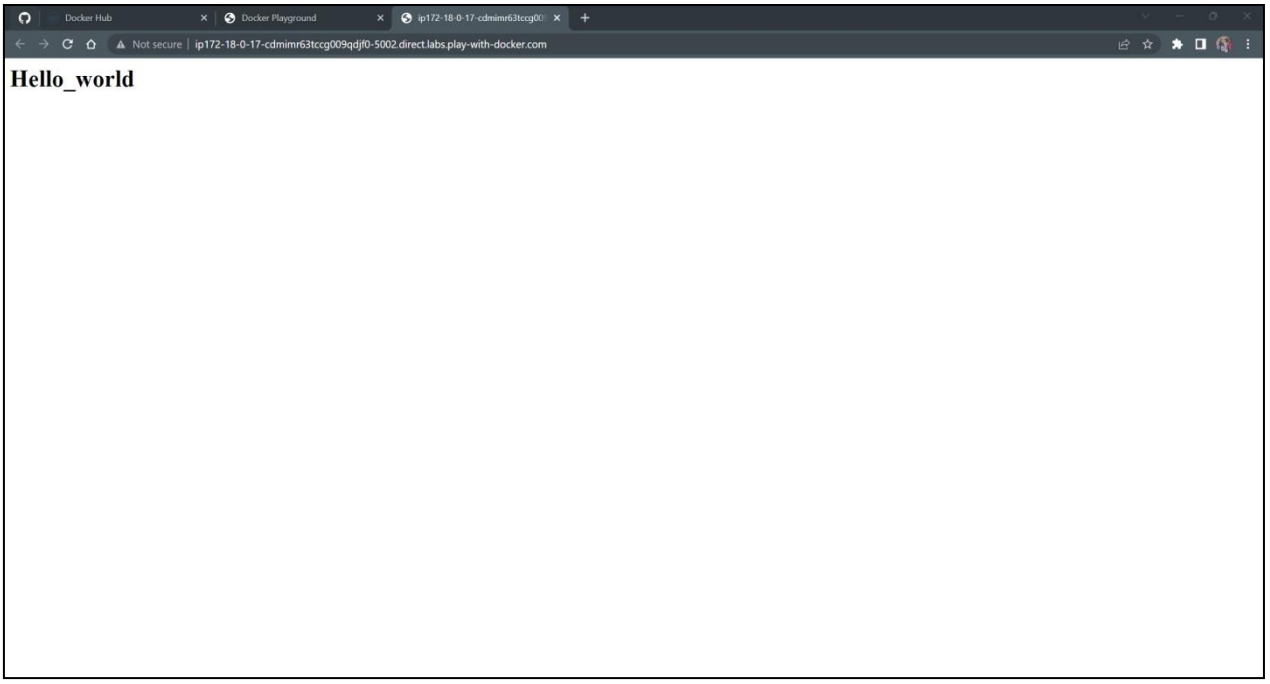
Pushing the image into repository in docker hub:

```
C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\hello_world>docker login
Authenticating with existing credentials...
Login Succeeded

Logging in with your password grants your terminal complete access to your account.
For better security, log in with a limited-privilege personal access token. Learn more at https://docs.docker.com/go/access-tokens/

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\hello_world>docker tag hello_world prem0046/hello_world

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\hello_world>docker push prem0046/hello_world
Using default tag: latest
The push refers to repository [docker.io/prem0046/hello_world]
096703ae4106: Pushed
30b75c628008: Mounted from prem0046/create_flask
265d09ef557c: Mounted from prem0046/create_flask
94b76bc8510f: Mounted from prem0046/create_flask
cf399be408ea: Mounted from prem0046/create_flask
793b971ccb99: Mounted from prem0046/create_flask
d172a9e6f9e6: Mounted from prem0046/create_flask
0c7daf9a72c8: Mounted from prem0046/create_flask
75ba02937496: Mounted from prem0046/create_flask
288cf3a46e32: Mounted from prem0046/create_flask
186da837555d: Mounted from prem0046/create_flask
955c9335e041: Mounted from prem0046/create_flask
8e079fee2186: Mounted from prem0046/create_flask
latest: digest: sha256:a66e001d30bff36740ec97fe3f5bca2cbc87f7750dfd359b260e6c89d2fd8f1b size: 3050

C:\Users\nmani\OneDrive\Desktop\IBM_Project\Assignments\Chilakamarthi Prem Kashyap(Team Leader)\Assignment-4\hello_world>
```



