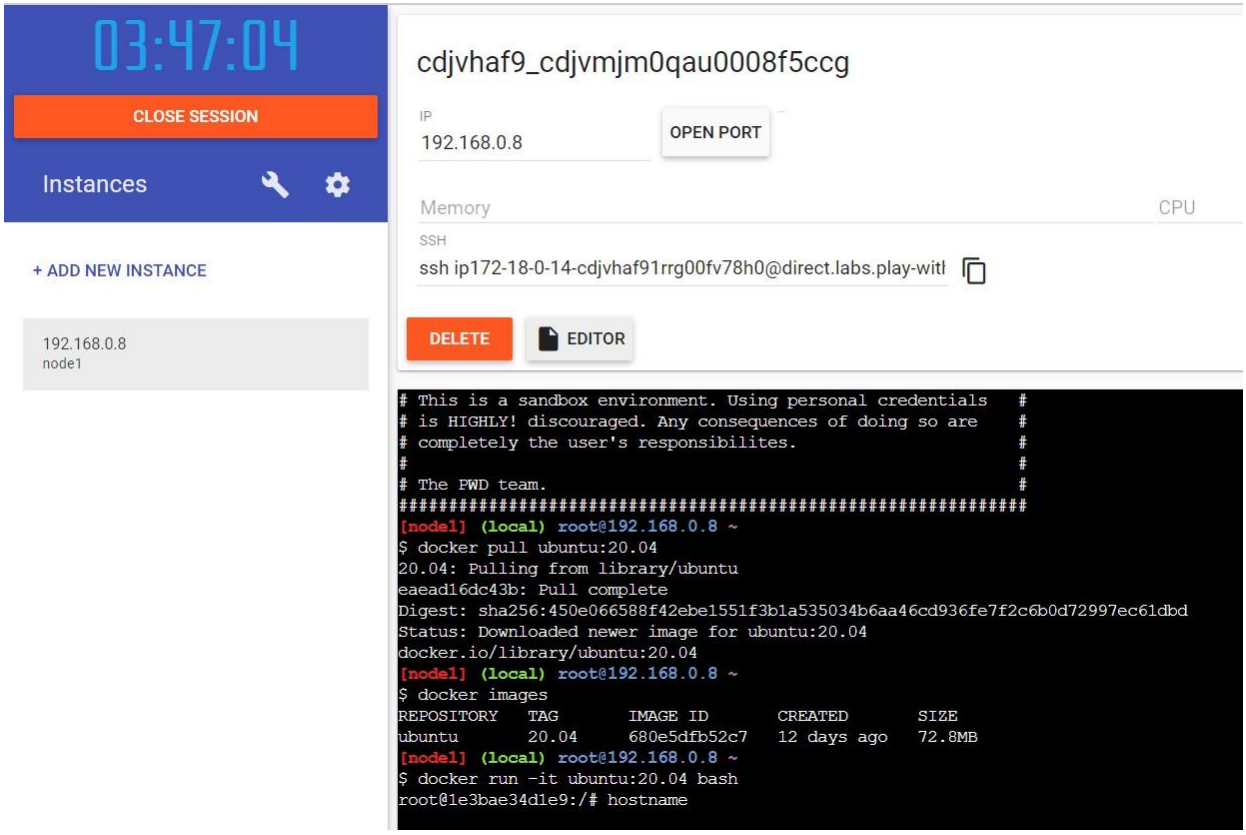
ASSIGNMENT-4
DOCKER AND KUBERNETES

Assignment Date	04 November 2022
Student Name	Buvaneswari J
Student Roll Number	19CS020
Maximum Marks	2 Marks

Question-1:

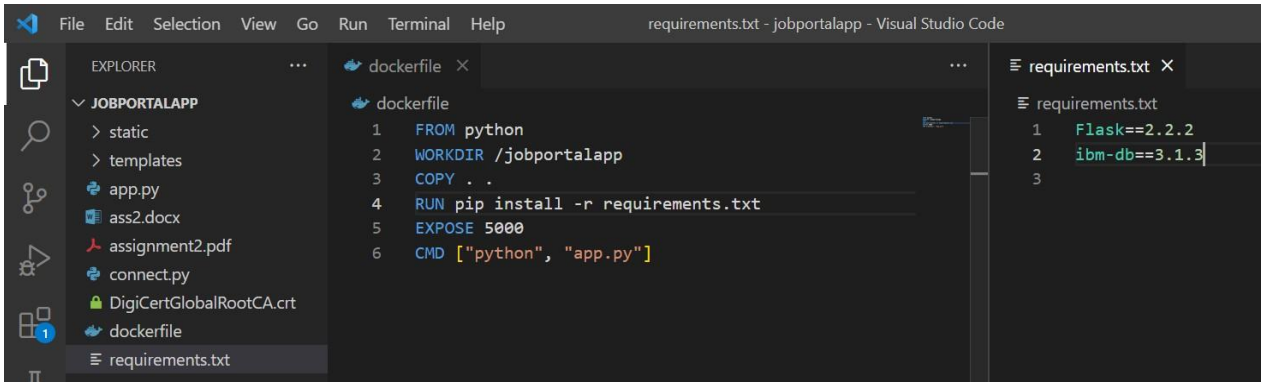
Pull an image from docker hub and run it on a docker playground