Testing it using docker playground:





Question- 3:

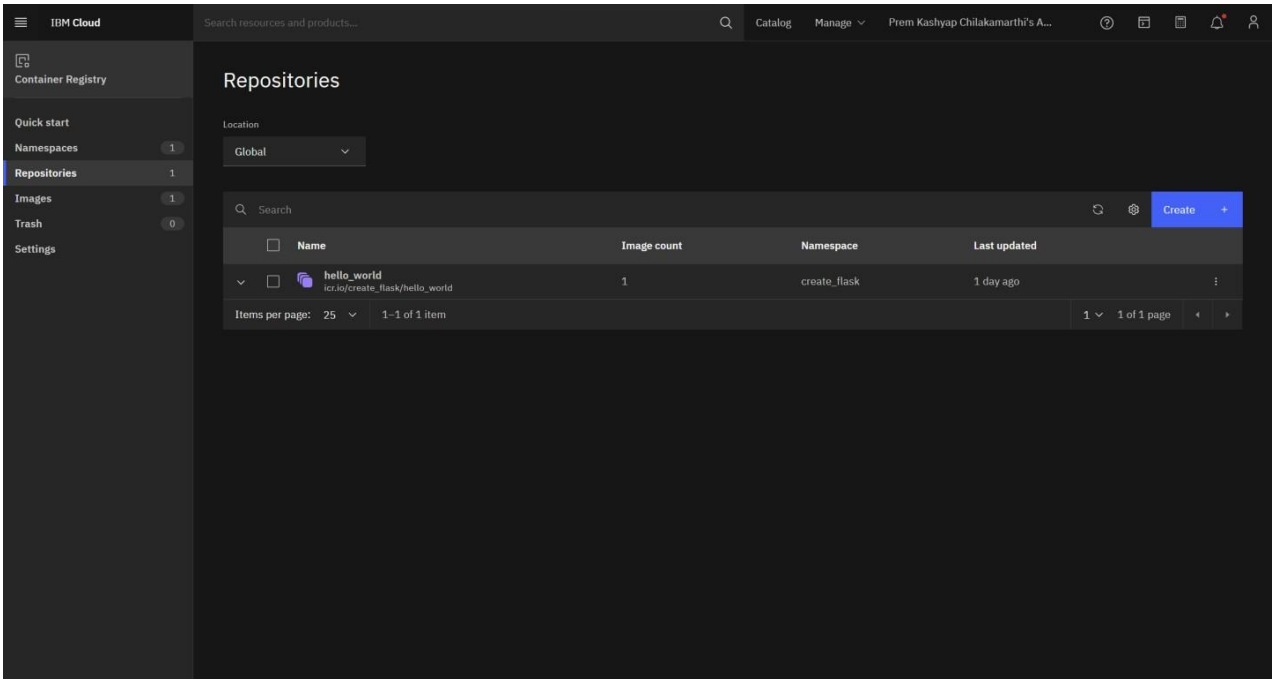
Create a IBM container registry and deploy hello world app or job portal app.

Hello_world Image link: icr.io/create_flask/hello_world

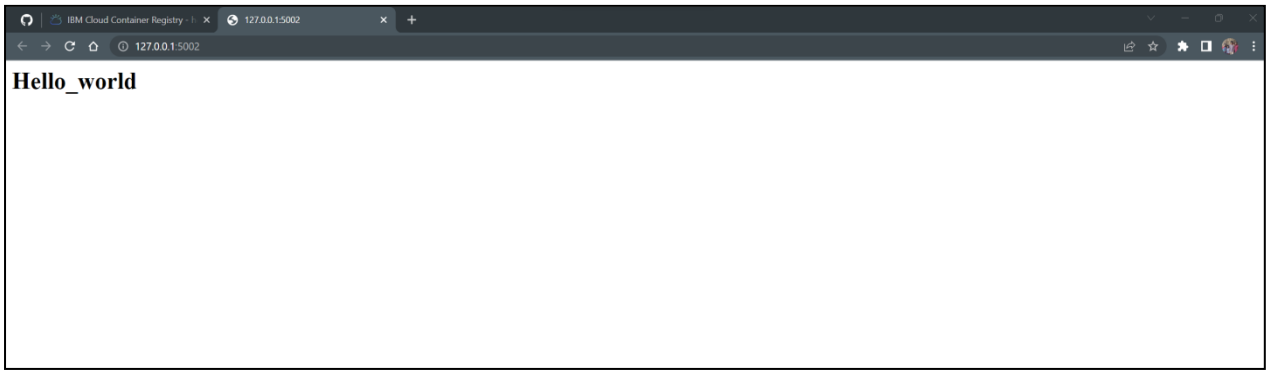
```
C:\Users\nmani>ibmcloud login
API endpoint: https://cloud.ibm.com
Region: jp-tok

Email> sec19cs095@sairamtap.edu.in

Password>
Authenticating...
OK

Targeted account Prem Kashyap Chilakamarthi's Account (c50714902c8f4427b45032b104b525a1)


API endpoint:      https://cloud.ibm.com
Region:            jp-tok
User:              sec19cs095@sairamtap.edu.in
Account:           Prem Kashyap Chilakamarthi's Account (c50714902c8f4427b45032b104b525a1)
Resource group:    No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:

C:\Users\nmani>ibmcloud plugin install container-service
Looking up 'container-service' from repository 'IBM Cloud'...
Plug-in 'container-service[kubernetes-service/ks] 1.0.459' found in repository 'IBM Cloud'
Attempting to download the binary file...
 26.86 MiB / 26.86 MiB [=============================================================================] 100.00% 1s
28168192 bytes downloaded
Installing binary...
OK
Plug-in 'container-service 1.0.459' was successfully installed into C:\Users\nmani\.bluemix\plugins\container-service. Use 'ibmcloud plugin show container-service' to show its det
ails.

C:\Users\nmani>ibmcloud plugin install container-registry
Looking up 'container-registry' from repository 'IBM Cloud'...
Plug-in 'container-registry[cr] 1.0.2' found in repository 'IBM Cloud'
Attempting to download the binary file...
 11.90 MiB / 11.90 MiB [=============================================================================] 100.00% 0s
12476416 bytes downloaded
Installing binary...
OK
Plug-in 'container-registry 1.0.2' was successfully installed into C:\Users\nmani\.bluemix\plugins\container-registry. Use 'ibmcloud plugin show container-registry' to show its de
tails.
```

```
C:\Users\nmani>ibmcloud plugin install observe-service
Looking up 'observe-service' from repository 'IBM Cloud'...
Plug-in 'observe-service 1.0.82' found in repository 'IBM Cloud'
Attempting to download the binary file...
 13.38 MiB / 13.38 MiB [=============================================================================] 100.00% 0s
14024704 bytes downloaded
Installing binary...
OK
Plug-in 'observe-service 1.0.82' was successfully installed into C:\Users\nmani\.bluemix\plugins\observe-service. Use 'ibmcloud plugin show observe-service' to show its details.

C:\Users\nmani>ibmcloud plugin list
Listing installed plug-ins...

Plugin Name                          Version   Status   Private endpoints supported
container-registry                   1.0.2              true
container-service[kubernetes-service/ks]   1.0.459            false
observe-service[ob]                  1.0.82             false
```

```
C:\Users\nmani>docker tag hello_world icr.io/create_flask/hello_world:latest

C:\Users\nmani>docker push icr.io/create_flask/hello_world:latest
The push refers to repository [icr.io/create_flask/hello_world]
096703ae4106: Pushed
30b75c628008: Pushed
265d09ef557c: Pushed
94b76bc8510f: Pushed
cf399be408ea: Pushed
793b971ccb99: Pushed
d172a9e6f9e6: Pushed
0c7daf9a72c8: Pushed
75ba02937496: Pushed
288cf3a46e32: Pushed
186da837555d: Pushed
955c9335e041: Pushed
8e079fee2186: Pushed
latest: digest: sha256:a66e001d30bff36740ec97fe3f5bca2cbc87f7750dfd359b260e6c89d2fd8f1b size: 3050

C:\Users\nmani>ibmcloud cr image-list
Listing images...

Repository                      Tag      Digest         Namespace
    Created        Size     Security status
icr.io/create_flask/hello_world   latest   a66e001d30bf   create_flask   19 hours ago   356 MB   -

OK
```