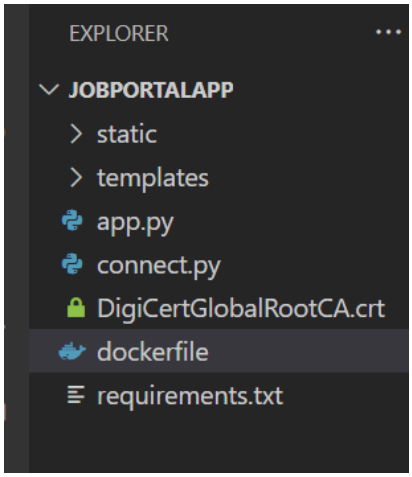
Question-2:

Create a docker file for the job portal application and deploy it in docker desktop application

Dockerfile and Requirements.txt :



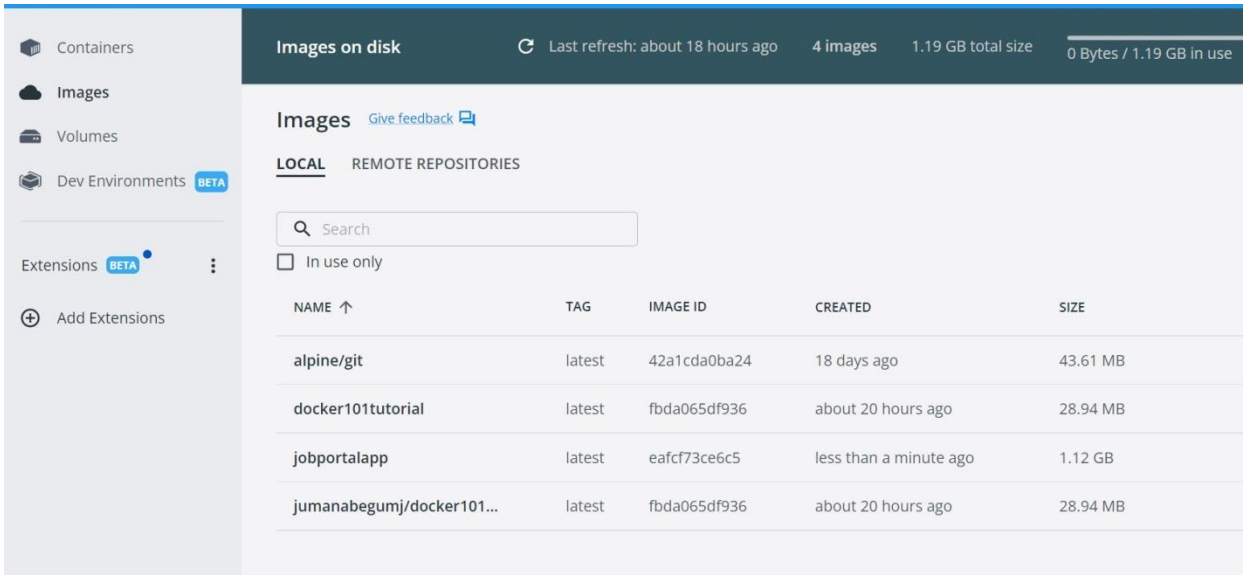
File structure:



Building a docker image:

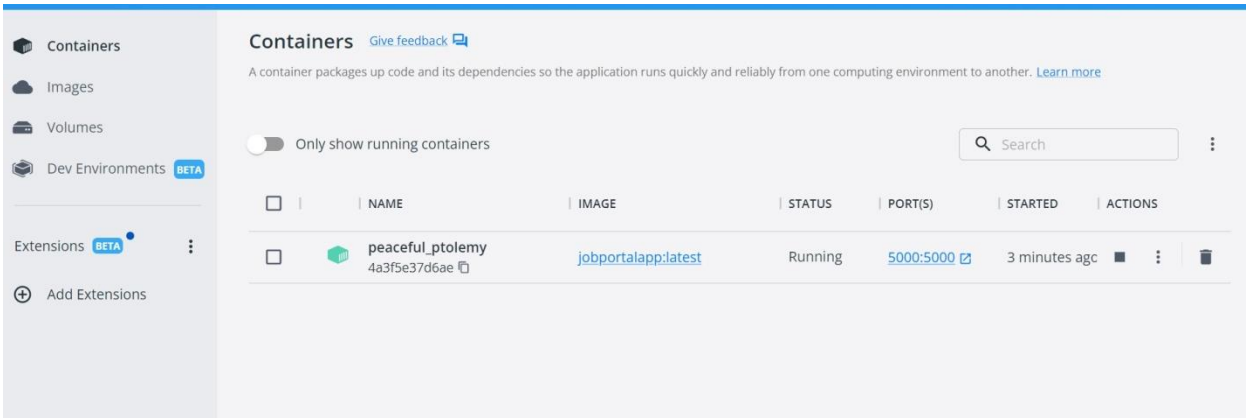
```
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\GCS\ibm\jobportalapp> docker build -t jobportalapp . --no-cache
[+] Building 16.3s (8/9)
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 31B
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [internal] load metadata for docker.io/library/python:latest
 => [auth] library/python:pull token for registry-1.docker.io
```