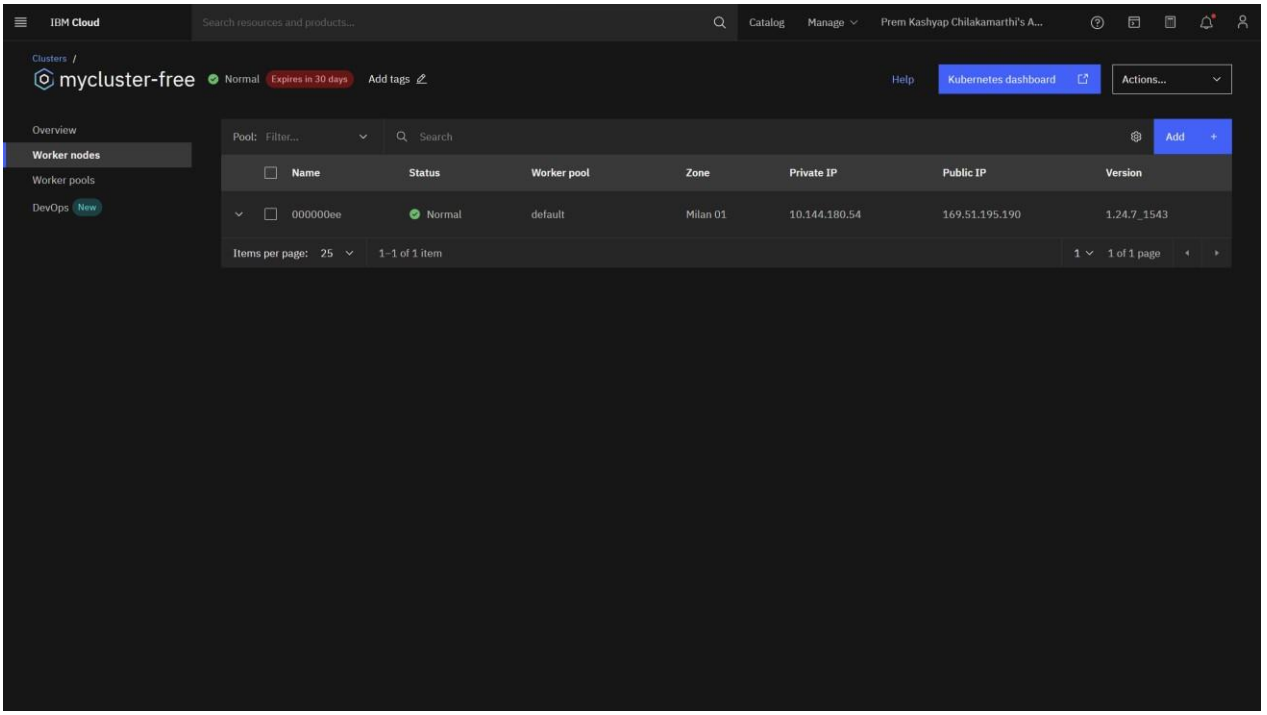

```
PS C:\Users\nmani> docker run -p 5002:5002 icr.io/create_flask/hello_world
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:5002
 * Running on http://172.17.0.2:5002
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 166-878-257
172.17.0.1 - - [11/Nov/2022 12:09:17] "GET / HTTP/1.1" 200 -
```