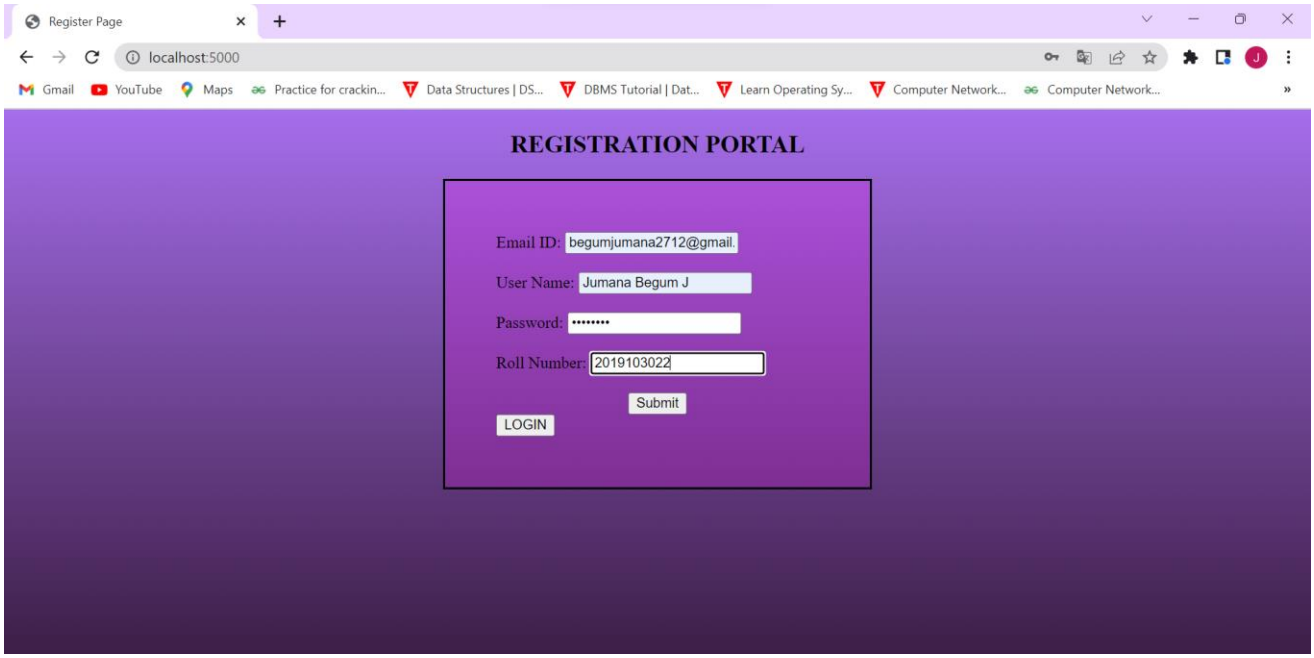
```
 => [1/4] FROM docker.io/library/python@sha256:fc809ada71c087cec7e2d2244bcb9fba137638978a669f2aaf6267db43e89fdf
 => [internal] load build context
 => => transferring context: 563B
 => CACHED [2/4] WORKDIR /jobportalapp
 => [3/4] COPY . .
 => [4/4] RUN pip install -r requirements.txt
 => exporting to image
 => => exporting layers
 => => writing image sha256:27af2017b3cf89729aec86cacb28670ac6ff02b4180ca2dc205d4bc29b9fc210
 => => naming to docker.io/library/jobportalapp

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

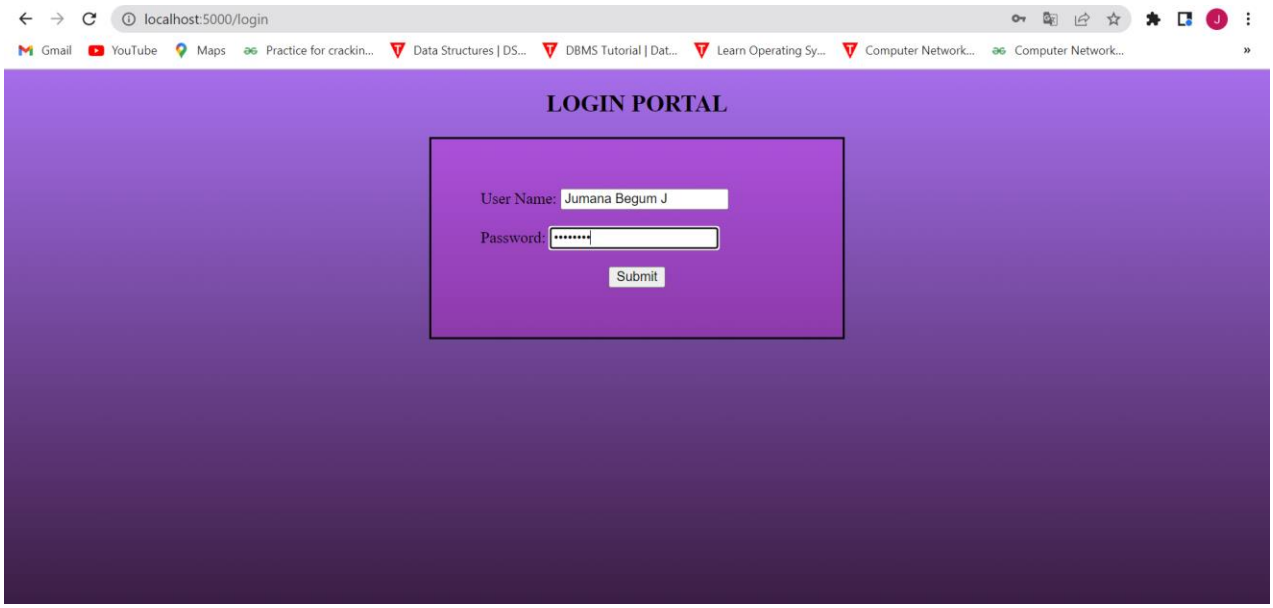


Run the image:

```
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\GCS\ibm\jobportalapp> docker run -p 5000:5000 jobportalapp
 * Serving Flask app 'app'
 * Debug mode: off
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://127.0.0.1:5000
 * Running on http://172.17.0.2:5000
Press CTRL+C to quit
172.17.0.1 - - [07/Nov/2022 13:42:45] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [07/Nov/2022 13:42:45] "GET /static/styles.css HTTP/1.1" 200 -
172.17.0.1 - - [07/Nov/2022 13:42:46] "GET /favicon.ico HTTP/1.1" 404 -
```

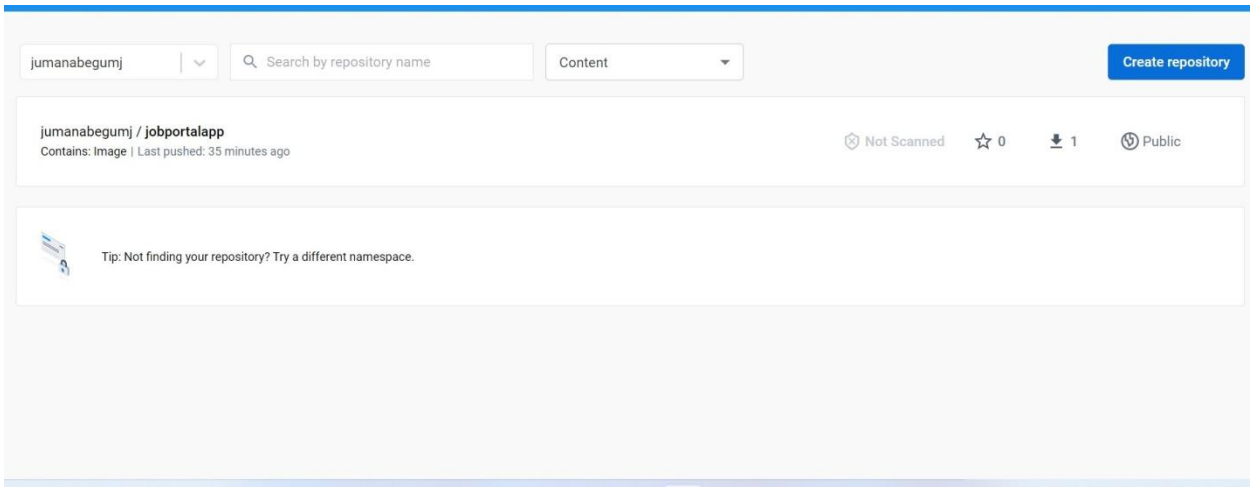

Containers
Images
Volumes
Dev Environments BETA
Extensions BETA
Add Extensions
Containers
Give feedback
A container packages up code and its dependencies so the application runs quickly and reliably from one computing environment to another. Learn more
Only show running containers
Search
NAME
IMAGE
STATUS
PORT(S)
STARTED
ACTIONS
peaceful_ptolemy
4a3f5e37d6ae
jobportalapp:latest
Running
5000:5000
3 minutes ago


Register Page
localhost:5000
Gmail
YouTube
Maps
Practice for crackin...
Data Structures | DS...
DBMS Tutorial | Dat...
Learn Operating Sy...
Computer Network...
Computer Network...
REGISTRATION PORTAL
Email ID: begumjumana2712@gmail.
User Name: Jumana Begum J
Password:
Roll Number: 2019103022
Submit
LOGIN



Authentication Successful

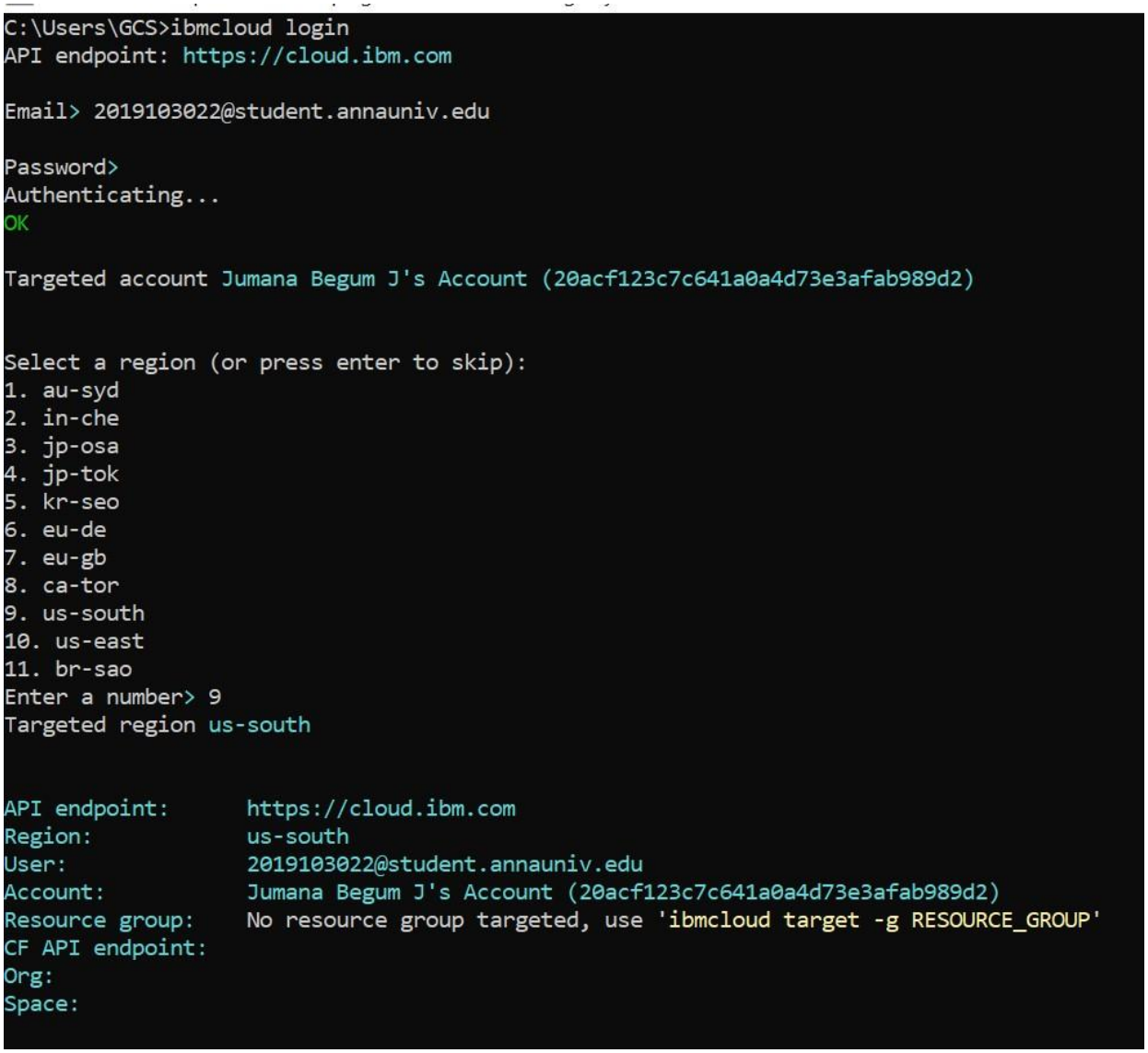
```
PS C:\Users\GCS\ibm\jobportalapp> docker push jumanabegumj/jobportalapp
Using default tag: latest
The push refers to repository [docker.io/jumanabegumj/jobportalapp]
An image does not exist locally with the tag: jumanabegumj/jobportalapp
PS C:\Users\GCS\ibm\jobportalapp>
 *  History restored