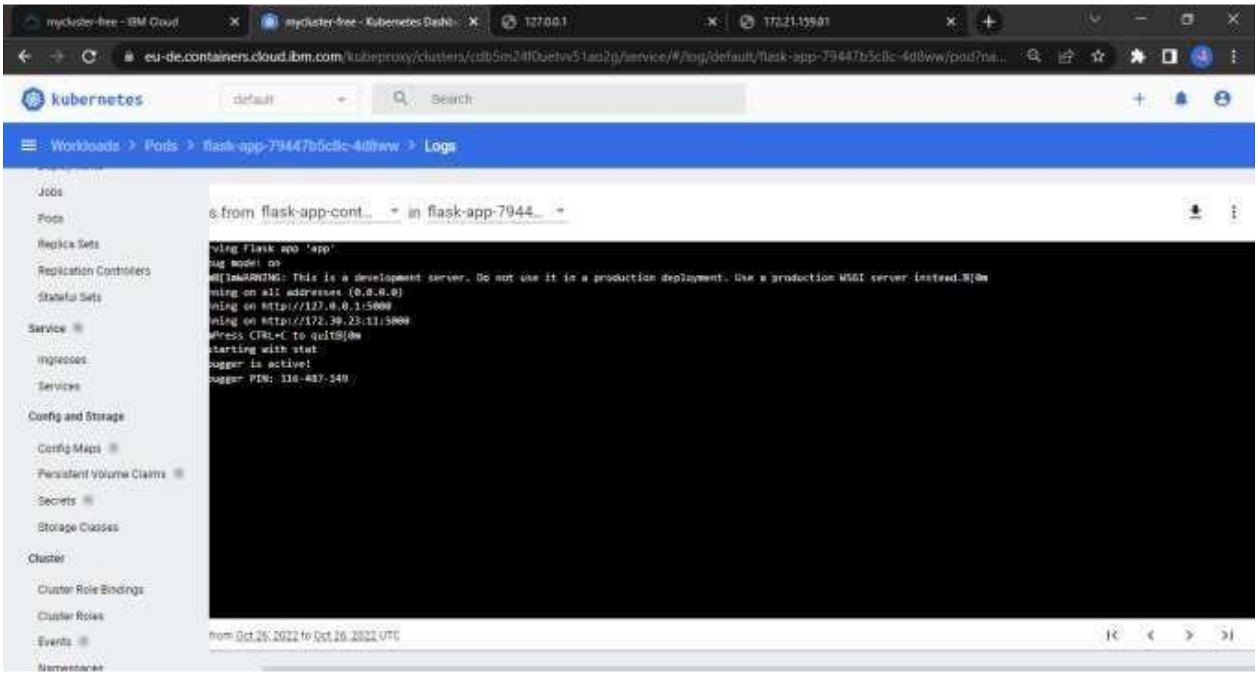
Question -4:

Create a Kubernetes cluster in IBM cloud and deploy helloworld image or jobportal image and also expose the same app to run in node port.

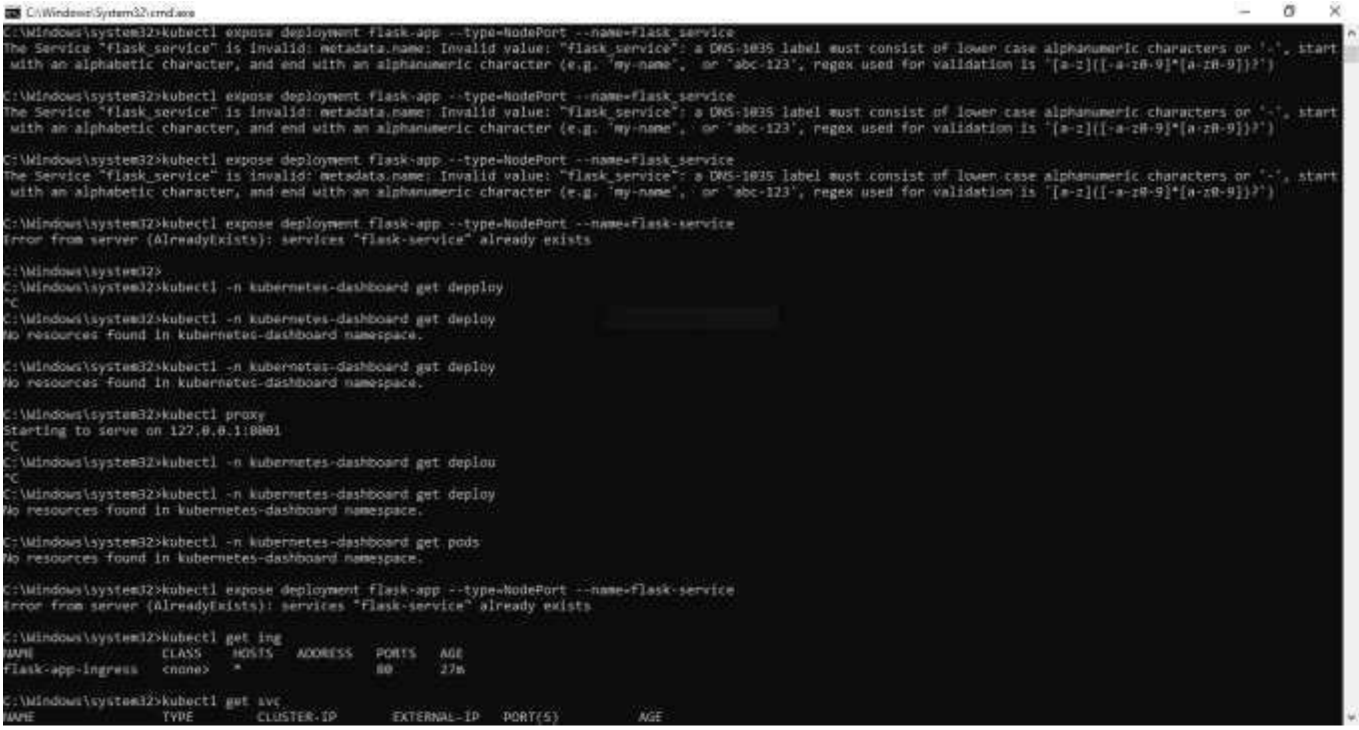
Creating a Kubernetes cluster in IBM cloud




```
C:\Users\gani\Desktop>cd deploy
The system cannot find the path specified.

C:\Users\gani\Desktop>kubectl apply -f kubernetes/depoly.yaml
error: the path "kubernetes/depoly.yaml" does not exist

C:\Users\gani\Desktop>kubectl apply -f depoly.yaml
error: the path "depoly.yaml" does not exist

C:\Users\gani\Desktop>kubectl apply -f C:\Users\gani\Desktop\deploy.yaml
deployment.apps/flask-app created

C:\Users\gani\Desktop>
```