Windows PowerShell
4dc7bb0417b9: Pushed
44fc8fdbf057: Pushed
1af3c9e07cc8: Pushed
6f6e69c2c592: Mounted from library/python
53b8bfee7a0a: Mounted from library/python
5b3f1ed98915: Mounted from library/python
6b183c62e3d7: Mounted from library/python
882fd36bfd35: Mounted from library/python
d1dec9917839: Mounted from library/python
d38adf39e1dd: Mounted from library/python
4ed121b04368: Mounted from library/python
d9d07d703dd5: Mounted from library/python
latest: digest: sha256:757e93556ceb70add341df5dc38f5e78857577d8c209e9dd2200d1f0fbdf769f size: 2847
```



Question-3

Create an IBM container registry and deploy helloworld or jobportal app

Log into ibm cloud using ibm cloud CLI



Install the container-registry plugin and set region

```
C:\Users\GCS>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 [============================================================
12476416 bytes downloaded
Installing binary...
OK
Plug-in 'container-registry 1.0.2' was successfully installed into C:\Users\GCS
ts details.

C:\Users\GCS>ibmcloud cr region-set us-south
The region is set to 'us-south', the registry is 'us.icr.io'.

OK

C:\Users\GCS>
```

Add a namespace

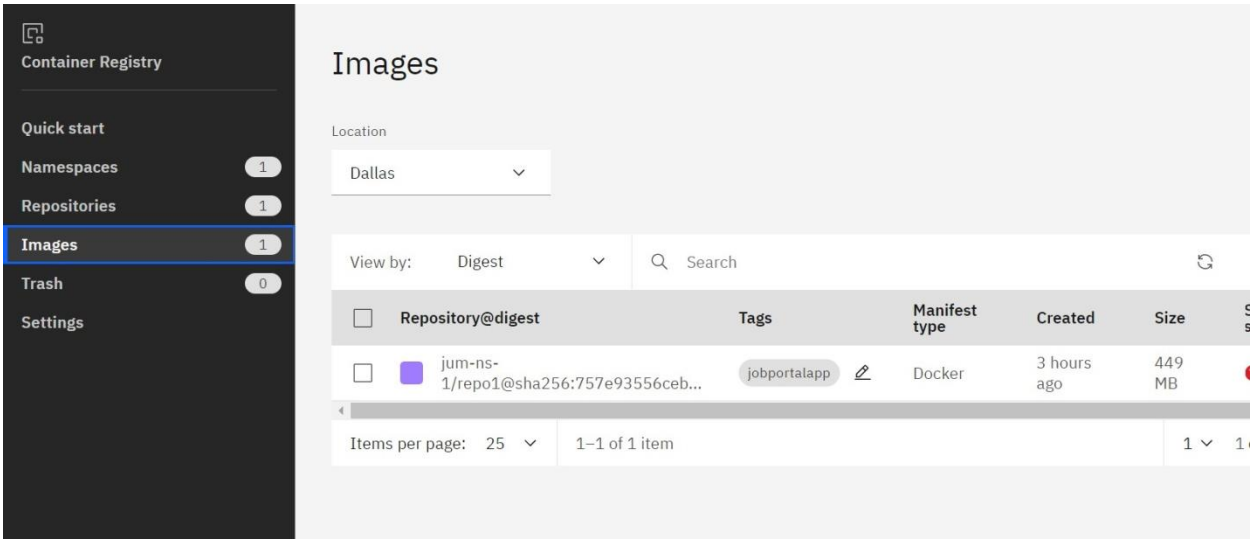
```
C:\Users\GCS>ibmcloud cr namespace-add jum-ns-1
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.

Adding namespace 'jum-ns-1' in resource group 'Default' for account Jumana Begum J's Account in registry us.icr.io...

Successfully added namespace 'jum-ns-1'

OK

C:\Users\GCS>ibmcloud cr namespace-list
Listing namespaces for account 'Jumana Begum J's Account' in registry 'us.icr.io'...

Namespace
jum-ns-1

OK

C:\Users\GCS>
```

Log the local docker daemon into IBM cloud container registry and give repository name and tag

```
C:\Users\GCS>ibmcloud cr login
Logging 'docker' in to 'us.icr.io'...
Logged in to 'us.icr.io'.

OK

C:\Users\GCS>docker images
REPOSITORY                        TAG       IMAGE ID       CREATED             SIZE
jumanabegumj/jobportalapp         latest    277a934ed29e   About an hour ago   1.12GB
jobportalapp                      latest    eafcf73ce6c5   3 hours ago         1.12GB
jumanabegumj/jobportalapp         <none>    eafcf73ce6c5   3 hours ago         1.12GB
jumanabegumj/docker101tutorial    latest    fbda065df936   22 hours ago        28.9MB
docker101tutorial                 latest    fbda065df936   22 hours ago        28.9MB
alpine/git                        latest    42a1cda0ba24   2 weeks ago         43.6MB

C:\Users\GCS>docker tag jobportalapp us.icr.io/jum-ns-1/repo1:jobportalapp

C:\Users\GCS>docker images
REPOSITORY                        TAG            IMAGE ID       CREATED             SIZE
jumanabegumj/jobportalapp         latest         277a934ed29e   About an hour ago   1.12GB
jobportalapp                      latest         eafcf73ce6c5   3 hours ago         1.12GB
us.icr.io/jum-ns-1/repo1          jobportalapp   eafcf73ce6c5   3 hours ago         1.12GB
jumanabegumj/jobportalapp         <none>         eafcf73ce6c5   3 hours ago         1.12GB
jumanabegumj/docker101tutorial    latest         fbda065df936   22 hours ago        28.9MB
docker101tutorial                 latest         fbda065df936   22 hours ago        28.9MB
alpine/git                        latest         42a1cda0ba24   2 weeks ago         43.6MB
```

Push the image and check if it is available in the container registry's images list

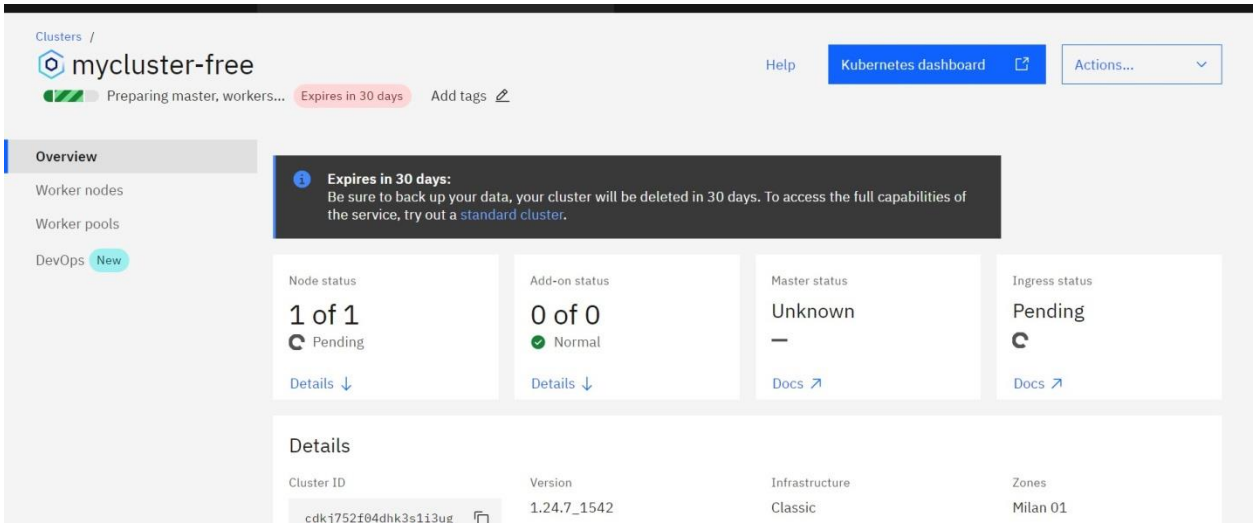
```
C:\Users\GCS>docker push us.icr.io/jum-ns-1/repo1:jobportalapp
The push refers to repository [us.icr.io/jum-ns-1/repo1]
4dc7bb0417b9: Pushed
44fc8fdbf057: Layer already exists
1af3c9e07cc8: Layer already exists
6f6e69c2c592: Layer already exists
53b8bfee7a0a: Layer already exists
5b3f1ed98915: Layer already exists
6b183c62e3d7: Layer already exists
882fd36bfd35: Layer already exists
d1dec9917839: Layer already exists
d38adf39e1dd: Pushed
4ed121b04368: Layer already exists
d9d07d703dd5: Layer already exists
jobportalapp: digest: sha256:757e93556ceb70add341df5dc38f5e78857577d8c209e9dd2200d1f0fbdf769f size: 2847

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

Repository                Tag           Digest         Namespace   Created       Size     Security status
us.icr.io/jum-ns-1/repo1  jobportalapp  757e93556ceb   jum-ns-1    3 hours ago   449 MB   -

OK

C:\Users\GCS>
```

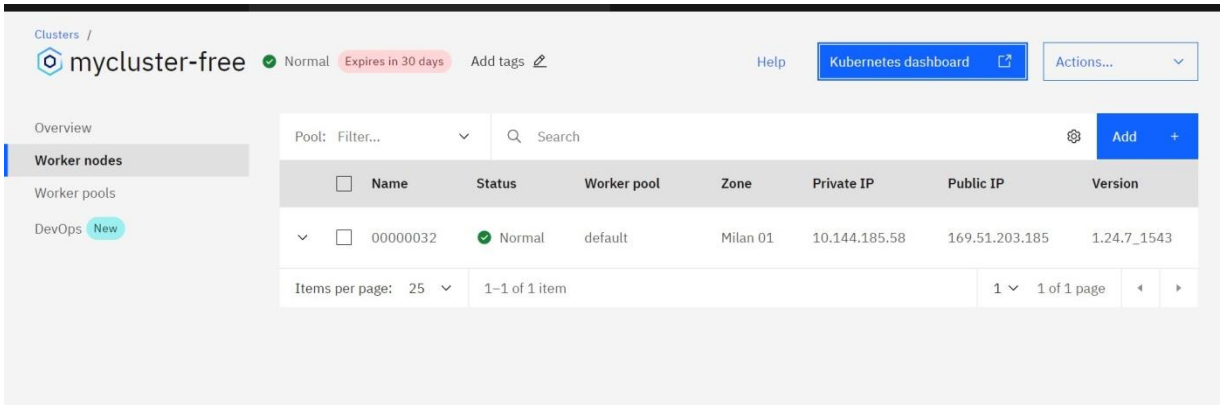

Container Registry
Quick start
Namespaces 1
Repositories 1
Images 1
Trash 0
Settings
Images
Location
Dallas
View by: Digest
Search
Repository@digest
Tags
Manifest type
Created
Size
jum-ns-1/repo1@sha256:757e93556ceb...
jobportalapp
Docker
3 hours ago
449 MB
Items per page: 25
1–1 of 1 item
1

Question-4

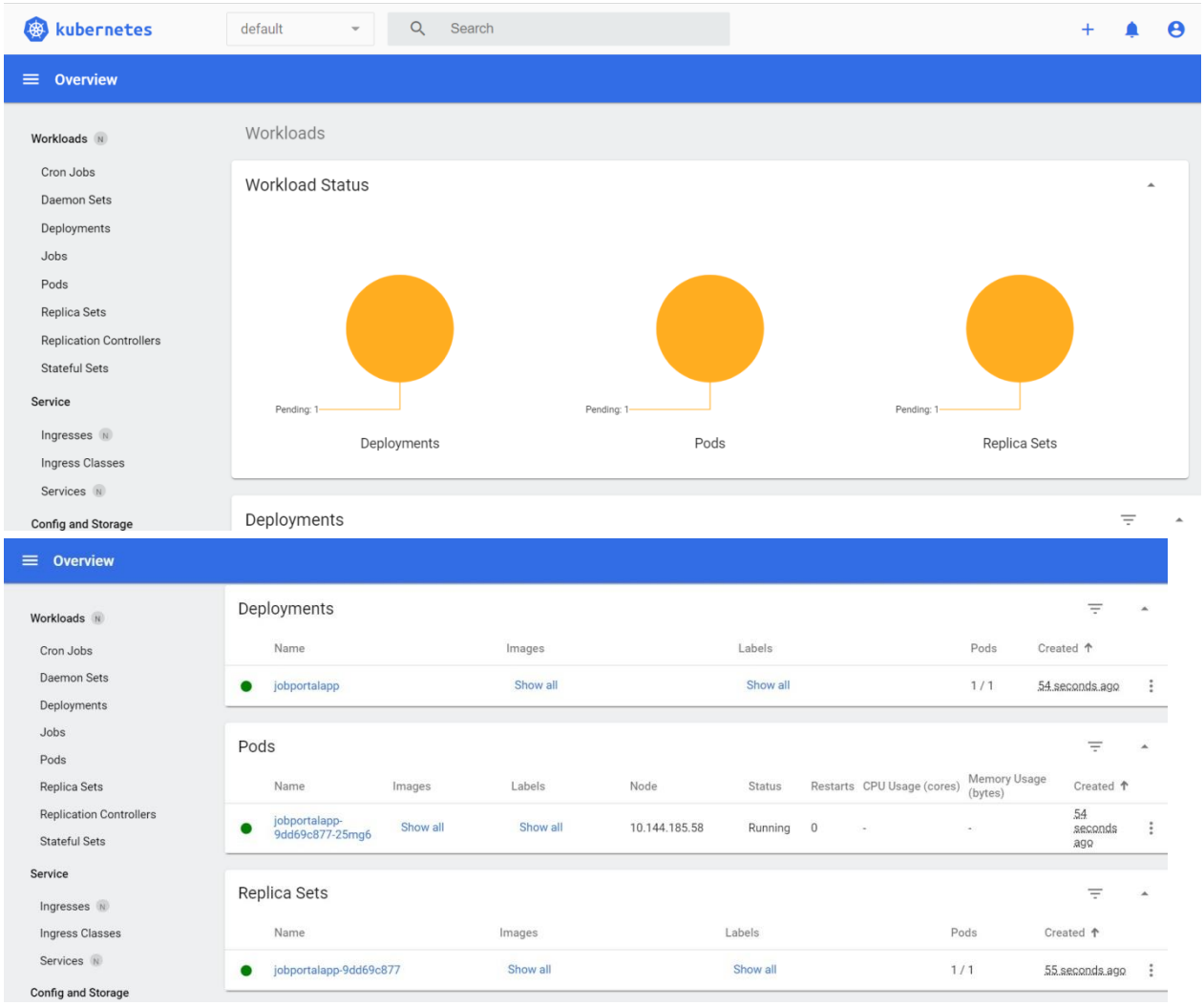
Create a Kubernetes cluster in IBM cloud and deploy helloworld or jobportal image and also expose the same app to run on nodeport

Create a new cluster





Access the Kubernetes dashboard and deploy the application image



In services tab edit the YAML file of the jobportal application

Edit a resource

YAML JSON

```
spec:
  ports:
    - name: tcp-5000-488-ct4tf
      protocol: TCP
      port: 5000
      targetPort: 5000
      nodePort: 32576
  selector:
    k8s-app: jobportalapp
  clusterIP: 172.21.63.60
  clusterIPs:
    - 172.21.63.60
  type: NodePort
  sessionAffinity: None
  externalTrafficPolicy: Cluster
  ipFamilies:
    - IPv4
  ipFamilyPolicy: SingleStack
  allocateLoadBalancerNodePorts: true
  internalTrafficPolicy: Cluster
status:
  loadBalancer: {}
```

Update Cancel

OUTPUT:

DEPLOYED IP address: http://169.51.203.185:32576/