mycluster-free - IBM Cloud
mycluster-free - Kubernetes Dashb
127.0.0.1
172.21.159.81
eu-de.containers.cloud.ibm.com
kubernetes
default
Search
Workloads > Pods > flask-app-79447b5c8c-4d8ww > Logs
Jobs
Pods
Replica Sets
Replication Controllers
Stateful Sets
Service
Ingresses
Services
Config and Storage
Config Maps
Persistent Volume Claims
Secrets
Storage Classes
Cluster
Cluster Role Bindings
Cluster Roles
Events
s from flask-app-cont... in flask-app-7944...
rving Flask app 'app'
bug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
nning on all addresses (0.0.0.0)
nning on http://127.0.0.1:5000
nning on http://172.30.23.11:5000
Press CTRL+C to quit
starting with stat
bugger is active!
bugger PIN: 116-487-149
from Oct 26, 2022 to Oct 26, 2022 UTC



C:\Windows\System32\cmd.exe
C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask_service
The Service "flask_service" is invalid: metadata.name: Invalid value: "flask_service": a DNS-1035 label must consist of lower case alphanumeric characters or '-', start with an alphabetic character, and end with an alphanumeric character (e.g. 'my-name', or 'abc-123', regex used for validation is '[a-z]([-a-z0-9]*[a-z0-9])?')
C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask_service
The Service "flask_service" is invalid: metadata.name: Invalid value: "flask_service": a DNS-1035 label must consist of lower case alphanumeric characters or '-', start with an alphabetic character, and end with an alphanumeric character (e.g. 'my-name', or 'abc-123', regex used for validation is '[a-z]([-a-z0-9]*[a-z0-9])?')
C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask_service
The Service "flask_service" is invalid: metadata.name: Invalid value: "flask_service": a DNS-1035 label must consist of lower case alphanumeric characters or '-', start with an alphabetic character, and end with an alphanumeric character (e.g. 'my-name', or 'abc-123', regex used for validation is '[a-z]([-a-z0-9]*[a-z0-9])?')
C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
Error from server (AlreadyExists): services "flask-service" already exists
C:\Windows\system32>
C:\Windows\system32>kubectl -n kubernetes-dashboard get depploy
^C
C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.
C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.
C:\Windows\system32>kubectl proxy
Starting to serve on 127.0.0.1:8001
^C
C:\Windows\system32>kubectl -n kubernetes-dashboard get deplou
^C
C:\Windows\system32>kubectl -n kubernetes-dashboard get deploy
No resources found in kubernetes-dashboard namespace.
C:\Windows\system32>kubectl -n kubernetes-dashboard get pods
No resources found in kubernetes-dashboard namespace.
C:\Windows\system32>kubectl expose deployment flask-app --type=NodePort --name=flask-service
Error from server (AlreadyExists): services "flask-service" already exists
C:\Windows\system32>kubectl get ing
NAME CLASS HOSTS ADDRESS PORTS AGE
flask-app-ingress <none> * 80 27m
C:\Windows\system32>kubectl get svc
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE